NOISE AND VIBRATION IMPACT ASSESSMENT ADDENDUM FOR THE VALLEY HIGHWAY EIS DENVER, COLORADO

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1.0 INTRODUCTION

The Colorado Department of Transportation (CDOT) is evaluating alternative improvements to Interstate 25 (I-25) in central Denver through the Valley Highway Environmental Impact Statement (EIS). The general region covered in the EIS is I-25 from Logan Street to 6th Avenue and 6th Avenue from I-25 to Federal Boulevard (see **Figure 1-1**). This portion of I-25 and its supporting street connections have become out of date, underserving the traffic demand placed on them, and will soon be surrounded by lengths of I-25 that have been improved to accommodate greater traffic capacities.

Previously in the project, the Draft EIS examined three System Alternatives along with the No Action Alternative. These study results were discussed in the Draft EIS (CDOT and FHWA, 2005). From the Draft EIS, a Preferred Alternative was developed that included elements of each of the three System Alternatives.

CDOT Project IM 0252-315 (12194) is examining through the Final EIS (FEIS) the Preferred Alternative that would modernize this stretch of I-25 through reconfigured interchanges and a highway profile consistent with the other improved I-25 sections abutting the project corridor. The analysis was performed for the FEIS to assess potential impacts from noise and vibration from the Preferred Alternative. This document is an addendum to the previous noise and vibration analysis report (FHU, 2005).

1.1 Preferred Alternative

The Preferred Alternative involves a number of proposed changes to this transportation corridor. Some of the changes are common to all the prior System Alternatives, while other changes were unique from a single System Alternative. The primary changes from existing conditions are described below.

With the Preferred Alternative, the number of continuous through lanes in each direction on I-25 increases from three lanes to four. Sixth Avenue from I-25 to Federal Boulevard will be reconfigured and widened. The I-25 interchanges at Broadway, Santa Fe Drive and Alameda Avenue, along with 6th Avenue at Federal Boulevard and Bryant Street, will be redesigned along with the connecting surface streets. The I-25 interchange at Broadway will be from System Alternative 3. The I-25 interchanges at both Santa Fe Drive and Alameda Avenue will be from System Alternative 1. The intersections of both Santa Fe Drive and Kalamath Street with Alameda Avenue would be from System Alternative 1. On 6th Avenue, the interchange at Federal Boulevard will be from System Alternative 2 and the Bryant Street ramps will be reduced. In addition, the Consolidated Mainline (CML) railroad corridor east of I-25 will be shifted to accommodate the changes. Santa Fe Drive and Kalamath Street would be grade-separated from the CML. More details on the specific roadway changes are provided in the Final EIS (CDOT and FHWA, 2006). The noise-sensitive areas near the project area are shown in **Figure 1-2**.

The Preferred Alternative is expected to be funded and constructed in phases (see **Section 4**). Phase 1 would be the first phase constructed and is currently the only phase funded.

Figure 1-1 Valley Highway EIS Project Area Map

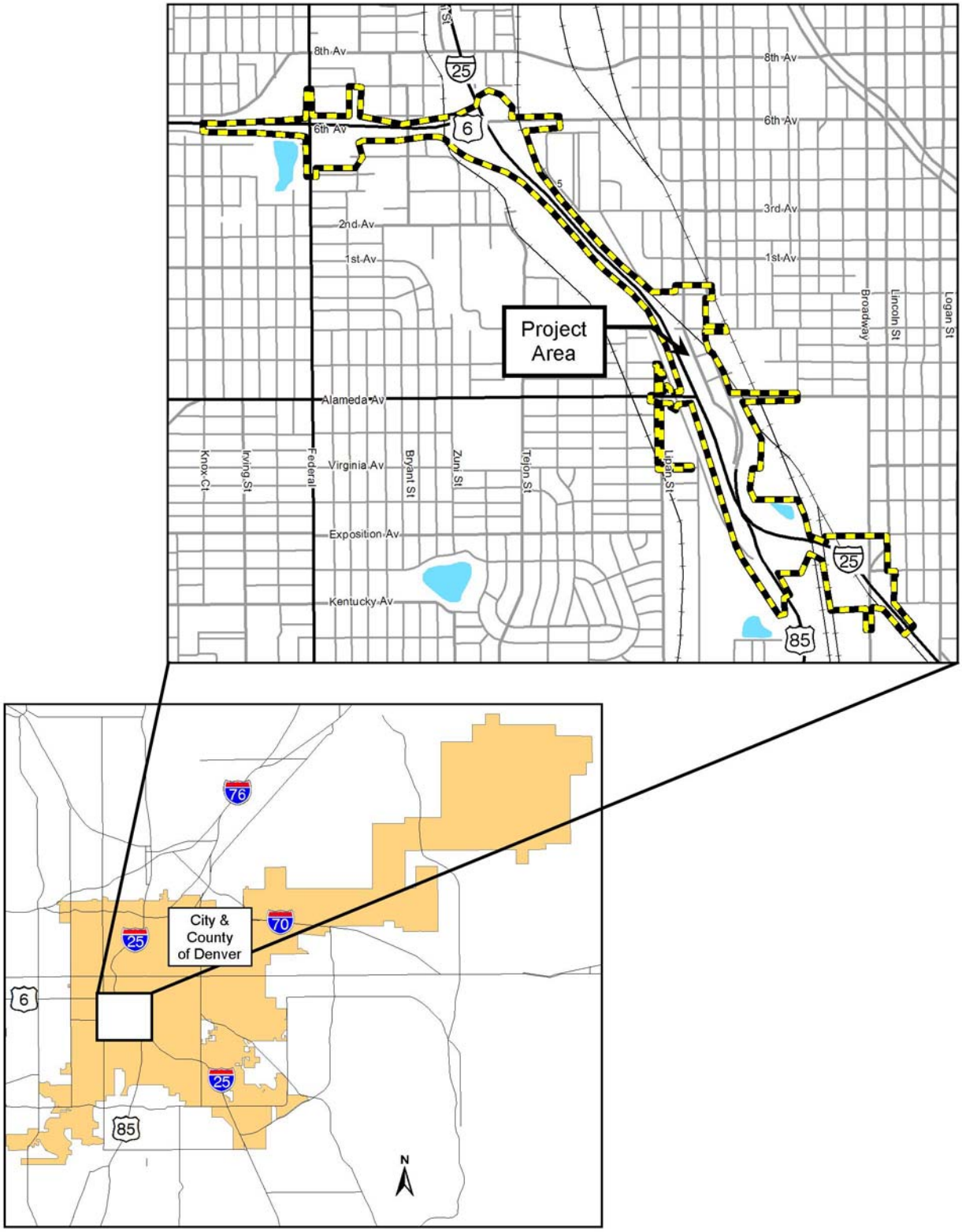
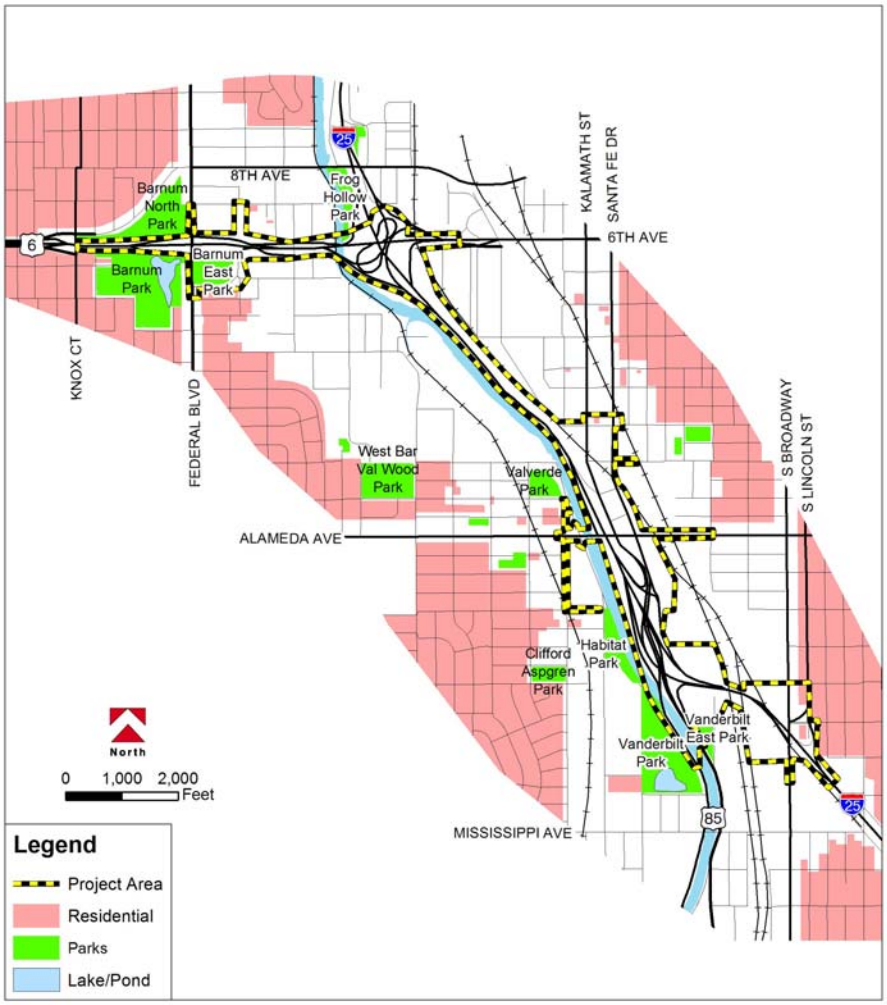


Figure 1-2 Noise Sensitive Areas Along Project Corridor



1.2 Preferred Alternative Phase 1

In total, the proposed changes contained within the Preferred Alternative represent a large construction project. It would take several years to construct the entire Preferred Alternative. At present, CDOT does not have sufficient construction budget for the entire Preferred Alternative. It is uncertain when and in what amounts future funds will become available for the Preferred Alternative. Therefore, the Preferred Alternative has been divided into six separate construction phases to accommodate the uncertainties in funding and construction scheduling. Each phase could be constructed as a stand-alone action, if necessary. Phase 1 of the Preferred Alternative is in the process of being added to the fiscally–constrained Regional Transportation Plan (RTP) and will be the first improvements to be completed. The remaining phases, through Phase 6, will be completed as funding and scheduling permit. Details of the phases are provided in the Final EIS (CDOT and FHWA, 2006) and **Section 4**.

It is possible that there could be a delay between completion of Phase 1 and initiation of any/all other phases of the Preferred Alternative. This could leave the finished Phase 1 conditions in place for a period of time. The finished Phase 1 conditions would be neither existing conditions nor the full Preferred Alternative. For this reason, the finished Phase 1 conditions were also evaluated for environmental impacts to assess whether this interim condition would have different impacts from the full Preferred Alternative. Therefore, an evaluation of traffic noise impacts from Phase 1 in addition to the Preferred Alternative is provided in **Section 4**.

2.0 NOISE FINDINGS AND RECOMMENDATIONS

Details on the noise analysis procedures were presented in the noise report prepared in support of the Draft EIS (FHU, 2005). In summary, traffic noise impacts were evaluated through a combination of measurements and computer modeling. Impact from traffic noise was assessed on the basis of the predicted noise levels' relationship to CDOT's implementation of the Federal Highway Administration (FHWA) Noise Abatement Criteria (NAC) (see **Table 2-1**) and the magnitude of the predicted traffic noise increase (if any). If a property was predicted to be impacted by traffic noise, noise mitigation measures for the property were evaluated. Train noise was assessed using the Federal Transit Administration (FTA) process. FTA uses several noise metrics for assessing noise impacts, but for this analysis the one-hour equivalent noise level (L_{eq}) was used.

Table 2-1 Noise Abatement Criteria

Land Use Category	FHWA NAC (L_{eq})	CDOT NAC (L_{eq})	Description of Land Use Category
A	57 dBA exterior	56 dBA exterior	Tracts of land in which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is to continue to serve its intended purpose. Such areas could include amphitheaters, particular parks, or open spaces which are recognized by appropriate local officials for activities requiring special qualities of serenity and quiet.
B	67 dBA exterior	66 dBA Exterior	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, picnic areas, playgrounds, active sports areas, and parks.
C	72 dBA Exterior	71 dBA Exterior	Developed lands, properties or activities not included in categories A and B above.
D	—	—	Undeveloped lands.
E	52 dBA Interior	51 dBA Interior	Residences, motels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

2.1 Preferred Alternative Traffic Noise Results

Traffic noise model runs were made for I-25 and the other major project streets using 2025 traffic volumes and road layouts using the same procedures as for the System Alternatives (FHU, 2005). Results for the model noise receivers are presented in **Table 2-2**. Locations of the model receivers are shown in Appendix B. The model noise contour results are presented in **Figure 2-1**.

From field observations and modeling, local traffic noise generally is louder than highway traffic noise for residences that are more than about 300 feet from I-25 or 6th Avenue. Local traffic is more intermittent, but is closer and louder.

The major transportation corridors in all of the project scenarios are essentially in the same places with relatively minor (in noise terms) profile differences between them. Therefore, noise levels predicted for the Preferred Alternative are similar to existing conditions, future no action, and the system alternatives (see **Table 2-2**). However, some details and refinements were added to the Preferred Alternative model relative to the others due to design changes, so in

some cases, the noise level for a location in the Preferred Alternative may have a different impact outcome than other alternatives (see **Table 2-3**).

Table 2-2 Noise Model Receiver Results

Receiver	Predicted Noise Level (dBA)						Land Use[1]
	Existing	2025 No Action	2025 System 1	2025 System 2	2025 System 3	2025 Preferred Alt.	
C1	72	72	73	73	73	71	Com.—1500 W. 3rd
C2	71	71	72	72	72	70	Com.—1500 W. 2nd
C3	71	71	72	72	72	70	Com.—1400 W. 2nd
C4	71	71	72	72	72	70	Com.—1400 W. 1st
C5	71	71	72	72	72	70	Com.—1400 W. 1st
C6	72	72	73	73	73	70	Com.—1100 W. Ellsworth
C7	71	71	NA[2]	71	71	NA[2]	Com.—1100 W. Ellsworth
C8	71	72	NA[2]	74	70	NA[2]	Com.—100 S. Kalamath
C9	71	72	72	70	69	71	Com.—250 S. Kalamath
C10	72	73	73	71	71	72	Com.—250 S. Kalamath
C11	70	72	72	70	70	71	Com.—300 S. Kalamath
C12	70	71	72	73	72	73	Com.—300 W. Center
C13	70	71	73	73	73	74	Com.—300 W. Center
C14	67	68	71	72	71	72	Com.—300 W. Exposition
C15	74	76	76	76	76	76	Com.—2400 W. 6th
C16	70	72	72	72	72	70	Com.—2400 W. 6th
C17	71	73	74	73	73	72	Com.—900 S. Broadway
C18	73	74	75	74	74	72	Com.—900 S. Lincoln
C19	72	74	77	75	75	74	Com.—900 S. Sherman
C20	71	73	75	74	74	72	Com.—900 S. Grant
C21	69	70	73	71	71	69	Com.—1000 S. Grant
P1	69	70	70	70	68	69	Park—Vanderbilt
P2	64	65	65	65	64	64	Park—Vanderbilt
P3	65	66	66	66	66	63	Park—Vanderbilt
P4	70	71	71	71	71	69	Park—Vanderbilt
P5	65	66	67	67	67	66	Park—Habitat
P6	63	63	62	62	62	61	Park—Habitat
P7	65	65	66	66	66	66	Park—Habitat
P8	68	69	69	69	69	70	Park—Valverde
P9	64	64	65	65	65	65	Park—Valverde
P10	69	69	69	69	69	71	Trail—Platte Bike Path
P11	77	77	75	75	75	77	Trail—Platte Bike Path
P12	70	72	72	72	72	67	Park—Frog Hollow
P13	72	73	73	73	73	71	Trail—Platte/Milstein Grove
P14	65	66	66	67	66	65	Park—Barnum East
P15	66	67	68	64	64	65	Res.—2900 block W. Short
P16	69	70	71	71	71	69	Park—Barnum
P20	66	68	68	68	68	67	Park—Barnum North
P21	65	66	67	67	67	66	Park—Vanderbilt East

Table 2-2 Noise Model Receiver Results *(continued)*

Receiver	Predicted Noise Level (dBA)						Land Use[1]
	Existing	2025 No Action	2025 System 1	2025 System 2	2025 System 3	2025 Preferred Alt.	
P22	66	67	67	67	67	65	Trail—Platte/Milstein Grove
R1	69	70	71	71	67	66	Res.—700 block S. Lincoln
R2	69	70	71	71	69	69	Res.—700 block S. Lincoln
R3	69	70	70	70	70	69	Res.—700 block S. Lincoln
R4	68	68	70	68	68	67	Res.—800 block S. Sherman
R5	63	64	66	64	64	64	Res.—800 block S. Sherman
R6	64	65	67	65	65	64	Res.—800 block S. Sherman
R7	60	61	62	61	61	59	Res.—800 block S. Sherman
R8	71	72	72	72	71	71	Res.—700 block S. Lincoln
R9	66	68	68	68	68	66	Res.—3300 block W. 5th
R10	65	67	67	67	67	64	Res.—3300 block W. 5th
R11	65	66	66	66	66	63	Res.—3300 block W. 5th
R12	58	59	61	59	59	59	Res.—800 block S. Sherman
R13	67	68	67	67	68	64	Res.—900 block W. Ellsworth
R14	68	69	69	71	68	67	Res.—900 block W. Byers
R15	68	68	68	68	68	68	Church—400 S. Platte River
RB1	67	68	72	NA[2]	NA[2]	NA[2]	Res.—800 block S. Lincoln
RB2	66	67	71	NA[2]	72	71	Res.—800 block S. Lincoln
RB3	65	66	70	NA[2]	73	72	Res.—800 block S. Lincoln
RB4	65	66	68	NA[2]	70	69	Res.—800 block S. Lincoln
RB5	67	68	69	NA[2]	71	70	Res.—800 block S. Lincoln
RB6	67	69	75	NA[2]	NA[2]	NA[2]	Res.—800 block S. Lincoln
RF1	65	66	69	NA[2]	NA[2]	NA[2]	Res.—800 block S. Lincoln
RF2	65	67	68	NA[2]	66	NA[3]	Res.—800 block S. Lincoln
RF3	65	67	68	NA[2]	65	NA[3]	Res.—800 block S. Lincoln
RF4	66	67	68	NA[2]	64	NA[3]	Res.—800 block S. Lincoln
RF5	67	69	68	NA[2]	64	NA[3]	Res.—800 block S. Lincoln
RF6	65	67	70	NA[2]	NA[2]	NA[2]	Res.—800 block S. Lincoln
FEIS57	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	69	Com.—700 S. Broadway
FEIS58	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	69	Com.—700 S. Broadway
FEIS59	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	71	Com.—800 S. Broadway
FEIS60	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	60	Com.—800 S. Broadway
FEIS61	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	59	Com.—700 S. Cherokee
FEIS62	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	64	Com.—700 S. Santa Fe
FEIS63	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	64	Com.—500 S. Santa Fe
FEIS64	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	67	Com.—700 S. Huron
FEIS65	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	68	Com.—500 S. Jason
FEIS66	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	67	Com.—300 S. Platte River
FEIS67	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	70	Com.—300 S. Santa Fe
FEIS68	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	74	Com.—300 S. Santa Fe
FEIS69	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	71	Com.—300 S. Santa Fe
FEIS70	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	68	Com.—200 S. Lipan
FEIS71	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	69	Com.—00 Raritan
FEIS72	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	69	Com.—00 Rio Grande

Table 2-2 Noise Model Receiver Results *(continued)*

Receiver	Predicted Noise Level (dBA)						Land Use[1]
	Existing	2025 No Action	2025 System 1	2025 System 2	2025 System 3	2025 Preferred Alt.	
FEIS73	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	69	Com.—00 Rio Grande
FEIS74	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	68	Com.—00 Rio Grande
FEIS75	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	71	Com.—2000 W. 3rd
FEIS76	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	65	Com.—400 Raritan
FEIS77	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	58	Trail—Platte Bike Path
FEIS78	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	57	Com.—1900 W. 6th
FEIS79	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	63	Com.—2000 W. 6th
FEIS80	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	51	Com.—2500 W. 6th
FEIS81	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	53	Res.—600 block Federal
FEIS82	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	64	Res.—600 block Canosa Ct.
FEIS83	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	70	Com.—2600 W. 6th
FEIS84	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	63	Com.—2500 W. 6th
FEIS85	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	67	Com.—2700 W. 6th
FEIS86	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	61	Res.—2800 block W. Short
FEIS87	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	63	Park—Barnum
FEIS88	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	63	Res.—3200 block W. 6th
FEIS89	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	61	Res.—600 block Knox Ct.
FEIS90	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	68	Com.—500 Knox Ct.

[1] Com. = commercial; Res.=residential
[2] Receiver removed by alternative
[3] Properties were modeled by receivers RB2-RB5
[4] Receiver was not analyzed for Draft EIS
NA = Not Analyzed

Several residential areas have subareas that are predicted to exceed the Category B NAC (see **Table 2-2**). The areas include:

- Three homes on the 800 block of S. Sherman Street
- Homes on the 500 to 800 blocks of S. Lincoln Street
- 900 block of W. Ellsworth Avenue (from local truck traffic, not I-25)
- 900 block of W. Byers Place
- One home on the 3300 block of W. 5th Avenue

An existing noise barrier at the 800 block of S. Sherman Street has recently been improved as part of the separate T-REX project.

It was estimated from the model results that 55 residences within the Study Area would be at or above the CDOT NAC. Of these, 44 homes were either on S. Lincoln Street north of Ohio Avenue or on S. Sherman Street behind the improved noise barrier. Essentially all of the residential lots on S. Lincoln Street in the Study Area were predicted to exceed the NAC. However, the NAC exceedences on S. Lincoln Street north of Ohio Avenue were due to vehicles on Lincoln Street, not I-25. The Ellsworth Avenue and Byers Place residences are isolated homes in otherwise commercial areas.

Figure 2-1 Preferred Alternative Model Noise Contours

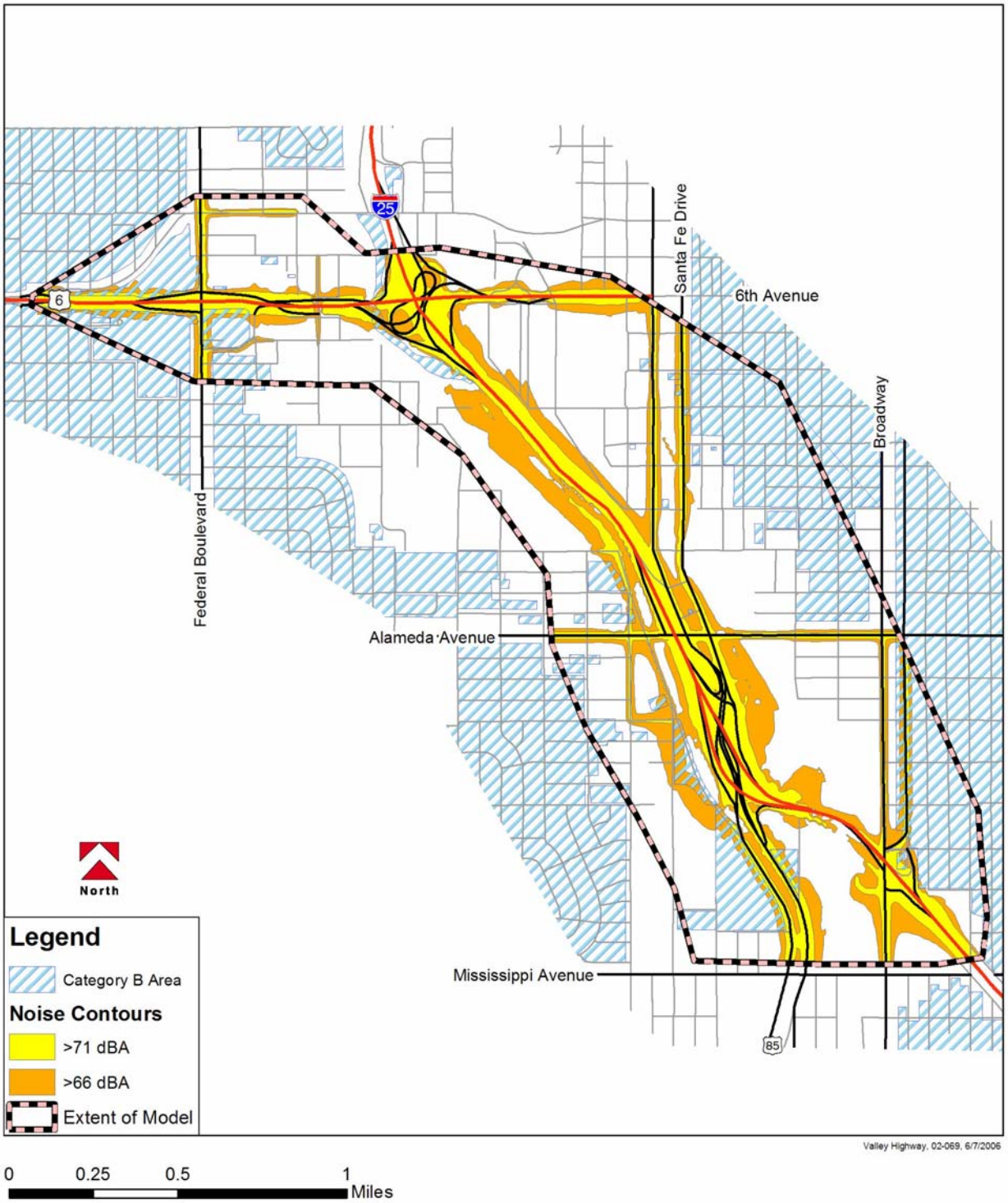


Figure 2-2 Preferred Alternative Noise Impacted Areas

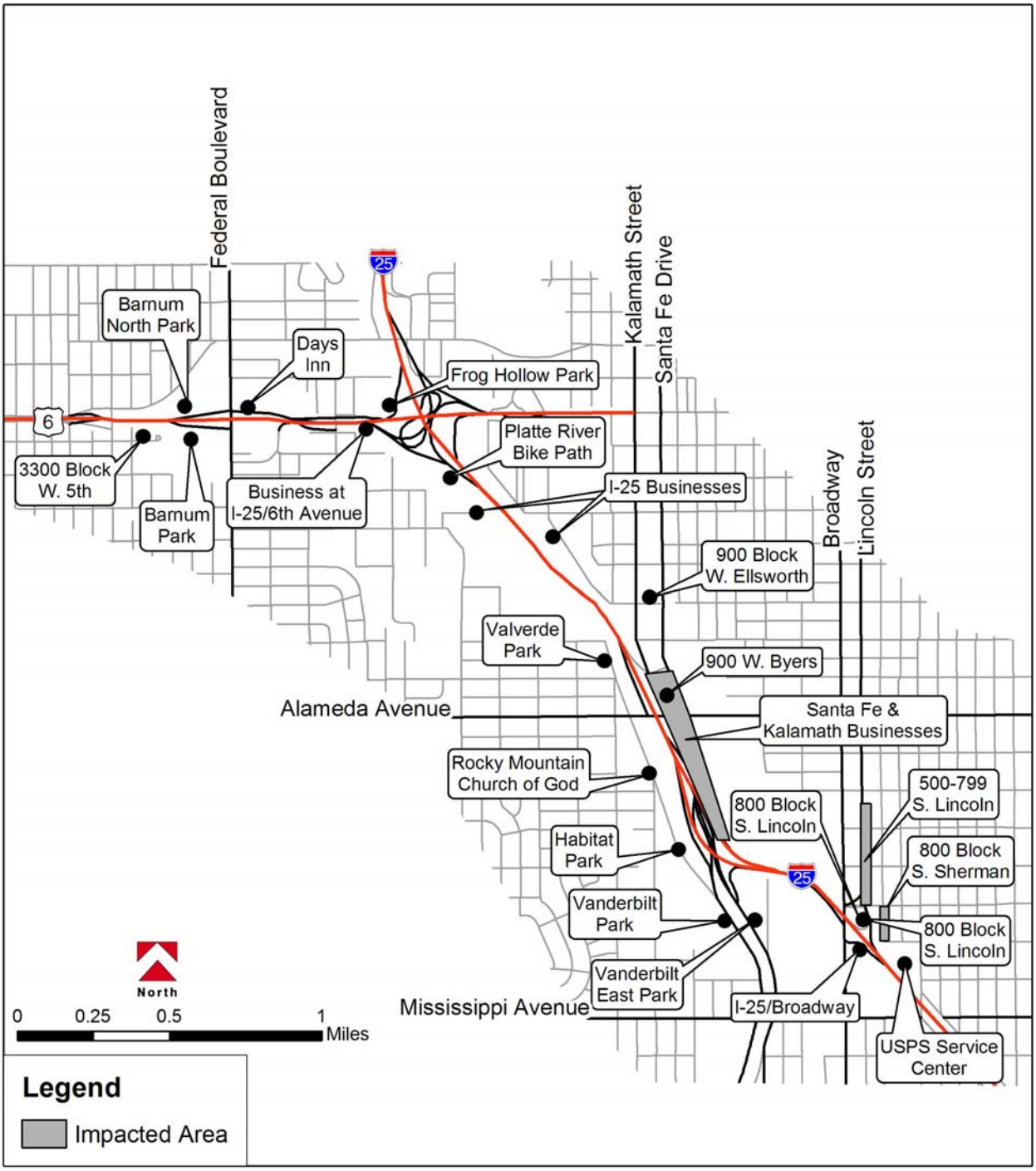


Table 2-3 Noise Impact Summary

Location	Land Type	Number of Noise-Impacted Properties (without mitigation)					
		Existing Conditions	No Action	System 1	System 2	System 3	Preferred Alternative
Category B							
800 block S. Sherman Street	Residential	3	4	4	4	4	3
800 block S. Lincoln Street	Residential	9	9	9	0	6	6
500-799 S. Lincoln Street	Residential	41	41	41	41	41	41
900 block W. Ellsworth Avenue	Residential	3	3	3	3	3	3
2900 block W. Short Place	Residential	5	5	5	0	0	0
3300 block W. 5th Avenue	Residential	3	3	3	3	3	1
900 block Byers Place	Residential	1	1	1	1	1	1
Barnum Park	Park	1	1	1	1	1	1
Barnum East Park	Park	1	1	1	1	1	0*
Barnum North Park	Park	1	1	1	1	1	1
Frog Hollow Park	Park	1	1	1	1	1	1
Valverde Park	Park	1	1	1	1	1	1
Habitat Park	Park	1	1	1	1	1	1
Vanderbilt Park	Park	1	1	1	1	1	1
Vanderbilt East Park	Park	1	1	1	1	1	1
South Platte River bike path	Park	1	1	1	1	1	1
Motel 5	Motel	1	1	0	0	0	0
Days Inn	Motel	1	1	1	1	1	1
Rocky Mountain Church of God	Church	1	1	1	1	1	1
Category C							
6th Avenue	Commercial	1	2	2	2	2	1
I-25	Commercial	7	7	7	5	5	2
Post Office Service Center	Commercial	1	1	1	1	1	1
I-25/Broadway	Commercial	2	2	2	2	2	3
Santa Fe Drive/ Kalamath Street	Commercial	37	44	42	27	28	35

*braided ramp provides noise shielding from US 6

Portions of the following parks are estimated to have traffic noise levels above the CDOT NAC for Category B:

- Vanderbilt East Park
- Vanderbilt Park
- Habitat Park
- Valverde Park
- South Platte River bike path (treated as a park for this evaluation)
- Frog Hollow Park
- Barnum Park
- Barnum North Park

Noise levels are also estimated to exceed the CDOT Category B NAC at:

- Days Inn Motel (620 Federal Boulevard)
- Rocky Mountain Church of God (455 S. Platte River Drive)

However, neither of these two properties have exterior facilities (e.g., swimming pools) in the impacted areas, so the Category E NAC is more relevant. Standard building construction should be sufficient to reduce interior noise levels to meet Category E NAC criteria, provided windows are not open.

Finally, there are several commercial properties with portions estimated to reach or exceed the Category C NAC:

- A business near the I-25/US 6 interchange
- Two businesses along I-25 between 4th Avenue and Virginia Avenue
- The U.S. Postal Service vehicle maintenance facility
- Three businesses near the I-25/Broadway interchange
- Several businesses along Santa Fe Drive/Kalamath Street near I-25

These results are regarded as being less of a concern than the Category B results because Category C properties are less noise sensitive.

2.2 Railroad Noise Results

Currently, there are at-grade crossings of the CML rails at both Santa Fe Drive and Kalamath Street. Locomotives must sound their horn when passing through the crossings. The Preferred Alternative would grade-separate these crossings and thereby eliminate the need for locomotive horns and reduce noise. The Preferred Alternative would relocate the rails approximately 50 feet to the east at two locations: 4th Avenue and Ellsworth Avenue. This relocation will require removal of some commercial buildings and bring the rails closer to some remaining buildings.

Train noise impacts were assessed using the FTA process. Most of the properties adjacent to the railroad in the Study Area are commercial, so the distance from the center of the railroad to

an L_{eq} of 71 dBA was used to assess train noise at commercial properties. This noise level corresponds to the CDOT Category C NAC. The distance to the 71 dBA L_{eq} line was calculated for trains without locomotive horns sounding. Using the FTA tools, the distance to L_{eq} 71 dBA is 50 feet without train horns. Five commercial buildings along the consolidated mainline between Alameda Avenue and 6th Avenue appear to be within 50 feet in the Study Area.

The home nearest the rails is on the 900 block of W. Byers Place at a distance of about 330 feet. The distance from the center of the railroad to an L_{eq} of 66 dBA was used to assess impacts to residential properties. This noise level corresponds to the CDOT Category B NAC. Using the FTA tools, the distance to L_{eq} 66 dBA is 110 feet without train horns. No residences are within this distance of the railroad in the Study Area.

Overall, the changes in train noise due solely to the proposed relocation of the CML rails will be minor because the move is not that great. However, the proposed grade separation would reduce train noise in the larger area by eliminating noise from locomotive horns. The Preferred Alternative would provide a net noise benefit in the larger railroad corridor. No mitigation actions are necessary for railroad noise.

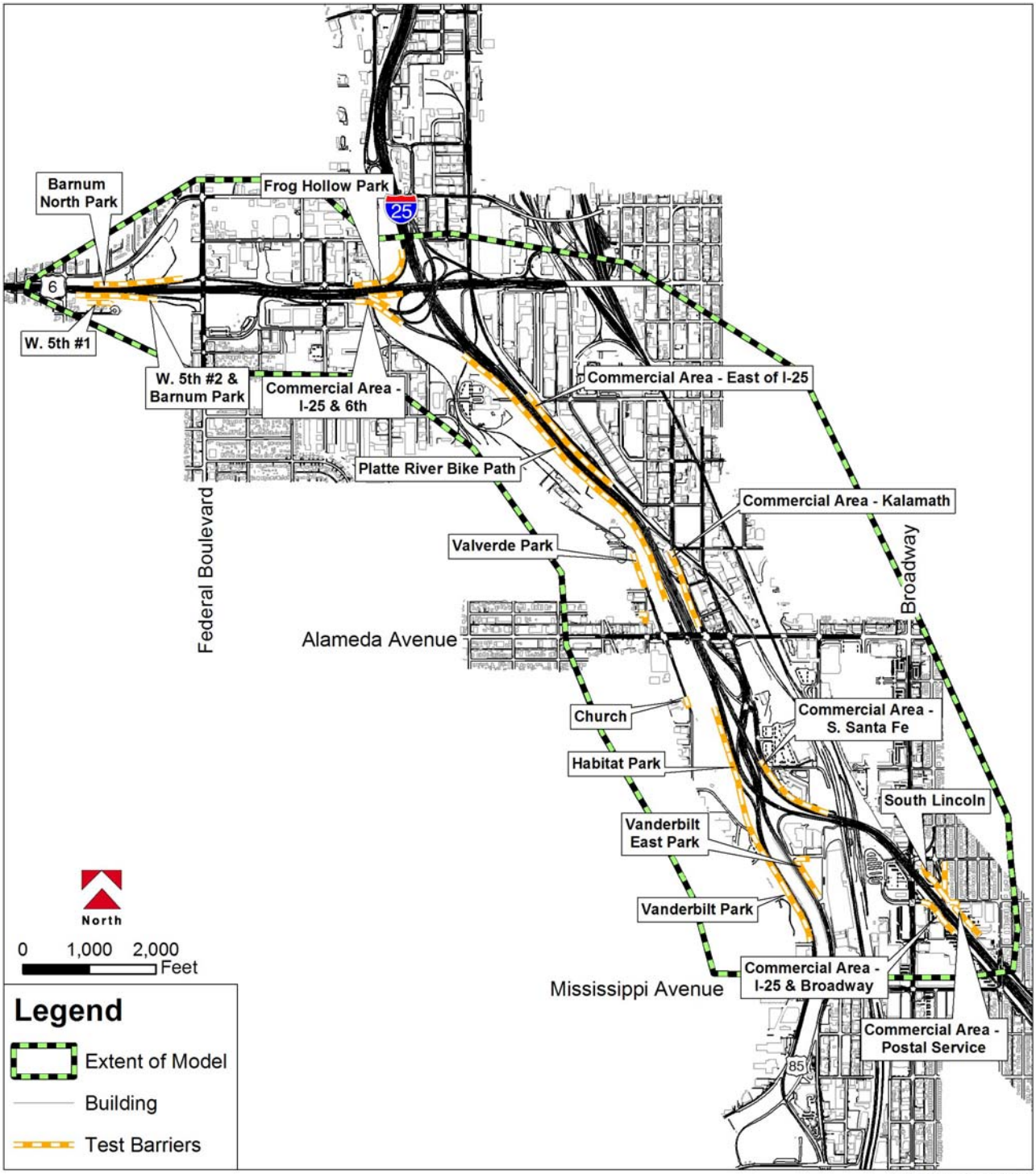
2.3 Mitigation

Noise mitigation evaluations for the project were performed because areas along the project corridor are predicted to be above the applicable CDOT NAC (see **Section 2.1**) under the Preferred Alternative. This includes multiple geographic areas and multiple land uses. The impacted areas are not guaranteed mitigation measures, but mitigation measures had to be evaluated according to CDOT policy. Typically, noise barriers are the mitigation action evaluated but other kinds of mitigation were also considered. For reasons described below, barriers appeared to be the only viable mitigation action and were the only mitigation evaluated in detail. CDOT's goal for noise barriers is a reduction of 10 dBA with a minimum of 5 dBA.

The locations evaluated for barrier placement are shown in **Figure 2-3**. To evaluate mitigation measures, hypothetical barriers protecting each of the impacted areas were added to the Preferred Alternative computer model and the model was re-run to assess barrier effectiveness. After the minimum parameters for an effective barrier were established in a given area for a feasible barrier (if possible), each barrier was assessed for reasonability according to CDOT guidance (see **Appendix A**). The feasibility and reasonableness of each barrier determined which barriers were recommended.

The topography of the project corridor plays a very important role in the overall noise environment. There are some significant topographic changes from I-25 to the adjoining areas throughout the corridor, and this also has a significant impact on the constructability of noise barriers. Barriers can easily be put into a computer model, but actually placing these barriers in the real world may not always be possible. Because of the topographic changes, a model barrier may not be a constant height throughout its length although the top elevation may be constant. These factors contribute to complication of the barrier evaluations. The barrier evaluations for each impacted area discussed in **Section 2.1** are described below.

Figure 2-3 Mitigation Barriers Evaluated



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2.3.1 Non-Barrier Mitigation Evaluation

CDOT guidelines require the evaluation of several non-barrier noise mitigation actions. For a variety of reasons that are described below, none of these actions appear to be viable for the project corridor.

Traffic management measures such as lane closures or reduced speeds do not appear to be reasonable for the roads of primary interest to the project. One of the stated reasons for the proposed improvements to I-25 is to add lanes to be consistent with adjoining sections of I-25, so closing lanes would be counterproductive. I-25 is a major interstate highway, and while reducing vehicle speeds could reduce traffic noise, it is not consistent with the function of an interstate highway. These same concepts apply to US 6 west of I-25. The other ramps and intersections that are included in the project must operate as safely and efficiently as possible in concert with the project highways and connecting city streets, and are relatively minor noise sources in comparison.

Changes in horizontal alignments have limited possibilities in the project corridor. Horizontal alignments are severely constrained by the South Platte River and the complete development of land adjacent to the project highways. Moving the highways horizontally could conceivably reduce noise impacts to the impacted areas but could transfer the impacts to other neighboring areas and require disruptions of adjoining property uses.

Changes in vertical alignments are being considered for some parts of the project corridor. Santa Fe Drive and Kalamath Street are being targeted for grade separation from the railroad, and noise reductions could be realized for both traffic and trains. The Broadway viaduct has just been rebuilt and the viaduct is not being changed under the EIS, so those elevations are fixed. Other parts of the project corridor have fewer possibilities for vertical re-alignment for a number of reasons. Logically, the most beneficial vertical change regarding traffic noise would be to lower the roads into cuts like the nearby I-25 “narrows.” However, much of the corridor involves multi-level interchanges and the various roadbed levels must tie back to the connecting road network in a reasonable manner, which limits opportunities for lowering road elevations. Some of the project corridor has hazardous material, groundwater quality and subsurface utility conflicts if the road elevations are lowered. So, vertical re-alignment of project roads for noise mitigation is problematic in that it could cause other types of environmental impacts while providing a noise benefit. Therefore, horizontal and vertical re-alignments were evaluated under the EIS, but there were few opportunities available solely to reduce traffic noise.

There really is no available undeveloped land along the project highways that could be used for a noise buffer zone or a vegetative planting area that would provide significant noise benefit. None of the privately-owned buildings are calculated to be so severely impacted by traffic noise that noise insulation measures are justified.

Pavement types and surfaces were a discussion topic throughout the EIS. CDOT has committed to considering quieter pavement types for the project corridor when the requirements for safety, durability, etc. are also met. So pavement type may be available to help reduce traffic noise in the corridor. However, this cannot be counted as a mitigation action for the noise reduction evaluation by CDOT policy.

2.3.2 800 Block of S. Sherman Street

The southernmost homes in the 800-block on the west side of S. Sherman Street are some of the residences closest to I-25 throughout the entire project corridor. A new concrete noise barrier that ranges in height from about 12 to 15.5 feet has been installed under the separate TREX project. As a new traffic noise mitigation action has just been completed for this area, further evaluation was not performed as part of this study.

2.3.3 South Lincoln Street

For purposes of this discussion, this residential area is being divided into two subareas: north of Ohio Avenue and south of Ohio Avenue.

2.3.3.1 NORTH OF OHIO AVENUE

Section 2.1 described how essentially all residences on S. Lincoln Street north of Ohio Avenue will have noise levels above the NAC, due to the traffic on Lincoln Street. Because Lincoln Street is a major arterial street in Denver, this condition will remain unchanged whether the Preferred Alternative is built or not. Furthermore, it is not feasible to construct a barrier to protect these homes from traffic noise from Lincoln Street as a barrier would cut off front access to the local street for these homes. This area is a mature urban neighborhood where Lincoln Street serves as one of the neighborhood streets. Separating residences from the neighborhood streets with a barrier is not reasonable. Even a barrier along the south side of 794 S. Lincoln Street to reduce I-25 noise is not warranted because it would do little to reduce traffic noise from Lincoln Street or the off ramp, the major noise sources to the residence. Therefore, no noise barriers are recommended for any residences on S. Lincoln Street north of Ohio Avenue.

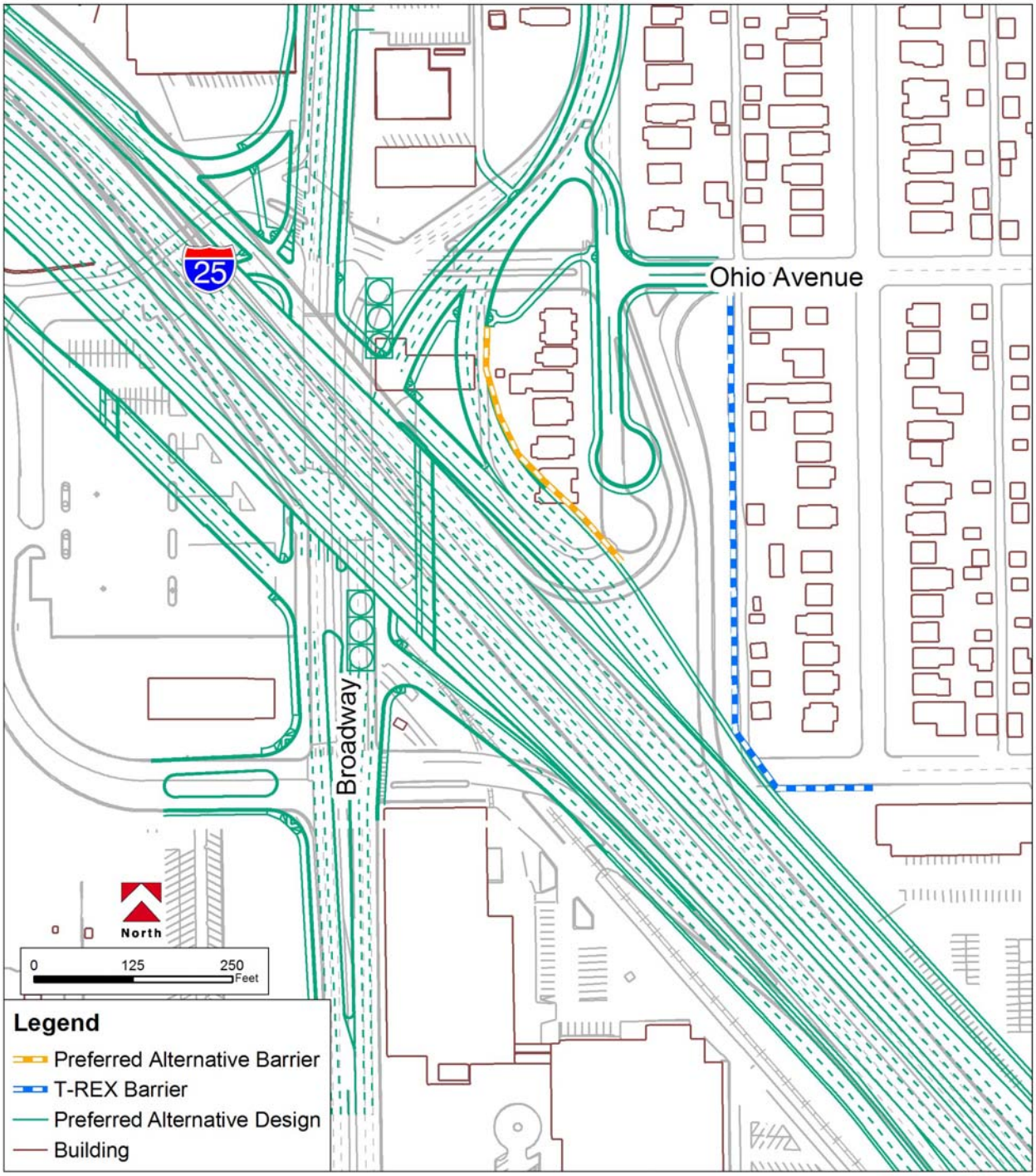
2.3.3.2 SOUTH OF OHIO AVENUE

Lincoln Street south of Ohio Avenue in the Study Area consists solely of the homes on the 800 block. Along with the homes on S. Sherman Street (see **Section 2.3.2**), these homes are the closest residences to I-25 in the entire project corridor. This is an unusual area as this block is literally surrounded by busy roads and streets. For the Preferred Alternative, the two southernmost buildings on this block will be removed; the other homes on the block will remain. The I-25 off-ramp will be relocated from the east to west sides of the homes.

With the complex traffic noise situation in this area, a 10-dBA noise reduction could not be achieved short of completely encircling the homes with barriers, which is not acceptable. The minimum 5-dBA noise reduction is feasible. Therefore, mitigation for a 10-dBA noise reduction is not discussed further.

A barrier was conceived (see **Figure 2-4**) that could provide a minimum 5-dBA noise benefit for three of the four buildings. The barrier basically parallels the off-ramp. Based on the current understanding of future ground contours, the barrier would be 12 feet tall for 360 feet. The cost/benefit calculation for this barrier was in the unreasonable category of CDOT guidelines. One residence would not receive even a 3 dBA benefit because of physical constraints limiting barrier length. However, this noise abatement barrier is still recommended given the unusual circumstances of these houses.

Figure 2-4 South Lincoln Street Mitigation Barrier



2.3.4 900 Block of W. Ellsworth Avenue

Section 2.1 described how residences on W. Ellsworth Avenue will have noise levels above the NAC. This condition will remain unchanged whether the Preferred Alternative is built or not. Furthermore, it is not feasible to construct a noise barrier to protect these homes from traffic noise from Ellsworth Avenue, Santa Fe Drive and Kalamath Street as an effective barrier would cut off access to these homes and the neighboring commercial properties. This is a mixed-use area and the traffic noise comes from the local streets. There is no alley access in this area. Separating the residences from their neighborhood streets with a barrier is an unacceptable action. Therefore, no noise barriers are recommended for the homes on the 900-block of W. Ellsworth Avenue.

2.3.5 900 W. Byers Place

Section 2.1 described how the 900 block of W. Byers Place will have noise levels above the Category B NAC. This condition will remain unchanged whether the Preferred Alternative is built or not. Furthermore, it is not feasible to construct a noise barrier to protect this home from traffic noise from Byers Place, Santa Fe Drive and Kalamath Street as the house is surrounded by commercial area parking and a barrier would cut off access to the home. This house is isolated in a commercial area and the noisy streets also serve as the neighborhood streets for the home. Separating the residence from the neighborhood streets with a barrier is an unacceptable action. Therefore, no noise barriers are recommended for 900 W. Byers Place.

2.3.6 3300 Block of W. 5th Avenue

Section 2.1 described how a residence on W. 5th Avenue will have noise levels above the NAC. This condition is due to the traffic on US 6, across a narrow finger of Barnum Park.

Two barrier positions were evaluated for these homes. The better position from a noise point of view would be along the residential property lines (see **Figure 2-5** Barrier #1), which is not on US 6 right of way. A barrier 400 feet long and varying in height (10-20 feet) was calculated to provide a 6 dBA noise reduction for these properties. A 25-foot-tall barrier at this position was insufficient to provide a 10-dBA reduction, so a 10-dBA reduction does not appear to be feasible. The second barrier position was along the US 6 right of way (see **Figure 2-5** Barrier #2). This barrier does not provide a 10-dBA noise reduction even if it is 25 feet tall. A barrier here would need to be more than 1200 feet long by 16-20 feet tall to provide a 5-6 dBA noise reduction.

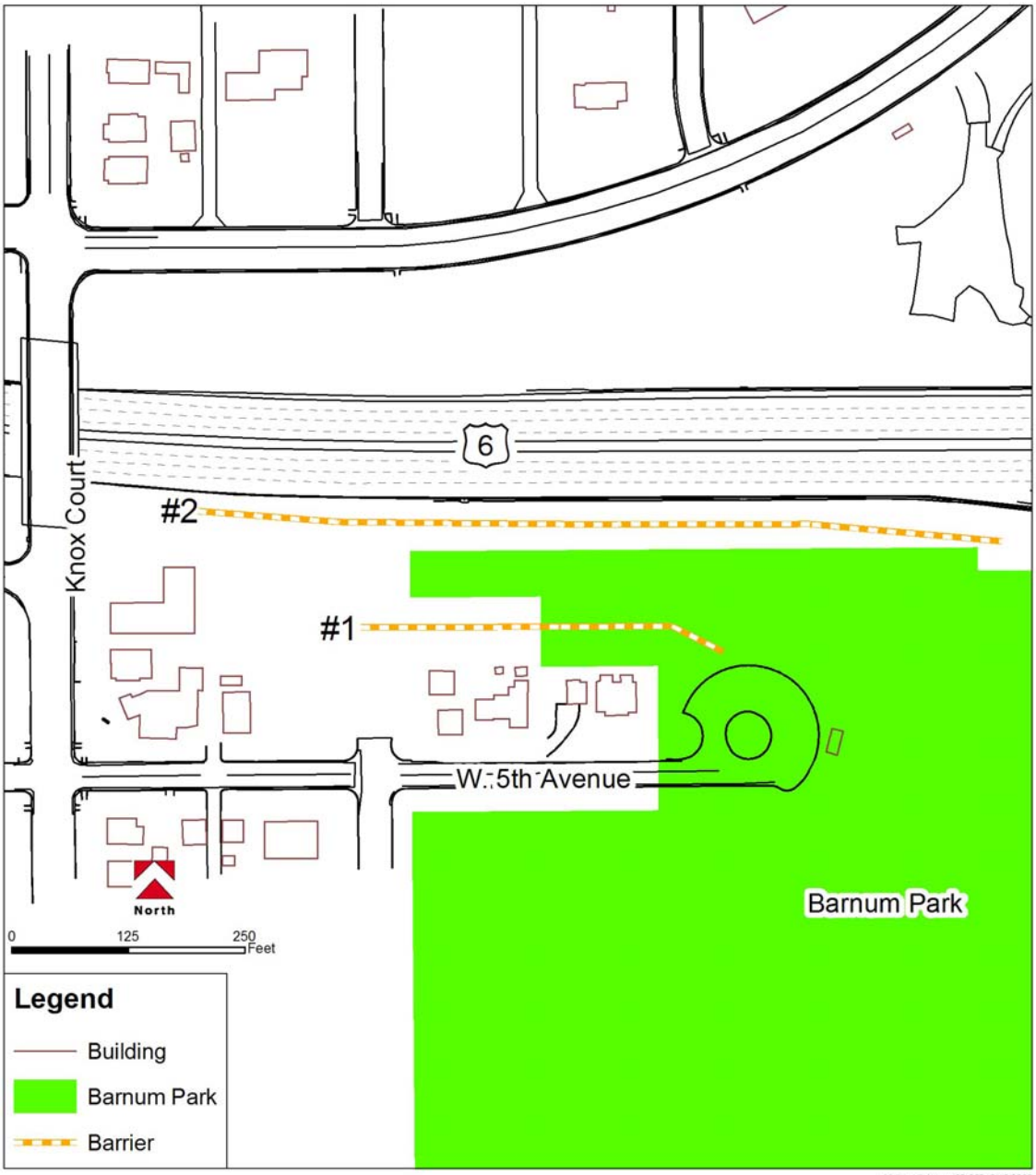
Neither of these barriers are recommended for the Preferred Alternative. The cost/benefit is unsatisfactory for both. Barrier #1 would have to be built on park and/or private land away from US 6 right of way, which would be problematic. Barrier #2 would have poor efficacy because of the physical setting and distance from the receivers. Though it may be possible to build noise barriers to protect these properties, the barriers would not be very effective.

2.3.7 Barnum Park

The northern portion of Barnum Park along 6th Avenue will have noise levels above the NAC. A barrier between 6th Avenue and the park was evaluated (see **Figure 2-5** Barrier #2). A 7-dBA noise reduction required a barrier 16-20 feet high by 780 feet long, however, it would provide

relatively little benefit. The affected area does not contain primary park facilities and most park activity appears to be in an area not impacted by traffic noise. This barrier is not being recommended.

Figure 2-5 West 5th Avenue Mitigation Barrier



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2.3.8 Barnum North Park

The southern portion of Barnum North Park along 6th Avenue will have noise levels above the NAC. A barrier between 6th Avenue and the park was evaluated. A 6-dBA noise reduction required a barrier about 14 feet high by 1350 feet long, however, it would provide relatively little benefit. The affected area does not contain primary park facilities (mainly a parking lot) and most park activity appears to be in areas not impacted by traffic noise. This barrier is not being recommended.

2.3.9 Frog Hollow Park

This park extends to the north, outside the primary study area of the EIS. It is mainly this northern portion of the park along I-25 that is impacted by traffic noise, although a southern portion along 6th Avenue is also impacted. It was concluded that a noise abatement barrier should protect the entire park, so that was the condition evaluated. A 5-dBA noise reduction required a barrier approximately 8 feet high by 1500 feet long and was found to be unreasonable. This barrier is not being recommended.

2.3.10 Valverde Park

The eastern portion of Valverde Park along Platte River Drive will have noise levels above the NAC. A barrier between Platte River Drive and the park was evaluated. A 6-dBA noise reduction required a barrier 8 feet high by 550 feet long; however, it would provide relatively little benefit. The park ball field appears to be beyond the benefit area because of the distance. The barrier would cut off a major access point from Platte River Drive and would obstruct access from the park to the bike path and South Platte River. This barrier is not being recommended.

2.3.11 Habitat Park

The western portion of Habitat Park will have noise levels above the NAC due to traffic on I-25 and Jason Street. Effective noise reduction would require barriers along both I-25 and Jason Street, effectively surrounding the park with barriers. This would severely restrict park access and is not a feasible situation. These barriers are not being recommended.

2.3.12 Vanderbilt Park

The eastern portion of Vanderbilt Park along Santa Fe Drive will have noise levels above the NAC. A barrier between Santa Fe Drive and the park was evaluated. A 6-dBA noise reduction could be achieved with a barrier 8 feet high by 2100 feet long. However, it would provide relatively little benefit. This barrier is not being recommended.

2.3.13 Vanderbilt East Park

The western portion of Vanderbilt East Park along Santa Fe Drive will have noise levels above the NAC. It should be noted that this park currently has no park facilities and none are certain for the future. This is an area being redeveloped from industrial to residential, so the park situation could change in the future. A barrier between Santa Fe Drive and the park was evaluated. An effective barrier needs to cover 2 of the 3 sides of the park. A barrier 14 feet high

by 850 feet long provided a noise reduction of 6 dBA. This barrier would provide relatively little benefit and is not being recommended.

2.3.14 Days Inn Motel

The extreme southern edge of the Days Inn Motel property (620 Federal Boulevard) overlooking 6th Avenue was calculated to have noise levels above the NAC. This area is primarily for car parking without any other visible exterior uses. There is some motel room access in this portion of the building, but is a relatively small portion of the motel. This part of the motel building serves as a noise barrier for the rest of the motel. There are only a couple of ground level rooms with exterior access on this side of the motel. Therefore, no mitigation is recommended for this location.

2.3.15 Rocky Mountain Church of God

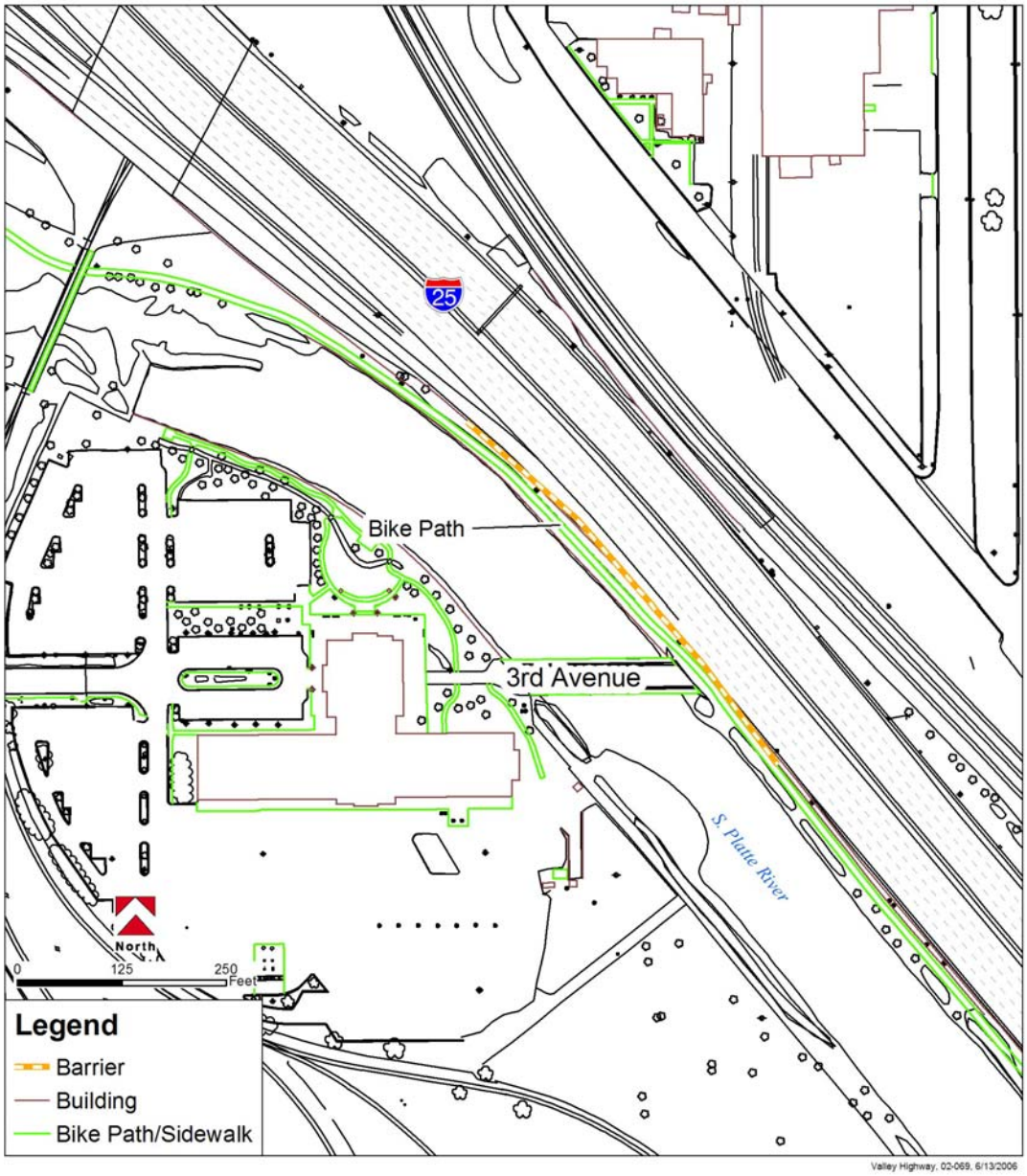
The Rocky Mountain Church of God (455 S. Platte River Drive) was calculated to have noise levels above the NAC. The church is close to the street and is surrounded by paved parking lots. There are two curb cuts close to the building providing access to these parking lots that prevent construction of a continuous barrier. There are no major exterior uses apparent at the church. Because of the property layout, any noise barrier would necessarily need to be very close to the church building, which would protect relatively little area and provide little benefit. Standard building construction should be sufficient to provide interior noise levels that comply with the Category E NAC. Therefore, no mitigation is recommended for this location.

2.3.16 South Platte River Bike Path

Parts of the South Platte River bike path were calculated to have noise levels that exceed the Category B NAC. The portion of the bike path covered by this evaluation is the section between Phil Milstein Park and Alameda Avenue. For most of this length, the bike path is along the river at a lower elevation than I-25. To protect this entire length of the bike path, a barrier 6-9 feet tall by 4100 feet long would provide a 7-dBA noise reduction. This barrier was found to be too costly for the benefit provided and, therefore, is not being recommended.

However, there is a segment of the bike path at 3rd Avenue where the path is at the same elevation as I-25 and as little as 10 feet from I-25 traffic. This segment is the noisiest part of the bike path. For this segment of the bike path, a barrier 9 feet high by 500 feet long (see **Figure 2-6**) could provide 7 dBA of noise reduction and could provide a safety benefit to bicyclists. (A 13-foot barrier could provide 10-dBA of noise reduction on the bike path.) This barrier is recommended.

Figure 2-6 Bike Path Mitigation Barrier



2.3.17 Various Commercial Areas

Several commercial properties were described in **Section 2.1** that were calculated to exceed the Category C NAC. The Preferred Alternative will require removal of several commercial buildings that otherwise could be impacted. Noise mitigation barriers were evaluated for each of the impacted areas. However, businesses tend not to want noise barriers as they could obstruct advertising or site recognition and could cause site access problems. Normally, commercial areas do not have noise-sensitive exterior property uses. These barriers usually have to be relatively large for the small number of receivers that benefit, so they are not often cost

effective. Typically, noise barriers are recommended for commercial areas only under extraordinary conditions, but no such conditions were observed for the affected properties. As is often the case with commercial areas, the mitigation costs were calculated to be excessive for the benefit that would be provided and no noise barriers are recommended.

However, the impacted business near the I-25/US 6 interchange may receive a noise reduction benefit if Type 7 concrete barriers are placed along the eastbound US 6 to southbound I-25 ramp. Type 7 barriers are typically used for safety reasons, and in this case such safety barriers could also shield the neighboring properties from some traffic noise. These barriers are already part of the road design for safety and are not truly noise barriers, but these barriers are noted here for disclosure of the noise-shielding benefit. No noise mitigation is recommended for any of the affected commercial areas (see **Section 2.1**).

2.4 Construction Noise

Adjoining properties in the project area would be exposed to noise from I-25 construction activities when the Preferred Alternative is built. Construction noise differs from traffic noise in several ways:

- Construction noise lasts only for the duration of the construction event, with most construction activities in noise-sensitive areas being conducted during hours that are less disturbing to adjacent and nearby residents;
- Construction activities generally are of a short-term nature, and depending on the nature of the construction operations, could last from seconds (e.g., a truck passing by) to months (e.g., constructing a bridge); and
- Construction noise also is intermittent and depends on the type of operation, location, and function of the equipment, and the equipment usage cycle. Traffic noise, on the other hand, is present in a more continuous fashion after construction activities are completed.

Construction noise impacts will be minimized somewhat by the fact that little of the project corridor abuts residential areas. To address the temporary elevated noise levels that may be experienced during construction, standard mitigation measures should be incorporated into construction contracts. These would include:

- Exhaust systems on equipment will be in good working order. Equipment will be maintained on a regular basis, and equipment may be subject to inspection by the project manager to ensure maintenance.
- Properly designed engine enclosures and intake silencers will be used where appropriate.
- New equipment will be subject to new product noise emission standards.
- Stationary equipment will be located as far from sensitive receivers as feasible.
- Most construction activities in noise sensitive areas will be conducted during hours that are less disturbing to adjacent and nearby residents.

In addition, construction noise from future project activities must comply with the City and County of Denver noise ordinance (Chapter 36 of the Municipal Code). Construction noise that complies with the noise ordinance can be viewed as not having an impact on neighboring properties. If a construction activity must occur at night and is likely to violate the noise ordinance, an impact is possible. Such a situation will require a variance from the City and

County of Denver. As part of the variance, the City and County of Denver typically requires specific mitigation actions and noise monitoring to ensure that impacts are minimized. Compliance with future noise variance requirements, if any, could be viewed as not having a significant impact on neighboring properties. No additional mitigation would be necessary.

2.5 Nuisance Noise Considerations

The noise Citizen's Working Group for the EIS provided a means for neighbors of the Valley Highway project corridor and interested citizens to express issues and concerns to CDOT. The members of the Citizens Working Group made clear that traffic noise from the project corridor is a major concern to them.

Noise impacts were examined as a standard part of the EIS in accordance with CDOT/FHWA guidelines. These guidelines specify that a noise impact occurs when a property approaches or exceeds the NAC specific to the property use, or when a property will experience a noise increase of 10 dBA or more. The guidelines further specify that impacted properties be evaluated for noise mitigation measures on the basis of feasibility and reasonableness of the mitigation measure. Specific noise mitigation measures (e.g., barriers) may or may not be recommended for impacted areas based on this mitigation evaluation. Properties that do not fit the definition of a noise impact typically are not considered for noise mitigation.

Members of the Citizens Working Group made clear that they are bothered by traffic noise from the Valley Highway corridor, even if the sound levels do not meet the definition of an impact specified in the CDOT/FHWA guidance. Working Group members were very interested in trying to reduce this "nuisance noise" that is not captured by the typical CDOT/FHWA noise analysis process. For purposes of this discussion, the "nuisance noise" of interest includes the following characteristics:

- Encompasses noise from traffic
- Is below CDOT/FHWA NAC levels
- Bothers/annoys people
- Interferes with quality of life
- Includes low-frequency sounds not adequately captured by A-weighted sound levels (i.e., C-weighted sound levels)
- Impacts property values

In light of this, the Citizens Working Group developed the following suggestions to be considered to reduce "nuisance noise" and improve the quality of life for neighbors of the project corridor.

- **Alternative Selection** – Consider the alternative or improvement that has the least impacts from a noise perspective as evaluation criteria. (Note: the Preferred Alternative includes the fewest impacts for the interchanges at I-25/Broadway and US 6/Federal, where residential areas are closest to the project highway corridors.)
- **Pavement Type** – Consider the quietest pavement type throughout the corridor that can meet the safety and durability requirements. Stone matrix asphalt, which has been used on the new I-25/Broadway viaduct, was an example cited of a way to implement nuisance noise considerations. CDOT has recently initiated a study to evaluate the long-term

relationship between different pavement types/surface textures and traffic noise, and this information may be used in the future to help minimize traffic noise.

- **Taller Barriers** – Use the taller Type 7 barriers or similar in the corridor to maximize noise reduction benefits from these necessary project components.
- **Absorptive Material** – Use sound-absorptive material wherever possible in the project corridor. This includes pavement type and vegetation.
- **Aesthetic Treatment/Landscaping** – Use aesthetic treatments and landscaping in the project to reduce traffic noise where possible. Combine visual treatments with noise-reducing properties, such as rough/uneven surfaces that reflect less sound rather than flat surfaces. Use earthen berms where possible. Use multipurpose barriers wherever possible, e.g. traffic control and noise reduction. Coordinate planning and design so that noise reduction actions are considered throughout the corridor.
- **Focused Actions** – Focus noise reduction actions to provide the most benefit to the most sensitive noise receptors.

In response to these concerns and suggestions, CDOT has agreed to consider additional noise reduction measures through project design. These are not viewed as mitigation actions and are not directed toward the traffic-noise-impacted properties. These are project enhancements that may be implemented as feasible to address concerns that are beyond the project impacts and project mitigation actions. Therefore, for project enhancement and betterment purposes, CDOT will evaluate the technological and economic feasibility of the following actions in final design of the Valley Highway project:

- Adopt traffic noise reduction as a goal in project development
- Evaluate noise barriers and other noise reduction techniques
- Examine noise impacts from a broader perspective
- Plan for noise reduction actions comprehensively throughout design
- Include noise-reducing technologies systematically

2.6 Summary

The recommendations provided in **Section 2.3** and summarized here are based on assumed specific project layouts. If the final layouts in the future differ from that assumed in these evaluations, corresponding adjustments to the mitigation evaluations may be required. From the feasibility and reasonableness evaluations for the barriers, highway traffic noise barriers are recommended between traffic and receivers for the following locations:

- 800-block of S. Lincoln Street (see **Figure 2-4**)
- S. Platte River bike path at 3rd Avenue (see **Figure 2-6**)
- Type 7 barriers (or similar) edge-of-road safety features that would also act as noise shields for roads bordering the I-25/US 6 interchange (see **Figure 2-3**)

The overall noise barrier findings are summarized in **Table 2-4**. Estimated traffic noise reductions from barriers that are recommended are summarized in **Table 2-5**.

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Table 2-4 Noise Mitigation Barrier Summary

Noise Impacted Area	Barrier Length (feet)	Barrier For 5 dBA Noise Reduction					Barrier For 10 dBA Noise Reduction				
		Barrier Height (feet)	Feasible?[1]	Reasonable?[1]	Recommended?	Comment	Barrier Height (feet)	Feasible?[1]	Reasonable?[1]	Recommended?	Comment
Category B											
800 block S. Sherman Street	NA	NA	NA	NA	NA	This area is covered by a new T-REX barrier.	NA	NA	NA	NA	This area is covered by a new T-REX barrier.
800 block S. Lincoln Street	360	12	Yes	Yes	Yes	Cost/benefit is high but still recommended.		No		No	10 dBA reduction could not be achieved.
500-799 S. Lincoln Street	NA	NA	No		No	A noise barrier would prohibit access to the homes.		No		No	A noise barrier would prohibit access to the homes.
900 block W. Ellsworth Avenue	NA	NA	No		No	A noise barrier would prohibit access to the homes.		No		No	A noise barrier would prohibit access to the homes.
3300 block W. 5th Avenue	400	10-20	Yes	No	No	Barrier provides relatively little benefit.		No		No	10 dBA reduction could not be achieved.
900 block W. Byers Place	NA	NA	No		No	A noise barrier would prohibit access to the home.		No		No	A noise barrier would prohibit access to the home.
Barnum Park	780	16-20	Yes	No	No	Barrier provides relatively little benefit.					Not analyzed.
Barnum North Park	1350	14	Yes	No	No	Barrier provides relatively little benefit.					Not analyzed.
Frog Hollow Park	1500	8	Yes	No	No	Barrier provides relatively little benefit.					Not analyzed.
Valverde Park	550	8	Yes	No	No	Barrier provides relatively little benefit.					Not analyzed.

Table 2-4 Noise Mitigation Barrier Summary (continued)

Noise Impacted Area	Barrier Length (feet)	Barrier For 5 dBA Noise Reduction					Barrier For 10 dBA Noise Reduction				
		Barrier Height (feet)	Feasible?[1]	Reasonable?[1]	Recommended?	Comment	Barrier Height (feet)	Feasible?[1]	Reasonable?[1]	Recommended?	Comment
Habitat Park	NA	NA	No		No	A noise barrier would prohibit access to the park.					Not analyzed.
Vanderbilt Park	2100	8	Yes	No	No	Barrier provides relatively little benefit.					Not analyzed.
Vanderbilt East Park	850	14	Yes	No	No	Barrier provides relatively little benefit.					Not analyzed.
Days Inn	NA	NA	No		No	No exterior uses in the impacted area.					Not analyzed.
Platte River bike path	4100	6-9	Yes	No	No	Barrier provides relatively little benefit.					Not analyzed.
Platte River bike path at 3rd Avenue	500	9	Yes	Yes	Yes	Cost/benefit is high but still recommended	13	Yes	No	No	Cost/benefit is too high
Rocky Mountain Church of God	NA	NA	No		No	Barrier conflicts with access; no exterior uses.					Not analyzed.
Category C											
I-25/6th Avenue	460	3	Yes	Yes	Yes	This noise barrier function will be served by safety barriers at edge of ramp.	3	Yes	Yes	Yes	This noise barrier function will be served by safety barriers at edge of ramp.
East of I-25	720	14	Yes	No	No	Cost/benefit is too high.					Not analyzed.
Post Office Service Center	580	9	Yes	No	No	Cost/benefit is too high.					Not analyzed.
I-25/Broadway	700	12-16	Yes	No	No	Cost/benefit is too high.					Not analyzed.
Santa Fe Drive/Kalamath Street	NA	NA	No			Could not get 5 dBA reduction. Barrier blocking noise also blocks property access.					Not analyzed.
S. Santa Fe/ I-25	1350	3-12	Yes	No	No	Cost/benefit is too high.					Not analyzed.

[1]According to CDOT guidelines (CDOT, 2002). NA - not applicable

Table 2-5 Modeled Noise Mitigation Reductions

Model Receiver (Appendix B)	2025 Preferred Alternative Noise Level (dBA)		
	Without Barrier	With Barrier	Reduction
RB2	72	66	6
RB3	72	65	7
RB4	69	64	5
RB5	70	68	2
P11	77	70	7
P13	71	63	8
P22	65	56	9
C15	76	66	10

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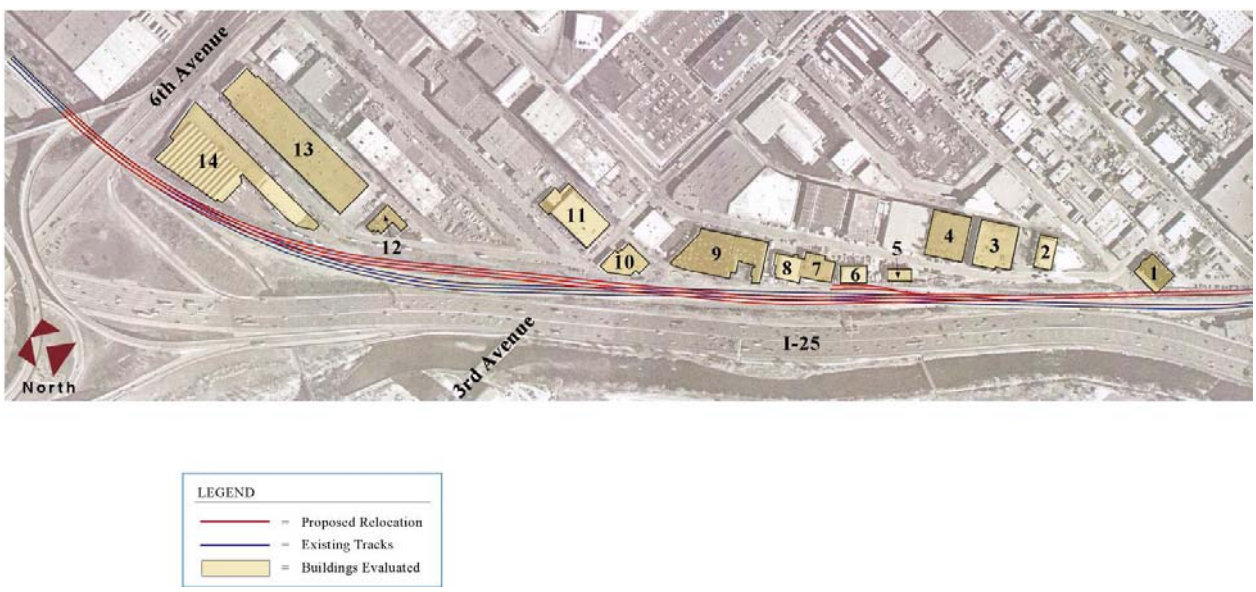
3.0 VIBRATION

Highway traffic and maintenance facility activities typically do not generate significant vibrations, but vibration from trains has the potential to be noticeable and intrusive to people in buildings. The Preferred Alternative will require relocation of the CML corridor that is directly east of and parallel to I-25 from Alameda Avenue to the 6th Avenue interchange (see **Figure 3-1**) to allow for improvements to I-25. Therefore, an analysis of train vibration impacts was performed for the EIS that focused on the relocation of the CML tracks.

The planned relocation of the railroad for all three System Alternatives and the Preferred Alternative were exactly the same. Therefore, the impacts from the rail relocation for the Preferred Alternative will be the same as the System Alternatives in the Draft EIS.

The methods and results for the rail vibration analysis that was performed for the System Alternatives were presented in the previous noise report (FHU, 2005) and have not been repeated here. In summary, it was concluded that the proposed relocation of the consolidated mainline rails will not cause train vibration impacts to neighboring properties. Therefore, no vibration mitigation actions are necessary.

Figure 3-1 Railroad Corridor Relocation Area



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4.0 PHASING OF PREFERRED ALTERNATIVE

The Preferred Alternative cannot currently be funded and constructed in a single action. Therefore, the Preferred Alternative will be constructed in phases. CDOT has funding available for some of the proposed improvements and these initial construction actions have been identified as Phase 1. The remainder of the Preferred Alternative improvements has been broken into logical groupings comprising Phases 2 through 6 that will be constructed when funds become available. When taken in order, completion of Phase 6 would represent completion of the Preferred Alternative.

Phase 1 consists of several major construction actions:

- Replacement of the Alameda Avenue bridge over I-25
- Reconstruction of the I-25/Santa Fe Drive interchange including the northbound Santa Fe Drive fly-over ramp
- Replacement of the Federal Boulevard bridge over US 6
- Relocation of the Federal Boulevard on ramp to eastbound US 6 north of Barnum East Park
- Realignment of the westbound US 6 off ramp to Federal Boulevard

Phase 2 consists primarily of the reconstruction of the I-25/Alameda Avenue interchange.

Phase 3 consists primarily of the widening of I-25 from Alameda Avenue to US 6 and the relocation of the CML railroad.

Phase 4 consists primarily of the construction of the underpasses of Santa Fe Drive and Kalamath Street under the CML railroad.

Phase 5 consists primarily of improvements to US 6, including:

- Widening of US 6 from Federal Boulevard to I-25
- Improvements to some ramps at the I-25/US 6 interchange
- Completion of the improvements to the US 6/Federal Boulevard/Bryant Street ramps

Phase 6 consists primarily of the reconstruction of the I-25/Broadway interchange and associated streets.

The predicted traffic noise impacts after each of the various construction phases of the Preferred Alternative are listed in **Table 4-1**. The differences in noise impacts between existing conditions, No Action, the Preferred Alternative and the various Preferred Alternative phases are not large. The road corridors would be essentially the same for all of the situations. Traffic volumes would be similar from a noise perspective, so traffic noise conditions would be very similar. It was predicted that there would be some relatively minor changes in traffic noise conditions in localized areas after some of the Preferred Alternative phases.

Two traffic noise mitigation barriers were recommended for the Preferred Alternative (see **Section 2.6**). The barrier recommended for the 800-block of South Lincoln Street would be constructed during Phase 6. The barrier recommended for the South Platte River bike path would be constructed during Phase 3. The Type 7 barriers recommended for the I-25/US 6 interchange (which are for safety, not noise reduction) would be constructed during Phase 5.

After each phase, the number of impacted receivers is expected to remain the same or to diminish. The most significant changes in traffic noise conditions were predicted to occur after completion of Phases 1, 4 and 6. Even so, these differences will be relatively minor.

Table 4-1 Noise Impact Summary after Project Phase Completion

Location	Number of Noise-Impacted Receivers (without mitigation actions)								
	Existing	No Action	Preferred Alternative	Preferred Alternative Phase					
				1	2	3	4	5	6
Category B									
800 block S. Sherman Street	3	4	3	3	3	3	3	3	3
800 block S. Lincoln Street	9	9	6	9	9	9	9	9	6 (4)
500-799 S. Lincoln Street	41	41	41	41	41	41	41	41	41
900 block W. Ellsworth Avenue	3	3	3	3	3	3	3	3	3
2900 block W. Short Place	5	5	0	0	0	0	0	0	0
3300 block W. 5th Avenue	3	3	1	3	3	3	3	1	1
900 block Byers Place	1	1	1	1	1	1	1	1	1
Barnum Park	1	1	1	1	1	1	1	1	1
Barnum East Park	1	1	0	1	1	1	1	0	0
Barnum North Park	1	1	1	1	1	1	1	1	1
Frog Hollow Park	1	1	1	1	1	1	1	1	1
Valverde Park	1	1	1	1	1	1	1	1	1
Habitat Park	1	1	1	1	1	1	1	1	1
Vanderbilt Park	1	1	1	1	1	1	1	1	1
Vanderbilt East Park	1	1	1	1	1	1	1	1	1
South Platte River bike path	1	1	1	1	1	1	1	1	1
Days Inn	1	1	1	1	1	1	1	1	1
Rocky Mountain Church of God	1	1	1	1	1	1	1	1	1
Category C									
Along 6th Avenue	1	2	1	1	1	1	1	1 (0)	1 (0)
East of I-25	7	7	2	7	7	2	2	2	2
Post Office Service Center	1	1	1	1	1	1	1	1	1
I-25/Broadway	2	2	3	2	2	2	2	2	3
Santa Fe Drive/ Kalamath Street	37	44	8	37	37	37	8	8	8

() = number of impacted receivers remaining with recommended noise barriers in place

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5.0 REFERENCES

Colorado Department of Transportation and Federal Highway Administration (CDOT and FHWA), 2006, *Valley Highway Final Environmental Impact Statement*, November.

CDOT and FHWA, 2005, *Valley Highway Draft Environmental Impact Statement*, April.

Colorado Department of Transportation, 2002, *Noise Analysis and Abatement Guidelines*, December.

Federal Highway Administration, 1978, *Highway Traffic Noise Prediction Model*, FHWA-RD-77-108, December.

Federal Transit Administration, 1995, *Transit Noise and Vibration Impact Assessment*, April.

Felsburg Holt & Ullevig (FHU), 2005, *Valley Highway Environmental Impact Statement, Noise and Vibration Impact Assessment Report*, February.

U.S. Code of Federal Regulations, Title 23, Part 772. *Procedures for Abatement of Highway Traffic Noise and Construction Noise*.

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APPENDIX A
NOISE MITIGATION EVALUATIONS

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COLORADO DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT DETERMINATION

Instructions: ***To complete this form refer to CDOT Noise Analysis Guidelines***

Project # VH EIS	Project code (SA#)	STIP #	Project Location: 900 W. Byers

A. FEASIBILITY:

1. Can a continuous noise barrier or berm be constructed? ☐ YES ☒ NO
2. Can a substantial noise reduction be achieved by constructing a noise barrier or berm?...
   10 dBA: ☐ YES ☐ NO 7-10 dBA: ☐ YES ☐ NO 5-7 dBA: ☐ YES ☒ NO
3. Are there any "fatal flaw" safety or maintenance issues involving the proposed noise barrier or berm? ☒ YES ☐ NO

B. REASONABLENESS:

		EXTREMELY REASONABLE	REASONABLE	MARGINALLY REASONABLE	UNREASONABLE
1.	Cost Benefit Index (per receiver per dBA)	☐ Less than $3000	☐ $3000-$3750	☐ $3750-$4000	☐ More than $4000
2.	Average Build Noise Level	☐ 70 dBA or More	☐ 66 - 70 dBA	☐ 63 - 66 dBA	☐ Less than 63 dBA
3.	Impacted persons' desires	☐ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
4.	Development Type (Category B*)	☐ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
5.	Development Existence (15 years or more)	☐ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
6.	Build Noise Level vs. Existing Noise Level	☐ Greater than 10 dBA	☐ 5 - 10 dBA	☐ 0 - 5 dBA	☐ Noise Level Decrease

***Category B – Residential, School, Hospital, Park, Picnic/Active Sports Area, Motel, Church, Library**

C. INSULATION CONSIDERATION:

1. Are normal noise abatement measures physically infeasible or economically unreasonable? ☒ YES ☐ NO
   If the answer to 1 is YES, then:
2. a. Does this project have noise impacts to public or non-profit buildings? ☐ YES ☒ NO
   b. If yes, is it reasonable and feasible to provide insulation for these buildings? ☐ YES ☐ NO
3. a. Is private residential property affected by a 30 dB(A) or more noise level increase? ☐ YES ☒ NO
   b. Are private residences impacted by 75 dB(A) or more? ☐ YES ☒ NO

D. ADDITIONAL CONSIDERATIONS:

This is an isolated house surrounded by parking lots in an industrial district

E. DECISION:

1. Are noise mitigation measures feasible? ☐ YES ☒ NO
2. Are noise mitigation measures reasonable? ☐ YES ☒ NO
3. Is insulation of buildings both feasible and reasonable? ☐ YES ☒ NO
4. Shall noise mitigation measures be provided? ☐ YES ☒ NO

F. DECISION DESCRIPTION AND JUSTIFICATION

Could not make a continuous barrier because of property access considerations. Could not provide real noise reduction. A barrier is not recommended.

Completed by: Joe Tuchek	Date: 6-13-06

CDOT Form #1209 12/02

COLORADO DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT DETERMINATION

Instructions: ***To complete this form refer to CDOT Noise Analysis Guidelines***

Project # VIt EIS	Project code (SA#)	STIP #	Project Location: 900 W. Ellsworth

A. FEASIBILITY:

1. Can a continuous noise barrier or berm be constructed? ☐ YES ☒ NO
2. Can a substantial noise reduction be achieved by constructing a noise barrier or berm?...
   10 dBA: ☐ YES ☐ NO 7-10 dBA: ☐ YES ☐ NO 5-7 dBA: ☐ YES ☒ NO
3. Are there any "fatal flaw" safety or maintenance issues involving the proposed noise barrier or berm? ☒ YES ☐ NO

B. REASONABLENESS:

		EXTREMELY REASONABLE	REASONABLE	MARGINALLY REASONABLE	UNREASONABLE
1.	Cost Benefit Index (per receiver per dBA)	☐ Less than $3000	☐ $3000-$3750	☐ $3750-$4000	☐ More than $4000
2.	Average Build Noise Level	☐ 70 dBA or More	☐ 66 - 70 dBA	☐ 63 - 66 dBA	☐ Less than 63 dBA
3.	Impacted persons' desires	☐ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
4.	Development Type (Category B*)	☐ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
5.	Development Existence (15 years or more)	☐ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
6.	Build Noise Level vs. Existing Noise Level	☐ Greater than 10 dBA	☐ 5 - 10 dBA	☐ 0 - 5 dBA	☐ Noise Level Decrease

***Category B – Residential, School, Hospital, Park, Picnic/Active Sports Area, Motel, Church, Library**

C. INSULATION CONSIDERATION:

1. Are normal noise abatement measures physically infeasible or economically unreasonable? ☒ YES ☐ NO
   If the answer to 1 is YES, then:
2. a. Does this project have noise impacts to public or non-profit buildings? ☐ YES ☒ NO
   b. If yes, is it reasonable and feasible to provide insulation for these buildings? ☐ YES ☐ NO
3. a. Is private residential property affected by a 30 dB(A) or more noise level increase? ☐ YES ☒ NO
   b. Are private residences impacted by 75 dB(A) or more? ☐ YES ☒ NO

D. ADDITIONAL CONSIDERATIONS:

There are 3 houses isolated in an industrial district.

E. DECISION:

1. Are noise mitigation measures feasible? ☐ YES ☒ NO
2. Are noise mitigation measures reasonable? ☐ YES ☒ NO
3. Is insulation of buildings both feasible and reasonable? ☐ YES ☒ NO
4. Shall noise mitigation measures be provided? ☐ YES ☒ NO

F. DECISION DESCRIPTION AND JUSTIFICATION

Could not make a continuous barrier because of property access considerations. Could not provide real noise reduction. A barrier is not recommended.

Completed by:	Date:
[illegible]	6-13-06

CDOT Form #1209 12/02

COLORADO DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT DETERMINATION

Instructions: ***To complete this form refer to CDOT Noise Analysis Guidelines***

Project # VH EIS	Project code (SA#)	STIP #	Project Location: 800 S. Lincoln

A. FEASIBILITY:

1. Can a continuous noise barrier or berm be constructed?. . . . . ☑ YES ☐ NO
2. Can a substantial noise reduction be achieved by constructing a noise barrier or berm?...
   10 dBA: ☐ YES ☐ NO 7-10 dBA: ☑ YES ☐ NO 5-7 dBA: ☑ YES ☐ NO
3. Are there any "fatal flaw" safety or maintenance issues involving the proposed noise barrier or berm?. . . . . ☐ YES ☑ NO

B. REASONABLENESS:

		EXTREMELY REASONABLE	REASONABLE	MARGINALLY REASONABLE	UNREASONABLE
1.	Cost Benefit Index (per receiver per dBA). .	☐ Less than $3000	☐ $3000-$3750	☐ $3750-$4000	☑ More than $4000 6500
2.	Average Build Noise Level	☑ 70 dBA or More	☐ 66 - 70 dBA	☐ 63 - 66 dBA	☐ Less than 63 dBA
3.	Impacted persons' desires	☐ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
4.	Development Type (Category B*)	☑ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
5.	Development Existence (15 years or more) .	☑ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
6.	Build Noise Level vs. Existing Noise Level .	☐ Greater than 10 dBA	☐ 5 - 10 dBA	☑ 0 - 5 dBA	☐ Noise Level Decrease

***Category B – Residential, School, Hospital, Park, Picnic/Active Sports Area, Motel, Church, Library**

C. INSULATION CONSIDERATION:

1. Are normal noise abatement measures physically infeasible or economically unreasonable?. . . . . ☑ YES ☐ NO
   If the answer to 1 is YES, then:
2. a. Does this project have noise impacts to public or non-profit buildings?. . . . . ☐ YES ☑ NO
   b. If yes, is it reasonable and feasible to provide insulation for these buildings?. . . . . ☐ YES ☐ NO
3. a. Is private residential property affected by a 30 dB(A) or more noise level increase?. . . . . ☐ YES ☑ NO
   b. Are private residences impacted by 75 dB(A) or more?. . . . . ☐ YES ☑ NO

D. ADDITIONAL CONSIDERATIONS:

the cost is high, but considering the relatively small barrier and the real-life situation, this barrier is still recommended.

E. DECISION:

1. Are noise mitigation measures feasible?. . . . . ☑ YES ☐ NO
2. Are noise mitigation measures reasonable?. . . . . ☑ YES ☐ NO
3. Is insulation of buildings both feasible and reasonable?. . . . . ☐ YES ☑ NO
4. Shall noise mitigation measures be provided?. . . . . ☑ YES ☐ NO

F. DECISION DESCRIPTION AND JUSTIFICATION

A barrier between the homes and the off ramp (12'x 360') is recommended.

Completed by: Dale Tuchek	Date: 6-12-06

CDOT Form #1209 12/02

COLORADO DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT DETERMINATION

Instructions: ***To complete this form refer to CDOT Noise Analysis Guidelines***

Project # VH EIS	Project code (SA#)	STIP #	Project Location: 3300 W. 5th - #1

A. FEASIBILITY:

1. Can a continuous noise barrier or berm be constructed? on Park Property ☒ YES ☐ NO
2. Can a substantial noise reduction be achieved by constructing a noise barrier or berm?...
   10 dBA: ☐ YES ☐ NO 7-10 dBA: ☐ YES ☐ NO 5-7 dBA: ☒ YES ☐ NO
3. Are there any "fatal flaw" safety or maintenance issues involving the proposed noise barrier or berm? ☐ YES ☒ NO

B. REASONABLENESS:

	EXTREMELY REASONABLE	REASONABLE	MARGINALLY REASONABLE	UNREASONABLE
1. Cost Benefit Index (per receiver per dBA)	☐ Less than $3000	☐ $3000-$3750	☐ $3750-$4000	☒ More than $4000 9600
2. Average Build Noise Level	☐ 70 dBA or More	☒ 66 - 70 dBA	☐ 63 - 66 dBA	☐ Less than 63 dBA
3. Impacted persons' desires	☐ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
4. Development Type (Category B*)	☒ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
5. Development Existence (15 years or more)	☒ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
6. Build Noise Level vs. Existing Noise Level	☐ Greater than 10 dBA	☐ 5 - 10 dBA	☒ 0 - 5 dBA	☐ Noise Level Decrease

***Category B – Residential, School, Hospital, Park, Picnic/Active Sports Area, Motel, Church, Library**

C. INSULATION CONSIDERATION:

1. Are normal noise abatement measures physically infeasible or economically unreasonable? ☒ YES ☐ NO
   If the answer to 1 is YES, then:
2. a. Does this project have noise impacts to public or non-profit buildings? ☐ YES ☒ NO
   b. If yes, is it reasonable and feasible to provide insulation for these buildings? ☐ YES ☐ NO
3. a. Is private residential property affected by a 30 dB(A) or more noise level increase? ☐ YES ☒ NO
   b. Are private residences impacted by 75 dB(A) or more? ☐ YES ☒ NO

D. ADDITIONAL CONSIDERATIONS: This barrier is near the residential property line and would have to be on Denver Park property. Not an ideal situation. Some of the property is privately owned, too, and would have to be purchased.

E. DECISION:

1. Are noise mitigation measures feasible? ☒ YES ☐ NO
2. Are noise mitigation measures reasonable? ☐ YES ☒ NO
3. Is insulation of buildings both feasible and reasonable? ☐ YES ☒ NO
4. Shall noise mitigation measures be provided? ☐ YES ☒ NO

F. DECISION DESCRIPTION AND JUSTIFICATION

This barrier would protect only 3 homes, though they are close to 6th Ave. The cost is high. Putting a wall in a park and on private property away from road ROW is problematic. The barrier is not recommended.

Completed by:	Date:
Dale Tischuk	6-12-06

CDOT Form #1209 12/02

COLORADO DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT DETERMINATION

Instructions: ***To complete this form refer to CDOT Noise Analysis Guidelines***

Project # VH EIS	Project code (SA#)	STIP #	Project Location: 3300 W. 5th #2

A. FEASIBILITY:

1. Can a continuous noise barrier or berm be constructed? ☒ YES ☐ NO
2. Can a substantial noise reduction be achieved by constructing a noise barrier or berm?...
   10 dBA: ☐ YES ☐ NO 7-10 dBA: ☐ YES ☐ NO 5-7 dBA: ☒ YES ☐ NO
3. Are there any "fatal flaw" safety or maintenance issues involving the proposed noise barrier or berm? ☐ YES ☒ NO

B. REASONABLENESS:

	EXTREMELY REASONABLE	REASONABLE	MARGINALLY REASONABLE	UNREASONABLE
1. Cost Benefit Index (per receiver per dBA)	☐ Less than $3000	☐ $3000-$3750	☐ $3750-$4000	☒ More than $4000 38000
2. Average Build Noise Level	☐ 70 dBA or More	☒ 66 - 70 dBA	☐ 63 - 66 dBA	☐ Less than 63 dBA
3. Impacted persons' desires	☐ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
4. Development Type (Category B*)	☒ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
5. Development Existence (15 years or more)	☒ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
6. Build Noise Level vs. Existing Noise Level	☐ Greater than 10 dBA	☐ 5 - 10 dBA	☒ 0 - 5 dBA	☐ Noise Level Decrease

***Category B – Residential, School, Hospital, Park, Picnic/Active Sports Area, Motel, Church, Library**

C. INSULATION CONSIDERATION:

1. Are normal noise abatement measures physically infeasible or economically unreasonable? ☒ YES ☐ NO
   If the answer to 1 is YES, then:
2. a. Does this project have noise impacts to public or non-profit buildings? ☐ YES ☒ NO
   b. If yes, is it reasonable and feasible to provide insulation for these buildings? ☐ YES ☐ NO
3. a. Is private residential property affected by a 30 dB(A) or more noise level increase? ☐ YES ☒ NO
   b. Are private residences impacted by 75 dB(A) or more? ☐ YES ☒ NO

D. ADDITIONAL CONSIDERATIONS:

this barrier is exhorbitantly expensive for the benefit provided.

E. DECISION:

1. Are noise mitigation measures feasible? ☒ YES ☐ NO
2. Are noise mitigation measures reasonable? ☐ YES ☒ NO
3. Is insulation of buildings both feasible and reasonable? ☐ YES ☒ NO
4. Shall noise mitigation measures be provided? ☐ YES ☒ NO

F. DECISION DESCRIPTION AND JUSTIFICATION

Given the geometry of this space, this barrier must be very long and tall. It is not very effective for its size. It is not recommended for the Preferred Alternative.

Completed by:	Date:
Dan Tischuk	6-12-06

CDOT Form #1209 12/02

COLORADO DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT DETERMINATION

Instructions: ***To complete this form refer to CDOT Noise Analysis Guidelines***

Project # VIt EIS	Project code (SA#)	STIP #	Project Location: Barnum Park

A. FEASIBILITY:

1. Can a continuous noise barrier or berm be constructed? ☒ YES ☐ NO
2. Can a substantial noise reduction be achieved by constructing a noise barrier or berm?...
   10 dBA: ☐ YES ☐ NO 7-10 dBA: ☐ YES ☐ NO 5-7 dBA: ☒ YES ☐ NO
3. Are there any "fatal flaw" safety or maintenance issues involving the proposed noise barrier or berm? ☐ YES ☒ NO

B. REASONABLENESS:

	EXTREMELY REASONABLE	REASONABLE	MARGINALLY REASONABLE	UNREASONABLE
1. Cost Benefit Index (per receiver per dBA)	☐ Less than $3000	☐ $3000-$3750	☐ $3750-$4000	☒ More than $4000 (27000)
2. Average Build Noise Level	☐ 70 dBA or More	☒ 66 - 70 dBA	☐ 63 - 66 dBA	☐ Less than 63 dBA
3. Impacted persons' desires	☐ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
4. Development Type (Category B*)	☒ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
5. Development Existence (15 years or more)	☒ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
6. Build Noise Level vs. Existing Noise Level	☐ Greater than 10 dBA	☐ 5 - 10 dBA	☒ 0 - 5 dBA	☐ Noise Level Decrease

***Category B – Residential, School, Hospital, Park, Picnic/Active Sports Area, Motel, Church, Library**

C. INSULATION CONSIDERATION:

1. Are normal noise abatement measures physically infeasible or economically unreasonable? ☒ YES ☐ NO
   If the answer to 1 is YES, then:
2. a. Does this project have noise impacts to public or non-profit buildings? ☐ YES ☒ NO
   b. If yes, is it reasonable and feasible to provide insulation for these buildings? ☐ YES ☐ NO
3. a. Is private residential property affected by a 30 dB(A) or more noise level increase? ☐ YES ☒ NO
   b. Are private residences impacted by 75 dB(A) or more? ☐ YES ☒ NO

D. ADDITIONAL CONSIDERATIONS:

there are no developed park facilities in the impacted area.

E. DECISION:

1. Are noise mitigation measures feasible? ☒ YES ☐ NO
2. Are noise mitigation measures reasonable? ☐ YES ☒ NO
3. Is insulation of buildings both feasible and reasonable? ☐ YES ☒ NO
4. Shall noise mitigation measures be provided? ☐ YES ☒ NO

F. DECISION DESCRIPTION AND JUSTIFICATION

the barrier is very large but provides relatively little benefit. this barrier is not recommended.

Completed by: Dale Tuchek	Date: 6-13-06

CDOT Form #1209 12/02

COLORADO DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT DETERMINATION

Instructions: ***To complete this form refer to CDOT Noise Analysis Guidelines***

Project # VH EIS	Project code (SA#)	STIP #	Project Location: Barnum North Park

A. FEASIBILITY:

1. Can a continuous noise barrier or berm be constructed? ☒ YES ☐ NO
2. Can a substantial noise reduction be achieved by constructing a noise barrier or berm?...
   10 dBA: ☐ YES ☐ NO 7-10 dBA: ☐ YES ☐ NO 5-7 dBA: ☒ YES ☐ NO
3. Are there any "fatal flaw" safety or maintenance issues involving the proposed noise barrier or berm? ☐ YES ☒ NO

B. REASONABLENESS:

	EXTREMELY REASONABLE	REASONABLE	MARGINALLY REASONABLE	UNREASONABLE
1. Cost Benefit Index (per receiver per dBA)	☐ Less than $3000	☐ $3000-$3750	☐ $3750-$4000	☒ More than $4000 94000
2. Average Build Noise Level	☐ 70 dBA or More	☒ 66 - 70 dBA	☐ 63 - 66 dBA	☐ Less than 63 dBA
3. Impacted persons' desires	☐ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
4. Development Type (Category B*)	☒ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
5. Development Existence (15 years or more)	☒ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
6. Build Noise Level vs. Existing Noise Level	☐ Greater than 10 dBA	☐ 5 - 10 dBA	☒ 0 - 5 dBA	☐ Noise Level Decrease

***Category B – Residential, School, Hospital, Park, Picnic/Active Sports Area, Motel, Church, Library**

C. INSULATION CONSIDERATION:

1. Are normal noise abatement measures physically infeasible or economically unreasonable? ☒ YES ☐ NO
   If the answer to 1 is YES, then:
2. a. Does this project have noise impacts to public or non-profit buildings? ☐ YES ☒ NO
   b. If yes, is it reasonable and feasible to provide insulation for these buildings? ☐ YES ☐ NO
3. a. Is private residential property affected by a 30 dB(A) or more noise level increase? ☐ YES ☒ NO
   b. Are private residences impacted by 75 dB(A) or more? ☐ YES ☒ NO

D. ADDITIONAL CONSIDERATIONS:

A very large wall for relatively little benefit. Doesn't help the ball fields much.

E. DECISION:

1. Are noise mitigation measures feasible? ☒ YES ☐ NO
2. Are noise mitigation measures reasonable? ☐ YES ☒ NO
3. Is insulation of buildings both feasible and reasonable? ☐ YES ☒ NO
4. Shall noise mitigation measures be provided? ☐ YES ☒ NO

F. DECISION DESCRIPTION AND JUSTIFICATION

The barrier is large but provides little benefit. The barrier is not recommended.

Completed by: Dale Tischmak	Date: 6-13-06

CDOT Form #1209 12/02

COLORADO DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT DETERMINATION

Instructions: ***To complete this form refer to CDOT Noise Analysis Guidelines***

Project # VH EIS	Project code (SA#)	STIP #	Project Location: Frog Hollow Park

A. FEASIBILITY:

1. Can a continuous noise barrier or berm be constructed? ☒ YES ☐ NO
2. Can a substantial noise reduction be achieved by constructing a noise barrier or berm?...
   10 dBA: ☐ YES ☐ NO 7-10 dBA: ☐ YES ☐ NO 5-7 dBA: ☒ YES ☐ NO
3. Are there any "fatal flaw" safety or maintenance issues involving the proposed noise barrier or berm? ☐ YES ☒ NO

B. REASONABLENESS:

		EXTREMELY REASONABLE	REASONABLE	MARGINALLY REASONABLE	UNREASONABLE
1.	Cost Benefit Index (per receiver per dBA)	☐ Less than $3000	☐ $3000-$3750	☐ $3750-$4000	☒ More than $4000 72000
2.	Average Build Noise Level	☐ 70 dBA or More	☒ 66 - 70 dBA	☐ 63 - 66 dBA	☐ Less than 63 dBA
3.	Impacted persons' desires	☐ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
4.	Development Type (Category B*)	☒ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
5.	Development Existence (15 years or more)	☒ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
6.	Build Noise Level vs. Existing Noise Level	☐ Greater than 10 dBA	☐ 5 - 10 dBA	☒ 0 - 5 dBA	☐ Noise Level Decrease

***Category B – Residential, School, Hospital, Park, Picnic/Active Sports Area, Motel, Church, Library**

C. INSULATION CONSIDERATION:

1. Are normal noise abatement measures physically infeasible or economically unreasonable? ☒ YES ☐ NO
   If the answer to 1 is YES, then:
2. a. Does this project have noise impacts to public or non-profit buildings? ☐ YES ☒ NO
   b. If yes, is it reasonable and feasible to provide insulation for these buildings? ☐ YES ☐ NO
3. a. Is private residential property affected by a 30 dB(A) or more noise level increase? ☐ YES ☒ NO
   b. Are private residences impacted by 75 dB(A) or more? ☐ YES ☒ NO

D. ADDITIONAL CONSIDERATIONS:

E. DECISION:

1. Are noise mitigation measures feasible? ☒ YES ☐ NO
2. Are noise mitigation measures reasonable? ☐ YES ☒ NO
3. Is insulation of buildings both feasible and reasonable? ☐ YES ☒ NO
4. Shall noise mitigation measures be provided? ☐ YES ☒ NO

F. DECISION DESCRIPTION AND JUSTIFICATION

The barrier is very expensive for the benefit provided. The main facility that would benefit is a bike path. The barrier is not recommended.

Completed by:	Date:
Debi Tuchule	6-13-06

CDOT Form #1209 12/02

COLORADO DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT DETERMINATION

Instructions: ***To complete this form refer to CDOT Noise Analysis Guidelines***

Project # VH EIS	Project code (SA#)	STIP #	Project Location: Milstein Park

A. FEASIBILITY:

1. Can a continuous noise barrier or berm be constructed? ☒ YES ☐ NO
2. Can a substantial noise reduction be achieved by constructing a noise barrier or berm?...
   10 dBA: ☐ YES ☐ NO 7-10 dBA: ☒ YES ☐ NO 5-7 dBA: ☐ YES ☐ NO
3. Are there any "fatal flaw" safety or maintenance issues involving the proposed noise barrier or berm? ☐ YES ☒ NO

B. REASONABLENESS:

		EXTREMELY REASONABLE	REASONABLE	MARGINALLY REASONABLE	UNREASONABLE
1.	Cost Benefit Index (per receiver per dBA)	☐ Less than $3000	☐ $3000-$3750	☐ $3750-$4000	☒ More than $4000
2.	Average Build Noise Level	☒ 70 dBA or More	☐ 66 - 70 dBA	☐ 63 - 66 dBA	☐ Less than 63 dBA
3.	Impacted persons' desires	☐ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
4.	Development Type (Category B*)	☒ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
5.	Development Existence (15 years or more)	☒ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
6.	Build Noise Level vs. Existing Noise Level	☐ Greater than 10 dBA	☐ 5 - 10 dBA	☒ 0 - 5 dBA	☐ Noise Level Decrease

***Category B – Residential, School, Hospital, Park, Picnic/Active Sports Area, Motel, Church, Library**

C. INSULATION CONSIDERATION:

1. Are normal noise abatement measures physically infeasible or economically unreasonable? ☒ YES ☐ NO
   If the answer to 1 is YES, then:
2. a. Does this project have noise impacts to public or non-profit buildings? ☐ YES ☒ NO
   b. If yes, is it reasonable and feasible to provide insulation for these buildings? ☐ YES ☐ NO
3. a. Is private residential property affected by a 30 dB(A) or more noise level increase? ☐ YES ☒ NO
   b. Are private residences impacted by 75 dB(A) or more? ☐ YES ☒ NO

D. ADDITIONAL CONSIDERATIONS:

These barriers are 1 meter tall at the edge of elevated roads and bridges. Safety barriers that are continuous would act as noise barriers. It is expected that the noise barriers would just be jersey barriers.

E. DECISION:

1. Are noise mitigation measures feasible? ☒ YES ☐ NO
2. Are noise mitigation measures reasonable? ☒ YES ☐ NO
3. Is insulation of buildings both feasible and reasonable? ☐ YES ☒ NO
4. Shall noise mitigation measures be provided? ☒ YES ☐ NO

F. DECISION DESCRIPTION AND JUSTIFICATION

It is recommended that jersey barriers or equivalent safety barriers be used at the edge of the roads in these areas. The safety barriers would also act as noise barriers. Separate noise barrier structures are not being recommended.

Completed by:	Date:
[illegible signature]	6-13-06

CDOT Form #1209 12/02

COLORADO DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT DETERMINATION

Instructions: ***To complete this form refer to CDOT Noise Analysis Guidelines***

Project # VH EIS	Project code (SA#)	STIP #	Project Location: Valverde Park

A. FEASIBILITY:

1. Can a continuous noise barrier or berm be constructed? ☒ YES ☐ NO
2. Can a substantial noise reduction be achieved by constructing a noise barrier or berm?...
   10 dBA: ☐ YES ☐ NO 7-10 dBA: ☐ YES ☐ NO 5-7 dBA: ☒ YES ☐ NO
3. Are there any "fatal flaw" safety or maintenance issues involving the proposed noise barrier or berm? ☐ YES ☒ NO

B. REASONABLENESS:

	EXTREMELY REASONABLE	REASONABLE	MARGINALLY REASONABLE	UNREASONABLE
1. Cost Benefit Index (per receiver per dBA)	☐ Less than $3000	☐ $3000-$3750	☐ $3750-$4000	☒ More than $4000 22000
2. Average Build Noise Level	☐ 70 dBA or More	☒ 66 - 70 dBA	☐ 63 - 66 dBA	☐ Less than 63 dBA
3. Impacted persons' desires	☐ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
4. Development Type (Category B*)	☒ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
5. Development Existence (15 years or more)	☒ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
6. Build Noise Level vs. Existing Noise Level	☐ Greater than 10 dBA	☐ 5 - 10 dBA	☒ 0 - 5 dBA	☐ Noise Level Decrease

***Category B – Residential, School, Hospital, Park, Picnic/Active Sports Area, Motel, Church, Library**

C. INSULATION CONSIDERATION:

1. Are normal noise abatement measures physically infeasible or economically unreasonable? ☒ YES ☐ NO
   If the answer to 1 is YES, then:
2. a. Does this project have noise impacts to public or non-profit buildings? ☐ YES ☒ NO
   b. If yes, is it reasonable and feasible to provide insulation for these buildings? ☐ YES ☐ NO
3. a. Is private residential property affected by a 30 dB(A) or more noise level increase? ☐ YES ☒ NO
   b. Are private residences impacted by 75 dB(A) or more? ☐ YES ☒ NO

D. ADDITIONAL CONSIDERATIONS: the developed park facilities are on the less noisy side of the park. The barrier would cut off foot access for one entire side of the park, the bike path side.

E. DECISION:

1. Are noise mitigation measures feasible? ☒ YES ☐ NO
2. Are noise mitigation measures reasonable? ☐ YES ☒ NO
3. Is insulation of buildings both feasible and reasonable? ☐ YES ☒ NO
4. Shall noise mitigation measures be provided? ☐ YES ☒ NO

F. DECISION DESCRIPTION AND JUSTIFICATION

The barrier is not particularly effective and would create access problems for a public space. The barrier is not recommended.

Completed by:	Date:
Dale Tischuk	6-12-06

CDOT Form #1209 12/02

COLORADO DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT DETERMINATION

Instructions: ***To complete this form refer to CDOT Noise Analysis Guidelines***

Project # VH EIS	Project code (SA#)	STIP #	Project Location: Habitat Park

A. FEASIBILITY:

1. Can a continuous noise barrier or berm be constructed? ☒ YES ☐ NO
2. Can a substantial noise reduction be achieved by constructing a noise barrier or berm?...
   10 dBA: ☐ YES ☐ NO 7-10 dBA: ☐ YES ☐ NO 5-7 dBA: ☐ YES ☒ NO
3. Are there any "fatal flaw" safety or maintenance issues involving the proposed noise barrier or berm? ☒ YES ☐ NO

B. REASONABLENESS:

		EXTREMELY REASONABLE	REASONABLE	MARGINALLY REASONABLE	UNREASONABLE
1.	Cost Benefit Index (per receiver per dBA)	☐ Less than $3000	☐ $3000-$3750	☐ $3750-$4000	☐ More than $4000
2.	Average Build Noise Level	☐ 70 dBA or More	☐ 66 - 70 dBA	☐ 63 - 66 dBA	☐ Less than 63 dBA
3.	Impacted persons' desires	☐ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
4.	Development Type (Category B*)	☐ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
5.	Development Existence (15 years or more)	☐ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
6.	Build Noise Level vs. Existing Noise Level	☐ Greater than 10 dBA	☐ 5 - 10 dBA	☐ 0 - 5 dBA	☐ Noise Level Decrease

***Category B – Residential, School, Hospital, Park, Picnic/Active Sports Area, Motel, Church, Library**

C. INSULATION CONSIDERATION:

1. Are normal noise abatement measures physically infeasible or economically unreasonable? ☐ YES ☐ NO
   If the answer to 1 is YES, then:
2. a. Does this project have noise impacts to public or non-profit buildings? ☐ YES ☐ NO
   b. If yes, is it reasonable and feasible to provide insulation for these buildings? ☐ YES ☐ NO
3. a. Is private residential property affected by a 30 dB(A) or more noise level increase? ☐ YES ☐ NO
   b. Are private residences impacted by 75 dB(A) or more? ☐ YES ☐ NO

D. ADDITIONAL CONSIDERATIONS:

E. DECISION:

1. Are noise mitigation measures feasible? ☐ YES ☒ NO
2. Are noise mitigation measures reasonable? ☐ YES ☐ NO
3. Is insulation of buildings both feasible and reasonable? ☐ YES ☐ NO
4. Shall noise mitigation measures be provided? ☐ YES ☒ NO

F. DECISION DESCRIPTION AND JUSTIFICATION

Both sides of the park would need barriers for effective noise reduction. This would severely restrict access. Effective noise barriers are not really feasible, so they are not recommended.

Completed by:	Date:
Dale Trachuk	6-13-06

CDOT Form #1209 12/02

COLORADO DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT DETERMINATION

Instructions: ***To complete this form refer to CDOT Noise Analysis Guidelines***

Project # VH ELS	Project code (SA#)	STIP #	Project Location: Vandewalt Park

A. FEASIBILITY:

1. Can a continuous noise barrier or berm be constructed? ☒ YES ☐ NO
2. Can a substantial noise reduction be achieved by constructing a noise barrier or berm?...
   10 dBA: ☐ YES ☐ NO 7-10 dBA: ☐ YES ☐ NO 5-7 dBA: ☒ YES ☐ NO
3. Are there any "fatal flaw" safety or maintenance issues involving the proposed noise barrier or berm? ☐ YES ☒ NO

B. REASONABLENESS:

		EXTREMELY REASONABLE	REASONABLE	MARGINALLY REASONABLE	UNREASONABLE
1.	Cost Benefit Index (per receiver per dBA)	☐ Less than $3000	☐ $3000-$3750	☐ $3750-$4000	☒ More than $4000 39000
2.	Average Build Noise Level	☐ 70 dBA or More	☒ 66 - 70 dBA	☒ 63 - 66 dBA	☐ Less than 63 dBA
3.	Impacted persons' desires	☐ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
4.	Development Type (Category B*)	☒ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
5.	Development Existence (15 years or more)	☒ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
6.	Build Noise Level vs. Existing Noise Level	☐ Greater than 10 dBA	☐ 5 - 10 dBA	☒ 0 - 5 dBA	☐ Noise Level Decrease

***Category B – Residential, School, Hospital, Park, Picnic/Active Sports Area, Motel, Church, Library**

C. INSULATION CONSIDERATION:

1. Are normal noise abatement measures physically infeasible or economically unreasonable? ☒ YES ☐ NO
   If the answer to 1 is YES, then:
2. a. Does this project have noise impacts to public or non-profit buildings? ☐ YES ☒ NO
   b. If yes, is it reasonable and feasible to provide insulation for these buildings? ☐ YES ☐ NO
3. a. Is private residential property affected by a 30 dB(A) or more noise level increase? ☐ YES ☒ NO
   b. Are private residences impacted by 75 dB(A) or more? ☐ YES ☒ NO

D. ADDITIONAL CONSIDERATIONS:

A barrier 8' x 1650' would provide 5-8 dB reduction for the eastern part of the park. Some of the park is leased property.

E. DECISION:

1. Are noise mitigation measures feasible? ☒ YES ☐ NO
2. Are noise mitigation measures reasonable? ☐ YES ☒ NO
3. Is insulation of buildings both feasible and reasonable? ☐ YES ☒ NO
4. Shall noise mitigation measures be provided? ☐ YES ☒ NO

F. DECISION DESCRIPTION AND JUSTIFICATION

For a barrier this size, relatively little benefit would be realized. The cost is high for the benefit provided. The barrier is not recommended.

Completed by:	Date:
[illegible]	6-13-06

CDOT Form #1209 12/02

COLORADO DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT DETERMINATION

Instructions: ***To complete this form refer to CDOT Noise Analysis Guidelines***

Project # Vit EIS	Project code (SA#)	STIP #	Project Location: Platte Bike Path

A. FEASIBILITY:

1. Can a continuous noise barrier or berm be constructed? ☒ YES ☐ NO
2. Can a substantial noise reduction be achieved by constructing a noise barrier or berm?...
   10 dBA: ☐ YES ☐ NO 7-10 dBA: ☐ YES ☐ NO 5-7 dBA: ☒ YES ☐ NO
3. Are there any "fatal flaw" safety or maintenance issues involving the proposed noise barrier or berm? ☐ YES ☒ NO

B. REASONABLENESS:

		EXTREMELY REASONABLE	REASONABLE	MARGINALLY REASONABLE	UNREASONABLE
1.	Cost Benefit Index (per receiver per dBA)	☐ Less than $3000	☐ $3000-$3750	☐ $3750-$4000	☒ More than $4000 180000
2.	Average Build Noise Level	☒ 70 dBA or More	☐ 66 - 70 dBA	☐ 63 - 66 dBA	☐ Less than 63 dBA
3.	Impacted persons' desires	☐ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
4.	Development Type (Category B*)	☒ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
5.	Development Existence (15 years or more)	☒ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
6.	Build Noise Level vs. Existing Noise Level	☐ Greater than 10 dBA	☐ 5 - 10 dBA	☒ 0 - 5 dBA	☐ Noise Level Decrease

***Category B – Residential, School, Hospital, Park, Picnic/Active Sports Area, Motel, Church, Library**

C. INSULATION CONSIDERATION:

1. Are normal noise abatement measures physically infeasible or economically unreasonable? ☒ YES ☐ NO
   If the answer to 1 is YES, then:
2. a. Does this project have noise impacts to public or non-profit buildings? ☐ YES ☒ NO
   b. If yes, is it reasonable and feasible to provide insulation for these buildings? ☐ YES ☐ NO
3. a. Is private residential property affected by a 30 dB(A) or more noise level increase? ☐ YES ☒ NO
   b. Are private residences impacted by 75 dB(A) or more? ☐ YES ☒ NO

D. ADDITIONAL CONSIDERATIONS:

This is a bike path, not truely a park.

E. DECISION:

1. Are noise mitigation measures feasible? ☒ YES ☐ NO
2. Are noise mitigation measures reasonable? ☐ YES ☒ NO
3. Is insulation of buildings both feasible and reasonable? ☐ YES ☒ NO
4. Shall noise mitigation measures be provided? ☐ YES ☒ NO

F. DECISION DESCRIPTION AND JUSTIFICATION

To protect the entire length of bike path along I-25 would require a very long barrier. The barrier would provide relatively little benefit. This barrier is not recommended.

Completed by:	Date:
Dale Tuchek	6-12-06

CDOT Form #1209 12/02

COLORADO DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT DETERMINATION

Instructions: ***To complete this form refer to CDOT Noise Analysis Guidelines***

Project # VH EIS	Project code (SA#)	STIP #	Project Location: Platte Bike Path at 3rd Ave.

A. FEASIBILITY:

1. Can a continuous noise barrier or berm be constructed? ☒ YES ☐ NO
2. Can a substantial noise reduction be achieved by constructing a noise barrier or berm?...
   10 dBA: ☐ YES ☐ NO 7-10 dBA: ☐ YES ☐ NO 5-7 dBA: ☒ YES ☐ NO
3. Are there any "fatal flaw" safety or maintenance issues involving the proposed noise barrier or berm? ☐ YES ☒ NO

B. REASONABLENESS:

		EXTREMELY REASONABLE	REASONABLE	MARGINALLY REASONABLE	UNREASONABLE
1.	Cost Benefit Index (per receiver per dBA)	☐ Less than $3000	☐ $3000-$3750	☐ $3750-$4000	☒ More than $4000 19000
2.	Average Build Noise Level	☒ 70 dBA or More	☐ 66 - 70 dBA	☐ 63 - 66 dBA	☐ Less than 63 dBA
3.	Impacted persons' desires	☐ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
4.	Development Type (Category B*)	☒ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
5.	Development Existence (15 years or more)	☒ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
6.	Build Noise Level vs. Existing Noise Level	☐ Greater than 10 dBA	☐ 5 - 10 dBA	☒ 0 - 5 dBA	☐ Noise Level Decrease

***Category B – Residential, School, Hospital, Park, Picnic/Active Sports Area, Motel, Church, Library**

C. INSULATION CONSIDERATION:

1. Are normal noise abatement measures physically infeasible or economically unreasonable? ☒ YES ☐ NO
   If the answer to 1 is YES, then:
2. a. Does this project have noise impacts to public or non-profit buildings? ☐ YES ☒ NO
   b. If yes, is it reasonable and feasible to provide insulation for these buildings? ☐ YES ☐ NO
3. a. Is private residential property affected by a 30 dB(A) or more noise level increase? ☐ YES ☒ NO
   b. Are private residences impacted by 75 dB(A) or more? ☐ YES ☒ NO

D. ADDITIONAL CONSIDERATIONS:

This is a bike path, not a traditional park, but is being treated as a park. The cost/benefit for a noise barrier is not reasonable, but the barrier could also provide a safety benefit to bicyclists. Barrier 9' x 500'

E. DECISION:

1. Are noise mitigation measures feasible? ☒ YES ☐ NO
2. Are noise mitigation measures reasonable? ☒ YES ☐ NO
3. Is insulation of buildings both feasible and reasonable? ☐ YES ☒ NO
4. Shall noise mitigation measures be provided? ☒ YES ☐ NO

F. DECISION DESCRIPTION AND JUSTIFICATION

The cost for this barrier is relatively high, but the path is very close to I-25 and very loud. This barrier would add safety for bicyclists. This barrier is recommended.

Completed by: Dale Tuschmann	Date: 6-12-06

CDOT Form #1209 12/02

COLORADO DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT DETERMINATION

Instructions: ***To complete this form refer to CDOT Noise Analysis Guidelines***

Project # VH EIS	Project code (SA#)	STIP #	Project Location: Vanderbilt East Park

A. FEASIBILITY:

1. Can a continuous noise barrier or berm be constructed? ☒ YES ☐ NO
2. Can a substantial noise reduction be achieved by constructing a noise barrier or berm?...
   10 dBA: ☐ YES ☐ NO 7-10 dBA: ☐ YES ☐ NO 5-7 dBA: ☒ YES ☐ NO
3. Are there any "fatal flaw" safety or maintenance issues involving the proposed noise barrier or berm? ☐ YES ☒ NO

B. REASONABLENESS:

	EXTREMELY REASONABLE	REASONABLE	MARGINALLY REASONABLE	UNREASONABLE
1. Cost Benefit Index (per receiver per dBA)	☐ Less than $3000	☐ $3000-$3750	☐ $3750-$4000	☒ More than $4000 55000
2. Average Build Noise Level	☐ 70 dBA or More	☒ 66 - 70 dBA	☐ 63 - 66 dBA	☐ Less than 63 dBA
3. Impacted persons' desires	☐ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
4. Development Type (Category B*)	☒ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
5. Development Existence (15 years or more)	☒ More than 75%	☐ 50% - 75%	☐ 25% - 50%	☐ Less than 25%
6. Build Noise Level vs. Existing Noise Level	☐ Greater than 10 dBA	☐ 5 - 10 dBA	☒ 0 - 5 dBA	☐ Noise Level Decrease

***Category B – Residential, School, Hospital, Park, Picnic/Active Sports Area, Motel, Church, Library**

C. INSULATION CONSIDERATION:

1. Are normal noise abatement measures physically infeasible or economically unreasonable? ☒ YES ☐ NO
   If the answer to 1 is YES, then:
2. a. Does this project have noise impacts to public or non-profit buildings? ☐ YES ☒ NO
   b. If yes, is it reasonable and feasible to provide insulation for these buildings? ☐ YES ☐ NO
3. a. Is private residential property affected by a 30 dB(A) or more noise level increase? ☐ YES ☒ NO
   b. Are private residences impacted by 75 dB(A) or more? ☐ YES ☒ NO

D. ADDITIONAL CONSIDERATIONS:

The barrier would have to cover 2 of the 3 park sides. This is presently an industrial area, but is being redeveloped residential. There are no facilities currently in the park.

E. DECISION:

1. Are noise mitigation measures feasible? ☒ YES ☐ NO
2. Are noise mitigation measures reasonable? ☐ YES ☒ NO
3. Is insulation of buildings both feasible and reasonable? ☐ YES ☒ NO
4. Shall noise mitigation measures be provided? ☐ YES ☒ NO

F. DECISION DESCRIPTION AND JUSTIFICATION

The barrier is very expensive for the benefit provided. The park has no facilities and none in the future are certain. The barrier is not recommended.

Completed by: Dale Tischuk	Date: 6-13-06

CDOT Form #1209 12/02

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APPENDIX B
NOISE MODEL RECEIVERS

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Figure B-1 Noise Model Receivers –
Federal Boulevard, Santa Fe Drive and Alameda Avenue
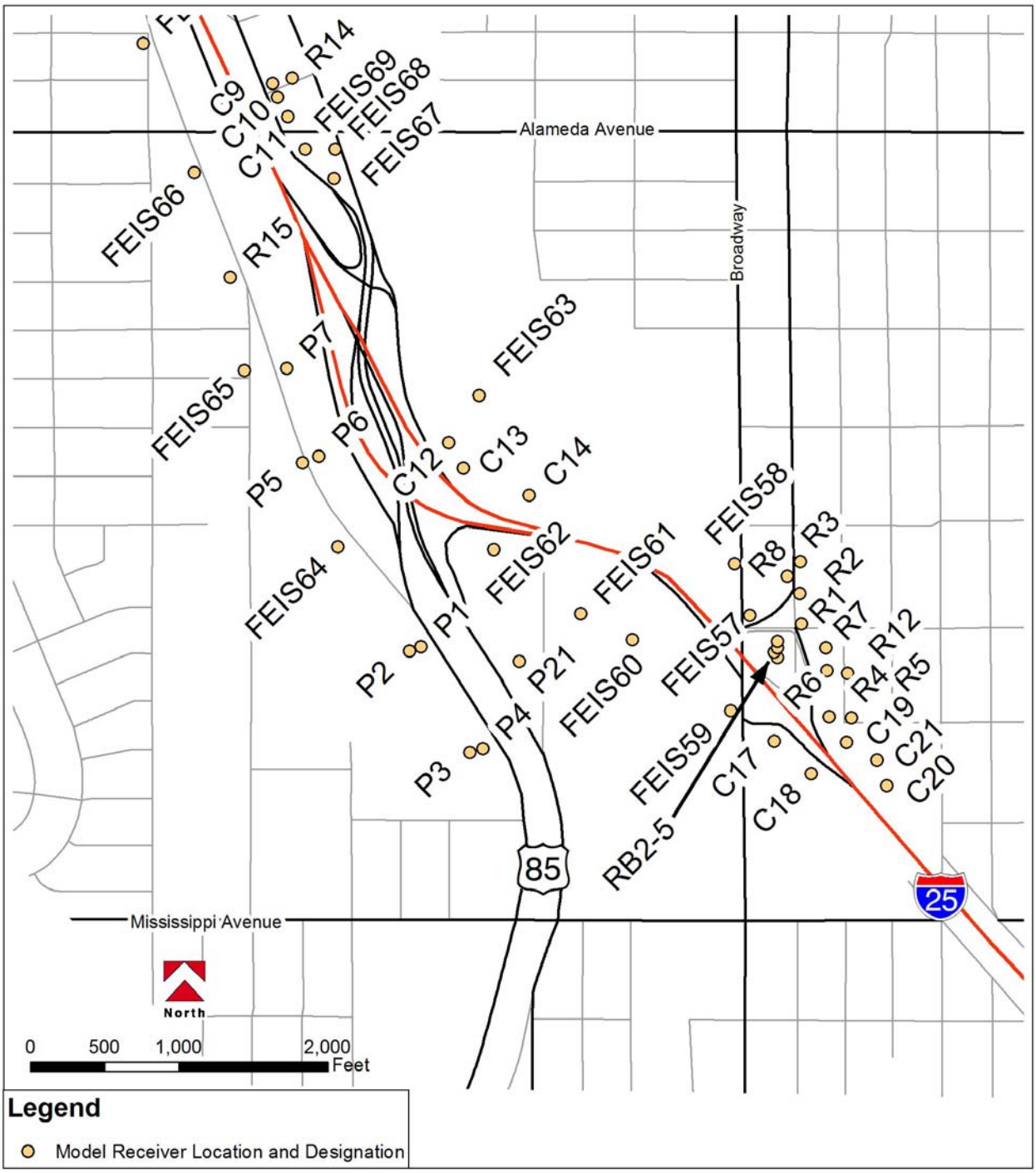
Figure B-2 Noise Model Receivers – Alameda Avenue, Broadway, and Mississippi Avenue