



Noise Analysis and Abatement Guidelines

COLORADO DEPARTMENT OF TRANSPORTATION NOISE ABATEMENT DETERMINATION WORKSHEET

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

Project/STIP # US160 SDEIS Grandview -Three Springs Segment MIT1abc Date of Analysis: 8/2/2011

Project Name & Location: R52, R55-C57, R118-R119, R318, R320-R323R318, south side of US160 wall along service road

A. FEASIBILITY:

1. Can a 5dBA noise reduction be achieved by constructing a noise barrier or berm? YES NO
2. Are there any fatal flaw drainage, terrain, safety, or maintenance issues involving the proposed noise barrier or berm? YES NO
3. Can a noise barrier or berm less than 20 feet tall be constructed? YES NO

B. REASONABLENESS:

1. Has the Design goal of 7 dBA noise reduction for abatement measure been met for at least one impacted receptor? YES NO
2. Is the Cost Benefit Index below \$6800 per receptor per dBA? YES NO
3. Are more than 50% of benefited resident/owners in favor of the recommended noise abatement measure? YES NO

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 NAC Activity Category D? YES NO
- b. If yes, is it reasonable and feasible to provide insulation for these buildings? YES NO

D. ADDITIONAL CONSIDERATIONS:

- These walls are not continuous, requiring gaps for driveway access to service rd.
- Hilly terrain affects the effectiveness of barrier height in this area.
- The CBI for the most optimized wall geometries are \$7276 and \$10,093.

E. STATEMENT OF LIKELIHOOD:

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 abatement measures be provided? YES NO

F. ABATEMENT DECISION DESCRIPTION AND JUSTIFICATION:

MIT 1a,b,c, barrier geometries needed to meet the noise reduction design goal, exceed the CBI; therefore, the required 3 reasonableness criteria cannot be met for abatement measure to be considered reasonable. No abatement is recommended for this location.

Completed by: _____

Jill Schliefer
Jill Schliefer

Date: August 2, 2011



Noise Analysis and Abatement Guidelines

COLORADO DEPARTMENT OF TRANSPORTATION NOISE ABATEMENT DETERMINATION WORKSHEET

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

Project/STIP # US160 SDEIS Grandview –Three Springs Segment MIT1d Date of Analysis: 8/2/2011

Project Name & Location: R52 to R119, R320-R323 south side of US160; wall location along eastbound exit ramp

A. FEASIBILITY:

1. Can a 5dBA noise reduction be achieved by constructing a noise barrier or berm? YES NO
2. Are there any fatal flaw drainage, terrain, safety, or maintenance issues involving the proposed noise barrier or berm? YES NO
3. Can a noise barrier or berm less than 20 feet tall be constructed? YES NO

B. REASONABLENESS:

1. Has the Design goal of 7 dBA noise reduction for abatement measure been met for at least one impacted receptor? YES NO
2. Is the Cost Benefit Index below \$6800 per receptor per dBA? YES NO
3. Are more than 50% of benefited resident/owners in favor of the recommended noise abatement measure? YES NO

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 NAC Activity Category D? YES NO
- b. If yes, is it reasonable and feasible to provide insulation for these buildings? YES NO

D. ADDITIONAL CONSIDERATIONS:

- This wall is continuous along outside of eastbound ramp to CR 233, however elevation differences between US160 mainline and ramp as it approaches CR233 allows line-of-sight traffic exposure to impacted area. Hilly terrain affects the effectiveness of barrier height in this area.
- CBI of \$14,571 for this wall is not reasonable.
- Icing along shadow zone of 18ft tall wall along ramp travel lane needs to be checked.

E. STATEMENT OF LIKELIHOOD:

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 abatement measures be provided? YES NO

F. ABATEMENT DECISION DESCRIPTION AND JUSTIFICATION:

MIT 1d barrier geometry needed to meet the noise reduction design goal, exceeds the CBI; therefore, the required 3 reasonableness criteria cannot be met for abatement measure to be considered reasonable. No abatement is recommended for this location.

Completed by: Jill Schlaefer

Date: August 2, 2011



Noise Analysis and Abatement Guidelines

COLORADO DEPARTMENT OF TRANSPORTATION NOISE ABATEMENT DETERMINATION WORKSHEET

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

Project/STIP # US160 SDEIS Grandview -Three Springs Segment MIT2ns Date of Analysis: 8/2/2011

Project Name & Location: R304-R307 and R309-R312, R315;wall along US550 service Rd. Revised F Modified and Eastern Realignment only

A. FEASIBILITY:

1. Can a 5dBA noise reduction be achieved by constructing a noise barrier or berm? YES NO
2. Are there any fatal flaw drainage, terrain, safety, or maintenance issues involving the proposed noise barrier or berm? YES NO
3. Can a noise barrier or berm less than 20 feet tall be constructed? YES NO

B. REASONABLENESS:

1. Has the Design goal of 7 dBA noise reduction for abatement measure been met for at least one impacted receptor? YES NO
2. Is the Cost Benefit Index below \$6800 per receptor per dBA? YES NO
3. Are more than 50% of benefited resident/owners in favor of the recommended noise abatement measure? YES NO

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 NAC Activity Category D? YES NO
- b. If yes, is it reasonable and feasible to provide insulation for these buildings? YES NO

D. ADDITIONAL CONSIDERATIONS:

- Walls n and s were considered both as separate walls and as a continuous wall between the 2 neighborhoods along the Revised F Modified service road, however elevation differences between US550 mainline, service roads, and receptors allows line-of-sight traffic exposure to portions of the impacted area. Terrain affects the effectiveness of barrier height in this area.
- None of the wall configurations can achieve the design goal noise reduction of 7 dBA with a wall under 20 ft in height.

E. STATEMENT OF LIKELIHOOD:

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 abatement measures be provided? YES NO

F. ABATEMENT DECISION DESCRIPTION AND JUSTIFICATION:

MIT 2n, s barrier geometries can meet the noise reduction design goal with a feasible 20 ft wall; therefore, the required 3 reasonableness criteria cannot be met for abatement measure to be considered reasonable. No abatement is recommended for this location.

Completed by: Jill Schlaefer

Date: August 2, 2011



Noise Analysis and Abatement Guidelines

COLORADO DEPARTMENT OF TRANSPORTATION NOISE ABATEMENT DETERMINATION WORKSHEET

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

Project/STIP # US160 SDEIS Grandview -Three Springs Segment MIT2c Date of Analysis: 8/2/2011

Project Name & Location: R300-R302; wall location along US 550 service road(Revised F Modified and Eastern Realignment only

A. FEASIBILITY:

1. Can a 5dBA noise reduction be achieved by constructing a noise barrier or berm? YES NO
2. Are there any fatal flaw drainage, terrain, safety, or maintenance issues involving the proposed noise barrier or berm? YES NO
3. Can a noise barrier or berm less than 20 feet tall be constructed? YES NO

B. REASONABLENESS:

1. Has the Design goal of 7 dBA noise reduction for abatement measure been met for at least one impacted receptor? YES NO
2. Is the Cost Benefit Index below \$6800 per receptor per dBA? YES NO
3. Are more than 50% of benefited resident/owners in favor of the recommended noise abatement measure? YES NO

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 NAC Activity Category D? YES NO
- b. If yes, is it reasonable and feasible to provide insulation for these buildings? YES NO

D. ADDITIONAL CONSIDERATIONS:

- Walls n and s were considered both as separate walls and as a continuous wall between the 2 neighborhoods along the Revised F Modified service road, however elevation differences between US550 mainline, service roads, and receptors allows line-of-sight traffic exposure to portions of the impacted area. Terrain affects the effectiveness of barrier height in this area.
- Wall configurations cannot achieve the design goal noise reduction of 7 dBA with a wall under 20 ft in height.

E. STATEMENT OF LIKELIHOOD:

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 abatement measures be provided? YES NO

F. ABATEMENT DECISION DESCRIPTION AND JUSTIFICATION:

MIT 2c barrier geometry cannot meet the noise reduction design goal with a feasible 20 ft wall; therefore, the required 3 reasonableness criteria cannot be met for abatement measure to be considered reasonable. No abatement is recommended for this location.

Completed by: Jill Schlaefer

Date: August 2, 2011



Noise Analysis and Abatement Guidelines

COLORADO DEPARTMENT OF TRANSPORTATION NOISE ABATEMENT DETERMINATION WORKSHEET

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

Project/STIP # US160 SDEIS Grandview -Three Springs Segment MIT3a Date of Analysis: 8/2/2011

Project Name & Location: R324, R68-69, R74, C75, R75a-d; wall along south side US160 service road and ramp

A. FEASIBILITY:

1. Can a 5dBA noise reduction be achieved by constructing a noise barrier or berm? YES NO
2. Are there any fatal flaw drainage, terrain, safety, or maintenance issues involving the proposed noise barrier or berm? YES NO
3. Can a noise barrier or berm less than 20 feet tall be constructed? YES NO

B. REASONABLENESS:

1. Has the Design goal of 7 dBA noise reduction for abatement measure been met for at least one impacted receptor? YES NO
2. Is the Cost Benefit Index below \$6800 per receptor per dBA? YES NO
3. Are more than 50% of benefited resident/owners in favor of the recommended noise abatement measure? YES NO

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 NAC Activity Category D? YES NO
- b. If yes, is it reasonable and feasible to provide insulation for these buildings? YES NO

D. ADDITIONAL CONSIDERATIONS:

- Walls that were considered along service road required gaps for driveway access.
- Wall along outside of CR 233 to US160 ramp is continuous, however elevation differences between US160 mainline and ramp as it approaches CR233 allows line-of-sight traffic exposure to portions of the impacted area.
- Wall configurations cannot achieve the design goal noise reduction of 7 dBA.

E. STATEMENT OF LIKELIHOOD:

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 abatement measures be provided? YES NO

F. ABATEMENT DECISION DESCRIPTION AND JUSTIFICATION:

MIT 3a barrier geometry cannot meet the noise reduction design goal; therefore, the required 3 reasonableness criteria cannot be met for abatement measure to be considered reasonable. No abatement is recommended for this location.

Completed by: Jill Schlaefer

Date: August 2, 2011



Noise Analysis and Abatement Guidelines

COLORADO DEPARTMENT OF TRANSPORTATION NOISE ABATEMENT DETERMINATION WORKSHEET

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

Project/STIP # US160 SDEIS Grandview –Three Springs Segment MIT3b Date of Analysis: 8/2/2011

Project Name & Location: R70-R73; wall along north side US160 ramp and mainline

A. FEASIBILITY:

1. Can a 5dBA noise reduction be achieved by constructing a noise barrier or berm? YES NO
2. Are there any fatal flaw drainage, terrain, safety, or maintenance issues involving the proposed noise barrier or berm? YES NO
3. Can a noise barrier or berm less than 20 feet tall be constructed? YES NO

B. REASONABLENESS:

1. Has the Design goal of 7 dBA noise reduction for abatement measure been met for at least one impacted receptor? YES NO
2. Is the Cost Benefit Index below \$6800 per receptor per dBA? YES NO
3. Are more than 50% of benefited resident/owners in favor of the recommended noise abatement measure? YES NO

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 NAC Activity Category D? YES NO
- b. If yes, is it reasonable and feasible to provide insulation for these buildings? YES NO

D. ADDITIONAL CONSIDERATIONS:

- This wall is continuous along outside of westbound US160 to CR 233 ramp, however elevation differences between US160 mainline and ramp as it approaches CR233 allows line-of-sight traffic exposure to portions of the impacted area.
- CBI of \$8438 for this wall is not reasonable.

E. STATEMENT OF LIKELIHOOD:

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 abatement measures be provided? YES NO

F. ABATEMENT DECISION DESCRIPTION AND JUSTIFICATION:

MIT 3b barrier geometry needed to meet the noise reduction design goal, exceeds the CBI; therefore, the required 3 reasonableness criteria cannot be met for abatement measure to be considered reasonable. No abatement is recommended for this location.

Completed by: Jill Schlaefer

Date: August 2, 2011



Noise Analysis and Abatement Guidelines

COLORADO DEPARTMENT OF TRANSPORTATION NOISE ABATEMENT DETERMINATION WORKSHEET

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

Project/STIP # US160 SDEIS Grandview -Three Springs Segment MIT4a Date of Analysis: 8/2/2011

Project Name & Location: R83-R84, R86; wall along south side US160 service road and mainline

A. FEASIBILITY:

1. Can a 5dBA noise reduction be achieved by constructing a noise barrier or berm? YES NO
2. Are there any fatal flaw drainage, terrain, safety, or maintenance issues involving the proposed noise barrier or berm? YES NO
3. Can a noise barrier or berm less than 20 feet tall be constructed? YES NO

B. REASONABLENESS:

1. Has the Design goal of 7 dBA noise reduction for abatement measure been met for at least one impacted receptor? YES NO
2. Is the Cost Benefit Index below \$6800 per receptor per dBA? YES NO
3. Are more than 50% of benefited resident/owners in favor of the recommended noise abatement measure? YES NO

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 NAC Activity Category D? YES NO
- b. If yes, is it reasonable and feasible to provide insulation for these buildings? YES NO

D. ADDITIONAL CONSIDERATIONS:

- Along the service road the wall requires gaps for driveway access.
- CBI of \$25,079 for this wall is not reasonable.

E. STATEMENT OF LIKELIHOOD:

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 abatement measures be provided? YES NO

F. ABATEMENT DECISION DESCRIPTION AND JUSTIFICATION:

MIT 4a barrier geometry needed to meet the noise reduction design goal, exceeds the CBI; therefore, the required 3 reasonableness criteria cannot be met for abatement measure to be considered reasonable. No abatement is recommended for this location.

Completed by: Jill Schlaefer

Date: August 2, 2011



Noise Analysis and Abatement Guidelines

COLORADO DEPARTMENT OF TRANSPORTATION NOISE ABATEMENT DETERMINATION WORKSHEET

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

Project/STIP # US160 SDEIS Grandview –Three Springs Segment MIT4b1 and b2-4 Date of Analysis: 8/2/2011

Project Name & Location: R81, R81a-b, R82, C116 and R85, R87-R88, R92; wall along north side US160 mainline

A. FEASIBILITY:

1. Can a 5dBA noise reduction be achieved by constructing a noise barrier or berm? YES NO
2. Are there any fatal flaw drainage, terrain, safety, or maintenance issues involving the proposed noise barrier or berm? YES NO
3. Can a noise barrier or berm less than 20 feet tall be constructed? YES NO

B. REASONABLENESS:

1. Has the Design goal of 7 dBA noise reduction for abatement measure been met for at least one impacted receptor? YES NO
2. Is the Cost Benefit Index below \$6800 per receptor per dBA? YES NO
3. Are more than 50% of benefited resident/owners in favor of the recommended noise abatement measure? YES NO

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 NAC Activity Category D? YES NO
- b. If yes, is it reasonable and feasible to provide insulation for these buildings? YES NO

D. ADDITIONAL CONSIDERATIONS:

- MIT4b1 assumes that all access is rerouted to another service road to allow a continuous barrier.
- On MIT4b1 cut-slope along north side of US160 mainline requires that wall to be constructed at cut-slope edge, reducing practical wall height and allowing line-of-sight to traffic from receptors located farther uphill, thus preventing feasible 5 dBA noise reduction.
- MIT4b2-4 requires several gaps for driveway access reducing effective wall coverage.
- CBI of MIT4b2-4 of \$35,137 for this wall is not reasonable.

E. STATEMENT OF LIKELIHOOD:

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 abatement measures be provided? YES NO

F. ABATEMENT DECISION DESCRIPTION AND JUSTIFICATION:

MIT4b1 wall is not feasible. MIT 4b2-4 barrier geometry needed to meet the noise reduction design goal exceeds the CBI; therefore, the required 3 reasonableness criteria cannot be met for abatement measure to be considered reasonable. No abatement is recommended for this location.

Completed by: Jill Schlaefer

Date: August 2, 2011



Noise Analysis and Abatement Guidelines

COLORADO DEPARTMENT OF TRANSPORTATION NOISE ABATEMENT DETERMINATION WORKSHEET

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

Project/STIP # US160 SDEIS Grandview -Three Springs Segment MIT6 Date of Analysis: 8/2/2011

Project Name & Location: R13E-R18E; wall location along southeast side US550 mainline on Eastern Realignment

A. FEASIBILITY:

1. Can a 5dBA noise reduction be achieved by constructing a noise barrier or berm? YES NO
2. Are there any fatal flaw drainage, terrain, safety, or maintenance issues involving the proposed noise barrier or berm? YES NO
3. Can a noise barrier or berm less than 20 feet tall be constructed? YES NO

B. REASONABLENESS:

1. Has the Design goal of 7 dBA noise reduction for abatement measure been met for at least one impacted receptor? YES NO
2. Is the Cost Benefit Index below \$6800 per receptor per dBA? YES NO
3. Are more than 50% of benefited resident/owners in favor of the recommended noise abatement measure? YES NO

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 NAC Activity Category D? YES NO
- b. If yes, is it reasonable and feasible to provide insulation for these buildings? YES NO

D. ADDITIONAL CONSIDERATIONS:

- This wall is continuous along the southeast side of US550 mainline and does not consider local roadway realignments that may be necessary for local access.
- Homes are located on very large lots and are located far apart.
- CBI of \$58,310 for this wall is not reasonable.
- Icing along shadow zone of 20ft tall wall along northbound travel lane needs to be checked.

E. STATEMENT OF LIKELIHOOD:

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 abatement measures be provided? YES NO

F. ABATEMENT DECISION DESCRIPTION AND JUSTIFICATION:

MIT 6 barrier geometry needed to meet the noise reduction design goal, exceeds the CBI; therefore, the required 3 reasonableness criteria cannot be met for abatement measure to be considered reasonable. No abatement is recommended for this location.

Completed by: Jill Schlaefer

Date: August 2, 2011



Noise Analysis and Abatement Guidelines

COLORADO DEPARTMENT OF TRANSPORTATION NOISE ABATEMENT DETERMINATION WORKSHEET

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

Project/STIP # US160 SDEIS Grandview -Three Springs Segment MIT7 Date of Analysis: 8/2/2011

Project Name & Location: Webb Ranch R155; wall location along east side US550 mainline on Revised G Modified

A. FEASIBILITY:

1. Can a 5dBA noise reduction be achieved by constructing a noise barrier or berm? YES NO
2. Are there any fatal flaw drainage, terrain, safety, or maintenance issues involving the proposed noise barrier or berm? YES NO
3. Can a noise barrier or berm less than 20 feet tall be constructed? YES NO

B. REASONABLENESS:

1. Has the Design goal of 7 dBA noise reduction for abatement measure been met for at least one impacted receptor? YES NO
2. Is the Cost Benefit Index below \$6800 per receptor per dBA? YES NO
3. Are more than 50% of benefited resident/owners in favor of the recommended noise abatement measure? YES NO

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 NAC Activity Category D? YES NO
- b. If yes, is it reasonable and feasible to provide insulation for these buildings? YES NO

D. ADDITIONAL CONSIDERATIONS:

- This wall is continuous along the east side of US550 mainline and approximately 100 ft along north side of CR220.
- Isolated receptor.
- CBI of \$118,356 for this wall is not reasonable.

E. STATEMENT OF LIKELIHOOD:

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 abatement measures be provided? YES NO

F. ABATEMENT DECISION DESCRIPTION AND JUSTIFICATION:

MIT 7 barrier geometry needed to meet the noise reduction design goal, exceeds the CBI; therefore, the required 3 reasonableness criteria cannot be met for abatement measure to be considered reasonable. No abatement is recommended for this location.

Completed by: Jill Schlaefer

Date: August 2, 2011