



# Noise Meeting Summary Report

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APPENDIX F

## Noise Meeting Handouts

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# Welcome to the US 6 and Wadsworth Boulevard Environmental Assessment Public Noise Meeting

Wednesday, June 4, 2008  
Lakewood Cultural Center, Lakewood, Colorado

## Tonight's Purpose

The purpose of tonight's meeting is to provide information about

- Measured noise levels along US 6,
- Noise mitigation that would be provided as part of proposed design improvements to the US 6/Wadsworth Boulevard interchange, and
- The CDOT noise analysis process.

Display boards provide information about existing and future noise levels in the study area, proposed locations of new and reconstructed noise walls, benefits of noise mitigation, noise wall aesthetics, and the CDOT noise analysis procedure. Handouts are available with information about the noise analysis and proposed mitigation, and general project information.

## Tonight's Agenda

### **4:00 p.m. to 7:00 p.m. – Sign-In and Public Open House**

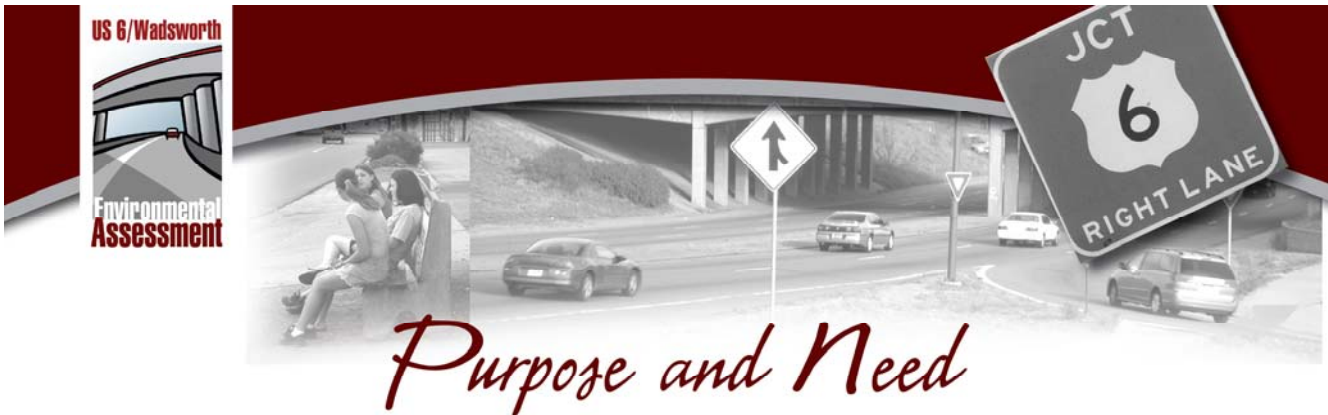
Please view display boards and talk with staff about the study and noise information. We encourage you to talk with staff about the proposed noise mitigation, ask questions, and share your comments.

### **6:00 p.m. – Informational Presentation**

An informational presentation will be held in the Community Room. Please take a seat to listen to information about the noise analysis and proposed noise mitigation. The presentation will last approximately 30 minutes.

## Ways to Provide Input

- Talk to one of the project team members at the display boards.
- Fill out a Noise Meeting Comment Form and place it in a comment box (available at the Reference Materials and Sign-In tables) on your way out.
- Mail your Comment Form to: US 6 / Wadsworth EA, c/o Colleen Kirby Roberts, CH2M HILL, 535 16th Street, Suite 800, Denver, CO, 80202.
- Submit comments via the project website at [www.US6Wadsworth.com](http://www.US6Wadsworth.com).



The project purpose and need identifies the transportation problems and other needs that the project is intended to address. It is defined through information gathered during scoping meetings and data collection activities.

### ***Purpose of the Proposed Action***

The purpose of the US 6 and Wadsworth Boulevard project is to improve traffic flow and safety, accommodate high traffic volumes, and increase multi-modal travel options and connections at the US 6 and Wadsworth Boulevard interchange and along Wadsworth Boulevard between 4th Avenue and 14th Avenue.

The project area includes US 6 (also designated as 6th Avenue) and Wadsworth Boulevard (also designated as State Highway 121). The east-west limits along US 6 are from the eastern interchange ramps with Wadsworth Boulevard west to Garrison Street. On Wadsworth Boulevard, the project limits are 4th Avenue to 14th Avenue. This area is a vital regional hub of the western Denver metropolitan area and the heart of the City of Lakewood.

The Colorado Department of Transportation (CDOT), Federal Highway Administration (FHWA), City of Lakewood (City), area residents, businesses, and commuters have prioritized making improvements to fix the transportation problems in the project area through previous planning efforts. CDOT's goal is to identify a proposed action that meets transportation needs, is compatible with local and regional plans, avoids or minimizes environmental harm, and can be implemented within cost constraints.

### ***Need for the Proposed Action***

The existing design and configuration of the interchange and roadway within the project limits have not kept pace with traffic and multi-modal travel demands. Improvements are needed to:

- Improve safety for motorists, pedestrians, and bicyclists
- Correct design deficiencies that contribute to safety concerns and operational inefficiencies
- Increase infrastructure capacity to meet current and future traffic volumes
- Support multi-modal connections



For federally-funded transportation projects, the National Environmental Policy Act (NEPA) requires that the environmental impacts of the proposed action be analyzed. This type of study is required before federal funds can be committed to the project. The Federal Highway Administration (FHWA) is the lead federal agency on the US 6 and Wadsworth Boulevard Interchange Environmental Assessment.

#### **Essential Elements of NEPA:**

- **Public & Agency Scoping**
- **Purpose & Need**
- **Alternatives Development**
- **Assess Impacts**
- **Determine Mitigation**
- **Prepare Environmental Assessment**
- **Public & Agency Review**
- **Decision Document**

**Public & Agency Scoping:** This is a public process used to identify environmental issues that need to be studied and to help define the purpose and need for the project.

**Purpose & Need:** The project purpose and need identifies the transportation problems and other needs that the project is intended to address. It is defined through information gathered during scoping meetings and data collection activities.

**Alternatives Development:** A range of alternatives will be developed for the design of the US 6 and Wadsworth Boulevard interchange and Wadsworth Boulevard from approximately 4th Avenue to 14th Avenue. A “No Action” Alternative – which would not provide any transportation improvements – will also be considered. The range of alternatives will then be screened to eliminate alternatives that aren’t reasonable, feasible, or that don’t meet the project purpose and need.

**Assess Impacts:** Transportation, social, and environmental impacts of the remaining alternatives are studied and documented in the Environmental Assessment.

**Determine Mitigation:** Mitigation measures are developed to avoid or minimize adverse impacts.

**Prepare Environmental Assessment:** Once impacts are analyzed and mitigation measures are identified, the Environmental Assessment is written and published for review by the public and agencies.

**Public & Agency Review:** The project team takes comments from the public and agencies during the review period. A public hearing is held to present the information and take formal comments on the document.

**Decision Document:** After receiving public and agency comments on the Environmental Assessment, FHWA issues a decision document. This document records the decision made by FHWA on the project and, if a construction project is identified, commits to mitigation of impacts.





CDOT follows FHWA regulations and guidelines, and the *CDOT Noise Analysis and Abatement Guidelines* for assessing traffic-related noise. These guidelines establish “noise abatement criteria,” that is, noise level standards above which noise-reducing actions should be considered. These standards are used for determining the noise impacts of a project as well as assessing potential mitigation for impacted areas. Noise abatement criteria vary depending on the activity that occurs on a property. The noise abatement criteria for different activity categories are shown in the table below.

CDOT noise abatement criteria are expressed in A-weighted decibels (dBA). An A-weighted decibel is a unit of measure corresponding to the way the human ear perceives the magnitude of sounds at different frequencies.

According to CDOT guidelines, a traffic noise impact at a location occurs when (1) predicted noise levels at that location exceed the noise abatement criteria, shown in the table below or (2) predicted noise levels exceed the current noise level by 10 dBA or more (even though the predicted levels may not exceed noise abatement criteria). This definition reflects the FHWA position that traffic noise impacts can occur under either of two separate conditions: (1) when noise levels are unacceptably high (absolute level); or (2) when a proposed highway project will substantially increase the existing noise environment (substantial increase).

CDOT’s guidelines state that noise mitigation should be considered for any property, typically called a receptor in noise studies, where traffic noise impacts will occur according to the criteria explained above. Information about mitigation measures is provided on the back of this page.

### CDOT Traffic Noise Abatement Criteria

Activity Category	$L_{eq}^{(1)}$ (dBA)	Description of Activity Category
A	56 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	66 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	71 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	--	Undeveloped lands.
E	51 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

<sup>(1)</sup> Road noise changes from moment to moment, but one can describe the noise energy over time in terms of its “equivalent level” (abbreviated  $L_{eq}$ ). The  $L_{eq}$  is a single level that has the same sound energy as the fluctuating level over a stated time period. The  $L_{eq}$  used for the noise abatement criteria is the hourly A-weighted equivalent level for the “noisiest hour” of the day in the design year.

(Continued on back of sheet)



To be included in a project, a proposed noise mitigation measure must first be found to be feasible. A summary of the feasibility criteria is as follows:

- The proposed mitigation measure must be predicted to achieve at least 5 dBA of noise reduction at front row receptors (that is, the row of properties closest to the road).
- The proposed mitigation measure must not create any “fatal flaw” safety or maintenance issues such as reduced sight distances, shadowing of ice-prone areas, interference with snow/debris removal, or crash hazards.
- If the mitigation measure is to be a barrier, such as a wall, it must be possible to construct it in a continuous manner. Gaps in noise barriers, e.g. for driveways, significantly degrade their performance.

If a mitigation measure is found to be feasible, it is then analyzed for its “reasonableness.” A summary of the reasonableness criteria is as follows:

- The cost/benefit index of the proposed measure should not exceed \$4,000 per dB of reduction per benefited receptor.
- The predicted design year noise levels should equal or exceed the Noise Abatement Criteria shown in the table on the front of this sheet.
- At least 50% of the affected properties should approve of the proposed measure.
- Land use in the affected area should be at least 50% Category B (refer to the Noise Abatement Criteria table on the front of this sheet).

Noise walls were determined to be a feasible mitigation measure for the US 6 and Wadsworth project. As such CDOT is proposing to construct 11,000 feet of new noise walls and reconstruct 1,700 feet of existing noise barriers. The total cost of the walls is estimated to be \$4.8 million (at \$30 per square foot). Fifteen-foot tall noise walls are proposed east and west of the US 6/Wadsworth interchange. Four-foot tall concrete barriers are proposed on the bridge. Noise walls will provide noticeable noise reduction at 330 residences (receptors). Typical noise reduction for residences is as follows:

- The first row of homes adjacent to US 6 would experience an average noise reduction of 11 decibels.
- The average noise reduction for second row receptors is 9 decibels.
- Third row receptors would experience an average noise reduction of 7 decibels.
- Homes 1,000 feet or farther from US 6 would not experience any change in noise conditions from noise walls.





**Q-1: How is noise measured?**

A-1: Noise, usually defined as unwanted or unacceptable sound, is measured in terms of decibels. A decibel is a unit of measurement that quantifies the sound pressure differences in the air that we perceive as sound (or noise) on a scale ranging from zero decibels on up. Zero decibels is the threshold of human hearing, 40 to 50 decibels is normal for a peaceful neighborhood, 70 to 80 decibels is the level adjacent to a busy urban street or 50 feet from a major freeway, and 120 to 140 decibels is a typical level at which sound is painful. For highway traffic noise studies, noise levels are quantified in terms of the equivalent sound level, or Leq. The Leq is essentially the average noise level over period of time, usually one hour.

**Q-2: How are noise level changes perceived?**

A-2: Studies have shown that changes in noise levels of 3 decibels or less are not normally detectable by the average human ear. An increase of 5 decibels is generally readily noticeable by anyone, and a 10-decibel increase is usually felt to be "twice as loud" as before.

**Q-3: How do changes in traffic or roadway geometry affect noise levels?**

A-3: Due to the nature of the decibel scale, a doubling of traffic will result in a 3-decibel increase in noise levels, which in and of itself would not normally be a perceivable noise increase. Traffic would need to increase at least three times to result in a readily perceivable (5 decibel) increase in noise. Using the same reasoning, if a highway is moved half as close to existing homes as it is now (i.e., from 200 to 100 feet), the noise levels will increase by 3 decibels. Conversely, if a highway is moved double the distance from existing homes, the noise levels will decrease by 3 decibels. Noise level increases due to highway projects are usually due to a combination of increased traffic and changes in the roadway alignment.

**Q-4: When is a noise analysis required?**

A-4: A noise analysis is required for a proposed CDOT project if that project consists of:

- A new highway built on a new location, or
- An existing highway that is significantly altered by substantially changing the horizontal or vertical characteristics of the road, or
- The number of through traffic lanes being increased. Minor projects, such as normal roadway resurfacings (without adding new lanes), do not require a noise analysis.

**Q-5: Is a noise analysis required when the speed limit of a highway is changed?**

A-5: No. Under the current regulations, a speed limit increase does not qualify as a project in which a noise analysis is required. CDOT does not have legal enforcement authority on the highways and cannot enforce lower speeds; enforcement of the traffic laws are the responsibility of local law enforcement.

**Q-6: Does CDOT analyze noise levels on existing highways?**

A-6: In the absence of a major highway project as described above, CDOT does not perform noise studies or mitigate noise for existing highways.



**Q-7: What constitutes a traffic noise impact?**

A-7: A "noise sensitive receiver" (defined as homes, parks, schools, businesses, etc.) is considered impacted by noise if either future noise levels (generally a 20 year projection) approach or exceed the CDOT Noise Abatement Criteria, or if there is a substantial increase in future noise levels over existing noise levels from a proposed CDOT project as described above. These are the noise levels experienced at the commonly used exterior portions of a property on the lowest or ground level for each home or individual unit. For residences, schools, and parks, impact is defined when the Leq is 66 decibels or higher, and for businesses and other commercial properties the impact Leq value is 71 decibels. A substantial increase impact occurs when there is a projected 10-decibel increase over existing noise levels. Impacts such as these require mitigation consideration and analysis, which will result in the construction of noise barriers if they are determined to be feasible and reasonable.

**Q-8: How was the selection of the noise levels in the Noise Abatement Criteria determined?**

A-8: CDOT's selection of the noise abatement criteria levels were based on guidance from FHWA, and is consistent with the criteria used by all state DOT's. FHWA used numerous approaches in establishing the noise abatement criteria were considered, to include hearing impairment, annoyance, sleep interference, and speech communication interference. The main challenge in establishing the criteria was to balance noise levels which are desirable with those that are achievable. As a result, speech impairment was usefully applied as being the condition that best met that balance.

**Q-9: Does EPA have standards which apply to highway noise?**

A-9: Not at this time. EPA does have recommended noise levels which are considered goals, but did not recommend those levels as strict standards applicable to highway projects due to factors including but not limited to cost, engineering feasibility, and geographical characteristics.

**Q-10: What does CDOT consider "feasible and reasonable"?**

A-10: A noise barrier must be both feasible and reasonable if it is to be constructed with a highway project. Feasibility and reasonableness are determined by criteria that are quantifiable but flexible, and judgments for special and/or unusual circumstances are made on a case-by-case basis. As a result, noise mitigation is not automatically provided where noise impacts have been identified. A barrier is feasible if it can be constructed without major engineering or safety issues and provide a substantial noise reduction to the adjacent receivers. Reasonableness deals with whether or not the barrier can be constructed in a cost-effective manner, the percentage of residential-type development, overall noise levels and noise level increases, and the desires of the community.

**Q-11: What is a "substantial noise reduction"?**

A-11: A noise barrier must provide at least a readily perceptible decrease in noise levels to adjacent receivers to be effective. This is defined as a noise decrease of at least 5 decibels. As noise level changes of 3 decibels or less are not generally perceivable, it is not prudent to construct a noise barrier that gives only a 1 or 2 decibel benefit to adjacent properties.



**Q-12: What types of noise barriers are constructed?**

A-12: Noise barriers are commonly constructed as walls, earthen berms, or a combination of the two. Walls are most common, and are usually constructed out of dense materials such as concrete or masonry block. Earth berms are a natural alternative to walls, but require much more land to construct. Walls can be constructed on top of berms in order to raise the overall height of the barrier.

**Q-13: How do noise barriers work?**

A-13: Noise barriers reduce noise by blocking the direct travel of sound waves from a source (such as a highway) to adjacent homes or businesses, forcing the waves over the top or around the barrier. The barrier must be high enough and long enough to block the view (line of sight) of the highway. This is the phenomenon that allows a noise barrier to provide a perceivable noise reduction. Noise barriers do very little good for homes on a hillside overlooking a road or for buildings which rise above a barrier. Openings or gaps in barriers for driveway connections or street intersections reduce barrier effectiveness. Noise barriers are most effective for the first one or two rows of homes at distances up to 200 to 300 feet from the barrier. As noise levels decrease with distance, there is a point away from the highway at which noise barriers are no longer effective. It is important to note that barriers are not designed to eliminate or block all noise.

**Q-14: Are noise barriers built to protect locations on the upper floors of homes?**

A-14: Noise barriers may, under certain geographic conditions, be able to be designed to protect upper levels of multi-family structures, where each unit is a separate residence. For single-family homes, the primary consideration is the outdoor, ground-floor areas of human activity. Barriers built for the second floor would have to be tall enough to provide a substantial noise reduction for those areas, which in most cases would require very high walls that would not be feasible or reasonable.

**Q-15: How are noise reflections from buildings and barrier walls considered?**

A-15: Highway traffic noise levels are not substantially increased by construction of a noise barrier or the presence of a building on the opposite side of a highway from sensitive properties. This is because the theoretical maximum noise increase from a source is limited to 3 decibels, which corresponds to a doubling of the source. In practice, not all of the sound energy is reflected back to the receiver. Some of the sound is diffracted over the barrier, some is reflected to points other than the affected property, some is scattered and/or absorbed by ground coverings and other terrain, and some is blocked by the presence of other vehicles on the highway. The overall noise increase is normally limited to 1-2 decibels at the most. In general, this is not a perceptible increase, but the character of the noise may seem to change, which is what is usually noticed.

In the case of parallel barriers, however, studies have shown that if two walls are constructed very close together, there is a potential for multiple reflections that may perceptibly increase noise levels. Generally, this is not normally a problem for barriers greater than 200 feet apart or where the width-to-height ratio is more than 10:1 (barriers 10 feet high should be at least 100 feet apart).

**Q-16: Will planting vegetation help reduce noise levels?**

A-16: Vegetation is only effective for reducing noise levels if it is at least 100-200 feet deep, high enough that it cannot be seen over, and dense enough that it cannot be seen through. It is not feasible to plant enough vegetation along a highway to achieve this type of reduction, although planting trees or shrubs can provide aesthetic benefit and visual screening.



**Q-17: Can anything be done about “Jake Brake” use?**

A-17: Colorado state law now requires that any vehicle equipped with engine compression brake devices (commonly referred to as “Jake Brakes”) be equipped with proper mufflers. Failure to do so will result in a \$500 fine. The enforcement of this law is the responsibility of the local authorities.

CDOT has not restricted the use of these devices for safety reasons. However, CDOT has assisted local entities with this issue by installing “Engine Brake Mufflers Required” signs along selected highways.

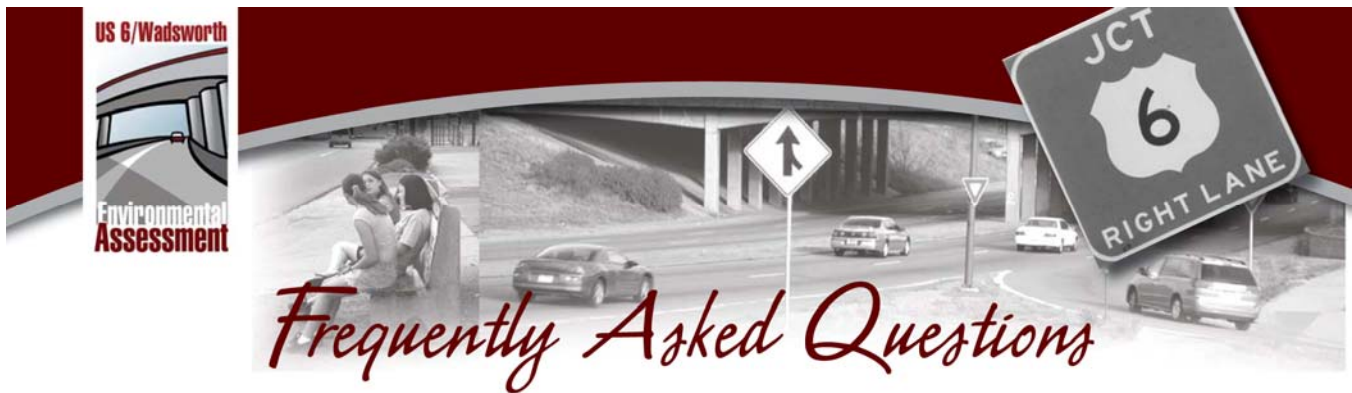
**Q-18: What is the effect of pavement type on noise levels?**

A-18: Research regarding pavement influence on noise levels has been an ongoing process. In general, the use of certain types of asphalt pavements or texturing of concrete pavements can give an initial noise reduction benefit to properties 200 to 300 feet from the highway. Over a long period of time, however, it is not known if these benefits continue to be realized. As a result, pavement type, in and of itself, cannot be considered as an alternative to conventional noise mitigation measures at this time. CDOT’s present policy for pavement type selection is made based on a life-cycle cost analysis, which at this time does not consider noise as a primary factor.

**Typical Noise Levels**

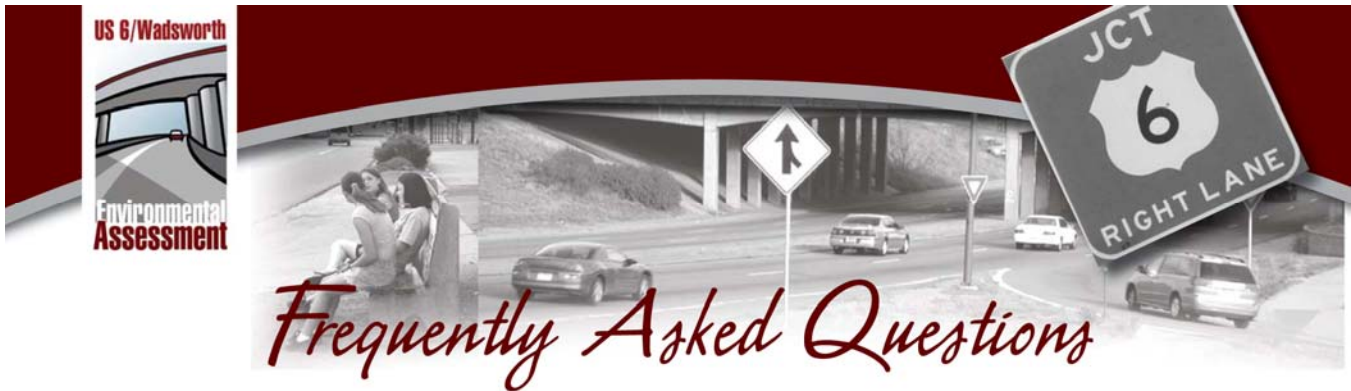
<b>Noise Source</b>	<b>Noise Level (DBA)</b>
Commercial Jet	110-120
Shouting at 5 feet	95-105
Heavy Truck/Motorcycle at 25 feet	85-95
Freeway Traffic at 50 feet	70-80
Conversational Speech at 5 feet	55-65
Quiet Neighborhood	45-55
Living Room	35-45
Remote Outdoor Location (no wind)	20-30
Threshold of Hearing	0





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- Q-19 What is quiet pavement, and are you considering using it for US 6 and/or Wadsworth Boulevard improvements?
- Q-20 Why did CDOT raise the speed limit on US 6 from 55 mph to 65 mph, and will you consider as part of this study reducing the speed limit back to 55 mph?
- Q-21 Will this study consider future transit along Wadsworth?



**Q-1: Why is CDOT conducting this study?**

A-1: Transportation improvements in the study area have been identified as a high priority for CDOT, the City of Lakewood, and area residents, businesses, and commuters. Roadway improvements in the region's West Corridor have been identified in Lakewood's Comprehensive Plan, the Denver Regional Council of Government's (DRCOG's) Regional Transportation Plan, and the 1997 West Corridor Major Investment Study prepared by the Regional Transportation District (RTD). Improvements in the West Corridor, including improvements to the US 6 and Wadsworth interchange, were identified as one of the set of 28 high-priority projects across the state that, in 1996, CDOT committed to completing over the next approximately 25 years. In 1999, Colorado voters approved bonding on CDOT's 28 high-priority projects against future gas tax revenues to complete the projects on an accelerated schedule. CDOT has completed nearly half of the projects of its Strategic Transportation Investment Program, also known as the 7<sup>th</sup> Pot Program. The US 6 and Wadsworth improvements have been identified as one of the roadway projects needed for the West Corridor, and as such, improvements could be eligible for priority funding.

**Q-2: What is an Environmental Assessment (EA)?**

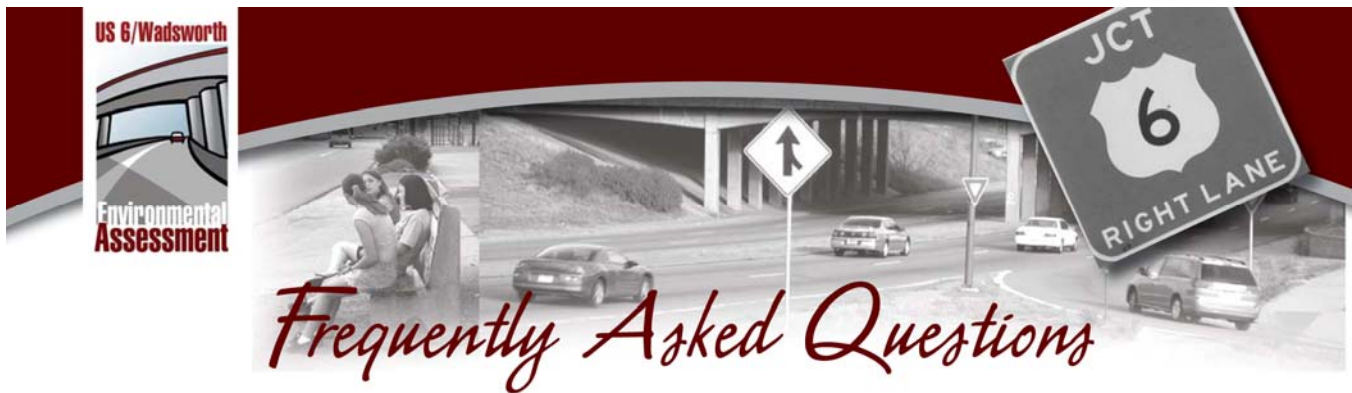
A-2: An EA is a document that describes the effects that a federal action would have on the environment. It also describes the impacts of alternatives to the Proposed Actions and identifies ways to avoid, minimize, or mitigate adverse impacts. The National Environmental Policy Act (NEPA), signed into law on January 1, 1970, established a national policy to protect the environment. Federal agencies are required to integrate the NEPA process into other planning processes to ensure that planning and decisions consider environmental values. Regulations for implementing NEPA established by the President's Council on Environmental Quality (CEQ) require that federal agencies document their consideration of environmental values and provide opportunity for public involvement. The potential for both beneficial and adverse impacts must be considered. EAs are normally prepared for those Proposed Actions whose environmental impacts are unknown. An EA will result in either a Finding of No Significant Impact (FONSI) or a finding of significant impact and a Notice of Intent to prepare an Environmental Impact Statement (EIS) to further study these impacts.

**Q-3: Why does this project require an EA?**

A-3: An EA is required because the proposed implementation of transportation improvements to US 6 and Wadsworth Boulevard is likely to have environmental impacts, and the extent of these impacts is unknown.

**Q-4: How long will the study take?**

A-4: The study was initiated in spring 2007 and will be anticipated to be completed in December 2008. If a construction project is identified at the end of the study, the project would then proceed into final design and construction. Final design typically takes 6 to 12 months to complete, and construction typically takes one to two years. The US 6 / Wadsworth study has been identified by CDOT and the Federal Highway Administration (FHWA) as a pilot NEPA streamlining project. It is also a priority project for CDOT and the City of Lakewood. The study is following an accelerated schedule due to the streamlining efforts.



**Q-5: What is the role of the public in this study?**

A-5: The public has been involved in developing the scope of the study and providing input on the development and screening of preliminary design concepts and identification of a preferred alternative for the interchange and Wadsworth Boulevard.

The public is also involved in developing and selecting mitigation measures used to avoid or minimize impacts of the alternative(s), including the proposed noise walls discussed at tonight's noise meeting. The public will then be able to review the EA document and provide formal comments at a public hearing. FHWA will consider these comments when writing its decision document on the project.

**Q-6: What is the role of the City of Lakewood in the study?**

A-6: The City of Lakewood is a partnering agency on the study. The City is working with CDOT and FHWA to provide a vision for improvements and necessary information and coordination among city departments and staff.

**Q-7: How does CDOT's project relate to Lakewood's Station Area Plan and rezoning for the West Corridor Light Rail Station?**

A-7: CDOT has reviewed Lakewood's Station Area Plan to determine whether proposed improvements on Wadsworth Boulevard would conflict with the Plan. Implementation of the Station Area Plan, however, is beyond the scope of this study. The City of Lakewood is a partner with CDOT on the EA.

**Q-8: What is the role of RTD and the West Corridor project in the study?**

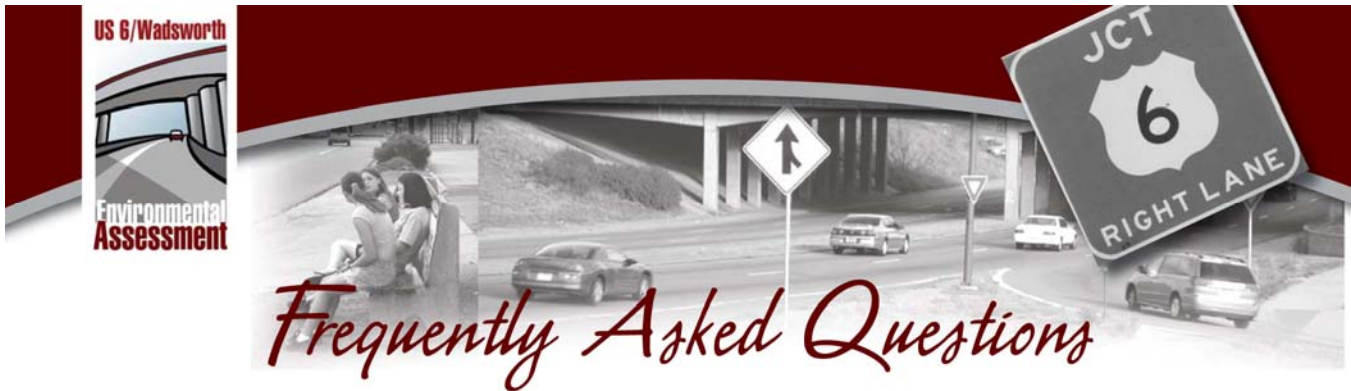
A-8: RTD is a cooperating agency on the study. RTD has jurisdiction over the West Corridor light rail line and station, which are located in the US 6 / Wadsworth study area. RTD is working with CDOT and FHWA to provide necessary information on the West Corridor project and coordinate between the West Corridor and US 6 / Wadsworth projects.

**Q-9: Is CDOT involved in the property acquisitions for the West Corridor (east side of Wadsworth between 13th and 14th Avenues)?**

A-9: No. The property acquisitions currently occurring along Wadsworth Boulevard between 13th and 14th Avenues are not related to the US 6 / Wadsworth EA.

**Q-10: Will this study take into account traffic impacts of the light rail station and increased development along the light rail line?**

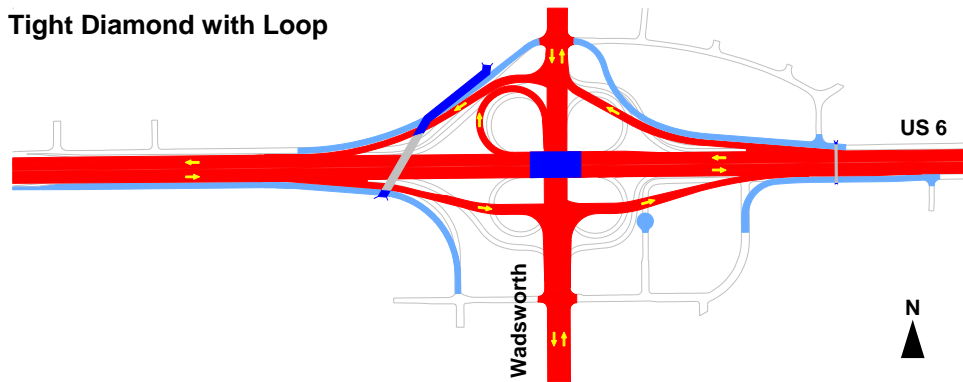
A-10: The study is using DRCOG's approved 2035 travel forecasting model to determine future corridor traffic conditions, as required by NEPA. The DRCOG model incorporates the entire RTD FasTracks program as well as the most current land use forecasts surrounding the Wadsworth Boulevard corridor and the proposed West Corridor Light Rail Transit station. To date, a number of planning efforts have been completed to evaluate the implementation of light rail transit, the transit station, and the potential for changes in land use surrounding the station such as transit-oriented development (TOD). These planning efforts are described below.



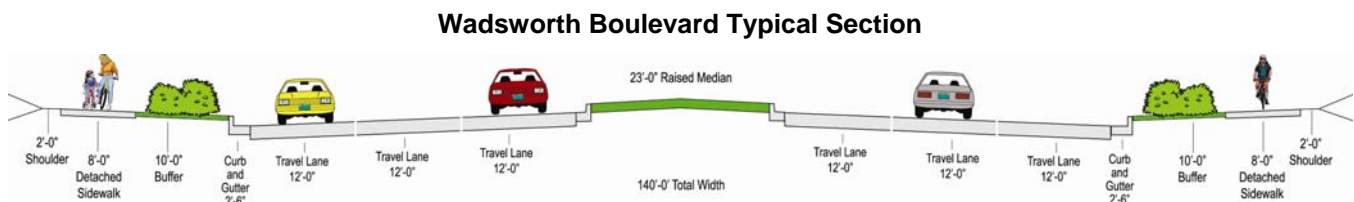
Title	Agency	Date	Status
West Corridor Major Investment Study	RTD	1997	Adopted
Final West Corridor Environmental Impact Statement	RTD	2003	Completed
Wadsworth Boulevard Station Area Plan	City of Lakewood	2006	Adopted
Article 22: Mixed Use Zone District Zoning Ordinance	City of Lakewood	2007	Adopted
Wadsworth Boulevard Station Area Implementation Plan	City of Lakewood	2007	Adopted
West Corridor Supplemental Environmental Assessment	RTD	2007	Completed

**Q-11: What are the options for improvements?**

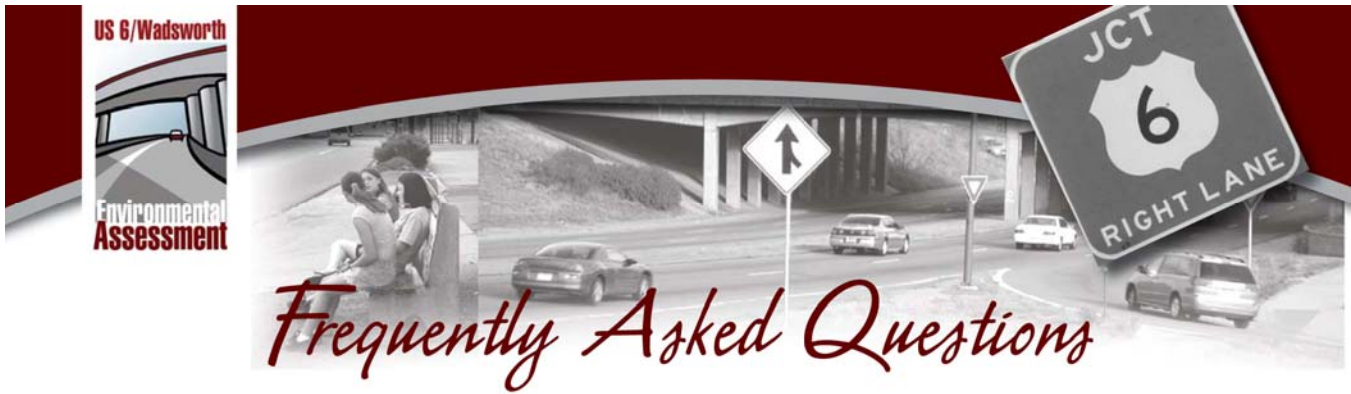
A-11: A Preferred Alternative has been identified for the US 6 and Wadsworth interchange and for Wadsworth Boulevard between 4th and 14th Avenues. CDOT has identified the Tight Diamond with Loop as the proposed configuration for the interchange. The interchange will have standard entrance and exit ramps similar to the interchange at US 6 and Indiana Street, but a new loop will be constructed in the northwest quadrant of the interchange to accommodate traffic moving from westbound US 6 to southbound Wadsworth Boulevard in the evening rush hour. This is the highest volume traffic movement at the interchange, and the loop will allow this traffic to exit US 6 onto Wadsworth Boulevard without turning left at a traffic signal.



CDOT has identified six travel lanes with a raised median and sidewalks as the proposed design for Wadsworth Boulevard between 4th and 14th Avenues. The basic elements of the design are shown below.







**Q-12: Will the project change traffic operations on the frontage roads?**

A-12: Traffic operations on frontage roads north of US 6 would be changed as part of the proposed interchange improvements. Traffic operations on frontage roads south of US 6 would remain the same, although the frontage roads would be reconstructed in the vicinity of the interchange.

Northeast of the interchange, the current design concept proposes a new two-way frontage road connection to Wadsworth in the approximate location of the existing Highland Drive intersection. Highland Drive and Broadview could both be accessed from the frontage road. Cars would be able to turn right to and from northbound Wadsworth and the new frontage road. Cars would be able to turn left onto the new frontage road from southbound Wadsworth.

Northwest of the interchange, the current design concept proposes a new two-way frontage road connection to Wadsworth across from the existing Highland Drive intersection. Cars would be able to turn right to and from southbound Wadsworth and the new frontage road. Cars would be able to turn left onto the new frontage road from northbound Wadsworth. The frontage road would change to a one-way westbound road just west of the existing 6th Avenue Business Center.

**Q-13: Who makes the final decision about project improvements?**

A-13: FHWA and CDOT will evaluate the environmental impacts of reconstruction of Wadsworth Boulevard and the interchange and determine which, if any, option should be funded.

**Q-14: How will my property be affected? Are you going to acquire my property?**

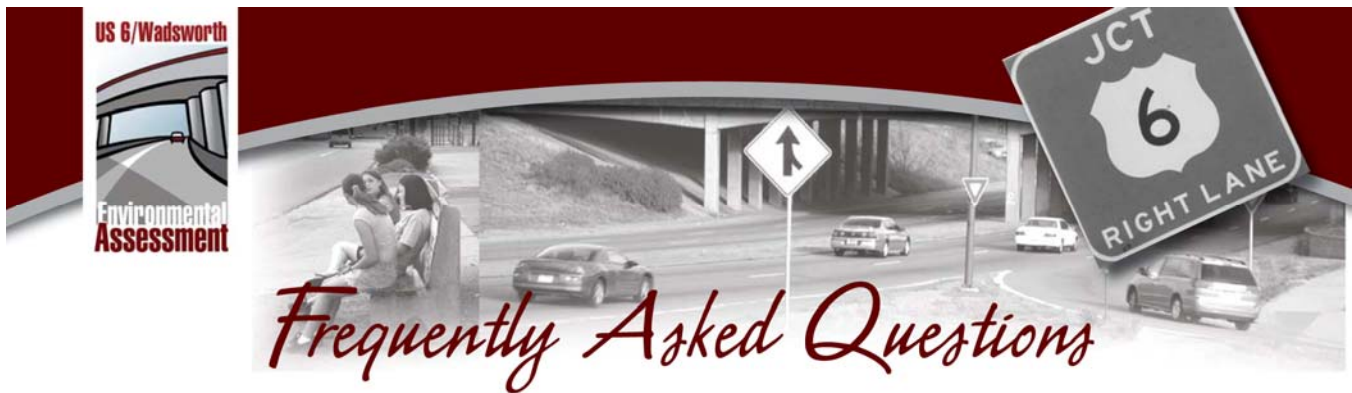
A-14: Preliminary estimates of property impacts have been developed for the Preferred Alternative. Maps of the preliminary estimates can be viewed at the project website, [www.US6Wadsworth.com](http://www.US6Wadsworth.com). The maps are located on the Study Documents page in the list of Open House #3 Display Boards: Tight Diamond with Loop – Preferred Alternative, and Wadsworth Boulevard – Preferred Alternative.

Estimates are considered preliminary because they do not take into account a) additional property impacts that may occur from noise walls or water quality treatment features, or b) impacts that may be lessened due to mitigation efforts such as retaining walls, shifts in alignment, or reconfiguration of frontage roads.

In the coming months, CDOT will individually evaluate each potential property acquisition to determine if the acquisitions can be minimized or avoided. If your property is one identified as a potential acquisition, we will contact you and provide the opportunity to schedule a meeting to discuss mitigation options. If you have additional questions about property impacts or the right-of-way acquisition process, please contact Colleen Kirby Roberts, CH2M HILL public involvement manager, at 303-573-5385, ext. 205.

**Q-15: Will the project construct noise walls along 6th Avenue west of Wadsworth?**

A-15: If a project is recommended for construction, noise mitigation will be provided for locations where highway noise is higher than acceptable thresholds (66 dBA), and where analysis shows that it is



reasonable and feasible to do so. Currently, analysis shows that new noise walls would be provided on both sides of US 6 between Wadsworth Boulevard and Garrison Street. Additionally, any existing noise walls that are demolished to allow for interchange reconstruction will be replaced to continue to provide appropriate noise mitigation.

**Q-16: How will the project affect traffic in neighborhoods?**

A-16: Specific impacts to neighborhood traffic have not been assessed at this stage of the study. When the alternatives for the interchange and Wadsworth Boulevard are evaluated in detail in the EA, the impacts to neighborhood traffic will be studied, along with transportation, social, and environmental impacts.

**Q-17: When will the project be constructed?**

A-17: The EA must be completed before CDOT can apply for federal funding to construct a project. A typical schedule would include 18 to 24 months for completion of an EA, 6 to 12 months for final design, and one to two years for construction. Because the project is a high priority, construction could start as early as 2010.

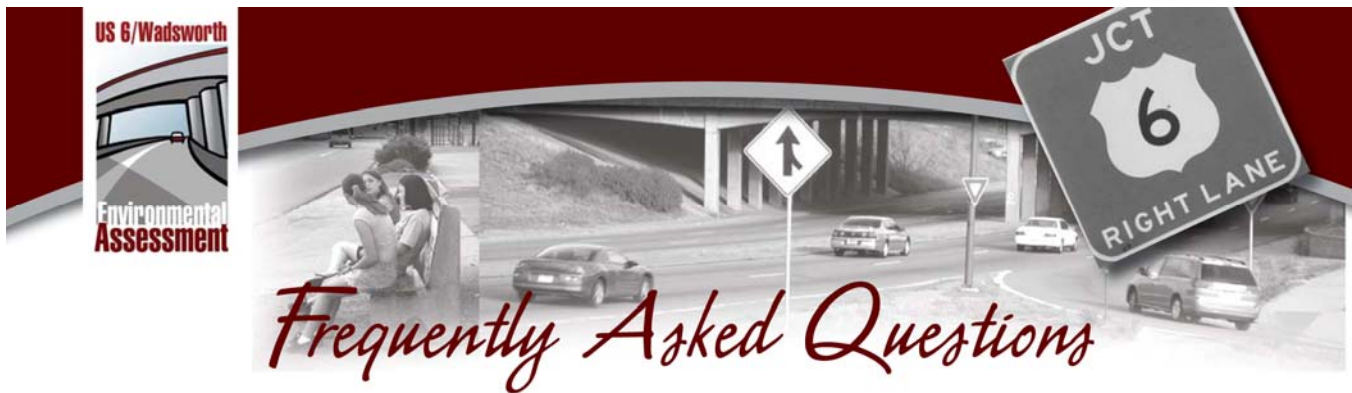
**Q-18: Will the project be constructed at the same time as other major construction projects in the area?**

A-18: If a construction project is identified, the construction timing will be coordinated with other major construction projects in the area. CDOT will work closely with other entities to coordinate construction schedules to minimize disruptions to area residents, businesses, and commuters to the greatest extent possible.

**Q-19: What is quiet pavement, and are you considering using it for US 6 and/or Wadsworth Boulevard improvements?**

A-19: At this point, the two main factors that influence CDOT's selection of pavement types are safety and durability. The selection of either asphalt or concrete pavement is based on a life-cycle cost analysis, which includes the cost of initially constructing the pavement and the future inflation-adjusted costs for maintaining the pavement over its useful life. Noise, while not a major factor in this analysis, can be used as one of several secondary factors in cases where the life cycle analysis indicates little to no pavement preference. CDOT is currently conducting a long-term research study to measure the noise effects of the age and type of pavements (both concrete and asphalt) used on Colorado's highways. This research project should provide insight into types of pavements and surface treatments that have potential for providing long-term noise benefits.

Stone Matrix Asphalt (SMA) is a gap-graded asphalt that maximizes rutting resistance and durability with a stable stone-on-stone skeleton held together by a mixture of asphalt, filler, and stabilizing agents. Typically, SMA is used on higher traffic roadways like freeways and expressways. A project using SMA was recently (2006) completed on US 6 between Simms and Indiana Avenues. While the evidence that SMA is quieter over the long term is mainly anecdotal, response to SMA, including in the project area, has been positive.



Although FHWA has supported studies and several pilot programs to evaluate the effect of pavement types on roadway noise (including the research being conducted presently in Colorado), pavement type in and of itself is not recognized as a noise mitigation measure. The most effective and commonly used measures of mitigating highway noise are noise barriers (walls or earthen berms), which will be evaluated for this project.

**Q-20: Why did CDOT raise the speed limit on US 6 from 55 mph to 65 mph? Will you consider as part of this study reducing the speed limit back to 55 mph?**

A-20: In 2000, CDOT conducted an investigation of speed limits on US 6 between Sheridan and I-70. This study concluded that appropriate limits for US 6 were 55 mph east of Sheridan and 65 mph west of Sheridan. In 2001, a follow-up investigation was completed after the new signs were posted, and the prevailing speed was found to be the same as before the signs went up.

Prevailing speeds are an important factor in setting speed limits and one of the considerations in the speed investigations conducted for US 6. These studies found that the prevailing speed (in the 85th percentile) along US 6 supports a speed limit of 65 mph west of Sheridan.

Traffic investigations have shown that most people will drive at a speed that they perceive is safe with the given roadway conditions and will ignore a speed limit that is unrealistically too low or too high. A realistic speed limit is voluntarily obeyed by the reasonable majority and more enforcement effort can be applied to the unreasonable few who drive too fast or too slow. When reasonably set, speed limits establish a middle ground for all drivers encouraging some to speed up while influencing others to slow down. This middle ground reduces turbulence within the traffic stream and limits conflict points and reduces accidents.

**Q-21: Will this study consider future transit along Wadsworth Boulevard?**

A-20: Transit along Wadsworth Boulevard is included in DRCOG's long-range plan. However, it is not included in the fiscally constrained plan, that is, the list of projects likely to be implemented within the next 25 years. The City of Lakewood and some metro-area residents would like to see transit along Wadsworth Boulevard in the shorter term. The implementation of transit along Wadsworth Boulevard is not part of the US 6/Wadsworth study; however, the ability of the interchange to accommodate transit along Wadsworth Boulevard is a high-priority consideration in the evaluation of alternatives for the interchange. The most important feature in accommodating future transit is a sufficiently long bridge on US 6 to allow additional travel or transit lanes on Wadsworth Boulevard.



Speed as it relates to accident causality is primarily related to speed differentials. Speed differential is the range of vehicle speeds within the traffic stream. A large variation in these speeds complicates the driving task and necessitates sudden braking, multiple lane changes and other compensating driving maneuvers.

A speed limit properly set, will establish a middle ground for all drivers encouraging some to speed up while enticing others to slow down. This then reduces turbulence within the traffic stream and limits conflict points and reduces accidents.

There is no question, however, that speed plays a role in accident severity. Once an accident has begun to occur the degree of damage to a vehicle and its occupants is directly related to the speed the vehicle is going.



An appropriate, "just right" speed limit will result in the maximum number of vehicles traveling at about the same speed, thus reducing conflicts caused by speed differentials. The 85th percentile speed, that speed at or below which 85% of the traffic is moving, is widely accepted as being closest to that "just right" speed limit - a case of Majority Rule. Of course, other Traffic Investigation factors must be taken into consideration.

Following are some reasons for establishing realistic speed limits:

- A) To provide guidance to the driver, especially strangers to the area, as to what is a suitable speed for normal conditions;
- B) Reasonable speed limits with adequate signing tend to reduce the speed difference between vehicles. The accident rate is less when the majority of vehicles are traveling at about the same speed;
- C) To furnish enforcement personnel with a guide as to what is an appropriate speed for a segment of road so that enforcement actions may be consistent and fair;
- D) To improve the overall credibility of all traffic control devices.

### WHAT YOU CAN DO

Anyone may report a road segment where the speed limit seems to be too high or too low. If the segment is a portion of county road or city street, contact should be made with that county or municipality. If the segment is a portion of the State Highway System, including U.S. and Interstate routes, contact should be with the Region's Traffic and Safety Engineer of the Colorado Department of Transportation.



**Safety and Traffic Engineering Branch**  
**4201 East Arkansas Avenue**  
**EP Suite 770**  
**Denver, Colorado 80222**

8/02

# Establishing Realistic SPEED LIMITS





## Why Speed Limits?

Speed limits are supposed to do two things. The primary purpose of speed limits is to enhance safety by reducing risks imposed by drivers speed choices. The intent is to reduce disparities in speeds and reduce the potential for vehicle conflicts. A related function of speed limits is to provide the basis for enforcement and sanctions for those who drive at speeds excessive for conditions and endanger others.

### LAW

Prima facie speed limits are those which, "on the face of it," are reasonable and prudent under normal conditions. Normally a driver may exceed a prima facie limit if it is safe to do so; however it is up to the driver to prove that he was driving in a safe manner under existing conditions.

In Colorado, basic prima facie speed limits are:

- 20 mph on narrow, winding mountain roads
- 25 mph in any business district
- 30 mph in any residential district
- 40 mph on open mountain highways

Absolute speed limits are those which may not be legally exceeded under any circumstances. These are:

- 65 mph on open highways
- 75 mph on rural interstate routes

Section 42-4-1102, Colorado Revised Statutes, requires that speed limits are not to be higher or lower than the basic prima facie speed limits unless a Traffic Investigation has justified the change. This law applies to all State Highways, County Roads and City Streets. For State Highways, including portions within municipal corporate limits, the Investigation to justify an increase or decrease of existing speed limits is normally conducted by, and approved by, the Safety and Traffic Engineering Branch of the Colorado Department of Transportation.

Each Investigation to determine an appropriate speed limit should consider the following factors applicable to the portion of road being studied.

- Prevailing speed data (85th percentile)
- Roadside development
- Accident experience
- Road characteristics
- Pace speed
- Parking practices/pedestrian activity

The use of vehicle speed data as one of the factors evaluated for selecting a suitable speed limit is based upon the following fundamental concepts deeply rooted in the United States system of government and law:

- A) Laws cannot be effectively enforced without the consent and voluntary compliance of the public;
- B) Laws are established for the protection of the public and the regulation of the unreasonable behavior of a few individuals;
- C) The normally careful and competent actions of a reasonable person should be considered legal;
- D) Most drivers are reasonable people who will drive carefully at a speed which is suitable for existing conditions.

### MISCONCEPTIONS

It is a popular misconception that reducing the speed limit will automatically slow the speed of traffic, while raising the speed limit will automatically cause an increase in the speed of traffic.

"Before and After" speed studies show that there are no significant changes in vehicle

speeds after speed limits are changed. "Before and After" accident studies usually do not show any significant change in accident rates after speed limits are increased or decreased. National studies go further and say that "it is generally at the upper boundary of a speed range where crash involvement rates are lowest."

### UNREALISTIC SPEED LIMITS

Traffic investigations have shown that most people will drive the roadway as they perceive the conditions and will ignore a speed limit that is unrealistically too low or too high. A realistic speed limit is voluntarily obeyed by the reasonable majority and more enforcement effort can be applied to the unreasonable few who drive too fast or too slow.



An unrealistic speed limit that is "too low" will:

- A) Make the behavior of the majority unlawful;
- B) If enforced - cause antagonism toward enforcement personnel and traffic laws in general;
- C) Create a bad image of the community for visitors and tourists;
- D) Result in speed differentials in the traffic flow.

A barrier is feasible if it can be constructed without major engineering or safety issues and provide a substantial noise reduction to the adjacent receivers. Reasonableness deals with whether or not the barrier can be constructed in a cost-effective manner, the percentage of residential-type development, overall noise level increases and the desire of the community.

### **What is a “substantial noise reduction”?**

A noise barrier must provide at least a readily perceptible decrease in noise levels to adjacent receivers to be effective. This is defined as a noise decrease of at least five decibels. As noise level changes of three decibels or less are not generally perceptible, it is not prudent to construct a noise barrier that only gives a one-or-two decibel benefit to adjacent properties.

### **What types of noise barriers are constructed?**

Noise barriers are commonly constructed as walls, earth berms, or a combination of the two. Walls are most common, and are usually constructed out of dense material, such as concrete or masonry block. Earth berms are a natural alternative to walls, but require much more land to construct. Walls can be constructed on top of berms in order to raise the overall height of the barrier.

### **How do noise barriers work?**

Noise barriers reduce noise by blocking the direct travel of sound waves from a source (highway) to adjacent homes or businesses, forcing them over the top or around the barrier.

The barrier must be high enough and long enough to block



the view (line of sight) of the highway. This is the phenomenon that allows a noise barrier to provide a perceivable noise reduction. Noise barriers do very little good for homes on a hillside overlooking a road or for buildings which rise above a barrier. Openings or gaps in barriers for driveway connections or street intersections reduce barrier effectiveness. Noise barriers are most effective for the first one or two rows of homes at distances up to 200 to 300 feet from the barrier. As noise levels decrease with distance, there is a point away from the highway at which noise barriers are no longer effective. They are not designed to eliminate or block all noise.

### **Will planting vegetation help reduce noise levels?**

Vegetation is only effective for reducing noise levels if it is at least 100 to 200 feet deep, high enough that it cannot be seen over, and dense enough that it cannot be seen through. It is not feasible to plant enough vegetation along a highway to achieve this type of reduction, however, planting trees or shrubs can provide aesthetic benefit and visual screening.

### **How does pavement type effect noise levels?**

Research regarding pavement influence on noise levels has been an ongoing process. In general, the use of certain types of asphalt pavements or texturing of concrete pavements can give an initial noise reduction benefit to properties 200 to 300 feet from the highway. Over a long period of time, however, it is not known if these benefits continue to be realized. As a result, pavement type, in and of itself, cannot be considered as an alternative to conventional noise mitigation measures at this time.

**For more information about highway traffic noise and the environment, please visit the FHWA Web site at <http://www.fhwa.dot.gov/environment/noise/index.htm> or visit the CDOT noise Web site at <http://www.dot.state.co.us/environmental/CulturalResources/Noise.asp>.**

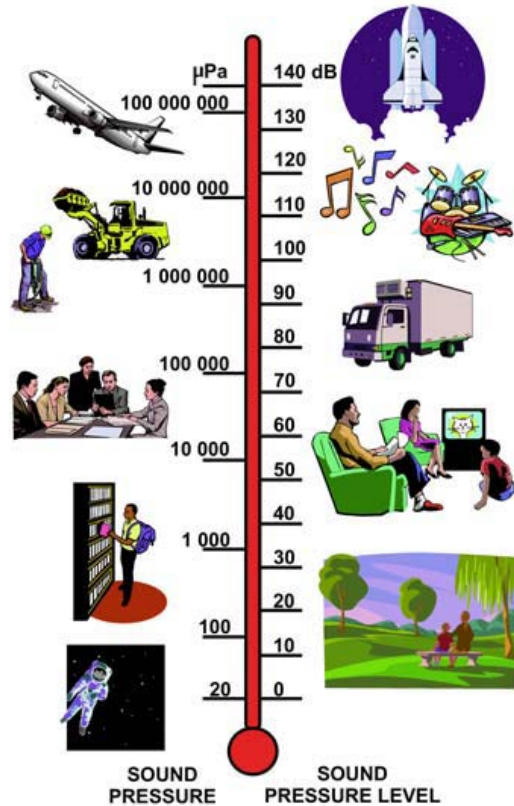
# Highway Traffic Noise: Assessment and Abatement



Traffic noise is an important consideration that must be taken into account when the Colorado Department of Transportation (CDOT) embarks on environmental studies that involve major highway improvements. For these projects, a noise study is required to assess existing noise levels and predict future noise levels (usually 20 years into the future) to determine noise impacts.

All traffic noise studies and analyses prepared for CDOT projects must adhere to procedures and requirements as established by Federal law, US Department of Transportation regulations and CDOT noise analysis guidelines. This assures that the policies are uniformly and consistently applied and provided equitable treatment for those impacted by highway traffic noise.

If noise impacts are identified during a traffic noise analysis, CDOT is required to examine and consider noise mitigation measures. If these measures are found to be feasible and reasonable in accordance with CDOT defined criteria, they must be included as part of the project.



### How are noise level changes perceived?

Studies have shown that changes in noise levels of three decibels or less are not typically detectable by the average human ear. An increase in five decibels is generally readily noticeable by anyone, and a 10-decibel increase is usually felt to be “twice as loud” as before.

### How do changes in traffic or roadway geometry affect noise levels?

Due to the nature of the decibel scale, a doubling of traffic will result in a three-decibel increase in noise levels, which in and of itself would not normally be a perceivable noise increase. Traffic would need to be increased at least three times to result in a readily perceivable (five decibel) increase in noise.

Using the same reasoning, if a highway is moved to half as close to existing homes (i.e. 200 to 100 feet), the noise levels will increase by three decibels. Conversely, if a highway is moved double the distance from existing homes, the noise levels will decrease by three decibels. Noise level increases due to highway projects are usually due to a combination of increased traffic and changes in the roadway alignment.

### When is a noise analysis required?

A noise analysis is required for a proposed CDOT project if that project consists of:

- A new highway built on a new location,
- An existing highway is significantly altered by substantially changing the horizontal or vertical characteristics of the road, or
- The number of through traffic lanes is being increased.

Minor projects, such as normal roadway resurfacing (without adding new lanes), do not require a noise analysis.

### Does CDOT analyze noise levels on existing highways?

In the absence of a major highway project as described above, CDOT does not perform noise studies or mitigate noise for existing highways.

### What constitutes a traffic noise impact?

A “noise sensitive receiver” (defined as homes, parks, schools, business, etc.) is considered to be impacted by noise if either future (generally a 20-year projection) noise levels approach or exceed the CDOT *Noise Abatement Criteria*, or if there is a substantial increase in future noise levels over existing noise levels from a proposed CDOT project as described above. These are the noise levels that are experienced at the commonly used exterior portions of the property on the lowest ground level for each home or individual unit.

For residences, schools and parks, impact is defined when the *hourly equivalent sound level* (essentially the average noise level over a time period), or **Leq** is 66 decibels or higher, and 71 decibels for businesses and other commercial properties. A substantial increase impact occurs when there is a projected 10-decibel increase over existing levels. Impacts such as these require mitigation consideration and analysis, which will construct noise barriers if they are determined to be feasible and reasonable.

### What does CDOT consider “feasible and reasonable”?

A noise barrier must be both feasible and reasonable if it is to be constructed with the highway project. Feasibility and reasonableness are determined by criteria that are quantifiable but flexible, and judgements for special and/or unusual circumstances are made on a case-by-case basis. As a result, noise mitigation is not automatically provided where noise impacts have been identified.



### **Cost**

SMA is significantly cheaper while still providing similar benefits as asphalt rubber and OGFC.

### **Durability**

In CDOT's pavement noise inventory, it was determined that SMA has a slightly higher initial noise level than OGFC, but as the pavement aged, the noise levels did not increase as quickly. A SMA constructed in 2002 had a noise decibel level of 96.15 and in 2003 the decibel level was 96.28. This change of 0.1 decibels is likely within the repeatability of the testing. To be noticeable by the human ear, it takes a change of three decibels or more.

### **Long-term durability**

While short-term studies show that OGFC can be slightly quieter than other pavement types such as Superpave, SMA or concrete, the noise mitigating qualities of any pavement deteriorate over time. CDOT has gathered an inventory of all their pavement types ranging in different ages and have found that the noise level of an ultra-thin bonded wearing surface (a type of OGFC) pavement built in 2003 was only 95 decibels. On the other hand, the noise level of one built in 2002 was approximately 99 decibels. That is an increase of four decibels in one year. Although these are different designs, there is an increase of four decibels in one year. More research is clearly needed.

### **Concrete**

When CDOT chooses concrete as the pavement type for a project, two types of methods will often be used that have noise-reducing benefits.



### **Tining and Grooving**

Tining is the creation of shallow channels in a concrete roadway to enhance weather traction of an otherwise smooth surface. While tining is necessary for safe driving conditions in wet weather, it does affect roadway noise.



CDOT has conducted several studies that look at different ways of applying tining. The results show that some tining patterns, including longitudinal tining, can help produce lower levels of pavement noise. Through various studies, it has been demonstrated that longitudinal tining is quieter than transverse tining and is, thus, the standard tining pattern of choice. In CDOT's inventory of pavement type, it was discovered that noise levels in a concrete roadway with longitudinal tining only increased by one decibel over several years, which is below the level that the human ear can distinguish. Grooving the surface produces an even quieter pavement at a nominal cost increase.

### **Research**

With new technology emerging constantly, CDOT will continue to monitor experiments around the world and continue to conduct experiments when funding allows. CDOT's goal is to maintain the safety and durability of the existing highway system and the methods to reach this goal must fall within funding abilities. Experimentation will continue when possible to enhance secondary goals, such as noise.

# Highway Traffic Noise: Effect of Pavement Types



## Pavement Types

There are several standard types of pavement that the Colorado Department of Transportation (CDOT) can choose from when constructing or resurfacing a roadway including Superpave Hot Mix Asphalt (HMA), Stone Matrix Asphalt (SMA), and Portland Cement Concrete.

## Pavement Type Selection Process

CDOT conducts a 40-year life cycle cost analysis when selecting a particular type of pavement to be used on a project. The analysis includes the initial construction cost, maintenance costs, rehabilitation costs and even user costs like traffic delays for motorists. If the life cycle cost analysis of certain pavement types is a tie, then secondary factors relating to unique project goals, such as noise can be considered to break the tie.

## Noise

Before embarking on a major transportation improvement, an environmental study is conducted to assess the potential impacts an improvement may have on the social, economic and natural environmental conditions as well as on the lives of residents and commuters. This study is required as part of the National Environmental Policy Act (NEPA). Noise is a major consideration as part of this process. For these projects, a noise study is required to assess existing noise levels and predict future noise levels. Noise studies and mitigation efforts are not required on minor projects or on existing highways in the absence of proposed major projects.

If a noise impact is identified during a noise analysis, CDOT then examines and considers noise mitigation options. The most common measures of mitigating noise are noise barriers, which include either walls or earth berms. Other options such as traffic management measures, acquisition of property to provide a buffer zone between the roadway and impacted

areas or planting vegetation are not normally practical nor effective.

FHWA does not recognize pavement type, in and of itself, as a noise abatement measure, and noise, therefore, is not a primary factor when selecting a pavement. This is due to the fact that there are several components to the noise generated from a roadway facility including tire-surface contact, engine, brakes (including truck Jake brakes) and wind drag around vehicles. The application of quieter surface materials would only address one component of this spectrum.

## Will Adding Rubber to Asphalt Make Pavements Quieter?

### What is Asphalt Rubber?

Wasted tires are turned into crumb rubber, which is then processed and blended with asphalt. Aggregate is heated and the asphalt/rubber blend is added to it. This mix is often used with OGFC and is believed to reduce noise. Although aggregate size and porosity clearly impact noise, asphalt rubber's contribution is not significant. Many studies are being conducted to gather more information in this area as the product is still being tested.

In addition to the questions regarding the effectiveness of asphalt rubber, CDOT has other concerns including cost, placement temperature, safety, and long-term noise mitigation. These additional questions make it difficult for CDOT to move its entire pavement program towards this one product.

### Cost

There is a significant cost variance for different pavement types. Cost of materials and placement is more than

\$4.00 a square yard per inch of thickness, making asphalt rubber one of the most costly asphalt products. It is 50% more than the cost of a regular HMA.

### Climate

Construction temperatures are a critical factor in the placement of asphalt rubber. To ensure the highest quality, the placement temperatures must be 65 degrees and rising. This makes night paving in Colorado virtually impossible. Since traffic congestion requires most construction in Colorado, especially in urban areas such as Denver and Colorado Springs, to be conducted at night, there is a very small window of opportunity to pave.

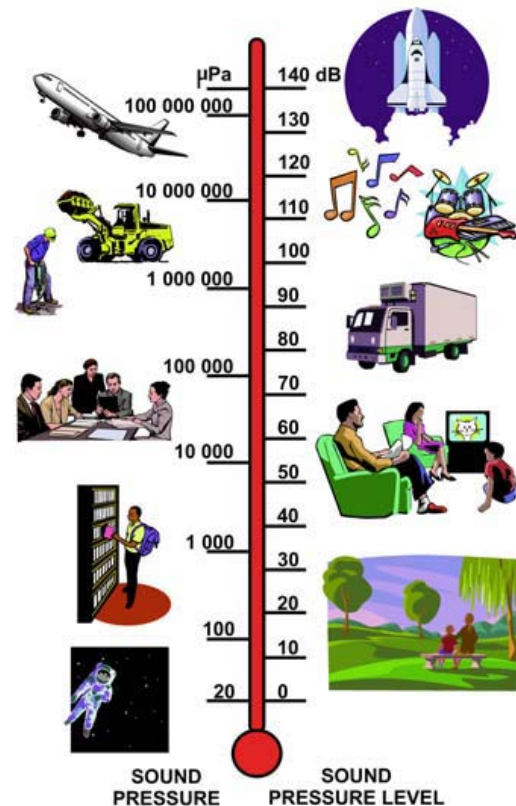
Additionally, asphalt rubber has not been proven to ensure a safe riding surface for Colorado's extreme winters and variable temperatures resulting in numerous freeze-thaw cycles.

### Open-Grade Friction Course

As mentioned earlier, OGFC is often used in combination with asphalt rubber. OGFC also has some safety issues having to do with preferential icing. This pavement type is designed to collect water and drain out to the sides. Due to the nature of the design, the pavement often gets clogged with road sand or other grit, preventing drainage from occurring. When the pavement cannot drain, the remaining water freezes, creating patches of black ice. This preferential icing creates safety hazards for motorists and emergency crews that have to work on these roadways. After a one-year experiment encompassing two winters, this is no longer a viable option in Colorado due to safety concerns.

### Stone Matrix Asphalt

One standard pavement type that CDOT currently uses frequently is SMA, which provides a rut resistant pavement with a skid resistant surface. Other reported benefits include better drainage, reductions in glare and lower tire noise than normal Superpave mixes.





First Name: \_\_\_\_\_ Last Name: \_\_\_\_\_

Address: \_\_\_\_\_ City: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Email Address: \_\_\_\_\_  Yes, add me to the US 6/Wadsworth mailing list

Do you support the construction of noise walls along US 6 as part of improvements to the US 6 and Wadsworth Boulevard interchange?  Yes  No

Comments?

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Do you have any comments about the aesthetics/appearance of noise walls along US 6?

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Please provide any additional comments here.

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Please leave this comment form in one of the comment boxes on your way out. A comment box is located at the Sign-In table near the entrance. You may also fold this form into thirds, tape or staple it, and mail it to the address printed below. Please affix a stamp before mailing the form. For additional project information, please visit the project website, [www.US6Wadsworth.com](http://www.US6Wadsworth.com), or call Colleen Kirby Roberts, public involvement manager, at 303-573-5385, ext. 205.

Return Address:

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Affix  
stamp  
here

US 6/Wadsworth EA  
CH2M HILL  
C/o Colleen Kirby Roberts  
535 16th Street, Suite 800  
Denver, CO 80202