

## Chapter 13: Noise

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### 13.1 Introduction

This chapter describes noise impacts associated with the Mountain View Corridor (MVC). Traffic noise impacts were evaluated using noise models and methodologies approved by the Federal Highway Administration (FHWA) and the Utah Department of Transportation (UDOT). Transit noise and vibration impacts were evaluated using procedures and methodologies approved by the Federal Transit Administration (FTA). Noise impacts were identified at residential and commercial locations within about 500 feet of the proposed alternatives. Where appropriate, noise barriers or other abatement measures were evaluated to mitigate noise impacts, and recommendations were made for considering whether to construct noise-abatement measures.

**Noise Impact Analysis Area.** The noise impact analysis area is the area adjacent to the proposed alternatives that could be affected by an increase in noise from construction and operation of the MVC.

## 13.2 Characteristics of Noise

Sound travels through the air as waves of minute air pressure fluctuations caused by vibration. In general, sound waves travel away from the noise source as an expanding spherical surface. As a result, the energy contained in a sound wave is spread over an increasing area as it travels away from the source. This results in a decrease in loudness at greater distances from the noise source.

Sound-level meters measure the actual pressure fluctuations caused by sound waves and record separate measurements for different sound frequency ranges. The decibel (dB) scale used to describe sound is a logarithmic scale that accounts for the large range of sound pressure levels in the environment. Most sounds consist of a broad range of sound frequencies. Several frequency-weighting schemes have been used to develop composite decibel scales that approximate the way the human ear responds to sound levels. The A-weighted decibel (dBA) scale is most widely used for this purpose. Typical A-weighted noise levels for various types of sound sources are summarized in [Table 13.2-1](#).

**Table 13.2-1. Weighted Noise Levels and Human Response**

Sound Source	dBA <sup>a</sup>	Response Descriptor
Carrier deck jet operation	140	Limit of amplified speech
	130	Painfully loud
Jet takeoff (200 feet)	120	Threshold of feeling and pain
Auto horn (3 feet)		
Riveting machine	110	
Jet takeoff (2,000 feet)		
Shout (0.5 foot)	100	Very annoying
New York subway station		
Heavy truck (50 feet)	90	Hearing damage (8-hour exposure)
Pneumatic drill (50 feet)		
Passenger train (100 feet)	80	Annoying
Helicopter (in-flight, 500 feet)		
Freight train (50 feet)		
Freeway traffic (50 feet)	70	Intrusive
Air conditioning unit (20 feet)	60	
Light auto traffic (50 feet)		
Normal speech (15 feet)	50	Quiet
Living room, bedroom, library	40	
Soft whisper (15 feet)	30	Very quiet
Broadcasting studio	20	
	10	Just audible
	0	Threshold of hearing

<sup>a</sup> Typical A-weighted noise levels taken with a sound-level meter and expressed as decibels on the "A" scale. The "A" scale approximates the frequency response of the human ear.

Source: CEQ 1970

Varying noise levels are often described in terms of the equivalent sound level ( $L_{eq}$ ). Equivalent noise levels are used to develop single-value descriptions of average noise exposure over stated periods of time. The  $L_{eq}$  data used for these average noise exposure descriptors are generally based on A-weighted sound-level measurements. Most often, units of hourly  $L_{eq}$  values are used to describe traffic noise.

The logarithmic nature of decibel scales is such that individual decibel ratings for different noise sources cannot be added directly to give the noise level for the combined noise source. For example, two noise sources that produce equal decibel ratings at a given location will produce a combined noise level that is 3 dBA greater than either sound alone. When two noise sources differ by 10 dBA, the combined noise level will be 0.4 dBA greater than the louder source alone.

People generally perceive a 10-dBA increase in a noise source as a doubling of loudness. For example, a 70-dBA sound will be perceived by an average person as twice as loud as a 60-dBA sound. People generally cannot detect differences of 1 dBA to 2 dBA between noise sources. Under ideal listening conditions, differences of 2 dBA or 3 dBA can be detected by some people. A 5-dBA change would probably be perceived by most people under normal listening conditions.

When distance is the only factor considered, sound levels from isolated point sources of noise typically decrease by about 6 dBA for every doubling of distance from the noise source. When the noise source is a continuous line (for example, vehicle traffic on a highway), noise levels decrease by about 3 dBA for every doubling of distance away from the source.

Noise levels at different distances can also be affected by factors other than the distance from the noise source. Topographic features and structural barriers that absorb, reflect, or scatter sound waves can increase or decrease noise levels. Atmospheric conditions (wind speed and direction, humidity levels, and temperatures) can also affect the degree to which sound is attenuated over distance.

Reflections off topographical features or buildings can sometimes result in higher noise levels (lower sound attenuation rates) than would normally be expected. Temperature inversions and wind conditions can also diffract and focus a sound wave to a location at considerable distance from the noise source. Focusing effects are usually noticeable only for very intense noise sources, such as blasting operations. As a result of these factors, the existing noise environment can be highly variable depending on local conditions.

## 13.3 Regulatory Setting

### 13.3.1 FHWA and UDOT Noise Standards

The Federal Noise Control Act of 1972 (Public Law 92-574) requires that all federal agencies administer their programs in a manner that promotes an environment free from noises that could jeopardize public health or welfare.

UDOT has adopted criteria for evaluating noise impacts associated with federally funded highway projects and for determining whether such impacts are sufficient to justify funding noise-abatement measures. The UDOT Noise-Abatement Criteria (NAC) are summarized in [Table 13.3-1](#).

**Table 13.3-1. UDOT's Noise-Abatement Criteria**

Activity Category	L <sub>eq</sub> Noise Levels (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
D	—	Undeveloped lands
E	51 (interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums

Source: UDOT 2008

A traffic noise impact occurs when a predicted traffic noise level approaches or exceeds the NAC listed above in [Table 13.3-1](#) for a specific activity category, or when the predicted traffic noise level substantially exceeds the existing noise level. As defined by UDOT, a design-year noise level greater than or equal to the NAC is considered to exceed the NAC, and a 10-dBA increase over existing noise levels is considered to substantially exceed the NAC.

### 13.3.2 FTA Noise and Vibration Standards

FTA has its own procedures and guidelines for assessing noise and vibration impacts. This section discusses basic concepts of transit noise that are used in this analysis.

The noise descriptors most often used for transit noise evaluations are the A-weighted sound level (dBA) and the equivalent sound level (L<sub>eq</sub>) as described in Section 13.3.1, FHWA and UDOT Noise Standards, for highway traffic noise.

In addition, the sound exposure level and the day-night sound level ( $L_{dn}$ ) are also used in transit noise assessments.

**Sound-Exposure Level.** The sound-exposure level describes the total noise exposure from a single noise event such as a light-rail train passing by. The sound-exposure level represents the total amount of sound energy during the event. The sound-exposure level is a cumulative measure of noise, which means that (1) louder events have greater sound-exposure levels than do quieter ones, and (2) events that last longer have greater sound-exposure levels than do shorter ones. People generally react to the duration of noise events and consider longer events to be more annoying than shorter ones.

**Day-Night Sound Level ( $L_{dn}$ ).** The  $L_{dn}$  is a 24-hour measure that accounts for the moment-to-moment fluctuations in noise levels due to all noise sources during a 24-hour period. In calculating the  $L_{dn}$ , nighttime (10:00 PM to 7:00 AM) noise levels are increased by 10 dBA to account for the lower background noise levels typically found during the evening when noises can disturb residents' sleep. For transit projects, the  $L_{dn}$  is used as the measure of cumulative noise impact.

**Ground-borne Vibration Level.** Ground-borne vibration is the motion of the ground relative to an equilibrium, non-moving position. The most common measure used to quantify vibration amplitude is the peak particle velocity (PPV), which is defined as the maximum instantaneous peak of the vibratory motion. The ground-borne vibration from transit trains is usually characterized in terms of the "smoothed" root mean square (rms) vibration velocity level, in decibels (VdB), with a reference quantity of one micro-inch per second.

### 13.3.2.1 Noise Impact Criteria for Mass-Transit Projects

The impact criteria in the Transit Noise and Vibration Impact Assessment Guideline (USDOT 2006) are used to estimate existing noise levels and future noise impacts from transit operations. The land-use classifications applicable to transit projects are shown in [Table 13.3-2](#) below.

**Table 13.3-2. Land-Use Categories and Metrics for Transit Noise Impact Criteria**

Land-Use Category	Noise Descriptor (dBA)	Description of Land-Use Category
1	Outdoor $L_{eq}(h)^a$	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, and such land uses as outdoor amphitheaters and concert pavilions, as well as national historic landmarks with substantial outdoor use.
2	Outdoor $L_{dn}$	Residences and buildings where people normally sleep. This category includes homes, hospitals, and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.
3	Outdoor $L_{eq}(h)^a$	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, and churches where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material. Buildings with interior spaces where quiet is important, such as medical offices, conference rooms, recording studios, and concert halls, fall into this category. Places for meditation or study associated with cemeteries, monuments, and museums, as well as certain historic sites, parks, and recreational facilities, are also included.

<sup>a</sup>  $L_{eq}$  for the noisiest hour of transit-related activity during hours of noise sensitivity.  
Source: USDOT 2006

There are two levels of noise impact included in the FTA criteria: severe impacts and moderate impacts. The level of impact affects whether noise mitigation is implemented.

- **Severe Impact.** Severe noise impacts are considered “significant” (as defined in the National Environmental Policy Act). Noise mitigation is normally specified for areas with severe impacts unless there is no practical method of mitigating the impact.
- **Moderate Impact.** In this range, other project-specific factors are considered to determine the magnitude of the impact and the need for mitigation. Other factors can include the predicted increase over existing noise levels, the types and number of noise-sensitive land uses affected, existing outdoor-indoor sound insulation, and the cost-effectiveness of mitigating noise to more acceptable levels.

The FTA noise impact criteria are shown in [Table 13.3-3](#) below.

Table 13.3-3. FTA Noise Impact Criteria

Existing Noise Exposure, $L_{eq}$ or $L_{dn}$ (dBA)	Project Noise Impact Exposure, $L_{eq}$ or $L_{dn}$ (dBA)					
	Category 1 or 2 Sites <sup>a</sup>			Category 3 Sites <sup>a</sup>		
	No Impact	Moderate Impact	Severe Impact	No Impact	Moderate Impact	Severe Impact
<43	<Ambient +10	52–58	>Ambient +15	<Ambient +15	Ambient +15 to 20	>Ambient +20
43	<52	52–58	>58	<57	57–63	>63
44	<52	52–58	>58	<57	57–63	>63
45	<52	52–58	>58	<57	57–63	>63
46	<52	53–59	>58	<57	58–64	>64
47	<53	53–59	>59	<58	58–64	>64
48	<53	53–59	>59	<58	58–64	>64
49	<53	54–59	>59	<58	59–64	>64
50	<54	54–59	>59	<59	59–64	>64
51	<54	54–60	>60	<59	59–65	>65
52	<54	55–60	>60	<60	60–65	>65
53	<55	55–60	>60	<60	60–65	>65
54	<55	55–61	>61	<60	60–66	>66
55	<55	56–61	>61	<61	61–66	>66
56	<56	56–62	>62	<61	61–67	>67
57	<56	57–62	>62	<62	62–67	>67
58	<57	57–62	>62	<62	62–67	>67
59	<58	58–63	>63	<63	63–68	>68
60	<58	58–63	>63	<63	63–68	>68
61	<59	59–64	>64	<64	64–69	>69
62	<59	59–64	>64	<64	64–69	>69
63	<60	60–65	>65	<65	65–70	>70
64	<61	61–65	>65	<66	66–70	>70
65	<61	61–66	>66	<66	66–71	>71
66	<62	62–67	>67	<67	67–72	>72
67	<63	63–67	>67	<68	68–72	>72
68	<63	63–68	>68	<68	68–73	>73
69	<64	64–69	>69	<69	69–74	>74
70	<65	65–69	>69	<70	70–74	>74
71	<66	66–70	>70	<71	71–75	>75
72	<66	66–71	>71	<71	71–76	>76
73	<66	66–71	>71	<71	71–76	>76
74	<66	66–72	>72	<71	71–77	>77
75	<66	66–73	>73	<71	71–78	>78
76	<66	66–74	>74	<71	71–79	>79
77	<66	66–74	>74	<71	71–79	>79
>77	<66	66–75	>75	<71	71–80	>80

See Table 13.3-2 above, Land-Use Categories and Metrics for Transit Noise Impact Criteria, for a description of land use categories 1, 2, and 3.

Source: USDOT 2006

## 13.4 Affected Environment

### 13.4.1 Methodology

#### 13.4.1.1 Traffic Noise

The MVC study area consists of a mix of undeveloped land with a variety of residential, recreational, and commercial land uses interspersed throughout the study area.

Existing noise levels along the proposed alternatives were determined by taking short-term (15-minute) sound-level measurements at 30 locations throughout the noise impact analysis area. Noise-measurement locations were selected to represent existing residential developments, recreation areas, or other areas where people could be exposed to traffic noise for extended periods of time. Noise-monitoring locations are shown in [Figure 13-1 through Figure 13-24](#), Noise Analysis.

#### 13.4.1.2 Transit Noise

Land uses along the 5600 West Transit Alternative consist of a mix of undeveloped open space, commercial and industrial facilities, and residential developments on both sides of the alignment. Noise and vibration levels along the 5600 West Transit Alternative are typical of suburban transportation corridors.

Existing noise levels along the 5600 West Transit Alternative were calculated using the General Noise Assessment procedures and assumptions in FTA's Transit Noise and Vibration Impact Assessment Guideline (USDOT 2006) for Category 2 land uses (residences and buildings where people normally sleep). Along the 5600 West Transit Alternative, most first-row residences are within about 50 feet to 100 feet of 5600 West. The estimated existing  $L_{eq}$  and  $L_{dn}$  at first-row residences within this distance from 5600 West is 65 dBA.

### 13.4.2 Current Noise Conditions in Salt Lake County

The measured noise level at each monitoring location in Salt Lake County is shown in [Table 13.4-1](#) below.



Table 13.4-1. Ambient Noise Levels in Salt Lake County

Monitoring Location	FHWA Activity Category <sup>a</sup>	Land Use	Location	Measured Noise Level (dBA)
1	C	Commercial	5500 West & 700 South	57
2	C	Commercial	South of 1300 South, west of 5400 West; near landfill	59
3	B	Residential	Kilt Rock Dr. (2800 South) & Kilt Rock Ct. (3755 West)	56
4	B	Residential	2750 South (Parkway Blvd.) & 6195 West	51
5	B	Residential	3140 South & 5860 West	54
6	B	Residential	2920 South & 6030 West	51
7	B	Residential	Appaloosa Dr. & Clydesdale Dr.	56
8	B	Residential	2685 South & 7450 West	52
9	B	Residential	7145 West & 3070 South	50
10	B	Residential	About 7270 West & 3000 South	51
11	B	Undeveloped/ scattered residential	North of State Route (SR) 201; 2100 South & 7400 West	50
12	B	Residential	7269 West & Majestic Way (3750 South)	64
13	B	Residential	Miriam Way (3825 South) & Centennial Rd. (7395 West)	51
14	B	Residential	3705 South & 7010 West	50
15	B	Residential	Copper Hill Dr. (3940 South ) & 7150 West	50
16	B	Residential	5725 West & 3705 South	49
17	B	Residential	5920 West & 3710 South	54
18	B	Residential	5933 West & 3920 South	47
19	B	Residential	5710 West & 4300 South	52
20	B	Recreational	USANA restricted entrance (south of stage area)	55
21	B	Recreational	USANA west parking lot	51
22	B	Residential	5996 South & 6350 West	51
23	B	Undeveloped	East of Highway 111 near 6800 South	52
24	B	Residential	5600 West & New Bingham Road (Highway 48)	55
25	B	Residential	Miners Mesa Rd. (6920 South) & High Bluff (6220 West)	46
26	B	Residential	Copper Hills High School (5445 New Bingham Highway)	47
27	C	Commercial/ industrial	Industrial Park at 9400 South & 6000 West (east of Prosperity Rd.)	47
28	B	Residential	Gold Stone Dr. (5620 West) & Shady Stone Dr. (11690 South) – residential	47
29	B	Residential	4895 West & Emma Mine Dr. (11980 South) – residential	44
30	B	Residential	Chilly Peak Dr. (14125 South) & Murdoch Peak Dr. (4830 West) – residential	57

<sup>a</sup> See Table 13.3-1 above, UDOT's Noise-Abatement Criteria, for a description of the FHWA activity categories.



Measured noise levels were typical of suburban environments and ranged from about 44 dBA to 59 dBA. Higher noise levels were measured at locations adjacent to high-traffic local roads (for example, 64 dBA at monitoring location 12). All measured noise levels along the proposed alternatives were below the UDOT noise-abatement criterion of 66 dBA for residential and recreational locations.

### 13.4.3 Current Noise Conditions in Utah County

The measured noise level at each monitoring location in Utah County is shown in [Table 13.4-2](#).

**Table 13.4-2. Ambient Noise Levels in Utah County**

Monitoring Location	FHWA Activity Category <sup>a</sup>	Land Use	Location	Measured Noise Level (dBA)
31	B	Residential	1600 South, east of Redwood Road – residential	50
32	B	Recreational	Jordan Narrows at Veterans Memorial Park – recreation	46
33	B	Residential	Bountiful Way (1950 North) & Providence Way (500 West) – residential	46
34	B	Residential	Hillside Dr. & Country Rd. (8450 North) – residential	47
35	B	Recreational	Jordan River at Saratoga Springs (Utah Lake) – recreation	51
36	B	Residential	2264 W. Hawthorne St. (120 North) – residential	46
37	B	Residential	9150 West & 7350 North – residential	64
38	B	Residential	9550 West & 8000 North – residential	45
39	B	Recreation/Residential	840 West & 975 South – recreation/residential	42
40	B	Residential	Mill Pond Road (7300 West & 7941 North) – residential	50

<sup>a</sup> See [Table 13.3-1](#) above, UDOT's Noise-Abatement Criteria, for a description of the FHWA activity categories.

Measured noise levels at the Utah County monitoring locations were typical of rural and suburban environments and ranged from about 42 dBA to 64 dBA. Similar to the Salt Lake County measurements, higher noise levels were measured at locations adjacent to high-traffic local roads. All measured noise levels along the proposed alternatives in Utah County were below the UDOT noise-abatement criterion of 66 dBA for residential and recreational locations.



## 13.5 Environmental Consequences

### 13.5.1 Methodology

#### 13.5.1.1 Traffic Noise Impact Methodology

The following methods were used to assess traffic noise impacts associated with the MVC project:

- Existing activities, developed land, and undeveloped land for which development is planned, designed, or programmed and that could be affected by noise from the MVC alternatives were identified from field surveys and aerial photographs. Existing residential developments were determined based on field observations and aerial photographs from 2004 for Utah County and from 2005 for Salt Lake County. Since that time, additional residential development (including new platted development) has taken place throughout the impact analysis area. New or platted residential developments that are in existence prior to the Record of Decision for the MVC project will be included in updated noise impact analyses conducted during the final design phase of the project. The results discussed below for UDOT's preferred alternative for the MVC would not change as a result of incorporating new information.
- As described in Section 13.4.1, Methodology, short-term (15-minute) sound-level measurements typical of existing conditions were taken throughout the impact analysis area and were used to characterize the existing noise environment.
- Future noise levels near the MVC were predicted using the FHWA Traffic Noise Model, Version 2.5 (February 2004).
- Future noise impacts from the MVC were identified using the criteria specified in UDOT's Noise Policy (January 2008).
- Mitigation measures for reducing noise impacts were evaluated using UDOT's guidelines for determining feasibility, reasonableness, and cost-effectiveness.

For noise impacts to recreation resources, see Chapter 6, Community Impacts.

#### The Traffic Noise Model

Traffic noise levels were modeled using the FHWA Traffic Noise Model, Version 2.5. The Traffic Noise Model estimates acoustic intensity at receiver locations based on the level of sound energy generated from a series of straight-line road segments. Where appropriate, the effects of local shielding from



existing structures, vegetation, terrain, and other adjustment factors can be included in the model to provide higher levels of detail and accuracy.

Because the MVC project would extend over a large area (about 44 miles), the project corridor was divided into segments to facilitate the noise modeling and reporting of results. In addition, the focus of the analysis was on those areas with substantial residential developments where noise-abatement measures might be warranted. Noise levels were modeled to reflect the expected traffic conditions in 2030 after the MVC is completed. Traffic volumes, vehicle speeds, and roadway alignments (including elevations above or below the existing ground surface) used in the model were based on information provided in the regional travel demand model used in the transportation evaluation. Vehicle mixes (cars versus trucks) for each road segment were determined from traffic volumes on similar types of facilities (for example, Interstate 80 [I-80] and Interstate 15 [I-15]).

### 13.5.1.2 Transit Noise and Vibration Impact Methodology

Noise and vibration impacts from the 5600 West Transit Alternative were estimated using the General Assessment methodologies in FTA's Transit Noise and Vibration Impact Assessment Guideline (USDOT 2006). The following preliminary operational characteristics were assumed for each transit option:

- Dedicated Right-of-Way Transit Option
  - Operation of a center-running, light-rail transit technology consisting of two cars per train at about 30 mph (miles per hour)
  - Four trains per hour per direction during both peak and off-peak hours
- Mixed-Traffic Transit Option
  - Operation of a streetcar-type technology in the outside travel lane operating at about 15 mph
  - Six cars per hour per direction during the peak hours; four cars per hour per direction during the off-peak hours

Sound-exposure levels and day-night sound levels ( $L_{dn}$ ) were estimated using procedures in the FTA guideline.

The impact analysis has been updated since the Draft EIS based on refinements to the action alternatives as described in Section 2.1.7.3, Design Options Incorporated in the Final EIS, and Section 2.1.7.4, Additional Changes to the Alternatives between the Draft EIS and Final EIS. In addition, this analysis has been updated since the Draft EIS to reflect Version 6.0 of the travel demand model and updated land-use forecasts. For more information, see Section 2.1.7.1,



Revised Travel Demand Modeling for the Final EIS. This analysis also reflects UDOT's revised noise policy (January 2008). A new appendix, Appendix 13C, Vibration, has been added to address vibration impacts associated with the transit alternatives.

### 13.5.2 No-Action Alternative

Under the No-Action Alternative, the Mountain View Corridor project would not be built, so no noise impacts would occur due to the project. However, other transportation projects identified in the Wasatch Front Regional Council and Mountainland Association of Governments long-range plans and by the local communities would be constructed, and these projects would contribute to localized noise impacts throughout the area. In addition, as the area changes to a more urban environment over the next 20 years, traffic volumes and traffic-related noise levels would continue to rise.

### 13.5.3 Salt Lake County Alternatives

In Salt Lake County, two roadway alternatives and a transit alternative which would be implemented as part of the roadway alternatives are under consideration: the 5600 West Transit Alternative, the 5800 West Freeway Alternative, and the 7200 West Freeway Alternative. Under the 5600 West Transit Alternative, there is a dedicated right-of-way option and a mixed-traffic option. In addition, a tolling option was considered for each freeway alternative. Impacts under each combination of alternatives and options are discussed in the following sections.

As shown in [Figure 13-1 through Figure 13-13](#), Noise Analysis, the two freeway alternatives are on separate alignments between I-80 and 5400 South near the USANA Amphitheatre. From about 5400 South to Utah County, the two freeway alternatives share a common alignment.

The goal of the noise impact analysis for the freeway alternatives was to determine if the predicted noise levels associated with the freeway alternatives would approach or exceed the applicable NAC (66 dBA for residential locations) and/or result in a 10-dBA increase over existing noise levels (a substantial exceedance according to UDOT's criteria). For the transit options, an impact would occur if noise levels exceed the applicable FTA noise impact criteria for Category 2 land uses (see [Table 13.3-3](#) above, FTA Noise Impact Criteria).



### 13.5.3.1 5600 West Transit Alternative

As described in Chapter 2, Alternatives, two transit options are under consideration along 5600 West in Salt Lake County. One option, the Dedicated Right-of-Way Option, would incorporate a transit system running down the center of the roadway, and the other, the Mixed-Traffic Option, would incorporate a transit system running alongside the roadway. A vibration impact assessment is included in Appendix 13C, Vibration.

5600 West Transit Alternative Impacts		
Noise Criterion	Dedicated Right-of-Way Option	Mixed-Traffic Option
Exceed FTA criteria	0	0

#### 5600 West Transit Alternative with Dedicated Right-of-Way Option

The Dedicated Right-of-Way Transit Option would consist of a center-running, light-rail transit technology with two cars per train that operates at about 30 mph. Appendix 13B, Expected Transit Noise Impacts, shows the existing and future estimated noise levels for Category 2 land uses adjacent to the 5600 West transit alignment with the Dedicated Right-of-Way Transit Option. In addition to the distance to the track and the proposed speed, the table in Appendix 13B includes the existing noise level (as estimated by the FTA guidelines), the expected noise level from operation of the transit system (based on preliminary operational characteristics), and the FTA impact criteria for each residential receptor group. The table in Appendix 13B compares the predicted transit noise level to the FTA impact criteria for various residential locations. Based on the difference between the predicted noise level and the impact criteria, the table lists the impact category (moderate or severe) for each location along with the number of receptor locations that would experience moderate or severe noise impacts from the transit alternative.

In many residential developments adjacent to the 5600 West transit alignment, privacy walls have been built between the first row of residences and 5600 West. The privacy walls vary in height from about 7 feet to 10 feet and block the line of sight between the residential development and 5600 West. Following FTA’s transit guidelines, these barriers were assumed to lower transit-related noise levels by 5 dBA at the first row of residences adjacent to 5600 West.

5600 West is a well-traveled transportation corridor with average daily traffic volumes ranging from about 21,000 to 45,000 vehicles per day, depending on location. The relatively high volume of vehicle traffic on 5600 West results in higher average noise levels at residential developments near the road. The operation of a center-running, light-rail transit system under the conditions described above (two cars per train operating at about 30 mph) would have a minor impact on noise levels along 5600 West.



The southern portion of the transit alternative south of Old Bingham Highway is currently undeveloped and would not be within an existing roadway alignment. However, over the next 20 years, this area will develop as a major urban center as part of the Daybreak residential development. It is reasonable to expect that noise levels in the urban center will increase substantially over its undeveloped state. As the area becomes more developed, noise levels will become more typical of urban corridors as described above for the 5600 West corridor. After the Daybreak development is fully built out, transit noise levels would likely be similar to those in other areas along 5600 West.

As shown in Appendix 13B, there would be no transit-related noise impacts associated with the Dedicated Right-of-Way Transit Option. In addition, there would be no vibration impacts under this transit option (see Appendix 13C, Vibration, for details about the vibration impact assessment).

**5600 West Transit Alternative with Mixed-Traffic Transit Option**

The Mixed-Traffic Transit Option would consist of a streetcar-type technology in the outside travel lane on 5600 West that operates at about 15 mph. The average sound-exposure level associated with a side-running streetcar system operating at 15 mph would be about 15 dBA less than for the light-rail transit system described on page 13-14. The transit noise impacts from the Mixed-Traffic Transit Option would be less than those from the Dedicated Right-of-Way Transit Option. There would be no transit-related noise or vibration impacts associated with the Mixed-Traffic Transit Option.

**13.5.3.2 5800 West Freeway Alternative**

As described in Chapter 2, Alternatives, this alternative would consist of a freeway extending from I-80 to the Utah County line.

To facilitate the noise modeling and impact analysis, the 5800 West Freeway Alternative was divided into nine segments as shown in [Figure 13-1 through Figure 13-9](#), Noise Analysis – 5800 West. Noise impacts are summarized below.

5800 West Freeway Alternative Impacts	
Noise Criterion	Impacts
Meet or exceed UDOT NAC	379

**5800 West Freeway Alternative – Segment 1 (I-80 to SR 201)**

The area between I-80 and State Route (SR) 201 is mostly undeveloped on both sides of the proposed alignment (see [Figure 13-1](#), Noise Analysis – 5800 West – I-80 to SR 201). Existing land uses include some industrial activities and



commercial land uses as well as some wetlands and agricultural land. There are very few residences in this segment.

Because there are no existing residential developments in Segment 1, hypothetical receptors were added to the noise model to determine the future noise impacts at residential locations after the project is completed.

If homes were constructed within about 500 feet of the alignment, people living in those homes would experience increased noise levels of up to 9 dBA over existing conditions. This noise level would exceed the residential NAC.

### **5800 West Freeway Alternative – Segment 2 (SR 201 to 3500 South)**

Land uses in Segment 2 are a mix of commercial and industrial businesses in the vicinity of the SR 201 interchange that transition to multi-family and single-family residential developments near Parkway Boulevard (see [Figure 13-2](#), Noise Analysis – 5800 West – SR 201 to 3500 South). Between Parkway Boulevard and 3500 South, the area consists of mostly single-family residences on the west side of the alignment with commercial businesses on the east side.

Noise levels in Segment 2 would increase by 1 dBA to 10 dBA at residences near the proposed alignment. The residential NAC would be met or exceeded at one receptor location representing about two single-family residences on the west side of the alignment.

### **5800 West Freeway Alternative – Segment 3 (3500 South to 4100 South)**

Land uses in Segment 3 are mostly residential on both sides of the proposed alignment (see [Figure 13-3](#), Noise Analysis – 5800 West – 3500 South to 4100 South). There are some recreation facilities on the west side of the alignment near 3500 South as well as near 4100 South.

Noise levels in Segment 3 would increase by 4 dBA to 14 dBA at residences near the alignment. The residential NAC would be met or exceeded at 36 receptor locations representing about 111 residences between 3500 South and 4100 South.

### **5800 West Freeway Alternative – Segment 4 (4100 South to 5400 South)**

Land uses in Segment 4 are mostly residential on both sides of the proposed alignment from about 4100 South to a point just south of the Denver & Rio Grande Railroad alignment (see [Figure 13-4](#), Noise Analysis – 5800 West – 4100 South to 5400 South). South of the railroad alignment, the roadway alignment





goes through a less-developed area before passing through a golf course and a parking lot on the west side of the USANA Amphitheatre.

Noise levels in Segment 4 would increase by 5 dBA to more than 20 dBA at residences nearest the alignment. The residential NAC would be met or exceeded at 31 receptor locations representing about 77 individual residences between 4100 South and 5400 South. The nearest entrance to the USANA Amphitheatre is located about 1,100 feet east of the freeway alignment. Traffic noise associated with the 5800 West alignment at this location would be about 58 dBA and would not exceed the NAC. It is unlikely that traffic noise from the road would interfere with events at the USANA Amphitheatre.

Segment 4 includes both Hillside Elementary and Hunter High schools. Noise levels at these schools would increase by at least 8 dBA. Potential noise-abatement measures for these schools could include a noise barrier (see Section 13.6, Noise-Abatement Measures).

#### **5800 West Freeway Alternative – Segment 5 (5400 South to 7800 South)**

Land uses south of 5400 South consist of mostly undeveloped land on the west side of the alignment and residential developments on the east side (see [Figure 13-5](#), Noise Analysis – 5800 West – 5400 South to 7800 South).

Noise levels in Segment 5 would increase by 4 dBA to 15 dBA at residences nearest the alignment. The residential NAC would be met or exceeded at 20 residential receptor locations representing about 58 residences in Segment 5.

#### **5800 West Freeway Alternative – Segment 6 (7800 South to Old Bingham Highway)**

Land uses south of 7800 South to the Old Bingham Highway consist of mostly undeveloped land on the west side of the alignment with some residential and industrial development on the east side (see [Figure 13-6](#), Noise Analysis – 5800 West – 7800 South to Old Bingham Highway).

Noise levels in Segment 6 would increase by 9 dBA to 15 dBA at residences nearest the alignment. The residential NAC would be met or exceeded at 15 residential receptor locations representing about 42 residences in Segment 6.



### **5800 West Freeway Alternative – Segment 7 (Old Bingham Highway to 11800 South)**

Land uses south of the Old Bingham Highway consist of undeveloped land on the west side of the alignment interspersed with some residential development and the proposed Daybreak development on the east side (see [Figure 13-7](#), Noise Analysis – 5800 West – Old Bingham Highway to 11800 South).

Noise levels in Segment 7 would increase by 5 dBA to 13 dBA at residences nearest the alignment. The residential NAC would be met or exceeded at eight residential receptor locations representing about 14 residences in Segment 7.

### **5800 West Freeway Alternative – Segment 8 (11800 South to 13400 South)**

Land uses south of 11800 South consist of undeveloped land on the west side of the alignment interspersed with residential development on the east side of the alignment (see [Figure 13-8](#), Noise Analysis – 5800 West – 11800 South to 13400 South). South of 12600 South, there is residential development on both sides of the alignment.

Noise levels in Segment 8 would increase by 5 dBA to 18 dBA at residences nearest the alignment. The residential NAC would be met or exceeded at eight residential receptor locations representing about 17 residences in Segment 8.

### **5800 West Freeway Alternative – Segment 9 (13400 South to Utah County)**

Land uses south of 13400 South to the Utah County line consist of residential development on the west side of the alignment with undeveloped open space on the east side of the alignment (see [Figure 13-9](#), Noise Analysis – 5800 West – 13400 South to Utah County).

Noise levels in Segment 9 would increase by 2 dBA to 16 dBA at residences nearest the alignment. The residential NAC would be met or exceeded at 24 residential receptor locations representing about 58 residences in Segment 9.

### **5800 West Freeway Alternative – Noise Impact Summary**

Under the 5800 West Freeway Alternative, the residential NAC would be met or exceeded at about 143 modeled noise receptors representing about 379 multi-family or single-family residences along the 5800 West Freeway Alternative alignment.



### Combined Impacts of 5800 West Freeway and 5600 West Transit Alternatives

The 5800 West Freeway Alternative would be implemented with one of the two 5600 West Transit Alternative options.

Combined Impacts of 5800 West Freeway and 5600 West Transit Alternatives		
Noise Criterion	Dedicated Right-of-Way Option	Mixed-Traffic Option
Meet or exceed UDOT NAC	379	379
Exceed FTA criteria	0	0

#### *5800 West Freeway Alternative with Dedicated Right-of-Way Transit Option*

As noted in Section 13.5.3.1, 5600 West Transit Alternative, there were no moderate or severe noise impacts associated with the Dedicated Right-of-Way Transit Option according to the FTA noise impact guidelines. Because the 5800 West Freeway Alternative and the Dedicated Right-of-Way Transit Option would not be on the same alignment and would not be adjacent to each other, they would not result in combined noise impacts. Overall, the combined noise impacts of the 5800 West Freeway Alternative with Dedicated Right-of-Way Transit Option would be the same as those from the 5800 West Freeway Alternative by itself.

#### *5800 West Freeway Alternative with Mixed-Traffic Transit Option*

There would be no noise impacts associated with the Mixed-Traffic Transit Option. The combined noise impacts of the 5800 West Freeway Alternative with Mixed-Traffic Transit Option would be the same as those from the 5800 West Freeway Alternative by itself.

#### **5800 West Freeway Alternative with Tolling Option**

The 5800 West Freeway Alternative with Tolling Option would result in less traffic on the proposed alignment than would the 5800 West Freeway Alternative by itself. The decrease in traffic volumes under the Tolling Option would not change the overall noise impacts compared to the 5800 West Freeway Alternative. (For example, if the Tolling Option reduced traffic on the alignment by half, this would reduce noise levels by 3 dBA—a difference that would not be perceptible to humans.) The overall noise impacts associated with the Tolling Option would be very similar to those for the 5800 West Freeway Alternative.



### 13.5.3.3 7200 West Freeway Alternative

As described in Chapter 2, Alternatives, this alternative would consist of a freeway extending from I-80 to the Utah County line.

7200 West Freeway Alternative Impacts	
Noise Criterion	Impacts
Meet or exceed UDOT NAC	763

As with the 5800 West Freeway Alternative, the 7200 West Freeway Alternative was divided into several segments to facilitate the noise modeling and impact analysis (see [Figure 13-10 through Figure 13-13](#), Noise Analysis – 7200 West).

#### 7200 West Freeway Alternative – Segment 10 (I-80 to SR 201)

Between I-80 and SR 201, land uses in Segment 10 are mostly undeveloped (see [Figure 13-10](#), Noise Analysis – 7200 West – I-80 to SR 201). There are several industrial facilities near the SR 201 interchange.

Noise levels in Segment 10 would increase by about 15 dBA over existing conditions near the SR 201 interchange but would remain below the commercial/industrial NAC.

#### 7200 West Freeway Alternative – Segment 11 (SR 201 to 3500 South)

Land uses in Segment 11 consist of commercial and industrial businesses near the SR 201 interchange that transition to multi-family and single-family residential developments south of the interchange (see [Figure 13-11](#), Noise Analysis – 7200 West – SR 201 to 3500 South). Between Parkway Boulevard and 3500 South, the area is primarily residential on both sides of the proposed alignment.

Noise levels in Segment 11 would increase by 5 dBA to 19 dBA depending on the distance between the residences and the alignment. Noise levels in Segment 11 would approach or exceed the residential NAC at 103 receptor locations representing about 257 residences in Segment 11.

#### 7200 West Freeway Alternative – Segment 12 (3500 South to 4100 South)

Land uses in Segment 12 consist of residential developments on both sides of the alignment (see [Figure 13-12](#), Noise Analysis – 7200 West – 3500 South to 4100 South).

Noise levels in Segment 12 would increase by 4 dBA to 17 dBA at residences within about 500 feet of the proposed alignment. The residential NAC would be



met or exceeded at 106 receptor locations representing about 293 residences in Segment 12.

### **7200 West Freeway Alternative – Segment 13 (4100 South to 5400 South)**

From 4100 South to about 5400 South, there is some residential development on the east side of the alignment near the Denver & Rio Grande Railroad alignment (see [Figure 13-13](#), Noise Analysis – 7200 West – 4100 South to 5400 South). There is less development south of the railroad alignment, which then passes along the west side of the USANA Amphitheatre.

Noise levels in Segment 13 would increase by about 8 dBA to 14 dBA at residences nearest the alignment. The residential NAC would be met or exceeded at six receptor locations representing about 24 residences in Segment 13.

### **7200 West Freeway Alternative – Segment 14 (5400 South to Utah County)**

From 5400 South to Utah County, the 7200 West Freeway Alternative is on the same alignment as that for Segments 5 through 9 for the 5800 West Freeway Alternative (see [Figure 13-5 through Figure 13-9](#), Noise Analysis – 5800 West). The transportation-related noise impacts for Segment 14 of the 7200 West Freeway Alternative would be the same as those for Segments 5 through 9 of the 5800 West Freeway Alternative.

### **7200 West Freeway Alternative – Noise Impact Summary**

Under the 7200 West Freeway Alternative, the residential NAC would be met or exceeded at about 290 modeled noise receptors representing about 763 multi-family or single-family residences along the 7200 West Freeway Alternative alignment.



### Combined Impacts of 7200 West Freeway and 5600 West Transit Alternatives

As with the 5800 West Freeway Alternative, the 7200 West Freeway Alternative would be implemented with one of the two 5600 West Transit Alternative options.

Combined Impacts of 7200 West Freeway and 5600 West Transit Alternatives		
Noise Criterion	Dedicated Right-of-Way Option	Mixed-Traffic Option
Meet or exceed UDOT NAC	763	763
Exceed FTA criteria	0	0

#### *7200 West Freeway Alternative with Dedicated Right-of-Way Transit Option*

As noted in Section 13.5.3.1, 5600 West Transit Alternative, there were no moderate or severe noise impacts associated with the Dedicated Right-of-Way Transit Option according to the FTA noise impact guidelines. Because the 7200 West Freeway Alternative and the Dedicated Right-of-Way Transit Option would not be on the same alignment and would not be adjacent to each other, they would not result in combined noise impacts. Overall, the combined impacts of the 7200 West Freeway Alternative with the Dedicated Right-of-Way Transit Option would be the same as those from the 7200 West Freeway Alternative by itself.

#### *7200 West Freeway Alternative with Mixed-Traffic Transit Option*

There would be no noise impacts associated with the Mixed-Traffic Transit Option. The combined noise impacts of the 7200 West Freeway Alternative with Mixed-Traffic Transit Option would be the same as those from the 7200 West Freeway Alternative by itself.

#### **7200 West Freeway Alternative with Tolling Option**

The traffic-related noise impacts associated with the 7200 West Freeway Alternative with Tolling Option would be the same as those for the 5800 West Freeway Alternative with Tolling Option. The reduction in traffic under the tolling option compared to the 7200 West Freeway Alternative would not reduce noise substantially at residential developments near the proposed alignment.



### 13.5.4 Utah County Alternatives

In Utah County, three alternatives are under consideration: the Southern Freeway Alternative, the 2100 North Freeway Alternative, and the Arterials Alternative. In addition, a tolling option was evaluated for each Utah County alternative. Impacts under each combination of alternatives and options are discussed in the following sections.

The goal of the noise impact analysis was to determine if the predicted noise levels associated with the Utah County alternatives would approach or exceed the applicable NAC (66 dBA for residential locations) and/or result in a 10-dBA increase over existing noise levels (a substantial exceedance according to UDOT’s criteria).

#### 13.5.4.1 Southern Freeway Alternative

As described in Chapter 2, Alternatives, this alternative would consist of a freeway extending from the Utah County line to I-15 at Lindon.

Southern Freeway Alternative Impacts	
Noise Criterion	Impacts
Meet or exceed UDOT NAC	135

To facilitate the noise modeling and impact analysis, the Southern Freeway Alternative was divided into three segments as shown in [Figure 13-14 through Figure 13-17](#), Noise Analysis – Southern Freeway. Noise impacts are summarized below.

#### Southern Freeway Alternative – Segment 1 (Utah County Line to 2100 North)

Segment 1 from just north of the Utah County line to near 2100 North is mostly undeveloped on both sides of the proposed alignment and goes through the Camp Williams National Guard complex (see [Figure 13-14 and Figure 13-15](#), Noise Analysis – Southern Freeway). There are a few scattered residences throughout this segment.

Noise levels in Segment 1 would increase by 1 dBA to 11 dBA depending on the distance between the residences and the alignment. Noise levels in Segment 1 would approach or exceed the residential NAC at two receptor locations representing about two residences.



### **Southern Freeway Alternative – Segment 2 (2100 North to SR 73/ Main Street/10800 West)**

Land uses in Segment 2 consist of undeveloped and agricultural land on both sides of the proposed alignment with some relatively new residential developments on the east and west sides of the alignment south of 2100 North (see [Figure 13-15](#) and [Figure 13-16](#), Noise Analysis – Southern Freeway).

Noise levels in Segment 2 would increase by 2 dBA to about 16 dBA depending on the distance between the residences and the alignment. Noise levels in Segment 2 would approach or exceed the residential NAC at seven receptor locations representing about 17 residences.

### **Southern Freeway Alternative – Segment 3 (SR 73/Main Street/ 10800 West to I-15)**

Land uses in Segment 3 consist of a mix of undeveloped and agricultural land on both sides of the alignment with residential development east of about 9150 West on both sides of the alignment (see [Figure 13-16](#) and [Figure 13-17](#), Noise Analysis – Southern Freeway).

Noise levels in Segment 3 would increase by about 3 dBA to more than 20 dBA over existing conditions at residences adjacent to the proposed alignment.

Noise levels in Segment 3 would approach or exceed the residential NAC at 46 residential receptor locations representing about 116 residences.

### **Southern Freeway Alternative – Noise Impact Summary**

Under the Southern Freeway Alternative, the residential NAC would be met or exceeded at about 55 modeled noise receptors representing about 135 residences along the Southern Freeway Alternative alignment.

### **Southern Freeway Alternative with Tolling Option**

The Southern Freeway Alternative with Tolling Option would result in less traffic on the proposed alignment than would the Southern Freeway Alternative by itself. The decrease in traffic under the Tolling Option would not change overall noise impacts compared to the Southern Freeway Alternative. (For example, if the Tolling Option reduced traffic on the alignment by half, this would reduce noise levels by 3 dBA—a difference that would not be perceptible to humans.) The overall noise impacts associated with the Tolling Option would be very similar to those for the Southern Freeway Alternative.





### 13.5.4.2 2100 North Freeway Alternative

As described in Chapter 2, Alternatives, this alternative would consist of a freeway extending from the Utah County line to SR 73 in Saratoga Springs and a lateral freeway extending east along 2100 North to I-15 in Lehi.

2100 North Freeway Alternative Impacts	
Noise Criterion	Impacts
Meet or exceed UDOT NAC	134

Noise impacts are summarized below.

The freeway segment from the Utah County line to SR 73 is the same as that for the Southern Freeway Alternative and consists of mostly undeveloped land on both sides of the alignment. The 2100 North freeway segment west of the Jordan River consists of agricultural land on both sides of the alignment with several scattered residences throughout. East of the Jordan River, the land uses transition to more residential on both sides of the proposed alignment.

Under the 2100 North Freeway Alternative, noise levels would increase by 2 dBA to more than 20 dBA depending on the distance between the residences and the alignment and other sources of noise such as I-15. Noise levels under the 2100 North Freeway Alternative would approach or exceed the residential NAC at 71 receptor locations representing about 134 residences.

#### 2100 North Freeway Alternative – Noise Impact Summary

Under the 2100 North Freeway Alternative, the residential NAC would be met or exceeded at about 71 modeled noise receptors representing about 134 residences along the 2100 North Freeway Alternative alignment.

#### 2100 North Freeway Alternative with Tolling Option

As with the Southern Freeway Alternative with Tolling Option, the 2100 North Freeway Alternative with Tolling Option would result in less traffic on the alignment than would the 2100 North Freeway Alternative by itself. This decrease in traffic would not change overall noise impacts compared to the 2100 North Freeway Alternative. The overall noise impacts associated with the Tolling Option would be similar to those for the 2100 North Freeway Alternative.



### 13.5.4.3 Arterials Alternative

As described in Chapter 2, Alternatives, this alternative would consist of a series of arterial roadways throughout northern Utah County. The combination of arterials includes a freeway segment from the Utah County line to SR 73 and arterial roadways at Porter Rockwell Boulevard, 2100 North, and 1900 South.

Arterials Alternative Impacts	
Noise Criterion	Impacts
Meet or exceed UDOT NAC	218

To facilitate the noise modeling and impact analysis, the Arterials Alternative was divided into seven segments as shown in [Figure 13-21 through Figure 13-24](#), Noise Analysis – Arterials. Noise impacts are summarized below.

#### Arterials Alternative – Segment 1 (Utah County Line to 2100 North)

Land uses in Segment 1 are the same as those described for Segment 1 of the Southern Freeway Alternative and consist of the Camp Williams National Guard complex and undeveloped land on both sides of the alignment (see [Figure 13-21 and Figure 13-22](#), Noise Analysis – Arterials).

Noise levels in Segment 1 would increase by about 1 dBA to 11 dBA depending on the distance between the residences and the alignment. Noise levels in Segment 1 would approach or exceed the residential NAC at two receptor locations representing about two residences.

#### Arterials Alternative – Segment 2 (2100 North to SR 73)

Land uses in Segment 2 consist of undeveloped and agricultural land on both sides of the alignment with relatively new residential developments south of 2100 North (see [Figure 13-22 and Figure 13-23](#), Noise Analysis – Arterials).

Noise levels in Segment 2 would increase by about 2 dBA to 6 dBA over existing conditions. Noise levels in Segment 2 would approach or exceed the residential NAC at one residential receptor representing two residences.

#### Arterials Alternative – Segment 3 (SR 73/Main Street/10800 West to 8000 West)

Land uses in Segment 3 consist of undeveloped and agricultural land on both sides of the alignment between about SR 68 and 8700 West. From 8700 West to about 8000 West, there are residential developments on both sides of the proposed alignment (see [Figure 13-23 and Figure 13-24](#), Noise Analysis – Arterials).



Noise levels in Segment 3 would increase by about 8 dBA to 24 dBA at residences adjacent to the proposed alignment. Noise levels in Segment 3 would approach or exceed the residential NAC at 37 receptor locations representing about 99 residences.

#### **Arterials Alternative – Segment 4 (8000 West to 7320 West)**

Land uses in Segment 4 consist of undeveloped and agricultural land on both sides of the alignment with a relatively new residential development on the north side of the alignment west of 7320 West (see [Figure 13-24](#), Noise Analysis – Arterials – 4 of 4).

Noise levels in Segment 4 would increase by about 7 dBA to 17 dBA at residences in the new development. Noise levels in Segment 4 would approach or exceed the residential NAC at five receptor locations representing about 15 residences in the development.

#### **Arterials Alternative – Segment 5 (7320 West to I-15)**

Land uses in Segment 5 consist of undeveloped and agricultural land on both sides of the alignment interspersed with commercial and industrial businesses, as well as scattered residences (see [Figure 13-24](#), Noise Analysis – Arterials – 4 of 4).

Noise levels in Segment 5 would increase by about 5 dBA to 15 dBA at receptor locations in this segment. Noise levels in Segment 5 would approach or exceed the residential NAC at five receptor locations representing about five residences.

#### **Arterials Alternative – Segment 6 (2100 North Arterial)**

West of the Jordan River, the 2100 North freeway segment consists of agricultural land uses on both sides of the alignment (see [Figure 13-22](#), Noise Analysis – Arterials – 2 of 4). East of the Jordan River, the alignment transitions to residential land uses on both sides of the proposed alignment.

Under the Arterials Alternative, noise levels in Segment 6 would increase by 2 dBA to more than 20 dBA along the alignment depending on the distance between the residences and the alignment and other sources of noise such as I-15. Noise levels in Segment 6 would approach or exceed the residential NAC at 41 receptor locations representing about 80 residences.

### **Arterials Alternative – Segment 7 (Porter Rockwell Arterial)**

Land uses along the Porter Rockwell arterial alignment are mostly commercial and industrial with some scattered residences throughout (see [Figure 13-21](#), Noise Analysis – Arterials – 1 of 4).

Under the Arterials Alternative, noise levels in Segment 7 would increase by 8 dBA to about 17 dBA along the alignment depending on the distance between the residences and the alignment and other sources of noise such as I-15. Noise levels in Segment 7 would approach or exceed the residential NAC at 10 receptor locations representing about 10 residences scattered throughout the corridor.

### **Arterials Alternative – Noise Impact Summary**

Under the Arterials Alternative, the residential NAC would be met or exceeded at about 105 modeled noise receptors representing about 218 residences along the Arterials Alternative alignment.

### **Arterial Alternative with Tolling Option**

The Arterials Alternative with Tolling Option would result in less traffic on the proposed alignment than would the Arterials Alternative by itself. This decrease in traffic would not affect overall noise impacts compared to the Arterials Alternative by itself.

## **13.5.5 Cumulative Impacts**

Cumulative impacts were analyzed for local and regionally important issues (farmlands, air quality, water quality, and ecosystems) as developed with resource agencies and the public during scoping. See Chapter 25, Cumulative Impacts, for a more detailed discussion of cumulative impacts.

## **13.5.6 Summary of Impacts**

[Table 13.5-1](#) below summarizes the impacts from each combination of alternatives and options in Salt Lake County and Utah County.

**Table 13.5-1. Summary of Noise Impacts**

Alternative <sup>a</sup>	Number of Sensitive Receptors that Approach or Exceed the UDOT NAC <sup>b</sup>
<i>5800 West Freeway / 5600 West Transit / Southern Freeway</i>	
Dedicated Transit	514
Mixed Transit	514
<i>5800 West Freeway / 5600 West Transit / 2100 North Freeway</i>	
Dedicated Transit	513
Mixed Transit	513
<i>5800 West Freeway / 5600 West Transit / Arterials</i>	
Dedicated Transit	597
Mixed Transit	597
<i>7200 West Freeway / 5600 West Transit / Southern Freeway</i>	
Dedicated Transit	898
Mixed Transit	898
<i>7200 West Freeway / 5600 West Transit / 2100 North Freeway</i>	
Dedicated Transit	897
Mixed Transit	897
<i>7200 West Freeway / 5600 West Transit / Arterials</i>	
Dedicated Transit	981
Mixed Transit	981
<sup>a</sup> Dedicated Transit = Dedicated Right-of-Way Transit Option; Mixed Transit = Mixed-Traffic Transit Option	
<sup>b</sup> Impacts summarized in this table are totals for both Salt Lake County and Utah County alternatives. Total impact includes transit options.	

## 13.6 Noise-Abatement Measures

Because there would be no moderate or severe impacts from the 5600 West Transit Alternative, no mitigation would be required for this alternative. The noise mitigation measures discussed below focus on the roadway alternatives.

This discussion of potential noise-abatement measures is based on full build-out of the action alternatives. As discussed in Chapter 36, Project Implementation (Phasing), the project might be implemented in phases. For example, alternatives that would be a freeway in 2030 could initially be implemented as at-grade arterials. In addition, initial construction might include fewer lanes than what would be needed at full build-out. Decisions regarding appropriate noise-abatement measures would be made at each construction phase. Noise-abatement measures that are needed at full build-out might not be needed at the initial construction phase.

### 13.6.1 Noise-Abatement Criteria

This section discusses methods for abating the operational traffic noise impacts identified in Section 13.5, Environmental Consequences. Because there were no transit noise impacts, noise abatement is not considered for the 5600 West Transit Alternative.

According to the UDOT Noise-Abatement Policy (UDOT 08A2-1), noise abatement will be considered for new highway construction where noise impacts are identified. The goal of noise abatement is to substantially reduce noise, which might or might not result in noise levels below the NAC.

The two relevant criteria to consider when identifying and evaluating noise-abatement measures are feasibility and reasonableness. Noise abatement will be provided by UDOT only if UDOT determines that noise-abatement measures are *both* feasible and reasonable.

#### 13.6.1.1 Feasibility

Noise-abatement feasibility deals primarily with construction and engineering considerations. (For example, can a substantial noise reduction be achieved at a specific location? Is noise abatement limited by factors such as topography, access requirements, the presence of local cross streets, or other noise sources in the area?)

Under UDOT's policy, a noise barrier (or other noise-abatement measure) that will not achieve at least 5 dBA of noise reduction for at least 75% of the first-row residences is not considered feasible. For the barrier analysis discussed below, a noise barrier could be either an earthen berm or a structural barrier (for example,

a concrete wall). With enough right-of-way between the edge of the road and the nearest homes, an earthen berm that blocks the line of sight to affected residences can be an effective noise barrier and can be more aesthetically pleasing to nearby residents. The type of barrier used for the MVC will be determined during the final design phase of the project.

### 13.6.1.2 Reasonableness

Reasonableness is a more subjective criterion than feasibility. Reasonableness suggests that common sense and good judgment have been applied in arriving at a decision to recommend a noise-abatement measure. (For example, does the noise-abatement measure satisfy the cost criterion established by the noise policy?) As a result, a noise barrier could be feasible (that is, provide the minimum required 5 dBA of noise reduction at 75% of the first-row residences), but not be reasonable (for example, by not meeting UDOT's cost criterion).

## 13.6.2 Feasibility and Reasonableness Factors

UDOT considers the following factors, among others, when determining the feasibility and reasonableness of noise-abatement measures:

- **Noise-Abatement Benefits.** UDOT will make reasonable efforts to substantially reduce noise. UDOT defines a substantial noise reduction as a 10-dBA noise reduction at first-row residences adjacent to the proposed alignment. Under UDOT's noise policy, noise barriers are considered feasible if at least 5 dBA of noise reduction can be achieved at 75% of first-row residences.
- **Land Use and Zoning.** The existing zoning and land uses adjacent to the MVC will be reviewed. In general, noise barriers are not consistent with commercial or industrial zoning because businesses usually attract customers by being visible to drivers on the roadway.
- **Engineering, Safety, and Maintenance.** Engineering, safety, and maintenance issues must be considered to determine the constructability of a noise-abatement measure. If any of these issues are substantial enough to preclude good safety and maintenance practices, then the barrier might not be feasible.
- **Cost of Abatement.** In residential areas, UDOT must consider all benefited residences when determining the cost-effectiveness of a noise barrier. Under UDOT's policy, a benefiting residence is one that gets a noise reduction of 5 dBA or more as a result of the noise barrier. The maximum cost used to determine the reasonableness of a noise-



abatement measure is \$30,000 per benefiting residence based on a barrier cost of \$20 per square foot (Chaney 2008).

- **Public Involvement and Balloting of Residents.** The UDOT Project Manager, Public Involvement Coordinator, and Environmental Engineer/Manager will decide on the appropriate level of public involvement for the MVC. The purpose of the public involvement process is to ensure that the concerns of the affected communities are known and that every effort to provide noise abatement to an affected community is made.

In order to determine whether affected residents want noise-abatement measures to be implemented, UDOT will conduct a survey of residents before building any noise-abatement measures. To conduct the survey, UDOT will send a ballot to the current owner of record for each residence that is determined to be affected by the project and that would benefit from noise abatement. Each ballot will be marked with the deadline by which the ballot must be returned. UDOT will send these ballots by regular mail and will consider this due diligence in notifying the affected residents of possible noise-abatement measures in their area.

Noise abatement will be recommended only if 75% of the following groups of residents and land owners vote, through balloting, in favor of the abatement:

- Front-row (adjacent) residences
- Receivers that would be affected by the project and would benefit from noise abatement

The denominator used to calculate this percentage will be the total number of completed ballots returned. At least 50% of the total number of mailed ballots must be returned for UDOT to determine if noise-abatement measures are desired by residents and land owners. If less than 50% of mailed ballots are returned, the noise-abatement measures will not be considered.

If the MVC project is being constructed more than 5 years after the EIS is approved, UDOT will complete and document an evaluation to determine whether the ownership of the affected residences has changed significantly since the initial survey was conducted. If the ownership of affected residences has changed significantly, UDOT will conduct a new survey of the affected residents during the initial design phase for each phase of the MVC project. For the purpose of this survey, if at least 25%





of the affected properties have changed ownership, this will be considered a significant change in ownership.

If the affected residents or property owners vote to reject construction of a noise-abatement measure, their area will not be reconsidered for future noise abatement unless a future transportation project is constructed in the area that meets the guidelines of a Type I project for noise abatement.

Because of the rapid growth in the MVC study area and the potential change in property ownership, UDOT will hold public involvement activities and balloting during the final design phase of the selected alternative.

- **Abatement Design.** A noise-abatement measure must be designed with the following considerations in mind: (1) good design practice, (2) optimal performance, and (3) current highway safety technology. UDOT will consider aesthetics treatment, graffiti deterrence, and landscaping where appropriate in relation to design standard specifications, cost efficiency, maintenance, and local municipality regulations.

Once UDOT has determined that a noise barrier is feasible, UDOT will determine whether its construction is reasonable by thoroughly considering the range of factors described above, including the cost-effectiveness of the measure. UDOT will construct noise barriers only if they have been determined to be both feasible and reasonable. The decision to recommend or not recommend a noise barrier is the responsibility of the UDOT Environmental Engineer/Manager with concurrence from the Project Manager and the Preconstruction Engineer. Final approval for projects with federal involvement will be made by FHWA.

This section describes the general process that UDOT follows to make recommendations for considering noise-abatement measures. Because of ongoing development in the MVC study area, it is likely that additional developments and residences will qualify for consideration of noise-abatement measures when the MVC is actually constructed. In addition, it is likely that some of the abatement measures described below that are not feasible or reasonable today might be feasible in the future due to increased development or because UDOT increased the allowance of \$30,000 per benefiting residence. For these reasons, the final recommendations concerning noise-abatement measures will be determined during the final design phase for each phase of the project.

### 13.6.3 Noise-Abatement Methodology for the Mountain View Corridor

The effectiveness of noise barriers is generally limited to areas within about 500 feet of the proposed right-of-way. Beyond this distance, noise barriers do not effectively reduce noise levels at individual residences. In addition, differences in terrain and elevation between the roadway and the nearby residences can reduce the effectiveness of noise barriers. The noise-abatement analysis discussed below was limited to those areas adjacent to each segment of the alignment where there were clustered residences that would potentially benefit from a noise barrier (that is, achieve at least a 5-dBA reduction in project-related noise levels) and would meet the UDOT cost-effectiveness criterion.

Thirty-four noise barriers were considered, and the results of the evaluation are summarized below. [Table 13A-1 through Table 13A-34](#) in Appendix 13A, Barrier Mitigation Tables, show the abatement evaluation for each noise barrier that was considered. In addition, the locations of potential noise barriers are shown in [Figure 13-1 through Figure 13-24](#), Noise Analysis.

For each barrier considered, the feasibility and reasonableness of barrier heights between 12 feet and 20 feet were evaluated to determine the following results:

- The number of benefiting residences (those receiving a 5-dBA noise reduction, regardless of whether they met or exceeded the residential NAC)
- The maximum noise level reduction from the barrier (which determines whether the noise barrier would achieve the 10-dBA reduction goal established by UDOT's Noise Policy)
- Whether a majority of first-row residences would benefit from the barrier
- The cost-effectiveness of the barrier (cost per benefiting residence)
- An overall determination of whether the barrier is both feasible and reasonable (cost-effective)

### 13.6.4 Noise-Abatement Measures for the Salt Lake County Alternatives

#### 13.6.4.1 5800 West Freeway Alternative

##### 5800 West Freeway Alternative – Segment 1 (I-80 to SR 201)

The area between I-80 and SR 201 is mostly undeveloped with no established residential developments. Therefore, noise-abatement measures were not considered in Segment 1.

### **5800 West Freeway Alternative – Segment 2 (SR 201 to 3500 South)**

One noise barrier was evaluated in Segment 2 (see [Figure 13-2](#), Noise Analysis – 5800 West – SR 201 to 3500 South).

Barrier 1 (about 1,000 feet long) was located on the east side of the alignment just south of Parkway Boulevard. Barrier 1 was not feasible because a 5-dBA reduction in noise levels could not be achieved at 75% of first-row residences.

### **5800 West Freeway Alternative – Segment 3 (3500 South to 4100 South)**

Two noise barriers were evaluated in Segment 3 (see [Figure 13-3](#), Noise Analysis – 5800 West – 3500 South to 4100 South).

Barrier 2 (about 2,200 feet long) was located on the east side of the proposed 5800 West alignment through a residential development from 3500 South to just north of 4100 South. A barrier 15 feet to 19 feet high would provide up to 8 dBA of noise reduction at first-row residences and would benefit more than 100 residences. Barrier 2 would be feasible and reasonable according to UDOT's noise-abatement criteria.

Barrier 3 (about 1,400 feet long) was located on the west side of the alignment from south of 3500 South to the open-space area north of 4100 South. A barrier between 15 feet and 19 feet high would provide from 7 dBA to 10 dBA of noise reduction (depending on the barrier height) to first-row residences. Barrier 3 would benefit more than 50 residences and would be feasible and reasonable according to UDOT's noise-abatement criteria.

### **5800 West Freeway Alternative – Segment 4 (4100 South to 5400 South)**

Three noise barriers were evaluated in Segment 4 (see [Figure 13-4](#), Noise Analysis – 5800 West – 4100 South to 5400 South).

Barrier 4 (about 2,000 feet long) was located on the west side of the alignment just north of 4300 South to south and west of the Denver & Rio Grande Railroad alignment. Noise barriers that are 15 feet and 17 feet high would be feasible (would provide 5 dBA of noise reduction) but would not meet the reasonableness criterion of UDOT's noise-abatement policy because the barriers would not benefit enough residences to meet the cost-effectiveness criterion. A 19-foot-high barrier would provide up to 10 dBA of noise reduction at first-row residences and would benefit about 25 residences, as well as the open field at Hillside Elementary School. A 19-foot-high barrier would be both feasible and reasonable according to UDOT's noise-abatement criteria.



Barrier 5 (about 715 feet long) was located on the east side of the alignment from just south of 4100 South to about 4300 South. A barrier between 8 feet and 12 feet high would separate the roadway from the open areas associated with Hunter High School and would provide 5 dBA of noise reduction.

Barrier 6 (about 2,500 feet long) was located on the east side of the alignment from about 4300 South to south and west of the Denver & Rio Grande Railroad alignment. Barrier heights between 15 feet and 19 feet high were feasible (would provide 5 dBA of noise reduction) but did not benefit enough residences to meet the cost-effectiveness criterion of UDOT's noise-abatement policy. If UDOT's allowable cost per benefiting residence (currently \$30,000) is increased in the future, it is possible that a noise barrier at this location would be cost-effective.

### **5800 West Freeway Alternative – Segment 5 (5400 South to 7800 South)**

Two noise barriers were evaluated in Segment 5 (see [Figure 13-5](#), Noise Analysis – 5800 West – 5400 South to 7800 South).

Barrier 7 (about 2,000 feet long) was located on the east side of the alignment from just north of Borax Avenue to just north of 6200 South. A noise barrier between 15 feet and 19 feet high would provide up to 7 dBA of noise reduction to first-row residences. Barrier 7 would benefit about 35 to 44 residences depending on the barrier height and would be feasible and reasonable according to UDOT's noise-abatement criteria.

Barrier 8 (about 4,500 feet long) was located on the east side of the alignment between about 6200 South and 7000 South. Noise barriers that are between 15 feet and 17 feet high would not provide 5 dBA of noise reduction at 75% of the first-row residences and, therefore, would not be feasible under UDOT's feasibility criterion. A 19-foot-high noise barrier would provide 7 dBA of noise reduction to first-row residences and would benefit about 61 residences. A 19-foot-high noise barrier at this location would be feasible and reasonable according to UDOT's noise-abatement criteria.

### **5800 West Freeway Alternative – Segment 6 (7800 South to Old Bingham Highway)**

One noise barrier was evaluated in Segment 6 (see [Figure 13-6](#), Noise Analysis – 5800 West – 7800 South to Old Bingham Highway).

Barrier 9 (about 2,500 feet long) was located on the east side of the alignment from about 8200 South to just north of the New Bingham Highway. Barriers between 17 feet and 19 feet high would provide up to 6 dBA of noise reduction to first-row residences and would benefit about 32 residences. Noise barriers that



are between 17 feet and 19 feet high would be feasible and reasonable according to UDOT's noise-abatement criteria.

### **5800 West Freeway Alternative – Segment 7 (Old Bingham Highway to 11800 South)**

One noise barrier was evaluated in Segment 7 (see [Figure 13-7](#), Noise Analysis – 5800 West – Old Bingham Highway to 11800 South).

Barrier 10 was located on the west side of the alignment north of 11800 South. Because the existing residential development is located more than 500 feet away from the proposed alignment, 5 dBA of noise reduction could not be achieved at first-row residences. Therefore, a noise barrier would not be feasible according to UDOT's noise-abatement criteria.

### **5800 West Freeway Alternative – Segment 8 (11800 South to 13400 South)**

Three noise barriers were evaluated in Segment 8 (see [Figure 13-8](#), Noise Analysis – 5800 West – 11800 South to 13400 South).

Barrier 11 (about 3,500 feet long) was located on the east side of the alignment between about 11800 South and 12600 South. A noise barrier between 15 feet and 19 feet high would provide up to 8 dBA of noise reduction to at least 75% of first-row residences and would benefit about 49 to 61 residences. Barrier 11 would be feasible and reasonable according to UDOT's noise-abatement criteria.

Barrier 12 (about 3,000 feet long) was located on the west side of the alignment south of 12600 South. A noise barrier 17 feet to 19 feet high would provide up to 9 dBA of noise reduction to first-row residences and would benefit about 48 to 75 residences. Barrier 12 would be feasible and reasonable according to UDOT's noise-abatement criteria.

Barrier 13 (about 1,500 feet long) was located on the east side of the alignment south of 12600 South. A noise barrier between 15 feet and 19 feet high would provide up to 11 dBA of noise reduction to first-row residences and would benefit about 17 to 21 residences. Barrier 13 would be feasible and reasonable according to UDOT's noise-abatement criteria.

### **5800 West Freeway Alternative – Segment 9 (13400 South to Utah County)**

One noise barrier was evaluated in Segment 9 (see [Figure 13-9](#), Noise Analysis – 5800 West – 13400 South to Utah County).



Barrier 14 (about 2,500 feet long) was located on the west side of the alignment south of 13400 South. Noise barriers between 15 feet and 19 feet high were modeled but would not provide the minimum required 5 dBA of noise reduction to the majority of first-row residences because of differences in terrain between the alignment and the residential development. As a result, Barrier 14 would not be feasible according to UDOT's noise-abatement criteria. During the final design phase of the project, noise barriers will be re-evaluated at this location to determine if conditions have changed enough (for example, roadway design changes) that a noise barrier would be reasonable and feasible.

#### **13.6.4.2 7200 West Freeway Alternative**

##### **7200 West Freeway Alternative – Segment 10 (I-80 to SR 201)**

The area between I-80 and SR 201 on the 7200 West alignment is mostly undeveloped with no established residential developments (see [Figure 13-10](#), Noise Analysis – 7200 West – I-80 to SR 201). Therefore, noise barriers were not considered in Segment 10.

##### **7200 West Freeway Alternative – Segment 11 (SR 201 to 3500 South)**

Six noise barriers were evaluated in Segment 11 (see [Figure 13-11](#), Noise Analysis – 7200 West – SR 201 to 3500 South).

Barrier 15 (about 2,500 feet long) was located on the east side of the alignment between the SR 201 interchange and a point just north of Parkway Boulevard. A noise barrier between 15 feet and 19 feet high would provide up to 11 dBA of noise reduction to first-row residences. Barrier 15 would benefit at least 61 residences and would be feasible and reasonable according to UDOT's noise-abatement criteria.

Barrier 16 (about 2,000 feet long) was located on the east side of the alignment between Parkway Boulevard and 3100 South. A noise barrier between 15 feet and 19 feet high would provide up to 7 dBA of noise reduction to first-row residences and would benefit about 35 residences. Barrier 16 would be feasible and reasonable according to UDOT's noise-abatement criteria.

Barrier 17 (about 2,000 feet long) was located on the east side of the alignment from south of 3100 South to near 3500 South. Noise barriers between 15 feet and 19 feet high would be feasible (would provide at least 5 dBA of noise reduction to first-row residences) but would benefit only about 11 residences. Barrier 17 would not be reasonable (that is, cost-effective) according to UDOT's noise-abatement criteria. If additional residential development takes place closer to the roadway, then a noise barrier might be feasible at this location. During the final



design phase of the project, a noise barrier will be re-evaluated to determine if conditions have changed enough that a noise barrier would be reasonable and feasible.

Barrier 18 (about 2,000 feet long) was located on the west side of the alignment just north of Parkway Boulevard. Noise barriers between 15 feet and 19 feet high were modeled but would not provide the minimum 5 dBA of noise reduction to first-row residences. Barrier 18 would not be feasible according to UDOT's noise-abatement criteria.

Barrier 19 (about 2,500 feet long) was located on the west side of the alignment between Parkway Boulevard and 3100 South. Noise barriers between 15 feet and 19 feet high would provide up to 9 dBA of noise reduction to first-row residences and would be feasible. Noise barrier 15 feet high would meet UDOT's reasonableness criterion, but a 17-foot or 19-foot-high barrier would not benefit enough residences to justify its cost. As a result, a noise barrier 15 feet high at this location would be feasible and reasonable according to UDOT's noise-abatement criteria.

Barrier 20 (about 2,500 feet long) was located on the west side of the alignment between 3100 South and 3500 South. Noise barriers between 15 feet and 19 feet high would provide up to 9 dBA of noise reduction to first-row residences. Barrier 20 would benefit about 80 residences and would be feasible and reasonable according to UDOT's noise-abatement criteria.

### **7200 West Freeway Alternative – Segment 12 (3500 South to 4100 South)**

Three noise barriers were evaluated in the residential neighborhoods in Segment 12 (see [Figure 13-12](#), Noise Analysis – 7200 West – 3500 South to 4100 South).

Barrier 21 (about 3,500 feet long), which would consist of two sections as shown in [Figure 13-12](#), was located on the west side of the alignment between about Jefferson Road and 4100 South. A noise barrier between 15 feet and 19 feet high would provide up to 8 dBA of noise reduction to first-row residences. Barrier 21 would benefit about 130 residences and would be feasible and reasonable according to UDOT's noise-abatement criteria. Parallel barriers can increase noise levels by about 3 dBA because noise is reflected between the two sections of the barrier. The actual performance of this barrier will be determined during the final design phase of the project.

Barrier 22 (about 2,500 feet long) was located on the east side of the alignment between about Bello Avenue and 3800 South. A noise barrier between 15 feet and 19 feet high would provide up to 8 dBA of noise reduction to first-row



residences and would benefit about 67 residences. Barrier 22 would be feasible and reasonable according to UDOT's noise-abatement criteria.

Barrier 23 (about 3,000 feet long) was located on the west side of the alignment between about 3800 South and 4100 South. A noise barrier between 15 feet and 19 feet high would provide up to 7 dBA of noise reduction to first-row residences. Barrier 23 would benefit about 80 residences and would be feasible and reasonable according to UDOT's noise-abatement criteria.

### **7200 West Freeway Alternative – Segment 13 (4100 South to 5400 South)**

One noise barrier was evaluated in the residential neighborhood just south of 4100 South (see [Figure 13-13](#), Noise Analysis – 4100 South to 5400 South).

Barrier 24 (about 810 feet long) was located on the north side of the alignment. Noise barriers between 15 feet and 19 feet high were modeled but would not provide the minimum 5 dBA of noise reduction to 75% of first-row residences. Barrier 24 would not be feasible according to UDOT's noise-abatement criteria.

### **7200 West Freeway Alternative – Segment 14 (5400 South to Utah County)**

The noise-abatement measures from 5400 South to the Utah County line for the 7200 West Freeway Alternative would be the same as those for Segment 5 through Segment 9 for the 5800 West Freeway Alternative (see [Figure 13-5 through Figure 13-9](#), Noise Analysis – 5800 West).

## **13.6.5 Noise-Abatement Measures for the Utah County Alternatives**

### **13.6.5.1 Southern Freeway Alternative**

#### **Southern Freeway Alternative – Segment 1 (Utah County Line to 2100 North)**

There is very little residential development within 500 feet of the proposed alignment in this segment (see [Figure 13-14](#) and [Figure 13-15](#), Noise Analysis – Southern Freeway). Therefore, noise barriers were not considered in this segment.





### **Southern Freeway Alternative – Segment 2 (2100 North to SR 73/ Main Street/10800 West)**

One noise barrier was evaluated in Segment 2 (see [Figure 13-16](#), Noise Analysis – Southern Freeway – 3 of 4).

Barrier 1 (about 3,000 feet long) was located on the west side of the alignment just south of SR 73. A noise barrier 12 feet to 20 feet high was modeled at this location but was not feasible because the barrier would not benefit enough residences to meet UDOT’s cost-effectiveness criterion. If additional residential development takes place closer to the roadway, then a noise barrier might be feasible at this location. During the final design phase of the project, a noise barrier will be re-evaluated to determine if conditions have changed enough that a noise barrier would be reasonable and feasible.

### **Southern Freeway Alternative – Segment 3 (SR 73/Main Street/ 10800 West to I-15)**

Two noise barriers were evaluated in Segment 3 (see [Figure 13-16](#) and [Figure 13-17](#), Noise Analysis – Southern Freeway).

Barrier 2 (about 4,500 feet long) was located on the south side of the alignment between about 8700 West and 8000 West. A noise barrier between 12 feet and 20 feet high would provide up to 13 dBA of noise reduction to first-row residences and would benefit about 79 to 82 residences depending on the height of the barrier. Barrier 2 would be feasible and reasonable according to UDOT’s noise-abatement criteria.

Barrier 3 (about 2,150 feet long) was located on the north side of the alignment adjacent to a relatively new residential development just west of 7320 West. A noise barrier 12 feet to 20 feet high was modeled at this location but was not feasible because the barrier would not benefit enough residences to meet UDOT’s cost-effectiveness criterion. If additional residential development takes place closer to the roadway, then a noise barrier might become feasible at this location.

#### **13.6.5.2 2100 North Freeway Alternative**

Three noise barriers were evaluated along the 2100 North Freeway alignment.

Barrier 4 (about 2,000 feet long) was located on the south side of the alignment between about 2300 West and 1900 West near the Union Pacific Railroad tracks (see [Figure 13-19](#), Noise Analysis – 2100 North Freeway – 2 of 3). A noise barrier 12 feet to 20 feet high was modeled at this location but was not feasible because the barrier would not benefit enough residences to meet UDOT’s cost-



effectiveness criterion. If additional residential development takes place closer to the roadway (or if UDOT's cost allowance is increased), then a noise barrier might be feasible at this location.

Barrier 5 (about 2,500 feet long) was located on the north side of the alignment in the same general location as Barrier 4. A noise barrier between 12 feet and 20 feet high was modeled at this location and would provide up to 11 dBA of noise reduction to first-row residences. Depending on the barrier height, a barrier at this location would benefit about 38 to 64 individual residences. Barrier 5 would be feasible and reasonable according to UDOT's noise-abatement criteria.

Barrier 6 (about 1,265 feet long) was located east of the Union Pacific Railroad tracks on the south side of the alignment near the tie-in to I-15. A noise barrier between 12 feet and 20 feet high was modeled at this location and would provide up to 10 dBA of noise reduction to first-row residences. Depending on the barrier height, a barrier at this location would benefit about 22 to 26 residences. Barrier 6 would be feasible and reasonable according to UDOT's noise-abatement criteria.

### **13.6.5.3 Arterials Alternative**

#### **Arterials Alternative – Segment 1 (Utah County Line to 2100 North)**

In Segment 1, there is very little residential development within 500 feet of the proposed alignment (see [Figure 13-21](#), Noise Analysis – Arterials – 1 of 4). Therefore, noise barriers were not considered in this segment.

#### **Arterials Alternative – Segment 2 (2100 North to SR 73)**

In Segment 2, there is very little residential development within 500 feet of the proposed alignment (see [Figure 13-22](#), Noise Analysis – Arterials – 2 of 4). Therefore, noise barriers were not considered in this segment.

#### **Arterials Alternative – Segment 3 (SR 73/Main Street/10800 West to 8000 West)**

Two noise barriers were evaluated in Segment 3.

Barrier 7 (about 4,500 feet long) was located on the south side of the alignment between about 8700 West and 8000 West (see [Figure 13-23](#), Noise Analysis – Arterials – 3 of 4). A noise barrier between 12 feet and 20 feet high would provide up to 13 dBA of noise reduction to first-row residences and would benefit about 76 to 85 residences depending on the barrier height. Barrier 7 would be feasible and reasonable according to UDOT's noise-abatement criteria.



Barrier 8 (about 2,150 feet long) was located on the north side of the alignment adjacent to a relatively new residential development just west of 7320 West (see [Figure 13-23](#)). A noise barrier 12 feet to 20 feet high was modeled at this location but was not feasible because the barrier would not benefit enough residences to meet UDOT's cost-effectiveness criterion. If additional residential development takes place closer to the roadway (or if UDOT's cost allowance is increased), then a noise barrier might be feasible at this location.

#### **Arterials Alternative – Segment 4 (8000 West to 7320 West)**

The area between 8000 West and 7320 West is relatively undeveloped. Therefore, noise barriers were not considered in Segment 4.

#### **Arterials Alternative – Segment 5 (7320 West to I-15)**

The area between 7320 West and I-15 is relatively undeveloped. Therefore, noise barriers were not considered in Segment 5.

#### **Arterials Alternative – Segment 6 (2100 North Arterial)**

Two noise barriers were evaluated in Segment 6 (see [Figure 13-22](#), Noise Analysis – Arterials – 2 of 4).

Barrier 9 (about 2,000 feet long) was located on the south side of the alignment between about 2300 West and 1900 West near the Union Pacific Railroad tracks. A noise barrier 12 feet to 20 feet high was modeled at this location but was not feasible because the barrier would not reduce noise by at least 5 dBA at first-row residences.

Barrier 10 (about 2,500 feet long) was located on the north side of the alignment in the same general location as Barrier 9. A noise barrier between 12 feet and 20 feet high was modeled at this location and would provide up to 8 dBA of noise reduction to first-row residences depending on the barrier height. Barrier 10 would benefit about 34 to 60 residences depending on the barrier height. A noise barrier at this location would be feasible and reasonable according to UDOT's noise-abatement criteria.

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## 13.7 References

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