WEST DAVIS
CORRIDOR

Noise Technical Report for the WDC System Interchange

in support of the
Re-evaluation of the Environmental Impact Statement

West Davis Corridor Project

Utah Department of Transportation

udot.utah.gov

Project No. S-R199(229)

Prepared by
HDR, Inc.
2825 E. Cottonwood Parkway, Suite 200
Salt Lake City, UT 84121-7077

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The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being or have been carried out by the Utah Department of Transportation (UDOT) pursuant to 23 United States Code (USC) Section 327 and a Memorandum of Understanding (MOU) dated January 17, 2017, and executed by FHWA and UDOT.

WEST DAVIS CORRIDOR

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Acronyms and Abbreviations

CFR	Code of Federal Regulations
dBA	A-weighted decibels
EIS	Environmental Impact Statement
FHWA	Federal Highway Administration
ID	identifier
L_{eq}	equivalent sound level
LOS	level of service
ML	monitoring location
mph	miles per hour
NA	not applicable
NAC	noise-abatement criteria
RFP	Request for Proposal
ROD	Record of Decision
TNM	Traffic Noise Model
UDOT	Utah Department of Transportation
WDC	West Davis Corridor

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1 Introduction

The purpose of this technical report is to evaluate the expected changes in noise impacts and mitigation, as documented in the West Davis Corridor (WDC) Final Environmental Impact Statement (EIS) and Record of Decision (ROD), compared to the Request for Proposal (RFP) design for the WDC/I-15 system interchange in Davis County, Utah.

The WDC ROD was signed on September 29, 2017. A re-evaluation of the EIS was prepared in February 2020 that evaluated design changes to the system interchange. This report evaluates the traffic-generated noise impacts from these changes. More details about these changes are provided in Section 2, Project Description, of this report.

This noise analysis was prepared in accordance with UDOT's Noise Abatement Policy, last revised June 15, 2017, which is consistent with federal regulation 23 Code of Federal Regulations (CFR) Part 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise*, and Utah Administrative Code Rule R930-3, *Highway Noise Abatement*.

2 Project Description

The project area for this noise analysis is the area associated with the I-15 and WDC system interchange from about 500 West and 550 North in Centerville, Utah, northerly through the WDC interchange to about 800 West and 1100 South in Farmington, Utah.

The WDC RFP design (Refined Selected Alternative) evaluated in this report includes the WDC RFP system interchange design in Centerville and Farmington. The WDC RFP design includes the required system interchange features to connect the WDC to I-15 and Legacy Parkway.

Applicability

The Refined Selected Alternative is new highway construction. Therefore, this project is a Type 1 project that requires considering noise-abatement measures.

What is a Type 1 project?

According to UDOT's Noise Abatement Policy, a Type 1 project is a project that alters the horizontal or vertical alignment of a road or increases the number of through travel lanes.

UDOT evaluated noise impacts using noise models and methodologies approved by the Federal Highway Administration (FHWA) and UDOT (*Noise Abatement*, UDOT 08A2-01, revised June 15, 2017). Noise impacts were identified and evaluated at residential and other locations (for example, schools and recreation sites) within about 600 feet from the nearest travel lane using level of service (LOS) C traffic volumes to represent the worst-case noise conditions while traffic is operating at uncongested, free-flow speeds. According to UDOT's Noise Abatement Policy, the posted speed limits are to be used as the free-flow speeds for noise modeling.

3 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 most closely approximates the way the human ear hears sounds and is the most widely used scale in assessing traffic-related noise impacts. Typical A-weighted noise levels for various types of sound sources are summarized in Table 1.

Varying noise levels are often described in terms of the equivalent noise level (L_{eq}). Equivalent noise levels are used to develop single-value descriptions of average noise exposure over stated periods of time (for example, 1 hour) and are generally based on A-weighted sound-level measurements.

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 a 1-to-2-dBA increase in noise levels. Under ideal listening conditions, differences of 2 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.

Table 1. Weighted Noise Levels and Human Response

Sound Source	dBA[a]	Response Descriptor
Carrier deck jet operation	140	Limit of amplified speech
	130	Painfully loud
Jet takeoff (200 feet) Auto horn (3 feet)	120	Threshold of feeling and pain
Riveting machine Jet takeoff (2,000 feet)	110	
Shout (0.5 foot) New York subway station	100	Very annoying
Heavy truck (50 feet) Pneumatic drill (50 feet)	90	Hearing damage (8-hour exposure)
Passenger train (100 feet) Helicopter (in-flight, 500 feet) Freight train (50 feet)	80	Annoying
Freeway traffic (50 feet)	70	Intrusive
Air conditioning unit (20 feet) Light auto traffic (50 feet)	60	
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

Source: CEQ 1970

[a] 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.

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 the local conditions.

4 Regulatory Setting

The federal regulation that FHWA uses to assess noise impacts is 23 CFR Part 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise*. This regulation was most recently updated on July 13, 2010. Utah Administrative Code Rule R930-3, *Highway Noise Abatement*, and UDOT's Noise Abatement Policy 08A2-01, revised June 15, 2017, establish UDOT's noise impact and abatement policies and procedures, which are compliant with 23 CFR Part 772.

Noise-abatement criteria (NAC) are used to define the noise levels that are considered an impact (in hourly A-weighted sound-level decibels) for each land use activity category. UDOT's Noise Abatement Policy states that a traffic noise impact occurs when either (1) the future worst-case noise level is equal to or greater than the UDOT NAC for specified land use activity categories or (2) the future worst-case noise level is greater than or equal to an increase of 10 dBA over the existing noise level.

The UDOT NAC are summarized in Table 2. 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.

Table 2. UDOT's Noise-abatement Criteria

Activity Category	L_{eq} 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)	Residential.
C	66 (exterior)	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails and trail crossings.
D	51 (interior)	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting room, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	71 (exterior)	Hotels, motels, offices, restaurants/bars, and other undeveloped lands, properties, or activities not included in categories A–D or F.
F	—	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	—	Undeveloped lands that are not permitted.

Source: UDOT 2017

5 Affected Environment

The noise study area (see Appendix A) includes areas of Farmington and Centerville within a 600-foot buffer adjacent to the WDC and I-15 system interchange where noise receptors are located.

The WDC corridor is a mix of mostly residential developments, recreation areas (parks), and some undeveloped areas. The predominant source of existing noise in the noise study area is automobile and truck traffic on I-15.

5.1 Noise Monitoring

Existing noise levels in the noise study area were determined during the FEIS process by taking short-term (15-minute) sound-level measurements at two locations in the noise study area with a Larson-Davis model 824 sound-level meter. Noise-measurement locations were selected to represent existing residential developments or other areas where people could be exposed to traffic noise for extended periods. Noise-monitoring locations are shown in Appendix A and the associated measured noise levels are listed in Table 3.

Table 3. Measured Noise Levels in the Noise Study Area

Monitoring Location	Location	Activity Category[a]	Measured Noise Level (dBA L_{eq}, rounded)
ML-2	725 West south of Glovers Lane	F	49
ML-4A	2150 North in Centerville on east side of I-15 frontage road	B	75

[a] For descriptions of the activity categories, see Table 2, UDOT's Noise-abatement Criteria, above.

Measured noise levels were used to characterize the existing noise environment and to validate FHWA's Traffic Noise Model (TNM). Validating the noise model ensures that the measured noise levels recorded in the field agree with traffic volumes during the measurement period. Measured noise levels that are within 3 dBA of the modeled noise are considered accurate for the purpose of validating the model (Table 4). As shown in the table, the measured noise levels were within 3 dBA of the modeled noise levels, so the TNM is considered valid. LOS C Traffic volumes travelling at the posted speed limit were used to estimate free flow conditions observed.

Monitored noise levels in the noise study area ranged from 49 to 75 dBA depending on the proximity of the monitoring location to the roadway and other noise sources such as local traffic on the nearby arterial streets. As a comparison, typical noise levels range from 35 to 50 dBA in rural and agricultural areas, 50 to 65 dBA in suburban to urban areas, and 65 to 75 dBA in downtown urban areas.

Table 4. Model Validation

Monitoring Location	Address	Measured Noise Level (dBA)	Modeled Noise Level (dBA)	Difference (dBA)
ML-4A	2150 North in Centerville on east side of the I-15 frontage road	75	77	2

5.2 Existing Noise Levels

The primary source of existing noise in the noise study area is automobile and truck traffic on I-15. Existing traffic noise levels for each receptor in the noise study area were calculated with the TNM version 2.5 software using existing conditions (that is, the existing travel lane configurations on I-15 and the posted speed limit of 70 miles per hour [mph]). Existing noise levels were determined using the LOS C traffic volumes based on roadway capacity.

The noise model developed for the existing conditions scenario included 476 receptors (representing 465 individual dwelling units and 11 recreation sites) throughout the noise study area. Under existing conditions, 105 receptors exceeded the NAC (representing 97 individual dwelling units and 8 recreation sites). The locations of those receptors exceeding the NAC are shown in Appendix A, Existing Noise Receptor Maps.

6 Expected Impacts with the Refined Selected Alternative

Traffic-related noise impacts with the Refined Selected Alternative were estimated with TNM version 2.5 based on the proposed roadway design as shown in Appendix B, Build Scenario Noise Receptor Maps. The modeled roadway included the proposed improvements necessary to construct the WDC/I-15 system interchange. This area is between about 500 West and 550 North in Centerville and about 800 West and 1100 South in Farmington. Roadway links were modeled in 100-foot increments to provide a high degree of accuracy in the model output. Traffic volumes used in the model were based on LOS C volumes for I-15 and LOS C volumes for WDC as provided by the traffic consultant. Posted speed limits were used to reflect free flow traffic conditions. The posted speed limits will be 65 mph on mainline WDC, 70 mph on I-15, 55 mph on the ramps between I-15 and the WDC, and 45 mph on the ramps between Legacy Parkway and the WDC.

Overall, noise levels with the Refined Selected Alternative would range from 54 to 78 dBA, compared to the existing conditions of 50 to 77 dBA.

With the Refined Selected Alternative, 198 of the 475 receptors would have traffic noise impacts (representing 189 dwelling units and 9 recreation sites); that is, they would approach, exceed, or substantially exceed (≥ 10-dBA increase over existing noise levels) the NAC as defined in Section 4, Regulatory Setting. The locations of those receptors exceeding the NAC are shown in Appendix B. Note that there is one less receptor for the Refined Selected Alternative because UDOT would be purchasing one of the receptors to accommodate the Refined Selected Alternative.

7 Summary

Table 5 summarizes the modeled existing and Refined Selected Alternative noise levels at the 476 receptors throughout the noise study area. Shaded cells indicate impacts with the Refined Selected Alternative. For receptor locations, refer to the maps in Appendix A, Existing Noise Receptor Maps, and Appendix B, Build Scenario Noise Receptor Maps.

Table 5. Modeled Existing and Refined Selected Alternative Noise Levels in the Noise Study Area

Receptor	Activity Category	UDOT NAC $L_{eq}(h)$	Existing		With Refined Selected Alternative		
			Existing Noise Levels (dBA)	Existing ≥ UDOT NAC?	Refined Selected Alternative Noise Levels (dBA)	≥ UDOT NAC?	≥ 10 dBA Increase over Existing Noise Level?
1	B	66	64	N	64	N	N
7	C	66	60	N	61	N	N
9	C	66	58	N	59	N	N
82	B	66	64	N	64	N	N
83	B	66	65	N	65	N	N
84	B	66	66	Y	**66**	**Y**	N
85	B	66	68	Y	**68**	**Y**	N
86	B	66	69	Y	**69**	**Y**	N
87	B	66	70	Y	**70**	**Y**	N
88	B	66	65	N	65	N	N
89	C	66	68	Y	**67**	**Y**	N
90	B	66	66	Y	65	N	N
91	C	66	69	Y	**68**	**Y**	N
92	C	66	67	Y	**67**	**Y**	N
93	B	66	65	N	64	N	N
94	B	66	65	N	64	N	N
95	B	66	65	N	64	N	N
96	B	66	65	N	64	N	N
97	B	66	66	Y	63	N	N
98	B	66	68	Y	64	N	N
99	B	66	69	Y	65	N	N
100	B	66	63	N	62	N	N
101	B	66	63	N	62	N	N
102	B	66	63	N	61	N	N
103	B	66	67	Y	**66**	**Y**	N
104	B	66	70	Y	**68**	**Y**	N
105	B	66	65	N	65	N	N
106	B	66	69	Y	**68**	**Y**	N
107	B	66	71	Y	**70**	**Y**	N
108	B	66	73	Y	**73**	**Y**	N
109	B	66	65	N	65	N	N
110	B	66	64	N	65	N	N

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Table 5. Modeled Existing and Refined Selected Alternative Noise Levels in the Noise Study Area

Receptor	Activity Category	UDOT NAC $L_{eq}(h)$	Existing		With Refined Selected Alternative		
			Existing Noise Levels (dBA)	Existing ≥ UDOT NAC?	Refined Selected Alternative Noise Levels (dBA)	≥ UDOT NAC?	≥ 10 dBA Increase over Existing Noise Level?
111	B	66	63	N	65	N	N
112	B	66	69	Y	**68**	**Y**	N
113	B	66	68	Y	**69**	**Y**	N
114	B	66	73	Y	**73**	**Y**	N
115	B	66	76	Y	**77**	**Y**	N
116	B	66	76	Y	**77**	**Y**	N
118	B	66	74	Y	**75**	**Y**	N
119	B	66	68	Y	**69**	**Y**	N
120	B	66	64	N	**66**	**Y**	N
121	B	66	63	N	65	N	N
122	B	66	62	N	64	N	N
123	B	66	71	Y	**71**	**Y**	N
124	B	66	73	Y	**74**	**Y**	N
125	B	66	76	Y	**77**	**Y**	N
126	B	66	77	Y	**77**	**Y**	N
127	B	66	77	Y	**77**	**Y**	N
128	B	66	77	Y	**78**	**Y**	N
129	B	66	77	Y	**77**	**Y**	N
130	B	66	69	Y	**70**	**Y**	N
131	B	66	66	Y	**67**	**Y**	N
132	B	66	64	N	65	N	N
133	B	66	65	N	**67**	**Y**	N
134	B	66	65	N	**67**	**Y**	N
135	B	66	65	N	**67**	**Y**	N
136	B	66	65	N	**67**	**Y**	N
137	B	66	65	N	**67**	**Y**	N
138	B	66	67	Y	**69**	**Y**	N
139	B	66	67	Y	**69**	**Y**	N
140	B	66	67	Y	**68**	**Y**	N
141	B	66	65	N	**67**	**Y**	N
142	B	66	66	Y	**67**	**Y**	N
143	B	66	71	Y	**72**	**Y**	N
144	B	66	72	Y	**73**	**Y**	N
145	B	66	70	Y	**71**	**Y**	N
146	B	66	70	Y	**71**	**Y**	N
147	B	66	76	Y	**77**	**Y**	N
148	B	66	74	Y	**75**	**Y**	N
149	B	66	71	Y	**72**	**Y**	N
150	B	66	69	Y	**71**	**Y**	N

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Table 5. Modeled Existing and Refined Selected Alternative Noise Levels in the Noise Study Area

Receptor	Activity Category	UDOT NAC $L_{eq}(h)$	Existing		With Refined Selected Alternative		
			Existing Noise Levels (dBA)	Existing ≥ UDOT NAC?	Refined Selected Alternative Noise Levels (dBA)	≥ UDOT NAC?	≥ 10 dBA Increase over Existing Noise Level?
151	B	66	68	Y	**70**	**Y**	N
152	B	66	75	Y	**76**	**Y**	N
153	B	66	72	Y	**73**	**Y**	N
154	B	66	72	Y	**74**	**Y**	N
155	B	66	63	N	**67**	**Y**	N
156	B	66	64	N	**68**	**Y**	N
157	B	66	66	Y	**70**	**Y**	N
158	B	66	68	Y	**73**	**Y**	N
159	B	66	70	Y	**78**	**Y**	N
160	B	66	70	Y	**78**	**Y**	N
161	B	66	59	N	65	N	N
162	B	66	60	N	**67**	**Y**	N
163	B	66	62	N	**69**	**Y**	N
164	B	66	66	Y	**72**	**Y**	N
165	B	66	68	Y	**78**	**Y**	**Y**
166	B	66	61	N	**67**	**Y**	N
167	B	66	60	N	65	N	N
168	B	66	63	N	**69**	**Y**	N
169	B	66	65	N	**71**	**Y**	N
170	B	66	58	N	65	N	N
171	B	66	59	N	**66**	**Y**	N
172	B	66	59	N	**66**	**Y**	N
173	B	66	64	N	**72**	**Y**	N
174	B	66	67	Y	**77**	**Y**	**Y**
175	B	66	67	Y	**77**	**Y**	**Y**
176	B	66	67	Y	**78**	**Y**	**Y**
177	B	66	66	Y	**77**	**Y**	**Y**
178	B	66	64	N	**71**	**Y**	N
179	B	66	64	N	**71**	**Y**	N
180	B	66	60	N	**67**	**Y**	N
181	B	66	60	N	**66**	**Y**	N
182	B	66	59	N	**66**	**Y**	N
183	B	66	58	N	65	N	N
184	B	66	60	N	**67**	**Y**	N
185	B	66	61	N	**69**	**Y**	N
186	B	66	62	N	**71**	**Y**	N
187	B	66	64	N	**73**	**Y**	N
188	B	66	66	Y	**78**	**Y**	**Y**
189	B	66	60	N	**68**	**Y**	N

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Table 5. Modeled Existing and Refined Selected Alternative Noise Levels in the Noise Study Area

Receptor	Activity Category	UDOT NAC $L_{eq}(h)$	Existing		With Refined Selected Alternative		
			Existing Noise Levels (dBA)	Existing ≥ UDOT NAC?	Refined Selected Alternative Noise Levels (dBA)	≥ UDOT NAC?	≥ 10 dBA Increase over Existing Noise Level?
190	B	66	56	N	63	N	N
191	B	66	56	N	62	N	N
192	B	66	56	N	62	N	N
193	B	66	55	N	61	N	N
194	B	66	55	N	61	N	N
195	B	66	54	N	60	N	N
196	B	66	58	N	**66**	Y	N
197	B	66	60	N	**67**	Y	N
198	B	66	61	N	**69**	Y	N
199	B	66	63	N	**72**	Y	N
200	B	66	65	N	**74**	Y	N
201	B	66	62	N	**70**	Y	N
202	B	66	62	N	**69**	Y	N
203	B	66	62	N	**70**	Y	N
204	B	66	64	N	**72**	Y	N
205	B	66	63	N	**71**	Y	N
206	B	66	63	N	**71**	Y	N
207	B	66	66	Y	**78**	Y	Y
208	B	66	67	Y	**78**	Y	Y
209	B	66	67	Y	**78**	Y	Y
210	B	66	67	Y	**77**	Y	Y
211	B	66	67	Y	**77**	Y	Y
212	B	66	63	N	**71**	Y	N
213	B	66	60	N	**69**	Y	N
214	B	66	59	N	**67**	Y	N
215	B	66	58	N	**66**	Y	N
216	B	66	57	N	65	N	N
217	B	66	57	N	64	N	N
218	B	66	65	N	**76**	Y	Y
219	B	66	62	N	**72**	Y	Y
220	B	66	61	N	**69**	Y	N
221	B	66	62	N	**66**	Y	N
222	B	66	58	N	65	N	N
223	B	66	60	N	65	N	N
224	B	66	59	N	**66**	Y	N
225	B	66	60	N	**69**	Y	N
226	B	66	62	N	**72**	Y	Y
227	B	66	66	Y	**77**	Y	Y
228	B	66	66	Y	**77**	Y	Y

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Table 5. Modeled Existing and Refined Selected Alternative Noise Levels in the Noise Study Area

Receptor	Activity Category	UDOT NAC $L_{eq}(h)$	Existing		With Refined Selected Alternative		
			Existing Noise Levels (dBA)	Existing ≥ UDOT NAC?	Refined Selected Alternative Noise Levels (dBA)	≥ UDOT NAC?	≥ 10 dBA Increase over Existing Noise Level?
229	B	66	63	N	**72**	Y	N
230	B	66	61	N	**69**	Y	N
231	B	66	60	N	**67**	Y	N
232	B	66	59	N	65	N	N
233	B	66	57	N	64	N	N
234	B	66	59	N	**66**	Y	N
235	B	66	61	N	**68**	Y	N
236	B	66	62	N	**72**	Y	Y
237	B	66	65	N	**76**	Y	Y
238	B	66	66	Y	**77**	Y	Y
239	B	66	64	N	**74**	Y	Y
240	B	66	62	N	**71**	Y	N
241	B	66	61	N	**70**	Y	N
242	B	66	59	N	**68**	Y	N
243	B	66	58	N	**67**	Y	N
244	B	66	57	N	65	N	N
245	B	66	56	N	63	N	N
246	B	66	56	N	64	N	N
247	B	66	57	N	64	N	N
248	B	66	59	N	**66**	Y	N
249	B	66	59	N	**66**	Y	N
250	B	66	58	N	65	N	N
251	B	66	58	N	65	N	N
252	B	66	60	N	**67**	Y	N
253	B	66	63	N	**72**	Y	N
254	B	66	65	N	**75**	Y	Y
255	B	66	66	Y	**76**	Y	Y
256	B	66	66	Y	**76**	Y	Y
257	B	66	66	Y	**76**	Y	Y
258	B	66	64	N	**73**	Y	N
259	B	66	62	N	**70**	Y	N
260	B	66	61	N	**68**	Y	N
261	B	66	59	N	**66**	Y	N
262	B	66	58	N	65	N	N
263	B	66	57	N	63	N	N
264	B	66	66	Y	**75**	Y	N
265	B	66	64	N	**73**	Y	N
266	B	66	65	N	**74**	Y	N
267	B	66	58	N	63	N	N

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Table 5. Modeled Existing and Refined Selected Alternative Noise Levels in the Noise Study Area

Receptor	Activity Category	UDOT NAC $L_{eq}(h)$	Existing		With Refined Selected Alternative		
			Existing Noise Levels (dBA)	Existing ≥ UDOT NAC?	Refined Selected Alternative Noise Levels (dBA)	≥ UDOT NAC?	≥ 10 dBA Increase over Existing Noise Level?
268	B	66	59	N	64	N	N
269	B	66	57	N	63	N	N
270	B	66	62	N	**67**	**Y**	N
271	B	66	65	N	**74**	**Y**	N
272	B	66	62	N	**67**	**Y**	N
273	B	66	60	N	65	N	N
274	B	66	58	N	64	N	N
275	B	66	58	N	64	N	N
276	B	66	55	N	59	N	N
277	B	66	58	N	62	N	N
278	B	66	55	N	59	N	N
279	B	66	56	N	60	N	N
280	B	66	57	N	61	N	N
281	B	66	57	N	61	N	N
282	B	66	57	N	61	N	N
283	B	66	58	N	62	N	N
284	B	66	60	N	65	N	N
285	B	66	61	N	**66**	**Y**	N
286	B	66	65	N	**73**	**Y**	N
287	B	66	65	N	**72**	**Y**	N
288	B	66	65	N	**71**	**Y**	N
289	B	66	62	N	**67**	**Y**	N
290	B	66	60	N	64	N	N
291	B	66	58	N	60	N	N
292	B	66	58	N	60	N	N
293	B	66	59	N	61	N	N
294	B	66	59	N	61	N	N
295	B	66	59	N	62	N	N
296 A	B	66	59	N	61	N	N
296 B	B	66	59	N	61	N	N
296 C	B	66	58	N	61	N	N
297	B	66	59	N	62	N	N
298	B	66	59	N	61	N	N
299	B	66	58	N	61	N	N
300	B	66	59	N	61	N	N
301	B	66	60	N	62	N	N
302	B	66	59	N	61	N	N
303	B	66	58	N	60	N	N
304	B	66	61	N	62	N	N
305	B	66	61	N	62	N	N

(*continued on next page*)

Table 5. Modeled Existing and Refined Selected Alternative Noise Levels in the Noise Study Area

Receptor	Activity Category	UDOT NAC $L_{eq}(h)$	Existing		With Refined Selected Alternative		
			Existing Noise Levels (dBA)	Existing ≥ UDOT NAC?	Refined Selected Alternative Noise Levels (dBA)	≥ UDOT NAC?	≥ 10 dBA Increase over Existing Noise Level?
306	B	66	62	N	63	N	N
307	B	66	64	N	65	N	N
308	B	66	64	N	**66**	**Y**	N
309	B	66	63	N	65	N	N
310	B	66	62	N	63	N	N
311	B	66	59	N	60	N	N
312	B	66	59	N	61	N	N
313	B	66	59	N	61	N	N
314	B	66	59	N	61	N	N
315	B	66	63	N	64	N	N
316	B	66	62	N	63	N	N
317	B	66	64	N	65	N	N
318	B	66	60	N	61	N	N
319	B	66	60	N	61	N	N
320	B	66	60	N	61	N	N
321	B	66	61	N	62	N	N
322	B	66	60	N	61	N	N
323	B	66	59	N	61	N	N
324	B	66	59	N	61	N	N
325	B	66	63	N	64	N	N
326	B	66	61	N	62	N	N
327	B	66	61	N	62	N	N
328	B	66	60	N	61	N	N
329	B	66	59	N	61	N	N
330	B	66	60	N	61	N	N
331	B	66	63	N	64	N	N
332	B	66	61	N	62	N	N
333	B	66	63	N	64	N	N
334	B	66	62	N	63	N	N
335	B	66	60	N	61	N	N
336	B	66	60	N	61	N	N
337	B	66	61	N	61	N	N
338	B	66	62	N	63	N	N
339	B	66	62	N	62	N	N
340	B	66	60	N	61	N	N
341	B	66	60	N	61	N	N
342	B	66	59	N	62	N	N
343	B	66	61	N	62	N	N
344	B	66	61	N	62	N	N
345	B	66	60	N	61	N	N

(*continued on next page*)

Table 5. Modeled Existing and Refined Selected Alternative Noise Levels in the Noise Study Area

Receptor	Activity Category	UDOT NAC $L_{eq}(h)$	Existing		With Refined Selected Alternative		
			Existing Noise Levels (dBA)	Existing ≥ UDOT NAC?	Refined Selected Alternative Noise Levels (dBA)	≥ UDOT NAC?	≥ 10 dBA Increase over Existing Noise Level?
346	B	66	61	N	61	N	N
347	B	66	61	N	62	N	N
348	C	66	72	Y	**73**	**Y**	N
349	B	66	58	N	60	N	N
350	B	66	59	N	60	N	N
351	B	66	59	N	61	N	N
352	B	66	60	N	61	N	N
353	B	66	61	N	62	N	N
354	B	66	62	N	63	N	N
355	B	66	63	N	63	N	N
356	B	66	64	N	64	N	N
357	B	66	64	N	64	N	N
358	B	66	66	Y	65	N	N
359	B	66	57	N	59	N	N
360	B	66	57	N	59	N	N
361	B	66	58	N	60	N	N
362	B	66	55	N	56	N	N
363	B	66	55	N	56	N	N
364	B	66	54	N	55	N	N
365	B	66	55	N	55	N	N
366	B	66	57	N	58	N	N
367	B	66	59	N	59	N	N
368	B	66	59	N	59	N	N
369	B	66	61	N	62	N	N
370	B	66	62	N	62	N	N
371	B	66	61	N	61	N	N
372	B	66	61	N	62	N	N
373	B	66	62	N	62	N	N
374	B	66	58	N	58	N	N
375	B	66	58	N	58	N	N
376	B	66	62	N	63	N	N
377	B	66	65	N	65	N	N
378	B	66	65	N	65	N	N
379	B	66	65	N	65	N	N
380	B	66	65	N	65	N	N
381	B	66	65	N	65	N	N
382	B	66	65	N	65	N	N
383	B	66	64	N	64	N	N
384	B	66	61	N	62	N	N
385	B	66	60	N	60	N	N

(*continued on next page*)

Table 5. Modeled Existing and Refined Selected Alternative Noise Levels in the Noise Study Area

Receptor	Activity Category	UDOT NAC $L_{eq}(h)$	Existing		With Refined Selected Alternative		
			Existing Noise Levels (dBA)	Existing ≥ UDOT NAC?	Refined Selected Alternative Noise Levels (dBA)	≥ UDOT NAC?	≥ 10 dBA Increase over Existing Noise Level?
386	B	66	62	N	62	N	N
387	B	66	66	Y	**66**	**Y**	N
388	B	66	64	N	64	N	N
389	B	66	63	N	63	N	N
390	B	66	62	N	63	N	N
391	B	66	61	N	62	N	N
392	B	66	61	N	61	N	N
393	B	66	60	N	61	N	N
394	B	66	59	N	60	N	N
395	B	66	59	N	59	N	N
396	B	66	58	N	59	N	N
397	B	66	66	Y	**66**	**Y**	N
398	B	66	66	Y	**66**	**Y**	N
399	B	66	66	Y	**66**	**Y**	N
400	B	66	66	Y	**66**	**Y**	N
401	B	66	66	Y	**66**	**Y**	N
402	B	66	65	N	65	N	N
403	B	66	58	N	58	N	N
404	B	66	57	N	58	N	N
405	B	66	56	N	57	N	N
406	B	66	60	N	61	N	N
407	B	66	60	N	61	N	N
408	B	66	60	N	60	N	N
409	B	66	63	N	63	N	N
410	B	66	62	N	62	N	N
411	B	66	60	N	60	N	N
412	B	66	60	N	60	N	N
413	B	66	60	N	60	N	N
414	B	66	58	N	59	N	N
415	B	66	55	N	56	N	N
416	B	66	54	N	54	N	N
417	B	66	54	N	54	N	N
418	B	66	54	N	54	N	N
419	B	66	54	N	54	N	N
420	B	66	55	N	55	N	N
421	B	66	56	N	56	N	N
422	B	66	54	N	55	N	N
423	B	66	58	N	58	N	N
424	B	66	65	N	65	N	N
425	B	66	65	N	65	N	N

(*continued on next page*)

Table 5. Modeled Existing and Refined Selected Alternative Noise Levels in the Noise Study Area

Receptor	Activity Category	UDOT NAC $L_{eq}(h)$	Existing		With Refined Selected Alternative		
			Existing Noise Levels (dBA)	Existing ≥ UDOT NAC?	Refined Selected Alternative Noise Levels (dBA)	≥ UDOT NAC?	≥ 10 dBA Increase over Existing Noise Level?
426	B	66	63	N	63	N	N
427	B	66	62	N	62	N	N
428	B	66	61	N	61	N	N
429	B	66	59	N	60	N	N
430	B	66	60	N	60	N	N
431	B	66	61	N	62	N	N
432	B	66	62	N	62	N	N
433	B	66	63	N	63	N	N
434	B	66	59	N	59	N	N
435	B	66	58	N	59	N	N
436	B	66	58	N	59	N	N
437	B	66	58	N	59	N	N
438	B	66	59	N	59	N	N
439	B	66	65	N	65	N	N
440	B	66	60	N	60	N	N
441	B	66	61	N	61	N	N
442	B	66	62	N	62	N	N
443	B	66	65	N	65	N	N
444	B	66	61	N	61	N	N
445	B	66	62	N	62	N	N
446	B	66	61	N	61	N	N
447	B	66	60	N	60	N	N
448	B	66	59	N	59	N	N
449	B	66	59	N	59	N	N
450	B	66	65	N	65	N	N
451	B	66	65	N	65	N	N
452	B	66	64	N	64	N	N
453	B	66	64	N	65	N	N
454	B	66	62	N	62	N	N
455	B	66	61	N	61	N	N
456	B	66	60	N	60	N	N
457	B	66	59	N	59	N	N
458	B	66	60	N	60	N	N
459	B	66	61	N	61	N	N
460	B	66	61	N	61	N	N
461	B	66	61	N	61	N	N
462	B	66	59	N	59	N	N
463	B	66	65	N	65	N	N
464	B	66	65	N	65	N	N
465	B	66	65	N	65	N	N

(*continued on next page*)

Table 5. Modeled Existing and Refined Selected Alternative Noise Levels in the Noise Study Area

Receptor	Activity Category	UDOT NAC $L_{eq}(h)$	Existing		With Refined Selected Alternative		
			Existing Noise Levels (dBA)	Existing ≥ UDOT NAC?	Refined Selected Alternative Noise Levels (dBA)	≥ UDOT NAC?	≥ 10 dBA Increase over Existing Noise Level?
466	B	66	65	N	65	N	N
467	B	66	65	N	**66**	**Y**	N
468	B	66	63	N	63	N	N
469	B	66	62	N	62	N	N
470	B	66	64	N	64	N	N
471	B	66	65	N	65	N	N
472	B	66	65	N	65	N	N
473	B	66	62	N	62	N	N
474	B	66	61	N	61	N	N
475	B	66	60	N	60	N	N
476	B	66	59	N	59	N	N
477	B	66	60	N	60	N	N
478	B	66	61	N	61	N	N
479	B	66	62	N	62	N	N
480	B	66	62	N	62	N	N
481	B	66	65	N	65	N	N
482	B	66	63	N	63	N	N
483	B	66	60	N	60	N	N
484	B	66	62	N	62	N	N
485	B	66	64	N	64	N	N
486	B	66	63	N	63	N	N
487	B	66	59	N	60	N	N
488	B	66	61	N	61	N	N
489	B	66	67	Y	**67**	**Y**	N
490	B	66	68	Y	**68**	**Y**	N
491	B	66	68	Y	**68**	**Y**	N
492	B	66	68	Y	**68**	**Y**	N
493	B	66	65	N	65	N	N
494	B	66	67	Y	**67**	**Y**	N
495	B	66	67	Y	**67**	**Y**	N
496	B	66	69	Y	**69**	**Y**	N
497	B	66	67	Y	**67**	**Y**	N
498	B	66	65	N	65	N	N
499	B	66	66	Y	**66**	**Y**	N
500	B	66	64	N	64	N	N
501	B	66	65	N	65	N	N
502	B	66	65	N	65	N	N
503	B	66	67	Y	**67**	**Y**	N
504	B	66	67	Y	**67**	**Y**	N
505	B	66	66	Y	**66**	**Y**	N

(*continued on next page*)

Table 5. Modeled Existing and Refined Selected Alternative Noise Levels in the Noise Study Area

Receptor	Activity Category	UDOT NAC $L_{eq}(h)$	Existing		With Refined Selected Alternative		
			Existing Noise Levels (dBA)	Existing ≥ UDOT NAC?	Refined Selected Alternative Noise Levels (dBA)	≥ UDOT NAC?	≥ 10 dBA Increase over Existing Noise Level?
506	B	66	66	Y	**66**	**Y**	N
507	B	66	67	Y	**67**	**Y**	N
508	B	66	68	Y	**68**	**Y**	N
509	B	66	71	Y	**71**	**Y**	N
510	B	66	71	Y	**71**	**Y**	N
511	B	66	72	Y	**72**	**Y**	N
512	B	66	72	Y	**72**	**Y**	N
513	B	66	67	Y	**67**	**Y**	N
514	C	66	67	Y	**68**	**Y**	N
516	C	66	69	Y	**70**	**Y**	N
518	B	66	63	N	63	N	N
519	B	66	62	N	63	N	N
520	B	66	61	N	62	N	N
521	B	66	61	N	62	N	N
522	B	66	61	N	62	N	N
523	B	66	62	N	63	N	N
524	B	66	62	N	63	N	N
525	B	66	63	N	64	N	N
526	B	66	62	N	63	N	N
527	B	66	62	N	63	N	N
528	B	66	61	N	63	N	N
529	B	66	63	N	64	N	N
530	B	66	62	N	63	N	N
531	B	66	61	N	63	N	N
532	B	66	61	N	62	N	N
533	B	66	60	N	62	N	N
534	B	66	61	N	62	N	N
535	B	66	65	N	**68**	**Y**	N
536	B	66	64	N	**67**	**Y**	N
537	B	66	65	N	**67**	**Y**	N
540	C	66	73	Y	**70**	**Y**	N
541	C	66	72	Y	**70**	**Y**	N
542	C	66	69	Y	**69**	**Y**	N
545	B	66	50	N	**62**	N	**Y**
546	B	66	50	N	**64**	N	**Y**
547	B	66	50	N	**67**	**Y**	**Y**
548	B	66	50	N	**67**	**Y**	**Y**
549	B	66	50	N	**66**	**Y**	**Y**
550	B	66	50	N	**64**	N	**Y**
551	B	66	50	N	**65**	N	**Y**

(*continued on next page*)

Table 5. Modeled Existing and Refined Selected Alternative Noise Levels in the Noise Study Area

Receptor	Activity Category	UDOT NAC $L_{eq}(h)$	Existing		With Refined Selected Alternative		
			Existing Noise Levels (dBA)	Existing ≥ UDOT NAC?	Refined Selected Alternative Noise Levels (dBA)	≥ UDOT NAC?	≥ 10 dBA Increase over Existing Noise Level?
552	B	66	50	N	**68**	Y	Y
553	B	66	50	N	**66**	Y	Y
554	B	66	50	N	**64**	N	Y
555	B	66	50	N	**68**	Y	Y
556	B	66	50	N	**67**	Y	Y
557	B	66	50	N	**66**	Y	Y
558	B	66	50	N	**63**	N	Y

Shaded cells indicate impacts with the Refined Selected Alternative.

8 Noise Abatement

This section discusses UDOT's methodology for evaluating noise-abatement mitigation measures for the traffic noise impacts identified in Section 6, Expected Impacts with the Refined Selected Alternative.

For a noise wall to be effective, it must be high enough and long enough to block the view of the noise source (that is, traffic on the roadway) from the receptor's line of sight. FHWA's *Highway Traffic Noise: Analysis and Abatement Guidance* (FHWA 2011) states that, as a general rule of thumb, the noise barrier should extend 4 times as far in each direction as the distance from the receptor to the barrier. For example, if the receptor is 50 feet from the proposed noise barrier, the barrier needs to extend at least 200 feet on either side of the receptor in order to shield the receptor from noise traveling past the ends of the barrier.

Gaps in a noise wall cause "noise leaks," which reduce the effectiveness of the wall at homes near the gap. In addition, the effectiveness of noise walls decreases with increasing distance from the wall. For example, a residence that's 300 feet from a noise wall might experience noise levels that exceed the residential NAC. However, the noise wall might be ineffective in reducing noise levels by 7 dBA or more at that distance, and, therefore, a noise barrier might not be warranted according to UDOT's Noise Abatement Policy. The goal of noise abatement is to substantially reduce noise, which might or might not result in noise levels below the residential NAC.

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

8.1 Feasibility and Reasonableness Factors

8.1.1 Feasibility Factors

The feasibility of noise-abatement measures deals primarily with construction and engineering considerations such as safety, location of cross streets, sight distance, and access to adjacent properties, among other considerations. Under UDOT's Noise Abatement Policy, a noise barrier must be considered "acoustically feasible" (that is, the barrier must reduce noise by at least 5 dBA for at least 50% of front-row receptors).

What are feasibility factors?

The feasibility of noise-abatement measures deals primarily construction and engineering considerations.

If a noise-abatement measure is determined by UDOT to be acoustically feasible, then the abatement measure will be evaluated to determine whether its construction is reasonable. If a noise-abatement measure is determined by UDOT to be not feasible, it will not be considered any further.

8.1.2 Reasonableness Factors

Under UDOT's Noise Abatement Policy, reasonableness factors must be collectively achieved in order for a noise-abatement measure to be considered "reasonable." All three reasonableness factors described below must be met in order for a noise barrier to be considered reasonable.

What are reasonableness factors?

Reasonableness factors are the noise-abatement design goal, cost-effectiveness, and the viewpoints of property owners and residents.

- ***Noise-abatement Design Goal.*** Every reasonable effort should be made to achieve substantial reductions in noise. UDOT defines the minimum noise reduction (design goal) from proposed abatement measures to be 7 dBA or greater for at least 35% of front-row receptors. No abatement measure will be considered reasonable if the noise-abatement design goal cannot be achieved.
- ***Cost-effectiveness.*** The cost of a noise-abatement measure must be considered reasonable in order for it to be included in a project. Noise-abatement costs are determined by multiplying a fixed unit cost per square foot by the height and length of the barrier.

  For residential receptors, cost-effectiveness is based on the cost of the abatement measure (for example, a noise wall) divided by the number of benefited receptors (the total number of dwelling units at which noise is reduced by a minimum of 5 dBA as a result of the abatement measure).

  Currently, the maximum cost used to determine the reasonableness of a noise-abatement measure is $30,000 per benefiting residence (Activity Category B) based on a unit cost of $20 per square foot of barrier, and $360 per lineal foot for Activity Categories A, C, D, or E.
- ***Viewpoints of Property Owners and Residents.*** If a noise-abatement measure is both feasible and cost-effective, UDOT will also consider the viewpoints of property owners and residents to determine whether the noise-abatement measures are desired. Balloting will be conducted for those noise-abatement measures that both meet the noise-abatement design goal and are cost-effective consistent with the procedures described in UDOT's Noise Abatement Policy.

The noise walls considered for the Refined Selected Alternative are discussed below. UDOT evaluated noise walls for seven locations in the WDC/I-15 system interchange area where noise impacts would occur with the Refined Selected Alternative. Two noise walls, the first wall from 1550 South in Farmington to 1650 North in Centerville, and the second wall at the Centerville Park were found to be both feasible and reasonable.

8.1.3 Noise Wall Evaluations

In this section, noise walls are described from north to south on the WDC and I-15. Refer to Figure 1 through Figure 3.

Figure 1. Noise Walls (1 of 3)

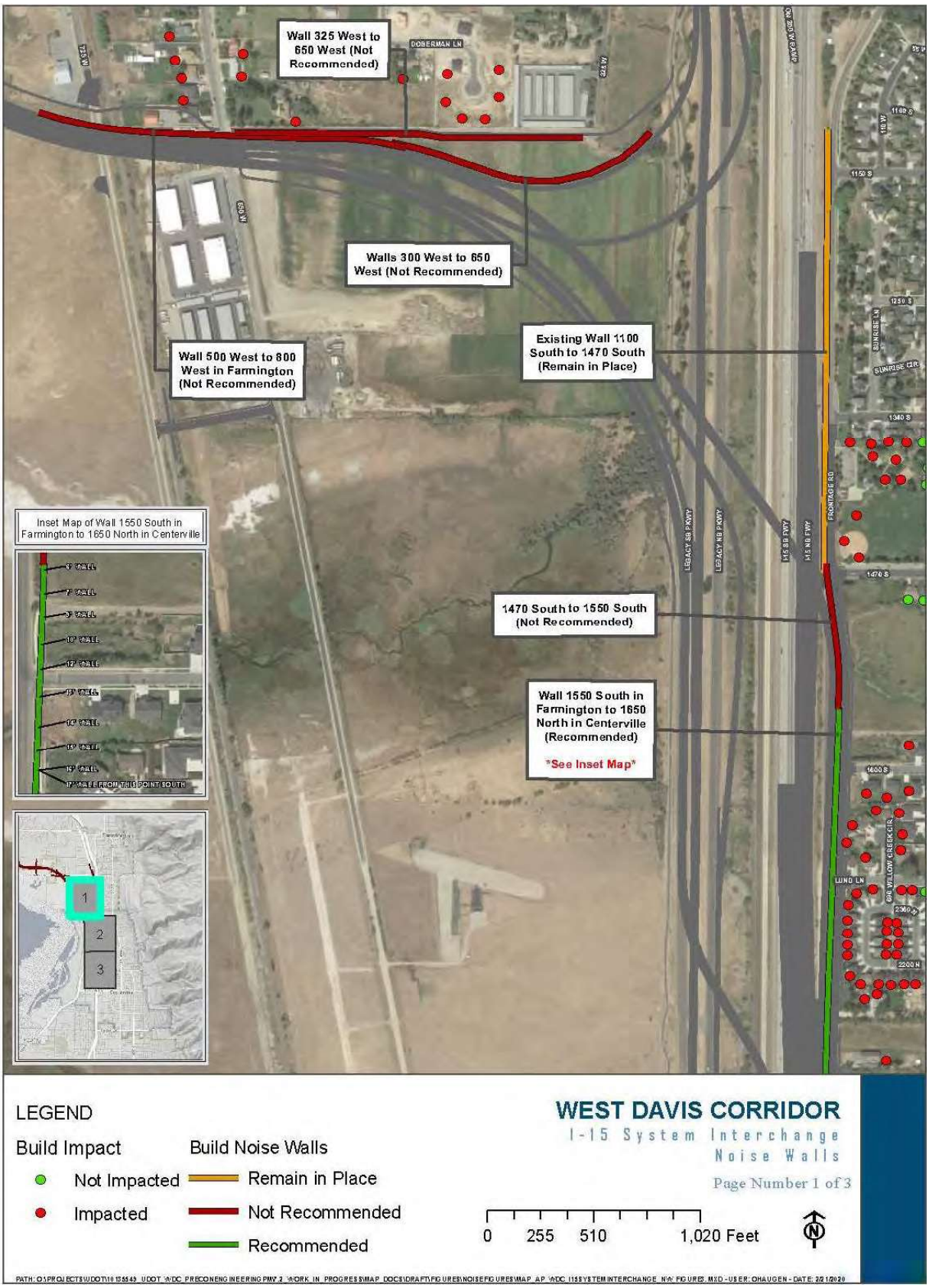


Figure 2. Noise Walls (2 of 3)

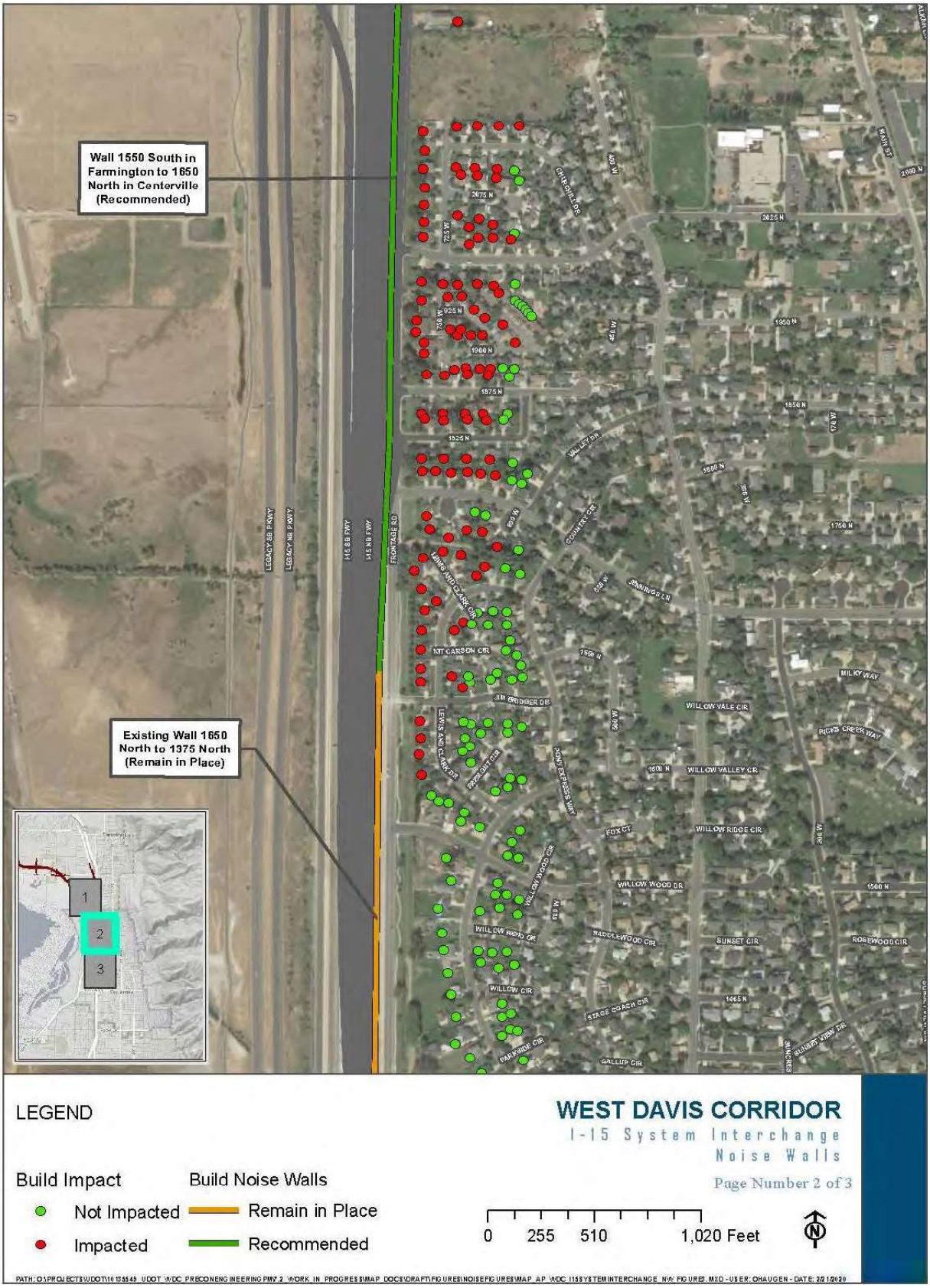
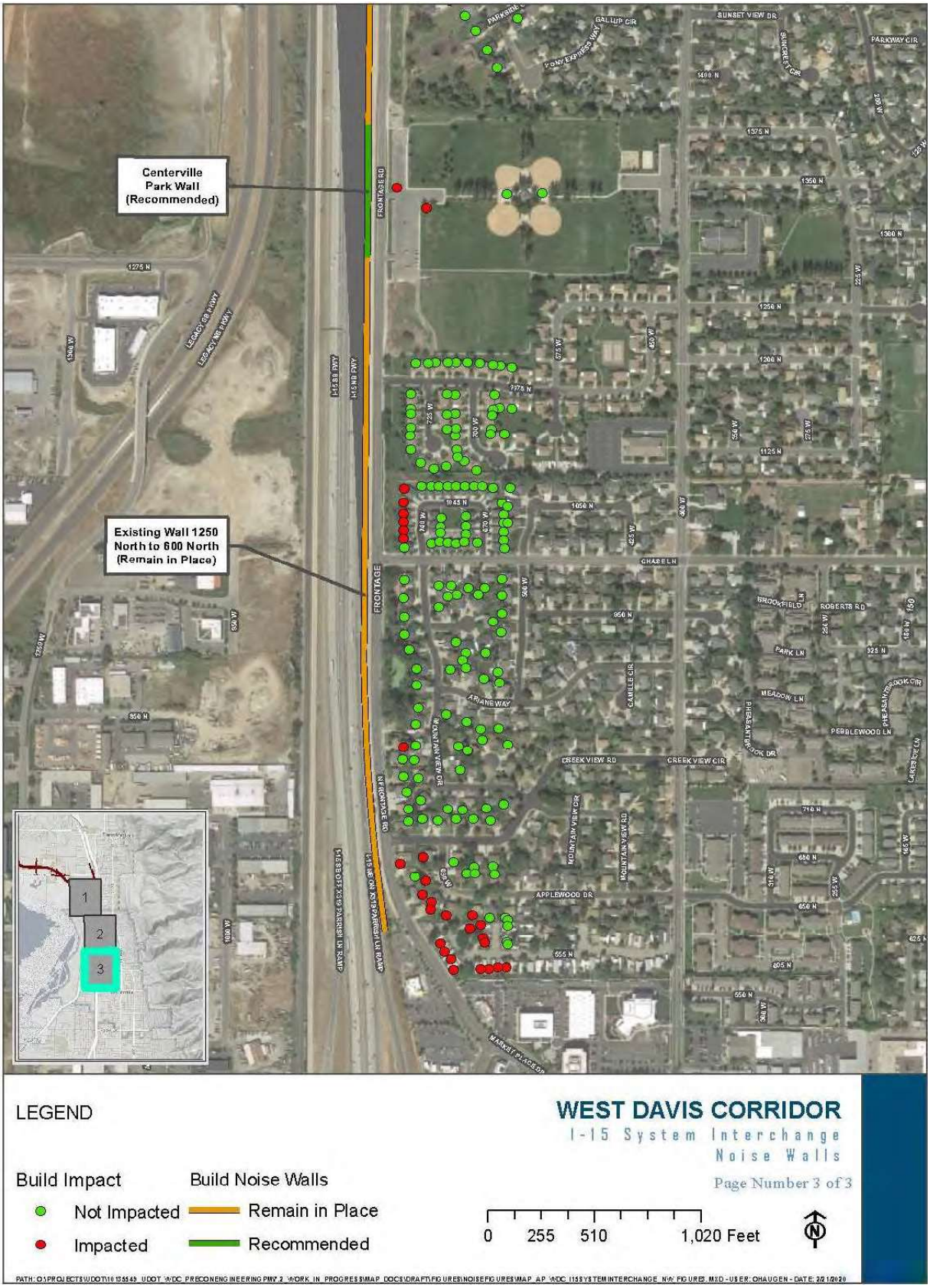


Figure 3. Noise Walls (3 of 3)



500 West to 800 West in Farmington

The wall from 500 West to 800 West in Farmington was evaluated where noise impacts are expected. There are a total of 7 impacted receptors in this area (552 to 558) and 2 front row receptors (552 and 555). All receptors are Activity Category B. This wall is located along the north side of the ramp from southbound Legacy Parkway to northbound WDC (see Figure 8-1, Build Scenario Noise Walls [1 of 3], above).

As summarized in Table 6, UDOT evaluated walls ranging from 10 to 17 feet high (for detailed information, see Appendix C, Noise Wall Analysis). Wall lengths used in the analysis varied (742 feet to 1,492 feet) for different height walls. The shorter distance walls were used for taller height walls.

Table 6. Noise-abatement Analysis for Noise Barrier 500 West to 800 West in Farmington

	Feasibility		Reasonable					
Barrier Height (Length)	% Front-row with 5-dBA Reduction	Acoustically Feasible?[a]	% Front-row with 7-dBA Reduction	Noise Abatement Design Goal?[b]	Anticipated Cost	Allowable Cost	Cost-effective?[c]	Is Barrier Feasible and Reasonable?
10 (1,492' long)	100	Yes	50	Yes	$298,400	$150,000	No	**No**
12 (792' long)	50	Yes	50	Yes	$190,080	$30,000	No	**No**
14 (742' long)	50	Yes	50	Yes	$207,760	$30,000	No	**No**
17 (742' long)	50	Yes	50	Yes	$252,280	$60,000	No	**No**

[a] 5-dBA reduction for at least 50% of front-row receptors.

[b] 7-dBA reduction for at least 35% of front-row receptors.

[c] Anticipated cost is less than allowable cost.

Noise walls from 500 West to 800 West in Farmington do not meet UDOT's reasonable cost-effectiveness criteria and are therefore not recommended.

325 West to 650 West in Farmington

The wall from 325 West to 650 West in Farmington was evaluated where noise impacts are expected. In this area there are a total of 8 impacted receptors (545 to 552) and 3 front row receptors (547, 548, and 552). All of the receptors are Activity Category B. This wall is located near the north right-of-way line of WDC at approximately 1100 South in Farmington. This wall is about 1,700 feet long (see Figure 8-1, Build Scenario Noise Walls [1 of 3], above).

As summarized in Table 7, UDOT evaluated a wall 17 feet high (for detailed information, see Appendix C, Noise Wall Analysis).

Table 7. Noise-abatement Analysis for Noise Barrier 325 West to 650 West in Farmington

	Feasibility		Reasonable					
Barrier Height	% Front-row with 5-dBA Reduction	Acoustically Feasible?[a]	% Front-row with 7-dBA Reduction	Noise Abatement Design Goal?[b]	Anticipated Cost	Allowable Cost	Cost-effective?[c]	Is Barrier Feasible and Reasonable?
17	33	No	NA	NA	NA	NA	NA	**No**

[a] 5-dBA reduction for at least 50% of front-row receptors.

[b] 7-dBA reduction for at least 35% of front-row receptors.

[c] Anticipated cost is less than allowable cost.

A noise wall from 325 West to 650 West near the right-of-way line does not meet UDOT's feasibility criteria and is therefore not recommended.

300 West to 650 West in Farmington

The walls from 300 West to 650 West in Farmington were evaluated where noise impacts are expected. In this area there are a total of 7 impacted receptors (545 to 551) and 2 front row receptors (547 and 548). All of the receptors are Activity Category B. These walls are located along the north side of the ramp from southbound Legacy Parkway to northbound WDC. A segment of this wall is located at the clear zone location, and the other segment is located at the top of slope adjacent to the ramp. These two walls have a combined length of about 2,295 feet (see Figure 8-1, Build Scenario Noise Walls [1 of 3], above).

As summarized in Table 8, UDOT evaluated a wall 17 feet high (for detailed information, see Appendix C, Noise Wall Analysis).

Table 8. Noise-abatement Analysis for Noise Barrier 300 West to 650 West in Farmington

	Feasibility		Reasonable					
Barrier Height	% Front-row with 5-dBA Reduction	Acoustically Feasible?[a]	% Front-row with 7-dBA Reduction	Noise Abatement Design Goal?[b]	Anticipated Cost	Allowable Cost	Cost-effective?[c]	Is Barrier Feasible and Reasonable?
17	100	Yes	0	No	NA	NA	NA	**No**

[a] 5-dBA reduction for at least 50% of front-row receptors.

[b] 7-dBA reduction for at least 35% of front-row receptors.

[c] Anticipated cost is less than allowable cost.

Noise walls from 300 West to 650 West do not meet UDOT's reasonable design goal criteria and are therefore not recommended.

1340 South to 1470 South in Farmington

An existing 6-foot-high noise wall is located on top of a berm on the east side of I-15 between 1100 South and 1470 South. In this area there are a total of 11 impacted receptors (84 to 87, 89, 91, 92, 516, and 540 to 542) and 4 front row receptors (87, 516, 540, and 541). Receptors 89, 91, 92, 516, and 540 to 542 are recreational receptors (Activity Category C). Receptors 84 to 87 are residential (Activity Category B). The southern section of this wall from 1340 South to 1470 South on the east side of I-15 in Farmington was evaluated within the project limits where noise impacts are expected. This analysis compares the benefits of a new, higher wall to the existing 6-foot-high wall on the berm. This wall within the project limits would be about 870 feet long (see Figure 8-1, Build Scenario Noise Walls [1 of 3], above).

As summarized in Table 9, UDOT evaluated a walls 15 to 17 feet high (for detailed information, see Appendix C, Noise Wall Analysis).

Table 9. Noise-abatement Analysis for Noise Barrier 1340 South to 1470 South in Farmington

Barrier Height	Feasibility		Reasonable					Is Barrier Feasible and Reasonable?
	% Front-row with 5-dBA Reduction	Acoustically Feasible?[a]	% Front-row with 7-dBA Reduction	Noise Abatement Design Goal?[b]	Anticipated Cost	Allowable Cost	Cost-effective?[c]	
15	0	No	NA	NA	NA	NA	NA	**No**
16	0	No	NA	NA	NA	NA	NA	**No**
17	0	No	NA	NA	NA	NA	NA	**No**

[a] 5-dBA reduction for at least 50% of front-row receptors.

[b] 7-dBA reduction for at least 35% of front-row receptors.

[c] Anticipated cost is less than allowable cost.

A higher wall from 1340 South to 1470 South in Farmington wall does not meet UDOT's feasibility criteria and is therefore not recommended. The existing 6-foot-high noise wall on top of the berm from 1100 South to 1470 South will remain in place.

1470 South to 1550 South Connection in Farmington

A new noise wall was evaluated for the gap area between the southern end of the 1140 South to 1470 South existing wall (see previous section) and the north end of the 1550 South Farmington to 1650 North Centerville Wall (see next section) within the project limits where noise impacts are expected. There are a total of 42 receptors in this area (82 to 102, 516, 518 to 534, and 540 to 542). Receptors 89, 91, 92, 516, and 540 to 542 are recreational receptors (Activity Category C). All other receptors are residential (Activity Category B). In this area there are 11 impacted receptors (84 to 87, 89, 91, 92, 516, and 540 to 542) and 4 front row receptors (87, 516, 540, and 541). This analysis compares the benefits of a new wall between the southern end of the 1140 South to 1470 South existing wall and the north end of the recommended 1550 South Farmington to 1650 North Centerville Wall. This wall within the project limits would be about 697 feet long (see Figure 8-1, Build Scenario Noise Walls [1 of 3], above).

As summarized in Table 10, UDOT evaluated a wall 17 feet high (for detailed information, see Appendix C, Noise Wall Analysis).

Table 10. Noise-abatement Analysis for Noise Barrier 1470 South to 1550 South Connection in Farmington

	Feasibility		Reasonable					
Barrier Height	% Front-row with 5-dBA Reduction	Acoustically Feasible?[a]	% Front-row with 7-dBA Reduction	Noise Abatement Design Goal?[b]	Anticipated Cost	Allowable Cost	Cost-effective?[c]	Is Barrier Feasible and Reasonable?
17	25	No	NA	NA	NA	NA	NA	**No**

[a] 5-dBA reduction for at least 50% of front-row receptors.

[b] 7-dBA reduction for at least 35% of front-row receptors.

[c] Anticipated cost is less than allowable cost.

The 1470 South to 1550 South Connection wall does not meet UDOT's feasible criteria and is therefore not recommended.

The existing 6-foot-high noise wall on top of the berm from 1100 South to 1470 South will remain in place.

1550 South in Farmington to 1650 North in Centerville

A 4,750 feet long wall was evaluated where noise impacts are expected on the east side of I-15 near the Farmington and Centerville border. In this area there are a total of 186 receptors (103 to 116, 118 to 121, and 123 to 290). There are 140 impacted receptors and 41 front row receptors (see Appendix C, Noise Wall Analysis for list of impacted receptors and front row receptors). This wall extends from 1550 South in Farmington to 1650 North in Centerville. There is an existing 17-foot-high wall from about 2100 North to about 1650 North in Centerville that must be removed due to the Refined Selected Alternative. The recommended wall will tie into the existing 17-foot-high noise wall at about 1650 North (see Figures 8-1 and 8-2, Build Scenario Noise Walls [1 of 3 and 2 of 3], above).

As summarized in Table 11, UDOT evaluated a 17-foot-high noise wall. Shorter heights were not evaluated so that the wall would match the existing 17-foot-high wall. The northern portion of this wall (approximately 500-feet long) will transition from 17 feet high to 6 feet high as the ramp to northbound WDC rises in elevation (for detailed information, see Appendix C, Noise Wall Analysis).

Table 11. Noise-abatement Analysis for Noise Barrier 1550 South in Farmington to 1650 North in Centerville

	Feasibility		Reasonable					
Barrier Height	% Front-row with 5-dBA Reduction	Acoustically Feasible?[a]	% Front-row with 7-dBA Reduction	Noise Abatement Design Goal?[b]	Anticipated Cost	Allowable Cost	Cost-effective?[c]	Is Barrier Feasible and Reasonable?
17[d]	100	Yes	93	Yes	$1,546,860	$4,830,000	Yes	**Yes**

[a] 5-dBA reduction for at least 50% of front-row receptors.

[b] 7-dBA reduction for at least 35% of front-row receptors.

[c] Anticipated cost is less than allowable cost.

[d] The wall varies in height from 17 feet to 6 feet as the northbound I-15 ramp to northbound WDC rises in elevation.

A 4,750-foot-long, 17-foot-high wall from 1550 South in Farmington to 1650 North in Centerville meets UDOT's noise-reduction and cost effectiveness criteria and is therefore recommended. The northern section of wall (approximately 500 feet long) will transition from 17 feet to 6 feet high as the I-15 ramp to WDC rises in elevation.

The existing 17-foot-high noise wall from 1650 North to 1375 North in Centerville will not be affected by the Refined Selected Alternative and is to remain in place.

Centerville Park

A wall to fill an existing gap at Centerville Park between two existing noise walls was evaluated where noise impacts are expected. In this area there are 4 total recreational receptors (7, 9, 348, and 514). Two of these receptors are impacted and front row receptors (348 and 514). This wall would be about 637 feet long (see Figure 8-3, Build Scenario Noise Walls [3 of 3], above).

As summarized in Table 12, UDOT evaluated a wall 17 feet high (for detailed information, see Appendix C, Noise Wall Analysis).

Table 12. Noise-abatement Analysis for Noise Barrier at Centerville Park

	Feasibility		Reasonable					
Barrier Height	% Front-row with 5-dBA Reduction	Acoustically Feasible?[a]	% Front-row with 7-dBA Reduction	Noise Abatement Design Goal?[b]	Anticipated Cost	Allowable Cost	Cost-effective?[c]	Is Barrier Feasible and Reasonable?
17	100	Yes	50	Yes	$216,580	$229,320	Yes	**Yes**

[a] 5-dBA reduction for at least 50% of front-row receptors.

[b] 7-dBA reduction for at least 35% of front-row receptors.

[c] Anticipated cost is less than allowable cost.

A 637-foot-long, 17-foot-high noise wall at Centerville Park meets UDOT's noise-reduction criteria and cost effectiveness criteria and is therefore recommended. The existing 17-foot-high noise wall south of Centerville Park from 1250 North to 600 North in Centerville will not be affected by the Refined Selected Alternative and is to remain in place.

9 Construction Noise

9.1 Construction Noise Activities

Table 13 shows the noise levels produced by various types of construction equipment. Properly maintained equipment will produce noise levels near the middle of the indicated ranges. The types of construction equipment used for this project will typically generate noise levels of 80 dBA to 90 dBA at a distance of 50 feet while the equipment is operating (EPA 1971; Gharabegian and others 1985; Toth 1979).

Construction equipment operations can vary from intermittent to fairly continuous with multiple pieces of equipment operating concurrently. Assuming that a bulldozer (85 dBA), backhoe (90 dBA), grader (90 dBA), and front-end loader (82 dBA) are operating concurrently in the same area, peak construction-period noise would generally be about 94 dBA at 50 feet from the construction site. Table 13 summarizes noise levels expected near an active construction site with the above equipment operating.

Table 13. Typical Noise Levels for Construction Equipment

Type of Equipment	Noise Level (dBA) at 50 feet
Bulldozer	85
Front loader	72 – 84
Jack hammer or rock drill	81 – 98
Crane with headache ball	75 – 87
Backhoe	72 – 93
Scraper and grader	80 – 93
Electrical generator	71 – 82
Concrete pump	81 – 83
Concrete vibrator	76
Concrete and dump trucks	83 – 90
Air compressor	74 – 87
Pile drivers (peaks)	95 – 106
Pneumatic tools	81 – 98
Roller (compactor)	73 – 75
Saws	73 – 82

Source: EPA 1971

Locations within about 1,900 feet of a construction site will experience occasional episodes of noise levels greater than 60 dBA. Areas within about 750 feet of a construction site will experience episodes of noise levels greater than 70 dBA. Such episodes of high noise levels associated with the proposed construction would not be continuous throughout the day and would generally be restricted to daytime hours.

Most construction activities associated with the Refined Selected Alternative would occur during daylight hours, which would minimize the number of noise impacts. Noise impacts

could occur when construction directly adjacent to residential, park, or recreation areas is necessary.

9.2 Construction Noise Mitigation

To reduce temporary noise impacts associated with construction, contractors will comply with all state and local regulations relating to construction noise.

The contractor will be required to follow UDOT *Special Provision* Section 00555M, *Prosecution and Progress*. The contractor will be required to conform to this specification to reduce the impact of construction noise on the surrounding community.

10 Information for Local Officials

Activity Categories F and G include lands that are not sensitive to traffic noise. There are no impact criteria for these land use types, so noise abatement is not required. However, for Activity Category G, an estimate of the distance to the approach criteria must be provided to local governments. This estimate will help local government officials promote compatibility between land development and the Refined Selected Alternative. Farmington City and Centerville City are the local governments that have land use jurisdiction in the project study area.

Table 14 lists the distances from the edge of the roadway pavement to the locations where the worst-hour $L_{eq}(h)$ levels of 66 dBA and 71 dBA would occur.

Table 14. Contour Distance to Future Noise Levels in Undeveloped Areas

Road	Approximate Distance from Edge of Pavement to Noise-level Contour	
	66-dBA Noise-level Contour	71-dBA Noise-level Contour
I-15 (assuming that recommended noise walls are in place)	220	50
I-15 (assuming no new noise walls)	540	330
WDC (assuming no noise walls)	300	45

11 Conclusions

The Refined Selected Alternative would generally result in a 3-dBA average noise level increase throughout the noise study area. Of the 475 receptors that were modeled, 198 (representing 189 dwelling units and 9 recreation sites) would have traffic noise impacts from the Refined Selected Alternative. Section 11.1 discusses the recommended noise walls in the noise study area that met the requirements of UDOT's Noise Abatement Policy.

As part of the final design phase, UDOT will conduct balloting consistent with the procedures in UDOT's 2017 Noise Abatement Policy.

11.1 Summary of Recommended Noise Walls

11.1.1 1550 South in Farmington to 1650 North in Centerville Wall

The recommended 1550 South to 1650 North wall would be 17 feet high and 4,750 feet long. The northern portion of this wall (approximately 500-feet) will transition from 17 feet high to 6 feet high as the ramp to northbound WDC rises in elevation. It would extend from about 1550 South in Farmington to 1650 North in Centerville on the east side of I-15 where it will tie into an existing 17-foot-high wall. (see Figure 6, Build Scenario Noise Walls [x of x]).

11.1.2 Centerville Park Wall

The recommended Centerville Park wall would be 17-feet high and 637-feet long. This wall would fill the gap between two existing noise walls east of I-16 at approximately1350 North in Centerville. (see Figure 6, Build Scenario Noise Walls [2 of 2]).

11.2 Summary of Walls to Remain in Place

11.2.1 1100 South to 1470 South Wall on Berm

This existing wall on berm begins north of the project limits at about 1100 South and ends at 1470 South. A portion of an existing 6-foot-high noise wall on berm from 1340 South to 1470 South was analyzed to determine if a higher wall would benefit impacted receptors compared to the existing wall. The analysis showed that a higher wall would not meet UDOT's noise reduction criteria when compared with the noise reduction provided by the existing wall on berm.

The existing 6-foot-high noise wall on berm will remain in place. (see Figure 8-1, Build Scenario Noise Walls [1 of 3]).

11.2.2 1650 North to 1375 North Wall

The existing 17-foot-high noise wall from 1650 North to 1375 North in Centerville will not be affected by the Refined Selected Alternative and will remain in place. (see Figure 8-2 and 8-3, Build Scenario Noise Walls [2 of 3 and 3 of 3]).

11.2.3 1250 North to 600 North Wall

The existing 17-foot-high noise wall from 1250 North to 600 North in Centerville will not be affected by the Refined Selected Alternative and will remain in place. (see Figure 8-3, Build Scenario Noise Walls [3 of 3]).

12 References

[CEQ] Council on Environmental Quality

1970 Environmental Quality: The First Annual Report of the Council on Environmental Quality. U.S. Government Printing Office, Washington, DC.

[EPA] U.S. Environmental Protection Agency

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[FHWA] Federal Highway Administration

2011 Highway Traffic Noise: Analysis and Abatement Guidance. FHWA-HEP-10-025. https://www.fhwa.dot.gov/environment/noise/regulations_and_guidance/analysis_and_abatement_guidance/revguidance.pdf. December.

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1985 Forest Fire Fighters' Noise Exposure. *Noise Control Engineering Journal* 25(3): 96–111.

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1979 Noise-Abatement Techniques for Construction Equipment. HS-803 293; DOT-TSC-NHTSA-79-45: PB-300 948. U.S. Department of Transportation, National Highway Traffic Safety Administration, Washington, DC.

[UDOT] Utah Department of Transportation

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Appendix A. Existing Noise Receptor Maps


GLOVERS LN
DOBERMAN LN
725 W
650 W
SHEEP RD
558
557
556
555
554
553
552
ML-2
LEGEND
Existing Impact
Not Impacted
Noise Monitoring Locations
WEST DAVIS CORRIDOR
I-15 System Interchange
Existing Noise Levels
Page Number 1 of 11
0
250
500 Feet
N


GLOVERS LN
DOBERMAN LN
325 W
1
2
3
4
5
6
7
8
9
10
11
545
546
547
548
549
550
551
LEGEND
Existing Impact
Not Impacted
Noise Monitoring Locations
WEST DAVIS CORRIDOR
I-15 System Interchange
Existing Noise Levels
Page Number 2 of 11
0
250
500 Feet
N


1250 S SUNRISE WAY
SUNRISE LN
SUNRISE CIR
1295 S
CAVE HOLLOW LN
CANYON DR
1340 S
FRONTAGE RD
I-15 SB FWY
I-15 NB FWY
1420 S
50 W
1470 S
87
86
85
84
83
82
529
530
534
542
89
88
525
533
91
92
528
90
527
93
526
532
516
94
523
531
524
541
95
519
521
540
96
518
520
97
100
99
98
101
522
102
LEGEND
Existing Impact
Not Impacted
Impacted
0
250
500 Feet
N
WEST DAVIS CORRIDOR
I-15 System Interchange
Existing Noise Levels
Page Number 3 of 11

LEGEND

Existing Impact

- Not Impacted
- Impacted
- Noise Monitoring Locations

WEST DAVIS CORRIDOR

I-15 System Interchange

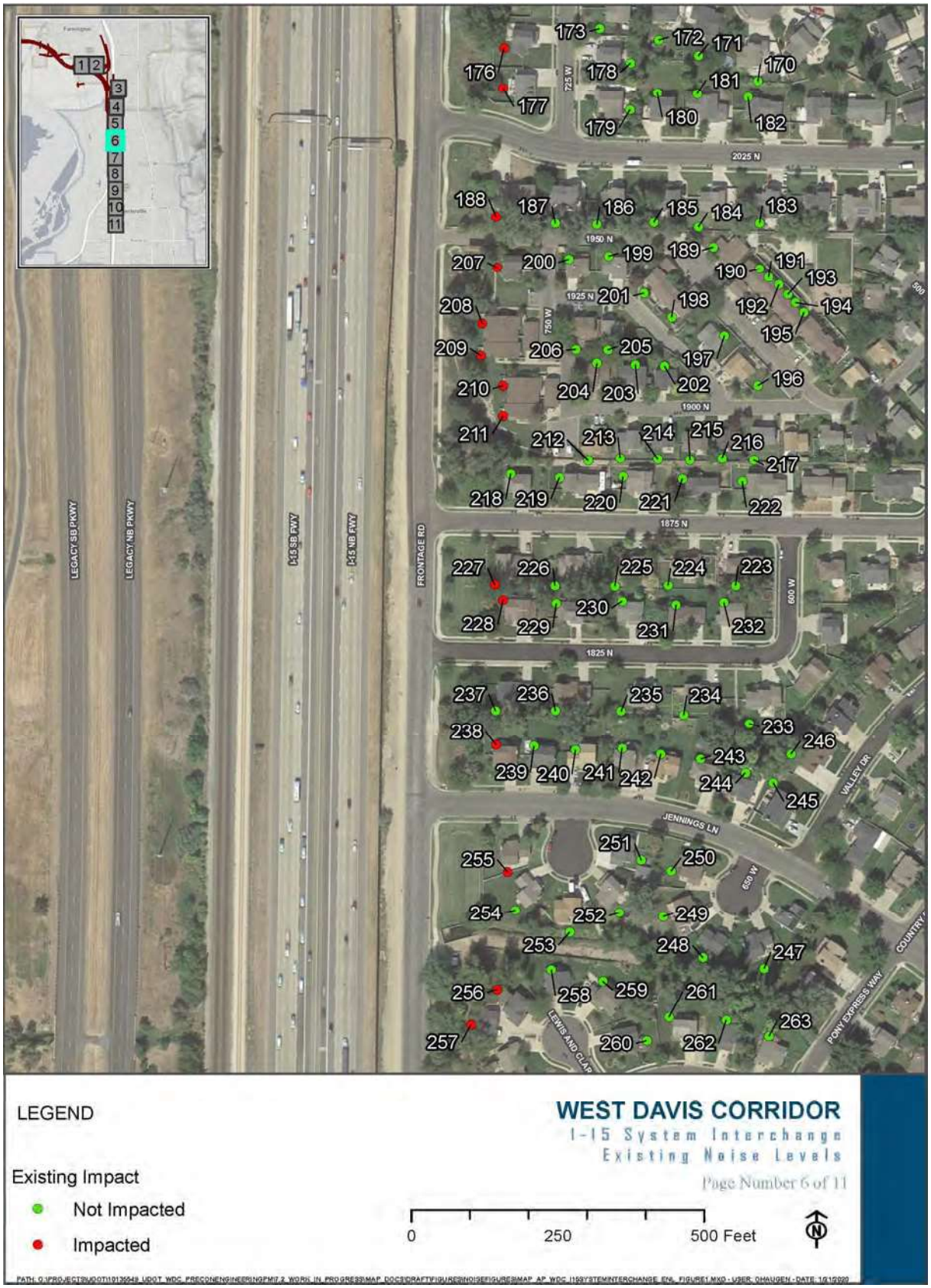
Existing Noise Levels

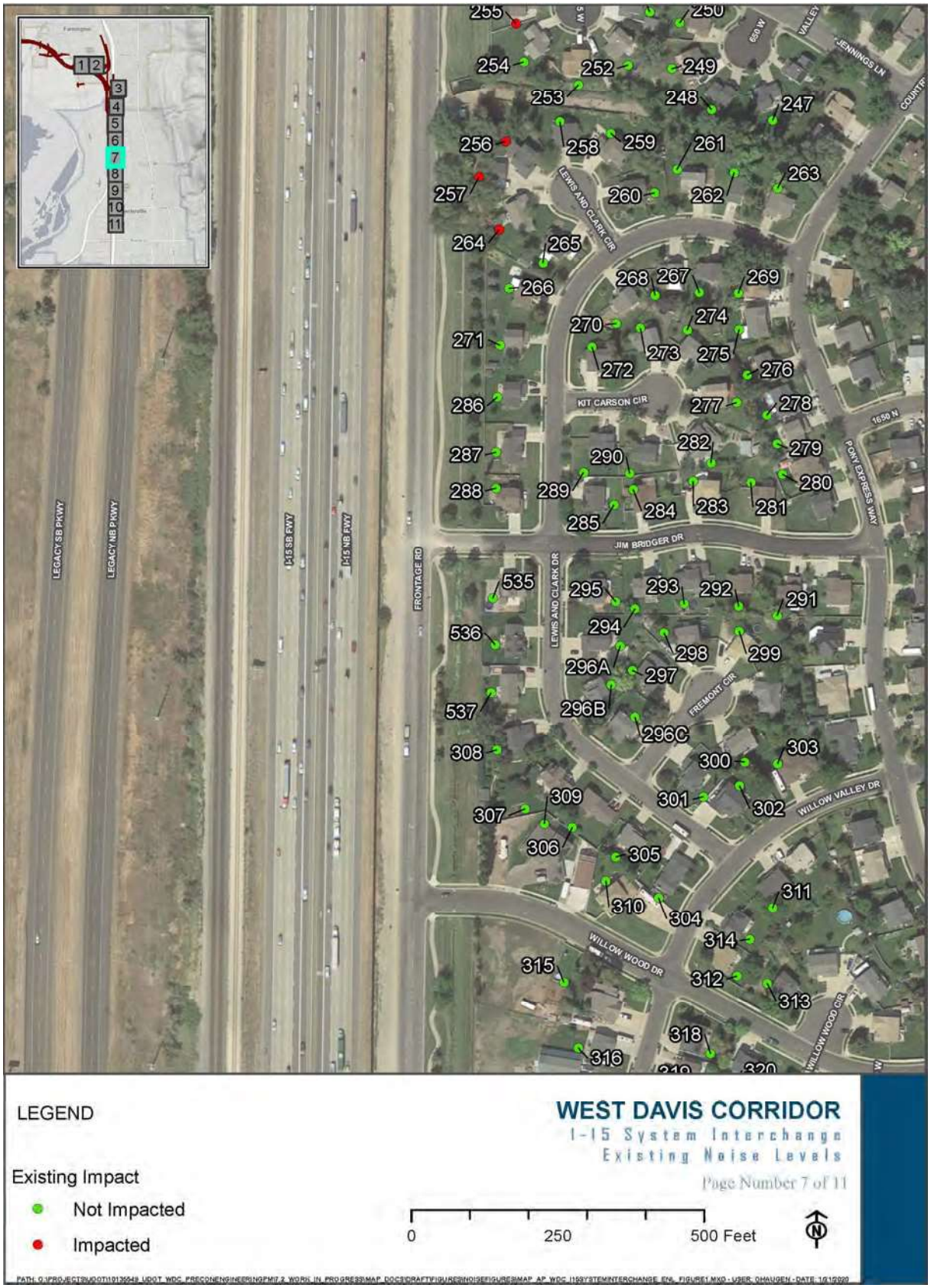
Page Number 4 of 11

0 250 500 Feet

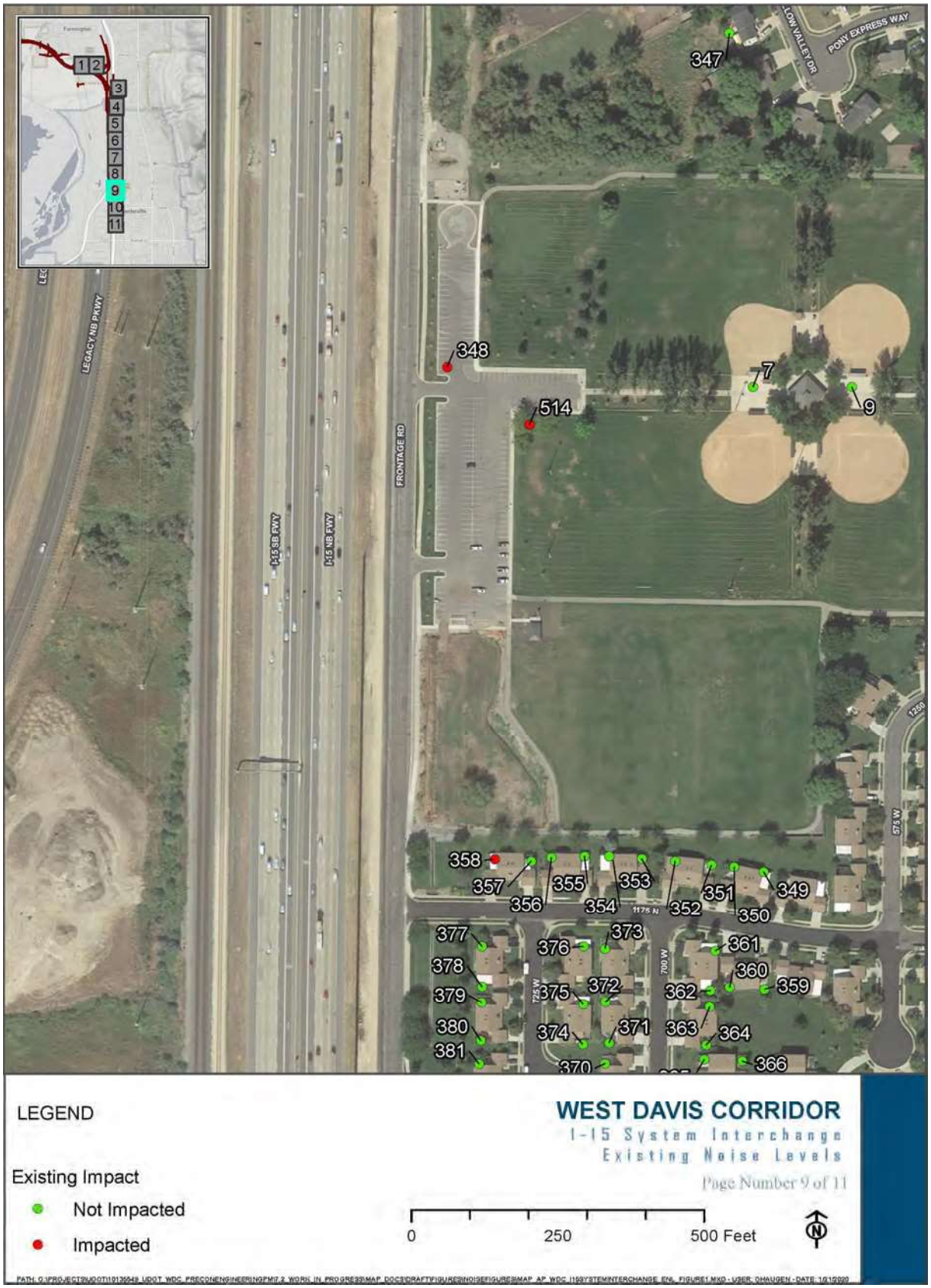
PATH: G:\PROJECTS\UDOT\19136949_UDOT_WDC_PRECONENGINEERING\PM\7.2_WORK_IN_PROGRESS\MAP_DOCS\DRAFT\FIGURES\NOISE\FIGURES\MAP_AP_WDC_I15SYSTEMINTERCHANGE_EN6_FIGURE1.MXD - USER: OHAUGEN - DATE: 1/6/2020

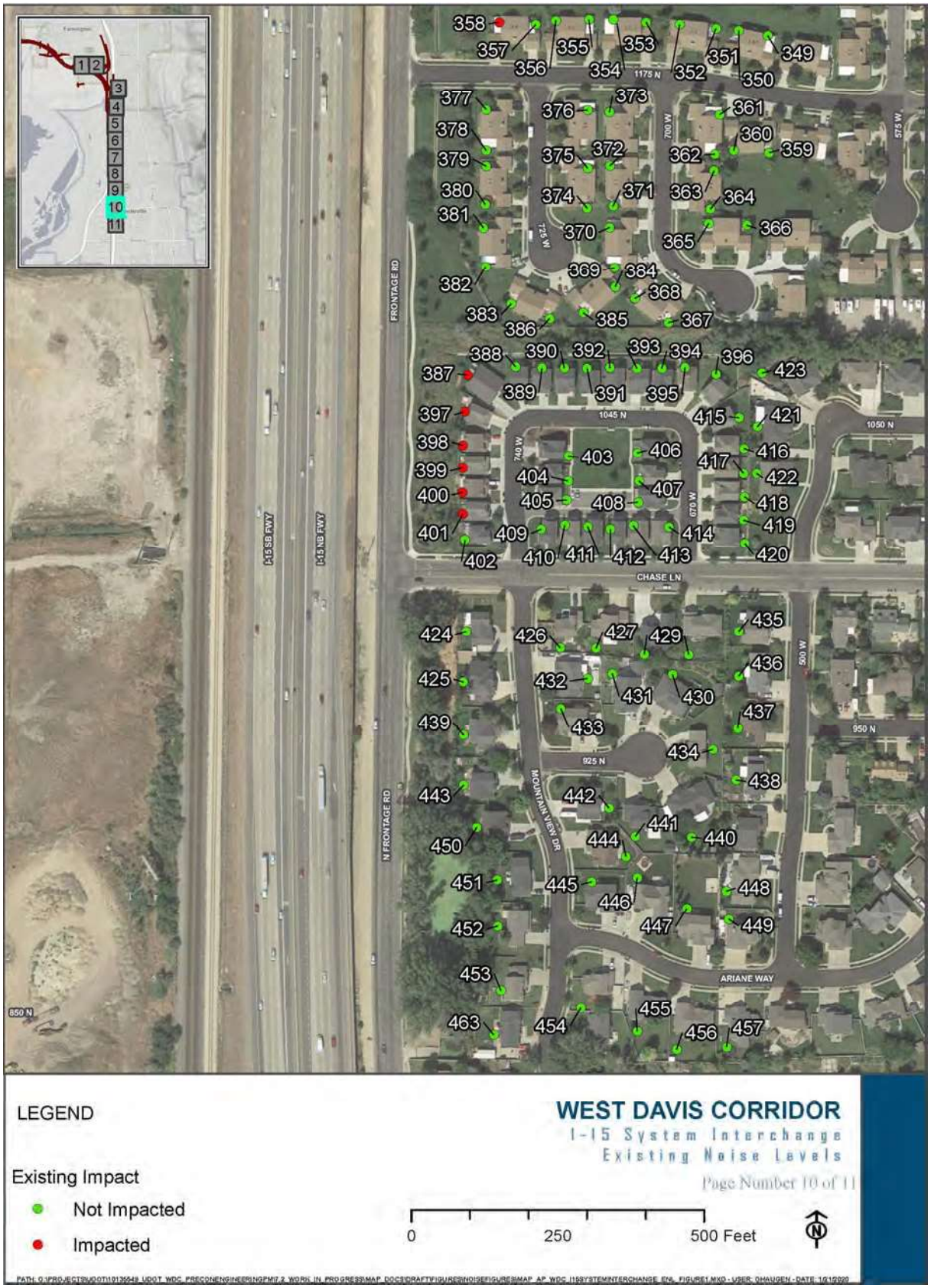

ML-4A
LEGACY SB PKWY
LEGACY NB PKWY
I-15 SB FWY
I-15 NB FWY
FRONTAGE RD
2200 N
650 W
CHURCHILL DR
725 W
2075 N
2025 N
LEGEND
Existing Impact
Not Impacted
Impacted
Noise Monitoring Locations
WEST DAVIS CORRIDOR
I-15 System Interchange
Existing Noise Levels
Page Number 5 of 11
0
250
500 Feet
N

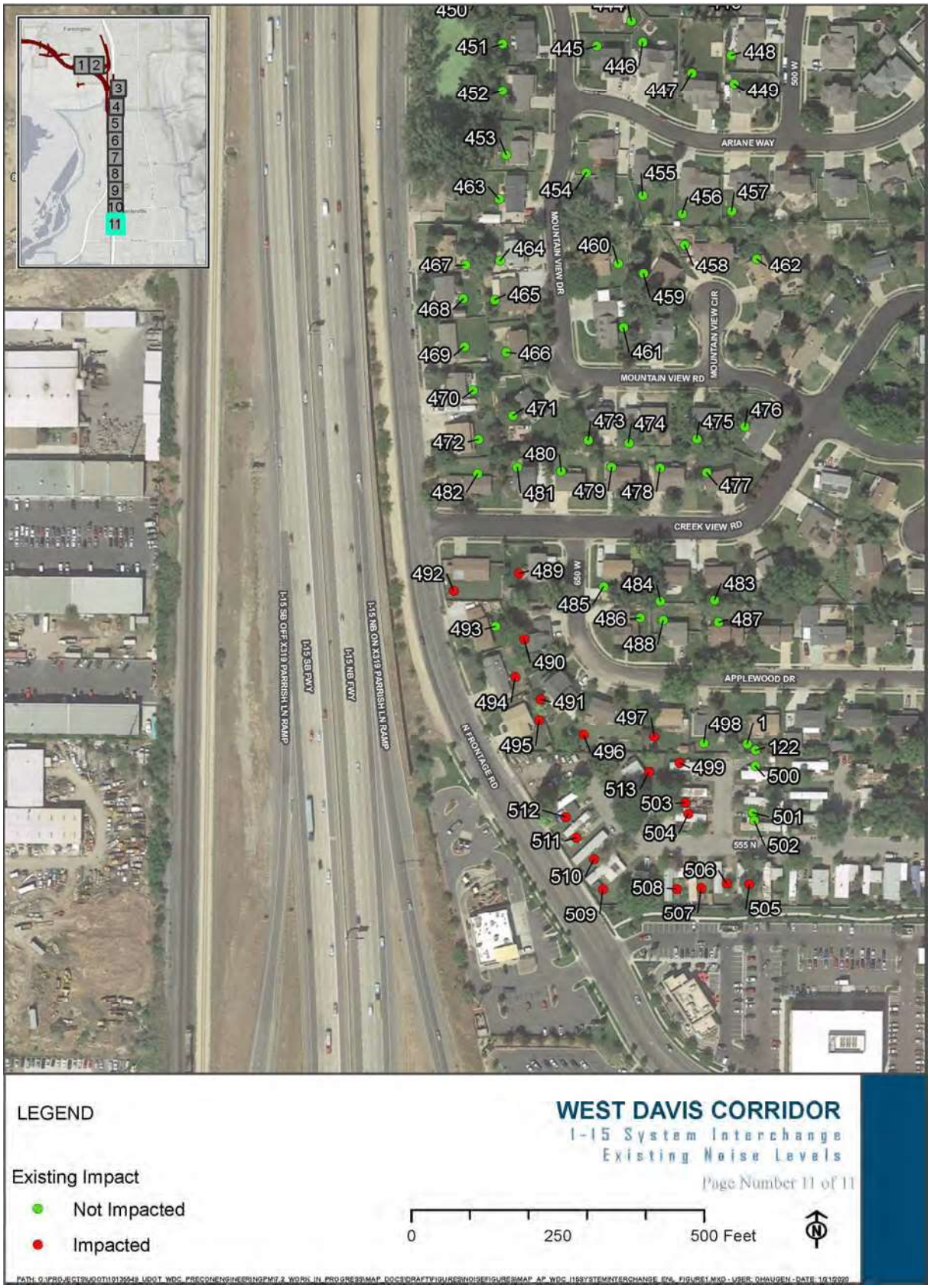

LEGACY SB PKWY
LEGACY NB PKWY
I-15 SB FWY
I-15 NB FWY
FRONTAGE RD
725 W
750 W
600 W
650 W
2025 N
1950 N
1925 N
1900 N
1875 N
1825 N
JENNINGS LN
VALLEY DR
PONY EXPRESS WAY
LEWIS AND CLARK
LEGEND
Existing Impact
Not Impacted
Impacted
WEST DAVIS CORRIDOR
I-15 System Interchange
Existing Noise Levels
Page Number 6 of 11
0
250
500 Feet
N


LEGEND
Existing Impact
Not Impacted
Impacted
WEST DAVIS CORRIDOR
I-15 System Interchange
Existing Noise Levels
Page Number 7 of 11
0
250
500 Feet
N
LEGACY SB PKWY
LEGACY NB PKWY
I-15 SB FWY
I-15 NB FWY
FRONTAGE RD
LEWIS AND CLARK DR
LEWIS AND CLARK CIR
KIT CARSON CIR
JIM BRIDGER DR
FREMONT CIR
WILLOW VALLEY DR
WILLOW WOOD DR
WILLOW WOOD CIR
PONY EXPRESS WAY
JENNINGS LN
650 W
1650 N


306
305
310
304
311
314
315
312
313
316
318
319
320
323
317
321
322
324
325
326
327
328
331
332
329
333
330
334
336
338
337
335
340
341
342
339
343
345
344
346
347
LEWIS AND CLARK DR
WILLOW WOOD DR
WILLOW WOOD CIR
WILLOW VALLEY DR
600 W
WILLOW BEND DR
WILLOW CIR
PARKSIDE CIR
PONY EXPRESS WAY
LEGACY SB PKWY
LEGACY NB PKWY
I-15 SB FWY
I-15 NB FWY
FRONTAGE RD
1 2 3 4 5 6 7 8 9 10 11
LEGEND
Existing Impact
Not Impacted
0
250
500 Feet
N
WEST DAVIS CORRIDOR
I-15 System Interchange
Existing Noise Levels
Page Number 8 of 11


LEGACY NB PKWY
I-15 SB FWY
I-15 NB FWY
FRONTAGE RD
LOW VALLEY DR
PONY EXPRESS WAY
1250
575 W
700 W
725 W
1175 N
347
348
514
7
9
358
357
356
355
354
353
352
351
350
349
377
378
379
380
381
376
375
374
373
372
371
370
361
360
359
362
363
364
366
LEGEND
Existing Impact
Not Impacted
Impacted
WEST DAVIS CORRIDOR
I-15 System Interchange
Existing Noise Levels
Page Number 9 of 11
0
250
500 Feet
N


LEGEND
Existing Impact
Not Impacted
Impacted
WEST DAVIS CORRIDOR
I-15 System Interchange
Existing Noise Levels
Page Number 10 of 11
0
250
500 Feet
FRONTAGE RD
I-15 SB FWY
I-15 NB FWY
N FRONTAGE RD
MOUNTAIN VIEW DR
CHASE LN
ARIANE WAY
1175 N
1045 N
1050 N
925 N
950 N
850 N
700 W
725 W
740 W
670 W
500 W
575 W


LEGEND
Existing Impact
Not Impacted
Impacted
WEST DAVIS CORRIDOR
I-15 System Interchange
Existing Noise Levels
Page Number 11 of 11
0
250
500 Feet
ARIANE WAY
MOUNTAIN VIEW DR
MOUNTAIN VIEW RD
MOUNTAIN VIEW CIR
CREEK VIEW RD
APPLEWOOD DR
N FRONTAGE RD
I-15 SB OFF X319 PARRISH LN RAMP
I-15 SB FWY
I-15 NB FWY
I-15 NB ON X319 PARRISH LN RAMP
W 500 N
555 N

Appendix B. Build Scenario Noise Receptor Maps


GLOVERS LN
DOBERMAN LN
725 W
680 W
558
554
557
556
553
555
552
ML-2
SHEEP RD
LEGEND
Build Impact
Impacted
WEST DAVIS CORRIDOR
I-15 System Interchange
Build Noise Levels
Page Number 1 of 11
0
250
500 Feet
N


GLOVERS LN
DOBERMAN LN
325 W
1
2
3
4
5
6
7
8
9
10
11
545
550
551
546
549
548
547
LEGEND
Build Impact
Impacted
0
250
500 Feet
WEST DAVIS CORRIDOR
I-15 System Interchange
Build Noise Levels
Page Number 2 of 11


1250 S SUNRISE WAY
SUNRISE LN
SUNRISE CIR
1295 S
CAVE HOLLOW LN
CANYON DR
1340 S
I-15 SB FWY
I-15 NB FWY
FRONTAGE RD
1420 S
50 W
1470 S
87
86
85
84
83
82
529
530
534
542
89
88
525
533
91
92
528
90
527
526
532
93
516
94
523
524
531
95
519
541
521
96
518
540
520
97
100
99
98
101
522
102
LEGEND
Build Impact
Not Impacted
Impacted
0
250
500 Feet
WEST DAVIS CORRIDOR
I-15 System Interchange
Build Noise Levels
Page Number 3 of 11

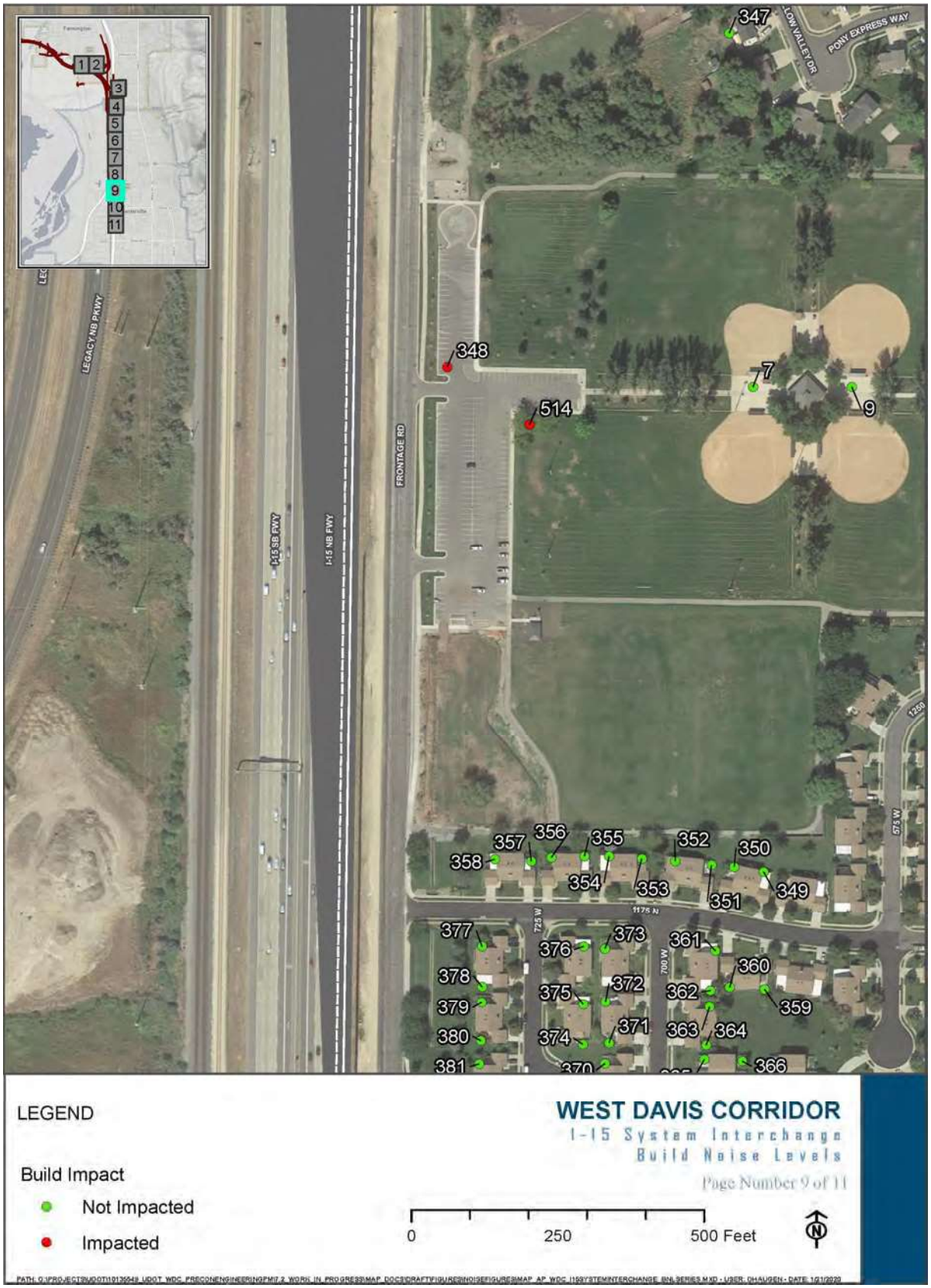

1600 S
1675 S
TUSCANY GROVE CIR
WILLOW CREEK CIR
LUND LN
FRONTAGE RD
LEGACY NB PKWY
I-15 SB FWY
I-15 NB FWY
690 W
725 W
650 W
2360 N
2200 N
ML-4A
LEGEND
Build Impact
Not Impacted
Impacted
WEST DAVIS CORRIDOR
I-15 System Interchange
Build Noise Levels
Page Number 4 of 11
0
250
500 Feet
N


ML-4A
LEGACY SB PKWY
LEGACY NB PKWY
I-15 SB FWY
I-15 NB FWY
FRONTAGE RD
2200 N
2075 N
2025 N
650 W
725 W
CHURCHILL DR
LEGEND
Build Impact
Not Impacted
Impacted
WEST DAVIS CORRIDOR
I-15 System Interchange
Build Noise Levels
Page Number 5 of 11
0
250
500 Feet


LEGACY SB PKWY
LEGACY NB PKWY
I-15 SB FWY
I-15 NB FWY
FRONTAGE RD
2025 N
1900 N
1875 N
1825 N
725 W
750 W
600 W
650 W
JENNINGS LN
VALLEY DR
LEWIS AND CLARK
PONY EXPRESS WAY
COUNTRY
LEGEND
Build Impact
Not Impacted
Impacted
WEST DAVIS CORRIDOR
I-15 System Interchange
Build Noise Levels
Page Number 6 of 11
0
250
500 Feet
N


LEGEND
Build Impact
Not Impacted
Impacted
WEST DAVIS CORRIDOR
I-15 System Interchange
Build Noise Levels
Page Number 7 of 11
0
250
500 Feet
LEGACY SB PKWY
LEGACY NB PKWY
I-15 SB FWY
I-15 NB FWY
FRONTAGE RD
LEWIS AND CLARK CIR
LEWIS AND CLARK DR
KIT CARSON CIR
JIM BRIDGER DR
FREMONT CIR
WILLOW VALLEY DR
WILLOW WOOD DR
WILLOW WOOD CIR
PONY EXPRESS WAY
JENNINGS LN
650 W
1650 N


309
305
304
310
311
314
315
312
313
316
318
320
319
323
317
321
322
324
325
326
327
328
331
332
329
333
330
334
336
338
337
335
340
341
339
342
343
345
344
346
347
LEGACY SB PKWY
LEGACY NB PKWY
I-15 SB FWY
I-15 NB FWY
FRONTAGE RD
WILLOW WOOD DR
WILLOW WOOD CIR
600 W
WILLOW BEND DR
WILLOW CIR
WILLOW VALLEY DR
PARKSIDE CIR
PONY EXPRESS WAY
LEGEND
Build Impact
Not Impacted
0
250
500 Feet
WEST DAVIS CORRIDOR
I-15 System Interchange
Build Noise Levels
Page Number 8 of 11


347
LOW VALLEY DR
PONY EXPRESS WAY
348
514
7
9
FRONTAGE RD
LEGACY NB PKWY
I-15 SB FWY
I-15 NB FWY
1250
575 W
357
356
355
352
350
358
354
353
351
349
1175 N
725 W
700 W
377
376
373
361
360
378
375
372
362
359
379
380
374
371
363
364
381
370
366
LEGEND
Build Impact
Not Impacted
Impacted
WEST DAVIS CORRIDOR
I-15 System Interchange
Build Noise Levels
Page Number 9 of 11
0
250
500 Feet
N


LEGEND
Build Impact
Not Impacted
Impacted
WEST DAVIS CORRIDOR
I-15 System Interchange
Build Noise Levels
Page Number 10 of 11
0
250
500 Feet
N
I-15 SB FWY
I-15 NB FWY
FRONTAGE RD
N FRONTAGE RD
CHASE LN
ARIANE WAY
MOUNTAIN VIEW DR
1175 N
1050 N
950 N
925 N
850 N
1045 N
575 W
500 W
700 W
670 W
740 W
725 W


LEGEND
Build Impact
Not Impacted
Impacted
WEST DAVIS CORRIDOR
I-15 System Interchange
Build Noise Levels
Page Number 11 of 11
0
250
500 Feet
ARIANE WAY
MOUNTAIN VIEW DR
MOUNTAIN VIEW RD
MOUNTAIN VIEW CIR
CREEK VIEW RD
APPLEWOOD DR
N FRONTAGE RD
I-15 SB OFF X319 PARRISH LN RAMP
I-15 SB FWY
I-15 NB FWY
I-15 NB ON X319 PARRISH LN RAMP
600 W
555 N

Appendix C. Noise Wall Analysis

Walls South of Glovers Lane - 500 West to 800 West - On NB WDC Ramp

Wall for R 552 to 558

Project Name: Interchange of WDC and I-15

Note: Maximum Height for Standard Noise Wall is 17'

TNM File: Dec 12 S of Glovers L

Wall Cost per sq ft: $20

# of Front Row Receptors (R): 2

Barrier Analysis: Dec 13 17' Wall on Ramp

Height = 17 Length = 742

Receptor Name	# of Receptors	1st Row Y=Yes	Approx. Existing Noise Level	Build Noise Level	Increase Over Existing	Receptors Impacted	Noise Level With 17-ft Wall	Noise Reduction	Front Row Receptors With 5 dBA Reduction	Front Row Receptors With 7 dba Reduction	Receptors With 5 dba Benefit
552	1	Y	50	68	18	1	61	7	1	1	1
553	1	N	50	66	16	1	61	5	0	0	1
554	1	N	50	64	14	1	60	4	0	0	0
555	1	Y	50	68	18	1	66	2	0	0	0
556	1	N	50	67	17	1	65	2	0	0	0
557	1	N	50	66	16	1	64	2	0	0	0
558	1	N	50	63	13	1	62	1	0	0	0
					Total	6			1	1	2

Feasibility:	
# of First-Row 5 dBA Reduction:	1
% of First-Row 5 dBA Reduction:	50%
Acoustic Feasibility (5 dBA reduction for 50% of front-row):	Yes
Reasonableness:	
# of First-Row 7 dBA Design Goal:	1
% of First-Row 7 dBA Design Goal:	50.0%
Noise Abatement Design Goal (7 dBA reduction for 35% of front-row):	Yes
Cost:	
# of Benefited:	2
Cost of Noise Wall (Length x Height x $20/sq ft):	$252,280
Cost of any other items critical to safety:	0
Anticipated Cost of Noise Abatement:	$252,280
Allowable Cost ($30,000 per benefited receptor):	$60,000
Cost Effective (Anticipated Cost < Allowable Cost):	No
5 dba Reduction Goal Met?	No
7 dba Recduction Goal Met?	NA
Cost Criteria Met?	NA
Feasible and Reasonable?:	No
Conclusion:	**Walls at this location are not recommended**

Walls South of Glovers Lane -

Wall for R 552 to 558

Project Name: Interchange of WDC and I-15

Wall Cost per sq ft: $20

# of Front Row Receptors (R): 2

Barrier Analysis: Dec 13 14' Wall on Ramp

Height = 14 Length = 742

Receptor Name	# of Receptors	1st Row Y=Yes	Approx. Existing Noise Level	Build Noise Level	Increase Over Existing	Receptors Impacted	Noise Level With 14-ft Wall	Noise Reduction	Front Row Receptors With 5 dBA Reduction	Front Row Receptors With 7 dba Reduction	Receptors With 5 dba Benefit
552	1	Y	50	68	18	1	61	7	1	1	1
553	1	N	50	66	16	1	62	4	0	0	0
554	1	N	50	64	14	1	61	3	0	0	0
555	1	Y	50	68	18	1	66	2	0	0	0
556	1	N	50	67	17	1	65	2	0	0	0
557	1	N	50	66	16	1	64	2	0	0	0
558	1	N	50	63	13	1	62	1	0	0	0
					Total	6			1	1	1

Feasibility:	
# of First-Row 5 dBA Reduction:	1
% of First-Row 5 dBA Reduction:	50%
Acoustic Feasibility (5 dBA reduction for 50% of front-row):	Yes
Reasonableness:	
# of First-Row 7 dBA Design Goal:	1
% of First-Row 7 dBA Design Goal:	50.0%
Noise Abatement Design Goal (7 dBA reduction for 35% of front-row):	Yes
Cost:	
# of Benefited:	1
Cost of Noise Wall (Length x Height x $20/sq ft):	$207,760
Cost of any other items critical to safety:	0
Anticipated Cost of Noise Abatement:	$207,760
Allowable Cost ($30,000 per benefited receptor):	$30,000
Cost Effective (Anticipated Cost < Allowable Cost):	No
5 dba Reduction Goal Met?	Yes
7 dba Recduction Goal Met?	Yes
Cost Criteria Met?	No
Feasible and Reasonable?:	No
Conclusion:	

Walls South of Glovers Lane -

Wall for R 552 to 558

Project Name: Interchange of WDC and I-15

Wall Cost per sq ft: $20

# of Front Row Receptors (R): 2

Barrier Analysis: Dec 13 12' Wall on Ramp

Height = 12 Length = 792

Receptor Name	# of Receptors	1st Row Y=Yes	Approx. Existing Noise Level	Build Noise Level	Increase Over Existing	Receptors Impacted	Noise Level With 12 -ft Wall	Noise Reduction	Front Row Receptors With 5 dBA Reduction	Front Row Receptors With 7 dba Reduction	Receptors With 5 dba Benefit
552	1	Y	50	68	18	1	61	7	1	1	1
553	1	N	50	66	16	1	62	4	0	0	0
554	1	N	50	64	14	1	61	3	0	0	0
555	1	Y	50	68	18	1	66	2	0	0	0
556	1	N	50	67	17	1	65	2	0	0	0
557	1	N	50	66	16	1	64	2	0	0	0
558	1	N	50	63	13	1	62	1	0	0	0
					Total	6			1	1	1

Feasibility:	
# of First-Row 5 dBA Reduction:	1
% of First-Row 5 dBA Reduction:	50%
Acoustic Feasibility (5 dBA reduction for 50% of front-row):	Yes
Reasonableness:	
# of First-Row 7 dBA Design Goal:	1
% of First-Row 7 dBA Design Goal:	50.0%
Noise Abatement Design Goal (7 dBA reduction for 35% of front-row):	Yes
Cost:	
# of Benefited:	1
Cost of Noise Wall (Length x Height x $20/sq ft):	$190,080
Cost of any other items critical to safety:	0
Anticipated Cost of Noise Abatement:	$190,080
Allowable Cost ($30,000 per benefited receptor):	$30,000
Cost Effective (Anticipated Cost < Allowable Cost):	No
5 dba Reduction Goal Met?	Yes
7 dba Recduction Goal Met?	Yes
Cost Criteria Met?	No
Feasible and Reasonable?:	No
Conclusion:	

Walls South of Glovers Lane -

Wall for R 552 to 558

Project Name: Interchange of WDC and I-15

Wall Cost per sq ft: $20 **Barrier Analysis: Dec 13 10' Wall on Ramp**

# of Front Row Receptors (R): 2 Height = 10 Length = 1492

Receptor Name	# of Receptors	1st Row Y=Yes	Approx. Existing Noise Level	Build Noise Level	Increase Over Existing	Receptors Impacted	Noise Level With 10 -ft Wall	Noise Reduction	Front Row Receptors With 5 dBA Reduction	Front Row Receptors With 7 dba Reduction	Impacted Receptors With 5 dba Benefit
552	1	Y	50	68	18	1	62	6	1	0	1
553	1	N	50	66	16	1	61	5	0	0	1
554	1	N	50	64	14	1	60	4	0	0	0
555	1	Y	50	68	18	1	61	7	1	1	1
556	1	N	50	67	17	1	61	6	0	0	1
557	1	N	50	66	16	1	61	5	0	0	1
558	1	N	50	63	13	1	61	2	0	0	0
					Total	6			2	1	5

Feasibility:	
# of First-Row 5 dBA Reduction:	2
% of First-Row 5 dBA Reduction:	100%
Acoustic Feasibility (5 dBA reduction for 50% of front-row):	Yes
Reasonableness:	
# of First-Row 7 dBA Design Goal:	1
% of First-Row 7 dBA Design Goal:	50.0%
Noise Abatement Design Goal (7 dBA reduction for 35% of front-row):	Yes
Cost:	
# of Benefited:	5
Cost of Noise Wall (Length x Height x $20/sq ft):	$298,400
Cost of any other items critical to safety:	0
Anticipated Cost of Noise Abatement:	$298,400
Allowable Cost ($30,000 per benefited receptor):	$150,000
Cost Effective (Anticipated Cost < Allowable Cost):	No
5 dba Reduction Goal Met?	Yes
7 dba Recduction Goal Met?	Yes
Cost Criteria Met?	No
Feasible and Reasonable?:	No
Conclusion:	

Wall South of Glovers Lane - 325 West to 650 West Near RoW Line for WDC

Wall for R 545 to 552

Project Name: Interchange of WDC and I-15

Note: Maximum Height for Standard Noise Wall is 17'

TNM File: Dec 12 S of Glovers L

Wall Cost per sq ft: $20

Barrier Analysis: Dec 9 - 17' Wall at ROW Line

# of Front Row Receptors (R): 3

Height = 17 Length = 1700

Receptor Name	# of Receptors	1st Row Y=Yes	Approx. Existing Noise Level	Build Noise Level	Increase Over Existing	Receptors Impacted	Noise Level With 17-ft Wall	Noise Reduction	Front Row Receptors With 5 dBA Reduction	Front Row Receptors With 7 dba Reduction	Receptors With 5 dba Benefit
545	1	N	50	62	12	1	61	1	0	0	0
546	1	N	50	64	14	1	62	2	0	0	0
547	1	Y	50	67	17	1	62	5	1	0	1
548	1	Y	50	67	17	1	63	4	0	0	0
549	1	N	50	66	16	1	64	2	0	0	0
550	1	N	50	64	14	1	63	1	0	0	0
551	1	N	50	65	15	1	64	1	0	0	0
552	1	Y	50	68	18	1	64	4	0	0	0
					Total	7			1	0	1

Feasibility:	
# of First-Row 5 dBA Reduction:	1
% of First-Row 5 dBA Reduction:	33%
Acoustic Feasibility (5 dBA reduction for 50% of front-row):	No
Reasonableness:	
# of First-Row 7 dBA Design Goal:	0
% of First-Row 7 dBA Design Goal:	0.0%
Noise Abatement Design Goal (7 dBA reduction for 35% of front-row):	No
Cost:	
# of Benefited:	1
Cost of Noise Wall (Length x Height x $20/sq ft):	NA
Cost of any other items critical to safety:	NA
Anticipated Cost of Noise Abatement:	NA
Allowable Cost ($30,000 per benefited receptor):	NA
Cost Effective (Anticipated Cost < Allowable Cost):	No
5 dba Reduction Goal Met?	No
7 dba Recduction Goal Met?	No
Cost Criteria Met?	NA
Feasible and Reasonable?:	No
Conclusion:	**Wall at this location is not recommended**

Wall South of Glovers Lane - 300 West to 650 West in Farmington - Along Legacy Ramp to NB WDC

Wall for R 545 to 551

Project Name: Interchange of WDC and I-15

Note: Maximum Height for Standard Noise Wall is 17'

TNM File: Dec 12 S of Glovers L

Wall Cost per sq ft: $20

Barrier Analysis: Dec 9 - 17' Wall Adjacent to Ramp

# of Front Row Receptors (R): 2

Height = 17 Length = 2295

Receptor Name	# of Receptors	1st Row Y=Yes	Approx. Existing Noise Level	Build Noise Level	Increase Over Existing	Receptors Impacted	Noise Level With 17-ft Wall	Noise Reduction	Front Row Receptors With 5 dBA Reduction	Front Row Receptors With 7 dba Reduction	Receptors With 5 dba Benefit
545	1	N	50	62	12	1	60	2	0	0	0
546	1	N	50	64	14	1	61	3	0	0	0
547	1	Y	50	67	17	1	62	5	1	0	1
548	1	Y	50	67	17	1	62	5	1	0	1
549	1	N	50	66	16	1	61	5	0	0	1
550	1	N	50	64	14	1	61	3	0	0	0
551	1	N	50	65	15	1	60	5	0	0	1
					Total	7			2	0	4

Feasibility:	
# of First-Row 5 dBA Reduction:	2
% of First-Row 5 dBA Reduction:	100%
Acoustic Feasibility (5 dBA reduction for 50% of front-row):	Yes
Reasonableness:	
# of First-Row 7 dBA Design Goal:	0
% of First-Row 7 dBA Design Goal:	0.0%
Noise Abatement Design Goal (7 dBA reduction for 35% of front-row):	No
Cost:	
# of Benefited:	4
Cost of Noise Wall (Length x Height x $20/sq ft):	NA
Cost of any other items critical to safety:	NA
Anticipated Cost of Noise Abatement:	NA
Allowable Cost ($30,000 per benefited receptor):	NA
Cost Effective (Anticipated Cost < Allowable Cost):	No
5 dba Reduction Goal Met?	No
7 dba Recduction Goal Met?	No
Cost Criteria Met?	No
Feasible and Reasonable?:	No
Conclusion:	**Wall at this location is not recommended**

Project Name: Interchange of WDC and I-15

Wall to Replace Exist 6 ' Wall on Top of Exist Berm From 1340 S to 1470 S in Farmin

TNM File: Dec 4 1340 S to 1600 S

Note: Maximum Height for Standard Noise Wall is 17' Noise Reduction compares effect of new tal

Wall Cost per sq ft: $20

# of Front Row Receptors (R): 4

Barrier Analysis: Dec 4 15' Wall 1340 S to 1470 S

Height = 15 Length (Total) = 870

Length (Recreation Only) = 600

Barrier Analysis: Dec 4 16' Wall 1340 S to 1470 S

Height = 16 Length (Total) = 870

Length (Recreation Only) = 600

Receptor Name	# of Receptors	1st Row Y-Yes	Approx. Existing Noise Level	Build Noise Level - No New Walls	Increase Over Existing	Receptors Impacted	Noise Level With 15-ft Wall	Noise Reduction	Front Row Receptors With 5 dBA Reduction	Front Row Receptors With 7 dba Reduction	Receptors With 5 dba Benefit	Noise Level With 16-ft Wall	Noise Reduction	Front Row Receptors With 5 dBA Reduction	Front Row Receptors With 7 dba Reduction	Receptors With 5 dba Benefit
84	1	N	66	68	2	1	65	3	0	0	0	64	4	0	0	0
85	1	N	68	68	0	1	65	3	0	0	0	65	3	0	0	0
86	1	N	69	69	0	1	66	3	0	0	0	66	3	0	0	0
87	1	Y	70	70	0	1	67	3	0	0	0	67	3	0	0	0
89	1	N	68	67	-1	1	65	2	0	0	0	65	2	0	0	0
91	1	N	69	68	-1	1	66	2	0	0	0	65	3	0	0	0
92	1	N	67	67	0	1	65	2	0	0	0	65	2	0	0	0
516	1	Y	69	70	1	1	67	3	0	0	0	67	3	0	0	0
540	1	Y	73	70	-3	1	68	2	0	0	0	68	2	0	0	0
541	1	Y	72	70	-2	1	68	2	0	0	0	67	3	0	0	0
542	1	N	69	69	0	1	66	3	0	0	0	66	3	0	0	0
					Total	11			0	0	0			0	0	0

Feasibility:		
# of First-Row 5 dBA Reduction:	0	0
% of First-Row 5 dBA Reduction:	0%	0%
Acoustic Feasibility (5 dBA reduction for 50% of front-row):	No	No
Reasonableness:		
# of First-Row 7 dBA Design Goal:	0	0
% of First-Row 7 dBA Design Goal:	0.0%	0.0%
Noise Abatement Design Goal (7 dBA reduction for 35% of front-row):	No	No
Cost:		
# of Benefited NAC B:	0	0
# of Benfited recreational use:		
Cost of Noise Wall (Length x Height x $20/sq ft):	$261,000	$278,400
Cost of any other items critical to safety:	0	0
Anticipated Cost of Noise Abatement:	$261,000	$278,400
Allowable Cost ($30,000 per benefited NAC B receptor):	$0	$0
Allowable Cost ($360 per linear ft along recreational use area):	$216,000	$216,000
Total Allowable Cost:	$216,000	$216,000
Cost Effective (Anticipated Cost < Allowable Cost):	No	No
5 dba Reduction Goal Met?	No	No
7 dba Recduction Goal Met?	No	No
Cost Criteria Met?	No	No
Feasible and Reasonable?:	No	No
Conclusion:	**Higher Wall on top of existing berm is not recommended**	

Project Name: Interchange of WDC and I-15 ıgton - East Side of I-15

TNM File: Dec 4 1340 S‖ wall to current noise with existing 6' wall on Berm

Wall Cost per sq ft: $20 **Barrier Analysis: Dec 4 17' Wall 1340 S to 1470 S**

# of Front Row Receptors (R): 4 Height = 17 Length (Total) = 870

Length (Recreation Only) = 600

Receptor Name	# of Receptors	1st Row Y-Yes	Approx. Existing Noise Level	Build Noise Level - No New Walls	Increase Over Existing	Receptors Impacted	Noise Level With 17-ft Wall	Noise Reduction	Front Row Receptors With 5 dBA Reduction	Front Row Receptors With 7 dba Reduction	Receptors With 5 dba Benefit
84	1	N	66	68	2	1	64	4	0	0	0
85	1	N	68	68	0	1	65	3	0	0	0
86	1	N	69	69	0	1	66	3	0	0	0
87	1	Y	70	70	0	1	66	4	0	0	0
89	1	N	68	67	-1	1	65	2	0	0	0
91	1	N	69	68	-1	1	65	3	0	0	0
92	1	N	67	67	0	1	64	3	0	0	0
516	1	Y	69	70	1	1	66	4	0	0	0
540	1	Y	73	70	-3	1	67	3	0	0	0
541	1	Y	72	70	-2	1	67	3	0	0	0
542	1	N	69	69	0	1	66	3	0	0	0
					Total	11			0	0	0

Feasibility:	
# of First-Row 5 dBA Reduction:	0
% of First-Row 5 dBA Reduction:	0%
Acoustic Feasibility (5 dBA reduction for 50% of front-row):	No
Reasonableness:	
# of First-Row 7 dBA Design Goal:	0
% of First-Row 7 dBA Design Goal:	0.0%
Noise Abatement Design Goal (7 dBA reduction for 35% of front-row):	No
Cost:	
# of Benefited NAC B:	0
# of Benfited recreational use:	
Cost of Noise Wall (Length x Height x $20/sq ft):	$295,800
Cost of any other items critical to safety:	0
Anticipated Cost of Noise Abatement:	$295,800
Allowable Cost ($30,000 per benefited NAC B receptor):	$0
Allowable Cost ($360 per linear ft along recreational use area):	$216,000
Total Allowable Cost:	$216,000
Cost Effective (Anticipated Cost < Allowable Cost):	No
5 dba Reduction Goal Met?	No
7 dba Recduction Goal Met?	No
Cost Criteria Met?	No
Feasible and Reasonable?:	No
Conclusion:	

I-15 - Barrier 1140 to 1470-Southern Connection

17

Wall Length (Total):	ft	697 ft
Wall Length (Recreational Frontage Only):		150 ft
Wall Cost per sq ft:	$20	
Cost of items critical to safety:		
# of First Row Receivers:	4	

Name	# of DU	Relocation	1st Row	# of 1st Row	Baseline Noise Level	17-ft Noise Level	17-ft Noise Reduction	Design Goal	Benefited	1st Row Design Goal	1st Row 5 dBA Reduction
82	1			0	65	64	1	No	No	No	No
83	1			0	66	65	1	No	No	No	No
84	1			0	68	66	2	No	No	No	No
85	1			0	69	68	1	No	No	No	No
86	1			0	71	69	2	No	No	No	No
87	1		Yes	1	74	70	4	No	No	No	No
88	1			0	66	65	1	No	No	No	No
89	1			0	69	67	2	No	No	No	No
90	1			0	66	65	1	No	No	No	No
91	1			0	70	68	2	No	No	No	No
92	1			0	68	67	1	No	No	No	No
93	1			0	65	64	1	No	No	No	No
94	1			0	65	64	1	No	No	No	No
95	1			0	65	64	1	No	No	No	No
96	1			0	65	63	2	No	No	No	No
97	1			0	64	63	1	No	No	No	No
98	1			0	65	64	1	No	No	No	No
99	1			0	66	64	2	No	No	No	No
100	1			0	63	61	2	No	No	No	No
101	1			0	63	61	2	No	No	No	No
102	1			0	62	61	1	No	No	No	No
516	1		Yes	1	73	70	3	No	No	No	No
518	1			0	63	61	2	No	No	No	No
519	1			0	63	62	1	No	No	No	No
520	1			0	62	61	1	No	No	No	No
521	1			0	62	60	2	No	No	No	No
522	1			0	61	60	1	No	No	No	No
523	1			0	63	62	1	No	No	No	No
524	1			0	63	62	1	No	No	No	No
525	1			0	64	63	1	No	No	No	No
526	1			0	63	62	1	No	No	No	No
527	1			0	63	62	1	No	No	No	No
528	1			0	62	61	1	No	No	No	No
529	1			0	64	63	1	No	No	No	No
530	1			0	63	62	1	No	No	No	No
531	1			0	62	61	1	No	No	No	No
532	1			0	62	61	1	No	No	No	No
533	1			0	62	61	1	No	No	No	No
534	1			0	62	61	1	No	No	No	No
540	1		Yes	1	73	69	4	No	No	No	No
541	1		Yes	1	75	70	5	No	Yes	No	Yes
542	1			0	71	69	2	No	No	No	No

Feasibility Factors:

# of First-Row 5 dBA Reduction:	1
% of First-Row 5 dBA Reduction:	25%
Acoustic Feasibility (5 dBA reduction for 50% of front-row):	No

Reasonableness Factors:

# of First-Row Design Goal:	0
% of First-Row Design Goal:	0%
Noise Abatement Design Goal (7 dBA reduction for 35% of front-row):	No
# of Benefited NAC B:	0
# of Benfited recreational use:	1
Cost of Noise Wall (Length x Height x $20/sq ft):	$236,980
Cost of any other items critical to safety:	0
Anticipated Cost of Noise Abatement:	$236,980
Allowable Cost ($30,000 per benefited NAC B receptor):	$0
Allowable Cost ($360 per linear ft along recreational use area):	$54,000
Total Allowable Cost:	$54,000
Cost Effective (Anticipated Cost < Allowable Cost):	No
Feasible and Reasonable:	No

Project Name: Interchange of WDC and I-15 **Wall From 1550 S in Farmington to 1650 N in Centerville - East Si**

Two TNM Files were used for this analysis.

Note: Maximum Height for Standard Noise Wall is 17'

Wall Cost per sq ft: $20

TNM Files: Nov 20 I-15 & WDC	**Oct 11 WDC & I-15 2150 N to 1650 N**
For Wall on NB Ramp use: Nov 21 Barrier Analysis	**Barrier Analysis: Oct 14 17' Wall 1650 N to 1550 S**

Wall Length = 4750 FT

# of Front Row Receptors (R): 41 Height = 17 Wall Area = 77343 SF

Receptor Name	# of Receptors	1st Row Y=Yes	Approx. Existing Noise Level	Build Noise Level - No New Walls	Increase Over Existing	Receptors Impacted	Noise Level With 17-ft Wall	Noise Reduction	Front Row Receptors With 5 dBA Reduction	Front Row Receptors With 7 dba Reduction	Receptors With 5 dba Benefit
103	1	N	68	66	-2	1	64	2	0	0	0
104	1	N	68	68	0	1	65	3	0	0	0
105	1	N	68	65	-3	0	62	3	0	0	0
106	1	N	68	68	0	1	64	4	0	0	0
107	1	N	68	70	2	1	66	4	0	0	0
108	1	Y	68	73	5	1	67	6	1	0	1
109	1	N	68	65	-3	0	62	3	0	0	0
110	1	N	68	65	-3	0	61	4	0	0	0
111	1	N	68	65	-3	0	61	4	0	0	0
112	1	N	68	68	0	1	64	4	0	0	0
113	1	N	68	69	1	1	64	5	0	0	1
114	1	N	68	73	5	1	66	7	0	0	1
115	1	Y	68	77	9	1	67	10	1	1	1
116	1	Y	68	77	9	1	67	10	1	1	1
118	1	Y	68	75	7	1	66	9	1	1	1
119	1	N	68	69	1	1	64	5	0	0	1
120	1	N	68	66	-2	1	61	5	0	0	1
121	1	N	68	65	-3	0	59	6	0	0	1
123	1	N	68	71	3	1	65	6	0	0	1
124	1	Y	68	74	6	1	65	9	1	1	1
125	1	Y	68	77	9	1	66	11	1	1	1
126	1	Y	68	77	9	1	66	11	1	1	1
127	1	Y	68	77	9	1	66	11	1	1	1
128	1	Y	68	78	10	1	67	11	1	1	1
129	1	Y	68	77	9	1	66	11	1	1	1
130	1	N	68	70	2	1	63	7	0	0	1
131	1	N	68	67	-1	1	62	5	0	0	1
132	1	N	68	65	-3	0	61	4	0	0	0
133	1	N	68	67	-1	1	61	6	0	0	1
134	1	N	68	67	-1	1	61	6	0	0	1
135	1	N	68	67	-1	1	60	7	0	0	1
136	1	N	68	67	-1	1	61	6	0	0	1
137	1	N	68	67	-1	1	61	6	0	0	1
138	1	N	68	69	1	1	62	7	0	0	1
139	1	N	68	69	1	1	62	7	0	0	1
140	1	N	68	68	0	1	62	6	0	0	1
141	1	N	68	67	-1	1	61	6	0	0	1
142	1	N	68	67	-1	1	61	6	0	0	1
143	1	N	68	72	4	1	64	8	0	0	1
144	1	N	68	73	5	1	64	9	0	0	1
145	1	N	68	71	3	1	64	7	0	0	1
146	1	N	68	71	3	1	63	8	0	0	1
147	1	Y	68	77	9	1	66	11	1	1	1
148	1	N	68	75	7	1	66	9	0	0	1
149	1	N	68	72	4	1	64	8	0	0	1
150	1	N	68	71	3	1	63	8	0	0	1
151	1	N	68	70	2	1	63	7	0	0	1
152	1	Y	68	76	8	1	67	9	1	1	1
153	1	N	68	73	5	1	65	8	0	0	1
154	1	Y	68	74	6	1	66	8	1	1	1
155	1	N	63	67	4	1	62	5	0	0	1
156	1	N	64	68	4	1	63	5	0	0	1
157	1	N	66	70	4	1	64	6	0	0	1
158	1	N	68	73	5	1	65	8	0	0	1
159	1	Y	70	78	8	1	67	11	1	1	1
160	1	Y	70	78	8	1	67	11	1	1	1
161	1	N	59	65	6	0	60	5	0	0	1
162	1	N	60	67	7	1	61	6	0	0	1

Project Name: Interchange of WDC and I-15 **Wall From 1550 S in Farmington to 1650 N in Centerville - East Si**

Two TNM Files were used for this analysis.

Note: Maximum Height for Standard Noise Wall is 17'

Wall Cost per sq ft: $20

TNM Files: Nov 20 I-15 & WDC	**Oct 11 WDC & I-15 2150 N to 1650 N**
For Wall on NB Ramp use: Nov 21 Barrier Analysis	**Barrier Analysis: Oct 14 17' Wall 1650 N to 1550 S**

Wall Length = 4750 FT

# of Front Row Receptors (R): 41 Height = 17 Wall Area = 77343 SF

Receptor Name	# of Receptors	1st Row Y=Yes	Approx. Existing Noise Level	Build Noise Level - No New Walls	Increase Over Existing	Receptors Impacted	Noise Level With 17-ft Wall	Noise Reduction	Front Row Receptors With 5 dBA Reduction	Front Row Receptors With 7 dba Reduction	Receptors With 5 dba Benefit
163	1	N	62	69	7	1	62	7	0	0	1
164	1	N	66	72	6	1	65	7	0	0	1
165	1	Y	68	78	10	1	67	11	1	1	1
166	1	N	61	67	6	1	61	6	0	0	1
167	1	N	60	65	5	0	60	5	0	0	1
168	1	N	63	69	6	1	63	6	0	0	1
169	1	N	65	71	6	1	64	7	0	0	1
170	1	N	58	65	7	0	60	5	0	0	1
171	1	N	59	66	7	1	60	6	0	0	1
172	1	N	59	66	7	1	60	6	0	0	1
173	1	N	64	72	8	1	65	7	0	0	1
174	1	Y	67	77	10	1	67	10	1	1	1
175	1	Y	67	77	10	1	67	10	1	1	1
176	1	Y	67	78	11	1	67	11	1	1	1
177	1	Y	66	77	11	1	67	10	1	1	1
178	1	N	64	71	7	1	64	7	0	0	1
179	1	N	64	71	7	1	64	7	0	0	1
180	1	N	60	67	7	1	61	6	0	0	1
181	1	N	60	66	6	1	62	4	0	0	0
182	1	N	59	66	7	1	60	6	0	0	1
183	1	N	58	65	7	0	59	6	0	0	1
184	1	N	60	67	7	1	61	6	0	0	1
185	1	N	61	69	8	1	62	7	0	0	1
186	1	N	62	71	9	1	63	8	0	0	1
187	1	N	64	73	9	1	64	9	0	0	1
188	1	Y	66	78	12	1	67	11	1	1	1
189	1	N	60	68	8	1	61	7	0	0	1
190	1	N	56	63	7	0	58	5	0	0	1
191	1	N	56	62	6	0	57	5	0	0	1
192	1	N	56	62	6	0	58	4	0	0	0
193	1	N	55	61	6	0	56	5	0	0	1
194	1	N	55	61	6	0	57	4	0	0	0
195	1	N	54	60	6	0	55	5	0	0	1
196	1	N	58	66	8	1	60	6	0	0	1
197	1	N	60	67	7	1	61	6	0	0	1
198	1	N	61	69	8	1	62	7	0	0	1
199	1	N	63	72	9	1	64	8	0	0	1
200	1	N	65	74	9	1	65	9	0	0	1
201	1	N	62	70	8	1	63	7	0	0	1
202	1	N	62	69	7	1	62	7	0	0	1
203	1	N	62	70	8	1	63	7	0	0	1
204	1	N	64	72	8	1	65	7	0	0	1
205	1	N	63	71	8	1	64	7	0	0	1
206	1	N	63	71	8	1	64	7	0	0	1
207	1	Y	66	78	12	1	67	11	1	1	1
208	1	Y	67	78	11	1	67	11	1	1	1
209	1	Y	67	78	11	1	68	10	1	1	1
210	1	Y	67	77	10	1	68	9	1	1	1
211	1	Y	67	77	10	1	69	8	1	1	1
212	1	N	63	71	8	1	63	8	0	0	1
213	1	N	60	69	9	1	61	8	0	0	1
214	1	N	59	67	8	1	60	7	0	0	1
215	1	N	58	66	8	1	59	7	0	0	1
216	1	N	57	65	8	0	58	7	0	0	1
217	1	N	57	64	7	0	57	7	0	0	1
218	1	Y	65	76	11	1	67	9	1	1	1
219	1	N	62	72	10	1	64	8	0	0	1
220	1	N	61	69	8	1	61	8	0	0	1

Project Name: Interchange of WDC and I-15 **Wall From 1550 S in Farmington to 1650 N in Centerville - East Si**

Two TNM Files were used for this analysis.

Note: Maximum Height for Standard Noise Wall is 17'

Wall Cost per sq ft: $20

TNM Files: Nov 20 I-15 & WDC	**Oct 11 WDC & I-15 2150 N to 1650 N**
For Wall on NB Ramp use: Nov 21 Barrier Analysis	**Barrier Analysis: Oct 14 17' Wall 1650 N to 1550 S**

Wall Length = 4750 FT

# of Front Row Receptors (R): 41 Height = 17 Wall Area = 77343 SF

Receptor Name	# of Receptors	1st Row Y=Yes	Approx. Existing Noise Level	Build Noise Level - No New Walls	Increase Over Existing	Receptors Impacted	Noise Level With 17-ft Wall	Noise Reduction	Front Row Receptors With 5 dBA Reduction	Front Row Receptors With 7 dba Reduction	Receptors With 5 dba Benefit
221	1	N	62	66	4	1	63	3	0	0	0
222	1	N	58	65	7	0	58	7	0	0	1
223	1	N	60	65	5	0	58	7	0	0	1
224	1	N	59	66	7	1	59	7	0	0	1
225	1	N	60	69	9	1	61	8	0	0	1
226	1	N	62	72	10	1	62	10	0	0	1
227	1	Y	66	77	11	1	67	10	1	1	1
228	1	Y	66	77	11	1	66	11	1	1	1
229	1	N	63	72	9	1	64	8	0	0	1
230	1	N	61	69	8	1	62	7	0	0	1
231	1	N	60	67	7	1	59	8	0	0	1
232	1	N	59	65	6	0	59	6	0	0	1
233	1	N	57	64	7	0	58	6	0	0	1
234	1	N	59	66	7	1	59	7	0	0	1
235	1	N	61	68	7	1	61	7	0	0	1
236	1	N	62	72	10	1	63	9	0	0	1
237	1	Y	65	76	11	1	66	10	1	1	1
238	1	Y	66	77	11	1	67	10	1	1	1
239	1	N	64	74	10	1	65	9	0	0	1
240	1	N	62	71	9	1	64	7	0	0	1
241	1	N	61	70	9	1	61	9	0	0	1
242	1	N	59	68	9	1	60	8	0	0	1
243	1	N	58	67	9	1	59	8	0	0	1
244	1	N	57	65	8	0	57	8	0	0	1
245	1	N	56	63	7	0	56	7	0	0	1
246	1	N	56	64	8	0	57	7	0	0	1
247	1	N	57	64	7	0	58	6	0	0	1
248	1	N	59	66	7	1	59	7	0	0	1
249	1	N	59	66	7	1	60	6	0	0	1
250	1	N	58	65	7	0	59	6	0	0	1
251	1	N	58	65	7	0	59	6	0	0	1
252	1	N	60	67	7	1	61	6	0	0	1
253	1	N	63	72	9	1	64	8	0	0	1
254	1	Y	65	75	10	1	65	10	1	1	1
255	1	Y	66	76	10	1	66	10	1	1	1
256	1	Y	66	76	10	1	66	10	1	1	1
257	1	Y	66	76	10	1	66	10	1	1	1
258	1	N	64	73	9	1	64	9	0	0	1
259	1	N	62	70	8	1	62	8	0	0	1
260	1	N	61	68	7	1	61	7	0	0	1
261	1	N	59	66	7	1	59	7	0	0	1
262	1	N	58	65	7	0	58	7	0	0	1
263	1	N	57	63	6	0	57	6	0	0	1
264	1	Y	66	75	9	1	66	9	1	1	1
265	1	N	64	73	9	1	65	8	0	0	1
266	1	Y	65	74	9	1	66	8	1	1	1
267	1	N	58	63	5	0	59	4	0	0	0
268	1	N	59	64	5	0	59	5	0	0	1
269	1	N	57	63	6	0	58	5	0	0	1
270	1	N	62	67	5	1	62	5	0	0	1
271	1	Y	65	74	9	1	66	8	1	1	1
272	1	N	62	67	5	1	62	5	0	0	1
273	1	N	60	65	5	0	60	5	0	0	1
274	1	N	58	64	6	0	59	5	0	0	1
275	1	N	58	64	6	0	58	6	0	0	1
276	1	N	55	59	4	0	55	4	0	0	0
277	1	N	58	62	4	0	58	4	0	0	0
278	1	N	55	59	4	0	56	3	0	0	0

Project Name: Interchange of WDC and I-15 Wall From 1550 S in Farmington to 1650 N in Centerville - East Si

Two TNM Files were used for this analysis.

Note: Maximum Height for Standard Noise Wall is 17'

Wall Cost per sq ft: $20

TNM Files: Nov 20 I-15 & WDC	**Oct 11 WDC & I-15 2150 N to 1650 N**
For Wall on NB Ramp use: Nov 21 Barrier Analysis	**Barrier Analysis: Oct 14 17' Wall 1650 N to 1550 S**

Wall Length = 4750 FT

# of Front Row Receptors (R): 41 Height = 17 Wall Area = 77343 SF

Receptor Name	# of Receptors	1st Row Y=Yes	Approx. Existing Noise Level	Build Noise Level - No New Walls	Increase Over Existing	Receptors Impacted	Noise Level With 17-ft Wall	Noise Reduction	Front Row Receptors With 5 dBA Reduction	Front Row Receptors With 7 dba Reduction	Receptors With 5 dba Benefit
279	1	N	56	60	4	0	58	2	0	0	0
280	1	N	57	61	4	0	58	3	0	0	0
281	1	N	57	61	4	0	58	3	0	0	0
282	1	N	57	61	4	0	59	2	0	0	0
283	1	N	58	62	4	0	59	3	0	0	0
284	1	N	60	65	5	0	61	4	0	0	0
285	1	N	61	66	5	1	61	5	0	0	1
286	1	Y	65	73	8	1	66	7	1	1	1
287	1	Y	65	72	7	1	66	6	1	0	1
288	1	Y	65	71	6	1	66	5	1	0	1
289	1	N	62	67	5	1	62	5	0	0	1
290	1	N	60	64	4	0	60	4	0	0	0
					Total	140			41	38	161

Feasibility:	
# of First-Row 5 dBA Reduction:	41
% of First-Row 5 dBA Reduction:	100%
Acoustic Feasibility (5 dBA reduction for 50% of front-row):	Yes
Reasonableness:	
# of First-Row 7 dBA Design Goal:	38
% of First-Row 7 dBA Design Goal:	92.7%
Noise Abatement Design Goal (7 dBA reduction for 35% of front-row):	Yes
Cost:	
# of Benefited:	161
Cost of Noise Wall (Area x $20/sq ft):	$1,546,860
Cost of any other items critical to safety:	0
Anticipated Cost of Noise Abatement:	$1,546,860
Allowable Cost ($30,000 per benefited receptor):	$4,830,000
Cost Effective (Anticipated Cost < Allowable Cost):	Yes
5 dba Reduction Goal Met?	Yes
7 dba Recduction Goal Met?	Yes
Cost Criteria Met?	Yes
Feasible and Reasonable?:	Yes

Conclusion: 17' Wall is recommended up to the location where the ramp to NB WDC begins to rise.

As the ramp rises, the last 500' of wall gradually tapers from 17' to 6'

Project Name: Interchange of WDC and Wall at Centerville Park 1350 North

TNM File: Dec 4 Wall at Centerville Park

Note: Maximum Height for Standard Noise Wall is 17'

Barrier Analysis: 17' Wall at Centerville Park

# of Front Row Receptors (R): 2 Height = 17 Length = 637

Receptor Name	# of Receptors	1st Row Y=Yes	Approx. Existing Noise Level	Build Noise Level - No New Walls	Increase Over Existing	Receptors Impacted	Noise Level With 17-ft Wall	Noise Reduction	Front Row Receptors With 5 dBA Reduction	Front Row Receptors With 7 dba Reduction	Receptors With 5 dba Benefit
7	1	N	60	61	1	0	58	3	0	0	0
9	1	N	58	59	1	0	57	2	0	0	0
348	1	Y	67	73	6	1	66	7	1	1	1
514	1	Y	67	68	1	1	63	5	1	0	1
					Total	2			2	1	2

Feasibility:	
# of First-Row 5 dBA Reduction:	2
% of First-Row 5 dBA Reduction:	100%
Acoustic Feasibility (5 dBA reduction for 50% of front-row):	Yes
Reasonableness:	
# of First-Row 7 dBA Design Goal:	1
% of First-Row 7 dBA Design Goal:	50.0%
Noise Abatement Design Goal (7 dBA reduction for 35% of front-row):	Yes
Cost:	
# of Benefited:	2
Cost of Noise Wall (Length x Height x $20/sq ft):	$216,580
Cost of any other items critical to safety:	0
Anticipated Cost of Noise Abatement:	$216,580
Allowable Cost ($360 per linear ft along recreational use area):	$229,320
Cost Effective (Anticipated Cost < Allowable Cost):	
5 dba Reduction Goal Met?	Yes
7 dba Recduction Goal Met?	Yes
Cost Criteria Met?	Yes
Feasible and Reasonable?:	Yes
Conclusion	**A 17' noise wall at this location is recommended**