Traffic Noise Report

SR-177; SR-193 to 1800 North

Project No. S-R199(381) PIN 20927

Prepared for:

UDOT Keeping Utah Moving

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December 20, 2024

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1 INTRODUCTION

This report evaluates the potential traffic-generated noise impacts from the Proposed Action, which would construct a new four-lane highway, State Route (SR) 177, in West Point, Davis County, Utah.

This report documents the traffic noise impacts analysis and the noise abatement ana lysis for the Proposed Action. The analyses in this report are consistent with the Utah Department of Transportation (UDOT) *Noise Abatement Policy 08A2-01* and 23 Code of Federal Regulations (CFR) 772.

The noise study area, hereafter referred to as the study area, encompasses all noise-sensitive land uses that could be affected by the Proposed Action (see Figure 1). Noise-sensitive land uses in the study area include single-family homes, four churches, two golf courses, a cemetery, an outdoor sports field, and a park.

2 APPLICABILITY

A traffic noise study is required because 1) the Proposed Action meets the definition of a Type I Project, and 2) noise-sensitive land use activities exist in proximity to the Proposed Action. Type I projects are those that include any of the following (UDOT 2020):

- The construction of a highway on new location; or a substantial horizontal alteration or substantial vertical alteration of an existing highway; or
- The addition of a through-traffic lane, the addition of a through-traffic lane that functions as a High Occupancy Vehicle (HOV) lane, High Occupancy/Toll (HOT) lane, bus lane, or climbing lane; or
- The addition of an auxiliary lane, except for when the auxiliary lane is a turn lane; or
- The addition or relocation of interchange lanes or ramps added to a quadrant to complete a partial interchange; or
- Restriping existing pavement for the purpose of adding a through-traffic lane or an auxiliary lane; or
- The addition of a new or substantial alteration of a weigh station, rest stop, ride share lot, or toll plaza.

The Federal Highway Administration (FHWA) has established Noise Abatement Criteria (NAC) for several land use activities. The FHWA's noise criteria are based on sound levels that impact nearby properties, also known as receptors, with primary consideration given to outdoor areas where frequent human use occurs. NAC are described in terms of the hourly equivalent A-weighted decibel, or dBA (see Section 3.2*, Decibels and Equivalent Sound Level*, for more information about dBA).

UDOT has developed a noise abatement policy that is consistent with FHWA noise abatement requirements in 23 CFR 772 and establishes UDOT-specific NAC for each land use category (see Table 1). Noise impact and abatement analyses are required for Land Use Activity Categories A, B, C, D, and E only when development exists or has been permitted. Land Use Activity Categories F and G include lands that are not sensitive to traffic noise; therefore, impact criteria do not exist for these categories and a noise impact analysis is not required. A traffic noise impact occurs when 1) the future worst-case noise level is equal to or greater than the UDOT NAC for specified land use 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 (UDOT 2020). For this analysis, the future condition is 2050.

Figure 1. Study Area and Noise-Sensitive Land Uses

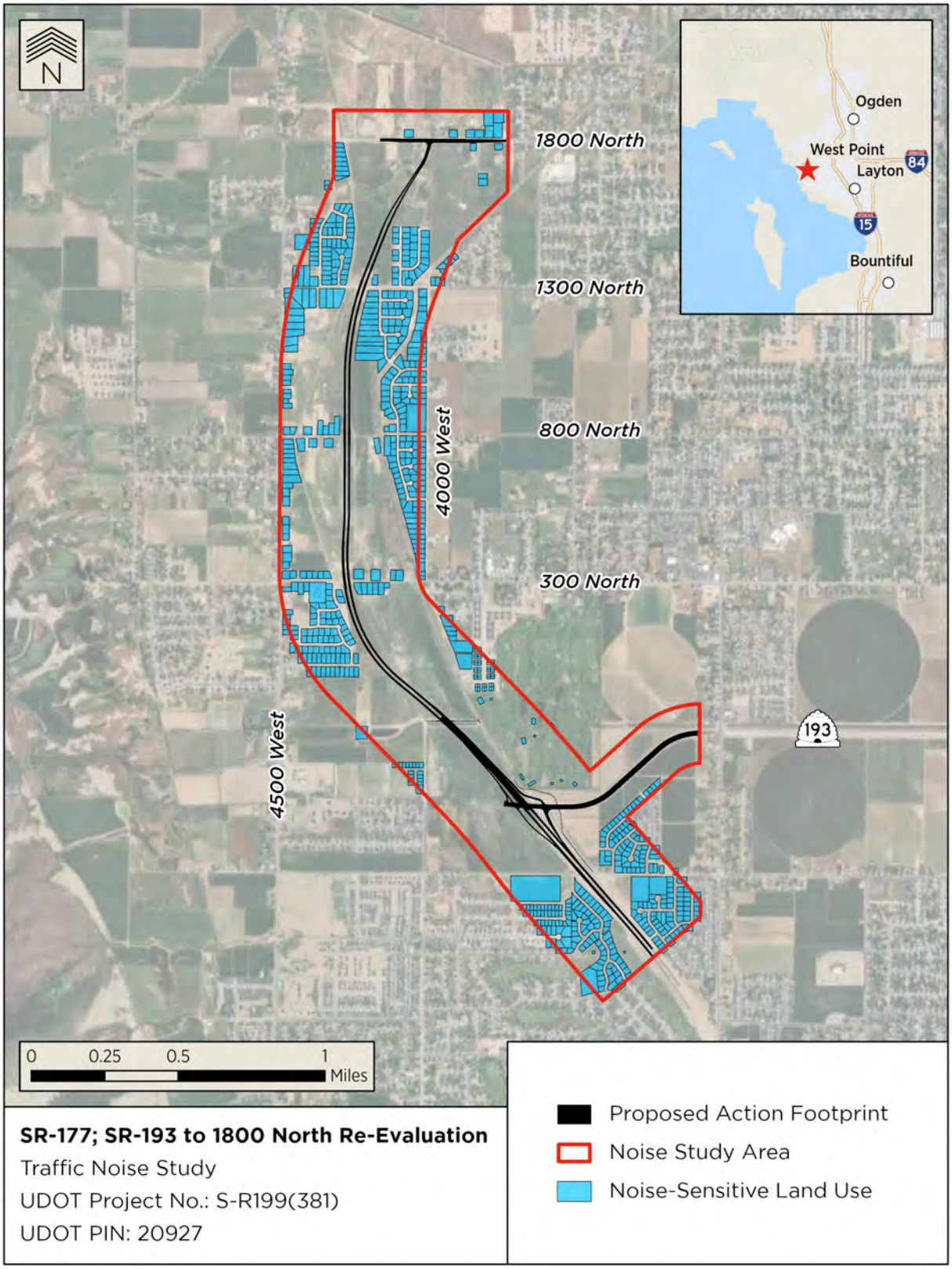


Table 1. Noise Abatement Criteria[1]

Activity Category	FHWA Criteria Leq[2](h)	UDOT Criteria Leq(h)[3]	Description of Activity
A	57 (Exterior)	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	67 (Exterior)	66 (Exterior)	Residential.
C	67 (Exterior)	66 (Exterior)	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, daycare 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	52 (Interior)	51 (Interior)	Auditoriums, daycare centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72 (Exterior)	71 (Exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in 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 2020

[1] Hourly A-Weighted Sound Level Decibels (dBA).

[2] Leq = The average sound energy over a specified period.

[3] Hourly A-weighted sound level in decibels reflecting a 1 dBA "approach" value below 23 CFR 772 values.

3 FUNDAMENTALS OF TRAFFIC NOISE

This section provides a brief overview of sound, how it is measured, and how it spreads between the noise source (e.g., vehicles) and the receiver (e.g., the human ear).

3.1 Sound, Noise, and Acoustics

Sound is produced by the vibration of sound pressure waves in the air. Noise is simply unwanted, loud, or annoying sound. Acoustics, or how sound is transmitted, consist of a path between the sound source and a receiver. The following factors determine the sound level and characteristics of the noise perceived by the receiver:

- The loudness (i.e., pressure) of the source.
- Ground absorption.

- Obstructions between the sound source and receiver which are natural (e.g., hills or densely wooded areas) or human-made (e.g., noise barriers, rows of houses, or large buildings).
- Atmospheric factors (e.g., temperature, humidity, wind, etc.) which affect the path between the sound/noise source and a receiver.

3.2 Decibels and Equivalent Sound Level

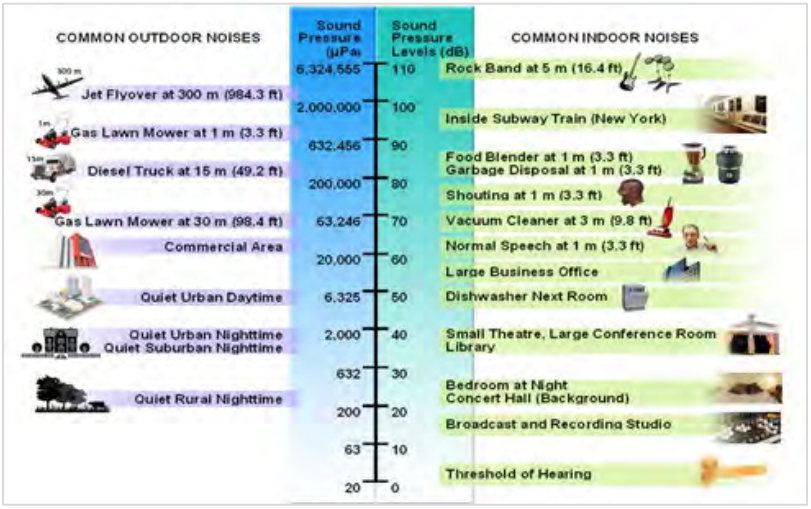
A decibel (dB) is a logarithmic unit used to measure sound-pressure levels. Because decibels are logarithmic, the sound pressure cannot be added or subtracted through ordinary arithmetic (e.g., 1+1=2). Under the decibel scale, a doubling of sound energy corresponds to a three-decibel increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be three decibels higher than one source under the same conditions. For example, if one vehicle produces 70 decibels when it passes an observer, two vehicles passing simultaneously would produce 73 decibels, not 140 decibels.

The decibel scale alone does not adequately characterize how humans perceive noise. This is because sound is composed of various frequencies, but the human ear does not respond to all frequencies. When measuring highway noise levels, frequencies not detectable by the human ear must be filtered. Studies have shown that the A-scale best approximates the frequency response of the human ear. Therefore, highway sound levels are reported in an A-weighted decibel, or dBA. Figure 2 illustrates the typical dBA for common noise levels.

Although a three-decibel increase corresponds to a doubling of sound energy, the human ear barely perceives this change.

In general, a five-decibel change is distinctly noticeable, and the human ear perceives a 10-decibel change as doubling the sound. Therefore, a doubling of sound energy (i.e., three-decibel increase), such as by doubling the amount of traffic on a highway, would generally be perceived as barely detectable.

Figure 2. Common Noise Levels



Source: FHWA 2018a

Daily sound levels fluctuate over time. UDOT uses an equivalent sound level, also known as Leq, to account for these variations. Leq is the average sound energy over a specified period. In other words, Leq is a steady-state sound level with the same acoustical energy as the time-varying sound that occurs during the same period. UDOT and the FHWA use an NAC that is a one-hour, A-weighted equivalent sound level, which is the average dBA occurring for one hour.

3.3 Sound Propagation

Sound propagation is the path by which sound from a source travel to a receiver. This is often referred to as the source-path-receiver concept. Geometric spreading, ground absorption, atmospheric effects, and shielding influence how a receiver perceives sound from a source. Each of these factors is described below.

GEOMETRIC SPREADING

Sound waves from a local point source spread in a uniform spherical pattern. As the sound wave extends from the point source, the sound level decreases by six dB each time the distance is doubled. However, an observer along a highway is usually within the hearing range of several vehicles (i.e., several point sources), not just one. Because of this, highways have several localized point sources along a defined path and, therefore, are treated as a line source to approximate the effect of several point sources. Unlike a single point source, sound from a line source spreads outward in a semi-cylindrical pattern, which produces a three-decibel decrease—compared to a six-decibel decrease—for each doubling of distance (FHWA 1980).

GROUND ABSORPTION

The sound path from a highway to a receiver is usually close to the ground (typically within nine to 10 feet). In addition to geometric spreading, the ground type—soft versus hard—can influence sound level reduction. Soft ground, such as plowed farmland, grass, or crops, absorbs sound waves and increases the drop-off rate by 1.5 dB for each doubling of distance. When added to the semi-spherical rate, the excess ground absorption results in a total drop-off rate of 4.5 dB each time the distance is doubled. Hard ground, such as a paved parking lot, reflects sound waves. Similarly, a body of water also reflects sound waves. Because of this reflection, excess ground absorption is not added to the drop-off rate. In general, the 4.5 dB drop-off rate is used in traffic noise analyses (FHWA 2011).

ATMOSPHERIC EFFECTS

Atmospheric factors, including air temperature, humidity, and wind, influence sound wave behavior and how the human ear perceives sound levels. For example, receivers downwind from a source can be exposed to increased noise levels relative to calm conditions, while locations upwind can have lowered noise levels. Sound levels can also increase over long distances from a highway because of atmospheric temperature inversions; that is, when temperatures are warmer at higher elevations compared to ground temperatures. In general, traffic noise analyses assume neutral atmospheric conditions because abnormal atmospheric conditions, such as high winds, heavy rain, and high humidity, are generally temporary (FHWA 2018b).

SHIELDING

Shielding refers to large objects or barriers between a noise source and a receiver. Natural terrain features (e.g., hills), and human-made features (e.g., buildings, walls, and berms), can substantially reduce noise levels at the receptor. The amount of reduction provided by shielding depends on the size of the object and the frequency content of the noise source. Walls are the most common object constructed between a highway and a receptor to reduce noise.

4 NOISE ABATEMENT

If a noise impact is identified, specific conditions must be met before traffic noise abatement will be implemented. Noise mitigation must be considered *feasible* and *reasonable*.

4.1 Feasibility

UDOT's policy requires consideration of the following factors to determine if mitigation is *feasible* (UDOT 2020):

- **Engineering considerations:** Engineering considerations such as safety, presence of cross streets, sight distance, access to adjacent properties, barrier height, topography, drainage, utilities, maintenance access, and maintenance of the abatement measure must be considered as part of establishing feasibility. Noise abatement measures are not intended to serve as privacy fences or safety

barriers. Abatement measures installed on structures (i.e., bridges) will not exceed 10 feet in height measured from the top of the deck or roadway to the top of the noise wall. Noise walls will not be installed on structures that require retrofitting to accommodate the noise abatement measure. Noise abatement measures will be considered if the project meets the criteria established in this policy if structure replacement is included as part of the project. Abatement measures shall be consistent with the general American Association of State Highway and Transportation Officials (AASHTO) design principles.

- **Safety on Urban Non-Access Controlled Roadways:** To avoid a damaged barrier from becoming a safety hazard in the event of a failure, barrier height shall be no greater than the distance from the back of curb to the face of proposed barrier.
- **Acoustic Feasibility:** Noise abatement must be considered acoustically feasible. This is defined as achieving at least a five-dBA highway traffic noise reduction for at least 50 percent of front-row receptors.

Failure to meet one of the above factors will result in the noise abatement measure being deemed not *feasible* and, therefore, not included in the project.

4.2 Reasonableness

The factors to determine if mitigation is *reasonable* include (UDOT 2020):

- **Noise Reduction Design Goal:** UDOT defines the noise reduction design goal as a minimum noise reduction from proposed abatement measures to be seven-dBA or greater for at least 35 percent of front-row receptors. Per 23 CFR 772, no abatement measure shall be deemed reasonable if the noise reduction design goal cannot be achieved.
- **Cost Effectiveness**: The cost of noise abatement measures must be deemed reasonable to be included in the project. Allowable noise abatement costs are based on a fixed unit cost of $20 per square foot, multiplied by the height and length of the barrier, plus the cost of additional right-of-way, utility relocations, and any other items associated with the abatement measure that are critical to safety or otherwise only necessary to accommodate the barrier.

  The cost effectiveness of abatement is determined by analyzing the cost of a barrier that would provide a noise reduction of five or more dBA for a receptor. A *reasonable* cost is considered to be a maximum of $30,000 per benefited receptor (Activity Category B - Residential) or $360 per linear foot for Activity Categories A, C, D, or E. When a proposed barrier benefits multiple Activity Categories, the reasonable cost per benefited receptor will be combined. If the anticipated cost of the noise abatement measure is less than the allowable cost, then the abatement is deemed reasonable.
- **Viewpoints of Property Owners and Tenants:** As part of the final design phase, UDOT needs to establish whether property owners and tenants are in favor of noise abatement measures that meet the feasible and reasonable criteria. Public balloting would occur so the property owners and tenants can indicate their preference for or against the proposed noise-abatement measures.

Failure to achieve any of the above factors will result in the noise abatement measure being deemed not *reasonable* and, therefore, not included in the project.

5 TRAFFIC NOISE MODEL 2.5

Traffic Noise Model 2.5 (TNM 2.5) is a modeling software developed by the FHWA and is used in this study to predict existing (2024) traffic-generated noise and worst-case future (2050) noise conditions. TNM 2.5 uses receivers, which are representative locations of noise-sensitive areas (receptors) to predict noise levels. Receivers may represent one or more receptors based on their proximity to the proposed improvements. TNM 2.5 accounts for vehicle type, vehicle speed, traffic volume, roadway geometry, geometric spreading, ground absorption, atmospheric effects, and shielding (see Section 3.3, *Sound Propagation*). Vehicle types used in TNM 2.5 include:

- Automobiles (Autos): Vehicles with two axles and four tires designed primarily to carry passengers.
- Medium-duty trucks (Medium Trucks): Cargo vehicles with two axles and six tires, including small vans and light trucks.
- Heavy-duty trucks (Heavy Trucks): Cargo vehicles with three or more axles.

TNM 2.5 predicts noise levels for the time of day when vehicle volume, travel speed, and percentage of heavy trucks combine to create the worst (i.e., loudest) traffic noise hour. For the existing condition, vehicle volume is based on peak traffic; for the future condition, vehicle volume is based on Level of Service (LOS) C (see Table 2 and Appendix A, *Traffic Volumes and Vehicle Mix*).

Table 2. TNM 2.5 Existing (2024) Peak and Future (2050) Level of Service C Traffic Volumes and Vehicle Mix

Road	Direction	Existing Peak (Per Lane)		Future LOS C (Per Lane)		Vehicle Mix (Percent)		
		Vehicle Volume	Speed (MPH)	Vehicle Volume	Speed (MPH)	Autos	Medium Trucks	Heavy Trucks
SR-177 Mainline	NB	n/a	n/a	1,300	75	84	15	1
	SB	n/a	n/a	1,300	75	84	15	1
SR-177 On-Ramps	NB	n/a	n/a	900	Variable	84	15	1
	SB	n/a	n/a	900	Variable	84	15	1
SR-177 Off-Ramps	NB	n/a	n/a	670	Variable	84	15	1
	SB	n/a	n/a	670	Variable	84	15	1
SR-193 East of SR-177	EB	249	50	n/a	n/a	84	14	2
	WB	175	50	n/a	n/a	84	14	2
SR-193 West of SR-177	EB	400	40	n/a	n/a	84	14	2
	WB	300	40	n/a	n/a	84	14	2
4500 West	NB	517	40	n/a	n/a	84	14	2
	SB	324	40	n/a	n/a	84	14	2
4000 West	NB	118	35	n/a	n/a	85	13	2
	SB	88	35	n/a	n/a	85	13	2
3000 West	NB	182	35	n/a	n/a	89	10	1
	SB	143	35	n/a	n/a	89	10	1

Table 2. TNM 2.5 Existing (2024) Peak and Future (2050) Level of Service C Traffic Volumes and Vehicle Mix

Road	Direction	Existing Peak (Per Lane)		Future LOS C (Per Lane)		Vehicle Mix (Percent)		
		Vehicle Volume	Speed (MPH)	Vehicle Volume	Speed (MPH)	Autos	Medium Trucks	Heavy Trucks
1800 North	EB	171	45	n/a	n/a	80	18	2
	WB	207	45	n/a	n/a	80	18	2
1300 North	EB	49	35	n/a	n/a	89	10	2
	WB	50	35	n/a	n/a	89	10	2
800 North	EB	61	35	n/a	n/a	74	24	2
	WB	53	35	n/a	n/a	74	24	2
300 North	EB	295	40	n/a	n/a	79	19	2
	WB	218	40	n/a	n/a	79	19	2
700 South	EB	110	35	n/a	n/a	84	14	2
	WB	202	35	n/a	n/a	84	14	2

LOS = Level of Service NB = Northbound SB = Southbound EB = Eastbound WB = Westbound

Note: Vehicle volumes marked "n/a" in the Future LOS C condition indicate that the roadway is included in the traffic noise model to produce baseline background noise levels. Future LOS C vehicle volumes were not applied to these roadways because they would not be modified by the Proposed Action.

6 EXISTING NOISE ENVIRONMENT

6.1 Noise-Sensitive Land Uses

Noise-sensitive land uses in the study area were identified using current aerial imagery, online tools (e.g., Google Street View), and field verification. City of West Point planning staff provided information for developments that have received (or are expected to receive) a formal building permit prior to the approval of the Environmental Impact Statement (EIS) Re-evaluation; the Craythorn Homestead development at the corner of SR-193 and Cold Springs Road was identified. NAC land use activities in the study area include:

- Single-family homes (Category B).
- Golf courses (Category C).
- Cemetery (Category C).
- Outdoor sports field (Category C).
- Rock Creek Park (Category C).
- Churches (Category D).

For this analysis, noise abatement is considered for outdoor areas (Category B and Category C) and indoor areas (Category D) that would benefit from a lowered noise level.

6.2 Field Measurements

Field measurements are taken to validate the use of TNM 2.5 to predict existing and future noise levels, and to provide background measurements that were applied to receptors where the TNM 2.5-predicted dBA was

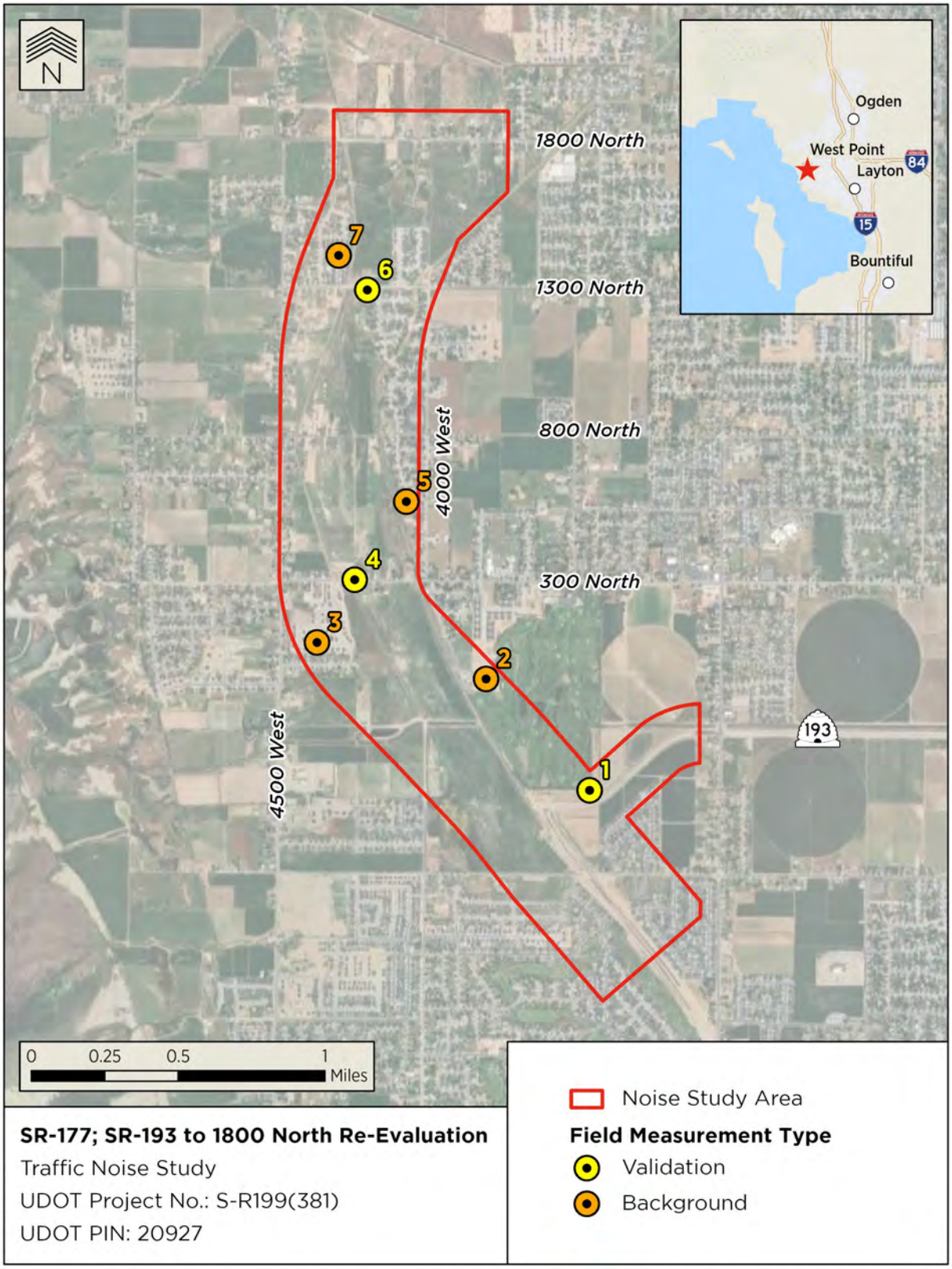
under the FHWA daytime noise levels of suburban-areas' range of 40 to 50 dBA (FHWA 2018a). Each background measurement site was selected to represent suburban residential areas throughout the study area. A model is valid if predicted noise levels are within three dBA of the field measurements. UDOT selected three short-term validation measurement sites and four short-term background measurement sites to represent the NAC land use activities identified in the study area (see Figure 1, Section 6.1, *Noise Sensitive Land Uses*, and Figure 3). A 20-minute field measurement was taken at each site using a Larson Davis SoundTrack LxT sound level meter (see Appendix B, *Meter Certifications*, for meter calibration certificates, and Appendix C, *Noise Field Measurements*, for measurement dates, times, and field measurement results). At each site, vehicles were counted on a weekday during free-flow conditions and classified as automobiles, medium-duty trucks, and heavy-duty trucks; buses and motorcycles were also counted for validation measurements. The observed travel speeds ranged between 30 and 35 MPH on SR-177, 35 and 40 MPH on 300 North, and 30 MPH on 1300 North. Temperature and wind speed were recorded manually; temperatures ranged from 83°F to 89°F, and sustained wind speeds were not observed.

Field measurement noise levels were compared to the TNM 2.5 predicted noise levels (see Table 3). TNM 2.5 predicted noise levels are within three dBA of the field measurement values; therefore, the model is considered valid.

Table 3. Field Measurement and TNM 2.5 Predicted Noise Levels

Field Measurement Site ID	Field Measurement Noise Level (dBA)	TNM 2.5 Predicted Noise Level (dBA)	Noise Level Difference (dBA)
1	48.0	48.8	-0.8
4	63.8	63.9	-0.1
6	56.4	56.0	0.4

Figure 3. Field Measurement Sites



7 TRAFFIC NOISE IMPACTS ANALYSIS

The purpose of the traffic noise analysis is to determine which (if any) noise receptors are impacted by traffic noise. A noise impact is defined as a receptor having a noise level greater than or equal to its NAC threshold or receiving an increase of 10 dBA or more over its existing noise level. For the traffic noise analysis, noise impact assessments were performed for 764 receivers representing 764 receptors in the study area (see Exhibit 1, Noise Receptors).

To determine if TNM 2.5 is accurately predicting suburban daytime noise levels in the existing condition, several field background measurements were taken; the average dBA for these measurements was 46 dBA. According to FHWA, suburban daytime noise levels might be in the 40-to-50 dBA range (FHWA 2018a). Since the field background measurement average falls within this range, if existing TNM 2.5 noise levels were below 46 dBA, then they were adjusted to 46 dBA instead of the lower TNM 2.5 noise level.

For the existing condition, outdoor noise levels range from 46 dBA to 65 dBA. Indoor noise levels range from 21 dBA to 37 dBA. Of the 764 receptors in this analysis, none are impacted in the existing condition (see Table 3).

For the future condition (2050), outdoor noise levels range from 46 dBA to 74 dBA. Indoor noise levels range from 25 dBA to 40 dBA. Of the 764 receptors in this analysis, 283 receptors are impacted in the future condition (see Table 3 and Exhibit 1, Noise Receptors):

- 43 receptors would have a noise level greater than or equal to their NAC threshold.
- 282 receptors would receive an increase of 10 dBA or more over their existing noise levels.
- 42 receptors would experience both types of impacts.

Table 4. TNM 2.5 Existing (2024) and Future (2050) Condition Noise Level Results and Impacts

Receiver	Receptors Represented	Land Use Activity Category	UDOT NAC (dBA)	Existing Noise Level[1] (dBA)	Future Noise Level[1] (dBA)	Noise Level Difference (dBA)	Impact	
							≥ UDOT NAC	≥ 10 dBA Increase Over Existing
RN001	1	B	66	46	**66**	**20**	**Yes**	**Yes**
RN002	1	B	66	46	65	**19**	No	**Yes**
RN003	1	B	66	51	65	**14**	No	**Yes**
RN004	1	B	66	46	65	**19**	No	**Yes**
RN005	1	B	66	46	64	**18**	No	**Yes**
RN006	1	B	66	46	63	**17f**	No	**Yes**
RN007	1	B	66	46	63	**17**	No	**Yes**
RN008	1	B	66	46	60	**14**	No	**Yes**
RN009	1	B	66	46	61	**15**	No	**Yes**
RN010	1	B	66	46	61	**15**	No	**Yes**
RN011	1	B	66	46	60	**14**	No	**Yes**
RN012	1	B	66	46	60	**14**	No	**Yes**

Table 4. TNM 2.5 Existing (2024) and Future (2050) Condition Noise Level Results and Impacts

Receiver	Receptors Represented	Land Use Activity Category	UDOT NAC (dBA)	Existing Noise Level[1] (dBA)	Future Noise Level[1] (dBA)	Noise Level Difference (dBA)	Impact	
							≥ UDOT NAC	≥ 10 dBA Increase Over Existing
RN013	1	B	66	46	60	**14**	No	**Yes**
RN014	1	B	66	46	59	**13**	No	**Yes**
RN015	1	B	66	46	55	9	No	No
RN019	1	B	66	60	65	5	No	No
RN020	1	B	66	46	63	**17**	No	**Yes**
RN021	1	B	66	46	62	**16**	No	**Yes**
RN022	1	B	66	46	59	**13**	No	**Yes**
RN023	1	B	66	46	58	**12**	No	**Yes**
RN024	1	B	66	47	56	9	No	No
RN025	1	B	66	60	60	0	No	No
RN026	1	B	66	51	57	6	No	No
RN027	1	B	66	51	56	5	No	No
RN028	1	B	66	46	55	9	No	No
RN029	1	B	66	49	56	7	No	No
RN030	1	B	66	47	56	9	No	No
RN031	1	B	66	53	57	4	No	No
RN032	1	B	66	54	57	3	No	No
RN033	1	B	66	46	56	10	No	**Yes**
RN034	1	B	66	46	56	10	No	**Yes**
RN035	1	B	66	46	56	10	No	**Yes**
RN036	1	B	66	46	56	10	No	**Yes**
RN037	1	B	66	46	56	10	No	**Yes**
RN038	1	B	66	48	56	8	No	No
RN039	1	B	66	46	56	10	No	**Yes**
RN040	1	B	66	47	56	9	No	No
RN041	1	B	66	52	55	3	No	No
RN042	1	B	66	46	60	**14**	No	**Yes**
RN043	1	B	66	46	58	**12**	No	**Yes**
RN044	1	B	66	46	57	**11**	No	**Yes**

Table 4. TNM 2.5 Existing (2024) and Future (2050) Condition Noise Level Results and Impacts

Receiver	Receptors Represented	Land Use Activity Category	UDOT NAC (dBA)	Existing Noise Level[1] (dBA)	Future Noise Level[1] (dBA)	Noise Level Difference (dBA)	Impact	
							≥ UDOT NAC	≥ 10 dBA Increase Over Existing
RN045	1	B	66	46	56	10	No	**Yes**
RN046	1	B	66	48	55	7	No	No
RN047	1	B	66	57	58	1	No	No
RN048	1	B	66	54	62	8	No	No
RN049	1	B	66	52	59	7	No	No
RN050	1	B	66	46	57	**11**	No	**Yes**
RN051	1	B	66	46	52	6	No	No
RN052	1	B	66	46	52	6	No	No
RN053	1	B	66	49	52	3	No	No
RN054	1	B	66	46	57	**11**	No	**Yes**
RN055	1	B	66	46	55	9	No	No
RN056	1	B	66	46	55	9	No	No
RN057	1	B	66	46	60	**14**	No	**Yes**
RN058	1	B	66	46	54	8	No	No
RN059	1	B	66	46	58	**12**	No	**Yes**
RN060	1	B	66	46	55	9	No	No
RN061	1	B	66	46	55	9	No	No
RN062	1	B	66	46	55	9	No	No
RN063	1	B	66	46	57	**11**	No	**Yes**
RN064	1	B	66	46	55	9	No	No
RN065	1	B	66	46	54	8	No	No
RN066	1	B	66	46	52	6	No	No
RN067	1	B	66	46	56	10	No	**Yes**
RN068	1	B	66	46	55	9	No	No
RN069	1	B	66	46	51	5	No	No
RN070	1	B	66	46	58	**12**	No	**Yes**
RN071	1	B	66	46	56	10	No	**Yes**
RN072	1	B	66	46	56	10	No	**Yes**
RN073	1	B	66	46	55	9	No	No

Table 4. TNM 2.5 Existing (2024) and Future (2050) Condition Noise Level Results and Impacts

Receiver	Receptors Represented	Land Use Activity Category	UDOT NAC (dBA)	Existing Noise Level[1] (dBA)	Future Noise Level[1] (dBA)	Noise Level Difference (dBA)	Impact	
							≥ UDOT NAC	≥ 10 dBA Increase Over Existing
RN074	1	B	66	46	54	8	No	No
RN075	1	B	66	46	52	6	No	No
RN076	1	B	66	46	51	5	No	No
RN077	1	B	66	46	53	7	No	No
RN078	1	B	66	46	52	6	No	No
RN079	1	B	66	46	56	10	No	**Yes**
RN080	1	B	66	46	48	2	No	No
RN081	1	B	66	46	48	2	No	No
RN082	1	B	66	46	47	1	No	No
RN083	1	B	66	46	51	5	No	No
RN084	1	B	66	46	55	9	No	No
RN085	1	B	66	46	51	5	No	No
RN086	1	B	66	46	50	4	No	No
RN087	1	B	66	46	56	10	No	**Yes**
RN088	1	B	66	46	51	5	No	No
RN089	1	B	66	46	49	3	No	No
RN090	1	B	66	46	54	8	No	No
RN091	1	B	66	46	52	6	No	No
RN092	1	B	66	46	55	9	No	No
RN093	1	B	66	46	54	8	No	No
RN094	1	B	66	46	54	8	No	No
RN095	1	B	66	46	54	8	No	No
RN096	1	B	66	46	54	8	No	No
RN097	1	B	66	46	54	8	No	No
RN098	1	B	66	46	53	7	No	No
RN099	1	B	66	49	53	4	No	No
RN100	1	B	66	53	55	2	No	No
RN101	1	B	66	61	61	0	No	No
RN102	1	B	66	46	63	**17**	No	**Yes**

Table 4. TNM 2.5 Existing (2024) and Future (2050) Condition Noise Level Results and Impacts

Receiver	Receptors Represented	Land Use Activity Category	UDOT NAC (dBA)	Existing Noise Level[1] (dBA)	Future Noise Level[1] (dBA)	Noise Level Difference (dBA)	Impact	
							≥ UDOT NAC	≥ 10 dBA Increase Over Existing
RN103	1	B	66	46	60	**14**	No	**Yes**
RN104	1	B	66	46	59	**13**	No	**Yes**
RN105	1	B	66	46	61	**15**	No	**Yes**
RN106	1	B	66	46	61	**15**	No	**Yes**
RN107	1	B	66	46	60	**14**	No	**Yes**
RN108	1	B	66	46	60	**14**	No	**Yes**
RN109	1	B	66	46	58	**12**	No	**Yes**
RN110	1	B	66	46	58	**12**	No	**Yes**
RN111	1	B	66	46	57	**11**	No	**Yes**
RN112	1	B	66	46	60	**14**	No	**Yes**
RN113	1	B	66	46	63	**17**	No	**Yes**
RN114	1	B	66	46	62	**16**	No	**Yes**
RN115	1	B	66	46	62	**16**	No	**Yes**
RN116	1	B	66	46	64	**18**	No	**Yes**
RN117	1	B	66	46	**67**	**21**	**Yes**	**Yes**
RN118	1	B	66	46	**67**	**21**	**Yes**	**Yes**
RN119	1	B	66	46	**68**	**22**	**Yes**	**Yes**
RN120	1	B	66	46	**67**	**21**	**Yes**	**Yes**
RN121	1	B	66	46	**66**	**20**	**Yes**	**Yes**
RN122	1	B	66	46	**68**	**22**	**Yes**	**Yes**
RN123	1	B	66	48	**70**	**22**	**Yes**	**Yes**
RN124	1	B	66	46	**68**	**22**	**Yes**	**Yes**
RN125	1	B	66	46	62	**16**	No	**Yes**
RN126	1	B	66	46	63	**17**	No	**Yes**
RN127	1	B	66	46	64	**18**	No	**Yes**
RN128	1	B	66	46	65	**19**	No	**Yes**
RN129	1	B	66	46	**66**	**20**	**Yes**	**Yes**
RN130	1	B	66	46	**66**	**20**	**Yes**	**Yes**
RN131	1	B	66	46	**69**	**23**	**Yes**	**Yes**

Table 4. TNM 2.5 Existing (2024) and Future (2050) Condition Noise Level Results and Impacts

Receiver	Receptors Represented	Land Use Activity Category	UDOT NAC (dBA)	Existing Noise Level[1] (dBA)	Future Noise Level[1] (dBA)	Noise Level Difference (dBA)	Impact	
							≥ UDOT NAC	≥ 10 dBA Increase Over Existing
RN132	1	B	66	46	**69**	**23**	**Yes**	**Yes**
RN133	1	B	66	46	**70**	**24**	**Yes**	**Yes**
RN137	1	B	66	59	64	5	No	No
RN138	1	B	66	62	64	2	No	No
RN139	1	B	66	62	63	1	No	No
RN140	1	B	66	61	62	1	No	No
RN141	1	B	66	59	60	1	No	No
RN142	1	B	66	48	55	7	No	No
RN143	1	B	66	60	61	1	No	No
RN144	1	B	66	46	49	3	No	No
RN145	1	B	66	46	48	2	No	No
RN146	1	B	66	46	55	9	No	No
RN147	1	B	66	48	55	7	No	No
RN148	1	B	66	46	54	8	No	No
RN149	1	D	51	21	25	4	No	No
RN150	1	B	66	46	54	8	No	No
RN151	1	B	66	46	51	5	No	No
RN152	1	B	66	46	53	7	No	No
RN153	1	B	66	46	52	6	No	No
RN154	1	B	66	46	47	1	No	No
RN155	1	B	66	46	46	0	No	No
RN156	1	B	66	46	46	0	No	No
RN157	1	B	66	46	51	5	No	No
RN158	1	B	66	46	47	1	No	No
RN159	1	B	66	46	46	0	No	No
RN160	1	B	66	46	46	0	No	No
RN161	1	B	66	46	51	5	No	No
RN162	1	B	66	46	49	3	No	No
RN163	1	B	66	46	46	0	No	No

Table 4. TNM 2.5 Existing (2024) and Future (2050) Condition Noise Level Results and Impacts

Receiver	Receptors Represented	Land Use Activity Category	UDOT NAC (dBA)	Existing Noise Level[1] (dBA)	Future Noise Level[1] (dBA)	Noise Level Difference (dBA)	Impact	
							≥ UDOT NAC	≥ 10 dBA Increase Over Existing
RN164	1	B	66	48	49	1	No	No
RN165	1	B	66	46	47	1	No	No
RN166	1	B	66	46	48	2	No	No
RN167	1	B	66	46	47	1	No	No
RN168	1	B	66	46	46	0	No	No
RN169	1	B	66	46	46	0	No	No
RN170	1	B	66	46	46	0	No	No
RN171	1	B	66	49	50	1	No	No
RN172	1	B	66	52	53	1	No	No
RN173	1	B	66	46	51	5	No	No
RN174	1	B	66	46	49	3	No	No
RN175	1	B	66	46	47	1	No	No
RN176	1	B	66	46	47	1	No	No
RN177	1	B	66	46	47	1	No	No
RN178	1	B	66	46	47	1	No	No
RN179	1	B	66	46	56	10	No	**Yes**
RN180	1	B	66	47	50	3	No	No
RN181	1	B	66	46	55	9	No	No
RN182	1	B	66	46	50	4	No	No
RN183	1	B	66	46	54	8	No	No
RN184	1	B	66	46	50	4	No	No
RN185	1	B	66	46	49	3	No	No
RN186	1	B	66	46	48	2	No	No
RN187	1	B	66	46	50	4	No	No
RN188	1	B	66	46	47	1	No	No
RN189	1	B	66	46	56	10	No	**Yes**
RN190	1	B	66	46	49	3	No	No
RN191	1	B	66	46	48	2	No	No
RN192	1	B	66	46	50	4	No	No

Table 4. TNM 2.5 Existing (2024) and Future (2050) Condition Noise Level Results and Impacts

Receiver	Receptors Represented	Land Use Activity Category	UDOT NAC (dBA)	Existing Noise Level[1] (dBA)	Future Noise Level[1] (dBA)	Noise Level Difference (dBA)	Impact	
							≥ UDOT NAC	≥ 10 dBA Increase Over Existing
RN193	1	B	66	46	54	8	No	No
RN194	1	B	66	46	47	1	No	No
RN195	1	B	66	46	47	1	No	No
RN196	1	B	66	46	51	5	No	No
RN197	1	B	66	46	50	4	No	No
RN198	1	B	66	46	49	3	No	No
RN199	1	B	66	46	58	**12**	No	**Yes**
RN200	1	B	66	46	52	6	No	No
RN201	1	B	66	46	49	3	No	No
RN202	1	B	66	46	49	3	No	No
RN203	1	B	66	46	58	**12**	No	**Yes**
RN204	1	B	66	46	52	6	No	No
RN205	1	B	66	46	50	4	No	No
RN206	1	B	66	46	48	2	No	No
RN207	1	B	66	46	52	6	No	No
RN208	1	B	66	46	51	5	No	No
RN209	1	B	66	46	51	5	No	No
RN210	1	B	66	46	52	6	No	No
RN211	1	B	66	51	64	**13**	No	**Yes**
RN212	1	B	66	51	63	**12**	No	**Yes**
RN213	1	B	66	51	61	10	No	**Yes**
RN214	1	B	66	51	59	8	No	No
RN215	1	B	66	46	56	10	No	**Yes**
RN216	1	B	66	46	50	4	No	No
RN217	1	B	66	46	48	2	No	No
RN218	1	B	66	46	46	0	No	No
RN219	1	B	66	46	50	4	No	No
RN220	1	B	66	46	57	**11**	No	**Yes**
RN221	1	B	66	46	54	8	No	No

Table 4. TNM 2.5 Existing (2024) and Future (2050) Condition Noise Level Results and Impacts

Receiver	Receptors Represented	Land Use Activity Category	UDOT NAC (dBA)	Existing Noise Level[1] (dBA)	Future Noise Level[1] (dBA)	Noise Level Difference (dBA)	Impact	
							≥ UDOT NAC	≥ 10 dBA Increase Over Existing
RN222	1	B	66	46	56	10	No	**Yes**
RN223	1	B	66	46	57	**11**	No	**Yes**
RN224	1	B	66	46	49	3	No	No
RN225	1	B	66	46	50	4	No	No
RN226	1	B	66	46	50	4	No	No
RN227	1	B	66	46	49	3	No	No
RN228	1	B	66	46	59	**13**	No	**Yes**
RN229	1	B	66	46	60	**14**	No	**Yes**
RN230	1	B	66	46	53	7	No	No
RN231	1	B	66	46	54	8	No	No
RN232	1	B	66	46	60	**14**	No	**Yes**
RN233	1	B	66	46	55	9	No	No
RN234	1	B	66	46	54	8	No	No
RN235	1	B	66	46	61	**15**	No	**Yes**
RN236	1	B	66	46	56	10	No	**Yes**
RN237	1	B	66	46	54	8	No	No
RN238	1	B	66	46	62	**16**	No	**Yes**
RN239	1	B	66	46	56	10	No	**Yes**
RN240	1	B	66	46	55	9	No	No
RN241	1	B	66	46	62	**16**	No	**Yes**
RN242	1	B	66	46	57	**11**	No	**Yes**
RN243	1	B	66	46	64	**18**	No	**Yes**
RN244	1	B	66	46	61	**15**	No	**Yes**
RN245	1	B	66	46	50	4	No	No
RN246	1	B	66	46	51	5	No	No
RM001	1	B	66	46	60	**14**	No	**Yes**
RM002	1	B	66	46	**66**	**20**	**Yes**	**Yes**
RM003	1	B	66	46	**68**	**22**	**Yes**	**Yes**
RM004	1	B	66	46	**67**	**21**	**Yes**	**Yes**

Table 4. TNM 2.5 Existing (2024) and Future (2050) Condition Noise Level Results and Impacts

Receiver	Receptors Represented	Land Use Activity Category	UDOT NAC (dBA)	Existing Noise Level[1] (dBA)	Future Noise Level[1] (dBA)	Noise Level Difference (dBA)	Impact	
							≥ UDOT NAC	≥ 10 dBA Increase Over Existing
RM005	1	B	66	46	**68**	**22**	**Yes**	**Yes**
RM006	1	B	66	46	**68**	**22**	**Yes**	**Yes**
RM007	1	B	66	46	**68**	**22**	**Yes**	**Yes**
RM008	1	B	66	46	65	**19**	No	**Yes**
RM009	1	B	66	47	**67**	**20**	**Yes**	**Yes**
RM010	1	B	66	50	**67**	**17**	**Yes**	**Yes**
RM011	1	B	66	46	61	**15**	No	**Yes**
RM012	1	B	66	46	65	**19**	No	**Yes**
RM013	1	B	66	46	57	**11**	No	**Yes**
RM014	1	B	66	46	56	10	No	**Yes**
RM015	1	B	66	46	54	8	No	No
RM016	1	B	66	46	54	8	No	No
RM017	1	B	66	46	53	7	No	No
RM018	1	B	66	46	52	6	No	No
RM019	1	B	66	46	52	6	No	No
RM020	1	B	66	46	51	5	No	No
RM021	1	B	66	46	50	4	No	No
RM022	1	B	66	46	50	4	No	No
RM023	1	B	66	46	64	**18**	No	**Yes**
RM024	1	B	66	46	61	**15**	No	**Yes**
RM025	1	B	66	46	59	**13**	No	**Yes**
RM026	1	B	66	46	57	**11**	No	**Yes**
RM027	1	B	66	46	56	10	No	**Yes**
RM028	1	B	66	46	54	8	No	No
RM029	1	B	66	46	53	7	No	No
RM030	1	B	66	46	52	6	No	No
RM031	1	B	66	46	51	5	No	No
RM032	1	B	66	46	50	4	No	No
RM033	1	B	66	46	52	6	No	No

Table 4. TNM 2.5 Existing (2024) and Future (2050) Condition Noise Level Results and Impacts

Receiver	Receptors Represented	Land Use Activity Category	UDOT NAC (dBA)	Existing Noise Level[1] (dBA)	Future Noise Level[1] (dBA)	Noise Level Difference (dBA)	Impact	
							≥ UDOT NAC	≥ 10 dBA Increase Over Existing
RM034	1	B	66	46	**66**	**20**	**Yes**	**Yes**
RM035	1	B	66	46	57	**11**	No	**Yes**
RM036	1	B	66	46	54	8	No	No
RM037	1	B	66	46	52	6	No	No
RM038	1	B	66	46	51	5	No	No
RM039	1	B	66	46	50	4	No	No
RM040	1	B	66	46	49	3	No	No
RM041	1	B	66	46	49	3	No	No
RM042	1	B	66	47	50	3	No	No
RM043	1	B	66	46	52	6	No	No
RM044	1	B	66	46	61	**15**	No	**Yes**
RM045	1	B	66	46	59	**13**	No	**Yes**
RM046	1	B	66	46	54	8	No	No
RM047	1	B	66	46	53	7	No	No
RM048	1	B	66	46	51	5	No	No
RM049	1	B	66	46	51	5	No	No
RM050	1	B	66	46	50	4	No	No
RM051	1	B	66	46	50	4	No	No
RM052	1	B	66	46	58	**12**	No	**Yes**
RM053	1	B	66	46	53	7	No	No
RM054	1	B	66	46	52	6	No	No
RM055	1	B	66	46	50	4	No	No
RM056	1	B	66	46	49	3	No	No
RM057	1	B	66	46	49	3	No	No
RM058	1	B	66	46	50	4	No	No
RM059	1	B	66	50	53	3	No	No
RM060	1	B	66	46	52	6	No	No
RM061	1	B	66	49	53	4	No	No
RM062	1	B	66	46	62	**16**	No	**Yes**

Table 4. TNM 2.5 Existing (2024) and Future (2050) Condition Noise Level Results and Impacts

Receiver	Receptors Represented	Land Use Activity Category	UDOT NAC (dBA)	Existing Noise Level[1] (dBA)	Future Noise Level[1] (dBA)	Noise Level Difference (dBA)	Impact	
							≥ UDOT NAC	≥ 10 dBA Increase Over Existing
RM063	1	B	66	46	58	**12**	No	**Yes**
RM064	1	B	66	46	56	10	No	**Yes**
RM065	1	B	66	46	57	**11**	No	**Yes**
RM066	1	B	66	49	53	4	No	No
RM067	1	B	66	46	61	**15**	No	**Yes**
RM068	1	B	66	46	57	**11**	No	**Yes**
RM069	1	B	66	46	53	7	No	No
RM070	1	B	66	46	56	10	No	**Yes**
RM071	1	B	66	46	53	7	No	No
RM072	1	B	66	46	56	10	No	**Yes**
RM073	1	B	66	50	54	4	No	No
RM074	1	B	66	46	59	**13**	No	**Yes**
RM075	1	B	66	46	57	**11**	No	**Yes**
RM076	1	B	66	46	63	**17**	No	**Yes**
RM077	1	B	66	47	**66**	**19**	**Yes**	**Yes**
RM078	1	B	66	51	**66**	**15**	**Yes**	**Yes**
RM079	1	B	66	58	**67**	9	**Yes**	No
RM080	1	D	51	37	40	3	No	No
RM081	1	B	66	53	56	3	No	No
RM082	1	B	66	47	52	5	No	No
RM083	1	B	66	52	54	2	No	No
RM084	1	B	66	54	56	2	No	No
RM085	1	B	66	46	60	**14**	No	**Yes**
RM086	1	B	66	46	58	**12**	No	**Yes**
RM087	1	B	66	46	57	**11**	No	**Yes**
RM088	1	B	66	57	58	1	No	No
RM089	1	B	66	58	59	1	No	No
RM090	1	B	66	59	59	0	No	No
RM091	1	B	66	50	55	5	No	No

Table 4. TNM 2.5 Existing (2024) and Future (2050) Condition Noise Level Results and Impacts

Receiver	Receptors Represented	Land Use Activity Category	UDOT NAC (dBA)	Existing Noise Level[1] (dBA)	Future Noise Level[1] (dBA)	Noise Level Difference (dBA)	Impact	
							≥ UDOT NAC	≥ 10 dBA Increase Over Existing
RM092	1	B	66	46	55	9	No	No
RM093	1	B	66	48	56	8	No	No
RM094	1	B	66	48	55	7	No	No
RM095	1	B	66	49	55	6	No	No
RM096	1	B	66	51	57	6	No	No
RM097	1	B	66	49	56	7	No	No
RM098	1	B	66	46	54	8	No	No
RM099	1	B	66	50	55	5	No	No
RM100	1	B	66	50	55	5	No	No
RM101	1	B	66	47	54	7	No	No
RM102	1	B	66	48	54	6	No	No
RM103	1	B	66	54	56	2	No	No
RM104	1	B	66	46	53	7	No	No
RM105	1	B	66	48	55	7	No	No
RM106	1	B	66	46	59	**13**	No	**Yes**
RM107	1	B	66	46	55	9	No	No
RM108	1	B	66	48	53	5	No	No
RM109	1	B	66	60	60	0	No	No
RM110	1	C	66	55	63	8	No	No
RM111	1	C	66	53	63	10	No	**Yes**
RM112	1	C	66	53	65	**12**	No	**Yes**
RM113	1	C	66	51	**68**	**17**	**Yes**	**Yes**
RM114	1	C	66	49	**69**	**20**	**Yes**	**Yes**
RM115	1	C	66	46	61	**15**	No	**Yes**
RM116	1	C	66	46	58	**12**	No	**Yes**
RM117	1	C	66	46	55	9	No	No
RM118	1	C	66	46	56	10	No	**Yes**
RM119	1	C	66	46	61	**15**	No	**Yes**
RM120	1	C	66	46	63	**17**	No	**Yes**

Table 4. TNM 2.5 Existing (2024) and Future (2050) Condition Noise Level Results and Impacts

Receiver	Receptors Represented	Land Use Activity Category	UDOT NAC (dBA)	Existing Noise Level[1] (dBA)	Future Noise Level[1] (dBA)	Noise Level Difference (dBA)	Impact	
							≥ UDOT NAC	≥ 10 dBA Increase Over Existing
RM121	1	B	66	46	62	**16**	No	**Yes**
RM122	1	B	66	46	60	**14**	No	**Yes**
RM123	1	C	66	46	57	**11**	No	**Yes**
RM124	1	C	66	46	56	10	No	**Yes**
RM125	1	B	66	46	55	9	No	No
RM126	1	B	66	46	55	9	No	No
RM127	1	B	66	46	55	9	No	No
RM128	1	B	66	46	54	8	No	No
RM129	1	B	66	46	54	8	No	No
RM130	1	B	66	51	**66**	**15**	**Yes**	**Yes**
RM131	1	B	66	46	**67**	**21**	**Yes**	**Yes**
RM132	1	B	66	48	59	**11**	No	**Yes**
RM133	1	B	66	48	59	**11**	No	**Yes**
RM134	1	B	66	48	59	**11**	No	**Yes**
RM135	1	B	66	46	58	**12**	No	**Yes**
RM136	1	B	66	46	58	**12**	No	**Yes**
RM137	1	B	66	46	58	**12**	No	**Yes**
RM138	1	B	66	46	57	**11**	No	**Yes**
RM139	1	B	66	46	57	**11**	No	**Yes**
RM140	1	B	66	46	56	10	No	**Yes**
RM141	1	B	66	46	56	10	No	**Yes**
RM142	1	B	66	46	56	10	No	**Yes**
RM143	1	B	66	46	57	**11**	No	**Yes**
RM144	1	B	66	46	61	**15**	No	**Yes**
RM145	1	B	66	46	61	**15**	No	**Yes**
RM146	1	B	66	46	62	**16**	No	**Yes**
RM147	1	B	66	46	62	**16**	No	**Yes**
RM148	1	B	66	46	62	**16**	No	**Yes**
RM149	1	B	66	46	63	**17**	No	**Yes**

Table 4. TNM 2.5 Existing (2024) and Future (2050) Condition Noise Level Results and Impacts

Receiver	Receptors Represented	Land Use Activity Category	UDOT NAC (dBA)	Existing Noise Level[1] (dBA)	Future Noise Level[1] (dBA)	Noise Level Difference (dBA)	Impact	
							≥ UDOT NAC	≥ 10 dBA Increase Over Existing
RM150	1	B	66	46	63	**17**	No	**Yes**
RM151	1	B	66	46	63	**17**	No	**Yes**
RM152	1	B	66	46	63	**17**	No	**Yes**
RM153	1	B	66	46	60	**14**	No	**Yes**
RM154	1	B	66	47	64	**17**	No	**Yes**
RM155	1	B	66	46	62	**16**	No	**Yes**
RM156	1	B	66	46	61	**15**	No	**Yes**
RM157	1	B	66	46	60	**14**	No	**Yes**
RM158	1	B	66	46	59	**13**	No	**Yes**
RM159	1	B	66	46	59	**13**	No	**Yes**
RM160	1	B	66	46	57	**11**	No	**Yes**
RM161	1	B	66	46	55	9	No	No
RM162	1	B	66	46	54	8	No	No
RM163	1	B	66	46	54	8	No	No
RM164	1	B	66	46	53	7	No	No
RM165	1	B	66	46	59	**13**	No	**Yes**
RM166	1	B	66	46	56	10	No	**Yes**
RM167	1	B	66	46	55	9	No	No
RM168	1	B	66	46	53	7	No	No
RM169	1	B	66	46	57	**11**	No	**Yes**
RM170	1	B	66	46	54	8	No	No
RM171	1	B	66	46	55	9	No	No
RM172	1	B	66	46	52	6	No	No
RM173	1	B	66	46	55	9	No	No
RM174	1	B	66	46	53	7	No	No
RM175	1	B	66	46	54	8	No	No
RM176	1	B	66	46	51	5	No	No
RM177	1	B	66	46	55	9	No	No
RM178	1	B	66	46	52	6	No	No

Table 4. TNM 2.5 Existing (2024) and Future (2050) Condition Noise Level Results and Impacts

Receiver	Receptors Represented	Land Use Activity Category	UDOT NAC (dBA)	Existing Noise Level[1] (dBA)	Future Noise Level[1] (dBA)	Noise Level Difference (dBA)	Impact	
							≥ UDOT NAC	≥ 10 dBA Increase Over Existing
RM179	1	B	66	46	53	7	No	No
RM180	1	B	66	46	51	5	No	No
RM181	1	B	66	46	54	8	No	No
RM182	1	B	66	46	52	6	No	No
RM183	1	B	66	46	52	6	No	No
RM184	1	B	66	46	50	4	No	No
RM185	1	B	66	46	54	8	No	No
RM186	1	B	66	46	52	6	No	No
RM187	1	B	66	46	52	6	No	No
RM188	1	B	66	46	50	4	No	No
RM189	1	B	66	46	54	8	No	No
RM190	1	B	66	46	51	5	No	No
RM191	1	B	66	46	54	8	No	No
RM192	1	B	66	46	50	4	No	No
RM193	1	B	66	46	53	7	No	No
RM194	1	B	66	46	50	4	No	No
RM195	1	B	66	46	53	7	No	No
RM196	1	B	66	46	50	4	No	No
RM197	1	B	66	47	64	**17**	No	**Yes**
RM198	1	B	66	46	62	**16**	No	**Yes**
RM199	1	B	66	46	60	**14**	No	**Yes**
RM200	1	B	66	46	59	**13**	No	**Yes**
RM201	1	B	66	50	58	8	No	No
RM202	1	B	66	46	60	**14**	No	**Yes**
RM203	1	B	66	47	58	**11**	No	**Yes**
RM204	1	B	66	47	56	9	No	No
RM205	1	B	66	64	65	1	No	No
RM206	1	B	66	57	61	4	No	No
RM207	1	B	66	46	56	10	No	**Yes**

Table 4. TNM 2.5 Existing (2024) and Future (2050) Condition Noise Level Results and Impacts

Receiver	Receptors Represented	Land Use Activity Category	UDOT NAC (dBA)	Existing Noise Level[1] (dBA)	Future Noise Level[1] (dBA)	Noise Level Difference (dBA)	Impact	
							≥ UDOT NAC	≥ 10 dBA Increase Over Existing
RM208	1	B	66	46	55	9	No	No
RM209	1	B	66	46	56	10	No	**Yes**
RM210	1	B	66	46	50	4	No	No
RM211	1	B	66	46	48	2	No	No
RM212	1	B	66	46	50	4	No	No
RM213	1	B	66	46	47	1	No	No
RM214	1	B	66	46	48	2	No	No
RM215	1	B	66	46	46	0	No	No
RM216	1	B	66	46	49	3	No	No
RM217	1	B	66	46	48	2	No	No
RM218	1	B	66	46	46	0	No	No
RM219	1	B	66	46	50	4	No	No
RM220	1	B	66	46	46	0	No	No
RM221	1	B	66	46	46	0	No	No
RM222	1	B	66	46	46	0	No	No
RM223	1	B	66	46	46	0	No	No
RM224	1	B	66	46	48	2	No	No
RM225	1	B	66	46	46	0	No	No
RM226	1	B	66	46	53	7	No	No
RM227	1	B	66	46	46	0	No	No
RM228	1	B	66	46	48	2	No	No
RM229	1	B	66	46	46	0	No	No
RM230	1	B	66	46	52	6	No	No
RM231	1	B	66	46	46	0	No	No
RM232	1	B	66	46	46	0	No	No
RM233	1	B	66	46	60	**14**	No	**Yes**
RM234	1	B	66	46	52	6	No	No
RM235	1	B	66	46	47	1	No	No
RM236	1	B	66	46	46	0	No	No

Table 4. TNM 2.5 Existing (2024) and Future (2050) Condition Noise Level Results and Impacts

Receiver	Receptors Represented	Land Use Activity Category	UDOT NAC (dBA)	Existing Noise Level[1] (dBA)	Future Noise Level[1] (dBA)	Noise Level Difference (dBA)	Impact	
							≥ UDOT NAC	≥ 10 dBA Increase Over Existing
RM237	1	B	66	46	46	0	No	No
RM238	1	B	66	46	60	**14**	No	**Yes**
RM239	1	B	66	46	54	8	No	No
RM240	1	B	66	52	56	4	No	No
RM241	1	B	66	46	47	1	No	No
RM242	1	B	66	46	46	0	No	No
RM243	1	B	66	52	52	0	No	No
RS036	1	B	66	65	65	0	No	No
RS037	1	B	66	58	61	3	No	No
RS038	1	B	66	55	59	4	No	No
RS039	1	B	66	53	59	6	No	No
RS040	1	B	66	51	59	8	No	No
RS041	1	B	66	49	58	9	No	No
RS117	1	B	66	52	57	5	No	No
RS118	1	B	66	50	57	7	No	No
RS119	1	B	66	47	56	9	No	No
RS120	1	B	66	46	56	10	No	**Yes**
RS135	1	B	66	46	57	**11**	No	**Yes**
RS136	1	B	66	46	57	**11**	No	**Yes**
RS137	1	B	66	46	57	**11**	No	**Yes**
RS138	1	B	66	46	58	**12**	No	**Yes**
RS139	1	B	66	46	58	**12**	No	**Yes**
RS140	1	B	66	46	58	**12**	No	**Yes**
RS141	1	B	66	46	59	**13**	No	**Yes**
RS142	1	B	66	46	59	**13**	No	**Yes**
RS143	1	B	66	46	60	**14**	No	**Yes**
RS144	1	B	66	46	55	9	No	No
RS145	1	C	66	49	61	**12**	No	**Yes**
RS146	1	B	66	55	**66**	**11**	**Yes**	**Yes**

Table 4. TNM 2.5 Existing (2024) and Future (2050) Condition Noise Level Results and Impacts

Receiver	Receptors Represented	Land Use Activity Category	UDOT NAC (dBA)	Existing Noise Level[1] (dBA)	Future Noise Level[1] (dBA)	Noise Level Difference (dBA)	Impact	
							≥ UDOT NAC	≥ 10 dBA Increase Over Existing
RS147	1	B	66	53	**66**	**13**	**Yes**	**Yes**
RS148	1	B	66	54	65	**11**	No	**Yes**
RS149	1	B	66	54	64	10	No	**Yes**
RS150	1	B	66	55	65	10	No	**Yes**
RS151	1	B	66	55	**66**	**11**	**Yes**	**Yes**
RS152	1	B	66	55	**67**	**12**	**Yes**	**Yes**
RS153	1	B	66	55	**68**	**13**	**Yes**	**Yes**
RS154	1	B	66	55	**68**	**13**	**Yes**	**Yes**
RS155	1	B	66	53	**66**	**13**	**Yes**	**Yes**
RS156	1	B	66	51	64	**13**	No	**Yes**
RS157	1	B	66	49	62	**13**	No	**Yes**
RS158	1	B	66	50	63	**13**	No	**Yes**
RS159	1	B	66	49	63	**14**	No	**Yes**
RS160	1	B	66	49	62	**13**	No	**Yes**
RS161	1	C	66	52	64	**12**	No	**Yes**
RS162	1	B	66	48	61	**13**	No	**Yes**
RS163	1	B	66	48	61	**13**	No	**Yes**
RS164	1	B	66	48	60	**12**	No	**Yes**
RS165	1	B	66	48	60	**12**	No	**Yes**
RS166	1	B	66	47	59	**12**	No	**Yes**
RS167	1	D	51	21	26	5	No	No
RS168	1	B	66	46	49	3	No	No
RS169	1	B	66	46	49	3	No	No
RS170	1	B	66	46	50	4	No	No
RS171	1	B	66	46	48	2	No	No
RS172	1	B	66	46	55	9	No	No
RS173	1	B	66	46	51	5	No	No
RS174	1	B	66	46	50	4	No	No
RS175	1	B	66	47	60	**13**	No	**Yes**

Table 4. TNM 2.5 Existing (2024) and Future (2050) Condition Noise Level Results and Impacts

Receiver	Receptors Represented	Land Use Activity Category	UDOT NAC (dBA)	Existing Noise Level[1] (dBA)	Future Noise Level[1] (dBA)	Noise Level Difference (dBA)	Impact	
							≥ UDOT NAC	≥ 10 dBA Increase Over Existing
RS176	1	B	66	46	51	5	No	No
RS177	1	B	66	46	52	6	No	No
RS178	1	B	66	49	61	**12**	No	**Yes**
RS179	1	B	66	46	56	10	No	**Yes**
RS180	1	B	66	46	51	5	No	No
RS181	1	B	66	46	55	9	No	No
RS182	1	B	66	46	53	7	No	No
RS183	1	B	66	46	54	8	No	No
RS184	1	C	66	46	53	7	No	No
RS185	1	B	66	46	56	10	No	**Yes**
RS186	1	B	66	46	49	3	No	No
RS187	1	B	66	46	51	5	No	No
RS188	1	B	66	46	52	6	No	No
RS189	1	B	66	46	51	5	No	No
RS190	1	B	66	46	56	10	No	**Yes**
RS191	1	B	66	46	46	0	No	No
RS192	1	B	66	46	46	0	No	No
RS193	1	B	66	46	46	0	No	No
RS194	1	B	66	46	51	5	No	No
RS195	1	B	66	46	51	5	No	No
RS196	1	B	66	46	52	6	No	No
RS197	1	B	66	46	51	5	No	No
RS198	1	B	66	46	52	6	No	No
RS199	1	B	66	46	57	**11**	No	**Yes**
RS200	1	B	66	46	54	8	No	No
RS201	1	B	66	46	56	10	No	**Yes**
RS202	1	B	66	46	48	2	No	No
RS203	1	B	66	46	49	3	No	No
RS204	1	B	66	46	49	3	No	No

Table 4. TNM 2.5 Existing (2024) and Future (2050) Condition Noise Level Results and Impacts

Receiver	Receptors Represented	Land Use Activity Category	UDOT NAC (dBA)	Existing Noise Level[1] (dBA)	Future Noise Level[1] (dBA)	Noise Level Difference (dBA)	Impact	
							≥ UDOT NAC	≥ 10 dBA Increase Over Existing
RS205	1	B	66	46	48	2	No	No
RS206	1	B	66	46	49	3	No	No
RS207	1	B	66	46	52	6	No	No
RS208	1	B	66	46	53	7	No	No
RS209	1	B	66	46	55	9	No	No
RS210	1	B	66	46	54	8	No	No
RS211	1	B	66	46	57	**11**	No	**Yes**
RS212	1	B	66	46	56	10	No	**Yes**
RS213	1	B	66	47	61	**14**	No	**Yes**
RS214	1	B	66	46	54	8	No	No
RS215	1	B	66	46	57	**11**	No	**Yes**
RS216	1	B	66	46	46	0	No	No
RS217	1	B	66	46	46	0	No	No
RS218	1	B	66	46	46	0	No	No
RS219	1	B	66	46	47	1	No	No
RS220	1	B	66	46	46	0	No	No
RS221	1	B	66	46	46	0	No	No
RS222	1	B	66	46	46	0	No	No
RS223	1	B	66	46	46	0	No	No
RS224	1	B	66	46	47	1	No	No
RS225	1	B	66	46	52	6	No	No
RS226	1	B	66	46	54	8	No	No
RS227	1	B	66	48	62	**14**	No	**Yes**
RS228	1	B	66	46	57	**11**	No	**Yes**
RS229	1	B	66	46	56	10	No	**Yes**
RS230	1	B	66	47	61	**14**	No	**Yes**
RS231	1	B	66	46	49	3	No	No
RS232	1	B	66	46	50	4	No	No
RS233	1	B	66	46	49	3	No	No

Table 4. TNM 2.5 Existing (2024) and Future (2050) Condition Noise Level Results and Impacts

Receiver	Receptors Represented	Land Use Activity Category	UDOT NAC (dBA)	Existing Noise Level[1] (dBA)	Future Noise Level[1] (dBA)	Noise Level Difference (dBA)	Impact	
							≥ UDOT NAC	≥ 10 dBA Increase Over Existing
RS234	1	B	66	46	49	3	No	No
RS235	1	B	66	46	50	4	No	No
RS236	1	B	66	46	50	4	No	No
RS237	1	B	66	46	52	6	No	No
RS238	1	B	66	46	50	4	No	No
RS239	1	B	66	46	51	5	No	No
RS240	1	B	66	46	52	6	No	No
RS241	1	B	66	46	57	**11**	No	**Yes**
RS242	1	B	66	46	57	**11**	No	**Yes**
RS243	1	B	66	46	57	**11**	No	**Yes**
RS244	1	B	66	47	60	**13**	No	**Yes**
RS245	1	B	66	46	46	0	No	No
RS246	1	B	66	46	46	0	No	No
RS247	1	B	66	46	46	0	No	No
RS248	1	B	66	46	46	0	No	No
RS249	1	B	66	46	46	0	No	No
RS250	1	B	66	46	47	1	No	No
RS251	1	B	66	46	47	1	No	No
RS252	1	B	66	46	46	0	No	No
RS253	1	B	66	46	48	2	No	No
RS254	1	B	66	46	48	2	No	No
RS255	1	B	66	46	55	9	No	No
RS256	1	B	66	46	52	6	No	No
RS257	1	B	66	46	58	**12**	No	**Yes**
RS258	1	B	66	46	60	**14**	No	**Yes**
RS259	1	B	66	46	59	**13**	No	**Yes**
RS260	1	B	66	46	60	**14**	No	**Yes**
RS261	1	B	66	46	60	**14**	No	**Yes**
RS262	1	B	66	47	61	**14**	No	**Yes**

Table 4. TNM 2.5 Existing (2024) and Future (2050) Condition Noise Level Results and Impacts

Receiver	Receptors Represented	Land Use Activity Category	UDOT NAC (dBA)	Existing Noise Level[1] (dBA)	Future Noise Level[1] (dBA)	Noise Level Difference (dBA)	Impact	
							≥ UDOT NAC	≥ 10 dBA Increase Over Existing
RS263	1	B	66	48	61	**13**	No	**Yes**
RS264	1	B	66	51	63	**12**	No	**Yes**
RS265	1	B	66	51	62	**11**	No	**Yes**
RS266	1	B	66	51	63	**12**	No	**Yes**
RS267	1	B	66	51	63	**12**	No	**Yes**
RS268	1	B	66	51	63	**12**	No	**Yes**
RS269	1	B	66	52	64	**12**	No	**Yes**
RS270	1	B	66	52	65	**13**	No	**Yes**
RS271	1	B	66	53	**66**	**13**	**Yes**	**Yes**
RS272	1	B	66	56	**69**	**13**	**Yes**	**Yes**
RS273	1	B	66	61	**74**	**13**	**Yes**	**Yes**
RS274	1	B	66	56	**70**	**14**	**Yes**	**Yes**
RS275	1	D	51	34	39	5	No	No
RS276	1	B	66	52	**66**	**14**	**Yes**	**Yes**
RS277	1	B	66	52	**66**	**14**	**Yes**	**Yes**
RS278	1	B	66	46	59	**13**	No	**Yes**
RS279	1	B	66	50	63	**13**	No	**Yes**
RS280	1	B	66	52	61	9	No	No
RS281	1	B	66	53	61	8	No	No
RS282	1	B	66	53	60	7	No	No
RS283	1	B	66	53	60	7	No	No
RS284	1	B	66	54	60	6	No	No
RS285	1	B	66	54	61	7	No	No
RS286	1	B	66	54	60	6	No	No
RS287	1	B	66	54	60	6	No	No
RS288	1	B	66	55	62	7	No	No
RS289	1	B	66	55	62	7	No	No
RS290	1	B	66	55	61	6	No	No
RS291	1	B	66	55	61	6	No	No

Table 4. TNM 2.5 Existing (2024) and Future (2050) Condition Noise Level Results and Impacts

Receiver	Receptors Represented	Land Use Activity Category	UDOT NAC (dBA)	Existing Noise Level[1] (dBA)	Future Noise Level[1] (dBA)	Noise Level Difference (dBA)	Impact	
							≥ UDOT NAC	≥ 10 dBA Increase Over Existing
RS292	1	B	66	55	61	6	No	No
RS293	1	B	66	54	61	7	No	No
RS294	1	B	66	54	59	5	No	No
RS295	1	B	66	54	60	6	No	No
RS296	1	B	66	46	56	10	No	**Yes**
RS297	1	B	66	46	52	6	No	No
RS298	1	B	66	46	46	0	No	No
RS299	1	B	66	46	46	0	No	No
RS300	1	B	66	46	46	0	No	No
RS301	1	B	66	46	46	0	No	No
RS302	1	B	66	46	46	0	No	No
RS303	1	B	66	46	54	8	No	No
RS304	1	B	66	46	54	8	No	No
RS305	1	B	66	46	53	7	No	No
RS306	1	B	66	46	49	3	No	No
RS307	1	B	66	46	48	2	No	No
RS308	1	B	66	46	53	7	No	No
RS309	1	B	66	46	48	2	No	No
RS310	1	B	66	46	52	6	No	No
RS311	1	B	66	46	47	1	No	No
RS312	1	B	66	46	48	2	No	No
RS313	1	B	66	46	55	9	No	No
RS314	1	B	66	46	48	2	No	No
RS315	1	B	66	46	47	1	No	No
RS316	1	B	66	48	61	**13**	No	**Yes**
RS317	1	B	66	46	56	10	No	**Yes**
RS318	1	B	66	46	47	1	No	No
RS319	1	B	66	46	52	6	No	No
RS320	1	B	66	46	46	0	No	No

Table 4. TNM 2.5 Existing (2024) and Future (2050) Condition Noise Level Results and Impacts

Receiver	Receptors Represented	Land Use Activity Category	UDOT NAC (dBA)	Existing Noise Level[1] (dBA)	Future Noise Level[1] (dBA)	Noise Level Difference (dBA)	Impact	
							≥ UDOT NAC	≥ 10 dBA Increase Over Existing
RS321	1	B	66	46	46	0	No	No
RS322	1	B	66	46	52	6	No	No
RS323	1	B	66	46	46	0	No	No
RS324	1	B	66	46	48	2	No	No
RS325	1	B	66	49	63	**14**	No	**Yes**
RS326	1	B	66	46	58	**12**	No	**Yes**
RS327	1	B	66	46	58	**12**	No	**Yes**
RS328	1	B	66	46	54	8	No	No
RS329	1	B	66	46	55	9	No	No
RS330	1	B	66	46	47	1	No	No
RS331	1	B	66	46	50	4	No	No
RS332	1	B	66	46	46	0	No	No
RS333	1	B	66	46	50	4	No	No
RS334	1	B	66	46	59	**13**	No	**Yes**
RS335	1	B	66	46	52	6	No	No
RS336	1	B	66	46	46	0	No	No
RS337	1	B	66	46	48	2	No	No
RS338	1	B	66	46	46	0	No	No
RS339	1	B	66	46	48	2	No	No
RS340	1	B	66	46	60	**14**	No	**Yes**
RS341	1	B	66	46	57	**11**	No	**Yes**
RS342	1	B	66	46	53	7	No	No
RS343	1	B	66	46	46	0	No	No
RS344	1	B	66	46	46	0	No	No
RS345	1	B	66	46	47	1	No	No
RS346	1	B	66	47	55	8	No	No
RS347	1	B	66	46	47	1	No	No
RS348	1	B	66	46	46	0	No	No
RS349	1	B	66	52	55	3	No	No

Table 4. TNM 2.5 Existing (2024) and Future (2050) Condition Noise Level Results and Impacts

Receiver	Receptors Represented	Land Use Activity Category	UDOT NAC (dBA)	Existing Noise Level[1] (dBA)	Future Noise Level[1] (dBA)	Noise Level Difference (dBA)	Impact	
							≥ UDOT NAC	≥ 10 dBA Increase Over Existing
RS350	1	C	66	58	59	1	No	No
RS351	1	B	66	56	58	2	No	No
RS352	1	B	66	46	47	1	No	No
RS353	1	B	66	46	47	1	No	No
RS354	1	B	66	47	57	10	No	**Yes**
RS355	1	B	66	46	54	8	No	No
RS356	1	B	66	46	55	9	No	No
RS357	1	B	66	46	52	6	No	No
RS358	1	B	66	46	51	5	No	No
RS359	1	B	66	46	50	4	No	No
RS360	1	B	66	46	47	1	No	No
RS361	1	B	66	46	46	0	No	No
RS362	1	B	66	48	50	2	No	No
RS363	1	B	66	48	51	3	No	No
RS364	1	B	66	52	64	**12**	No	**Yes**
RS365	1	B	66	46	58	**12**	No	**Yes**
RS366	1	B	66	46	51	5	No	No
RS367	1	B	66	46	50	4	No	No
RS368	1	B	66	46	50	4	No	No
RS369	1	B	66	48	62	**14**	No	**Yes**
RS370	1	B	66	46	57	**11**	No	**Yes**
RS371	1	B	66	46	52	6	No	No
RS372	1	B	66	46	50	4	No	No
RS373	1	B	66	46	47	1	No	No
RS374	1	B	66	50	64	**14**	No	**Yes**
RS375	1	B	66	46	61	**15**	No	**Yes**
RS376	1	B	66	46	55	9	No	No
RS377	1	B	66	46	52	6	No	No
RS378	1	B	66	46	49	3	No	No

Table 4. TNM 2.5 Existing (2024) and Future (2050) Condition Noise Level Results and Impacts

Receiver	Receptors Represented	Land Use Activity Category	UDOT NAC (dBA)	Existing Noise Level[1] (dBA)	Future Noise Level[1] (dBA)	Noise Level Difference (dBA)	Impact	
							≥ UDOT NAC	≥ 10 dBA Increase Over Existing
RS379	1	B	66	46	46	0	No	No
RS380	1	B	66	46	54	8	No	No
RS381	1	B	66	46	57	**11**	No	**Yes**
RS382	1	B	66	46	51	5	No	No
RS383	1	B	66	46	50	4	No	No
RS384	1	B	66	46	48	2	No	No
RS385	1	B	66	46	46	0	No	No
RS386	1	B	66	46	54	8	No	No
RS387	1	B	66	46	52	6	No	No
RS388	1	B	66	46	50	4	No	No
RS389	1	B	66	46	50	4	No	No
RS390	1	B	66	46	46	0	No	No
RS391	1	B	66	46	48	2	No	No
RS392	1	B	66	46	46	0	No	No
RS393	1	B	66	46	59	**13**	No	**Yes**
RS394	1	B	66	46	55	9	No	No
RS395	1	B	66	46	54	8	No	No
RS396	1	B	66	46	52	6	No	No
RS397	1	B	66	46	53	7	No	No
RS398	1	B	66	46	49	3	No	No
RS399	1	B	66	46	51	5	No	No
RS400	1	B	66	46	48	2	No	No
RS401	1	B	66	46	50	4	No	No
RS402	1	B	66	46	48	2	No	No
RS403	1	B	66	46	51	5	No	No
RS404	1	B	66	46	48	2	No	No
RS405	1	B	66	46	53	7	No	No

[1] *dBA rounded to the nearest integer.*

8 NOISE ABATEMENT ANALYSIS

All impacted receptors are considered for noise abatement analysis. Sections 8.1 through 8.13 discuss the detailed barrier analyses that considered noise abatement for impacted receptors. Each barrier analysis was conducted to determine a recommended barrier height and length at impacted receptors. A recommended barrier would provide sufficient noise reduction (i.e., is acoustically *feasible* and *reasonable*) at an allowable cost, as defined in Section 4, *Noise Abatement*. The following steps were applied for the noise barrier analysis to recommend or not recommend a noise barrier for balloting:

1. Determine the location of the barrier between the traffic noise source and impacted receptors based on engineering considerations.
2. Determine the estimated length of the barrier based on the distance of the end impacted receptors from the outside travel lane of the traffic noise source.
3. Evaluate a range of uniform barrier heights (i.e., a barrier that has the same height across its entire length) and adjust barrier lengths according to the height to meet *feasible* and *reasonable* criteria, including cost effectiveness. The maximum barrier height considered in each barrier analysis is 17 feet, as recommended in UDOT's *2024 Standard Drawings for Road and Bridge Construction* (UDOT 2024). The minimum barrier height is limited either to the minimum barrier height of six feet tall as recommended in UDOT's *2024 Standard Drawings for Road and Bridge Construction*, a barrier that is either not acoustically feasible, or a barrier that does not meet the noise reduction design goal. Barriers between and including the minimum and maximum heights are evaluated to determine if increasing the barrier height would qualify a barrier to be considered both *feasible* and *reasonable*. In general, taller barrier heights will provide a greater noise reduction and will shorten the overall barrier length.

The following sections describe 13 detailed barrier analyses that considered noise abatement (i.e., noise barriers) for impacted receptors.

8.1 Noise Barrier 1 – Proposed

This analysis evaluates noise abatement as a noise barrier for 48 impacted receptors represented by receivers RS145–RS166, RS175, RS178, RS179, RS185, RS190, RS199, RS201, RS211–RS213, RS215, RS227–RS230, RS241–RS244, and RS257–RS263 (see Exhibit 1, *Noise Receptors*). Three noise barrier scenarios are included in this analysis:

- A barrier system (Noise Barrier 1 System Analysis) including two barriers with a gap in the middle. A Bureau of Reclamation buried canal is in this gap, and structures cannot be built on this property.
- A single barrier (Noise Barrier 1 North Analysis) for receptors north of the Bureau of Reclamation property.
- A single barrier (Noise Barrier 1 South Analysis) for receptors south of the Bureau of Reclamation property.

8.1.1 Noise Barrier 1 System Analysis

The barriers evaluated range in heights from 15 feet to 17 feet, and lengths of 1,819 feet to 1,969 (see Table 5 and Exhibit 2, *Noise Barriers*).

All barriers achieve at least a five-dBA noise reduction for at least 50 percent of front-row receptors and are therefore acoustically feasible.

All barriers, except for the 15-foot-tall barrier, achieve at least a seven-dBA noise reduction for at least 35 percent of front-row receptors and therefore meet the noise reduction design goal. Therefore, the 15-foot-tall barrier is not evaluated further in this analysis.

All remaining barriers cost less than the $30,000 allowance per benefited receptor for Activity Category B receptors; however, the remaining barriers do not cost less than $360 per linear foot for the Activity Category C receptor. Therefore, the 16-foot-tall and 17-foot-tall barriers are not evaluated further in this analysis.

8.1.2 Noise Barrier 1 North Analysis

The barriers evaluated range in heights from 15 feet to 17 feet, and lengths of 1,169 feet to 1,194 feet (see Table 5 and Exhibit 2, *Noise Barriers*).

All barriers achieve at least a five-dBA noise reduction for at least 50 percent of front-row receptors and are therefore acoustically feasible.

All barriers, except for the 15-foot-tall barrier, achieve at least a seven-dBA noise reduction for at least 35 percent of front-row receptors and therefore meet the noise reduction design goal. Therefore, the 15-foot-tall barrier is not evaluated further in this analysis.

All remaining barriers cost less than the $30,000 allowance per benefited receptor for Activity Category B receptors.

8.1.3 Noise Barrier 1 South Analysis

The barrier evaluated is 17 feet tall and 1,600 feet long (see Table 5 and Exhibit 2, *Noise Barriers*).

The barrier does not achieve at least a five-dBA noise reduction for at least 50 percent of front-row receptors and is therefore not acoustically feasible. Therefore, the 17-foot-tall barrier is not evaluated further in this analysis.

8.1.4 Noise Barrier 1 Scenarios Conclusions

Noise Barrier 1 System Analysis Conclusion: The barriers are not considered *feasible* and *reasonable*. Therefore, the barriers are not recommended for balloting (see Table 5).

Noise Barrier 1 North Analysis Conclusion: Barriers ranging in height from 16 feet to 17 feet are considered *feasible* and *reasonable*. The 16-foot-tall barrier benefits the same number of receptors as the 17-foot-tall barrier and costs less per benefited receptor. Therefore, a 16-foot-tall barrier is recommended for balloting (see Table 5).

Noise Barrier 1 South Analysis Conclusion: The barrier is not considered *feasible* and *reasonable*. Therefore, the barrier is not recommended for balloting (see Table 5).

Table 5. Noise Barrier 1 Analysis Summary

Barrier Height (Feet)	Barrier Length for Activity Category B Receptors (Feet)	Barrier Length for Activity Category C Receptors (Feet)	Front-Row Receptors with ≥5 dBA Reduction (Percent)	Front-Row Receptors with ≥7 dBA Reduction (Percent)	Number of Benefited Receptors	Cost Per Benefited Receptor for NAC Activity Category B ($30,000)	Cost for NAC Activity Category C Receptor ($360 Per Linear Foot)	Barrier Recommended for Balloting
Noise Barrier 1 System								
15	1,194	775	60	30	n/a	n/a	n/a	No
16	1,194	675	60	40	33	$16,101	$465	No
17	1,194	625	60	40	33	$16,825	$445	No
Noise Barrier 1 North								
15	1,194	n/a	67	33	n/a	n/a	n/a	No
16	**1,169**	**n/a**	**67**	**44**	**22**	**$23,646**	**n/a**	**Yes**
17	1,169	n/a	67	44	22	$24,708	n/a	No
Noise Barrier 1 South								
15	1,194	n/a	67	33	n/a	n/a	n/a	No

8.2 Noise Barrier 2 – Existing Barrier

This analysis evaluates noise abatement at the existing 16-foot-tall noise barrier on the east side of SR-177 for 17 impacted receptors represented by receivers RS264–RS272, RS296, RS297, RS303–RS305, RS308, RS316, and RS317 (see Exhibit 1, *Noise Receptors*). In accordance with FHWA guidance, the existing barrier was evaluated to determine noise levels for the impacted receptors in a "no barrier" scenario. This "no barrier" scenario was then compared to the "with barrier" scenario to determine if the existing barrier satisfied the requirements of the UDOT *Noise Abatement Policy 08A2-01* for acoustic feasibility and met the noise reduction design goal. The barrier evaluated is 16 feet tall and 1,598 feet long (see Table 6 and Exhibit 2, *Noise Barriers*).

The barrier achieves at least a five-dBA noise reduction for at least 50 percent of front-row receptors and is therefore acoustically feasible.

The barrier achieves at least a seven-dBA noise reduction for at least 35 percent of front-row receptors and therefore meets the noise reduction design goal.

Noise Barrier 2 Analysis Conclusion: The existing 16-foot-tall barrier is acoustically feasible and meets the noise reduction design goal. Therefore, the existing barrier is recommended to remain in place (see Table 6).

Table 6. Noise Barrier 2 Analysis Summary

Barrier Height (Feet)	Barrier Length (Feet)	Front-Row Receptors with ≥5 dBA Reduction (Percent)	Front-Row Receptors with ≥7 dBA Reduction (Percent)
16	1,598	100	78

8.3 Noise Barrier 3 – Proposed

This analysis evaluates noise abatement as a noise barrier for eight impacted receptors represented by receivers RS273, RS274, RS325–RS327, RS334, RS340, and RS341 (see Exhibit 1, *Noise Receptors*). The barrier evaluated is 17 feet tall and 910 feet long (see Table 7 and Exhibit 2, *Noise Barriers*).

The barrier does not achieve at least a five-dBA noise reduction for at least 50 percent of front-row receptors and is therefore not acoustically feasible. Therefore, the 17-foot-tall barrier is not evaluated further in this analysis.

Noise Barrier 3 Analysis Conclusion: The barrier is not considered *feasible* and *reasonable*. Therefore, a barrier is not recommended for balloting (see Table 7).

Table 7. Noise Barrier 3 Analysis Summary

Barrier Height (Feet)	Barrier Length (Feet)	Front-Row Receptors with ≥5 dBA Reduction (Percent)	Front-Row Receptors with ≥7 dBA Reduction (Percent)	Number of Benefited Receptors	Cost Per Benefited Receptor for NAC Activity Category B ($30,000)	Barrier Recommended for Balloting
17	910	33	n/a	n/a	n/a	No

8.4 Noise Barrier 4 – Proposed

This analysis evaluates noise abatement as a noise barrier for six impacted receptors represented by receivers RS276–RS279, RS374, and RS393 (see Exhibit 1, *Noise Receptors*). The barrier evaluated is 17 feet tall and 1,205 feet long (see Table 8 and Exhibit 2, *Noise Barriers*).

The barrier does not achieve at least a five-dBA noise reduction for at least 50 percent of front-row receptors and is therefore not acoustically feasible. Therefore, the 17-foot-tall barrier is not evaluated further in this analysis.

Noise Barrier 4 Analysis Conclusion: The barrier is not considered *feasible* and *reasonable*. Therefore, a barrier is not recommended for balloting (see Table 8).

Table 8. Noise Barrier 4 Analysis Summary

Barrier Height (Feet)	Barrier Length (Feet)	Front-Row Receptors with ≥5 dBA Reduction (Percent)	Front-Row Receptors with ≥7 dBA Reduction (Percent)	Number of Benefited Receptors	Cost Per Benefited Receptor for NAC Activity Category B ($30,000)	Barrier Recommended for Balloting
17	1,205	0	n/a	n/a	n/a	No

8.5 Noise Barrier 5 – Proposed

This analysis evaluates noise abatement as a noise barrier for 10 impacted receptors represented by receivers RS120 and RS135–RS143 (see Exhibit 1, *Noise Receptors*). The barrier evaluated is 17 feet tall and 1,739 feet long (see Table 9 and Exhibit 2, *Noise Barriers*).

The barrier does not achieve at least a five-dBA noise reduction for at least 50 percent of front-row receptors and is therefore not acoustically feasible. Therefore, the 17-foot-tall barrier is not evaluated further in this analysis.

Noise Barrier 5 Analysis Conclusion: The barrier is not considered *feasible* and *reasonable*. Therefore, a barrier is not recommended for balloting (see Table 9).

Table 9. Noise Barrier 5 Analysis Summary

Barrier Height (Feet)	Barrier Length (Feet)	Front-Row Receptors with ≥5 dBA Reduction (Percent)	Front-Row Receptors with ≥7 dBA Reduction (Percent)	Number of Benefited Receptors	Cost Per Benefited Receptor for NAC Activity Category B ($30,000)	Barrier Recommended for Balloting
17	1,739	0	n/a	n/a	n/a	No

8.6 Noise Barrier 6 – Proposed

This analysis evaluates noise abatement as a noise barrier for seven impacted receptors represented by receivers RM111–RM116 and RM118 (see Exhibit 1, *Noise Receptors*). The barrier evaluated is 17 feet tall and 1,756 feet long (see Table 10 and Exhibit 2, *Noise Barriers*).

The barrier does not achieve at least a five-dBA noise reduction for at least 50 percent of front-row receptors and is therefore not acoustically feasible. Therefore, the 17-foot-tall barrier is not evaluated further in this analysis.

Noise Barrier 6 Analysis Conclusion: The barrier is not considered *feasible* and *reasonable*. Therefore, a barrier is not recommended for balloting (see Table 10).

Table 10. Noise Barrier 6 Analysis Summary

Barrier Height (Feet)	Barrier Length (Feet)	Front-Row Receptors with ≥5 dBA Reduction (Percent)	Front-Row Receptors with ≥7 dBA Reduction (Percent)	Number of Benefited Receptors	Cost Per Benefited Receptor for NAC Activity Category B ($30,000)	Barrier Recommended for Balloting
17	1,756	11	n/a	n/a	n/a	No

8.7 Noise Barrier 7 – Proposed

This analysis evaluates noise abatement as a noise barrier for 42 impacted receptors represented by receivers RM001–RM014, RM023–RM027, RM034, RM035, RM044, RM045, RM052, RM062–RM065, RM067, RM068, RM070, RM072, RM074–RM079, RM085–RM087, and RM106 (see Exhibit 1, *Noise Receptors*). The barriers evaluated range in heights from nine feet to 17 feet, and lengths of 2,032 feet to 2,557 feet (see Table 11 and Exhibit 2, *Noise Barriers*). All barriers include a 10-foot-tall and 157-foot-long barrier segment on the bridge crossing over 300 North; ten feet is the maximum height UDOT's noise policy allows for a noise barrier installed on a structure.

All barriers achieve at least a five-dBA noise reduction for at least 50 percent of front-row receptors and are therefore acoustically feasible.

All barriers, except for the nine-foot-tall barrier, achieve at least a seven-dBA noise reduction for at least 35 percent of front-row receptors and therefore meet the noise reduction design goal. Therefore, the nine-foot-tall barrier is not evaluated further in this analysis.

All barriers, except for the 10-foot-tall barrier, cost less than the $30,000 allowance per benefited receptor and are therefore cost-effective. Therefore, the 10-foot-tall barrier is not evaluated further in this analysis.

Noise Barrier 7 Analysis Conclusion: Barriers ranging in height from 11 feet to 17 feet are considered *feasible* and *reasonable*. The 15-foot-tall barrier benefits the same number of receptors as the 16-foot and 17-foot-tall barriers, and costs less per benefited receptor than all other barriers. Therefore, a 15-foot-tall barrier is recommended for balloting (see Table 11).

Table 11. Noise Barrier 7 Analysis Summary

Barrier Height (Feet)	Barrier Length (Feet)	Front-Row Receptors with ≥5 dBA Reduction (Percent)	Front-Row Receptors with ≥7 dBA Reduction (Percent)	Number of Benefited Receptors	Cost Per Benefited Receptor for NAC Activity Category B ($30,000)	Barrier Recommended for Balloting
9	2,557	82	18	n/a	n/a	No
10	2,557	82	55	26	$31,208	No
11	2,557	82	64	29	$29,634	No
12	2,282	82	64	34	$23,736	No
13	2,257	82	64	36	$23,331	No
14	2,257	82	64	39	$22,613	No
15	**2,057**	**82**	**73**	**40**	**$20,973**	**Yes**
16	2,032	82	73	40	$21,644	No
17	2,032	82	73	40	$22,582	No

8.8 Noise Barrier 8 – Proposed

This analysis evaluates noise abatement as a noise barrier for 20 impacted receptors represented by receivers RM119–RM124, RM130, RM155–RM160, RM165, RM166, RM169, and RM197–RM200 (see Exhibit 1, *Noise Receptors*). The barrier evaluated is 17 feet tall and 772 feet long (see Table 12 and Exhibit 2, *Noise Barriers*).

The barrier achieves at least a five-dBA noise reduction for at least 50 percent of front-row receptors and is therefore acoustically feasible.

The barrier does not achieve at least a seven-dBA noise reduction for at least 35 percent of front-row receptors and therefore does not meet the noise reduction design goal. Therefore, the 17-foot-tall barrier is not evaluated further in this analysis.

Noise Barrier 8 Analysis Conclusion: The barrier is not considered *feasible* and *reasonable*. Therefore, a barrier is not recommended for balloting (see Table 12).

Table 12. Noise Barrier 8 Analysis Summary

Barrier Height (Feet)	Barrier Length (Feet)	Front-Row Receptors with ≥5 dBA Reduction (Percent)	Front-Row Receptors with ≥7 dBA Reduction (Percent)	Number of Benefited Receptors	Cost Per Benefited Receptor for NAC Activity Category B ($30,000)	Barrier Recommended for Balloting
17	772	100	0	n/a	n/a	No

8.9 Noise Barrier 9 – Proposed

This analysis evaluates noise abatement as a noise barrier for two impacted receptors represented by receivers RM012 and RM106 (see Exhibit 1, *Noise Receptors*). The barrier evaluated is 17 feet tall and 1,136 feet long (see Table 13 and Exhibit 2, *Noise Barriers*).

The barrier achieves at least a five-dBA noise reduction for at least 50 percent of front-row receptors and is therefore acoustically feasible.

The barrier does not achieve at least a seven-dBA noise reduction for at least 35 percent of front-row receptors and therefore does not meet the noise reduction design goal. Therefore, the 17-foot-tall barrier is not evaluated further in this analysis.

Noise Barrier 9 Analysis Conclusion: The barrier is not considered *feasible* and *reasonable*. Therefore, a barrier is not recommended for balloting (see Table 13).

Table 13. Noise Barrier 9 Analysis Summary

Barrier Height (Feet)	Barrier Length (Feet)	Front-Row Receptors with ≥5 dBA Reduction (Percent)	Front-Row Receptors with ≥7 dBA Reduction (Percent)	Number of Benefited Receptors	Cost Per Benefited Receptor for NAC Activity Category B ($30,000)	Barrier Recommended for Balloting
17	1,136	100	0	n/a	n/a	No

8.10 Noise Barrier 10 – Proposed

This analysis evaluates noise abatement as a noise barrier for 30 impacted receptors represented by receivers RM131–RM154, RM202, RM203, RM207, RM209, RM233, and RM238 (see Exhibit 1, *Noise Receptors*). The barrier evaluated is 17 feet tall and 2,455 feet long (see Table 14 and Exhibit 2, *Noise Barriers*).

The barrier does not achieve at least a five-dBA noise reduction for at least 50 percent of front-row receptors and is therefore not acoustically feasible. Therefore, the 17-foot-tall barrier is not evaluated further in this analysis.

Noise Barrier 10 Analysis Conclusion: The barrier is not considered *feasible* and *reasonable*. Therefore, a barrier is not recommended for balloting (see Table 14).

Table 14. Noise Barrier 10 Analysis Summary

Barrier Height (Feet)	Barrier Length (Feet)	Front-Row Receptors with ≥5 dBA Reduction (Percent)	Front-Row Receptors with ≥7 dBA Reduction (Percent)	Number of Benefited Receptors	Cost Per Benefited Receptor for NAC Activity Category B ($30,000)	Barrier Recommended for Balloting
17	2,455	17	n/a	n/a	n/a	No

8.11 Noise Barrier 11 – Proposed

This analysis evaluates noise abatement as a noise barrier for five impacted receptors represented by receivers RN001 and RN020–RN023 (see Exhibit 1, *Noise Receptors*). The barriers evaluated range in heights from seven feet to 17 feet, and lengths of 150 feet to 541 feet (see Table 15 and Exhibit 2, *Noise Barriers*).

All barriers achieve at least a five-dBA noise reduction for at least 50 percent of front-row receptors and are therefore acoustically feasible.

All barriers, except for the seven-foot-tall barrier, achieve at least a seven-dBA noise reduction for at least 35 percent of front-row receptors and therefore meet the noise reduction design goal. Therefore, the seven-foot-tall barrier is not evaluated further in this analysis.

The remaining barriers cost more than the $30,000 allowance per benefited receptor and are therefore not cost-effective.

Noise Barrier 11 Analysis Conclusion: The analysis evaluated barriers ranging from 14 to 17 feet in height, which benefited the maximum number of receptors but exceeded the $30,000 allowance per benefited receptor, making them not cost-effective. The analysis then evaluated barriers ranging from seven to 13 feet in height, which benefited fewer receptors, but their shorter lengths increased the likelihood of the barrier being cost-effective. However, barriers at these shorter heights and lengths still exceed the $30,000 allowance per benefited receptor, making them not cost-effective. Therefore, no barriers are considered *feasible* and *reasonable* and a barrier at this location is not recommended for balloting (see Table 15).

Table 15. Noise Barrier 11 Analysis Summary

Barrier Height (Feet)	Barrier Length (Feet)	Front-Row Receptors with ≥5 dBA Reduction (Percent)	Front-Row Receptors with ≥7 dBA Reduction (Percent)	Number of Benefited Receptors	Cost Per Benefited Receptor for NAC Activity Category B ($30,000)	Barrier Recommended for Balloting
7	541	100	0	n/a	n/a	No
8	250	100	100	1	$71,250	No
9	190	100	100	1	$57,950	No
10	170	100	100	1	$55,250	No
11	160	100	100	1	$55,200	No
12	150	100	100	1	$54,750	No
13	210	100	100	1	$80,850	No
14	541	100	100	3	$73,035	No
15	541	100	100	3	$76,642	No
16	510	100	100	3	$75,650	No
17	489	100	100	3	$75,795	No

8.12 Noise Barrier 12 – Proposed

This analysis evaluates noise abatement as a noise barrier for 34 impacted receptors represented by receivers RN002–RN014, RN033–RN037, RN039, RN042–RN045, RN050, RN054, RN057, RN059, RN063, RN067, RN070–RN072, RN079, and RN087 (see Exhibit 1, *Noise Receptors*). The barrier evaluated is 17 feet tall and 3,914 feet long, with a 10-foot-tall and 164-foot-long barrier segment on the bridge crossing over 1300 North (see Table 16 and Exhibit 2, *Noise Barriers*). Ten feet is the maximum height UDOT's noise policy allows for a noise barrier installed on a structure.

The barrier achieves at least a five-dBA noise reduction for at least 50 percent of front-row receptors and is therefore acoustically feasible.

The barrier does not achieve at least a seven-dBA noise reduction for at least 35 percent of front-row receptors and therefore does not meet the noise reduction design goal. Therefore, the 17-foot-tall barrier is not evaluated further in this analysis.

Noise Barrier 12 Analysis Conclusion: The barrier is not considered *feasible* and *reasonable*. Therefore, a barrier is not recommended for balloting (see Table 16).

Table 16. Noise Barrier 12 Analysis Summary

Barrier Height (Feet)	Barrier Length (Feet)	Front-Row Receptors with ≥5 dBA Reduction (Percent)	Front-Row Receptors with ≥7 dBA Reduction (Percent)	Number of Benefited Receptors	Cost Per Benefited Receptor for NAC Activity Category B ($30,000)	Barrier Recommended for Balloting
17	3,914	71	29	n/a	n/a	No

8.13 Noise Barrier 13 – Proposed

This analysis evaluates noise abatement as a noise barrier for 54 impacted receptors represented by receivers RN102–RN133, RN179, RN189, RN193, RN199, RN203, RN211–RN213, RN215, RN220, RN222, RN223, RN228, RN229, RN232, RN235, RN236, RN238, RN239, and RN241–RN244 (see Exhibit 1, *Noise Receptors*). The barriers evaluated range in heights from 11 feet to 17 feet, and lengths of 2,644 feet to 2,994 feet (see Table 17 and Exhibit 2, *Noise Barriers*). All barriers include a 10-foot-tall and 169-foot-long barrier segment on the bridge crossing over 1300 North. Ten feet is the maximum height UDOT's noise policy allows for a noise barrier installed on a structure.

All barriers achieve at least a five-dBA noise reduction for at least 50 percent of front-row receptors and are therefore acoustically feasible.

All barriers, except for the 11-foot-tall barrier, achieve at least a seven-dBA noise reduction for at least 35 percent of front-row receptors and therefore meet the noise reduction design goal. The 11-foot-tall barrier is not evaluated further in this analysis.

The remaining barriers each cost more than the $30,000 allowance per benefited receptor and are therefore not cost-effective.

8.13.1 Noise Barrier 13 Optimized

Because the 17-foot-tall barrier is near the $30,000 allowance per benefited receptor, an optimized barrier was analyzed to determine if reducing end barrier segments at one-foot increments could reduce the cost per benefited receptor while remaining acoustically feasible and meeting the noise reduction design goal.

The evaluated optimized barrier ranges in height from 13 feet to 17 feet; is 2,644 feet long; and includes a 10-foot-tall and 169-foot-long barrier segment on the bridge crossing over 1300 North.

The optimized barrier achieves at least a five-dBA noise reduction for at least 50 percent of front-row receptors and is therefore acoustically feasible.

The optimized barrier achieves at least a seven-dBA noise reduction for at least 35 percent of front-row receptors and therefore meets the noise reduction design goal.

The optimized barrier costs less than the $30,000 allowance per benefited receptor and is therefore cost-effective.

Noise Barrier 13 Analysis Conclusion: Barriers ranging in uniform heights from 11 feet to 17 feet are not considered *feasible* and *reasonable*. However, an optimized barrier that ranges in height from 13 feet to 17 feet is considered *feasible* and *reasonable*. Therefore, the optimized barrier is recommended for balloting (see Table 17).

Table 17. Noise Barrier 13 Analysis Summary

Barrier Height (Feet)	Barrier Length (Feet)	Front-Row Receptors with ≥5 dBA Reduction (Percent)	Front-Row Receptors with ≥7 dBA Reduction (Percent)	Number of Benefited Receptors	Cost Per Benefited Receptor for NAC Activity Category B ($30,000)	Barrier Recommended for Balloting
11	2,994	74	32	n/a	n/a	No
12	2,994	79	42	27	$39,442	No
13	2,969	79	58	28	$39,707	No
14	2,969	95	58	35	$33,366	No
15	2,794	95	58	37	$31,066	No
16	2,744	95	63	38	$31,044	No
Optimized 13–17	**2,644**	**89**	**63**	**39**	**$29,915**	**Yes**
17	2,719	95	63	40	$30,489	No

9 CONSTRUCTION NOISE

Land uses that are sensitive to traffic noise are also sensitive to construction noise during UDOT project delivery. UDOT typically controls construction noise by limiting the hours that construction equipment can be operated and requiring permissible sound levels when construction is occurring. UDOT has developed a supplemental specification—2024 UDOT Special Provision 00555—that establishes noise control during construction (UDOT 2024). All UDOT contractors are required to conform to this specification to reduce the impact of construction noise on the surrounding community. This specification would be applicable for the Proposed Action.

10 COORDINATION WITH LOCAL OFFICIALS

Land use compatibility noise data was developed to inform local authorities of future noise levels on undeveloped land next to the Proposed Action, specifically land adjacent to SR-177 which is a major traffic noise generator. For this analysis, one undeveloped property was selected on the west side of SR-177at approximately 500 North. The 66 dBA contour would be approximately 250 feet from the edge of the outside lane. The 71 dBA contour would be approximately 50 feet from the edge of the outside lane.

Although the noise contour information is based on the results of the noise modeling, it should not be interpreted to be site specific for any areas along SR-177. Variations in terrain, the roadway profile, the proximity to intersections, and existing development could change the distances of these noise contours. This information is intended only to provide a general guide for future planning and should not be used in the final design or layout of future development.

11 CONCLUSIONS

The following sections provide conclusions for the traffic noise impacts analysis and the noise abatement analysis for the Proposed Action.

11.1 Traffic Noise Impact Analysis Conclusions

For the existing condition, outdoor noise levels range from 46 dBA to 65 dBA. Indoor noise levels range from 21 dBA to 37 dBA. Of the 764 receptors in this analysis, none are impacted in the existing condition.

For the future condition (2050), outdoor noise levels range from 46 dBA to 74 dBA. Indoor noise levels range from 25 dBA to 40 dBA. Of the 764 receptors in this analysis, 283 receptors are impacted in the future condition:

- 43 receptors would have a noise level greater than or equal to their NAC threshold.
- 282 receptors would receive an increase of 10 dBA or more over their existing noise levels.
- 42 receptors would experience both types of impacts.

11.2 Noise Abatement Analysis Conclusions

Thirteen barrier analyses considered noise abatement for impacted receptors (see Table 18).

Table 18. Noise Barrier Analysis Summary and Barriers Recommended for Balloting

Barrier Analysis	Barrier Recommended for Balloting	Barrier Height (Feet)	Barrier Length (Feet)
1	**Yes**	**16**	**1,169**
2	**Existing Barrier Remain in Place**	**16**	**1,598**
3	No	n/a	n/a
4	No	n/a	n/a
5	No	n/a	n/a
6	No	n/a	n/a
7	**Yes**	**15**	**2,057**
8	No	n/a	n/a
9	No	n/a	n/a
10	No	n/a	n/a
11	No	n/a	n/a
12	No	n/a	n/a
13	**Yes**	**Optimized 13–17**	**2,644**

12 REFERENCES

[FHWA] Federal Highway Administration. 1980. *Highway Noise Fundamentals*. September.

–––. 2011. *Highway Traffic Noise: Analysis and Abatement Guidance*. Available at: https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/. December.

–––. 2018a. *Techniques for Reviewing Noise Analyses and Associated Noise Reports*. Available at: https://www.fhwa.dot.gov/Environment/noise/resources/reviewing_noise_analysis/. June1.

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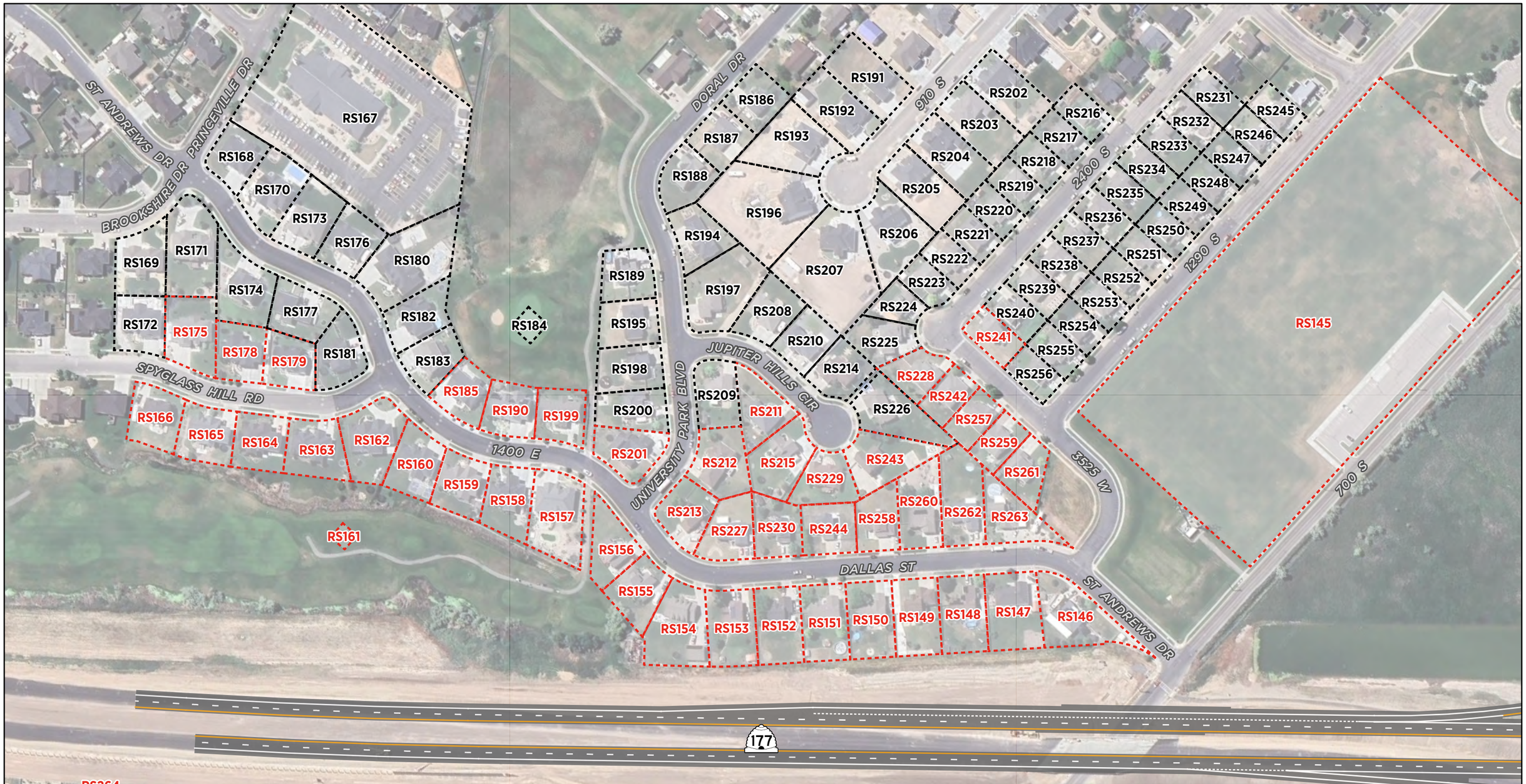
[UDOT] Utah Department of Transportation. 2020. *Noise Abatement UDOT 08A2-01*. May 28.

–––. 2024. *Utah Department of Transportation 2024 Standard Drawings for Road and Bridge Construction*. Available at: https://www.udot.utah.gov/connect/business/standards/. January.

EXHIBIT 1: NOISE RECEPTORS

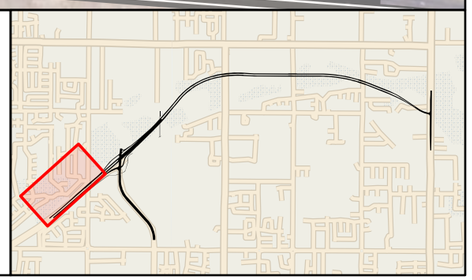


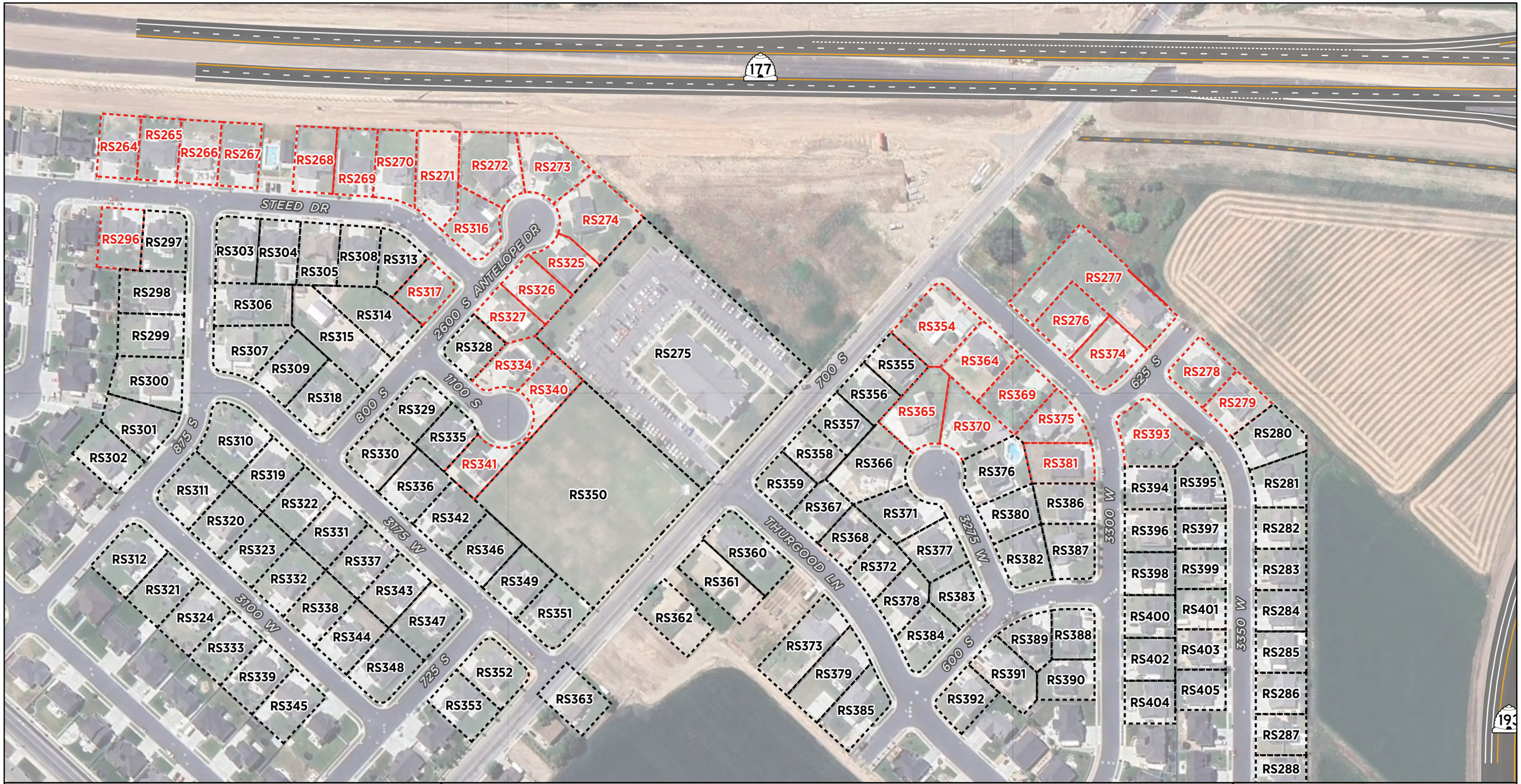
SR-177; SR-193 to 1800 North Re-Evaluation
Traffic Noise Study
Exhibit 1: Noise Receptors
UDOT Project No.: S-R199(381)
UDOT PIN: 20927

Proposed Action Design
Impacted Receptor
Receptor Area

N

0 125 250 500 Feet





SR-177; SR-193 to 1800 North Re-Evaluation
Traffic Noise Study
Exhibit 1: Noise Receptors
UDOT Project No.: S-R199(381)
UDOT PIN: 20927

Proposed Action Design
Impacted Receptor
Receptor Area

N

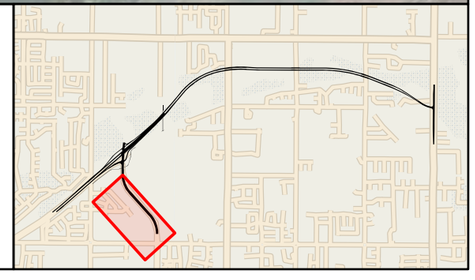
0 125 250 500 Feet

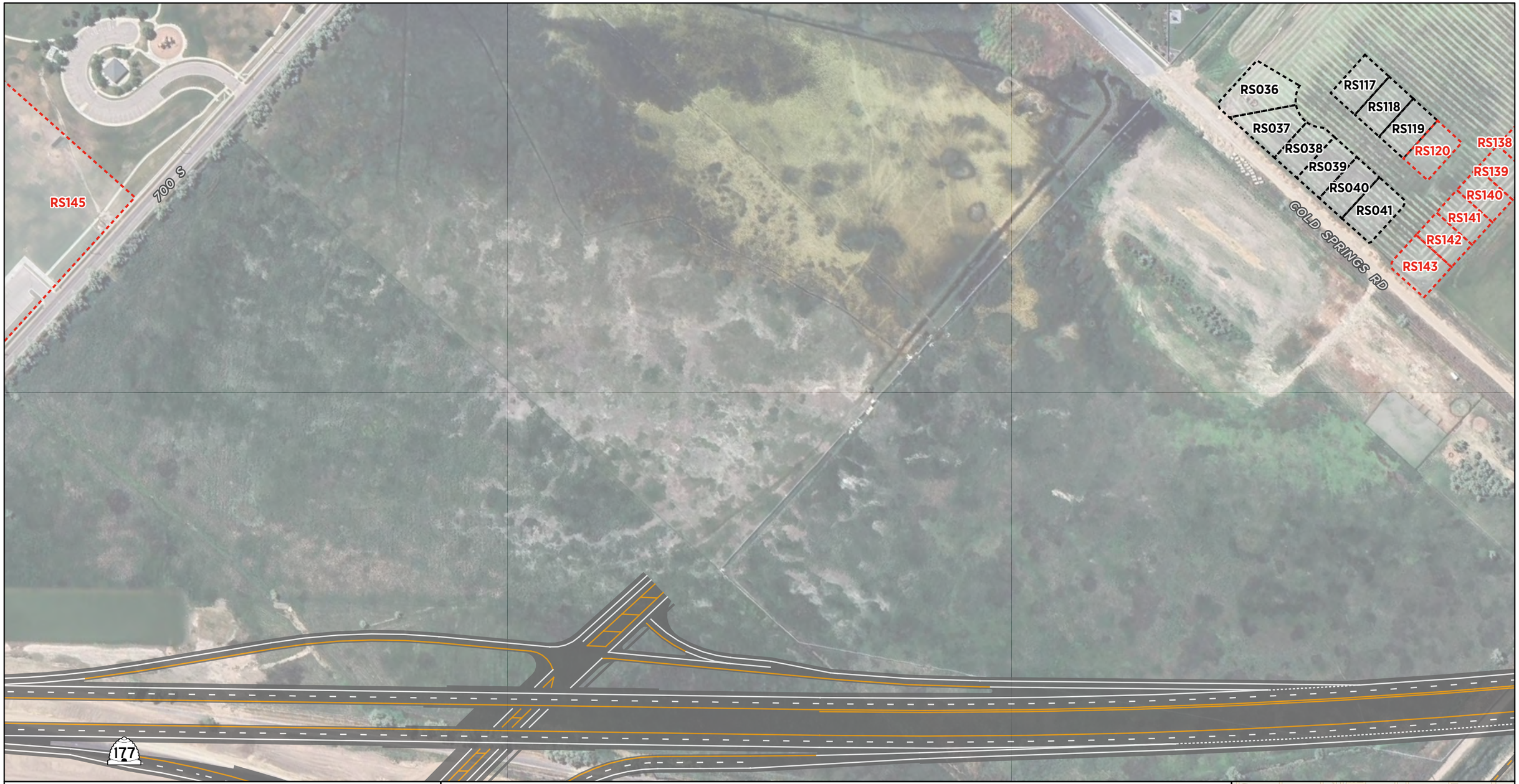
SR-177; SR-193 to 1800 North Re-Evaluation
Traffic Noise Study
Exhibit 1: Noise Receptors
UDOT Project No.: S-R199(381)
UDOT PIN: 20927

Proposed Action Design
Impacted Receptor
Receptor Area

N

0 125 250 500 Feet



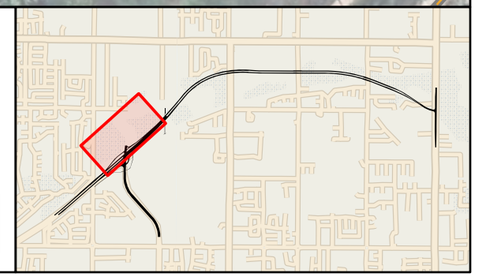


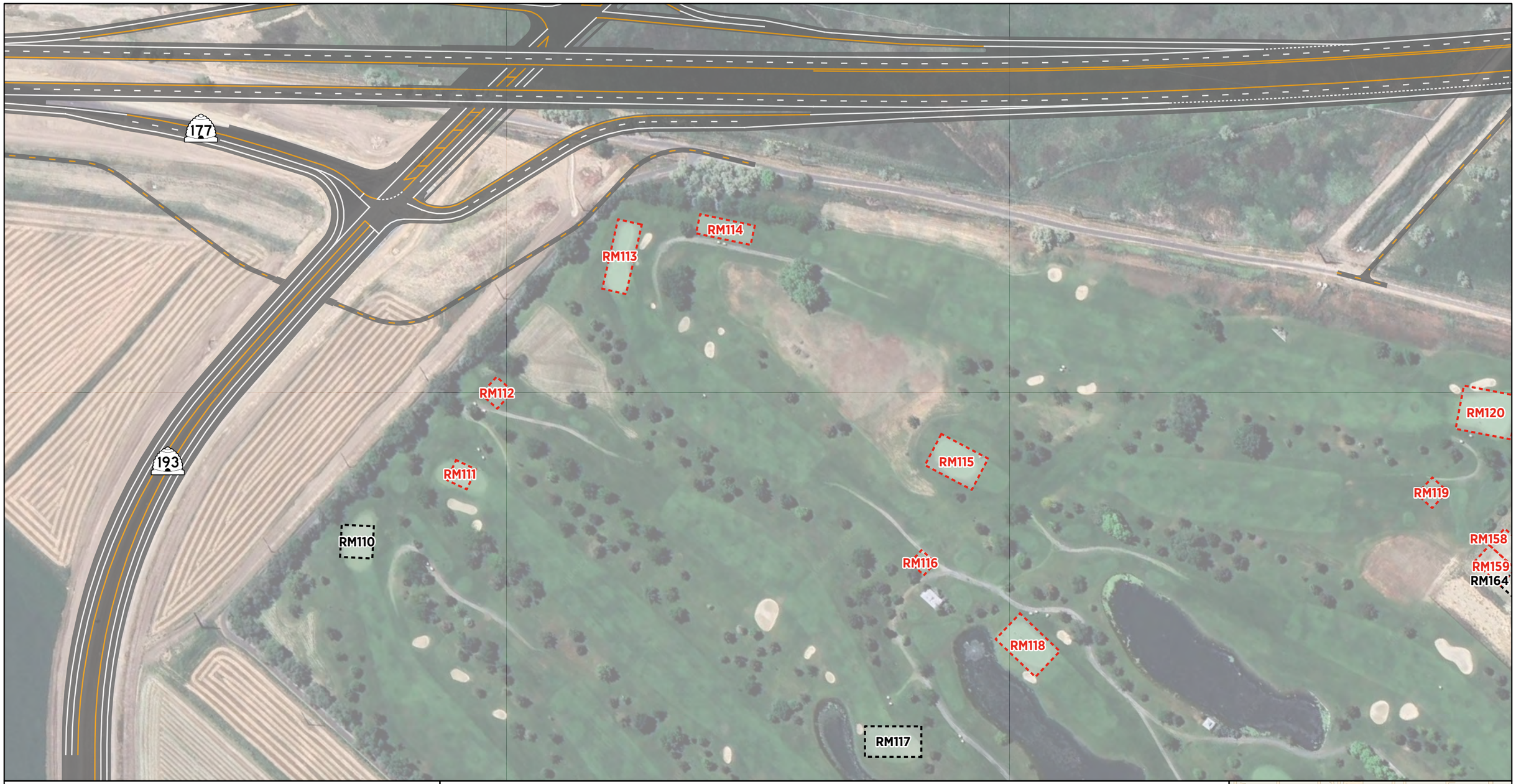
SR-177; SR-193 to 1800 North Re-Evaluation
Traffic Noise Study
Exhibit 1: Noise Receptors
UDOT Project No.: S-R199(381)
UDOT PIN: 20927

Proposed Action Design
Impacted Receptor
Receptor Area

N

0 125 250 500 Feet



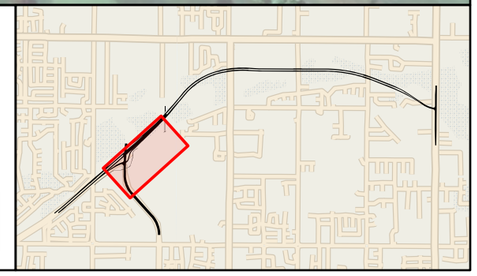


SR-177; SR-193 to 1800 North Re-Evaluation
Traffic Noise Study
Exhibit 1: Noise Receptors
UDOT Project No.: S-R199(381)
UDOT PIN: 20927

Proposed Action Design
Impacted Receptor
Receptor Area

N

0 125 250 500 Feet

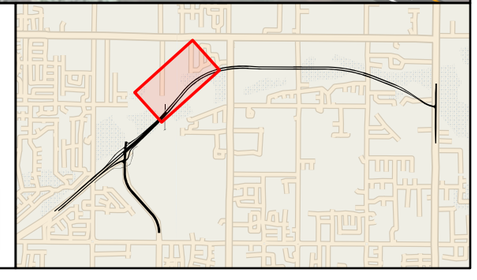


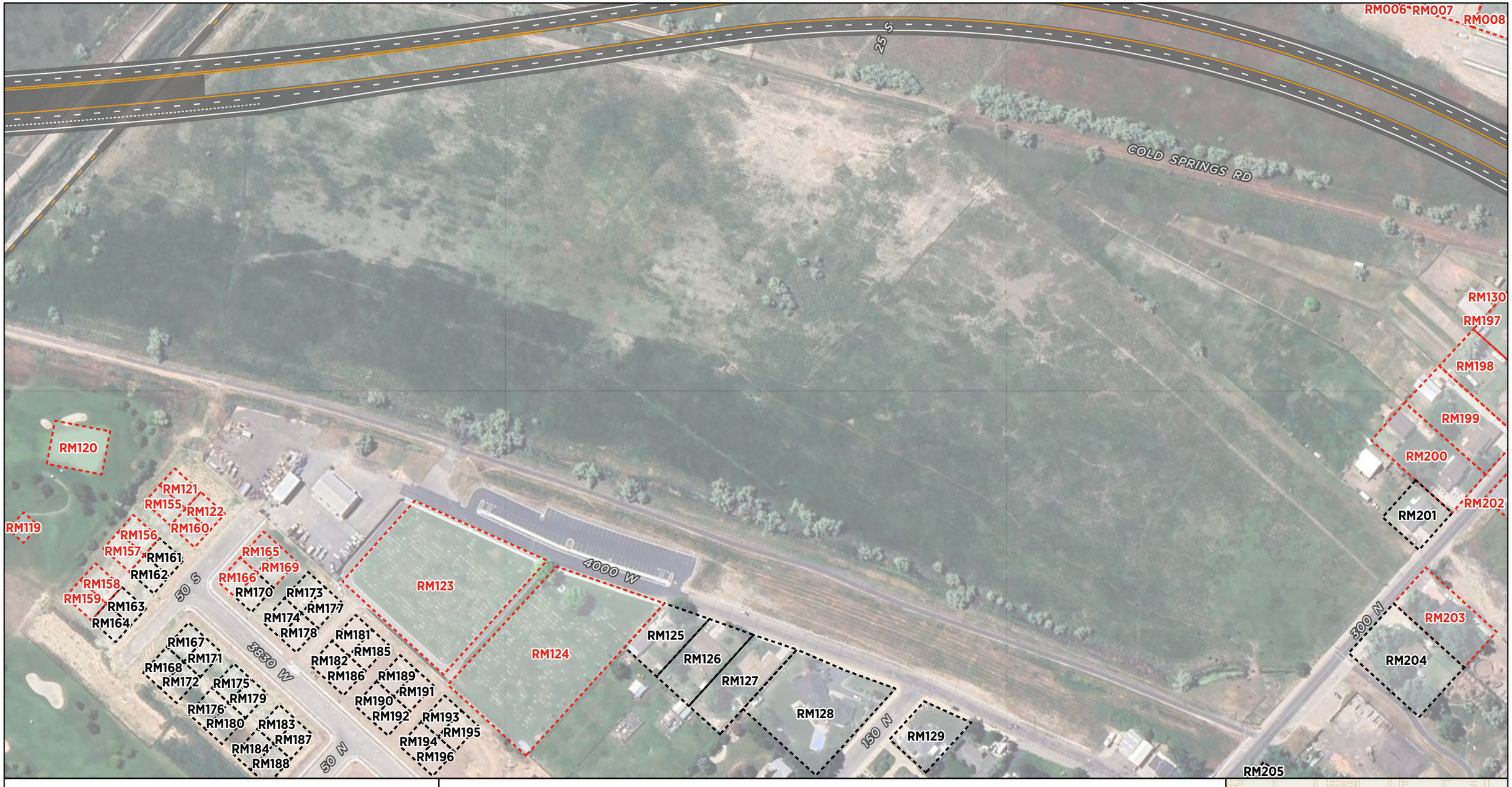
SR-177; SR-193 to 1800 North Re-Evaluation
Traffic Noise Study
Exhibit 1: Noise Receptors
UDOT Project No.: S-R199(381)
UDOT PIN: 20927

Proposed Action Design
Impacted Receptor
Receptor Area

N

0 125 250 500 Feet



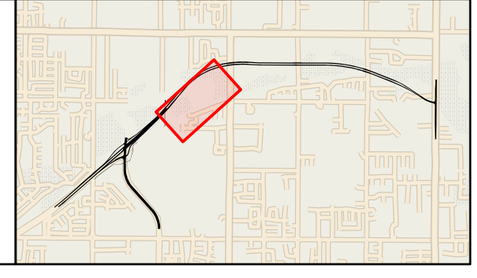


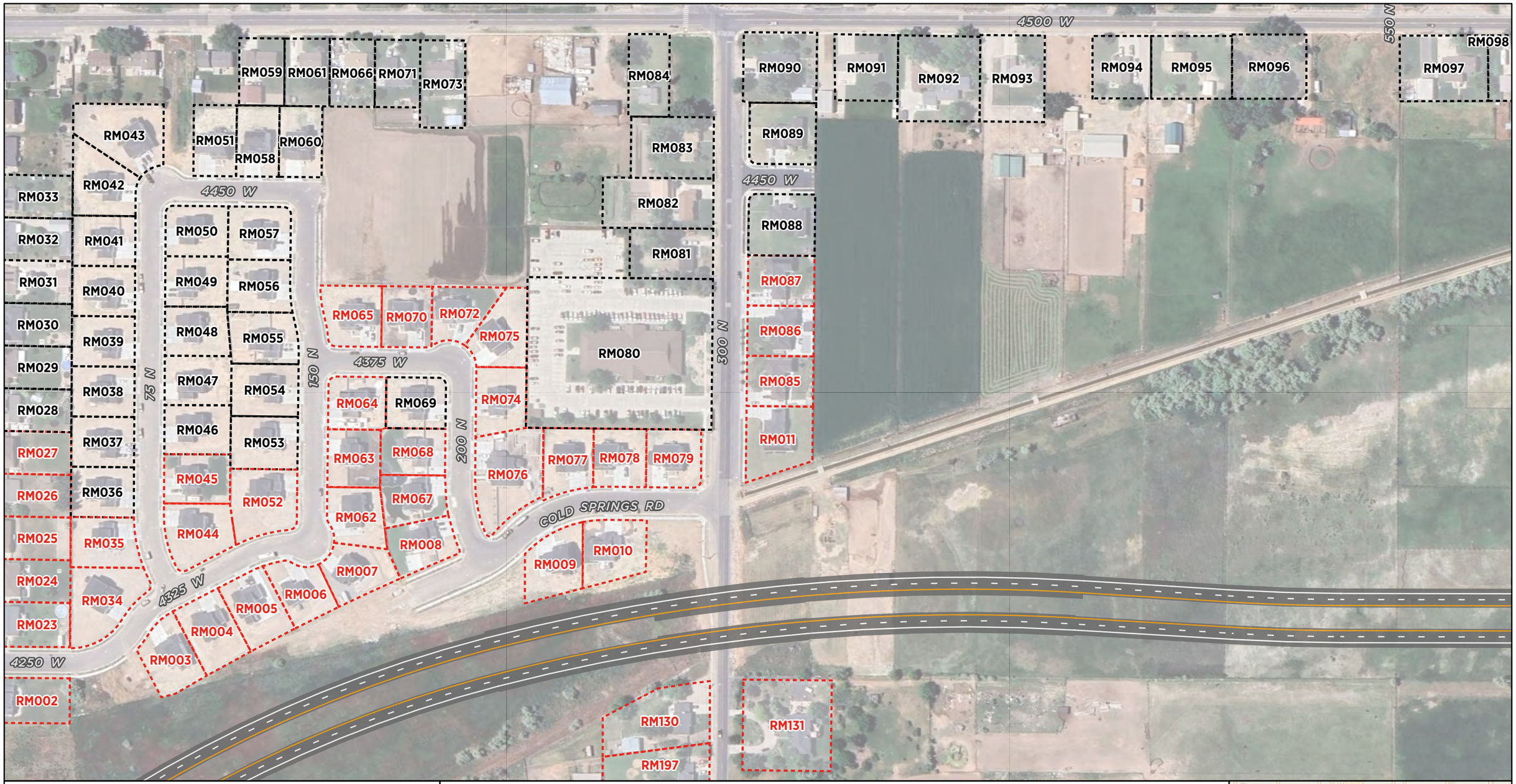
SR-177; SR-193 to 1800 North Re-Evaluation
Traffic Noise Study
Exhibit 1: Noise Receptors
UDOT Project No.: S-R199(381)
UDOT PIN: 20927

Proposed Action Design
Impacted Receptor
Receptor Area

N

0 125 250 500 Feet



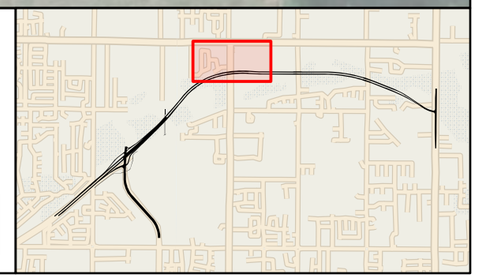


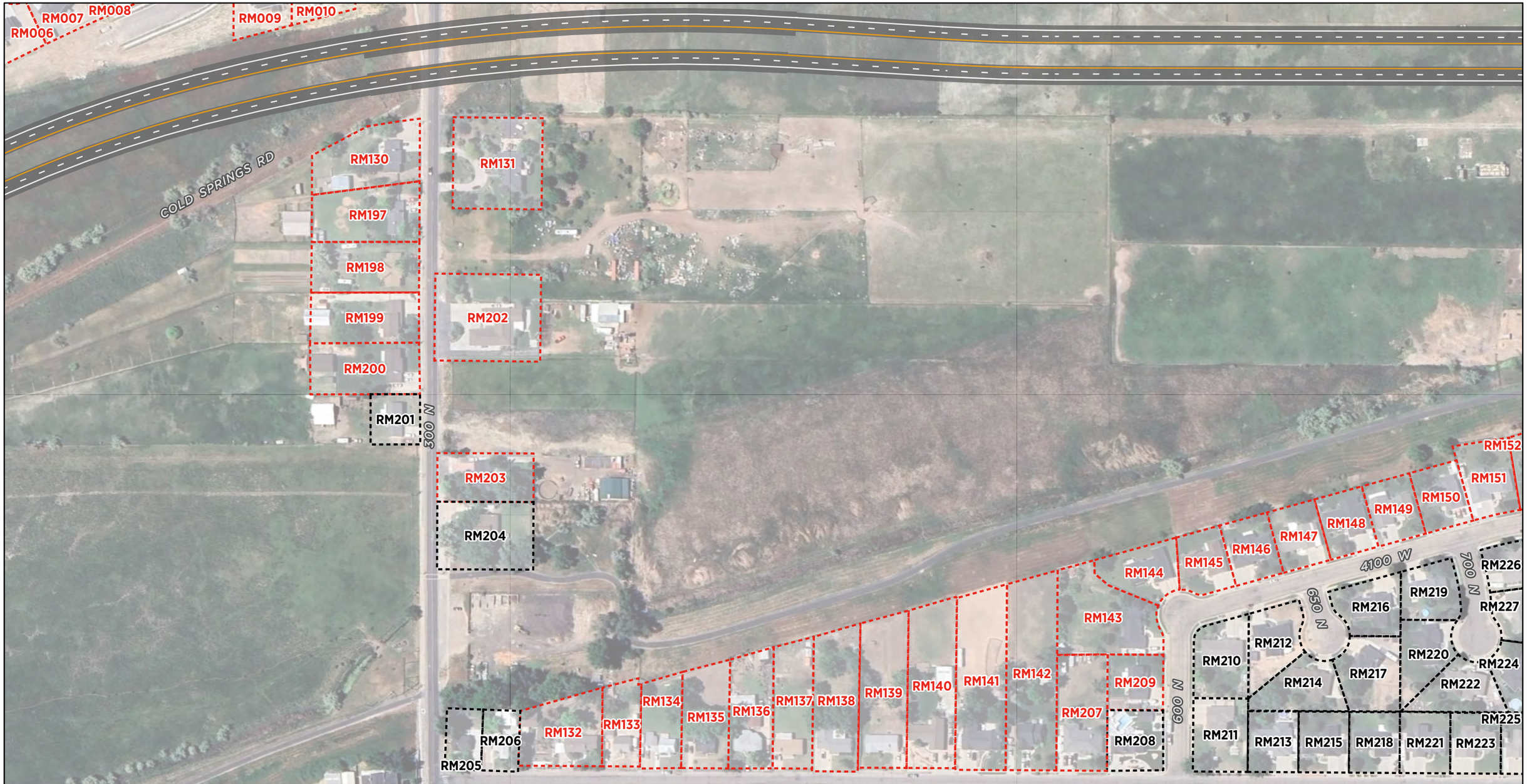
SR-177; SR-193 to 1800 North Re-Evaluation
Traffic Noise Study
Exhibit 1: Noise Receptors
UDOT Project No.: S-R199(381)
UDOT PIN: 20927

Proposed Action Design
Impacted Receptor
Receptor Area

N

0 125 250 500 Feet



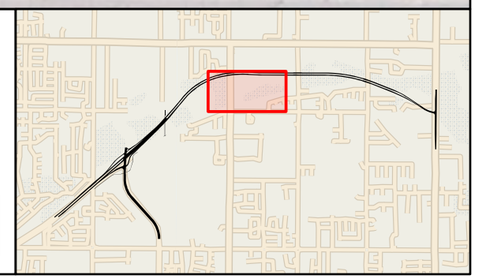


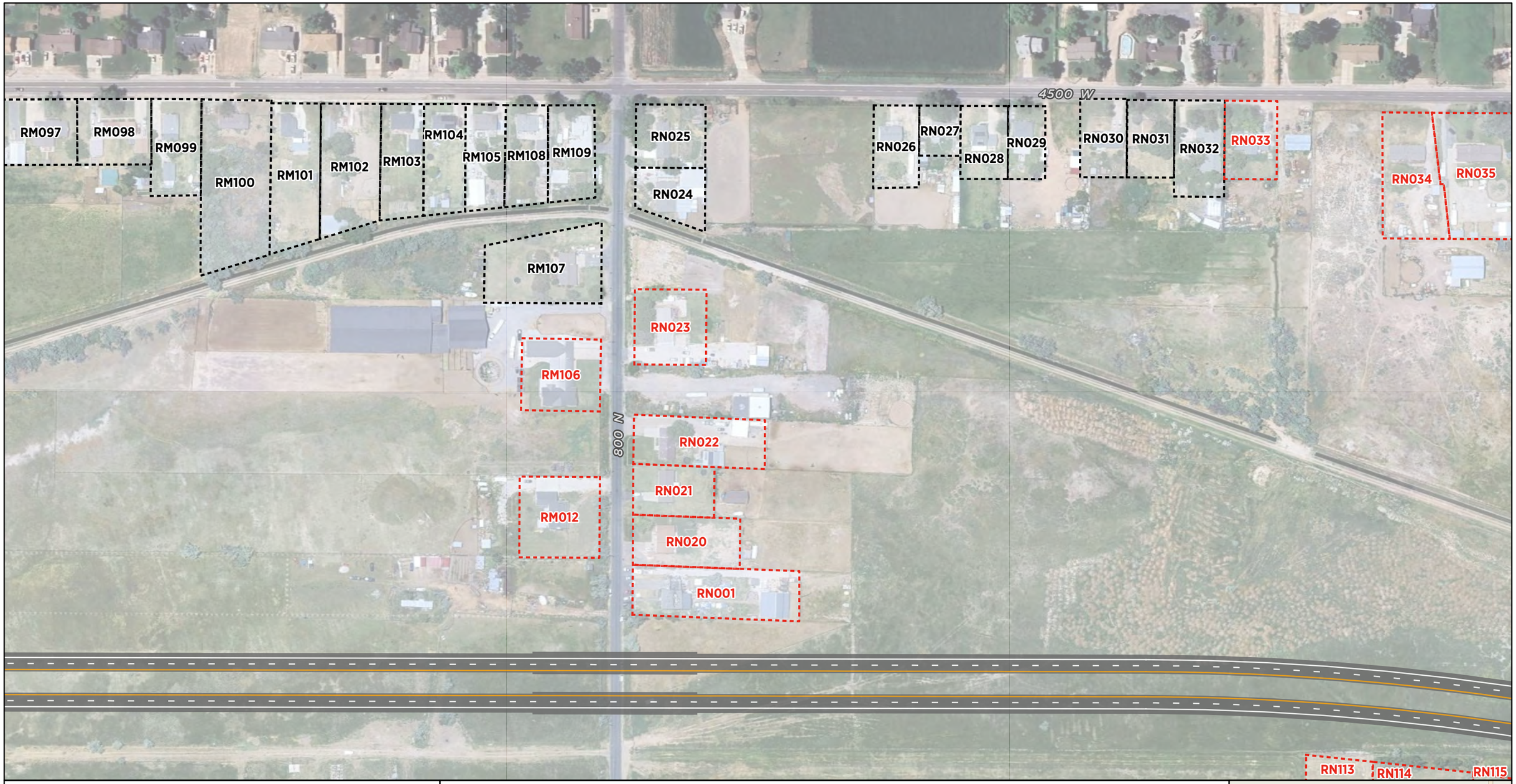
SR-177; SR-193 to 1800 North Re-Evaluation
Traffic Noise Study
Exhibit 1: Noise Receptors
UDOT Project No.: S-R199(381)
UDOT PIN: 20927

Proposed Action Design
Impacted Receptor
Receptor Area

N

0 125 250 500 Feet



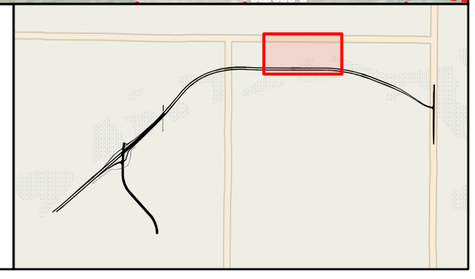


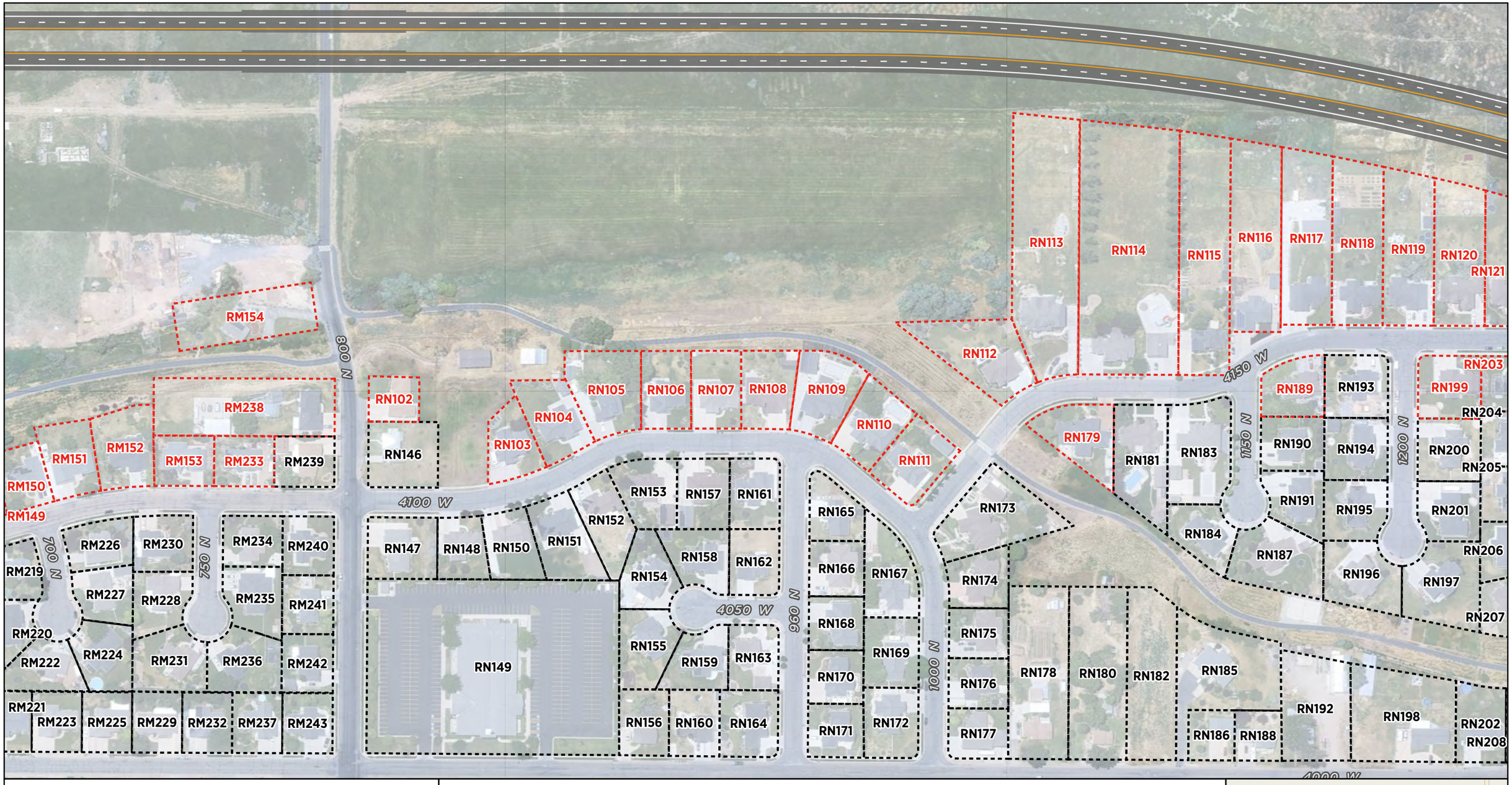
SR-177; SR-193 to 1800 North Re-Evaluation
Traffic Noise Study
Exhibit 1: Noise Receptors
UDOT Project No.: S-R199(381)
UDOT PIN: 20927

Proposed Action Design
Impacted Receptor
Receptor Area

N

0 125 250 500 Feet



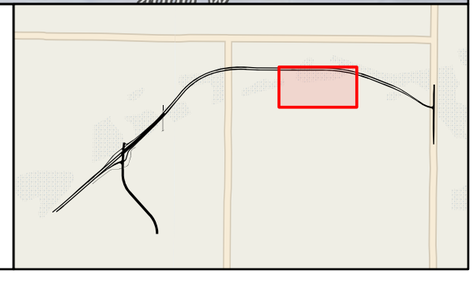


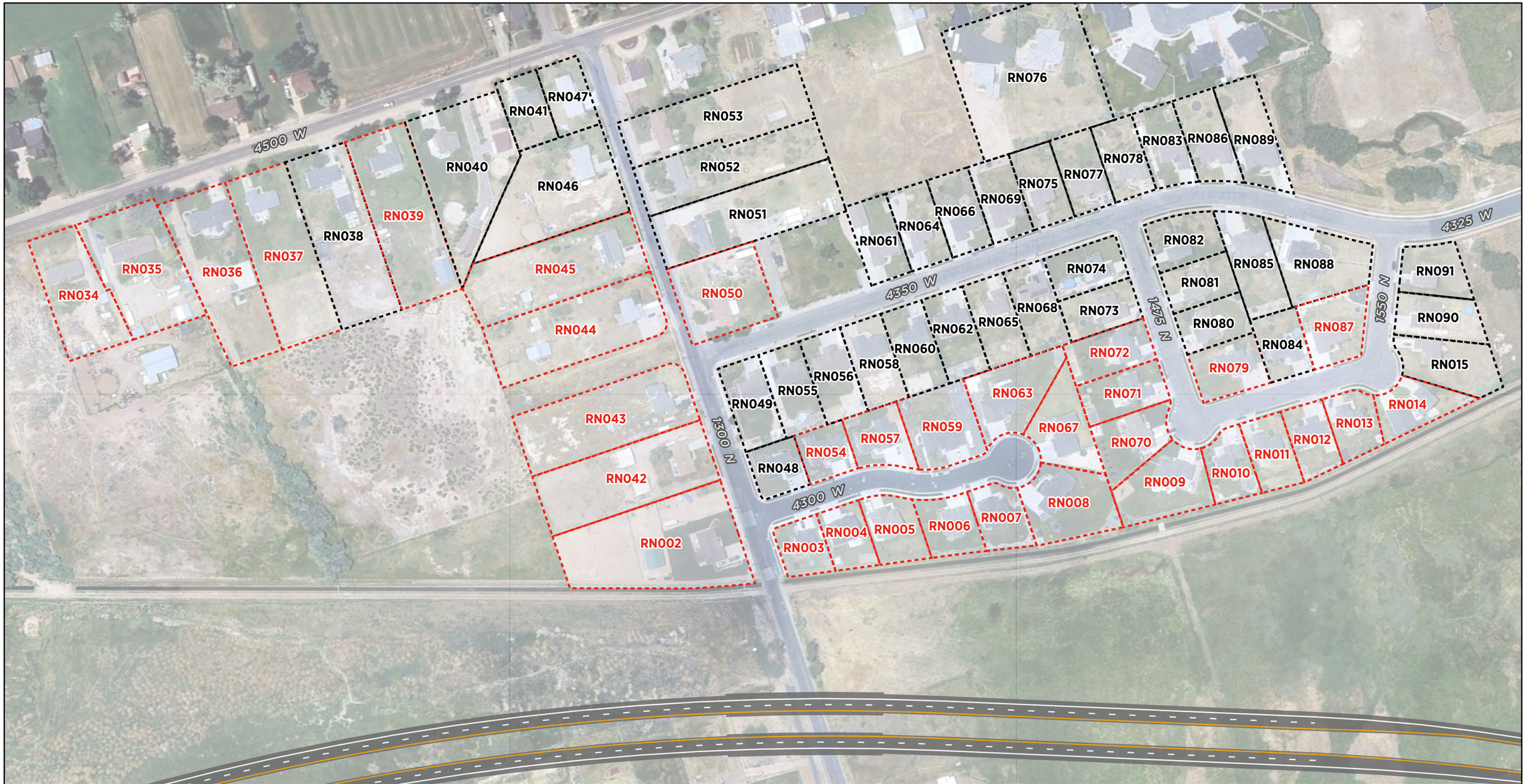
SR-177; SR-193 to 1800 North Re-Evaluation
Traffic Noise Study
Exhibit 1: Noise Receptors
UDOT Project No.: S-R199(381)
UDOT PIN: 20927

Proposed Action Design
Impacted Receptor
Receptor Area

N

0 125 250 500 Feet



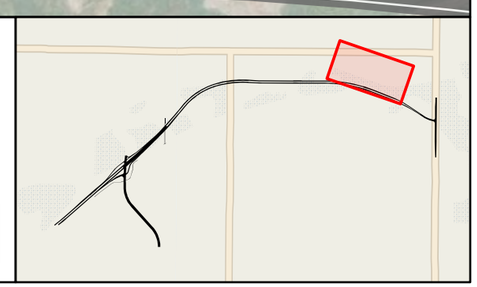


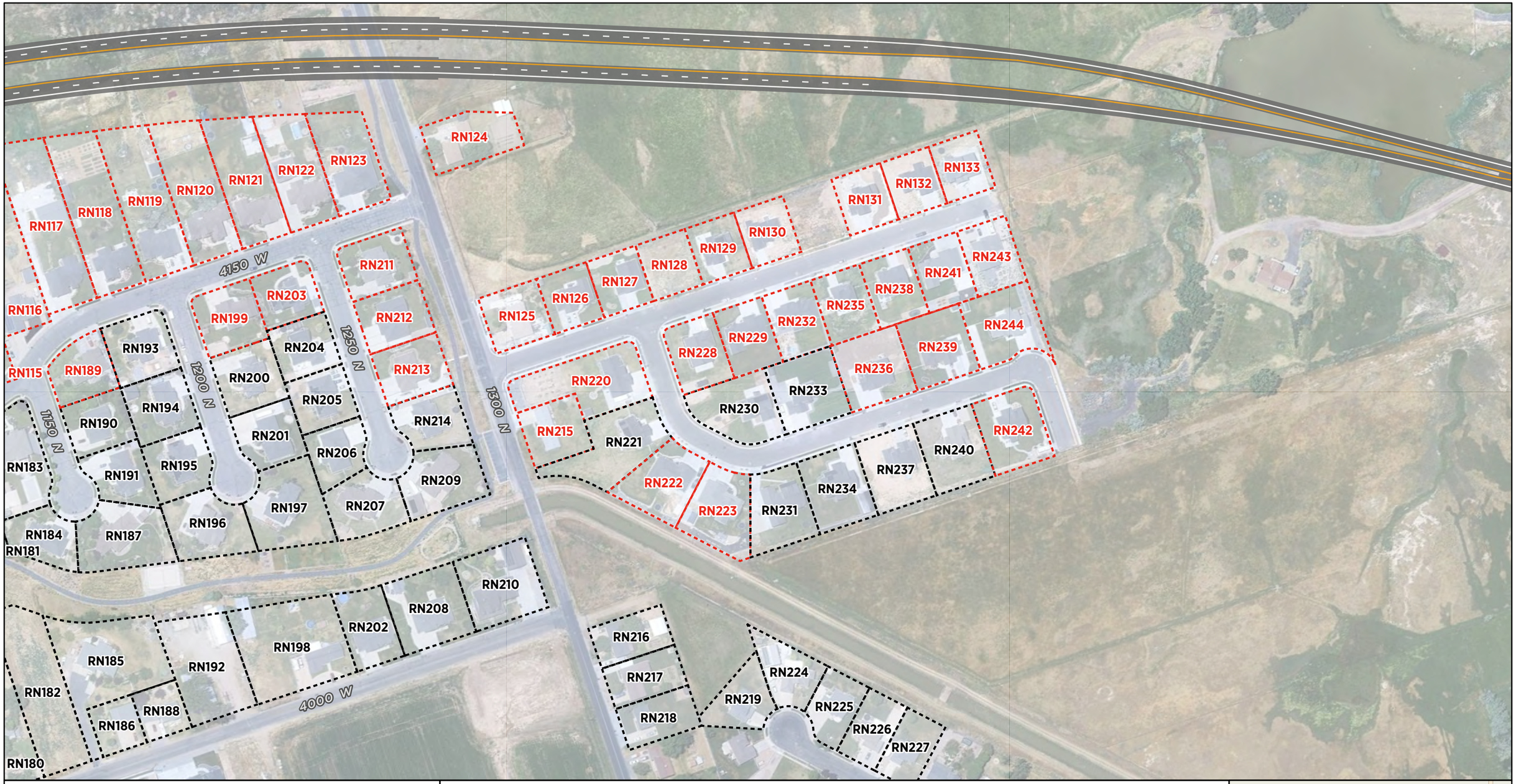
SR-177; SR-193 to 1800 North Re-Evaluation
Traffic Noise Study
Exhibit 1: Noise Receptors
UDOT Project No.: S-R199(381)
UDOT PIN: 20927

Proposed Action Design
Impacted Receptor
Receptor Area

N

0 125 250 500 Feet



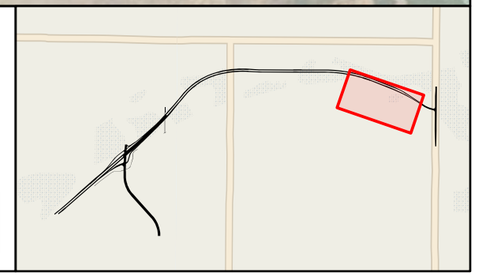


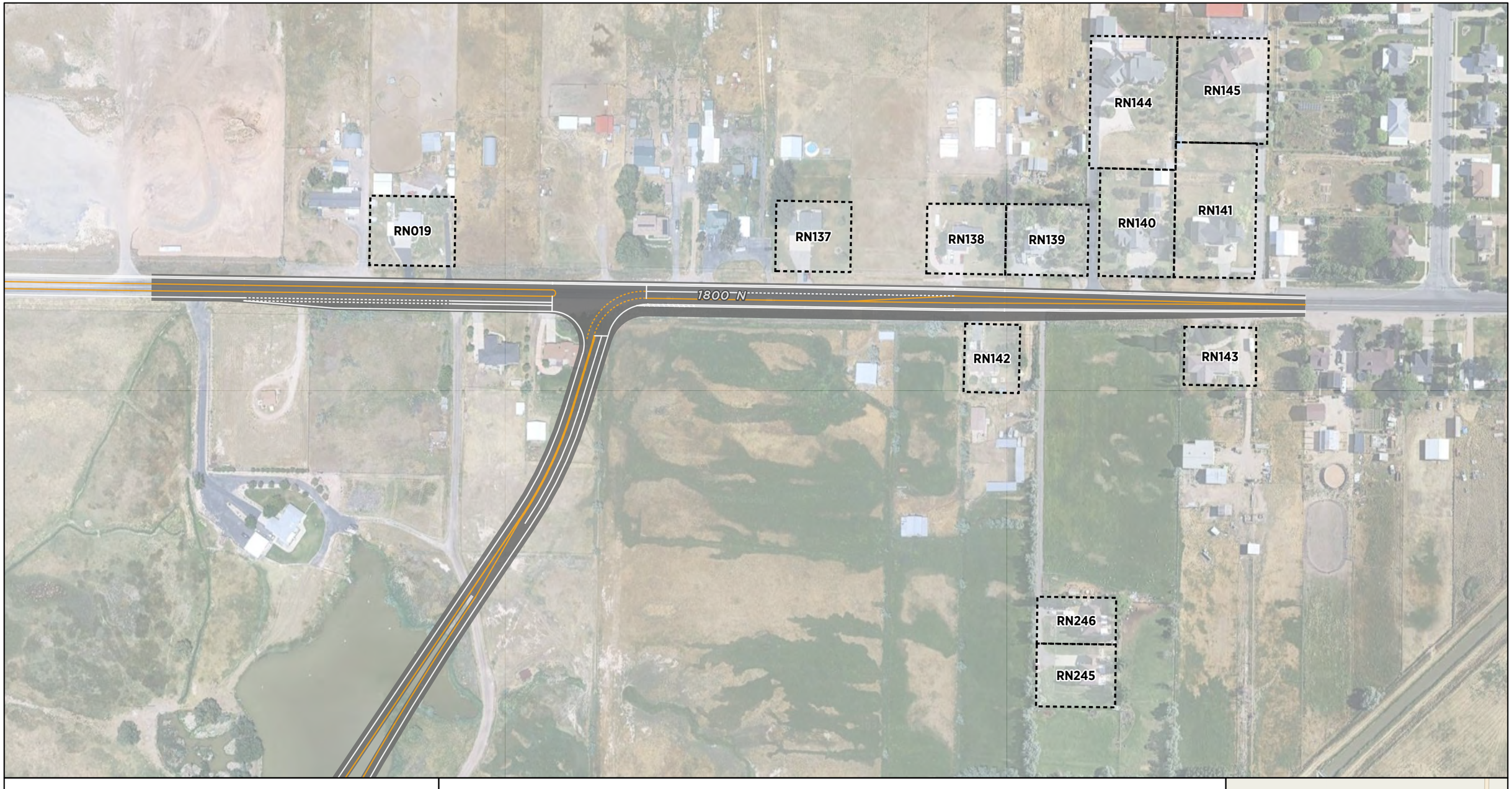
SR-177; SR-193 to 1800 North Re-Evaluation
Traffic Noise Study
Exhibit 1: Noise Receptors
UDOT Project No.: S-R199(381)
UDOT PIN: 20927

Proposed Action Design
Impacted Receptor
Receptor Area

N

0 125 250 500 Feet





SR-177; SR-193 to 1800 North Re-Evaluation
Traffic Noise Study
Exhibit 1: Noise Receptors
UDOT Project No.: S-R199(381)
UDOT PIN: 20927

Proposed Action Design
Impacted Receptor
Receptor Area

N

0 125 250 500 Feet

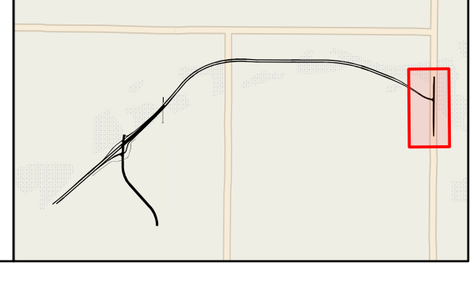
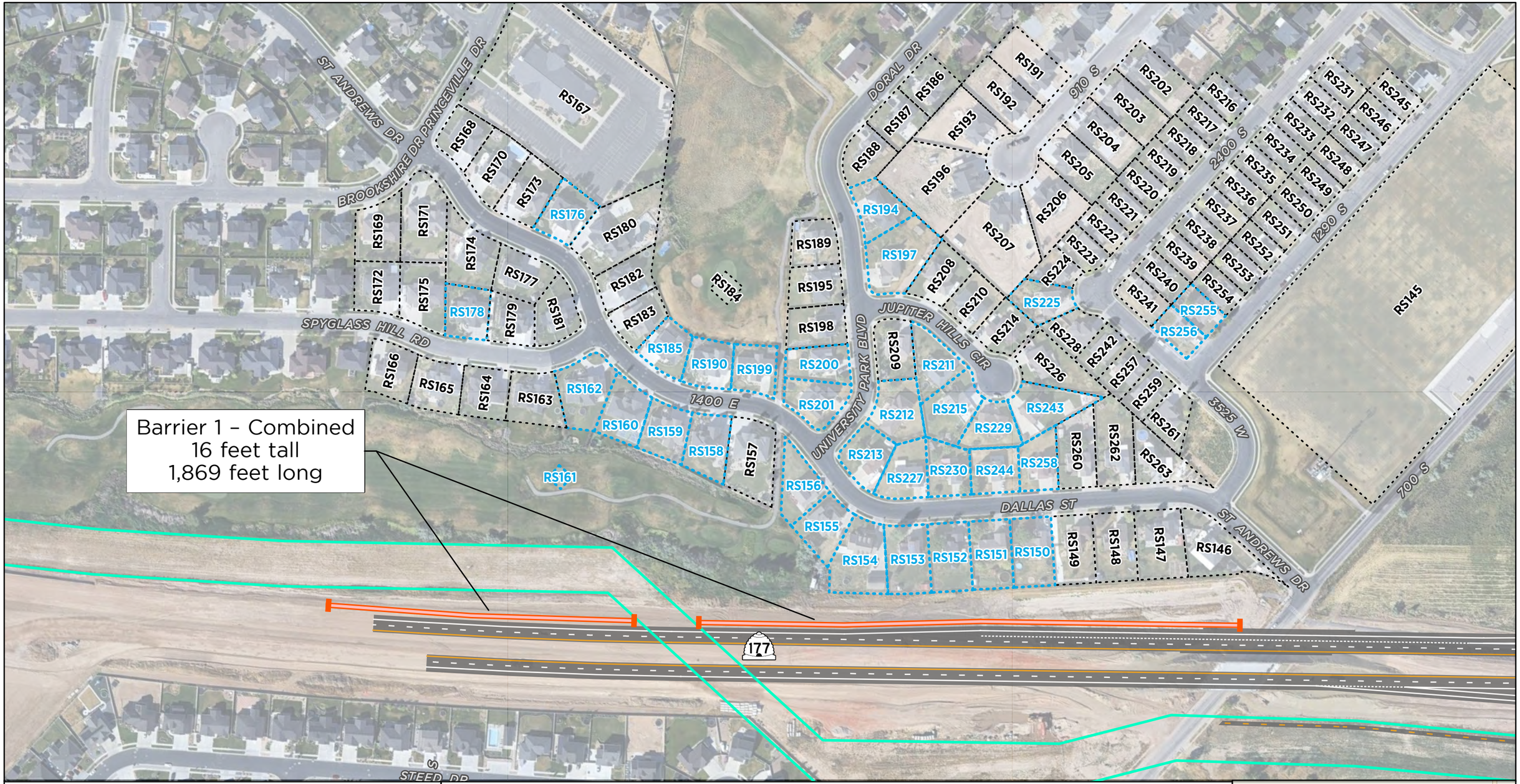


EXHIBIT 2: NOISE BARRIERS

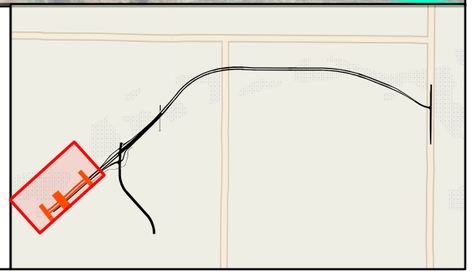


SR-177; SR-193 to 1800 North Re-Evaluation
Traffic Noise Study
Exhibit 2: Noise Barriers
UDOT Project No.: S-R199(381)
UDOT PIN: 20927

Proposed Action Design
Barrier Not Recommended for Balloting
Receptor Area
Benefited Receptor
Bureau of Reclamation Property

N

0 125 250 500 Feet



SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 1 System

NAC							17-Foot Barrier			16-Foot Barrier			15-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors
RS145	No	1	C	49	61	12	60	1	0	60	1	0	60	1	0
RS146	Yes	1	B	55	66	11	64	2	0	64	2	0	64	2	0
RS147	Yes	1	B	53	66	13	62	4	0	62	4	0	62	4	0
RS148	Yes	1	B	54	65	11	61	4	0	61	4	0	61	4	0
RS149	Yes	1	B	54	64	10	60	4	0	60	4	0	60	4	0
RS150	Yes	1	B	55	65	10	59	6	1	60	5	1	60	5	1
RS151	Yes	1	B	55	66	11	59	7	1	59	7	1	60	6	1
RS152	Yes	1	B	55	67	12	59	8	1	59	8	1	60	7	1
RS153	Yes	1	B	55	68	13	59	9	1	60	8	1	60	8	1
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RS156	No	1	B	51	64	13	58	6	1	58	6	1	58	6	1
RS157	No	1	B	49	62	13	57	5	1	58	4	0	58	4	0
RS158	No	1	B	50	63	13	58	5	1	58	5	1	58	5	1
RS159	No	1	B	49	63	14	58	5	1	58	5	1	58	5	1
RS160	No	1	B	49	62	13	57	5	1	57	5	1	57	5	1
RS161	Yes	1	C	52	64	12	59	5	1	59	5	1	59	5	1
RS162	No	1	B	48	61	13	56	5	1	56	5	1	56	5	1
RS163	No	1	B	48	61	13	57	4	0	57	4	0	57	4	0
RS164	No	1	B	48	60	12	57	3	0	57	3	0	56	4	0
RS165	No	1	B	48	60	12	57	3	0	57	3	0	56	4	0
RS166	No	1	B	47	59	12	56	3	0	56	3	0	56	3	0
RS167	No	1	D	21	26	5	23	3	0	23	3	0	23	3	0
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RS169	No	1	B	46	49	3	46	3	0	46	3	0	46	3	0
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RS171	No	1	B	46	48	2	46	2	0	46	2	0	46	2	0
RS172	No	1	B	46	55	9	51	4	0	51	4	0	51	4	0
RS173	No	1	B	46	51	5	47	4	0	47	4	0	47	4	0
RS174	No	1	B	46	50	4	48	2	0	48	2	0	48	2	0
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RS184	No	1	C	46	53	7	49	4	0	50	3	0	50	3	0
RS185	No	1	B	46	56	10	51	5	1	51	5	1	51	5	1
RS186	No	1	B	46	49	3	45	4	0	45	4	0	46	3	0
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RS189	No	1	B	46	51	5	47	4	0	47	4	0	47	4	0
RS190	No	1	B	46	56	10	51	5	1	51	5	1	52	4	0
RS191	No	1	B	46	46	0	43	3	0	43	3	0	43	3	0
RS192	No	1	B	46	46	0	43	3	0	43	3	0	43	3	0
RS193	No	1	B	46	46	0	44	2	0	44	2	0	44	2	0

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 1 System

NAC							17-Foot Barrier			16-Foot Barrier			15-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors
RS194	No	1	B	46	51	5	46	5	1	46	5	1	46	5	1
RS195	No	1	B	46	51	5	47	4	0	47	4	0	48	3	0
RS196	No	1	B	46	52	6	49	3	0	49	3	0	49	3	0
RS197	No	1	B	46	51	5	45	6	1	45	6	1	45	6	1
RS198	No	1	B	46	52	6	49	3	0	49	3	0	50	2	0
RS199	No	1	B	46	57	11	52	5	1	52	5	1	52	5	1
RS200	No	1	B	46	54	8	49	5	1	49	5	1	49	5	1
RS201	No	1	B	46	56	10	50	6	1	50	6	1	51	5	1
RS202	No	1	B	46	48	2	46	2	0	46	2	0	46	2	0
RS203	No	1	B	46	49	3	46	3	0	46	3	0	46	3	0
RS204	No	1	B	46	49	3	46	3	0	46	3	0	46	3	0
RS205	No	1	B	46	48	2	45	3	0	46	2	0	46	2	0
RS206	No	1	B	46	49	3	46	3	0	46	3	0	46	3	0
RS207	No	1	B	46	52	6	48	4	0	48	4	0	48	4	0
RS208	No	1	B	46	53	7	49	4	0	49	4	0	50	3	0
RS209	No	1	B	46	55	9	51	4	0	51	4	0	51	4	0
RS210	No	1	B	46	54	8	51	3	0	51	3	0	51	3	0
RS211	No	1	B	46	57	11	49	8	1	49	8	1	50	7	1
RS212	No	1	B	46	56	10	51	5	1	51	5	1	51	5	1
RS213	No	1	B	47	61	14	54	7	1	54	7	1	54	7	1
RS214	No	1	B	46	54	8	51	3	0	51	3	0	51	3	0
RS215	No	1	B	46	57	11	50	7	1	50	7	1	51	6	1
RS216	No	1	B	46	46	0	42	4	0	42	4	0	43	3	0
RS217	No	1	B	46	46	0	43	3	0	43	3	0	43	3	0
RS218	No	1	B	46	46	0	43	3	0	44	2	0	44	2	0
RS219	No	1	B	46	47	1	44	3	0	44	3	0	44	3	0
RS220	No	1	B	46	46	0	44	2	0	44	2	0	44	2	0
RS221	No	1	B	46	46	0	42	4	0	43	3	0	43	3	0
RS222	No	1	B	46	46	0	43	3	0	43	3	0	44	2	0
RS223	No	1	B	46	46	0	44	2	0	44	2	0	44	2	0
RS224	No	1	B	46	47	1	44	3	0	44	3	0	44	3	0
RS225	No	1	B	46	52	6	46	6	1	47	5	1	47	5	1
RS226	No	1	B	46	54	8	50	4	0	50	4	0	50	4	0
RS227	No	1	B	48	62	14	54	8	1	54	8	1	54	8	1
RS228	No	1	B	46	57	11	53	4	0	53	4	0	53	4	0
RS229	No	1	B	46	56	10	50	6	1	51	5	1	51	5	1
RS230	No	1	B	47	61	14	53	8	1	53	8	1	53	8	1
RS231	No	1	B	46	49	3	47	2	0	47	2	0	47	2	0
RS232	No	1	B	46	50	4	48	2	0	48	2	0	48	2	0
RS233	No	1	B	46	49	3	47	2	0	47	2	0	47	2	0
RS234	No	1	B	46	49	3	46	3	0	46	3	0	46	3	0
RS235	No	1	B	46	50	4	48	2	0	48	2	0	48	2	0
RS236	No	1	B	46	50	4	47	3	0	47	3	0	47	3	0
RS237	No	1	B	46	52	6	50	2	0	50	2	0	50	2	0
RS238	No	1	B	46	50	4	47	3	0	47	3	0	47	3	0
RS239	No	1	B	46	51	5	48	3	0	48	3	0	48	3	0
RS240	No	1	B	46	52	6	48	4	0	48	4	0	48	4	0
RS241	No	1	B	46	57	11	55	2	0	55	2	0	55	2	0
RS242	No	1	B	46	57	11	54	3	0	54	3	0	54	3	0

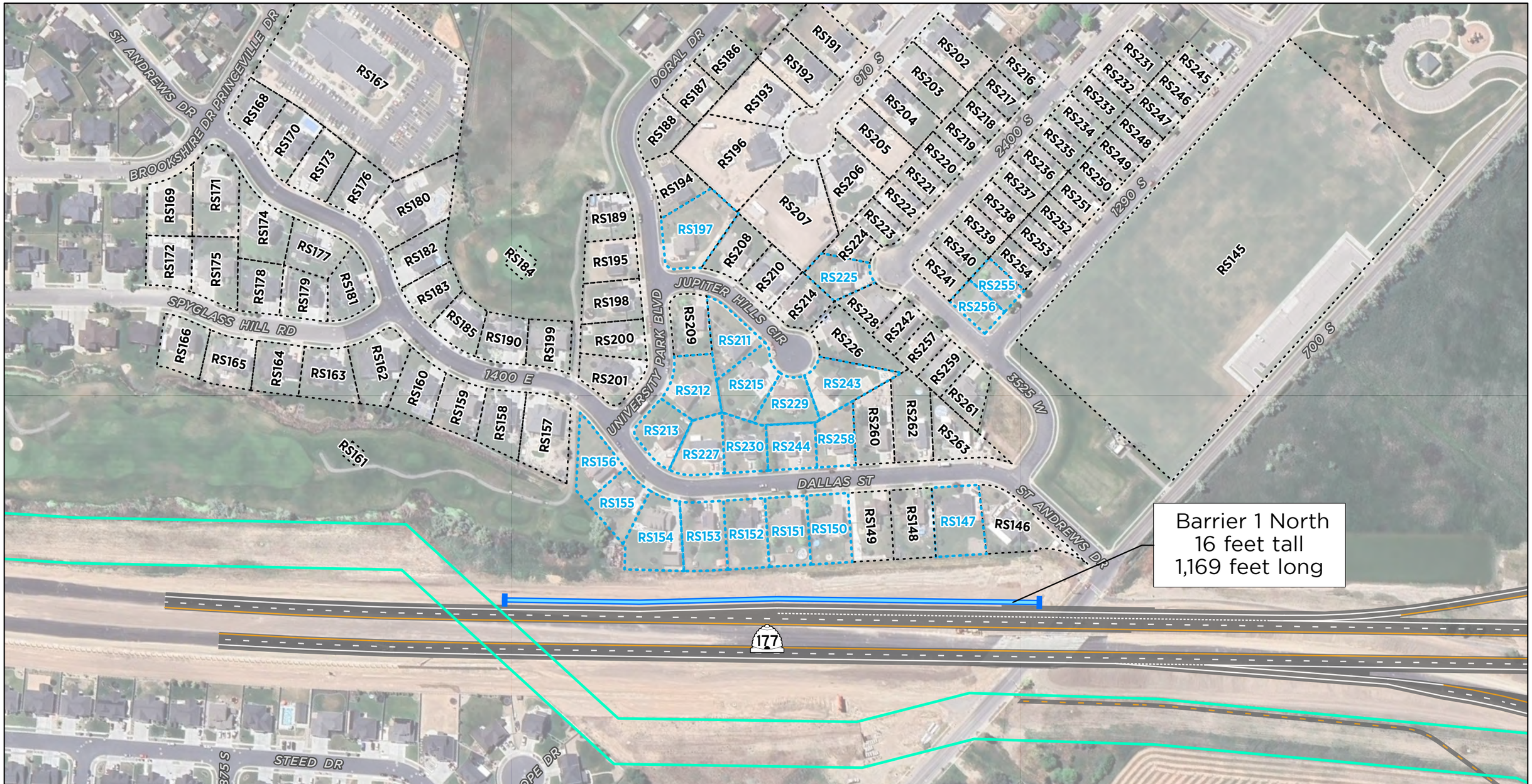
SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 1 System

NAC							17-Foot Barrier			16-Foot Barrier			15-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors
RS243	No	1	B	46	57	11	51	6	1	51	6	1	52	5	1
RS244	No	1	B	47	60	13	53	7	1	53	7	1	53	7	1
RS245	No	1	B	46	46	0	43	3	0	43	3	0	43	3	0
RS246	No	1	B	46	46	0	43	3	0	43	3	0	43	3	0
RS247	No	1	B	46	46	0	43	3	0	43	3	0	43	3	0
RS248	No	1	B	46	46	0	43	3	0	44	2	0	44	2	0
RS249	No	1	B	46	46	0	44	2	0	44	2	0	44	2	0
RS250	No	1	B	46	47	1	44	3	0	44	3	0	45	2	0
RS251	No	1	B	46	47	1	44	3	0	44	3	0	44	3	0
RS252	No	1	B	46	46	0	44	2	0	44	2	0	44	2	0
RS253	No	1	B	46	48	2	44	4	0	44	4	0	44	4	0
RS254	No	1	B	46	48	2	46	2	0	46	2	0	47	1	0
RS255	No	1	B	46	55	9	47	8	1	47	8	1	47	8	1
RS256	No	1	B	46	52	6	45	7	1	46	6	1	46	6	1
RS257	No	1	B	46	58	12	55	3	0	55	3	0	55	3	0
RS258	No	1	B	46	60	14	54	6	1	54	6	1	54	6	1
RS259	No	1	B	46	59	13	57	2	0	57	2	0	57	2	0
RS260	No	1	B	46	60	14	56	4	0	56	4	0	56	4	0
RS261	No	1	B	46	60	14	59	1	0	59	1	0	59	1	0
RS262	No	1	B	47	61	14	57	4	0	57	4	0	57	4	0
RS263	No	1	B	48	61	13	59	2	0	59	2	0	59	2	0

= Impacted receptor
= 5 dBA reduction or better
= 7 dBA reduction or better

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 1 System

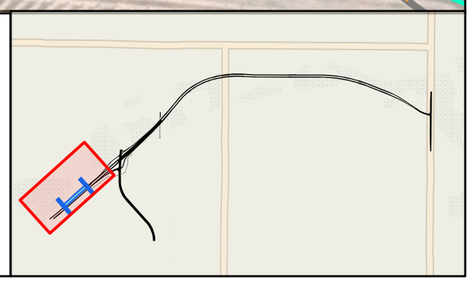
NAC		17-Foot Barrier	16-Foot Barrier	15-Foot Barrier
	Inputs – Overall			
	Barrier Length (ft.) =	1,819	1,869	1,969
	Barrier Height (ft.) =	17	16	15
	Barrier Area (sq. ft.) =	30,923	29,904	29,535
	Inputs – Category A, C, D, or E			
	Barrier Height (ft.) =	17	16	15
	Barrier Length (ft.) =	625	675	775
	Barrier Area (ft.) =	10,625	10,800	11,625
	Right-of-Way Acquisition Area (sq. ft.) =	0	0	0
	Safety Barrier (linear ft.) =	625	675	775
	Inputs – Category B			
	Barrier Height (ft.) =	17	16	15
	Barrier Length (ft.) =	1,194	1,194	1,194
	Barrier Area (sq. ft.) =	20,298	19,104	17,910
	Right-of-Way Acquisition Area (sq. ft.) =	0	0	0
	Safety Barrier (linear ft.) =	1,194	1,194	1,194
Feasibility	**Acoustic Feasibility**			
	Front Row Receptors =	10	10	10
	Front-Row Receptors with a 5 dBA Reduction =	6	6	6
	% of Front-Row Receptors Reduced At Least 5 dBA =	60%	60%	60%
	Acoustically Feasible =	**Yes**	**Yes**	**Yes**
Reasonableness	**Noise Reduction Design Goal**			
	Front Row Receptors =	10	10	10
	Front Row Receptors with 7 dBA Reduction =	4	4	3
	% of Front Row Reduced At Least 7 dBA =	40%	40%	30%
	Meets Noise Reduction Design Goal =	**Yes**	**Yes**	**No**
	Cost Effectiveness – Category A, C, D, or E			
	Barrier Cost (Barrier area x 20) =	$212,500	$216,000	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	$0	$0	n/a
	Safety Barrier (linear ft. x 125) =	$78,125	$84,375	n/a
	Total Barrier Cost =	$290,625	$300,375	n/a
	Allowable Cost (length x 360) =	$225,000	$243,000	n/a
	Cost per Linear Foot =	$465	$445	n/a
	Cost Reasonable =	**No**	**No**	**n/a**
	Cost Effectiveness – Category B			
	Barrier Cost (Barrier area x 20) =	$405,960	$382,080	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	$0	$0	n/a
	Safety Barrier (linear ft. x 125) =	$149,250	$149,250	n/a
	Total Barrier Cost =	$555,210	$531,330	n/a
	Allowable Cost (benefited x 30k) =	$990,000	$990,000	n/a
	Benefited (Category B w/ 5 dBA Reduction) =	33	33	n/a
	Cost per Benefited Receptor (Barrier cost / benefited) =	$16,825	$16,101	n/a
	Cost Reasonable =	**Yes**	**Yes**	**n/a**



SR-177; SR-193 to 1800 North Re-Evaluation
Traffic Noise Study
Exhibit 2: Noise Barriers
UDOT Project No.: S-R199(381)
UDOT PIN: 20927

- Proposed Action Design
- Barrier Recommended for Balloting
- Receptor Area
- Benefited Receptor
- Bureau of Reclamation Property

0 125 250 500 Feet



SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 1 North

NAC							17-Foot Barrier			16-Foot Barrier			15-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors
RS145	No	1	C	49	61	12	60	1	0	60	1	0	60	1	0
RS146	Yes	1	B	55	66	11	62	4	0	63	3	0	63	3	0
RS147	Yes	1	B	53	66	13	61	5	1	61	5	1	61	5	1
RS148	Yes	1	B	54	65	11	61	4	0	61	4	0	61	4	0
RS149	Yes	1	B	54	64	10	60	4	0	60	4	0	60	4	0
RS150	Yes	1	B	55	65	10	59	6	1	60	5	1	60	5	1
RS151	Yes	1	B	55	66	11	59	7	1	59	7	1	60	6	1
RS152	Yes	1	B	55	67	12	59	8	1	60	7	1	60	7	1
RS153	Yes	1	B	55	68	13	60	8	1	60	8	1	60	8	1
RS154	Yes	1	B	55	68	13	60	8	1	60	8	1	60	8	1
RS155	No	1	B	53	66	13	59	7	1	60	6	1	60	6	1
RS156	No	1	B	51	64	13	59	5	1	59	5	1	59	5	1
RS157	No	1	B	49	62	13	59	3	0	59	3	0	59	3	0
RS158	No	1	B	50	63	13	60	3	0	60	3	0	60	3	0
RS159	No	1	B	49	63	14	60	3	0	60	3	0	60	3	0
RS160	No	1	B	49	62	13	60	2	0	60	2	0	59	3	0
RS161	No	1	C	52	64	12	63	1	0	63	1	0	63	1	0
RS162	No	1	B	48	61	13	59	2	0	59	2	0	59	2	0
RS163	No	1	B	48	61	13	59	2	0	59	2	0	59	2	0
RS164	No	1	B	48	60	12	59	1	0	59	1	0	59	1	0
RS165	No	1	B	48	60	12	59	1	0	59	1	0	59	1	0
RS166	No	1	B	47	59	12	58	1	0	58	1	0	58	1	0
RS167	No	1	D	21	26	5	24	2	0	24	2	0	24	2	0
RS168	No	1	B	46	49	3	46	3	0	46	3	0	46	3	0
RS169	No	1	B	46	49	3	47	2	0	47	2	0	47	2	0
RS170	No	1	B	46	50	4	47	3	0	48	2	0	48	2	0
RS171	No	1	B	46	48	2	47	1	0	47	1	0	47	1	0
RS172	No	1	B	46	55	9	52	3	0	52	3	0	52	3	0
RS173	No	1	B	46	51	5	48	3	0	48	3	0	48	3	0
RS174	No	1	B	46	50	4	49	1	0	49	1	0	49	1	0
RS175	No	1	B	47	60	13	59	1	0	59	1	0	59	1	0
RS176	No	1	B	46	51	5	48	3	0	48	3	0	48	3	0
RS177	No	1	B	46	52	6	51	1	0	51	1	0	51	1	0
RS178	No	1	B	49	61	12	61	0	0	61	0	0	61	0	0
RS179	No	1	B	46	56	10	54	2	0	54	2	0	54	2	0
RS180	No	1	B	46	51	5	50	1	0	50	1	0	50	1	0
RS181	No	1	B	46	55	9	53	2	0	53	2	0	53	2	0
RS182	No	1	B	46	53	7	52	1	0	52	1	0	52	1	0
RS183	No	1	B	46	54	8	52	2	0	52	2	0	52	2	0
RS184	No	1	C	46	53	7	51	2	0	51	2	0	51	2	0
RS185	No	1	B	46	56	10	53	3	0	53	3	0	53	3	0
RS186	No	1	B	46	49	3	46	3	0	46	3	0	46	3	0
RS187	No	1	B	46	51	5	48	3	0	48	3	0	48	3	0
RS188	No	1	B	46	52	6	50	2	0	50	2	0	50	2	0
RS189	No	1	B	46	51	5	48	3	0	48	3	0	48	3	0
RS190	No	1	B	46	56	10	53	3	0	54	2	0	54	2	0
RS191	No	1	B	46	46	0	43	3	0	43	3	0	43	3	0
RS192	No	1	B	46	46	0	43	3	0	43	3	0	43	3	0
RS193	No	1	B	46	46	0	44	2	0	44	2	0	44	2	0

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 1 North

NAC							17-Foot Barrier			16-Foot Barrier			15-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors
RS194	No	1	B	46	51	5	47	4	0	47	4	0	47	4	0
RS195	No	1	B	46	51	5	48	3	0	48	3	0	48	3	0
RS196	No	1	B	46	52	6	49	3	0	49	3	0	49	3	0
RS197	No	1	B	46	51	5	45	6	1	45	6	1	45	6	1
RS198	No	1	B	46	52	6	50	2	0	50	2	0	50	2	0
RS199	No	1	B	46	57	11	53	4	0	53	4	0	53	4	0
RS200	No	1	B	46	54	8	52	2	0	52	2	0	51	3	0
RS201	No	1	B	46	56	10	53	3	0	53	3	0	52	4	0
RS202	No	1	B	46	48	2	46	2	0	46	2	0	46	2	0
RS203	No	1	B	46	49	3	46	3	0	46	3	0	47	2	0
RS204	No	1	B	46	49	3	46	3	0	46	3	0	46	3	0
RS205	No	1	B	46	48	2	45	3	0	46	2	0	46	2	0
RS206	No	1	B	46	49	3	46	3	0	46	3	0	46	3	0
RS207	No	1	B	46	52	6	48	4	0	48	4	0	48	4	0
RS208	No	1	B	46	53	7	50	3	0	50	3	0	50	3	0
RS209	No	1	B	46	55	9	52	3	0	52	3	0	52	3	0
RS210	No	1	B	46	54	8	52	2	0	52	2	0	52	2	0
RS211	No	1	B	46	57	11	50	7	1	50	7	1	50	7	1
RS212	No	1	B	46	56	10	51	5	1	51	5	1	51	5	1
RS213	No	1	B	47	61	14	55	6	1	55	6	1	55	6	1
RS214	No	1	B	46	54	8	51	3	0	51	3	0	51	3	0
RS215	No	1	B	46	57	11	51	6	1	51	6	1	51	6	1
RS216	No	1	B	46	46	0	43	3	0	43	3	0	44	2	0
RS217	No	1	B	46	46	0	44	2	0	44	2	0	44	2	0
RS218	No	1	B	46	46	0	45	1	0	45	1	0	45	1	0
RS219	No	1	B	46	47	1	45	2	0	45	2	0	45	2	0
RS220	No	1	B	46	46	0	45	1	0	45	1	0	45	1	0
RS221	No	1	B	46	46	0	44	2	0	44	2	0	44	2	0
RS222	No	1	B	46	46	0	45	1	0	45	1	0	45	1	0
RS223	No	1	B	46	46	0	45	1	0	45	1	0	45	1	0
RS224	No	1	B	46	47	1	44	3	0	44	3	0	44	3	0
RS225	No	1	B	46	52	6	47	5	1	47	5	1	47	5	1
RS226	No	1	B	46	54	8	51	3	0	51	3	0	51	3	0
RS227	No	1	B	48	62	14	54	8	1	54	8	1	54	8	1
RS228	No	1	B	46	57	11	54	3	0	54	3	0	54	3	0
RS229	No	1	B	46	56	10	51	5	1	51	5	1	51	5	1
RS230	No	1	B	47	61	14	54	7	1	54	7	1	54	7	1
RS231	No	1	B	46	49	3	48	1	0	48	1	0	48	1	0
RS232	No	1	B	46	50	4	48	2	0	48	2	0	48	2	0
RS233	No	1	B	46	49	3	47	2	0	47	2	0	47	2	0
RS234	No	1	B	46	49	3	46	3	0	46	3	0	47	2	0
RS235	No	1	B	46	50	4	48	2	0	48	2	0	48	2	0
RS236	No	1	B	46	50	4	47	3	0	47	3	0	47	3	0
RS237	No	1	B	46	52	6	50	2	0	50	2	0	50	2	0
RS238	No	1	B	46	50	4	47	3	0	47	3	0	47	3	0
RS239	No	1	B	46	51	5	48	3	0	48	3	0	48	3	0
RS240	No	1	B	46	52	6	48	4	0	48	4	0	48	4	0
RS241	No	1	B	46	57	11	55	2	0	55	2	0	55	2	0
RS242	No	1	B	46	57	11	54	3	0	54	3	0	55	2	0

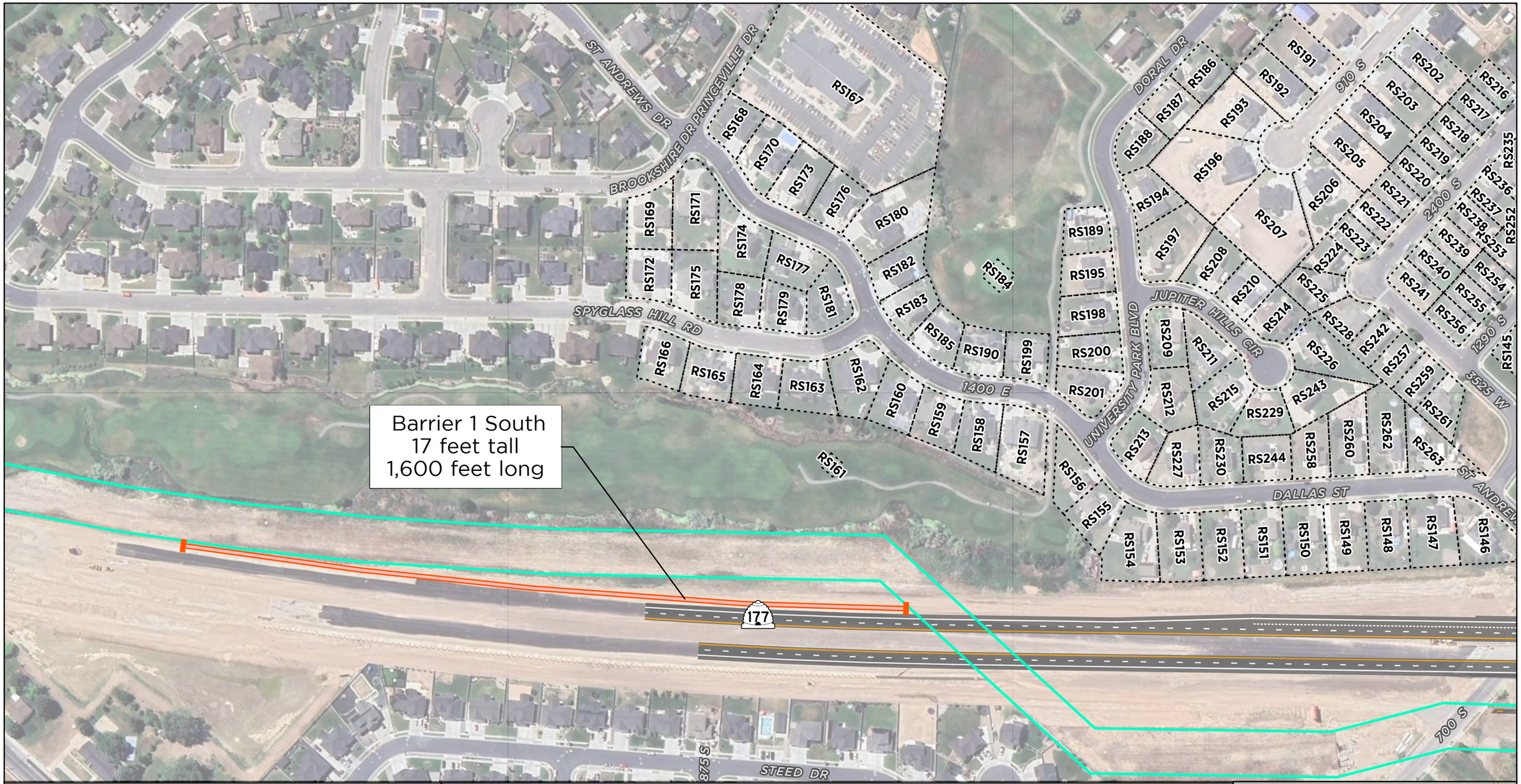
SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 1 North

NAC							17-Foot Barrier			16-Foot Barrier			15-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors
RS243	No	1	B	46	57	11	51	6	1	52	5	1	52	5	1
RS244	No	1	B	47	60	13	53	7	1	54	6	1	54	6	1
RS245	No	1	B	46	46	0	43	3	0	43	3	0	43	3	0
RS246	No	1	B	46	46	0	43	3	0	43	3	0	43	3	0
RS247	No	1	B	46	46	0	43	3	0	43	3	0	44	2	0
RS248	No	1	B	46	46	0	44	2	0	44	2	0	44	2	0
RS249	No	1	B	46	46	0	44	2	0	44	2	0	44	2	0
RS250	No	1	B	46	47	1	45	2	0	45	2	0	45	2	0
RS251	No	1	B	46	47	1	44	3	0	44	3	0	45	2	0
RS252	No	1	B	46	46	0	44	2	0	44	2	0	44	2	0
RS253	No	1	B	46	48	2	44	4	0	45	3	0	45	3	0
RS254	No	1	B	46	48	2	45	3	0	45	3	0	45	3	0
RS255	No	1	B	46	55	9	47	8	1	47	8	1	47	8	1
RS256	No	1	B	46	52	6	46	6	1	46	6	1	46	6	1
RS257	No	1	B	46	58	12	55	3	0	55	3	0	55	3	0
RS258	No	1	B	46	60	14	54	6	1	54	6	1	54	6	1
RS259	No	1	B	46	59	13	57	2	0	57	2	0	57	2	0
RS260	No	1	B	46	60	14	56	4	0	56	4	0	56	4	0
RS261	No	1	B	46	60	14	59	1	0	59	1	0	59	1	0
RS262	No	1	B	47	61	14	57	4	0	57	4	0	57	4	0
RS263	No	1	B	48	61	13	59	2	0	59	2	0	59	2	0

= Impacted receptor
= 5 dBA reduction or better
= 7 dBA reduction or better

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 1 North

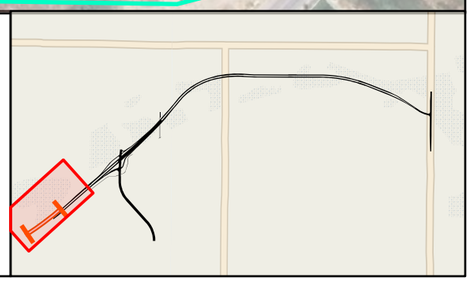
NAC		17-Foot Barrier	16-Foot Barrier	15-Foot Barrier
	Inputs – Overall			
	Barrier Length (ft.) =	1,169	1,169	1,194
	Barrier Height (ft.) =	17	16	15
	Barrier Area (sq. ft.) =	19,873	18,704	17,910
	Inputs – Category A, C, D, or E			
	Barrier Height (ft.) =	n/a	n/a	n/a
	Barrier Length (ft.) =	n/a	n/a	n/a
	Barrier Area (ft.) =	n/a	n/a	n/a
	Right-of-Way Acquisition Area (sq. ft.) =	n/a	n/a	n/a
	Safety Barrier (linear ft.) =	n/a	n/a	n/a
	Inputs – Category B			
	Barrier Height (ft.) =	17	16	15
	Barrier Length (ft.) =	1,169	1,169	1,194
	Barrier Area (sq. ft.) =	19,873	18,704	17,910
	Right-of-Way Acquisition Area (sq. ft.) =	0	0	0
	Safety Barrier (linear ft.) =	1,169	1,169	1,194
Feasibility	**Acoustic Feasibility**			
	Front Row Receptors =	9	9	9
	Front-Row Receptors with a 5 dBA Reduction =	6	6	6
	% of Front-Row Receptors Reduced At Least 5 dBA =	67%	67%	67%
	Acoustically Feasible =	**Yes**	**Yes**	**Yes**
Reasonableness	**Noise Reduction Design Goal**			
	Front Row Receptors =	9	9	9
	Front Row Receptors with 7 dBA Reduction =	4	4	3
	% of Front Row Reduced At Least 7 dBA =	44%	44%	33%
	Meets Noise Reduction Design Goal =	**Yes**	**Yes**	**No**
	Cost Effectiveness – Category A, C, D, or E			
	Barrier Cost (Barrier area x 20) =	n/a	n/a	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a	n/a	n/a
	Safety Barrier (linear ft. x 125) =	n/a	n/a	n/a
	Total Barrier Cost =	n/a	n/a	n/a
	Allowable Cost (length x 360) =	n/a	n/a	n/a
	Cost Reasonable =	**n/a**	**n/a**	**n/a**
	Cost Effectiveness – Category B			
	Barrier Cost (Barrier area x 20) =	$397,460	$374,080	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	$0	$0	n/a
	Safety Barrier (linear ft. x 125) =	$146,125	$146,125	n/a
	Total Barrier Cost =	$543,585	$520,205	n/a
	Allowable Cost (benefited x 30k) =	$660,000	$660,000	n/a
	Benefited (Category B w/ 5 dBA Reduction) =	22	22	n/a
	Cost per Benefited Receptor (Barrier cost / benefited) =	$24,708	$23,646	n/a
	Cost Reasonable =	**Yes**	**Yes**	**n/a**
	Is Noise Barrier 1 North Feasible and Reasonable?	**Yes**	**Yes**	**No**



SR-177; SR-193 to 1800 North Re-Evaluation
Traffic Noise Study
Exhibit 2: Noise Barriers
UDOT Project No.: S-R199(381)
UDOT PIN: 20927

Proposed Action Design
Barrier Not Recommended for Balloting
Receptor Area
Benefited Receptor
Bureau of Reclamation Property

0 125 250 500 Feet



SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 1 South

NAC							17-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors
RS145	No	1	C	49	61	12	61	0	0
RS146	No	1	B	55	66	11	66	0	0
RS147	No	1	B	53	66	13	66	0	0
RS148	No	1	B	54	65	11	65	0	0
RS149	No	1	B	54	64	10	64	0	0
RS150	No	1	B	55	65	10	65	0	0
RS151	No	1	B	55	66	11	66	0	0
RS152	No	1	B	55	67	12	67	0	0
RS153	No	1	B	55	68	13	68	0	0
RS154	No	1	B	55	68	13	68	0	0
RS155	No	1	B	53	66	13	66	0	0
RS156	No	1	B	51	64	13	64	0	0
RS157	No	1	B	49	62	13	62	0	0
RS158	No	1	B	50	63	13	63	0	0
RS159	No	1	B	49	63	14	62	1	0
RS160	No	1	B	49	62	13	61	1	0
RS161	Yes	1	C	52	64	12	61	3	0
RS162	No	1	B	48	61	13	59	2	0
RS163	No	1	B	48	61	13	59	2	0
RS164	No	1	B	48	60	12	58	2	0
RS165	No	1	B	48	60	12	57	3	0
RS166	No	1	B	47	59	12	56	3	0
RS167	No	1	D	21	26	5	26	0	0
RS168	No	1	B	46	49	3	48	1	0
RS169	No	1	B	46	49	3	47	2	0
RS170	No	1	B	46	50	4	49	1	0
RS171	No	1	B	46	48	2	47	1	0
RS172	No	1	B	46	55	9	53	2	0
RS173	No	1	B	46	51	5	50	1	0
RS174	No	1	B	46	50	4	48	2	0
RS175	No	1	B	47	60	13	58	2	0
RS176	No	1	B	46	51	5	50	1	0
RS177	No	1	B	46	52	6	48	4	0
RS178	No	1	B	49	61	12	57	4	0
RS179	No	1	B	46	56	10	55	1	0
RS180	No	1	B	46	51	5	48	3	0
RS181	No	1	B	46	55	9	52	3	0
RS182	No	1	B	46	53	7	50	3	0
RS183	No	1	B	46	54	8	52	2	0
RS184	No	1	C	46	53	7	52	1	0
RS185	No	1	B	46	56	10	54	2	0
RS186	No	1	B	46	49	3	49	0	0
RS187	No	1	B	46	51	5	51	0	0
RS188	No	1	B	46	52	6	51	1	0
RS189	No	1	B	46	51	5	51	0	0
RS190	No	1	B	46	56	10	55	1	0
RS191	No	1	B	46	46	0	45	1	0
RS192	No	1	B	46	46	0	45	1	0
RS193	No	1	B	46	46	0	46	0	0

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 1 South

NAC							17-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors
RS194	No	1	B	46	51	5	50	1	0
RS195	No	1	B	46	51	5	51	0	0
RS196	No	1	B	46	52	6	51	1	0
RS197	No	1	B	46	51	5	51	0	0
RS198	No	1	B	46	52	6	52	0	0
RS199	No	1	B	46	57	11	56	1	0
RS200	No	1	B	46	54	8	53	1	0
RS201	No	1	B	46	56	10	56	0	0
RS202	No	1	B	46	48	2	48	0	0
RS203	No	1	B	46	49	3	49	0	0
RS204	No	1	B	46	49	3	48	1	0
RS205	No	1	B	46	48	2	48	0	0
RS206	No	1	B	46	49	3	49	0	0
RS207	No	1	B	46	52	6	52	0	0
RS208	No	1	B	46	53	7	53	0	0
RS209	No	1	B	46	55	9	55	0	0
RS210	No	1	B	46	54	8	54	0	0
RS211	No	1	B	46	57	11	57	0	0
RS212	No	1	B	46	56	10	56	0	0
RS213	No	1	B	47	61	14	60	1	0
RS214	No	1	B	46	54	8	54	0	0
RS215	No	1	B	46	57	11	57	0	0
RS216	No	1	B	46	46	0	43	3	0
RS217	No	1	B	46	46	0	45	1	0
RS218	No	1	B	46	46	0	45	1	0
RS219	No	1	B	46	47	1	46	1	0
RS220	No	1	B	46	46	0	45	1	0
RS221	No	1	B	46	46	0	44	2	0
RS222	No	1	B	46	46	0	45	1	0
RS223	No	1	B	46	46	0	45	1	0
RS224	No	1	B	46	47	1	47	0	0
RS225	No	1	B	46	52	6	52	0	0
RS226	No	1	B	46	54	8	54	0	0
RS227	No	1	B	48	62	14	62	0	0
RS228	No	1	B	46	57	11	57	0	0
RS229	No	1	B	46	56	10	56	0	0
RS230	No	1	B	47	61	14	60	1	0
RS231	No	1	B	46	49	3	49	0	0
RS232	No	1	B	46	50	4	50	0	0
RS233	No	1	B	46	49	3	49	0	0
RS234	No	1	B	46	49	3	48	1	0
RS235	No	1	B	46	50	4	50	0	0
RS236	No	1	B	46	50	4	49	1	0
RS237	No	1	B	46	52	6	51	1	0
RS238	No	1	B	46	50	4	50	0	0
RS239	No	1	B	46	51	5	51	0	0
RS240	No	1	B	46	52	6	52	0	0
RS241	No	1	B	46	57	11	57	0	0
RS242	No	1	B	46	57	11	57	0	0

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 1 South

NAC							17-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors
RS243	No	1	B	46	57	11	57	0	0
RS244	No	1	B	47	60	13	60	0	0
RS245	No	1	B	46	46	0	45	1	0
RS246	No	1	B	46	46	0	45	1	0
RS247	No	1	B	46	46	0	45	1	0
RS248	No	1	B	46	46	0	46	0	0
RS249	No	1	B	46	46	0	46	0	0
RS250	No	1	B	46	47	1	47	0	0
RS251	No	1	B	46	47	1	47	0	0
RS252	No	1	B	46	46	0	45	1	0
RS253	No	1	B	46	48	2	47	1	0
RS254	No	1	B	46	48	2	48	0	0
RS255	No	1	B	46	55	9	55	0	0
RS256	No	1	B	46	52	6	52	0	0
RS257	No	1	B	46	58	12	58	0	0
RS258	No	1	B	46	60	14	60	0	0
RS259	No	1	B	46	59	13	59	0	0
RS260	No	1	B	46	60	14	60	0	0
RS261	No	1	B	46	60	14	59	1	0
RS262	No	1	B	47	61	14	61	0	0
RS263	No	1	B	48	61	13	61	0	0

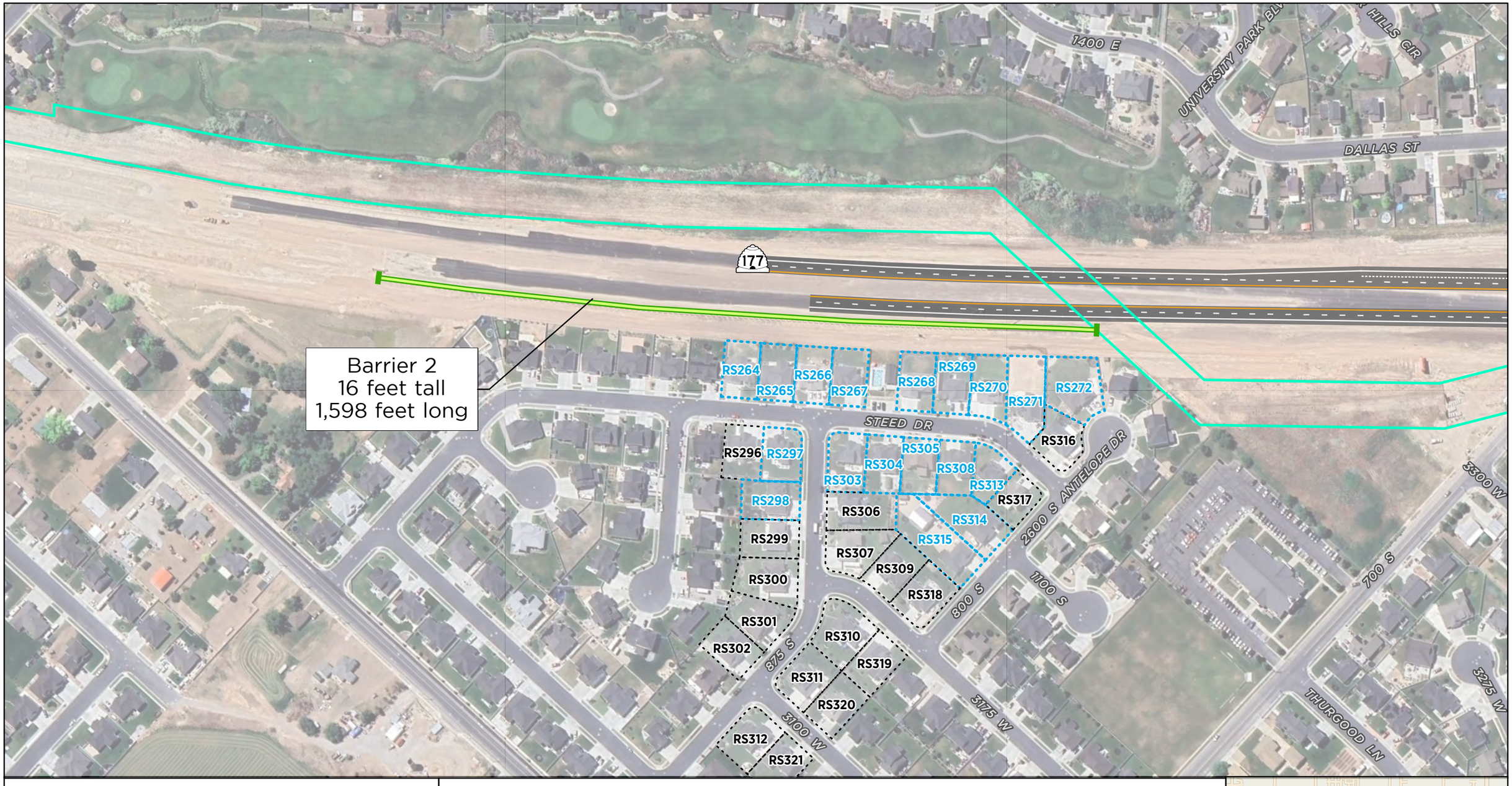
= Impacted receptor
= 5 dBA reduction or better
= 7 dBA reduction or better

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 1 South

NAC	17-Foot Barrier

	Inputs – Overall	
	Barrier Length (ft.) =	1,600
	Barrier Height (ft.) =	17
	Barrier Area (sq. ft.) =	27,200
	Inputs – Category A, C, D, or E	
	Barrier Height (ft.) =	17
	Barrier Length (ft.) =	350
	Barrier Area (ft.) =	5,950
	Right-of-Way Acquisition Area (sq. ft.) =	0
	Safety Barrier (linear ft.) =	350
	Inputs – Category B	
	Barrier Height (ft.) =	17
	Barrier Length (ft.) =	1,250
	Barrier Area (sq. ft.) =	21,250
	Right-of-Way Acquisition Area (sq. ft.) =	0
	Safety Barrier (linear ft.) =	1,250
Feasibility	**Acoustic Feasibility**	
	Front Row Receptors =	1
	Front-Row Receptors with a 5 dBA Reduction =	0
	% of Front-Row Receptors Reduced At Least 5 dBA =	0%
	Acoustically Feasible =	**No**
Reasonableness	**Noise Reduction Design Goal**	
	Front Row Receptors =	1
	Front Row Receptors with 7 dBA Reduction =	0
	% of Front Row Reduced At Least 7 dBA =	0%
	Meets Noise Reduction Design Goal =	**No**
	Cost Effectiveness – Category A, C, D, or E	
	Barrier Cost (Barrier area x 20) =	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a
	Safety Barrier (linear ft. x 125) =	n/a
	Total Barrier Cost =	n/a
	Allowable Cost (length x 360) =	n/a
	Cost Reasonable =	**n/a**
	Cost Effectiveness – Category B	
	Barrier Cost (Barrier area x 20) =	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a
	Safety Barrier (linear ft. x 125) =	n/a
	Total Barrier Cost =	n/a
	Allowable Cost (benefited x 30k) =	n/a
	Benefited (Category B w/ 5 dBA Reduction) =	n/a
	Cost per Benefited Receptor (Barrier cost / benefited) =	n/a
	Cost Reasonable =	**n/a**

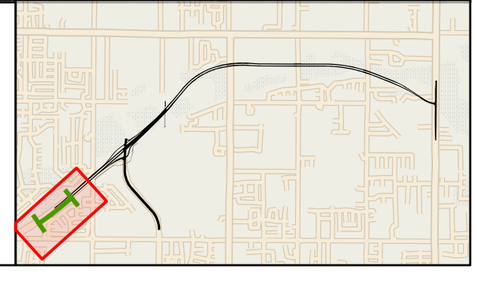
Is Noise Barrier 1 South Feasible and Reasonable?	**No**



SR-177; SR-193 to 1800 North Re-Evaluation
Traffic Noise Study
Exhibit 2: Noise Barriers
UDOT Project No.: S-R199(381)
UDOT PIN: 20927

Proposed Action Design
Barrier Remain-in-Place
Benefited Receptor
Receptor Area
Bureau of Reclamation Property

0 125 250 500 Feet



SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 2

NAC							Existing 16-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future W/O Barrier dBA	Increase dBA	dBA	Reduction dBA	Benefited Receptors
RS264	Yes	1	B	51	76	25	63	13	1
RS265	Yes	1	B	51	76	25	62	14	1
RS266	Yes	1	B	51	75	24	63	12	1
RS267	Yes	1	B	51	75	24	63	12	1
RS268	Yes	1	B	51	75	24	63	12	1
RS269	Yes	1	B	52	75	23	64	11	1
RS270	Yes	1	B	52	74	22	65	9	1
RS271	Yes	1	B	53	73	20	67	6	1
RS272	Yes	1	B	56	74	18	69	5	1
RS296	No	1	B	46	60	14	56	4	0
RS297	No	1	B	46	59	13	52	7	1
RS298	No	1	B	46	50	4	45	5	1
RS299	No	1	B	46	49	3	45	4	0
RS300	No	1	B	46	46	0	44	2	0
RS301	No	1	B	46	46	0	45	1	0
RS302	No	1	B	46	47	1	45	2	0
RS303	No	1	B	46	62	16	54	8	1
RS304	No	1	B	46	64	18	54	10	1
RS305	No	1	B	46	60	14	53	7	1
RS306	No	1	B	46	50	4	48	2	0
RS307	No	1	B	46	51	5	48	3	0
RS308	No	1	B	46	62	16	53	9	1
RS309	No	1	B	46	50	4	48	2	0
RS310	No	1	B	46	51	5	51	0	0
RS311	No	1	B	46	49	3	47	2	0
RS312	No	1	B	46	49	3	48	1	0
RS313	No	1	B	46	60	14	55	5	1
RS314	No	1	B	46	53	7	48	5	1
RS315	No	1	B	46	52	6	47	5	1
RS316	No	1	B	48	65	17	61	4	0
RS317	No	1	B	46	60	14	56	4	0
RS318	No	1	B	46	47	1	47	0	0
RS319	No	1	B	46	52	6	52	0	0
RS320	No	1	B	46	46	0	45	1	0
RS321	No	1	B	46	46	0	43	3	0

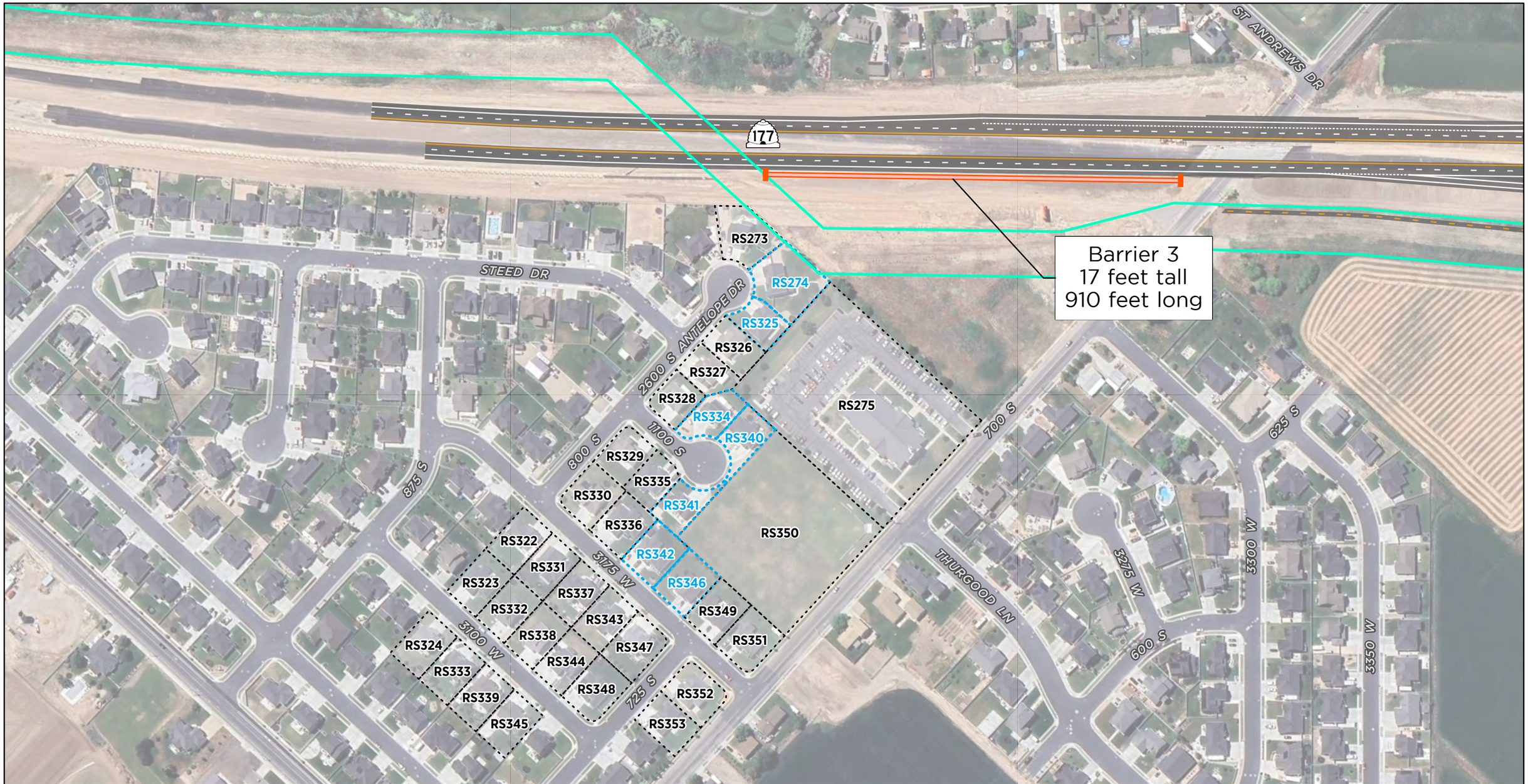
= Impacted receptor
= 5 dBA reduction or better
= 7 dBA reduction or better

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 2

NAC	Existing 16-Foot Barrier

	Inputs – Overall	
	Barrier Length (ft.) =	1,598
	Barrier Height (ft.) =	16
	Barrier Area (sq. ft.) =	25,568
	Inputs – Category A, C, D, or E	
	Barrier Height (ft.) =	n/a
	Barrier Length (ft.) =	n/a
	Barrier Area (ft.) =	n/a
	Right-of-Way Acquisition Area (sq. ft.) =	n/a
	Safety Barrier (linear ft.) =	n/a
	Inputs – Category B	
	Barrier Height (ft.) =	16
	Barrier Length (ft.) =	1,598
	Barrier Area (sq. ft.) =	25,568
	Right-of-Way Acquisition Area (sq. ft.) =	0
	Safety Barrier (linear ft.) =	0
Feasibility	**Acoustic Feasibility**	
	Front Row Receptors =	9
	Front-Row Receptors with a 5 dBA Reduction =	9
	% of Front-Row Receptors Reduced At Least 5 dBA =	100%
	Acoustically Feasible =	**Yes**
Reasonableness	**Noise Reduction Design Goal**	
	Front Row Receptors =	9
	Front Row Receptors with 7 dBA Reduction =	7
	% of Front Row Reduced At Least 7 dBA =	78%
	Meets Noise Reduction Design Goal =	**Yes**
	Cost Effectiveness – Category A, C, D, or E	
	Barrier Cost (Barrier area x 20) =	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a
	Safety Barrier (linear ft. x 125) =	n/a
	Total Barrier Cost =	n/a
	Allowable Cost (length x 360) =	n/a
	Cost Reasonable =	**n/a**
	Cost Effectiveness – Category B	
	Barrier Cost (Barrier area x 20) =	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a
	Safety Barrier (linear ft. x 125) =	n/a
	Total Barrier Cost =	n/a
	Allowable Cost (benefited x 30k) =	n/a
	Benefited (Category B w/ 5 dBA Reduction) =	n/a
	Cost per Benefited Receptor (Barrier cost / benefited) =	n/a
	Cost Reasonable =	**n/a**

Is Noise Barrier 2 Feasible? **Yes**

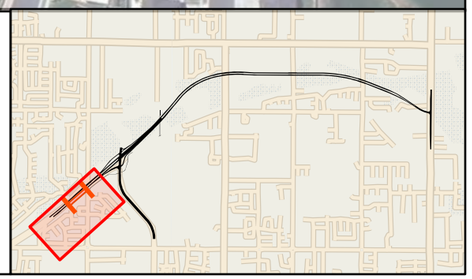


SR-177; SR-193 to 1800 North Re-Evaluation
Traffic Noise Study
Exhibit 2: Noise Barriers
UDOT Project No.: S-R199(381)
UDOT PIN: 20927

- Proposed Action Design
- Barrier Not Recommended for Balloting
- Benefited Receptor
- Receptor Area
- Bureau of Reclamation Property

N

0 125 250 500 Feet



SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 3

NAC							17-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors
RS273	Yes	1	B	61	74	13	72	2	0
RS274	Yes	1	B	56	70	14	65	5	1
RS275	Yes	1	D	34	39	5	36	3	0
RS322	No	1	B	46	52	6	49	3	0
RS323	No	1	B	46	46	0	44	2	0
RS324	No	1	B	46	48	2	46	2	0
RS325	No	1	B	49	63	14	56	7	1
RS326	No	1	B	46	58	12	54	4	0
RS327	No	1	B	46	58	12	54	4	0
RS328	No	1	B	46	54	8	54	0	0
RS329	No	1	B	46	55	9	52	3	0
RS330	No	1	B	46	47	1	46	1	0
RS331	No	1	B	46	50	4	48	2	0
RS332	No	1	B	46	46	0	44	2	0
RS333	No	1	B	46	50	4	49	1	0
RS334	No	1	B	46	59	13	54	5	1
RS335	No	1	B	46	52	6	52	0	0
RS336	No	1	B	46	46	0	45	1	0
RS337	No	1	B	46	48	2	47	1	0
RS338	No	1	B	46	46	0	44	2	0
RS339	No	1	B	46	48	2	46	2	0
RS340	No	1	B	46	60	14	54	6	1
RS341	No	1	B	46	57	11	51	6	1
RS342	No	1	B	46	53	7	48	5	1
RS343	No	1	B	46	46	0	44	2	0
RS344	No	1	B	46	46	0	45	1	0
RS345	No	1	B	46	47	1	46	1	0
RS346	No	1	B	47	55	8	50	5	1
RS347	No	1	B	46	47	1	47	0	0
RS348	No	1	B	46	46	0	46	0	0
RS349	No	1	B	52	55	3	53	2	0
RS350	No	1	C	58	59	1	59	0	0
RS351	No	1	B	56	58	2	57	1	0
RS352	No	1	B	46	47	1	47	0	0
RS353	No	1	B	46	47	1	45	2	0

= Impacted receptor
= 5 dBA reduction or better
= 7 dBA reduction or better

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 3

NAC	17-Foot Barrier

	Inputs – Overall	
	Barrier Length (ft.) =	910
	Barrier Height (ft.) =	17
	Barrier Area (sq. ft.) =	15,470
	Inputs – Category A, C, D, or E	
	Barrier Height (ft.) =	n/a
	Barrier Length (ft.) =	n/a
	Barrier Area (ft.) =	n/a
	Right-of-Way Acquisition Area (sq. ft.) =	n/a
	Safety Barrier (linear ft.) =	n/a
	Inputs – Category B	
	Barrier Height (ft.) =	17
	Barrier Length (ft.) =	910
	Barrier Area (sq. ft.) =	15,470
	Right-of-Way Acquisition Area (sq. ft.) =	0
	Safety Barrier (linear ft.) =	910
Feasibility	**Acoustic Feasibility**	
	Front Row Receptors =	3
	Front-Row Receptors with a 5 dBA Reduction =	1
	% of Front-Row Receptors Reduced At Least 5 dBA =	33%
	Acoustically Feasible =	**No**
Reasonableness	**Noise Reduction Design Goal**	
	Front Row Receptors =	3
	Front Row Receptors with 7 dBA Reduction =	0
	% of Front Row Reduced At Least 7 dBA =	0%
	Meets Noise Reduction Design Goal =	**No**
	Cost Effectiveness – Category A, C, D, or E	
	Barrier Cost (Barrier area x 20) =	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a
	Safety Barrier (linear ft. x 125) =	n/a
	Total Barrier Cost =	n/a
	Allowable Cost (length x 360) =	n/a
	Cost Reasonable =	**n/a**
	Cost Effectiveness – Category B	
	Barrier Cost (Barrier area x 20) =	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a
	Safety Barrier (linear ft. x 125) =	n/a
	Total Barrier Cost =	n/a
	Allowable Cost (benefited x 30k) =	n/a
	Benefited (Category B w/ 5 dBA Reduction) =	n/a
	Cost per Benefited Receptor (Barrier cost / benefited) =	n/a
	Cost Reasonable =	**n/a**

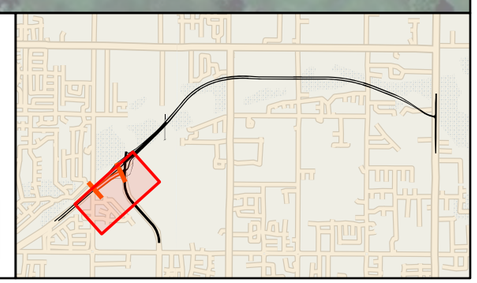
Is Noise Barrier 3 Feasible and Reasonable?	**No**

SR-177; SR-193 to 1800 North Re-Evaluation
Traffic Noise Study
Exhibit 2: Noise Barriers
UDOT Project No.: S-R199(381)
UDOT PIN: 20927

- Proposed Action Design
- Barrier Not Recommended for Balloting
- Benefited Receptor
- Receptor Area

N

0 125 250 500 Feet



SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 4

NAC							17-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors
RS276	Yes	1	B	52	66	14	64	2	0
RS277	Yes	1	B	52	66	14	64	2	0
RS278	Yes	1	B	46	59	13	56	3	0
RS279	Yes	1	B	50	63	13	60	3	0
RS280	No	1	B	52	61	9	60	1	0
RS281	No	1	B	53	61	8	60	1	0
RS282	No	1	B	53	60	7	60	0	0
RS283	No	1	B	53	60	7	60	0	0
RS284	No	1	B	54	60	6	60	0	0
RS285	No	1	B	54	61	7	60	1	0
RS286	No	1	B	54	60	6	60	0	0
RS287	No	1	B	54	60	6	60	0	0
RS288	No	1	B	55	62	7	61	1	0
RS289	No	1	B	55	62	7	61	1	0
RS290	No	1	B	55	61	6	61	0	0
RS291	No	1	B	55	61	6	61	0	0
RS374	No	1	B	49	64	15	63	1	0
RS393	No	1	B	46	59	13	57	2	0
RS394	No	1	B	46	55	9	52	3	0
RS395	No	1	B	46	54	8	53	1	0
RS396	No	1	B	46	52	6	46	6	1
RS397	No	1	B	46	53	7	52	1	0
RS398	No	1	B	46	49	3	46	3	0
RS399	No	1	B	46	51	5	51	0	0
RS400	No	1	B	46	48	2	46	2	0
RS401	No	1	B	46	50	4	49	1	0
RS402	No	1	B	46	48	2	47	1	0
RS403	No	1	B	46	51	5	49	2	0
RS404	No	1	B	46	48	2	47	1	0
RS405	No	1	B	46	53	7	53	0	0

= Impacted receptor
= 5 dBA reduction or better
= 7 dBA reduction or better

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 4

NAC	17-Foot Barrier

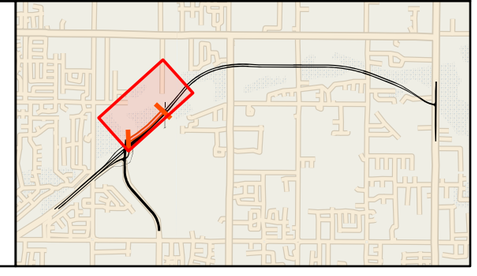
	Inputs – Overall	
	Barrier Length (ft.) =	1,205
	Barrier Height (ft.) =	17
	Barrier Area (sq. ft.) =	20,485
	Inputs – Category A, C, D, or E	
	Barrier Height (ft.) =	n/a
	Barrier Length (ft.) =	n/a
	Barrier Area (ft.) =	n/a
	Right-of-Way Acquisition Area (sq. ft.) =	n/a
	Safety Barrier (linear ft.) =	n/a
	Inputs – Category B	
	Barrier Height (ft.) =	17
	Barrier Length (ft.) =	1,205
	Barrier Area (sq. ft.) =	20,485
	Right-of-Way Acquisition Area (sq. ft.) =	0
	Safety Barrier (linear ft.) =	1,205
Feasibility	**Acoustic Feasibility**	
	Front Row Receptors =	4
	Front-Row Receptors with a 5 dBA Reduction =	0
	% of Front-Row Receptors Reduced At Least 5 dBA =	0%
	Acoustically Feasible =	**No**
Reasonableness	**Noise Reduction Design Goal**	
	Front Row Receptors =	4
	Front Row Receptors with 7 dBA Reduction =	0
	% of Front Row Reduced At Least 7 dBA =	0%
	Meets Noise Reduction Design Goal =	**No**
	Cost Effectiveness – Category A, C, D, or E	
	Barrier Cost (Barrier area x 20) =	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a
	Safety Barrier (linear ft. x 125) =	n/a
	Total Barrier Cost =	n/a
	Allowable Cost (length x 360) =	n/a
	Cost Reasonable =	**n/a**
	Cost Effectiveness – Category B	
	Barrier Cost (Barrier area x 20) =	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a
	Safety Barrier (linear ft. x 125) =	n/a
	Total Barrier Cost =	n/a
	Allowable Cost (benefited x 30k) =	n/a
	Benefited (Category B w/ 5 dBA Reduction) =	n/a
	Cost per Benefited Receptor (Barrier cost / benefited) =	n/a
	Cost Reasonable =	**n/a**

Is Noise Barrier 4 Feasible and Reasonable?	**No**

SR-177; SR-193 to 1800 North Re-Evaluation
Traffic Noise Study
Exhibit 2: Noise Barriers
UDOT Project No.: S-R199(381)
UDOT PIN: 20927

Proposed Action Design
Barrier Not Recommended for Balloting
Receptor Area

0 125 250 500 Feet



SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 5

NAC							17-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors
RS036	Yes	1	B	65	65	0	65	0	0
RS037	Yes	1	B	58	61	3	60	1	0
RS038	Yes	1	B	55	59	4	58	1	0
RS039	Yes	1	B	53	59	6	57	2	0
RS040	Yes	1	B	51	59	8	57	2	0
RS041	Yes	1	B	49	58	9	56	2	0
RS117	No	1	B	52	57	5	55	2	0
RS118	No	1	B	50	57	7	55	2	0
RS119	No	1	B	47	56	9	54	2	0
RS120	No	1	B	46	56	10	53	3	0
RS135	No	1	B	46	57	11	55	2	0
RS136	No	1	B	46	57	11	55	2	0
RS137	No	1	B	46	57	11	55	2	0
RS138	No	1	B	46	58	12	56	2	0
RS139	No	1	B	46	58	12	56	2	0
RS140	No	1	B	46	58	12	56	2	0
RS141	No	1	B	46	59	13	57	2	0
RS142	No	1	B	46	59	13	57	2	0
RS143	Yes	1	B	46	60	14	58	2	0
RS144	No	1	B	46	55	9	55	0	0

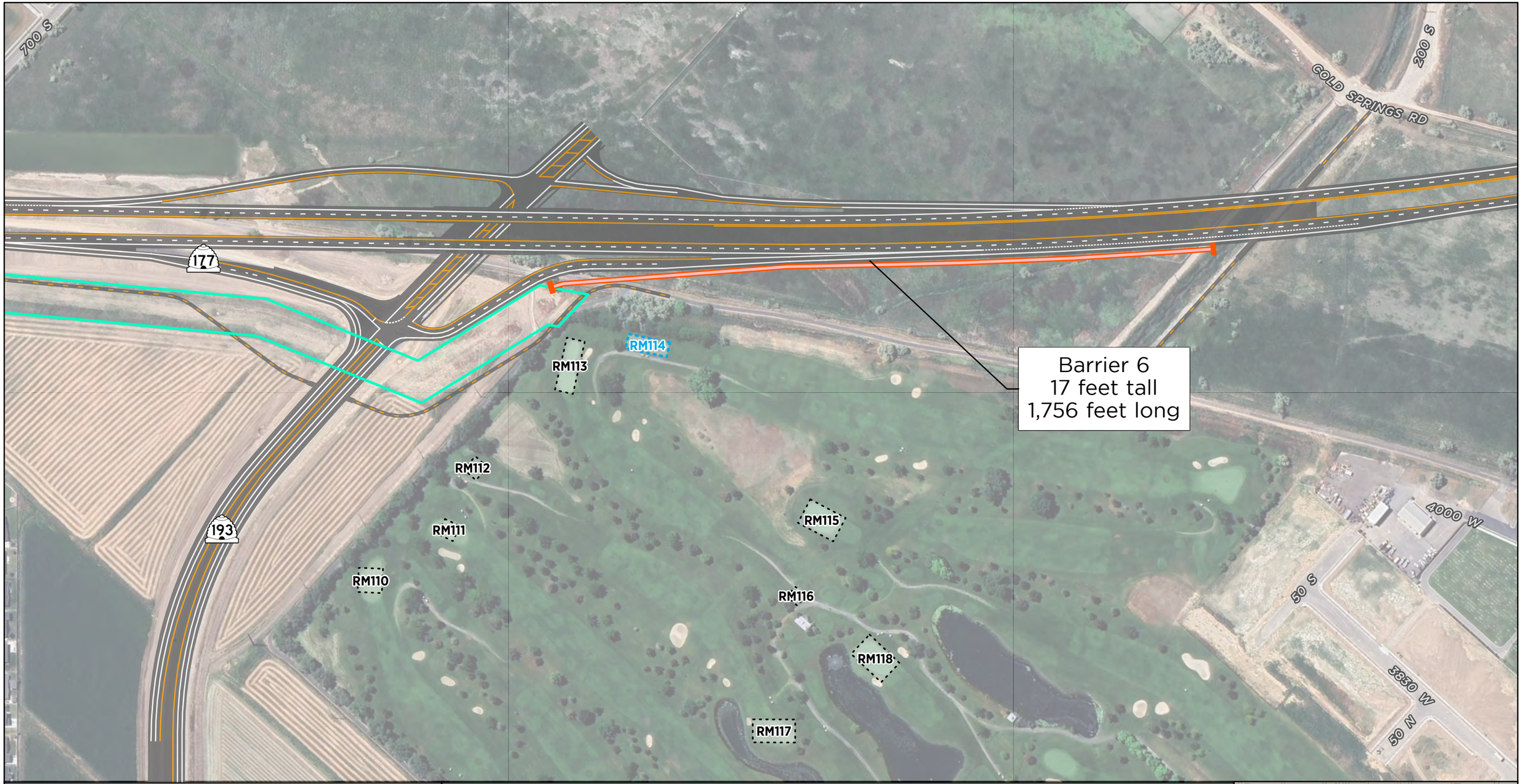
= Impacted receptor
= 5 dBA reduction or better
= 7 dBA reduction or better

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 5

NAC	17-Foot Barrier

	Inputs – Overall	
	Barrier Length (ft.) =	1,739
	Barrier Height (ft.) =	17
	Barrier Area (sq. ft.) =	29,563
	Inputs – Category A, C, D, or E	
	Barrier Height (ft.) =	n/a
	Barrier Length (ft.) =	n/a
	Barrier Area (ft.) =	n/a
	Right-of-Way Acquisition Area (sq. ft.) =	n/a
	Safety Barrier (linear ft.) =	n/a
	Inputs – Category B	
	Barrier Height (ft.) =	17
	Barrier Length (ft.) =	1,739
	Barrier Area (sq. ft.) =	29,563
	Right-of-Way Acquisition Area (sq. ft.) =	0
	Safety Barrier (linear ft.) =	1,739
Feasibility	**Acoustic Feasibility**	
	Front Row Receptors =	7
	Front-Row Receptors with a 5 dBA Reduction =	0
	% of Front-Row Receptors Reduced At Least 5 dBA =	0%
	Acoustically Feasible =	**No**
Reasonableness	**Noise Reduction Design Goal**	
	Front Row Receptors =	7
	Front Row Receptors with 7 dBA Reduction =	0
	% of Front Row Reduced At Least 7 dBA =	0%
	Meets Noise Reduction Design Goal =	**No**
	Cost Effectiveness – Category A, C, D, or E	
	Barrier Cost (Barrier area x 20) =	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a
	Safety Barrier (linear ft. x 125) =	n/a
	Total Barrier Cost =	n/a
	Allowable Cost (length x 360) =	n/a
	Cost Reasonable =	**n/a**
	Cost Effectiveness – Category B	
	Barrier Cost (Barrier area x 20) =	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a
	Safety Barrier (linear ft. x 125) =	n/a
	Total Barrier Cost =	n/a
	Allowable Cost (benefited x 30k) =	n/a
	Benefited (Category B w/ 5 dBA Reduction) =	n/a
	Cost per Benefited Receptor (Barrier cost / benefited) =	n/a
	Cost Reasonable =	**n/a**

Is Noise Barrier 5 Feasible and Reasonable? **No**

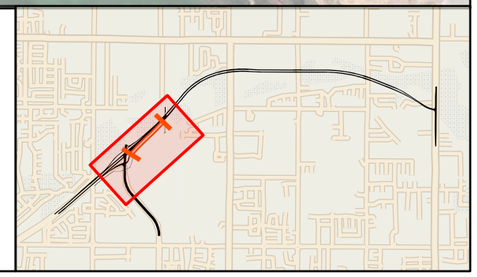


SR-177; SR-193 to 1800 North Re-Evaluation
Traffic Noise Study
Exhibit 2: Noise Barriers
UDOT Project No.: S-R199(381)
UDOT PIN: 20927

Proposed Action Design
Barrier Not Recommended for Balloting
Benefited Receptor
Receptor Area
Bureau of Reclamation Property

N

0 125 250 500 Feet



SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 6

NAC							17-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors
RM110	Yes	1	C	55	63	8	63	0	0
RM111	Yes	1	C	53	63	10	63	0	0
RM112	Yes	1	C	53	65	12	65	0	0
RM113	Yes	1	C	51	68	17	66	2	0
RM114	Yes	1	C	49	69	20	64	5	1
RM115	Yes	1	C	46	61	15	57	4	0
RM116	Yes	1	C	46	58	12	56	2	0
RM117	Yes	1	C	46	55	9	53	2	0
RM118	Yes	1	C	46	56	10	54	2	0

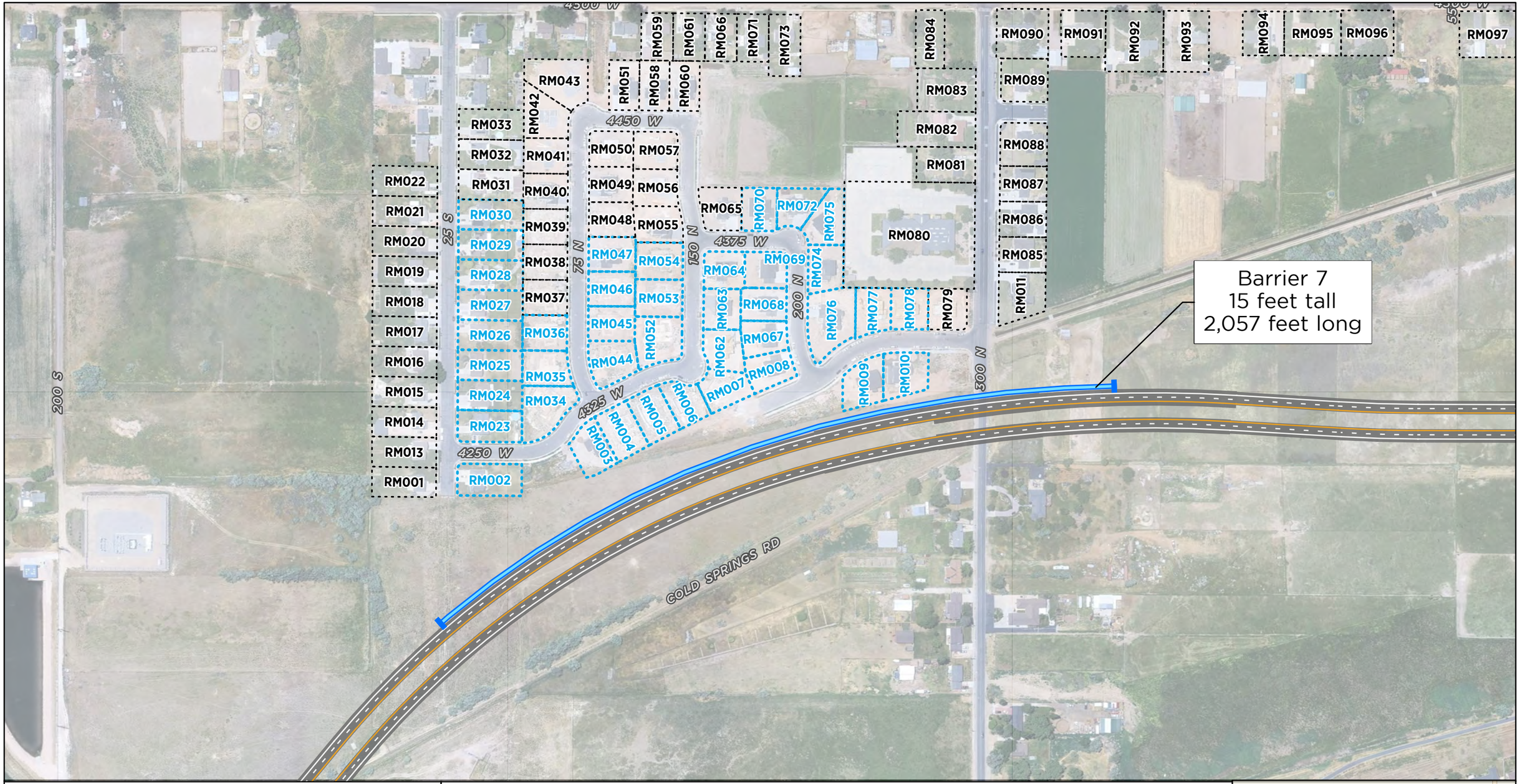
= Impacted receptor
= 5 dBA reduction or better
= 7 dBA reduction or better

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 6

NAC	17-Foot Barrier

	Inputs – Overall	
	Barrier Length (ft.) =	1,756
	Barrier Height (ft.) =	17
	Barrier Area (sq. ft.) =	29,852
	Inputs – Category A, C, D, or E	
	Barrier Height (ft.) =	17
	Barrier Length (ft.) =	1,756
	Barrier Area (ft.) =	29,852
	Right-of-Way Acquisition Area (sq. ft.) =	0
	Safety Barrier (linear ft.) =	1,756
	Inputs – Category B	
	Barrier Height (ft.) =	0
	Barrier Length (ft.) =	0
	Barrier Area (sq. ft.) =	0
	Right-of-Way Acquisition Area (sq. ft.) =	0
	Safety Barrier (linear ft.) =	0
Feasibility	**Acoustic Feasibility**	
	Front Row Receptors =	9
	Front-Row Receptors with a 5 dBA Reduction =	1
	% of Front-Row Receptors Reduced At Least 5 dBA =	11%
	Acoustically Feasible =	**No**
Reasonableness	**Noise Reduction Design Goal**	
	Front Row Receptors =	9
	Front Row Receptors with 7 dBA Reduction =	0
	% of Front Row Reduced At Least 7 dBA =	0%
	Meets Noise Reduction Design Goal =	**No**
	Cost Effectiveness – Category A, C, D, or E	
	Barrier Cost (Barrier area x 20) =	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a
	Safety Barrier (linear ft. x 125) =	n/a
	Total Barrier Cost =	n/a
	Allowable Cost (length x 360) =	n/a
	Cost Reasonable =	**n/a**
	Cost Effectiveness – Category B	
	Barrier Cost (Barrier area x 20) =	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a
	Safety Barrier (linear ft. x 125) =	n/a
	Total Barrier Cost =	n/a
	Allowable Cost (benefited x 30k) =	n/a
	Benefited (Category B w/ 5 dBA Reduction) =	n/a
	Cost per Benefited Receptor (Barrier cost / benefited) =	n/a
	Cost Reasonable =	**n/a**

Is Noise Barrier 6 Feasible and Reasonable?	**No**

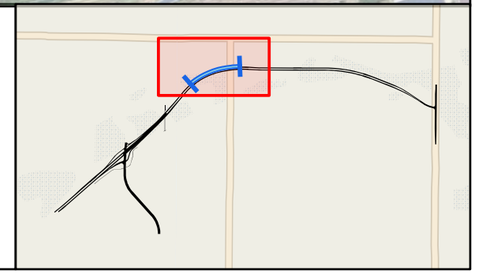


SR-177; SR-193 to 1800 North Re-Evaluation
Traffic Noise Study
Exhibit 2: Noise Barriers
UDOT Project No.: S-R199(381)
UDOT PIN: 20927

- Proposed Action Design
- Barrier Recommended for Balloting
- Receptor Area
- Benefited Receptor

N

0 125 250 500 Feet



SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 7

NAC							17-Foot Barrier			16-Foot Barrier			15-Foot Barrier			14-Foot Barrier			13-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors
RM001	Yes	1	B	46	60	14	57	3	0	57	3	0	57	3	0	56	4	0	56	4	0
RM002	Yes	1	B	46	66	20	58	8	1	58	8	1	58	8	1	58	8	1	58	8	1
RM003	Yes	1	B	46	68	22	59	9	1	59	9	1	59	9	1	59	9	1	60	8	1
RM004	Yes	1	B	46	67	21	58	9	1	58	9	1	58	9	1	59	8	1	59	8	1
RM005	Yes	1	B	46	68	22	58	10	1	59	9	1	59	9	1	59	9	1	60	8	1
RM006	Yes	1	B	46	68	22	58	10	1	59	9	1	59	9	1	59	9	1	60	8	1
RM007	Yes	1	B	46	68	22	59	9	1	59	9	1	59	9	1	59	9	1	60	8	1
RM008	Yes	1	B	46	65	19	55	10	1	55	10	1	56	9	1	56	9	1	56	9	1
RM009	Yes	1	B	47	67	20	60	7	1	60	7	1	60	7	1	61	6	1	61	6	1
RM010	Yes	1	B	50	67	17	61	6	1	61	6	1	62	5	1	62	5	1	62	5	1
RM011	Yes	1	B	46	61	15	58	3	0	59	2	0	59	2	0	58	3	0	59	2	0
RM012	No	1	B	46	65	19	64	1	0	64	1	0	64	1	0	64	1	0	64	1	0
RM013	No	1	B	46	57	11	55	2	0	55	2	0	55	2	0	54	3	0	54	3	0
RM014	No	1	B	46	56	10	54	2	0	54	2	0	54	2	0	53	3	0	53	3	0
RM015	No	1	B	46	54	8	52	2	0	52	2	0	52	2	0	52	2	0	52	2	0
RM016	No	1	B	46	54	8	51	3	0	51	3	0	52	2	0	51	3	0	51	3	0
RM017	No	1	B	46	53	7	51	2	0	51	2	0	51	2	0	50	3	0	51	2	0
RM018	No	1	B	46	52	6	50	2	0	50	2	0	50	2	0	50	2	0	50	2	0
RM019	No	1	B	46	52	6	49	3	0	49	3	0	49	3	0	49	3	0	49	3	0
RM020	No	1	B	46	51	5	48	3	0	48	3	0	49	2	0	49	2	0	49	2	0
RM021	No	1	B	46	50	4	48	2	0	48	2	0	48	2	0	48	2	0	48	2	0
RM022	No	1	B	46	50	4	48	2	0	48	2	0	48	2	0	48	2	0	48	2	0
RM023	No	1	B	46	64	18	54	10	1	54	10	1	54	10	1	54	10	1	55	9	1
RM024	No	1	B	46	61	15	53	8	1	53	8	1	53	8	1	53	8	1	54	7	1
RM025	No	1	B	46	59	13	51	8	1	51	8	1	52	7	1	52	7	1	52	7	1
RM026	No	1	B	46	57	11	50	7	1	50	7	1	51	6	1	51	6	1	51	6	1
RM027	No	1	B	46	56	10	49	7	1	50	6	1	50	6	1	50	6	1	51	5	1
RM028	No	1	B	46	54	8	48	6	1	49	5	1	49	5	1	49	5	1	50	4	0
RM029	No	1	B	46	53	7	48	5	1	48	5	1	48	5	1	48	5	1	49	4	0
RM030	No	1	B	46	52	6	47	5	1	47	5	1	47	5	1	48	4	0	48	4	0
RM031	No	1	B	46	51	5	47	4	0	47	4	0	47	4	0	47	4	0	48	3	0
RM032	No	1	B	46	50	4	47	3	0	47	3	0	47	3	0	48	2	0	48	2	0
RM033	No	1	B	46	52	6	48	4	0	48	4	0	48	4	0	48	4	0	49	3	0
RM034	No	1	B	46	66	20	58	8	1	58	8	1	58	8	1	57	9	1	57	9	1
RM035	No	1	B	46	57	11	52	5	1	52	5	1	52	5	1	52	5	1	52	5	1
RM036	No	1	B	46	54	8	49	5	1	49	5	1	49	5	1	49	5	1	50	4	0
RM037	No	1	B	46	52	6	48	4	0	49	3	0	49	3	0	49	3	0	49	3	0
RM038	No	1	B	46	51	5	47	4	0	48	3	0	48	3	0	48	3	0	48	3	0
RM039	No	1	B	46	50	4	47	3	0	47	3	0	47	3	0	47	3	0	47	3	0
RM040	No	1	B	46	49	3	46	3	0	47	2	0	47	2	0	47	2	0	47	2	0
RM041	No	1	B	46	49	3	46	3	0	46	3	0	47	2	0	47	2	0	47	2	0
RM042	No	1	B	47	50	3	49	1	0	49	1	0	49	1	0	49	1	0	49	1	0
RM043	No	1	B	46	52	6	48	4	0	49	3	0	49	3	0	49	3	0	49	3	0
RM044	No	1	B	46	61	15	51	10	1	51	10	1	52	9	1	52	9	1	52	9	1
RM045	No	1	B	46	59	13	50	9	1	50	9	1	51	8	1	51	8	1	51	8	1
RM046	No	1	B	46	54	8	48	6	1	48	6	1	48	6	1	48	6	1	49	5	1
RM047	No	1	B	46	53	7	48	5	1	48	5	1	48	5	1	48	5	1	48	5	1
RM048	No	1	B	46	51	5	47	4	0	47	4	0	47	4	0	47	4	0	47	4	0
RM049	No	1	B	46	51	5	47	4	0	47	4	0	47	4	0	47	4	0	48	3	0

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 7

NAC							17-Foot Barrier			16-Foot Barrier			15-Foot Barrier			14-Foot Barrier			13-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors
RM050	No	1	B	46	50	4	47	3	0	47	3	0	47	3	0	47	3	0	48	2	0
RM051	No	1	B	46	50	4	48	2	0	48	2	0	48	2	0	48	2	0	49	1	0
RM052	No	1	B	46	58	12	49	9	1	49	9	1	50	8	1	50	8	1	51	7	1
RM053	No	1	B	46	53	7	47	6	1	47	6	1	48	5	1	47	6	1	48	5	1
RM054	No	1	B	46	52	6	47	5	1	47	5	1	47	5	1	46	6	1	47	5	1
RM055	No	1	B	46	50	4	46	4	0	46	4	0	46	4	0	46	4	0	47	3	0
RM056	No	1	B	46	49	3	46	3	0	46	3	0	46	3	0	46	3	0	47	2	0
RM057	No	1	B	46	49	3	46	3	0	46	3	0	46	3	0	46	3	0	47	2	0
RM058	No	1	B	46	50	4	47	3	0	47	3	0	48	2	0	48	2	0	48	2	0
RM059	No	1	B	50	53	3	52	1	0	52	1	0	52	1	0	52	1	0	52	1	0
RM060	No	1	B	46	52	6	49	3	0	49	3	0	49	3	0	49	3	0	49	3	0
RM061	No	1	B	49	53	4	51	2	0	51	2	0	51	2	0	51	2	0	52	1	0
RM062	No	1	B	46	62	16	52	10	1	52	10	1	53	9	1	53	9	1	53	9	1
RM063	No	1	B	46	58	12	50	8	1	50	8	1	50	8	1	51	7	1	51	7	1
RM064	No	1	B	46	56	10	48	8	1	48	8	1	48	8	1	49	7	1	49	7	1
RM065	No	1	B	46	57	11	54	3	0	54	3	0	55	2	0	55	2	0	55	2	0
RM066	No	1	B	49	53	4	51	2	0	51	2	0	51	2	0	51	2	0	51	2	0
RM067	No	1	B	46	61	15	51	10	1	51	10	1	51	10	1	52	9	1	52	9	1
RM068	No	1	B	46	57	11	49	8	1	49	8	1	49	8	1	50	7	1	50	7	1
RM069	No	1	B	46	53	7	47	6	1	47	6	1	47	6	1	47	6	1	48	5	1
RM070	No	1	B	46	56	10	51	5	1	51	5	1	51	5	1	51	5	1	51	5	1
RM071	No	1	B	46	53	7	50	3	0	50	3	0	51	2	0	51	2	0	51	2	0
RM072	No	1	B	46	56	10	50	6	1	50	6	1	50	6	1	50	6	1	50	6	1
RM073	No	1	B	50	54	4	52	2	0	52	2	0	52	2	0	52	2	0	52	2	0
RM074	No	1	B	46	59	13	51	8	1	51	8	1	52	7	1	52	7	1	52	7	1
RM075	No	1	B	46	57	11	50	7	1	50	7	1	51	6	1	51	6	1	51	6	1
RM076	No	1	B	46	63	17	58	5	1	58	5	1	58	5	1	58	5	1	58	5	1
RM077	No	1	B	47	66	19	61	5	1	61	5	1	61	5	1	61	5	1	61	5	1
RM078	No	1	B	51	66	15	61	5	1	61	5	1	61	5	1	61	5	1	61	5	1
RM079	No	1	B	58	67	9	63	4	0	63	4	0	63	4	0	63	4	0	63	4	0
RM080	No	1	D	37	40	3	38	2	0	38	2	0	38	2	0	39	1	0	39	1	0
RM081	No	1	B	53	56	3	54	2	0	54	2	0	54	2	0	55	1	0	55	1	0
RM082	No	1	B	47	52	5	50	2	0	50	2	0	50	2	0	50	2	0	50	2	0
RM083	No	1	B	52	54	2	53	1	0	53	1	0	53	1	0	53	1	0	53	1	0
RM084	No	1	B	54	56	2	55	1	0	55	1	0	55	1	0	55	1	0	55	1	0
RM085	No	1	B	46	60	14	57	3	0	57	3	0	57	3	0	57	3	0	57	3	0
RM086	No	1	B	46	58	12	56	2	0	56	2	0	56	2	0	56	2	0	56	2	0
RM087	No	1	B	46	57	11	55	2	0	55	2	0	55	2	0	55	2	0	55	2	0
RM088	No	1	B	57	58	1	58	0	0	58	0	0	58	0	0	58	0	0	58	0	0
RM089	No	1	B	58	59	1	59	0	0	59	0	0	59	0	0	59	0	0	59	0	0
RM090	No	1	B	59	59	0	59	0	0	59	0	0	59	0	0	59	0	0	59	0	0
RM091	No	1	B	50	55	5	54	1	0	54	1	0	54	1	0	54	1	0	54	1	0
RM092	No	1	B	46	55	9	54	1	0	54	1	0	54	1	0	54	1	0	54	1	0
RM093	No	1	B	48	56	8	55	1	0	55	1	0	55	1	0	55	1	0	55	1	0
RM094	No	1	B	48	55	7	55	0	0	55	0	0	55	0	0	55	0	0	55	0	0
RM095	No	1	B	49	55	6	55	0	0	55	0	0	55	0	0	55	0	0	55	0	0
RM096	No	1	B	51	57	6	56	1	0	56	1	0	56	1	0	56	1	0	56	1	0
RM097	No	1	B	49	56	7	55	1	0	55	1	0	55	1	0	55	1	0	55	1	0
RM098	No	1	B	46	54	8	54	0	0	54	0	0	54	0	0	54	0	0	54	0	0

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 7

NAC							17-Foot Barrier			16-Foot Barrier			15-Foot Barrier			14-Foot Barrier			13-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors
RM099	No	1	B	50	55	5	55	0	0	55	0	0	55	0	0	55	0	0	55	0	0
RM100	No	1	B	50	55	5	55	0	0	55	0	0	55	0	0	55	0	0	55	0	0
RM101	No	1	B	47	54	7	54	0	0	54	0	0	54	0	0	54	0	0	54	0	0
RM102	No	1	B	48	54	6	54	0	0	54	0	0	54	0	0	54	0	0	54	0	0
RM103	No	1	B	54	56	2	56	0	0	56	0	0	56	0	0	56	0	0	56	0	0
RM104	No	1	B	46	53	7	53	0	0	53	0	0	53	0	0	53	0	0	53	0	0
RM105	No	1	B	48	55	7	55	0	0	55	0	0	55	0	0	55	0	0	55	0	0
RM106	No	1	B	46	59	13	58	1	0	58	1	0	58	1	0	58	1	0	58	1	0
RM107	No	1	B	46	55	9	55	0	0	55	0	0	55	0	0	55	0	0	55	0	0
RM108	No	1	B	48	53	5	53	0	0	53	0	0	53	0	0	53	0	0	53	0	0
RM109	No	1	B	60	60	0	60	0	0	60	0	0	60	0	0	60	0	0	60	0	0

= Impacted receptor
= 5 dBA reduction or better
= 7 dBA reduction or better

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 7

NAC		17-Foot Barrier	16-Foot Barrier	15-Foot Barrier	14-Foot Barrier	13-Foot Barrier
	Inputs – Overall					
	Barrier Length (ft.) =	2,032	2,032	2,057	2,257	2,257
	*Barrier Height (ft.) =	17 & 10	16 & 10	15 & 10	14 & 10	13 & 10
	Barrier Area (sq. ft.) =	33,445	31,570	30,070	30,970	28,870
	Inputs – Category A, C, D, or E					
	Barrier Height (ft.) =	n/a	n/a	n/a	n/a	n/a
	Barrier Length (ft.) =	n/a	n/a	n/a	n/a	n/a
	Barrier Area (ft.) =	n/a	n/a	n/a	n/a	n/a
	Right-of-Way Acquisition Area (sq. ft.) =	n/a	n/a	n/a	n/a	n/a
	Safety Barrier (linear ft.) =	n/a	n/a	n/a	n/a	n/a
	Inputs – Category B					
	Barrier Height (ft.) =	17 & 10	16 & 10	15 & 10	14 & 10	13 & 10
	Barrier Length (ft.) =	2,032	2,032	2,057	2,257	2,257
	Barrier Area (sq. ft.) =	33,445	31,570	30,070	30,970	28,870
	Right-of-Way Acquisition Area (sq. ft.) =	0	0	0	0	0
	**Safety Barrier (linear ft.) =	1,875	1,875	1,900	2,100	2,100
Feasibility	**Acoustic Feasibility**					
	Front Row Receptors =	11	11	11	11	11
	Front-Row Receptors with a 5 dBA Reduction =	9	9	9	9	9
	% of Front-Row Receptors Reduced At Least 5 dBA =	82%	82%	82%	82%	82%
	Acoustically Feasible =	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Reasonableness	**Noise Reduction Design Goal**					
	Front Row Receptors =	11	11	11	11	11
	Front Row Receptors with 7 dBA Reduction =	8	8	8	7	7
	% of Front Row Reduced At Least 7 dBA =	73%	73%	73%	64%	64%
	Meets Noise Reduction Design Goal =	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
	Cost Effectiveness – Category A, C, D, or E					
	Barrier Cost (Barrier area x 20) =	n/a	n/a	n/a	n/a	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a	n/a	n/a	n/a	n/a
	Safety Barrier (linear ft. x 125) =	n/a	n/a	n/a	n/a	n/a
	Total Barrier Cost =	n/a	n/a	n/a	n/a	n/a
	Allowable Cost (length x 360) =	n/a	n/a	n/a	n/a	n/a
	Cost Reasonable =	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**
	Cost Effectiveness – Category B					
	Barrier Cost (Barrier area x 20) =	$668,900	$631,400	$601,400	$619,400	$577,400
	Right-of-Way Acquisition (sq. ft. x 20) =	$0	$0	$0	$0	$0
	Safety Barrier (linear ft. x 125) =	$234,375	$234,375	$237,500	$262,500	$262,500
	Total Barrier Cost =	$903,275	$865,775	$838,900	$881,900	$839,900
	Allowable Cost (benefited x 30k) =	$1,200,000	$1,200,000	$1,200,000	$1,170,000	$1,080,000
	Benefited (Category B w/ 5 dBA Reduction) =	40	40	40	39	36
	Cost per Benefited Receptor (Barrier cost / benefited) =	$22,582	$21,644	$20,973	$22,613	$23,331
	Cost Reasonable =	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
	Is Noise Barrier 7 Feasible and Reasonable?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**

*Overall barrier heights include a uniform barrier at the height indicated and a 10-foot-tall and 157-foot-long segment on the bridge over 300 North.

**Safety barrier length excludes the proposed 157-foot-long barrier length on the bridge over 300 North.

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 7

NAC							12-Foot Barrier			11-Foot Barrier			10-Foot Barrier			9-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors
RM001	Yes	1	B	46	60	14	57	3	0	57	3	0	57	3	0	57	3	0
RM002	Yes	1	B	46	66	20	58	8	1	59	7	1	60	6	1	60	6	1
RM003	Yes	1	B	46	68	22	60	8	1	61	7	1	61	7	1	61	7	1
RM004	Yes	1	B	46	67	21	60	7	1	60	7	1	60	7	1	61	6	1
RM005	Yes	1	B	46	68	22	60	8	1	60	8	1	61	7	1	61	7	1
RM006	Yes	1	B	46	68	22	60	8	1	60	8	1	61	7	1	62	6	1
RM007	Yes	1	B	46	68	22	60	8	1	61	7	1	61	7	1	62	6	1
RM008	Yes	1	B	46	65	19	57	8	1	57	8	1	58	7	1	59	6	1
RM009	Yes	1	B	47	67	20	61	6	1	61	6	1	62	5	1	62	5	1
RM010	Yes	1	B	50	67	17	62	5	1	62	5	1	62	5	1	62	5	1
RM011	Yes	1	B	46	61	15	59	2	0	58	3	0	58	3	0	59	2	0
RM012	No	1	B	46	65	19	64	1	0	64	1	0	64	1	0	64	1	0
RM013	No	1	B	46	57	11	54	3	0	54	3	0	54	3	0	54	3	0
RM014	No	1	B	46	56	10	53	3	0	53	3	0	54	2	0	54	2	0
RM015	No	1	B	46	54	8	52	2	0	52	2	0	52	2	0	52	2	0
RM016	No	1	B	46	54	8	51	3	0	51	3	0	52	2	0	52	2	0
RM017	No	1	B	46	53	7	51	2	0	51	2	0	51	2	0	51	2	0
RM018	No	1	B	46	52	6	50	2	0	50	2	0	50	2	0	50	2	0
RM019	No	1	B	46	52	6	49	3	0	50	2	0	50	2	0	50	2	0
RM020	No	1	B	46	51	5	49	2	0	49	2	0	49	2	0	49	2	0
RM021	No	1	B	46	50	4	48	2	0	49	1	0	49	1	0	49	1	0
RM022	No	1	B	46	50	4	48	2	0	48	2	0	48	2	0	49	1	0
RM023	No	1	B	46	64	18	56	8	1	56	8	1	57	7	1	57	7	1
RM024	No	1	B	46	61	15	55	6	1	55	6	1	56	5	1	56	5	1
RM025	No	1	B	46	59	13	53	6	1	54	5	1	54	5	1	55	4	0
RM026	No	1	B	46	57	11	52	5	1	52	5	1	53	4	0	53	4	0
RM027	No	1	B	46	56	10	51	5	1	52	4	0	52	4	0	53	3	0
RM028	No	1	B	46	54	8	50	4	0	51	3	0	51	3	0	52	2	0
RM029	No	1	B	46	53	7	49	4	0	50	3	0	50	3	0	51	2	0
RM030	No	1	B	46	52	6	49	3	0	49	3	0	49	3	0	50	2	0
RM031	No	1	B	46	51	5	48	3	0	48	3	0	49	2	0	49	2	0
RM032	No	1	B	46	50	4	48	2	0	48	2	0	49	1	0	49	1	0
RM033	No	1	B	46	52	6	49	3	0	50	2	0	50	2	0	50	2	0
RM034	No	1	B	46	66	20	58	8	1	58	8	1	58	8	1	59	7	1
RM035	No	1	B	46	57	11	53	4	0	53	4	0	53	4	0	54	3	0
RM036	No	1	B	46	54	8	50	4	0	50	4	0	51	3	0	51	3	0
RM037	No	1	B	46	52	6	49	3	0	50	2	0	50	2	0	50	2	0
RM038	No	1	B	46	51	5	49	2	0	49	2	0	50	1	0	50	1	0
RM039	No	1	B	46	50	4	48	2	0	48	2	0	48	2	0	48	2	0
RM040	No	1	B	46	49	3	47	2	0	47	2	0	48	1	0	48	1	0
RM041	No	1	B	46	49	3	47	2	0	47	2	0	47	2	0	48	1	0
RM042	No	1	B	47	50	3	49	1	0	49	1	0	49	1	0	50	0	0
RM043	No	1	B	46	52	6	49	3	0	49	3	0	49	3	0	49	3	0
RM044	No	1	B	46	61	15	53	8	1	54	7	1	54	7	1	55	6	1
RM045	No	1	B	46	59	13	52	7	1	53	6	1	53	6	1	54	5	1
RM046	No	1	B	46	54	8	49	5	1	50	4	0	50	4	0	51	3	0
RM047	No	1	B	46	53	7	49	4	0	49	4	0	50	3	0	50	3	0
RM048	No	1	B	46	51	5	48	3	0	48	3	0	48	3	0	49	2	0
RM049	No	1	B	46	51	5	48	3	0	48	3	0	48	3	0	49	2	0

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 7

NAC							12-Foot Barrier			11-Foot Barrier			10-Foot Barrier			9-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors
RM050	No	1	B	46	50	4	48	2	0	48	2	0	48	2	0	49	1	0
RM051	No	1	B	46	50	4	49	1	0	49	1	0	49	1	0	49	1	0
RM052	No	1	B	46	58	12	51	7	1	52	6	1	52	6	1	53	5	1
RM053	No	1	B	46	53	7	48	5	1	49	4	0	49	4	0	50	3	0
RM054	No	1	B	46	52	6	47	5	1	48	4	0	48	4	0	49	3	0
RM055	No	1	B	46	50	4	47	3	0	47	3	0	48	2	0	48	2	0
RM056	No	1	B	46	49	3	47	2	0	48	1	0	48	1	0	48	1	0
RM057	No	1	B	46	49	3	47	2	0	47	2	0	47	2	0	47	2	0
RM058	No	1	B	46	50	4	48	2	0	48	2	0	48	2	0	49	1	0
RM059	No	1	B	50	53	3	52	1	0	52	1	0	52	1	0	52	1	0
RM060	No	1	B	46	52	6	49	3	0	49	3	0	49	3	0	50	2	0
RM061	No	1	B	49	53	4	52	1	0	52	1	0	52	1	0	52	1	0
RM062	No	1	B	46	62	16	54	8	1	55	7	1	55	7	1	56	6	1
RM063	No	1	B	46	58	12	52	6	1	52	6	1	53	5	1	53	5	1
RM064	No	1	B	46	56	10	50	6	1	50	6	1	51	5	1	51	5	1
RM065	No	1	B	46	57	11	55	2	0	55	2	0	55	2	0	55	2	0
RM066	No	1	B	49	53	4	52	1	0	52	1	0	52	1	0	52	1	0
RM067	No	1	B	46	61	15	53	8	1	53	8	1	54	7	1	54	7	1
RM068	No	1	B	46	57	11	51	6	1	51	6	1	52	5	1	52	5	1
RM069	No	1	B	46	53	7	48	5	1	49	4	0	49	4	0	50	3	0
RM070	No	1	B	46	56	10	51	5	1	51	5	1	52	4	0	52	4	0
RM071	No	1	B	46	53	7	51	2	0	51	2	0	51	2	0	51	2	0
RM072	No	1	B	46	56	10	51	5	1	51	5	1	51	5	1	52	4	0
RM073	No	1	B	50	54	4	52	2	0	52	2	0	52	2	0	52	2	0
RM074	No	1	B	46	59	13	52	7	1	53	6	1	53	6	1	54	5	1
RM075	No	1	B	46	57	11	52	5	1	52	5	1	52	5	1	53	4	0
RM076	No	1	B	46	63	17	58	5	1	58	5	1	59	4	0	59	4	0
RM077	No	1	B	47	66	19	61	5	1	60	6	1	61	5	1	61	5	1
RM078	No	1	B	51	66	15	61	5	1	61	5	1	61	5	1	61	5	1
RM079	No	1	B	58	67	9	63	4	0	63	4	0	63	4	0	63	4	0
RM080	No	1	D	37	40	3	39	1	0	39	1	0	39	1	0	39	1	0
RM081	No	1	B	53	56	3	55	1	0	55	1	0	55	1	0	55	1	0
RM082	No	1	B	47	52	5	50	2	0	50	2	0	51	1	0	51	1	0
RM083	No	1	B	52	54	2	53	1	0	53	1	0	53	1	0	54	0	0
RM084	No	1	B	54	56	2	55	1	0	55	1	0	55	1	0	55	1	0
RM085	No	1	B	46	60	14	57	3	0	57	3	0	57	3	0	57	3	0
RM086	No	1	B	46	58	12	56	2	0	56	2	0	56	2	0	56	2	0
RM087	No	1	B	46	57	11	55	2	0	55	2	0	55	2	0	55	2	0
RM088	No	1	B	57	58	1	58	0	0	58	0	0	58	0	0	58	0	0
RM089	No	1	B	58	59	1	59	0	0	59	0	0	59	0	0	59	0	0
RM090	No	1	B	59	59	0	59	0	0	59	0	0	59	0	0	59	0	0
RM091	No	1	B	50	55	5	54	1	0	54	1	0	54	1	0	54	1	0
RM092	No	1	B	46	55	9	54	1	0	54	1	0	54	1	0	54	1	0
RM093	No	1	B	48	56	8	55	1	0	54	2	0	55	1	0	55	1	0
RM094	No	1	B	48	55	7	55	0	0	54	1	0	54	1	0	54	1	0
RM095	No	1	B	49	55	6	55	0	0	55	0	0	55	0	0	55	0	0
RM096	No	1	B	51	57	6	56	1	0	56	1	0	56	1	0	56	1	0
RM097	No	1	B	49	56	7	55	1	0	55	1	0	55	1	0	55	1	0
RM098	No	1	B	46	54	8	54	0	0	54	0	0	54	0	0	54	0	0

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 7

NAC							12-Foot Barrier			11-Foot Barrier			10-Foot Barrier			9-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors
RM099	No	1	B	50	55	5	55	0	0	55	0	0	55	0	0	55	0	0
RM100	No	1	B	50	55	5	55	0	0	55	0	0	55	0	0	55	0	0
RM101	No	1	B	47	54	7	54	0	0	54	0	0	54	0	0	54	0	0
RM102	No	1	B	48	54	6	54	0	0	54	0	0	54	0	0	54	0	0
RM103	No	1	B	54	56	2	56	0	0	56	0	0	56	0	0	56	0	0
RM104	No	1	B	46	53	7	53	0	0	53	0	0	53	0	0	53	0	0
RM105	No	1	B	48	55	7	55	0	0	55	0	0	55	0	0	55	0	0
RM106	No	1	B	46	59	13	58	1	0	58	1	0	58	1	0	58	1	0
RM107	No	1	B	46	55	9	55	0	0	55	0	0	55	0	0	55	0	0
RM108	No	1	B	48	53	5	53	0	0	53	0	0	53	0	0	53	0	0
RM109	No	1	B	60	60	0	60	0	0	60	0	0	60	0	0	60	0	0

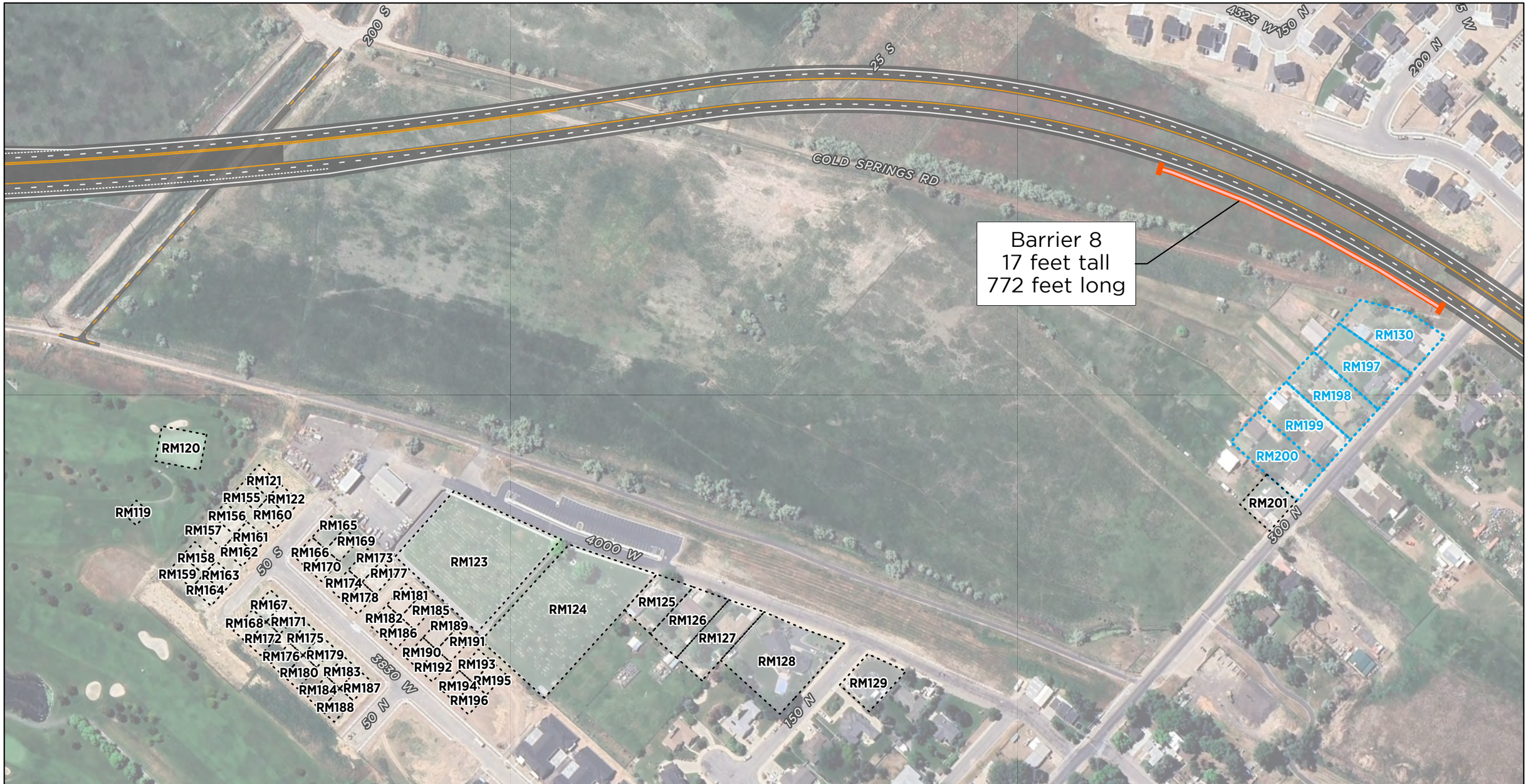
= Impacted receptor
= 5 dBA reduction or better
= 7 dBA reduction or better

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 7

NAC		12-Foot Barrier	11-Foot Barrier	10-Foot Barrier	9-Foot Barrier
	Inputs – Overall				
	Barrier Length (ft.) =	2,282	2,557	2,557	2,557
	*Barrier Height (ft.) =	12 & 10	11 & 10	10 & 10	9 & 10
	Barrier Area (sq. ft.) =	27,070	27,970	25,570	23,170
	Inputs – Category A, C, D, or E				
	Barrier Height (ft.) =	n/a	n/a	n/a	n/a
	Barrier Length (ft.) =	n/a	n/a	n/a	n/a
	Barrier Area (ft.) =	n/a	n/a	n/a	n/a
	Right-of-Way Acquisition Area (sq. ft.) =	n/a	n/a	n/a	n/a
	Safety Barrier (linear ft.) =	n/a	n/a	n/a	n/a
	Inputs – Category B				
	Barrier Height (ft.) =	12 & 10	11 & 10	10 & 10	9 & 10
	Barrier Length (ft.) =	2,282	2,557	2,557	2,557
	Barrier Area (sq. ft.) =	27,070	27,970	25,570	23,170
	Right-of-Way Acquisition Area (sq. ft.) =	0	0	0	0
	**Safety Barrier (linear ft.) =	2,125	2,400	2,400	2,400
Feasibility	**Acoustic Feasibility**				
	Front Row Receptors =	11	11	11	11
	Front-Row Receptors with a 5 dBA Reduction =	9	9	9	9
	% of Front-Row Receptors Reduced At Least 5 dBA =	82%	82%	82%	82%
	Acoustically Feasible =	**Yes**	**Yes**	**Yes**	**Yes**
Reasonableness	**Noise Reduction Design Goal**				
	Front Row Receptors =	11	11	11	11
	Front Row Receptors with 7 dBA Reduction =	7	7	6	2
	% of Front Row Reduced At Least 7 dBA =	64%	64%	55%	18%
	Meets Noise Reduction Design Goal =	**Yes**	**Yes**	**Yes**	**No**
	Cost Effectiveness – Category A, C, D, or E				
	Barrier Cost (Barrier area x 20) =	n/a	n/a	n/a	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a	n/a	n/a	n/a
	Safety Barrier (linear ft. x 125) =	n/a	n/a	n/a	n/a
	Total Barrier Cost =	n/a	n/a	n/a	n/a
	Allowable Cost (length x 360) =	n/a	n/a	n/a	n/a
	Cost Reasonable =	**n/a**	**n/a**	**n/a**	**n/a**
	Cost Effectiveness – Category B				
	Barrier Cost (Barrier area x 20) =	$541,400	$559,400	$511,400	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	$0	$0	$0	n/a
	Safety Barrier (linear ft. x 125) =	$265,625	$300,000	$300,000	n/a
	Total Barrier Cost =	$807,025	$859,400	$811,400	n/a
	Allowable Cost (benefited x 30k) =	$1,020,000	$870,000	$780,000	n/a
	Benefited (Category B w/ 5 dBA Reduction) =	34	29	26	n/a
	Cost per Benefited Receptor (Barrier cost / benefited) =	$23,736	$29,634	$31,208	n/a
	Cost Reasonable =	**Yes**	**Yes**	**No**	**n/a**
	Is Noise Barrier 7 Feasible and Reasonable?	**Yes**	**Yes**	**No**	**No**

*Overall barrier heights include a uniform barrier at the height indicated and a 10-foot-tall and 157-foot-long segment on the bridge over 300 North.

**Safety barrier length excludes the proposed 157-foot-long barrier length on the bridge over 300 North.

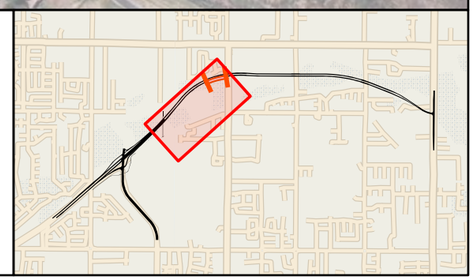


SR-177; SR-193 to 1800 North Re-Evaluation
Traffic Noise Study
Exhibit 2: Noise Barriers
UDOT Project No.: S-R199(381)
UDOT PIN: 20927

- Proposed Action Design
- Barrier Not Recommended for Balloting
- Benefited Receptor
- Receptor Area

N

0 125 250 500 Feet



SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 8

NAC							17-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors
RM119	No	1	C	46	61	15	61	0	0
RM120	No	1	C	46	63	17	63	0	0
RM121	No	1	B	46	62	16	62	0	0
RM122	No	1	B	46	60	14	60	0	0
RM123	No	1	C	46	57	11	57	0	0
RM124	No	1	C	46	56	10	56	0	0
RM125	No	1	B	46	55	9	55	0	0
RM126	No	1	B	46	55	9	55	0	0
RM127	No	1	B	46	55	9	54	1	0
RM128	No	1	B	46	54	8	54	0	0
RM129	No	1	B	46	54	8	54	0	0
RM130	Yes	1	B	51	66	15	60	6	1
RM155	No	1	B	46	62	16	61	1	0
RM156	No	1	B	46	61	15	61	0	0
RM157	No	1	B	46	60	14	60	0	0
RM158	No	1	B	46	59	13	59	0	0
RM159	No	1	B	46	59	13	59	0	0
RM160	No	1	B	46	57	11	56	1	0
RM161	No	1	B	46	55	9	55	0	0
RM162	No	1	B	46	54	8	54	0	0
RM163	No	1	B	46	54	8	54	0	0
RM164	No	1	B	46	53	7	53	0	0
RM165	No	1	B	46	59	13	59	0	0
RM166	No	1	B	46	56	10	56	0	0
RM167	No	1	B	46	55	9	55	0	0
RM168	No	1	B	46	53	7	53	0	0
RM169	No	1	B	46	57	11	56	1	0
RM170	No	1	B	46	54	8	53	1	0
RM171	No	1	B	46	55	9	55	0	0
RM172	No	1	B	46	52	6	52	0	0
RM173	No	1	B	46	55	9	55	0	0
RM174	No	1	B	46	53	7	53	0	0
RM175	No	1	B	46	54	8	54	0	0
RM176	No	1	B	46	51	5	51	0	0
RM177	No	1	B	46	55	9	55	0	0
RM178	No	1	B	46	52	6	52	0	0
RM179	No	1	B	46	53	7	53	0	0
RM180	No	1	B	46	51	5	51	0	0
RM181	No	1	B	46	54	8	54	0	0
RM182	No	1	B	46	52	6	52	0	0
RM183	No	1	B	46	52	6	52	0	0
RM184	No	1	B	46	50	4	50	0	0
RM185	No	1	B	46	54	8	54	0	0
RM186	No	1	B	46	52	6	52	0	0
RM187	No	1	B	46	52	6	52	0	0
RM188	No	1	B	46	50	4	50	0	0
RM189	No	1	B	46	54	8	54	0	0
RM190	No	1	B	46	51	5	51	0	0
RM191	No	1	B	46	54	8	53	1	0

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 8

NAC							17-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors
RM192	No	1	B	46	50	4	50	0	0
RM193	No	1	B	46	53	7	53	0	0
RM194	No	1	B	46	50	4	50	0	0
RM195	No	1	B	46	53	7	53	0	0
RM196	No	1	B	46	50	4	50	0	0
RM197	No	1	B	47	64	17	58	6	1
RM198	No	1	B	46	62	16	56	6	1
RM199	No	1	B	46	60	14	55	5	1
RM200	No	1	B	46	59	13	54	5	1
RM201	No	1	B	50	58	8	54	4	0

= Impacted receptor
= 5 dBA reduction or better
= 7 dBA reduction or better

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 8

NAC	17-Foot Barrier

	Inputs – Overall	
	Barrier Length (ft.) =	772
	Barrier Height (ft.) =	17
	Barrier Area (sq. ft.) =	13,124
	Inputs – Category A, C, D, or E	
	Barrier Height (ft.) =	n/a
	Barrier Length (ft.) =	n/a
	Barrier Area (ft.) =	n/a
	Right-of-Way Acquisition Area (sq. ft.) =	0
	Safety Barrier (linear ft.) =	n/a
	Inputs – Category B	
	Barrier Height (ft.) =	17
	Barrier Length (ft.) =	772
	Barrier Area (sq. ft.) =	13,124
	Right-of-Way Acquisition Area (sq. ft.) =	0
	Safety Barrier (linear ft.) =	772
Feasibility	**Acoustic Feasibility**	
	Front Row Receptors =	1
	Front-Row Receptors with a 5 dBA Reduction =	1
	% of Front-Row Receptors Reduced At Least 5 dBA =	100%
	Acoustically Feasible =	**Yes**
Reasonableness	**Noise Reduction Design Goal**	
	Front Row Receptors =	1
	Front Row Receptors with 7 dBA Reduction =	0
	% of Front Row Reduced At Least 7 dBA =	0%
	Meets Noise Reduction Design Goal =	**No**
	Cost Effectiveness – Category A, C, D, or E	
	Barrier Cost (Barrier area x 20) =	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a
	Safety Barrier (linear ft. x 125) =	n/a
	Total Barrier Cost =	n/a
	Allowable Cost (length x 360) =	n/a
	Cost Reasonable =	**n/a**
	Cost Effectiveness – Category B	
	Barrier Cost (Barrier area x 20) =	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a
	Safety Barrier (linear ft. x 125) =	n/a
	Total Barrier Cost =	n/a
	Allowable Cost (benefited x 30k) =	n/a
	Benefited (Category B w/ 5 dBA Reduction) =	n/a
	Cost per Benefited Receptor (Barrier cost / benefited) =	n/a
	Cost Reasonable =	**n/a**

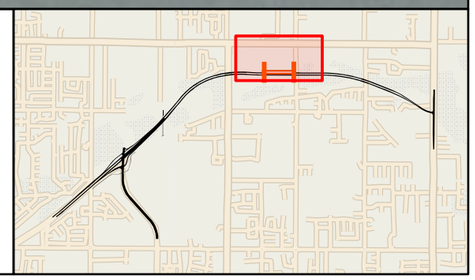
Is Noise Barrier 8 Feasible and Reasonable?	**No**

SR-177; SR-193 to 1800 North Re-Evaluation
Traffic Noise Study
Exhibit 2: Noise Barriers
UDOT Project No.: S-R199(381)
UDOT PIN: 20927

Proposed Action Design
Barrier Not Recommended for Balloting
Benefited Receptor
Receptor Area

N

0 125 250 500
Feet



SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier **9**

		NAC					17-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors
RM012	Yes	1	B	46	65	19	60	5	1
RM097	No	1	B	49	56	7	55	1	0
RM098	No	1	B	46	54	8	52	2	0
RM099	No	1	B	50	55	5	54	1	0
RM100	No	1	B	50	55	5	54	1	0
RM101	No	1	B	47	54	7	53	1	0
RM102	No	1	B	48	54	6	53	1	0
RM103	No	1	B	54	56	2	55	1	0
RM104	No	1	B	46	53	7	51	2	0
RM105	No	1	B	48	55	7	54	1	0
RM106	No	1	B	46	59	13	54	5	1
RM107	No	1	B	46	55	9	52	3	0
RM108	No	1	B	48	53	5	52	1	0
RM109	No	1	B	60	60	0	60	0	0

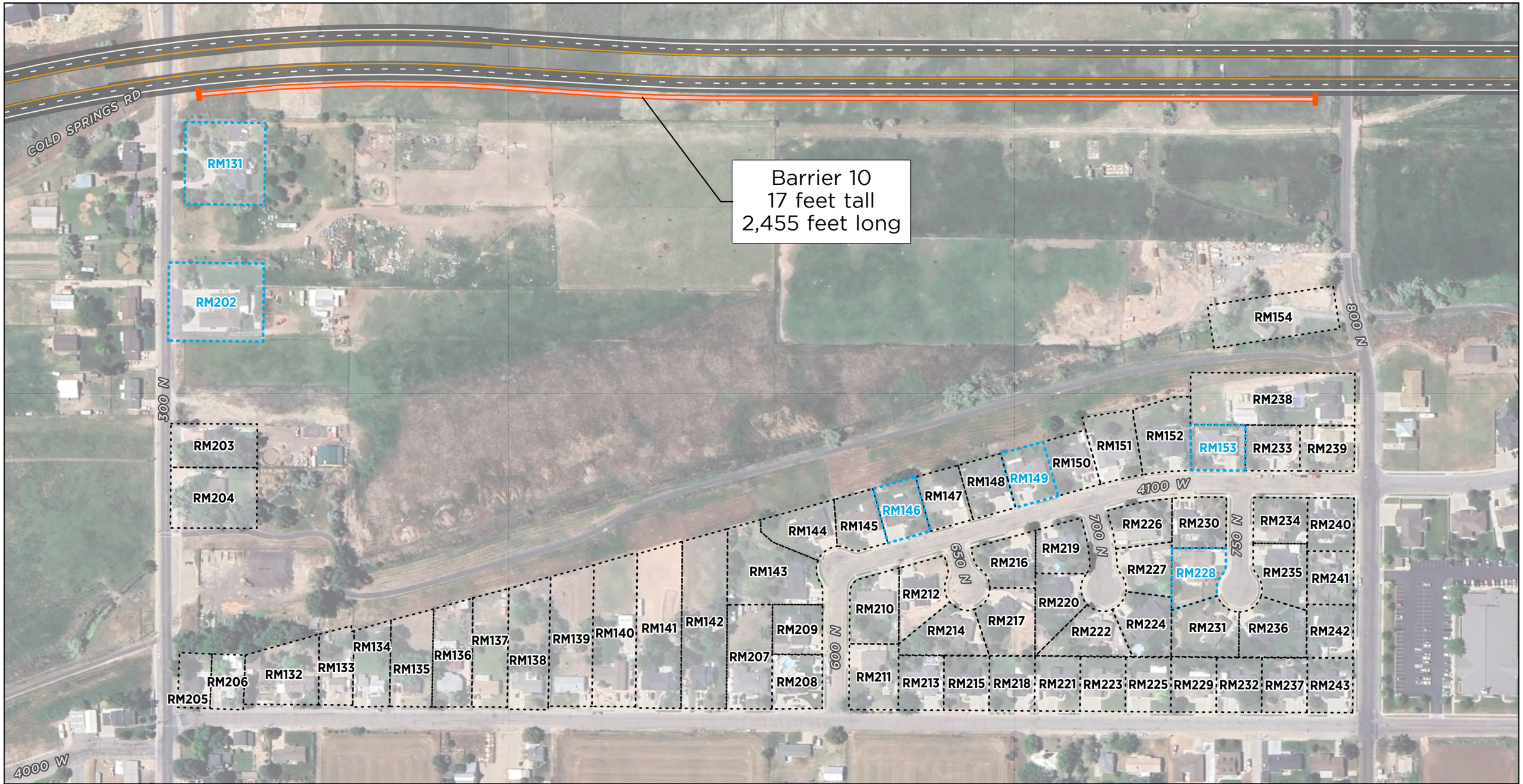
= Impacted receptor
= 5 dBA reduction or better
= 7 dBA reduction or better

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier **9**

NAC	17-Foot Barrier

	Inputs – Overall	
	Barrier Length (ft.) =	1,136
	Barrier Height (ft.) =	17
	Barrier Area (sq. ft.) =	19,312
	Inputs – Category A, C, D, or E	
	Barrier Height (ft.) =	n/a
	Barrier Length (ft.) =	n/a
	Barrier Area (ft.) =	n/a
	Right-of-Way Acquisition Area (sq. ft.) =	n/a
	Safety Barrier (linear ft.) =	n/a
	Inputs – Category B	
	Barrier Height (ft.) =	17
	Barrier Length (ft.) =	1,136
	Barrier Area (sq. ft.) =	19,312
	Right-of-Way Acquisition Area (sq. ft.) =	0
	Safety Barrier (linear ft.) =	1,136
Feasibility	**Acoustic Feasibility**	
	Front Row Receptors =	1
	Front-Row Receptors with a 5 dBA Reduction =	1
	% of Front-Row Receptors Reduced At Least 5 dBA =	100%
	Acoustically Feasible =	**Yes**
Reasonableness	**Noise Reduction Design Goal**	
	Front Row Receptors =	1
	Front Row Receptors with 7 dBA Reduction =	0
	% of Front Row Reduced At Least 7 dBA =	0%
	Meets Noise Reduction Design Goal =	**No**
	Cost Effectiveness – Category A, C, D, or E	
	Barrier Cost (Barrier area x 20) =	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a
	Safety Barrier (linear ft. x 125) =	n/a
	Total Barrier Cost =	n/a
	Allowable Cost (length x 360) =	n/a
	Cost Reasonable =	**n/a**
	Cost Effectiveness – Category B	
	Barrier Cost (Barrier area x 20) =	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a
	Safety Barrier (linear ft. x 125) =	n/a
	Total Barrier Cost =	n/a
	Allowable Cost (benefited x 30k) =	n/a
	Benefited (Category B w/ 5 dBA Reduction) =	n/a
	Cost per Benefited Receptor (Barrier cost / benefited) =	n/a
	Cost Reasonable =	**n/a**

Is Noise Barrier 9 Feasible and Reasonable? **No**

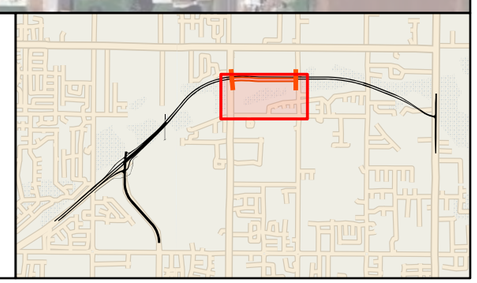


SR-177; SR-193 to 1800 North Re-Evaluation
Traffic Noise Study
Exhibit 2: Noise Barriers
UDOT Project No.: S-R199(381)
UDOT PIN: 20927

Proposed Action Design
Barrier Not Recommended for Balloting
Benefited Receptor
Receptor Area

N

0 125 250 500 Feet



SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 10

NAC							17-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors
RM131	Yes	1	B	46	67	21	57	10	1
RM132	No	1	B	48	59	11	58	1	0
RM133	Yes	1	B	48	59	11	58	1	0
RM134	Yes	1	B	48	59	11	58	1	0
RM135	Yes	1	B	46	58	12	57	1	0
RM136	Yes	1	B	46	58	12	56	2	0
RM137	Yes	1	B	46	58	12	56	2	0
RM138	Yes	1	B	46	57	11	55	2	0
RM139	Yes	1	B	46	57	11	55	2	0
RM140	Yes	1	B	46	56	10	54	2	0
RM141	Yes	1	B	46	56	10	52	4	0
RM142	Yes	1	B	46	56	10	53	3	0
RM143	Yes	1	B	46	57	11	54	3	0
RM144	Yes	1	B	46	61	15	57	4	0
RM145	Yes	1	B	46	61	15	57	4	0
RM146	Yes	1	B	46	62	16	57	5	1
RM147	Yes	1	B	46	62	16	58	4	0
RM148	Yes	1	B	46	62	16	58	4	0
RM149	Yes	1	B	46	63	17	58	5	1
RM150	Yes	1	B	46	63	17	59	4	0
RM151	Yes	1	B	46	63	17	59	4	0
RM152	Yes	1	B	46	63	17	60	3	0
RM153	Yes	1	B	46	60	14	54	6	1
RM154	Yes	1	B	47	64	17	61	3	0
RM202	No	1	B	46	60	14	53	7	1
RM203	No	1	B	47	58	11	54	4	0
RM204	No	1	B	47	56	9	52	4	0
RM205	No	1	B	64	65	1	64	1	0
RM206	No	1	B	57	61	4	60	1	0
RM207	No	1	B	46	56	10	53	3	0
RM208	No	1	B	46	55	9	52	3	0
RM209	No	1	B	46	56	10	53	3	0
RM210	No	1	B	46	50	4	49	1	0
RM211	No	1	B	46	48	2	47	1	0
RM212	No	1	B	46	50	4	46	4	0
RM213	No	1	B	46	47	1	45	2	0
RM214	No	1	B	46	48	2	44	4	0
RM215	No	1	B	46	46	0	45	1	0
RM216	No	1	B	46	49	3	46	3	0
RM217	No	1	B	46	48	2	44	4	0
RM218	No	1	B	46	46	0	44	2	0
RM219	No	1	B	46	50	4	47	3	0
RM220	No	1	B	46	46	0	43	3	0
RM221	No	1	B	46	46	0	44	2	0
RM222	No	1	B	46	46	0	42	4	0
RM223	No	1	B	46	46	0	43	3	0
RM224	No	1	B	46	48	2	44	4	0
RM225	No	1	B	46	46	0	43	3	0
RM226	No	1	B	46	53	7	49	4	0

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 10

NAC							17-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors
RM227	No	1	B	46	46	0	43	3	0
RM228	No	1	B	46	48	2	43	5	1
RM229	No	1	B	46	46	0	43	3	0
RM230	No	1	B	46	52	6	48	4	0
RM231	No	1	B	46	46	0	44	2	0
RM232	No	1	B	46	46	0	44	2	0
RM233	No	1	B	46	60	14	57	3	0
RM234	No	1	B	46	52	6	50	2	0
RM235	No	1	B	46	47	1	46	1	0
RM236	No	1	B	46	46	0	44	2	0
RM237	No	1	B	46	46	0	46	0	0
RM238	No	1	B	46	60	14	58	2	0
RM239	No	1	B	46	54	8	53	1	0
RM240	No	1	B	52	56	4	55	1	0
RM241	No	1	B	46	47	1	44	3	0
RM242	No	1	B	46	46	0	44	2	0
RM243	No	1	B	52	52	0	52	0	0

= Impacted receptor
= 5 dBA reduction or better
= 7 dBA reduction or better

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 10

NAC	17-Foot Barrier

	Inputs – Overall	
	Barrier Length (ft.) =	2,455
	Barrier Height (ft.) =	17
	Barrier Area (sq. ft.) =	41,735
	Inputs – Category A, C, D, or E	
	Barrier Height (ft.) =	n/a
	Barrier Length (ft.) =	n/a
	Barrier Area (ft.) =	n/a
	Right-of-Way Acquisition Area (sq. ft.) =	n/a
	Safety Barrier (linear ft.) =	n/a
	Inputs – Category B	
	Barrier Height (ft.) =	17
	Barrier Length (ft.) =	2,455
	Barrier Area (sq. ft.) =	41,735
	Right-of-Way Acquisition Area (sq. ft.) =	0
	Safety Barrier (linear ft.) =	2,455
Feasibility	**Acoustic Feasibility**	
	Front Row Receptors =	23
	Front-Row Receptors with a 5 dBA Reduction =	4
	% of Front-Row Receptors Reduced At Least 5 dBA =	17%
	Acoustically Feasible =	**No**
Reasonableness	**Noise Reduction Design Goal**	
	Front Row Receptors =	23
	Front Row Receptors with 7 dBA Reduction =	1
	% of Front Row Reduced At Least 7 dBA =	4%
	Meets Noise Reduction Design Goal =	**No**
	Cost Effectiveness – Category A, C, D, or E	
	Barrier Cost (Barrier area x 20) =	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a
	Safety Barrier (linear ft. x 125) =	n/a
	Total Barrier Cost =	n/a
	Allowable Cost (length x 360) =	n/a
	Cost Reasonable =	**n/a**
	Cost Effectiveness – Category B	
	Barrier Cost (Barrier area x 20) =	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a
	Safety Barrier (linear ft. x 125) =	n/a
	Total Barrier Cost =	n/a
	Allowable Cost (benefited x 30k) =	n/a
	Benefited (Category B w/ 5 dBA Reduction) =	n/a
	Cost per Benefited Receptor (Barrier cost / benefited) =	n/a
	Cost Reasonable =	**n/a**

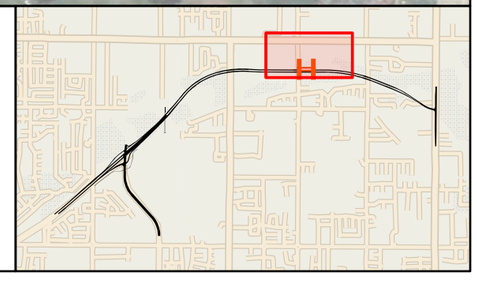
Is Noise Barrier 10 Feasible and Reasonable? **No**

SR-177; SR-193 to 1800 North Re-Evaluation
Traffic Noise Study
Exhibit 2: Noise Barriers
UDOT Project No.: S-R199(381)
UDOT PIN: 20927

Proposed Action Design
Barrier Not Recommended for Balloting
Benefited Receptor
Receptor Area

N

0 125 250 500 Feet



SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 11

NAC							17-Foot Barrier			16-Foot Barrier			15-Foot Barrier			14-Foot Barrier			13-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors
RN001	Yes	1	B	46	67	21	58	9	1	58	9	1	58	9	1	58	9	1	59	8	1
RN020	No	1	B	46	63	17	59	4	0	59	4	0	59	4	0	59	4	0	62	1	0
RN021	No	1	B	46	62	16	57	5	1	57	5	1	57	5	1	57	5	1	61	1	0
RN022	No	1	B	46	59	13	54	5	1	54	5	1	54	5	1	54	5	1	58	1	0
RN023	No	1	B	46	58	12	56	2	0	56	2	0	56	2	0	56	2	0	58	0	0
RN024	No	1	B	47	56	9	54	2	0	54	2	0	54	2	0	54	2	0	55	1	0
RN025	No	1	B	60	60	0	60	0	0	60	0	0	60	0	0	60	0	0	60	0	0
RN026	No	1	B	51	56	5	56	0	0	56	0	0	56	0	0	56	0	0	56	0	0
RN027	No	1	B	51	56	5	55	1	0	55	1	0	55	1	0	55	1	0	56	0	0
RN028	No	1	B	46	55	9	54	1	0	54	1	0	54	1	0	54	1	0	55	0	0
RN029	No	1	B	49	56	7	55	1	0	55	1	0	55	1	0	55	1	0	55	1	0

= Impacted receptor
= 5 dBA reduction or better
= 7 dBA reduction or better

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 11

NAC		17-Foot Barrier	16-Foot Barrier	15-Foot Barrier	14-Foot Barrier	13-Foot Barrier
	Inputs – Overall					
	Barrier Length (ft.) =	489	510	541	541	210
	Barrier Height (ft.) =	17	16	15	14	13
	Barrier Area (sq. ft.) =	8,313	8,160	8,115	7,574	2,730
	Inputs – Category A, C, D, or E					
	Barrier Height (ft.) =	n/a	n/a	n/a	n/a	n/a
	Barrier Length (ft.) =	n/a	n/a	n/a	n/a	n/a
	Barrier Area (ft.) =	n/a	n/a	n/a	n/a	n/a
	Right-of-Way Acquisition Area (sq. ft.) =	n/a	n/a	n/a	n/a	n/a
	Safety Barrier (linear ft.) =	n/a	n/a	n/a	n/a	n/a
	Inputs – Category B					
	Barrier Height (ft.) =	17	16	15	14	13
	Barrier Length (ft.) =	489	510	541	541	210
	Barrier Area (sq. ft.) =	8,313	8,160	8,115	7,574	2,730
	Right-of-Way Acquisition Area (sq. ft.) =	0	0	0	0	0
	Safety Barrier (linear ft.) =	489	510	541	541	210
Feasibility	**Acoustic Feasibility**					
	Front Row Receptors =	1	1	1	1	1
	Front-Row Receptors with a 5 dBA Reduction =	1	1	1	1	1
	% of Front-Row Receptors Reduced At Least 5 dBA =	100%	100%	100%	100%	100%
	Acoustically Feasible =	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Reasonableness	**Noise Reduction Design Goal**					
	Front Row Receptors =	1	1	1	1	1
	Front Row Receptors with 7 dBA Reduction =	1	1	1	1	1
	% of Front Row Reduced At Least 7 dBA =	100%	100%	100%	100%	100%
	Meets Noise Reduction Design Goal =	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
	Cost Effectiveness – Category A, C, D, or E					
	Barrier Cost (Barrier area x 20) =	n/a	n/a	n/a	n/a	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a	n/a	n/a	n/a	n/a
	Safety Barrier (linear ft. x 125) =	n/a	n/a	n/a	n/a	n/a
	Total Barrier Cost =	n/a	n/a	n/a	n/a	n/a
	Allowable Cost (length x 360) =	n/a	n/a	n/a	n/a	n/a
	Cost Reasonable =	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**
	Cost Effectiveness – Category B					
	Barrier Cost (Barrier area x 20) =	$166,260	$163,200	$162,300	$151,480	$54,600
	Right-of-Way Acquisition (sq. ft. x 20) =	$0	$0	$0	$0	$0
	Safety Barrier (linear ft. x 125) =	$61,125	$63,750	$67,625	$67,625	$26,250
	Total Barrier Cost =	$227,385	$226,950	$229,925	$219,105	$80,850
	Allowable Cost (benefited x 30k) =	$90,000	$90,000	$90,000	$90,000	$30,000
	Benefited (Category B w/ 5 dBA Reduction) =	3	3	3	3	1
	Cost per Benefited Receptor (Barrier cost / benefited) =	$75,795	$75,650	$76,642	$73,035	$80,850
	Cost Reasonable =	**No**	**No**	**No**	**No**	**No**
	Is Noise Barrier 11 Feasible and Reasonable?	**No**	**No**	**No**	**No**	**No**

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 11

NAC							12-Foot Barrier			11-Foot Barrier			10-Foot Barrier			9-Foot Barrier			8-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors
RN001	Yes	1	B	46	67	21	60	7	1	60	7	1	60	7	1	60	7	1	60	7	1
RN020	No	1	B	46	63	17	63	0	0	63	0	0	63	0	0	63	0	0	62	1	0
RN021	No	1	B	46	62	16	62	0	0	62	0	0	61	1	0	61	1	0	61	1	0
RN022	No	1	B	46	59	13	58	1	0	58	1	0	58	1	0	58	1	0	58	1	0
RN023	No	1	B	46	58	12	58	0	0	58	0	0	58	0	0	58	0	0	58	0	0
RN024	No	1	B	47	56	9	55	1	0	55	1	0	55	1	0	55	1	0	55	1	0
RN025	No	1	B	60	60	0	60	0	0	60	0	0	60	0	0	60	0	0	60	0	0
RN026	No	1	B	51	56	5	56	0	0	56	0	0	56	0	0	56	0	0	56	0	0
RN027	No	1	B	51	56	5	56	0	0	56	0	0	56	0	0	56	0	0	56	0	0
RN028	No	1	B	46	55	9	55	0	0	55	0	0	55	0	0	55	0	0	55	0	0
RN029	No	1	B	49	56	7	55	1	0	55	1	0	55	1	0	55	1	0	55	1	0

= Impacted receptor
= 5 dBA reduction or better
= 7 dBA reduction or better

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 11

NAC		12-Foot Barrier	11-Foot Barrier	10-Foot Barrier	9-Foot Barrier	8-Foot Barrier
	Inputs – Overall					
	Barrier Length (ft.) =	150	160	170	190	250
	Barrier Height (ft.) =	12	11	10	9	8
	Barrier Area (sq. ft.) =	1,800	1,760	1,700	1,710	2,000
	Inputs – Category A, C, D, or E					
	Barrier Height (ft.) =	n/a	n/a	n/a	n/a	n/a
	Barrier Length (ft.) =	n/a	n/a	n/a	n/a	n/a
	Barrier Area (ft.) =	n/a	n/a	n/a	n/a	n/a
	Right-of-Way Acquisition Area (sq. ft.) =	n/a	n/a	n/a	n/a	n/a
	Safety Barrier (linear ft.) =	n/a	n/a	n/a	n/a	n/a
	Inputs – Category B					
	Barrier Height (ft.) =	12	11	10	9	8
	Barrier Length (ft.) =	150	160	170	190	250
	Barrier Area (sq. ft.) =	1,800	1,760	1,700	1,710	2,000
	Right-of-Way Acquisition Area (sq. ft.) =	0	0	0	0	0
	Safety Barrier (linear ft.) =	150	160	170	190	250
Feasibility	**Acoustic Feasibility**					
	Front Row Receptors =	1	1	1	1	1
	Front-Row Receptors with a 5 dBA Reduction =	1	1	1	1	1
	% of Front-Row Receptors Reduced At Least 5 dBA =	100%	100%	100%	100%	100%
	Acoustically Feasible =	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Reasonableness	**Noise Reduction Design Goal**					
	Front Row Receptors =	1	1	1	1	1
	Front Row Receptors with 7 dBA Reduction =	1	1	1	1	1
	% of Front Row Reduced At Least 7 dBA =	100%	100%	100%	100%	100%
	Meets Noise Reduction Design Goal =	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
	Cost Effectiveness – Category A, C, D, or E					
	Barrier Cost (Barrier area x 20) =	n/a	n/a	n/a	n/a	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a	n/a	n/a	n/a	n/a
	Safety Barrier (linear ft. x 125) =	n/a	n/a	n/a	n/a	n/a
	Total Barrier Cost =	n/a	n/a	n/a	n/a	n/a
	Allowable Cost (length x 360) =	n/a	n/a	n/a	n/a	n/a
	Cost Reasonable =	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**
	Cost Effectiveness – Category B					
	Barrier Cost (Barrier area x 20) =	$36,000	$35,200	$34,000	$34,200	$40,000
	Right-of-Way Acquisition (sq. ft. x 20) =	$0	$0	$0	$0	$0
	Safety Barrier (linear ft. x 125) =	$18,750	$20,000	$21,250	$23,750	$31,250
	Total Barrier Cost =	$54,750	$55,200	$55,250	$57,950	$71,250
	Allowable Cost (benefited x 30k) =	$30,000	$30,000	$30,000	$30,000	$30,000
	Benefited (Category B w/ 5 dBA Reduction) =	1	1	1	1	1
	Cost per Benefited Receptor (Barrier cost / benefited) =	$54,750	$55,200	$55,250	$57,950	$71,250
	Cost Reasonable =	**No**	**No**	**No**	**No**	**No**
	Is Noise Barrier 11 Feasible and Reasonable?	**No**	**No**	**No**	**No**	**No**

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 11

NAC							7-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors
RN001	Yes	1	B	46	67	21	61	6	1
RN020	No	1	B	46	63	17	61	2	0
RN021	No	1	B	46	62	16	59	3	0
RN022	No	1	B	46	59	13	56	3	0
RN023	No	1	B	46	58	12	57	1	0
RN024	No	1	B	47	56	9	55	1	0
RN025	No	1	B	60	60	0	60	0	0
RN026	No	1	B	51	56	5	56	0	0
RN027	No	1	B	51	56	5	56	0	0
RN028	No	1	B	46	55	9	55	0	0
RN029	No	1	B	49	56	7	55	1	0

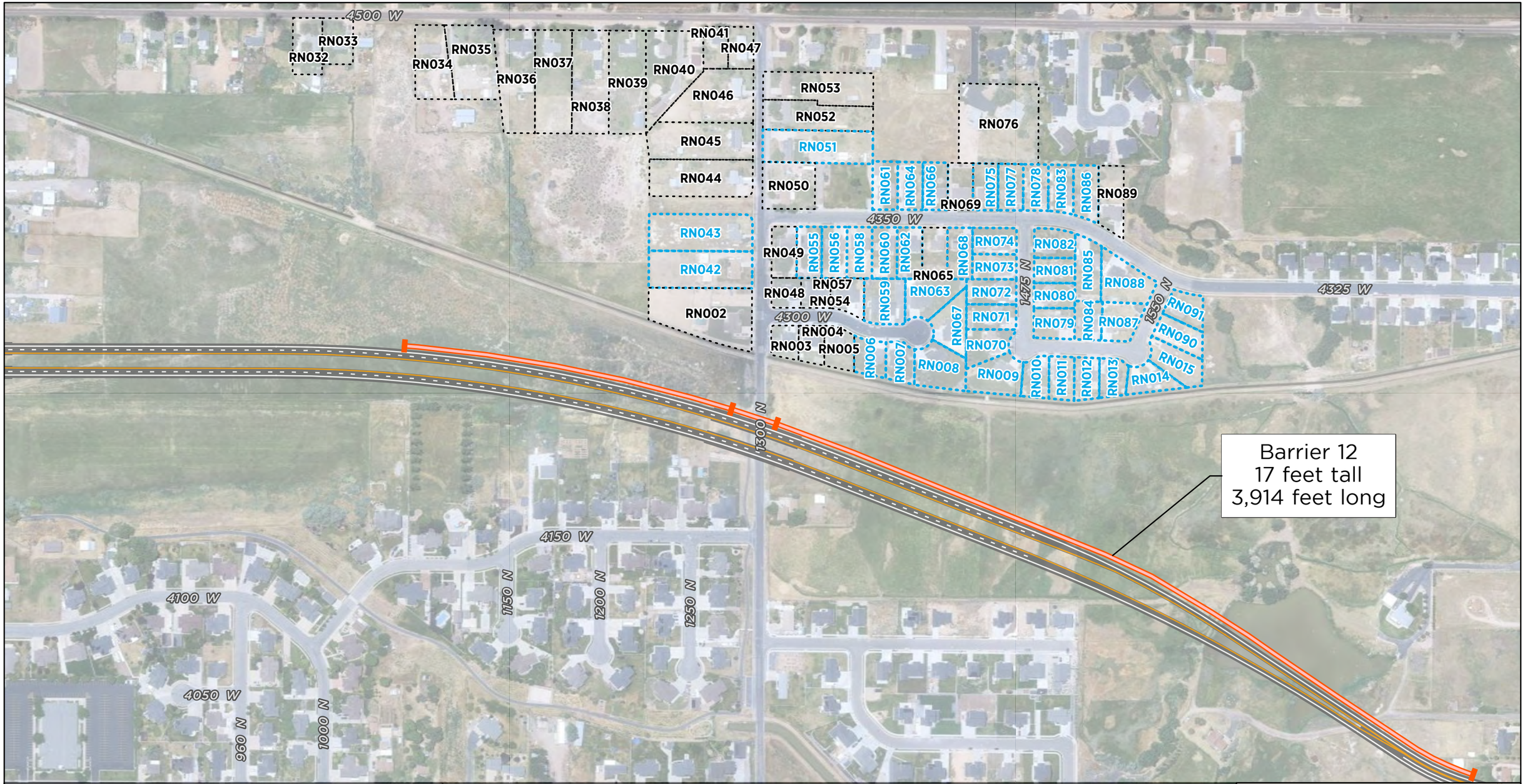
= Impacted receptor
= 5 dBA reduction or better
= 7 dBA reduction or better

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 11

NAC	7-Foot Barrier

	Inputs – Overall	
	Barrier Length (ft.) =	541
	Barrier Height (ft.) =	7
	Barrier Area (sq. ft.) =	3,787
	Inputs – Category A, C, D, or E	
	Barrier Height (ft.) =	n/a
	Barrier Length (ft.) =	n/a
	Barrier Area (ft.) =	n/a
	Right-of-Way Acquisition Area (sq. ft.) =	n/a
	Safety Barrier (linear ft.) =	n/a
	Inputs – Category B	
	Barrier Height (ft.) =	7
	Barrier Length (ft.) =	541
	Barrier Area (sq. ft.) =	3,787
	Right-of-Way Acquisition Area (sq. ft.) =	0
	Safety Barrier (linear ft.) =	541
Feasibility	**Acoustic Feasibility**	
	Front Row Receptors =	1
	Front-Row Receptors with a 5 dBA Reduction =	1
	% of Front-Row Receptors Reduced At Least 5 dBA =	100%
	Acoustically Feasible =	**Yes**
Reasonableness	**Noise Reduction Design Goal**	
	Front Row Receptors =	1
	Front Row Receptors with 7 dBA Reduction =	0
	% of Front Row Reduced At Least 7 dBA =	0%
	Meets Noise Reduction Design Goal =	**No**
	Cost Effectiveness – Category A, C, D, or E	
	Barrier Cost (Barrier area x 20) =	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a
	Safety Barrier (linear ft. x 125) =	n/a
	Total Barrier Cost =	n/a
	Allowable Cost (length x 360) =	n/a
	Cost Reasonable =	**n/a**
	Cost Effectiveness – Category B	
	Barrier Cost (Barrier area x 20) =	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a
	Safety Barrier (linear ft. x 125) =	n/a
	Total Barrier Cost =	n/a
	Allowable Cost (benefited x 30k) =	n/a
	Benefited (Category B w/ 5 dBA Reduction) =	n/a
	Cost per Benefited Receptor (Barrier cost / benefited) =	n/a
	Cost Reasonable =	**n/a**

Is Noise Barrier 11 Feasible and Reasonable? **No**

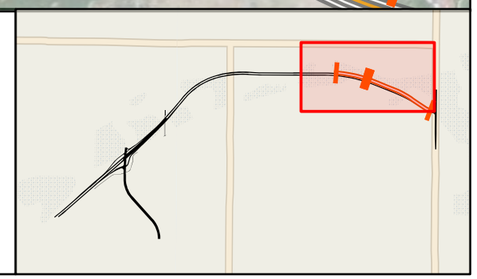


SR-177; SR-193 to 1800 North Re-Evaluation
Traffic Noise Study
Exhibit 2: Noise Barriers
UDOT Project No.: S-R199(381)
UDOT PIN: 20927

- Proposed Action Design
- Barrier Not Recommended for Balloting
- Receptor Area
- Benefited Receptor

N

0 125 250 500 Feet



SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 12

NAC							17-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors
RN002	Yes	1	B	46	65	19	61	4	0
RN003	Yes	1	B	51	65	14	62	3	0
RN004	Yes	1	B	46	65	19	61	4	0
RN005	Yes	1	B	46	64	18	60	4	0
RN006	Yes	1	B	46	63	17	58	5	1
RN007	Yes	1	B	46	63	17	57	6	1
RN008	Yes	1	B	46	60	14	53	7	1
RN009	Yes	1	B	46	61	15	55	6	1
RN010	Yes	1	B	46	61	15	54	7	1
RN011	Yes	1	B	46	60	14	54	6	1
RN012	Yes	1	B	46	60	14	54	6	1
RN013	Yes	1	B	46	60	14	53	7	1
RN014	Yes	1	B	46	59	13	51	8	1
RN015	Yes	1	B	46	55	9	49	6	1
RN032	No	1	B	54	57	3	57	0	0
RN033	No	1	B	46	56	10	54	2	0
RN034	No	1	B	46	56	10	54	2	0
RN035	No	1	B	46	56	10	54	2	0
RN036	No	1	B	46	56	10	54	2	0
RN037	No	1	B	46	56	10	54	2	0
RN038	No	1	B	48	56	8	54	2	0
RN039	No	1	B	46	56	10	53	3	0
RN040	No	1	B	47	56	9	53	3	0
RN041	No	1	B	52	55	3	54	1	0
RN042	No	1	B	46	60	14	54	6	1
RN043	No	1	B	46	58	12	53	5	1
RN044	No	1	B	46	57	11	53	4	0
RN045	No	1	B	46	56	10	52	4	0
RN046	No	1	B	48	55	7	52	3	0
RN047	No	1	B	57	58	1	58	0	0
RN048	No	1	B	54	62	8	59	3	0
RN049	No	1	B	52	59	7	55	4	0
RN050	No	1	B	46	57	11	53	4	0
RN051	No	1	B	46	52	6	47	5	1
RN052	No	1	B	46	52	6	48	4	0
RN053	No	1	B	49	52	3	50	2	0
RN054	No	1	B	46	57	11	53	4	0
RN055	No	1	B	46	55	9	50	5	1
RN056	No	1	B	46	55	9	49	6	1
RN057	No	1	B	46	60	14	57	3	0
RN058	No	1	B	46	54	8	49	5	1
RN059	No	1	B	46	58	12	52	6	1
RN060	No	1	B	46	55	9	50	5	1
RN061	No	1	B	46	55	9	49	6	1
RN062	No	1	B	46	55	9	50	5	1
RN063	No	1	B	46	57	11	52	5	1
RN064	No	1	B	46	55	9	50	5	1
RN065	No	1	B	46	54	8	50	4	0
RN066	No	1	B	46	52	6	47	5	1

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 12

NAC							17-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors
RN067	No	1	B	46	56	10	50	6	1
RN068	No	1	B	46	55	9	50	5	1
RN069	No	1	B	46	51	5	47	4	0
RN070	No	1	B	46	58	12	52	6	1
RN071	No	1	B	46	56	10	50	6	1
RN072	No	1	B	46	56	10	50	6	1
RN073	No	1	B	46	55	9	49	6	1
RN074	No	1	B	46	54	8	48	6	1
RN075	No	1	B	46	52	6	47	5	1
RN076	No	1	B	46	51	5	47	4	0
RN077	No	1	B	46	53	7	47	6	1
RN078	No	1	B	46	52	6	47	5	1
RN079	No	1	B	46	56	10	49	7	1
RN080	No	1	B	46	48	2	42	6	1
RN081	No	1	B	46	48	2	42	6	1
RN082	No	1	B	46	47	1	42	5	1
RN083	No	1	B	46	51	5	46	5	1
RN084	No	1	B	46	55	9	50	5	1
RN085	No	1	B	46	51	5	45	6	1
RN086	No	1	B	46	50	4	45	5	1
RN087	No	1	B	46	56	10	51	5	1
RN088	No	1	B	46	51	5	45	6	1
RN089	No	1	B	46	49	3	46	3	0
RN090	No	1	B	46	54	8	48	6	1
RN091	No	1	B	46	52	6	47	5	1

= Impacted receptor
= 5 dBA reduction or better
= 7 dBA reduction or better

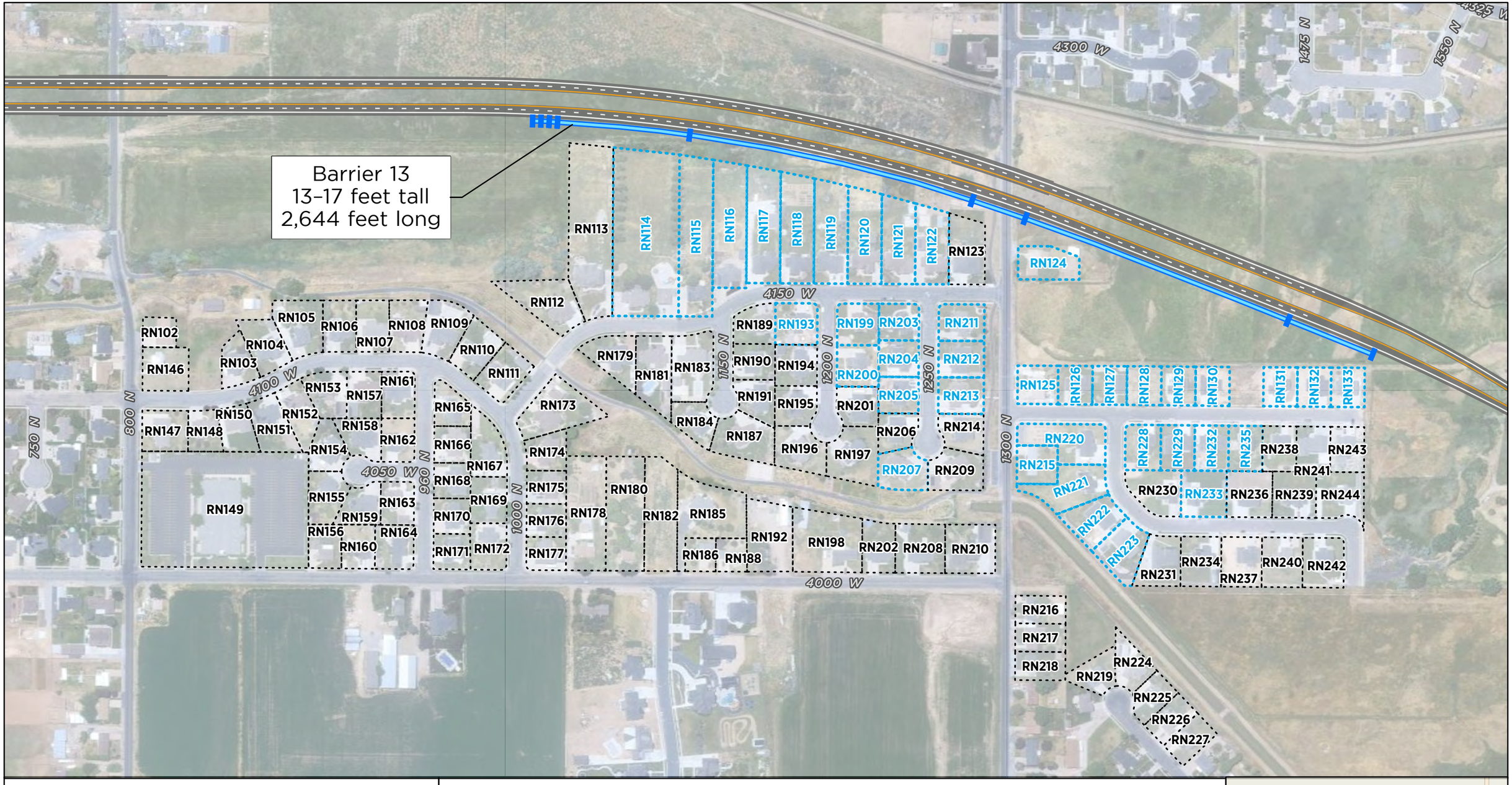
SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 12

NAC	17-Foot Barrier

	Inputs – Overall	
	Barrier Length (ft.) =	3,914
	*Barrier Height (ft.) =	10 & 17
	Barrier Area (sq. ft.) =	65,390
	Inputs – Category A, C, D, or E	
	Barrier Height (ft.) =	n/a
	Barrier Length (ft.) =	n/a
	Barrier Area (ft.) =	n/a
	Right-of-Way Acquisition Area (sq. ft.) =	n/a
	Safety Barrier (linear ft.) =	n/a
	Inputs – Category B	
	Barrier Height (ft.) =	10 & 17
	Barrier Length (ft.) =	3,914
	Barrier Area (sq. ft.) =	65,390
	Right-of-Way Acquisition Area (sq. ft.) =	0
	Safety Barrier (linear ft.) =	0
Feasibility	**Acoustic Feasibility**	
	Front Row Receptors =	14
	Front-Row Receptors with a 5 dBA Reduction =	10
	% of Front-Row Receptors Reduced At Least 5 dBA =	71%
	Acoustically Feasible =	**Yes**
Reasonableness	**Noise Reduction Design Goal**	
	Front Row Receptors =	14
	Front Row Receptors with 7 dBA Reduction =	4
	% of Front Row Reduced At Least 7 dBA =	29%
	Meets Noise Reduction Design Goal =	**No**
	Cost Effectiveness – Category A, C, D, or E	
	Barrier Cost (Barrier area x 20) =	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a
	Safety Barrier (linear ft. x 125) =	n/a
	Total Barrier Cost =	n/a
	Allowable Cost (length x 360) =	n/a
	Cost Reasonable =	**n/a**
	Cost Effectiveness – Category B	
	Barrier Cost (Barrier area x 20) =	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a
	Safety Barrier (linear ft. x 125) =	n/a
	Total Barrier Cost =	n/a
	Allowable Cost (benefited x 30k) =	n/a
	Benefited (Category B w/ 5 dBA Reduction) =	n/a
	Cost per Benefited Receptor (Barrier cost / benefited) =	n/a
	Cost Reasonable =	**n/a**

Is Noise Barrier 12 Feasible and Reasonable?	**No**

*Overall barrier heights include a uniform barrier at the height indicated and a 10-foot-tall and 164-foot-long segment on the bridge over 1300 North.

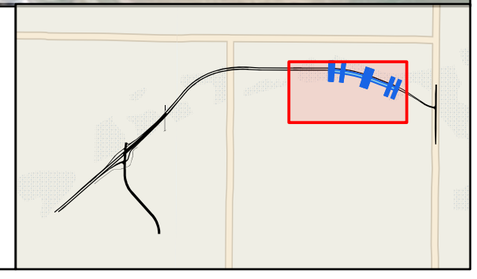


SR-177; SR-193 to 1800 North Re-Evaluation
Traffic Noise Study
Exhibit 2: Noise Barriers
UDOT Project No.: S-R199(381)
UDOT PIN: 20927

Proposed Action Design
Barrier Recommended for Balloting
Receptor Area
Benefited Receptor

N

0 125 250 500 Feet



SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 13

NAC							17-Foot Barrier			17-Foot Optimized Barrier			16-Foot Barrier			15-Foot Barrier			14-Foot Barrier			13-Foot Barrier			12-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors
RN102	No	1	B	46	63	17	62	1	0	62	1	0	62	1	0	62	1	0	62	1	0	62	1	0	62	1	0
RN103	No	1	B	46	60	14	60	0	0	60	0	0	60	0	0	60	0	0	60	0	0	60	0	0	60	0	0
RN104	No	1	B	46	59	13	59	0	0	59	0	0	59	0	0	59	0	0	59	0	0	59	0	0	59	0	0
RN105	No	1	B	46	61	15	60	1	0	60	1	0	60	1	0	60	1	0	60	1	0	60	1	0	60	1	0
RN106	No	1	B	46	61	15	60	1	0	60	1	0	60	1	0	60	1	0	60	1	0	60	1	0	60	1	0
RN107	No	1	B	46	60	14	59	1	0	59	1	0	59	1	0	59	1	0	59	1	0	59	1	0	59	1	0
RN108	No	1	B	46	60	14	59	1	0	59	1	0	59	1	0	59	1	0	58	2	0	59	1	0	59	1	0
RN109	No	1	B	46	58	12	57	1	0	57	1	0	57	1	0	56	2	0	56	2	0	56	2	0	56	2	0
RN110	No	1	B	46	58	12	56	2	0	57	1	0	56	2	0	56	2	0	55	3	0	55	3	0	55	3	0
RN111	No	1	B	46	57	11	55	2	0	56	1	0	55	2	0	55	2	0	54	3	0	54	3	0	54	3	0
RN112	No	1	B	46	60	14	57	3	0	58	2	0	57	3	0	57	3	0	57	3	0	57	3	0	57	3	0
RN113	Yes	1	B	46	63	17	58	5	1	59	4	0	58	5	1	58	5	1	58	5	1	59	4	0	59	4	0
RN114	Yes	1	B	46	62	16	57	5	1	57	5	1	57	5	1	57	5	1	57	5	1	58	4	0	58	4	0
RN115	Yes	1	B	46	62	16	56	6	1	57	5	1	57	5	1	57	5	1	57	5	1	58	4	0	58	4	0
RN116	Yes	1	B	46	64	18	57	7	1	57	7	1	57	7	1	58	6	1	58	6	1	59	5	1	59	5	1
RN117	Yes	1	B	46	67	21	59	8	1	59	8	1	59	8	1	59	8	1	59	8	1	60	7	1	61	6	1
RN118	Yes	1	B	46	67	21	59	8	1	59	8	1	59	8	1	60	7	1	60	7	1	60	7	1	61	6	1
RN119	Yes	1	B	46	68	22	60	8	1	60	8	1	60	8	1	60	8	1	60	8	1	61	7	1	61	7	1
RN120	Yes	1	B	46	67	21	61	6	1	61	6	1	61	6	1	61	6	1	61	6	1	61	6	1	62	5	1
RN121	Yes	1	B	46	66	20	59	7	1	59	7	1	59	7	1	59	7	1	59	7	1	59	7	1	60	6	1
RN122	Yes	1	B	46	68	22	63	5	1	63	5	1	63	5	1	63	5	1	63	5	1	63	5	1	63	5	1
RN123	Yes	1	B	48	70	22	66	4	0	66	4	0	66	4	0	66	4	0	66	4	0	66	4	0	66	4	0
RN124	Yes	1	B	46	68	22	58	10	1	58	10	1	58	10	1	58	10	1	59	9	1	59	9	1	59	9	1
RN125	No	1	B	46	62	16	55	7	1	55	7	1	55	7	1	55	7	1	56	6	1	56	6	1	56	6	1
RN126	No	1	B	46	63	17	56	7	1	56	7	1	56	7	1	56	7	1	56	7	1	56	7	1	57	6	1
RN127	Yes	1	B	46	64	18	55	9	1	55	9	1	56	8	1	56	8	1	56	8	1	56	8	1	57	7	1
RN128	Yes	1	B	46	65	19	56	9	1	57	8	1	57	8	1	57	8	1	57	8	1	57	8	1	58	7	1
RN129	Yes	1	B	46	66	20	57	9	1	57	9	1	57	9	1	58	8	1	58	8	1	58	8	1	59	7	1
RN130	Yes	1	B	46	66	20	58	8	1	58	8	1	58	8	1	58	8	1	58	8	1	59	7	1	59	7	1
RN131	Yes	1	B	46	69	23	60	9	1	60	9	1	60	9	1	60	9	1	61	8	1	61	8	1	61	8	1
RN132	Yes	1	B	46	69	23	61	8	1	61	8	1	61	8	1	61	8	1	62	7	1	62	7	1	62	7	1
RN133	Yes	1	B	46	70	24	65	5	1	65	5	1	65	5	1	65	5	1	65	5	1	65	5	1	65	5	1
RN146	No	1	B	46	55	9	55	0	0	55	0	0	55	0	0	55	0	0	55	0	0	55	0	0	55	0	0
RN147	No	1	B	48	55	7	55	0	0	55	0	0	55	0	0	55	0	0	55	0	0	55	0	0	55	0	0
RN148	No	1	B	46	54	8	54	0	0	54	0	0	54	0	0	54	0	0	54	0	0	54	0	0	54	0	0
RN149	No	1	D	21	25	4	25	0	0	25	0	0	25	0	0	25	0	0	25	0	0	25	0	0	25	0	0
RN150	No	1	B	46	54	8	54	0	0	54	0	0	54	0	0	54	0	0	54	0	0	54	0	0	54	0	0
RN151	No	1	B	46	51	5	51	0	0	51	0	0	51	0	0	51	0	0	51	0	0	51	0	0	51	0	0
RN152	No	1	B	46	53	7	53	0	0	53	0	0	53	0	0	53	0	0	53	0	0	53	0	0	53	0	0
RN153	No	1	B	46	52	6	52	0	0	52	0	0	52	0	0	52	0	0	51	1	0	52	0	0	52	0	0
RN154	No	1	B	46	47	1	47	0	0	47	0	0	47	0	0	47	0	0	47	0	0	47	0	0	47	0	0
RN155	No	1	B	46	46	0	46	0	0	46	0	0	46	0	0	46	0	0	46	0	0	46	0	0	46	0	0
RN156	No	1	B	46	46	0	46	0	0	46	0	0	46	0	0	46	0	0	46	0	0	46	0	0	46	0	0
RN157	No	1	B	46	51	5	51	0	0	51	0	0	51	0	0	51	0	0	51	0	0	51	0	0	51	0	0
RN158	No	1	B	46	47	1	47	0	0	47	0	0	47	0	0	47	0	0	47	0	0	47	0	0	47	0	0
RN159	No	1	B	46	46	0	44	2	0	45	1	0	45	1	0	45	1	0	45	1	0	45	1	0	45	1	0
RN160	No	1	B	46	46	0	44	2	0	44	2	0	44	2	0	44	2	0	44	2	0	44	2	0	44	2	0
RN161	No	1	B	46	51	5	50	1	0	51	0	0	50	1	0	50	1	0	50	1	0	50	1	0	50	1	0
RN162	No	1	B	46	49	3	47	2	0	47	2	0	47	2	0	47	2	0	47	2	0	48	1	0	48	1	0
RN163	No	1	B	46	46	0	45	1	0	45	1	0	45	1	0	45	1	0	45	1	0	45	1	0	45	1	0
RN164	No	1	B	48	49	1	49	0	0	49	0	0	49	0	0	49	0	0	49	0	0	49	0	0	49	0	0
RN165	No	1	B	46	47	1	45	2	0	45	2	0	45	2	0	45	2	0	45	2	0	45	2	0	46	1	0
RN166	No	1	B	46	48	2	44	4	0	45	3	0	44	4	0	44	4	0	45	3	0	45	3	0	46	2	0
RN167	No	1	B	46	47	1	45	2	0	45	2	0	45	2	0	45	2	0	44	3	0	44	3	0	45	2	0
RN168	No	1	B	46	46	0	43	3	0	43	3	0	43	3	0	43	3	0	44	2	0	44	2	0	44	2	0
RN169	No	1	B	46	46	0	44	2	0	44	2	0	44	2	0	44	2	0	44	2	0	44	2	0	44	2	0
RN170	No	1	B	46	46	0	45	1	0	45	1	0	45	1	0	45	1	0	45	1	0	45	1	0	45	1	0
RN171	No	1	B	49	50	1	50	0	0	50	0	0	50	0	0	50	0	0	50	0	0	50	0	0	50	0	0
RN172	No	1	B	52	53	1	53	0	0	53	0	0	53	0	0	53	0	0	53	0	0	53	0	0	53	0	0
RN173	No	1	B	46	51	5	48	3	0	48	3	0	48	3	0	48	3	0	48	3	0	49	2	0	49	2	0
RN174	No	1	B	46	49	3	47	2	0	47	2	0	47	2	0	47	2	0	47	2	0	47	2	0	48	1	0
RN175	No	1	B	46	47	1	45	2	0	45	2	0	45	2	0	45	2	0	45	2	0	46	1	0	46	1	0
RN176	No	1	B	46	47	1	45	2	0	45	2	0	45	2	0	45	2	0	46	1	0	46	1	0	46	1	0
RN177	No	1	B	46	47	1	46	1	0	46	1	0	47	0	0	47	0	0	46	1	0	47	0	0	47	0	0
RN178	No	1	B	46	47	1	45	2	0	45	2	0	45	2	0	46	1	0	46	1	0	46	1	0	46	1	0
RN179	No	1	B	46	56	10	53	3	0	53	3	0	53	3	0	53	3	0	53	3	0	53	3	0	53	3	0

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 13

NAC							17-Foot Barrier			17-Foot Optimized Barrier			16-Foot Barrier			15-Foot Barrier			14-Foot Barrier			13-Foot Barrier			12-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors	W/Barrier dBA	Reduction dBA	Benefited Receptors
RN180	No	1	B	47	50	3	49	1	0	49	1	0	49	1	0	49	1	0	49	1	0	49	1	0	49	1	0
RN181	No	1	B	46	55	9	51	4	0	52	3	0	51	4	0	52	3	0	52	3	0	52	3	0	53	2	0
RN182	No	1	B	46	50	4	49	1	0	49	1	0	49	1	0	49	1	0	49	1	0	49	1	0	49	1	0
RN183	No	1	B	46	54	8	50	4	0	50	4	0	50	4	0	51	3	0	51	3	0	51	3	0	51	3	0
RN184	No	1	B	46	50	4	47	3	0	48	2	0	48	2	0	48	2	0	48	2	0	49	1	0	49	1	0
RN185	No	1	B	46	49	3	47	2	0	47	2	0	47	2	0	47	2	0	47	2	0	48	1	0	48	1	0
RN186	No	1	B	46	48	2	47	1	0	47	1	0	47	1	0	47	1	0	47	1	0	47	1	0	47	1	0
RN187	No	1	B	46	50	4	47	3	0	47	3	0	47	3	0	47	3	0	48	2	0	48	2	0	48	2	0
RN188	No	1	B	46	47	1	46	1	0	46	1	0	46	1	0	46	1	0	46	1	0	46	1	0	47	0	0
RN189	No	1	B	46	56	10	52	4	0	52	4	0	53	3	0	53	3	0	53	3	0	54	2	0	54	2	0
RN190	No	1	B	46	49	3	46	3	0	46	3	0	46	3	0	47	2	0	47	2	0	48	1	0	48	1	0
RN191	No	1	B	46	48	2	45	3	0	45	3	0	45	3	0	45	3	0	46	2	0	46	2	0	46	2	0
RN192	No	1	B	46	50	4	49	1	0	49	1	0	49	1	0	49	1	0	49	1	0	49	1	0	49	1	0
RN193	No	1	B	46	54	8	47	7	1	48	6	1	47	7	1	48	6	1	48	6	1	49	5	1	49	5	1
RN194	No	1	B	46	47	1	45	2	0	46	1	0	45	2	0	46	1	0	46	1	0	46	1	0	47	0	0
RN195	No	1	B	46	47	1	43	4	0	44	3	0	44	3	0	44	3	0	45	2	0	45	2	0	45	2	0
RN196	No	1	B	46	51	5	49	2	0	49	2	0	49	2	0	49	2	0	49	2	0	50	1	0	49	2	0
RN197	No	1	B	46	50	4	46	4	0	46	4	0	46	4	0	47	3	0	47	3	0	47	3	0	48	2	0
RN198	No	1	B	46	49	3	47	2	0	47	2	0	47	2	0	47	2	0	47	2	0	48	1	0	48	1	0
RN199	No	1	B	46	58	12	52	6	1	52	6	1	52	6	1	52	6	1	53	5	1	53	5	1	53	5	1
RN200	No	1	B	46	52	6	47	5	1	47	5	1	47	5	1	47	5	1	48	4	0	48	4	0	48	4	0
RN201	No	1	B	46	49	3	45	4	0	45	4	0	45	4	0	46	3	0	46	3	0	46	3	0	47	2	0
RN202	No	1	B	46	49	3	46	3	0	46	3	0	47	2	0	47	2	0	47	2	0	47	2	0	48	1	0
RN203	No	1	B	46	58	12	52	6	1	52	6	1	52	6	1	52	6	1	53	5	1	53	5	1	53	5	1
RN204	No	1	B	46	52	6	46	6	1	46	6	1	46	6	1	47	5	1	47	5	1	48	4	0	48	4	0
RN205	No	1	B	46	50	4	45	5	1	45	5	1	46	4	0	46	4	0	46	4	0	47	3	0	47	3	0
RN206	No	1	B	46	48	2	45	3	0	45	3	0	45	3	0	45	3	0	45	3	0	46	2	0	46	2	0
RN207	No	1	B	46	52	6	48	5	1	48	5	1	47	5	1	48	4	0	48	4	0	48	4	0	48	4	0
RN208	No	1	B	46	51	5	47	4	0	47	4	0	47	4	0	47	4	0	47	4	0	47	4	0	48	3	0
RN209	No	1	B	46	51	5	47	4	0	47	4	0	47	4	0	47	4	0	47	4	0	48	3	0	48	3	0
RN210	No	1	B	46	52	6	48	4	0	48	4	0	48	4	0	49	3	0	49	3	0	49	3	0	49	3	0
RN211	No	1	B	51	64	13	59	5	1	59	5	1	59	5	1	59	5	1	59	5	1	59	5	1	59	5	1
RN212	No	1	B	51	63	12	58	5	1	58	5	1	58	5	1	58	5	1	58	5	1	58	5	1	58	5	1
RN213	No	1	B	51	61	10	56	5	1	56	5	1	56	5	1	56	5	1	56	5	1	57	4	0	57	4	0
RN214	No	1	B	51	59	8	55	4	0	55	4	0	55	4	0	55	4	0	56	3	0	56	3	0	56	3	0
RN215	No	1	B	46	56	10	50	6	1	50	6	1	51	5	1	51	5	1	51	5	1	51	5	1	51	5	1
RN216	No	1	B	46	50	4	48	2	0	48	2	0	48	2	0	48	2	0	48	2	0	48	2	0	48	2	0
RN217	No	1	B	46	48	2	46	2	0	46	2	0	46	2	0	46	2	0	47	1	0	47	1	0	47	1	0
RN218	No	1	B	46	46	0	44	2	0	44	2	0	44	2	0	44	2	0	44	2	0	44	2	0	45	1	0
RN219	No	1	B	46	50	4	46	4	0	46	4	0	46	4	0	46	4	0	47	3	0	47	3	0	47	3	0
RN220	No	1	B	46	57	11	51	6	1	51	6	1	51	6	1	51	6	1	51	6	1	52	5	1	52	5	1
RN221	No	1	B	46	54	8	49	5	1	49	5	1	49	5	1	49	5	1	49	5	1	50	4	0	50	4	0
RN222	No	1	B	46	56	10	51	5	1	51	5	1	51	5	1	51	5	1	51	5	1	52	4	0	52	4	0
RN223	No	1	B	46	57	11	50	7	1	50	7	1	51	6	1	51	6	1	51	6	1	51	6	1	51	6	1
RN224	No	1	B	46	49	3	47	2	0	47	2	0	47	2	0	47	2	0	48	1	0	48	1	0	48	1	0
RN225	No	1	B	46	50	4	48	2	0	48	2	0	48	2	0	48	2	0	48	2	0	48	2	0	48	2	0
RN226	No	1	B	46	50	4	48	2	0	48	2	0	48	2	0	48	2	0	48	2	0	48	2	0	48	2	0
RN227	No	1	B	46	49	3	48	1	0	48	1	0	48	1	0	48	1	0	48	1	0	48	1	0	48	1	0
RN228	No	1	B	46	59	13	53	6	1	53	6	1	53	6	1	53	6	1	53	6	1	53	6	1	54	5	1
RN229	No	1	B	46	60	14	53	7	1	53	7	1	54	6	1	54	6	1	54	6	1	54	6	1	55	5	1
RN230	No	1	B	46	53	7	49	4	0	49	4	0	49	4	0	49	4	0	50	3	0	50	3	0	50	3	0
RN231	No	1	B	46	54	8	51	3	0	51	3	0	52	2	0	52	2	0	52	2	0	52	2	0	53	1	0
RN232	No	1	B	46	60	14	54	6	1	54	6	1	55	5	1	55	5	1	55	5	1	55	5	1	56	4	0
RN233	No	1	B	46	55	9	50	5	1	50	5	1	50	5	1	50	5	1	51	4	0	51	4	0	51	4	0
RN234	No	1	B	46	54	8	51	3	0	51	3	0	51	3	0	51	3	0	51	3	0	51	3	0	52	2	0
RN235	No	1	B	46	61	15	56	5	1	56	5	1	57	4	0	57	4	0	57	4	0	57	4	0	57	4	0
RN236	No	1	B	46	56	10	52	4	0	52	4	0	52	4	0	52	4	0	52	4	0	53	3	0	53	3	0
RN237	No	1	B	46	54	8	51	3	0	51	3	0	51	3	0	52	2	0	52	2	0	52	2	0	52	2	0
RN238	No	1	B	46	62	16	58	4	0	58	4	0	58	4	0	58	4	0	58	4	0	58	4	0	58	4	0
RN239	No	1	B	46	56	10	53	3	0	53	3	0	54	2	0	54	2	0	54	2	0	54	2	0	54	2	0
RN240	No	1	B	46	55	9	54	1	0	54	1	0	54	1	0	54	1	0	54	1	0	54	1	0	54	1	0
RN241	No	1	B	46	62	16	59	3	0	59	3	0	59	3	0	59	3	0	59	3	0	59	3	0	59	3	0
RN242	No	1	B	46	57	11	57	0	0	57	0	0	57	0	0	57	0	0	57	0	0	57	0	0	57	0	0
RN243	No	1	B	46	64	18	63	1	0	63	1	0	63	1	0	63	1	0	63	1	0	63	1	0	62	2	0
RN244	No	1	B	46	61	15	60	1	0	60	1	0	60	1	0	60	1	0	60	1	0	60	1	0	60	1	0

= Impacted receptor
= 5 dBA reduction or better
= 7 dBA reduction or better

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 13

NAC		17-Foot Barrier	17-Foot Optimized Barrier	16-Foot Barrier	15-Foot Barrier	14-Foot Barrier	13-Foot Barrier	12-Foot Barrier
	Inputs – Overall							
	Barrier Length (ft.) =	2,719	2,644	2,744	2,794	2,969	2,969	2,994
	*Barrier Height (ft.) =	10 & 17	10, 13–17	10 & 16	10 & 15	10 & 14	10 & 13	10 & 12
	Barrier Area (sq. ft.) =	45,040	42,865	42,890	41,065	40,890	38,090	35,590
	Inputs – Category A, C, D, or E							
	Barrier Height (ft.) =	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Barrier Length (ft.) =	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Barrier Area (ft.) =	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Right-of-Way Acquisition Area (sq. ft.) =	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Safety Barrier (linear ft.) =	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Inputs – Category B							
	Barrier Height (ft.) =	10 & 17	10, 13–17	10 & 16	10 & 15	10 & 14	10 & 13	10 & 12
	Barrier Length (ft.) =	2,719	2,644	2,744	2,794	2,969	2,969	2,994
	Barrier Area (sq. ft.) =	45,040	42,865	42,890	41,065	40,890	38,090	35,590
	Right-of-Way Acquisition Area (sq. ft.) =	0	0	0	0	0	0	0
	Safety Barrier (linear ft.) =	2,550	2,475	2,575	2,625	2,800	2,800	2,825
Feasibility	**Acoustic Feasibility**							
	Front Row Receptors =	19	19	19	19	19	19	19
	Front-Row Receptors with a 5 dBA Reduction =	18	17	18	18	18	15	15
	% of Front-Row Receptors Reduced At Least 5 dBA =	95%	89%	95%	95%	95%	79%	79%
	Acoustically Feasible =	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Reasonableness	**Noise Reduction Design Goal**							
	Front Row Receptors =	19	19	19	19	19	19	19
	Front Row Receptors with 7 dBA Reduction =	12	12	12	11	11	11	8
	% of Front Row Reduced At Least 7 dBA =	63%	63%	63%	58%	58%	58%	42%
	Meets Noise Reduction Design Goal =	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
	Cost Effectiveness – Category A, C, D, or E							
	Barrier Cost (Barrier area x 20) =	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Safety Barrier (linear ft. x 125) =	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Total Barrier Cost =	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Allowable Cost (length x 360) =	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Cost Reasonable =	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**
	Cost Effectiveness – Category B							
	Barrier Cost (Barrier area x 20) =	$900,800	$857,300	$857,800	$821,300	$817,800	$761,800	$711,800
	Right-of-Way Acquisition (sq. ft. x 20) =	$0	$0	$0	$0	$0	$0	$0
	Safety Barrier (linear ft. x 125) =	$318,750	$309,375	$321,875	$328,125	$350,000	$350,000	$353,125
	Total Barrier Cost =	$1,219,550	$1,166,675	$1,179,675	$1,149,425	$1,167,800	$1,111,800	$1,064,925
	Allowable Cost (benefited x 30k) =	$1,200,000	$1,170,000	$1,140,000	$1,110,000	$1,050,000	$840,000	$810,000
	Benefited (Category B w/ 5 dBA Reduction) =	40	39	38	37	35	28	27
	Cost per Benefited Receptor (Barrier cost / benefited) =	$30,489	$29,915	$31,044	$31,066	$33,366	$39,707	$39,442
	Cost Reasonable =	**No**	**Yes**	**No**	**No**	**No**	**No**	**No**
	Is Noise Barrier 13 Feasible and Reasonable?	**No**	**Yes**	**No**	**No**	**No**	**No**	**No**

*Overall barrier heights, unless otherwise indicated, include a uniform barrier at the height indicated and a 10-foot-tall and 169-foot-long segment on the bridge over 1300 North.

**Safety barrier length excludes the proposed 169-foot-long barrier length on the bridge over 1300 North.

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 13

NAC							11-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors
RN102	No	1	B	46	63	17	62	1	0
RN103	No	1	B	46	60	14	60	0	0
RN104	No	1	B	46	59	13	59	0	0
RN105	No	1	B	46	61	15	60	1	0
RN106	No	1	B	46	61	15	60	1	0
RN107	No	1	B	46	60	14	59	1	0
RN108	No	1	B	46	60	14	59	1	0
RN109	No	1	B	46	58	12	56	2	0
RN110	No	1	B	46	58	12	56	2	0
RN111	No	1	B	46	57	11	55	2	0
RN112	No	1	B	46	60	14	57	3	0
RN113	Yes	1	B	46	63	17	60	3	0
RN114	Yes	1	B	46	62	16	59	3	0
RN115	Yes	1	B	46	62	16	59	3	0
RN116	Yes	1	B	46	64	18	60	4	0
RN117	Yes	1	B	46	67	21	61	6	1
RN118	Yes	1	B	46	67	21	61	6	1
RN119	Yes	1	B	46	68	22	62	6	1
RN120	Yes	1	B	46	67	21	62	5	1
RN121	Yes	1	B	46	66	20	60	6	1
RN122	Yes	1	B	46	68	22	63	5	1
RN123	Yes	1	B	48	70	22	66	4	0
RN124	Yes	1	B	46	68	22	59	9	1
RN125	No	1	B	46	62	16	56	6	1
RN126	No	1	B	46	63	17	57	6	1
RN127	Yes	1	B	46	64	18	57	7	1
RN128	Yes	1	B	46	65	19	58	7	1
RN129	Yes	1	B	46	66	20	59	7	1
RN130	Yes	1	B	46	66	20	60	6	1
RN131	Yes	1	B	46	69	23	62	7	1
RN132	Yes	1	B	46	69	23	62	7	1
RN133	Yes	1	B	46	70	24	65	5	1
RN146	No	1	B	46	55	9	55	0	0
RN147	No	1	B	48	55	7	55	0	0
RN148	No	1	B	46	54	8	54	0	0
RN149	No	1	D	21	25	4	25	0	0
RN150	No	1	B	46	54	8	54	0	0
RN151	No	1	B	46	51	5	51	0	0
RN152	No	1	B	46	53	7	53	0	0
RN153	No	1	B	46	52	6	52	0	0
RN154	No	1	B	46	47	1	47	0	0
RN155	No	1	B	46	46	0	46	0	0
RN156	No	1	B	46	46	0	46	0	0
RN157	No	1	B	46	51	5	51	0	0
RN158	No	1	B	46	47	1	47	0	0
RN159	No	1	B	46	46	0	46	0	0
RN160	No	1	B	46	46	0	44	2	0
RN161	No	1	B	46	51	5	51	0	0
RN162	No	1	B	46	49	3	49	0	0
RN163	No	1	B	46	46	0	46	0	0
RN164	No	1	B	48	49	1	49	0	0
RN165	No	1	B	46	47	1	46	1	0
RN166	No	1	B	46	48	2	47	1	0
RN167	No	1	B	46	47	1	45	2	0
RN168	No	1	B	46	46	0	44	2	0
RN169	No	1	B	46	46	0	44	2	0
RN170	No	1	B	46	46	0	45	1	0
RN171	No	1	B	49	50	1	50	0	0
RN172	No	1	B	52	53	1	53	0	0
RN173	No	1	B	46	51	5	50	1	0
RN174	No	1	B	46	49	3	48	1	0
RN175	No	1	B	46	47	1	47	0	0
RN176	No	1	B	46	47	1	46	1	0
RN177	No	1	B	46	47	1	47	0	0
RN178	No	1	B	46	47	1	46	1	0
RN179	No	1	B	46	56	10	54	2	0

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 13

NAC							11-Foot Barrier		
Receiver	Front Row	Receptors Represented	Land Use Category	Existing dBA	Future dBA	Increase dBA	W/Barrier dBA	Reduction dBA	Benefited Receptors
RN180	No	1	B	47	50	3	50	0	0
RN181	No	1	B	46	55	9	53	2	0
RN182	No	1	B	46	50	4	49	1	0
RN183	No	1	B	46	54	8	52	2	0
RN184	No	1	B	46	50	4	49	1	0
RN185	No	1	B	46	49	3	48	1	0
RN186	No	1	B	46	48	2	47	1	0
RN187	No	1	B	46	50	4	49	1	0
RN188	No	1	B	46	47	1	47	0	0
RN189	No	1	B	46	56	10	54	2	0
RN190	No	1	B	46	49	3	48	1	0
RN191	No	1	B	46	48	2	47	1	0
RN192	No	1	B	46	50	4	50	0	0
RN193	No	1	B	46	54	8	50	4	0
RN194	No	1	B	46	47	1	47	0	0
RN195	No	1	B	46	47	1	46	1	0
RN196	No	1	B	46	51	5	49	2	0
RN197	No	1	B	46	50	4	48	2	0
RN198	No	1	B	46	49	3	48	1	0
RN199	No	1	B	46	58	12	54	4	0
RN200	No	1	B	46	52	6	49	3	0
RN201	No	1	B	46	49	3	47	2	0
RN202	No	1	B	46	49	3	48	1	0
RN203	No	1	B	46	58	12	53	5	1
RN204	No	1	B	46	52	6	49	3	0
RN205	No	1	B	46	50	4	47	3	0
RN206	No	1	B	46	48	2	46	2	0
RN207	No	1	B	46	52	6	49	3	0
RN208	No	1	B	46	51	5	48	3	0
RN209	No	1	B	46	51	5	49	2	0
RN210	No	1	B	46	52	6	50	2	0
RN211	No	1	B	51	64	13	60	4	0
RN212	No	1	B	51	63	12	59	4	0
RN213	No	1	B	51	61	10	57	4	0
RN214	No	1	B	51	59	8	56	3	0
RN215	No	1	B	46	56	10	52	4	0
RN216	No	1	B	46	50	4	49	1	0
RN217	No	1	B	46	48	2	47	1	0
RN218	No	1	B	46	46	0	45	1	0
RN219	No	1	B	46	50	4	47	3	0
RN220	No	1	B	46	57	11	52	5	1
RN221	No	1	B	46	54	8	51	3	0
RN222	No	1	B	46	56	10	52	4	0
RN223	No	1	B	46	57	11	52	5	1
RN224	No	1	B	46	49	3	49	0	0
RN225	No	1	B	46	50	4	49	1	0
RN226	No	1	B	46	50	4	49	1	0
RN227	No	1	B	46	49	3	49	0	0
RN228	No	1	B	46	59	13	54	5	1
RN229	No	1	B	46	60	14	55	5	1
RN230	No	1	B	46	53	7	50	3	0
RN231	No	1	B	46	54	8	53	1	0
RN232	No	1	B	46	60	14	56	4	0
RN233	No	1	B	46	55	9	52	3	0
RN234	No	1	B	46	54	8	52	2	0
RN235	No	1	B	46	61	15	58	3	0
RN236	No	1	B	46	56	10	53	3	0
RN237	No	1	B	46	54	8	52	2	0
RN238	No	1	B	46	62	16	59	3	0
RN239	No	1	B	46	56	10	54	2	0
RN240	No	1	B	46	55	9	55	0	0
RN241	No	1	B	46	62	16	59	3	0
RN242	No	1	B	46	57	11	57	0	0
RN243	No	1	B	46	64	18	62	2	0
RN244	No	1	B	46	61	15	60	1	0

= Impacted receptor
= 5 dBA reduction or better
= 7 dBA reduction or better

SR-177; SR-193 to 1800 N Noise Abatement Analysis
Noise Barrier 13

NAC		11-Foot Barrier
	Inputs – Overall	
	Barrier Length (ft.) =	2,994
	*Barrier Height (ft.) =	10 & 11
	Barrier Area (sq. ft.) =	32,765
	Inputs – Category A, C, D, or E	
	Barrier Height (ft.) =	n/a
	Barrier Length (ft.) =	n/a
	Barrier Area (ft.) =	n/a
	Right-of-Way Acquisition Area (sq. ft.) =	n/a
	Safety Barrier (linear ft.) =	n/a
	Inputs – Category B	
	Barrier Height (ft.) =	10 & 11
	Barrier Length (ft.) =	2,994
	Barrier Area (sq. ft.) =	32,765
	Right-of-Way Acquisition Area (sq. ft.) =	0
	Safety Barrier (linear ft.) =	2,825
Feasibility	**Acoustic Feasibility**	
	Front Row Receptors =	19
	Front-Row Receptors with a 5 dBA Reduction =	14
	% of Front-Row Receptors Reduced At Least 5 dBA =	74%
	Acoustically Feasible =	**Yes**
Reasonableness	**Noise Reduction Design Goal**	
	Front Row Receptors =	19
	Front Row Receptors with 7 dBA Reduction =	6
	% of Front Row Reduced At Least 7 dBA =	32%
	Meets Noise Reduction Design Goal =	**No**
	Cost Effectiveness – Category A, C, D, or E	
	Barrier Cost (Barrier area x 20) =	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a
	Safety Barrier (linear ft. x 125) =	n/a
	Total Barrier Cost =	n/a
	Allowable Cost (length x 360) =	n/a
	Cost Reasonable =	**n/a**
	Cost Effectiveness – Category B	
	Barrier Cost (Barrier area x 20) =	n/a
	Right-of-Way Acquisition (sq. ft. x 20) =	n/a
	Safety Barrier (linear ft. x 125) =	n/a
	Total Barrier Cost =	n/a
	Allowable Cost (benefited x 30k) =	n/a
	Benefited (Category B w/ 5 dBA Reduction) =	n/a
	Cost per Benefited Receptor (Barrier cost / benefited) =	n/a
	Cost Reasonable =	**n/a**
	Is Noise Barrier 13 Feasible and Reasonable?	**No**

*Overall barrier heights, unless otherwise indicated, include a uniform barrier at the height indicated and a 10-foot-tall and 169-foot-long segment on the bridge over 1300 North.

**Safety barrier length excludes the proposed 169-foot-long barrier length on the bridge over 1300 North.

APPENDIX A: TRAFFIC VOLUMES AND VEHICLE MIX

MEMORANDUM

To:	UDOT Region Two and Environmental
From:	Avenue Consultants
Date:	September 5, 2024
Subject:	SR-177; SR-193 to 1800 North Preconstruction Re-evaluation Traffic Volumes and Vehicle Mix Data for the Traffic Noise Study
	Project No.: S-R199(381) PIN: 20927

The purpose of this memorandum is to document the development of traffic volume data used for the traffic noise study.

1 EXISTING TRAFFIC VOLUMES

The Utah Department of Transportation (UDOT) *Noise Abatement Policy 08A2-01* directs calculating existing (2024) traffic-generated noise levels using existing traffic volumes, meaning the worst hourly traffic volumes.

Traffic analysis and field observations indicate that the afternoon/evening (PM) peak hour represents the worst traffic performance of the day in the existing condition. Therefore, we recommend using the PM peak hour traffic volumes for the existing condition in the traffic noise study.

Table 1 shows the existing, worst hourly traffic volumes.

2 FUTURE TRAFFIC VOLUMES

The UDOT *Noise Abatement Policy 08A2-01* directs calculating future (2050) worst-case traffic-generated noise levels using future traffic volumes, meaning using Level of Service (LOS) C traffic volumes and the Proposed Action's design speed.

We estimated generalized hourly LOS C traffic volumes by determining a percentage of the hourly roadway capacity. The *Wasatch Front Travel Demand Model* (WF-TDM) provided the roadway capacity data used in developing future traffic volumes. We extracted hourly capacities specific to the roadway segments intended for the traffic noise study, and these capacities are determined based on the roadway's functional type and the number of lanes.

To convert the roadway capacity to LOS C volume, we reviewed the *Highway Capacity Manual* (HCM) and conducted tests using the *Highway Capacity Software* (HCS) to establish a factor for the conversion. The HCM review indicated a LOS C range of 71 to 80 percent of the roadway capacity for arterial roadways. Additionally, the HCS analysis, focusing on a sample freeway segment, demonstrated a LOS C range from 57 to 75 percent of the roadway capacity. Combining insights from these methodologies, we used a LOS C value of 75 percent of capacity for traffic volumes.

Table 1 shows the future, LOS C traffic volumes.

Table 1: Existing (2024) and Future (2050) Condition Traffic Volumes

Roadway	Direction	Existing Volume (Per Lane)	Future Volume (Per Lane)
SR-177 Mainline	NB	n/a	1,300
	SB	n/a	1,300
SR-177 On-Ramps	NB	n/a	900
	SB	n/a	900
SR-177 Off-Ramps	NB	n/a	670
	SB	n/a	670
SR-193 East of SR-177	EB	249	n/a
	WB	175	n/a
SR-193 West of SR-177	EB	400	n/a
	WB	300	n/a
4500 West	NB	517	n/a
	SB	324	n/a
4000 West	NB	118	n/a
	SB	88	n/a
3000 West	NB	182	n/a
	SB	143	n/a
1800 North	EB	171	n/a
	WB	207	n/a
1300 North	EB	49	n/a
	WB	50	n/a
800 North	EB	61	n/a
	WB	53	n/a
300 North	EB	295	n/a
	WB	218	n/a
700 South	EB	110	n/a
	WB	202	n/a

3 VEHICLE MIX

The vehicle mix was estimated, representing the percentage distribution of automobiles, medium trucks, and heavy trucks, by relying on data obtained from collected traffic counts, UDOT's published traffic data, and the WF-TDM for future projections.

Table 2 shows the vehicle mix used for both the existing and future traffic volumes.

Table 2: Vehicle Mix

Roadway	Direction	Vehicle Type		
		Automobile (Percent)	Medium Truck (Percent)	Heavy Truck (Percent)
SR-177 Mainline	NB	84%	15%	1%
	SB	84%	15%	1%
SR-177 On-Ramps	NB	84%	15%	1%
	SB	84%	15%	1%
SR-177 Off-Ramps	NB	84%	15%	1%
	SB	84%	15%	1%
SR-193 East of SR-177	EB	84%	14%	2%
	WB	84%	14%	2%
SR-193 West of SR-177	EB	84%	14%	2%
	WB	84%	14%	2%
4500 West	NB	84%	14%	2%
	SB	84%	14%	2%
4000 West	NB	85%	13%	2%
	SB	85%	13%	2%
3000 West	NB	89%	10%	1%
	SB	89%	10%	1%
1800 North	EB	80%	18%	2%
	WB	80%	18%	2%
1300 North	EB	89%	10%	2%
	WB	89%	10%	2%
800 North	EB	74%	24%	2%
	WB	74%	24%	2%
300 North	EB	79%	19%	2%
	WB	79%	19%	2%
700 South	EB	84%	14%	2%
	WB	84%	14%	2%

APPENDIX B: METER CERTIFICATIONS

Calibration Certificate

Certificate Number 2024005505
Customer:
Avenue Consultants

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Model Number	LxT1	***Procedure Number***	D0001.8378		
Serial Number	0006299	***Technician***	Jacob Cannon		
Test Results	**Pass**	***Calibration Date***	11 Apr 2024		
Initial Condition	AS RECEIVED same as shipped	***Calibration Due***	11 Apr 2025		
		Temperature	23.3	°C	± 0.25 °C
Description	SoundTrack LxT Class 1 Class 1 Sound Level Meter Firmware Revision: 2.404	***Humidity***	53.8	%RH	± 2.0 %RH
		Static Pressure	86.5	kPa	± 0.13 kPa

Evaluation Method Tested electrically using Larson Davis PRMLxT1 S/N 071360 and a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 50.0 mV/Pa.

Compliance Standards Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8384:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61252:2002	ANSI S1.25 (R2007)
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017. **Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

Correction data from Larson Davis LxT Manual for SoundTrack LxT & SoundExpert Lxt, I770.01 Rev O Supporting Firmware Version 4.0.5, 2019-09-10

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa

Periodic tests were performed in accordance with procedures from IEC 61672-3:2013 / ANSI/ASA S1.4-2014/Part3.

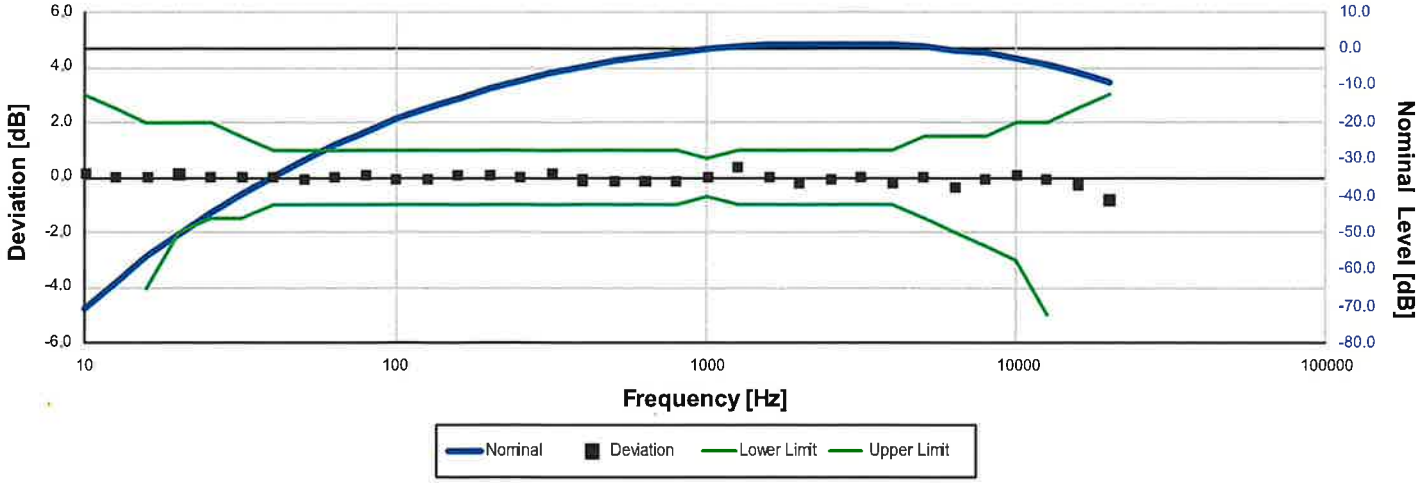
Pattern approval for IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1 successfully completed by Physikalisch-Technische Bundesanstalt (PTB) on 2007-10-09 reference number PTB-1.72-4034218.

The sound level meter submitted for testing successfully completed the periodic tests of IEC 61672-3:2013 / ANSI/ASA S1.4-2014/Part 3, for the environmental conditions under which the tests were performed. As evidence was publicly available, from an independent testing organization responsible for approving the results of pattern-evaluation tests performed in accordance with IEC 61672-2:2013 / ANSI/ASA S1.4-2014/Part 2, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1; the sound level meter submitted for testing conforms to the class 1specifications in IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1.

Standards Used

Description	Cal Date	Cal Due	Cal Standard
Hart Scientific 2626-S Humidity/Temperature Sensor	2023-02-20	2024-08-20	006946
SRS DS360 Ultra Low Distortion Generator	2024-03-26	2025-03-26	007635

A-weight Filter Response

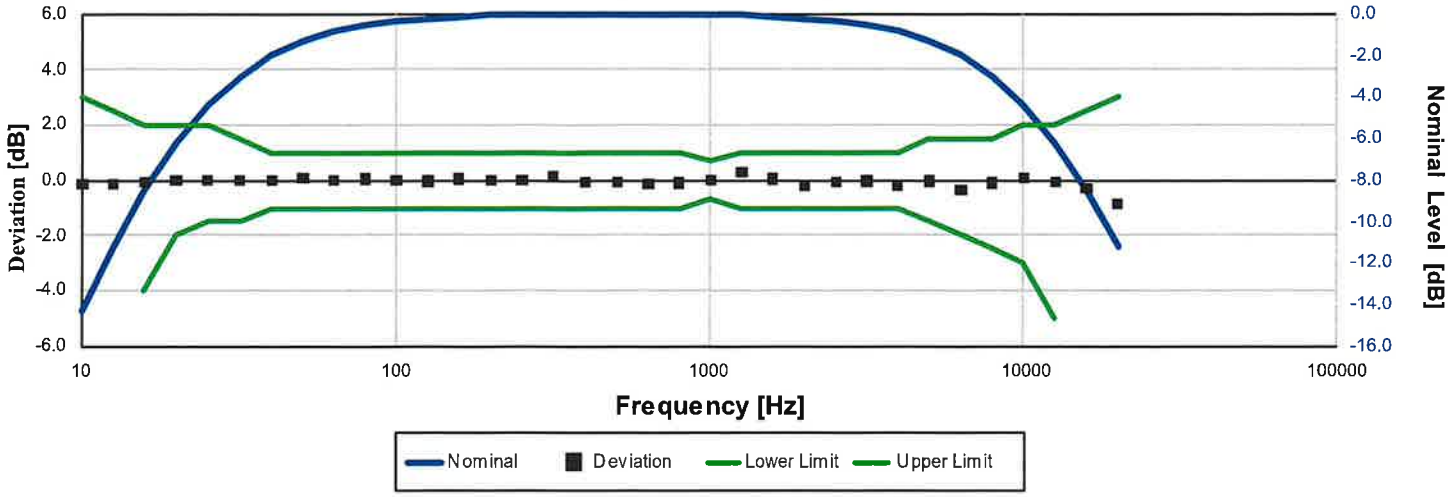


Electrical signal test of frequency weighting performed according to IEC 61672-3:2013 13 and ANSI S1.4-2014 Part 3: 13 for compliance to IEC 61672-1:2013 5.5; IEC 60651:2001 6.1 and 9.2.2; IEC 60804:2000 5; ANSI S1.4:1983 (R2006) 5.1 and 8.2.1; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Deviation [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
10.00	-70.28	0.12	-inf	3.00	0.25	Pass
12.59	-63.39	0.01	-inf	2.50	0.25	Pass
15.85	-56.68	0.02	-4.00	2.00	0.25	Pass
19.95	-50.39	0.11	-2.00	2.00	0.25	Pass
25.12	-44.67	0.03	-1.50	2.00	0.25	Pass
31.62	-39.38	0.02	-1.50	1.50	0.25	Pass
39.81	-34.60	0.00	-1.00	1.00	0.25	Pass
50.12	-30.24	-0.04	-1.00	1.00	0.25	Pass
63.10	-26.18	0.02	-1.00	1.00	0.25	Pass
79.43	-22.45	0.05	-1.00	1.00	0.25	Pass
100.00	-19.14	-0.04	-1.00	1.00	0.25	Pass
125.89	-16.14	-0.04	-1.00	1.00	0.25	Pass
158.49	-13.31	0.09	-1.00	1.00	0.25	Pass
199.53	-10.85	0.05	-1.00	1.00	0.25	Pass
251.19	-8.60	0.01	-1.00	1.00	0.25	Pass
316.23	-6.47	0.13	-1.00	1.00	0.25	Pass
398.11	-4.91	-0.10	-1.00	1.00	0.25	Pass
501.19	-3.34	-0.14	-1.00	1.00	0.25	Pass
630.96	-2.05	-0.15	-1.00	1.00	0.25	Pass
794.33	-0.94	-0.14	-1.00	1.00	0.25	Pass
1,000.00	0.00	0.00	-0.70	0.70	0.25	Pass
1,258.93	0.95	0.35	-1.00	1.00	0.25	Pass
1,584.89	1.02	0.02	-1.00	1.00	0.25	Pass
1,995.26	0.97	-0.23	-1.00	1.00	0.25	Pass
2,511.89	1.23	-0.07	-1.00	1.00	0.25	Pass
3,162.28	1.19	-0.01	-1.00	1.00	0.25	Pass
3,981.07	0.81	-0.19	-1.00	1.00	0.25	Pass
5,011.87	0.52	0.02	-1.50	1.50	0.25	Pass
6,309.57	-0.48	-0.38	-2.00	1.50	0.25	Pass
7,943.28	-1.20	-0.10	-2.50	1.50	0.25	Pass
10,000.00	-2.40	0.10	-3.00	2.00	0.25	Pass
12,589.25	-4.36	-0.06	-5.00	2.00	0.25	Pass
15,848.93	-6.85	-0.25	-16.00	2.50	0.25	Pass
19,952.62	-10.13	-0.83	-inf	3.00	0.25	Pass

-- End of measurement results--

C-weight Filter Response

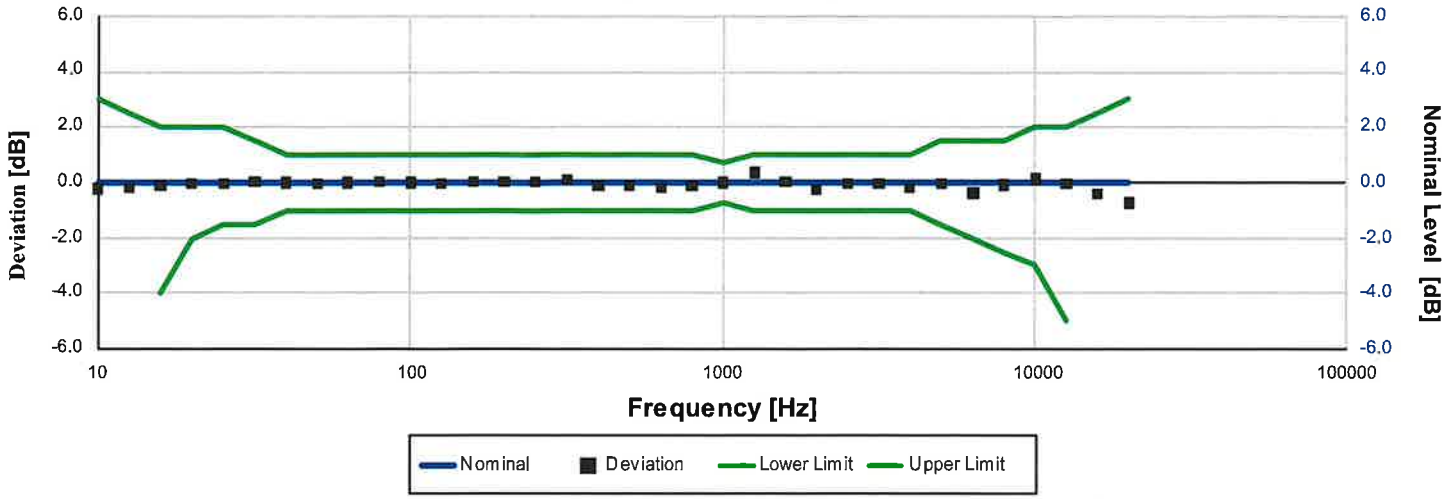


Electrical signal test of frequency weighting performed according to IEC 61672-3:2013 13 and ANSI S1.4-2014 Part 3: 13 for compliance to IEC 61672-1:2013 5.5; IEC 60651:2001 6.1 and 9.2.2; IEC 60804:2000 5; ANSI S1.4:1983 (R2006) 5.1 and 8.2.1; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Deviation [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
10.00	-14.43	-0.13	-inf	3.00	0.25	Pass
12.59	-11.33	-0.13	-inf	2.50	0.25	Pass
15.85	-8.54	-0.04	-4.00	2.00	0.25	Pass
19.95	-6.18	0.02	-2.00	2.00	0.25	Pass
25.12	-4.37	0.03	-1.50	2.00	0.25	Pass
31.62	-2.96	0.04	-1.50	1.50	0.25	Pass
39.81	-1.97	0.03	-1.00	1.00	0.25	Pass
50.12	-1.22	0.09	-1.00	1.00	0.25	Pass
63.10	-0.80	0.00	-1.00	1.00	0.25	Pass
79.43	-0.45	0.05	-1.00	1.00	0.25	Pass
100.00	-0.28	0.02	-1.00	1.00	0.25	Pass
125.89	-0.22	-0.02	-1.00	1.00	0.25	Pass
158.49	-0.05	0.05	-1.00	1.00	0.25	Pass
199.53	-0.01	-0.01	-1.00	1.00	0.25	Pass
251.19	0.03	0.03	-1.00	1.00	0.25	Pass
316.23	0.15	0.15	-1.00	1.00	0.25	Pass
398.11	-0.07	-0.07	-1.00	1.00	0.25	Pass
501.19	-0.08	-0.08	-1.00	1.00	0.25	Pass
630.96	-0.13	-0.12	-1.00	1.00	0.25	Pass
794.33	-0.10	-0.10	-1.00	1.00	0.25	Pass
1,000.00	0.00	0.00	-0.70	0.70	0.25	Pass
1,258.93	0.32	0.32	-1.00	1.00	0.25	Pass
1,584.89	-0.05	0.05	-1.00	1.00	0.25	Pass
1,995.26	-0.41	-0.20	-1.00	1.00	0.25	Pass
2,511.89	-0.34	-0.04	-1.00	1.00	0.25	Pass
3,162.28	-0.51	-0.01	-1.00	1.00	0.25	Pass
3,981.07	-0.99	-0.19	-1.00	1.00	0.25	Pass
5,011.87	-1.33	-0.03	-1.50	1.50	0.25	Pass
6,309.57	-2.36	-0.36	-2.00	1.50	0.25	Pass
7,943.28	-3.10	-0.10	-2.50	1.50	0.25	Pass
10,000.00	-4.32	0.08	-3.00	2.00	0.25	Pass
12,589.25	-6.28	-0.08	-5.00	2.00	0.25	Pass
15,848.93	-8.78	-0.28	-16.00	2.50	0.25	Pass
19,952.62	-12.06	-0.86	-inf	3.00	0.25	Pass

-- End of measurement results--

Z-weight Filter Response



Electrical signal test of frequency weighting performed according to IEC 61672-3:2013 13 and ANSI S1.4-2014 Part 3: 13 for compliance to IEC 61672-1:2013 5.5; IEC 60651:2001 6.1 and 9.2.2; IEC 60804:2000 5; ANSI S1.4:1983 (R2006) 5.1 and 8.2.1; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Deviation [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
10.00	-0.23	-0.23	-inf	3.00	0.25	Pass
12.59	-0.19	-0.19	-inf	2.50	0.25	Pass
15.85	-0.11	-0.11	-4.00	2.00	0.25	Pass
19.95	-0.03	-0.03	-2.00	2.00	0.25	Pass
25.12	-0.03	-0.03	-1.50	2.00	0.25	Pass
31.62	0.01	0.01	-1.50	1.50	0.25	Pass
39.81	-0.01	-0.01	-1.00	1.00	0.25	Pass
50.12	-0.06	-0.06	-1.00	1.00	0.25	Pass
63.10	0.00	0.00	-1.00	1.00	0.25	Pass
79.43	0.04	0.03	-1.00	1.00	0.25	Pass
100.00	-0.01	-0.01	-1.00	1.00	0.25	Pass
125.89	-0.06	-0.06	-1.00	1.00	0.25	Pass
158.49	0.02	0.02	-1.00	1.00	0.25	Pass
199.53	0.01	0.01	-1.00	1.00	0.25	Pass
251.19	0.01	0.01	-1.00	1.00	0.25	Pass
316.23	0.13	0.13	-1.00	1.00	0.25	Pass
398.11	-0.11	-0.11	-1.00	1.00	0.25	Pass
501.19	-0.12	-0.12	-1.00	1.00	0.25	Pass
630.96	-0.16	-0.16	-1.00	1.00	0.25	Pass
794.33	-0.13	-0.13	-1.00	1.00	0.25	Pass
1,000.00	0.00	0.00	-0.70	0.70	0.25	Pass
1,258.93	0.35	0.35	-1.00	1.00	0.25	Pass
1,584.89	0.03	0.03	-1.00	1.00	0.25	Pass
1,995.26	-0.25	-0.25	-1.00	1.00	0.25	Pass
2,511.89	-0.06	-0.06	-1.00	1.00	0.25	Pass
3,162.28	-0.03	-0.03	-1.00	1.00	0.25	Pass
3,981.07	-0.19	-0.19	-1.00	1.00	0.25	Pass
5,011.87	-0.06	-0.06	-1.50	1.50	0.25	Pass
6,309.57	-0.37	-0.37	-2.00	1.50	0.25	Pass
7,943.28	-0.07	-0.07	-2.50	1.50	0.25	Pass
10,000.00	0.14	0.14	-3.00	2.00	0.25	Pass
12,589.25	-0.05	-0.04	-5.00	2.00	0.25	Pass
15,848.93	-0.39	-0.39	-16.00	2.50	0.25	Pass
19,952.62	-0.73	-0.73	-inf	3.00	0.25	Pass

-- End of measurement results--

High Level Stability

Electrical signal test of high level stability performed according to IEC 61672-3:2013 21 and ANSI S1.4-2014 Part 3: 21 for compliance to IEC 61672-1:2013 5.15 and ANSI S1.4-2014 Part 1: 5.15

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
High Level Stability	0.01	-0.10	0.10	0.00 ‡	Pass

-- End of measurement results--

Long-Term Stability

Electrical signal test of long term stability performed according to IEC 61672-3:2013 15 and ANSI S1.4-2014 Part 3: 15 for compliance to ISC 61672-1:2013 5.14 and ANSI S1.4-2014 Part 1: 5.14

Test Duration [min]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
33	0.07	-0.10	0.10	0.01 ‡	Pass

-- End of measurement results--

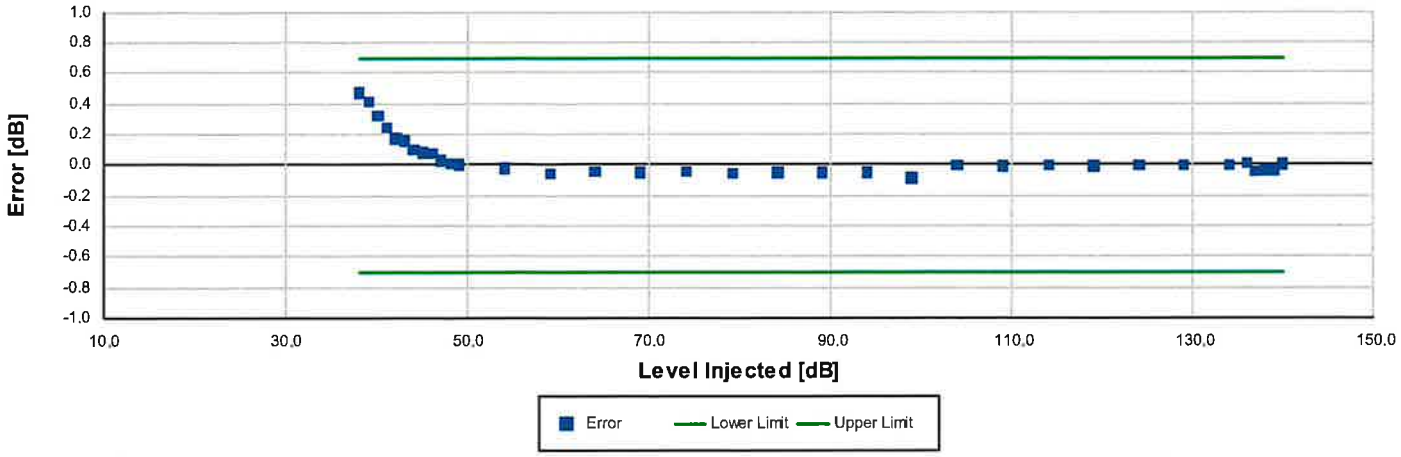
1 kHz Reference Levels

Frequency weightings and time weightings at 1 kHz (reference is A weighted Fast) performed according to IEC 61672-3:2013 14 and ANSI S1.4-2014 Part 3: 14 for compliance to IEC 61672-1:2013 5.5.9 and 5.8.3 and ANSI S1.4-2014 Part 1: 5.5.9 and 5.8.3

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
C weight	115.20	115.00	115.40	0.15	Pass
Z weight	115.20	115.00	115.40	0.15	Pass
Slow	115.20	115.10	115.30	0.15	Pass
Impulse	115.20	115.10	115.30	0.15	Pass

-- End of measurement results--

A-weighted Broadband Log Linearity: 8,000.00 Hz



Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
38.00	0.48	-0.70	0.70	0.16	Pass
39.00	0.41	-0.70	0.70	0.16	Pass
40.00	0.32	-0.70	0.70	0.16	Pass
41.00	0.25	-0.70	0.70	0.16	Pass
42.00	0.18	-0.70	0.70	0.16	Pass
43.00	0.16	-0.70	0.70	0.16	Pass
44.00	0.11	-0.70	0.70	0.17	Pass
45.00	0.09	-0.70	0.70	0.16	Pass
46.00	0.08	-0.70	0.70	0.16	Pass
47.00	0.03	-0.70	0.70	0.16	Pass
48.00	0.01	-0.70	0.70	0.16	Pass
49.00	0.00	-0.70	0.70	0.16	Pass
54.00	-0.02	-0.70	0.70	0.16	Pass
59.00	-0.06	-0.70	0.70	0.16	Pass
64.00	-0.04	-0.70	0.70	0.16	Pass
69.00	-0.05	-0.70	0.70	0.16	Pass
74.00	-0.04	-0.70	0.70	0.16	Pass
79.00	-0.05	-0.70	0.70	0.16	Pass
84.00	-0.05	-0.70	0.70	0.16	Pass
89.00	-0.05	-0.70	0.70	0.16	Pass
94.00	-0.05	-0.70	0.70	0.16	Pass
99.00	-0.08	-0.70	0.70	0.15	Pass
104.00	0.00	-0.70	0.70	0.15	Pass
109.00	-0.01	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
119.00	-0.01	-0.70	0.70	0.15	Pass
124.00	0.00	-0.70	0.70	0.15	Pass
129.00	0.00	-0.70	0.70	0.15	Pass
134.00	0.00	-0.70	0.70	0.15	Pass
136.00	0.01	-0.70	0.70	0.15	Pass
137.00	-0.04	-0.70	0.70	0.15	Pass
138.00	-0.04	-0.70	0.70	0.15	Pass
139.00	-0.04	-0.70	0.70	0.15	Pass
140.00	0.01	-0.70	0.70	0.15	Pass

-- End of measurement results--

Slow Detector

Toneburst response performed according to IEC 61672-3:2013 18 and ANSI S1.4-2014 Part 3: 18 for compliance to IEC 61672-1:2013 5.9, IEC 60651:2001 9.4.2, ANSI S1.4:1983 (R2006) 8.4.2 and ANSI S1.4-2014 Part 1: 5.9

Amplitude [dB]	Duration [ms]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
137.00	200	-7.55	-7.92	-6.92	0.15	Pass
	2	-27.14	-29.99	-25.99	0.15	Pass

-- End of measurement results--

Fast Detector

Toneburst response performed according to IEC 61672-3:2013 18 and ANSI S1.4-2014 Part 3: 18 for compliance to IEC 61672-1:2013 5.9, IEC 60651:2001 9.4.2, ANSI S1.4:1983 (R2006) 8.4.2 and ANSI S1.4-2014 Part 1: 5.9

Amplitude [dB]	Duration [ms]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
137.00	200.00	-1.06	-1.48	-0.48	0.26	Pass
	2.00	-18.19	-19.49	-16.99	0.15	Pass
	0.25	-27.30	-29.99	-25.99	0.15	Pass

-- End of measurement results--

Sound Exposure Level

Toneburst response performed according to IEC 61672-3:2013 18 and ANSI S1.4-2014 Part 3: 18 for compliance to IEC 61672-1:2013 5.9, IEC 60651:2001 9.4.2, ANSI S1.4:1983 (R2006) 8.4.2 and ANSI S1.4-2014 Part 1: 5.9

Amplitude [dB]	Duration [ms]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
137.00	200.00	-7.01	-7.49	-6.49	0.15	Pass
	2.00	-27.03	-28.49	-25.99	0.15	Pass
	0.25	-36.14	-39.02	-35.02	0.15	Pass

-- End of measurement results--

Peak C-weight

C-weighted peak sound level performed according to IEC 61672-3:2013 19 and ANSI S1.4-2014 Part 3: 19 for compliance to IEC 61672-1:2013 5.13 and ANSI S1.4-2014 Part 1: 5.13

Level [dB]	Frequency [Hz]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
135.00	31.50	138.21	135.50	139.50	0.15	Pass
135.00	500.00	138.58	137.50	139.50	0.15	Pass
135.00	8,000.00	137.77	136.40	140.40	0.15	Pass
135.00, Negative	500.00	137.18	136.40	138.40	0.15	Pass
135.00, Positive	500.00	137.15	136.40	138.40	0.15	Pass

-- End of measurement results--

Peak Z-weight

Z-weighted peak sound level performed according to IEC 60651:2001 9.4.4 and ANSI S1.4:1983 (R2006) 8.4.4

Amplitude [dB]	Duration[µs]		Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
134.85	100	Negative Pulse	135.43	133.08	137.08	0.15	Pass
	100	Positive Pulse	135.41	133.07	137.07	0.15	Pass
124.85	100	Negative Pulse	126.32	123.98	127.98	0.15	Pass
	100	Positive Pulse	126.31	123.98	127.98	0.15	Pass
114.85	100	Negative Pulse	116.34	114.01	118.01	0.15	Pass
	100	Positive Pulse	116.34	114.00	118.00	0.15	Pass
104.85	100	Negative Pulse	106.31	103.97	107.97	0.15	Pass
	100	Positive Pulse	106.31	103.98	107.98	0.15	Pass

-- End of measurement results--

Overload Detector

Overload indication performed according to IEC 61672-3:2013 20 and ANSI S1.4-2014 Part 3: 20 for compliance to IEC 61672-1:2013 5.11, IEC 60804:2000 9.3.5, IEC 61252:2002 11, ANSI S1.4 (R2006) 5.8, and ANSI S1.4-2014 Part 1: 5.11, ANSI S1.25 (R2007) 7.6, ANSI S1.43 (R2007) 7

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
Positive	141.70	140.00	143.00	0.15	Pass
Negative	141.60	140.00	143.00	0.15	Pass
Difference	0.10	-1.50	1.50	0.15	Pass

-- End of measurement results--

Peak Rise Time

Peak rise time performed according to IEC 60651:2001 9.4.4 and ANSI S1.4:1983 (R2006) 8.4.4

Amplitude [dB]	Duration [µs]		Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
137.85	40	Negative Pulse	134.52	133.09	135.09	0.15	Pass
		Positive Pulse	134.51	133.07	135.07	0.15	Pass
	30	Negative Pulse	133.41	133.09	135.09	0.15	Pass
		Positive Pulse	133.45	133.07	135.07	0.15	Pass

-- End of measurement results--

Positive Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
136.85	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
126.85	3	-0.15	± 0.50	0.15 ‡	Pass
	5	-0.15	± 1.00	0.16 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
116.85	3	-0.16	± 0.50	0.15 ‡	Pass
	5	-0.15	± 1.00	0.15 ‡	Pass
	10	-0.11	± 1.50	0.15 ‡	Pass
106.85	3	-0.16	± 0.50	0.15 ‡	Pass
	5	-0.14	± 1.00	0.15 ‡	Pass
	10	-0.18	± 1.50	0.15 ‡	Pass

-- End of measurement results--

Negative Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
136.85	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
126.85	3	-0.13	± 0.50	0.15 ‡	Pass
	5	-0.12	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
116.85	3	-0.15	± 0.50	0.15 ‡	Pass
	5	-0.13	± 1.00	0.15 ‡	Pass
	10	-0.10	± 1.50	0.15 ‡	Pass
106.85	3	-0.16	± 0.50	0.15 ‡	Pass
	5	-0.13	± 1.00	0.15 ‡	Pass
	10	-0.17	± 1.50	0.15 ‡	Pass

-- End of measurement results--

Tone Burst

2kHz tone burst tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Tone burst response measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
136.85	3	OVLD	± 0.50	0.15	Pass
	5	OVLD	± 1.00	0.15	Pass
126.85	3	-0.08	± 0.50	0.15	Pass
	5	0.00	± 1.00	0.15	Pass
116.85	3	-0.10	± 0.50	0.15	Pass
	5	-0.03	± 1.00	0.15	Pass
106.85	3	-0.13	± 0.50	0.15	Pass
	5	-0.08	± 1.00	0.15	Pass

-- End of measurement results--

Impulse Detector - Repeat

Impulse Detector measured according to IEC 60651:2001 9.4.3 and ANSI S1.4:1983 (R2006) 8.4.3

Amplitude [dB]	Repitition Rate [Hz]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
140	100.00	-2.87	-3.71	-1.71	0.15	Pass
	20.00	-7.53	-9.57	-5.57	0.20	Pass
	2.00	-8.73	-10.76	-6.76	0.15	Pass
Step	2.00	5.10	4.00	6.00	0.15	Pass

-- End of measurement results--

Impulse Detector - Single

Impulse Detector measured according to IEC 60651:2001 9.4.3 and ANSI S1.4:1983 (R2006) 8.4.3

Amplitude [dB]	Duration [ms]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
140	20.00	-3.66	-5.11	-2.11	0.15	Pass
	5.00	-8.76	-10.76	-6.76	0.16	Pass
	2.00	-12.70	-14.55	-10.55	0.16	Pass
Step	2.00	10.09	9.00	11.00	0.16	Pass

-- End of measurement results--

Gain

Gain measured according to IEC 61672-3:2013 17.3 and 17.4 and ANSI S1.4-2014 Part 3: 17.3 and 17.4

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
0 dB Gain	93.98	93.93	94.13	0.15	Pass
0 dB Gain, Linearity	41.19	40.33	41.73	0.16	Pass
OBA Low Range	94.03	93.93	94.13	0.15	Pass
OBA Normal Range	94.03	93.20	94.80	0.15	Pass

-- End of measurement results--

Broadband Noise Floor

Self-generated noise measured according to IEC 61672-3:2013 11.2 and ANSI S1.4-2014 Part 3: 11.2

Measurement	Test Result [dB]	Upper limit [dB]	Result
A-weight Noise Floor	27.29	36.00	Pass
C-weight Noise Floor	27.17	35.00	Pass
Z-weight Noise Floor	33.49	39.00	Pass

-- End of measurement results--

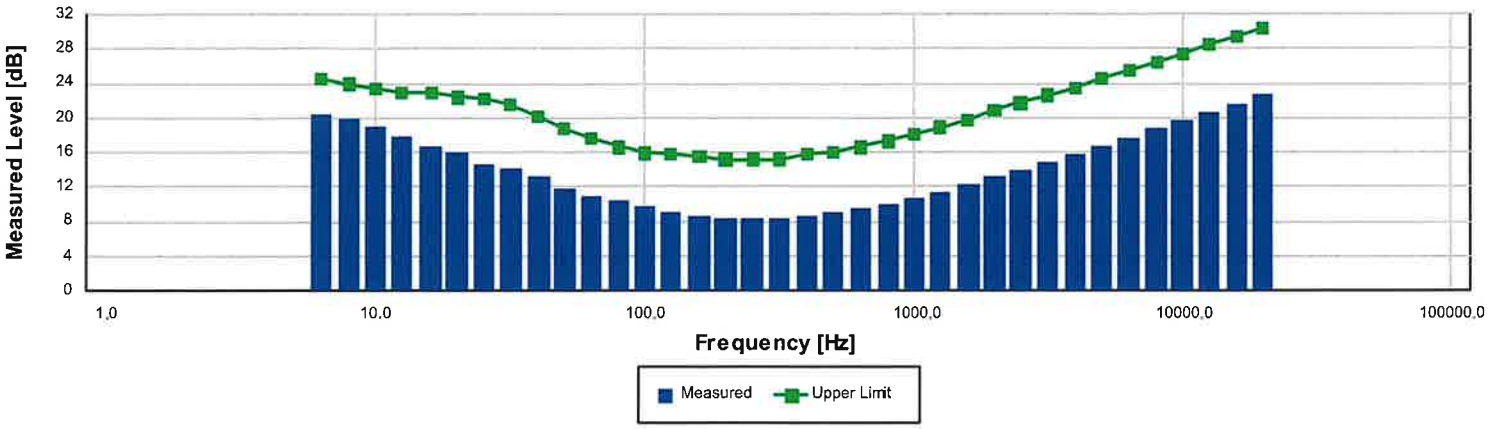
Total Harmonic Distortion

Measured using 1/3-Octave filters

Measurement	Test Result [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
10 Hz Signal	135.13	135.05	136.65	0.15	Pass
THD	-62.67		-58.00	0.00 ‡	Pass
THD+N	-59.85		-58.00	0.00 ‡	Pass

-- End of measurement results--

1/3-Octave Self-Generated Noise



The SLM is set to low range.

Frequency [Hz]	Test Result [dB]	Upper limit [dB]	Result
6.30	20.43	24.60	Pass
8.00	20.00	24.00	Pass
10.00	18.91	23.50	Pass
12.50	17.83	23.00	Pass
16.00	16.72	22.90	Pass
20.00	15.99	22.40	Pass
25.00	14.70	22.30	Pass
31.50	14.06	21.50	Pass
40.00	13.13	20.20	Pass
50.00	11.88	18.80	Pass
63.00	10.97	17.60	Pass
80.00	10.52	16.60	Pass
100.00	9.76	15.90	Pass
125.00	9.07	15.70	Pass
160.00	8.51	15.50	Pass
200.00	8.47	15.20	Pass
250.00	8.25	15.20	Pass
315.00	8.41	15.20	Pass
400.00	8.61	15.70	Pass
500.00	8.98	16.00	Pass
630.00	9.47	16.60	Pass
800.00	10.02	17.30	Pass
1,000.00	10.72	18.10	Pass
1,250.00	11.49	18.90	Pass
1,600.00	12.30	19.80	Pass
2,000.00	13.12	20.80	Pass
2,500.00	13.94	21.70	Pass
3,150.00	14.85	22.60	Pass
4,000.00	15.87	23.50	Pass
5,000.00	16.79	24.50	Pass
6,300.00	17.69	25.50	Pass
8,000.00	18.70	26.50	Pass
10,000.00	19.68	27.40	Pass
12,500.00	20.66	28.50	Pass
16,000.00	21.64	29.50	Pass
20,000.00	22.64	30.40	Pass

-- End of measurement results--

-- End of Report--

Signatory: *Jacob Cannon*

LARSON DAVIS – A PCB DIVISION
1681 West 820 North
Provo, UT 84601, United States
716-684-0001

APPENDIX C: FIELD MEASUREMENTS

Field Noise Measurement Site Data Sheet

PROJECT NAME:	SR-177; SR-193 to 1800 North Re-evaluation
SITE / ADDRESS:	1 / 200 South Trail
OBSERVER NAME:	Matt Montgomery
DATE:	July 16, 2024

General Meteorological Conditions

TEMPERATURE / CLOUD COVER::	83°F/Overcast
WIND SPEED / DIRECTION:	7 MPH/SE

Sound Level Meter Information

MODEL / SERIAL NUMBER:	Larson Davis SoundTrack LxT1 / 0006299
EVENT NUMBER:	.002

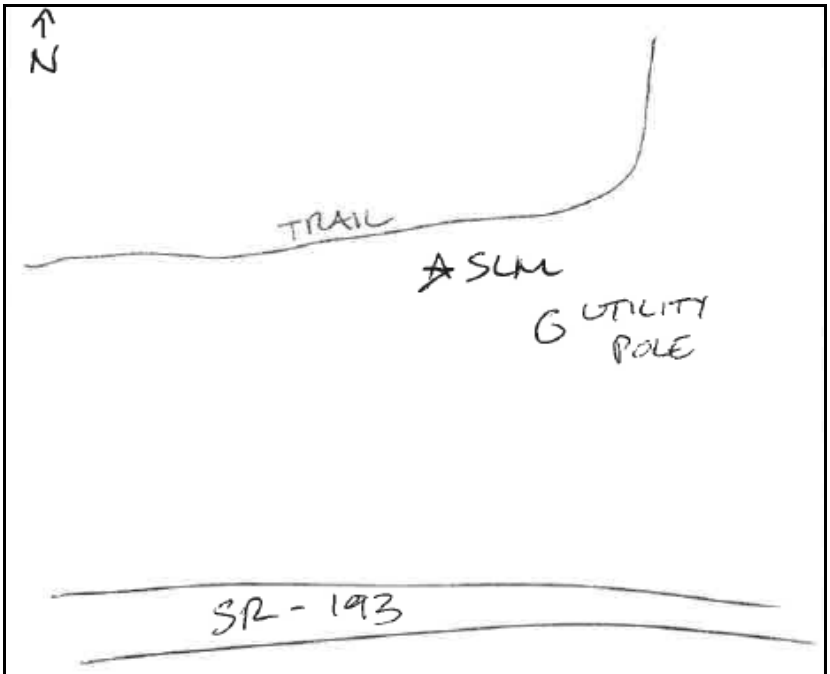
Calibration Information

PRE-MEASUREMENT LEVEL:	94.03
POST-MEASUREMENT LEVEL:	94.05

Validation Measurement Results

START TIME:	10:01 AM
END TIME:	10:21 AM
LA_{eq}:	48.0
LAS_{max}:	48.4

Site Sketch *(plan view, distances, roadways, buildings, reflecting surfaces)*



Background Noise / Unusual Events Log

START TIME	END TIME	DESCRIPTION	START TIME	END TIME	DESCRIPTION

Field Noise Measurement Site Data Sheet

PROJECT NAME:	SR-177; SR-193 to 1800 North Re-evaluation
SITE / ADDRESS:	1 / 200 South Trail

North

East

South

West

Field Noise Measurement Site Data Sheet

PROJECT NAME:	SR-177; SR-193 to 1800 North Re-evaluation
SITE / ADDRESS:	1 / 200 South Trail

Traffic Speed & Volumes (per lane per 20 minutes)

ROAD	DIRECTION	SPEED	CONGESTION	AUTO	MED. TRUCK	HEAVY TRUCK	BUS	MOTORCYCLE
SR-193	EB	50	No	39	8	1	0	1
SR-193	WB	50	No	61	9	3	0	0

Traffic Speed & Volumes (per lane per hour)

ROAD	DIRECTION	SPEED	CONGESTION	AUTO	MED. TRUCK	HEAVY TRUCK	BUS	MOTORCYCLE
SR-193	EB	50	No	117	24	3	0	3
SR-193	WB	50	No	183	27	9	0	0

Field Noise Measurement Site Data Sheet

PROJECT NAME:	SR-177; SR-193 to 1800 North Re-evaluation
SITE / ADDRESS:	4 / 4228 West 300 North
OBSERVER NAME:	Matt Montgomery
DATE:	July 16, 2024

General Meteorological Conditions

TEMPERATURE / CLOUD COVER::	87°F/Overcast
WIND SPEED / DIRECTION:	0 MPH/N

Sound Level Meter Information

MODEL / SERIAL NUMBER:	Larson Davis SoundTrack LxT1 / 0006299
EVENT NUMBER:	.003

Calibration Information

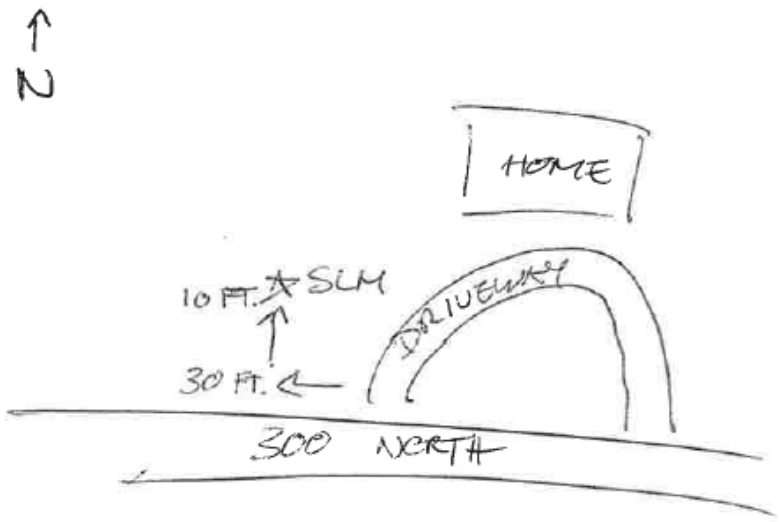
PRE-MEASUREMENT LEVEL:	94.05
POST-MEASUREMENT LEVEL:	94.04

Validation Measurement Results

START TIME:	10:53 AM
END TIME:	11:14 AM
LA_{eq}:	63.8
LAS_{max}:	83.9

A 21-minute measurement was recorded. Two unusual events occurred during the measurement (see below). These events occurred over a 1-minute period; this period was removed from the measurement data which provides a 20-minute measurement consistent with other sites. The LA_{eq} was adjusted to reflect the 20-minute period.

Site Sketch *(plan view, distances, roadways, buildings, reflecting surfaces)*



Background Noise / Unusual Events Log

START TIME	END TIME	DESCRIPTION	START TIME	END TIME	DESCRIPTION
11:02:21	11:02:51	Propeller plane			
11:04:11	11:04:41	Propeller plane			

Field Noise Measurement Site Data Sheet

PROJECT NAME:	SR-177; SR-193 to 1800 North Re-evaluation
SITE / ADDRESS:	4 / 4228 West 300 North

North

East

South

West

Field Noise Measurement Site Data Sheet

PROJECT NAME:	SR-177; SR-193 to 1800 North Re-evaluation
SITE / ADDRESS:	4 / 4228 West 300 North

Traffic Speed & Volumes (per lane per 20 minutes)

ROAD	DIRECTION	SPEED	CONGESTION	AUTO	MED. TRUCK	HEAVY TRUCK	BUS	MOTORCYCLE
300 North	EB	35-40	No	34	5	0	0	0
300 North	WB	35-40	No	21	7	1	1	0

Traffic Speed & Volumes (per lane per hour)

ROAD	DIRECTION	SPEED	CONGESTION	AUTO	MED. TRUCK	HEAVY TRUCK	BUS	MOTORCYCLE
300 North	EB	35-40	No	102	15	0	0	0
300 North	WB	35-40	No	63	21	3	3	0

Field Noise Measurement Site Data Sheet

PROJECT NAME:	SR-177; SR-193 to 1800 North Re-evaluation
SITE / ADDRESS:	6 / Emigrant Trail
OBSERVER NAME:	Matt Montgomery
DATE:	July 16, 2024

General Meteorological Conditions

TEMPERATURE / CLOUD COVER::	89°F/Overcast
WIND SPEED / DIRECTION:	3 MPH/N

Sound Level Meter Information

MODEL / SERIAL NUMBER:	Larson Davis SoundTrack LxT1 / 0006299
EVENT NUMBER:	.005

Calibration Information

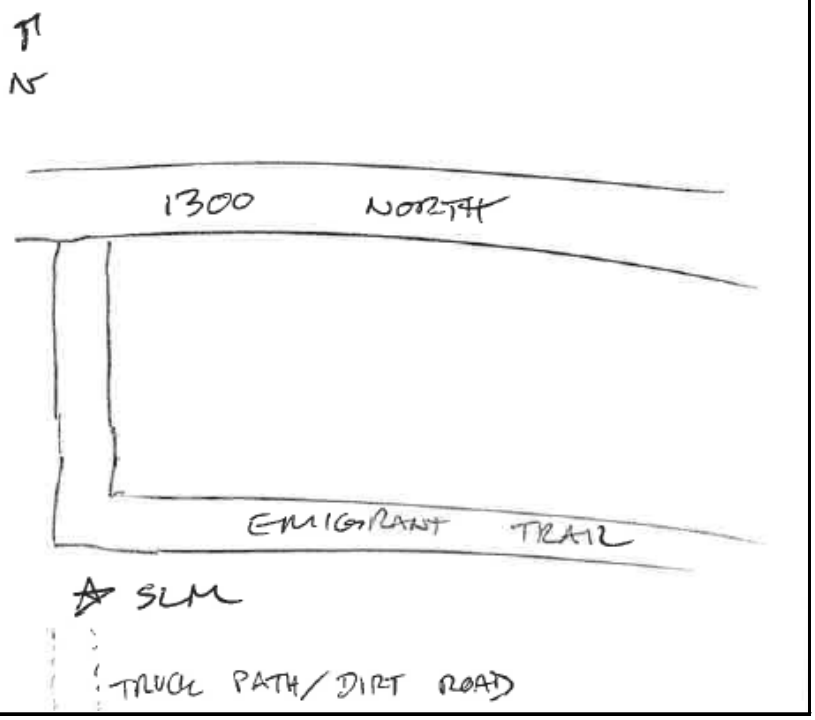
PRE-MEASUREMENT LEVEL:	94.04
POST-MEASUREMENT LEVEL:	94.10

Validation Measurement Results

START TIME:	12:03 PM
END TIME:	12:26 PM
LA_{eq}:	56.4
LAS_{max}:	71.4

A 23-minute measurement was recorded. Six unusual events occurred during the measurement (see below). These events occurred over a 3-minute period; this period was removed from the measurement data which provides a 20-minute measurement consistent with other sites. The LA_{eq} was adjusted to reflect the 20-minute period.

Site Sketch *(plan view, distances, roadways, buildings, reflecting surfaces)*



Background Noise / Unusual Events Log

START TIME	END TIME	DESCRIPTION	START TIME	END TIME	DESCRIPTION
12:04:14	12:04:44	Propeller plane			
12:07:44	12:08:14	Helicopter			
12:10:04	12:10:34	Commercial jet			
12:20:34	12:21:04	Commercial jet			
12:22:44	12:23:14	Commercial jet			
12:23:54	12:24:24	Propeller plane			

Field Noise Measurement Site Data Sheet

PROJECT NAME:	SR-177; SR-193 to 1800 North Re-evaluation
SITE / ADDRESS:	6 / Emigrant Trail

North

East

South

West

Field Noise Measurement Site Data Sheet

PROJECT NAME:	SR-177; SR-193 to 1800 North Re-evaluation
SITE / ADDRESS:	6 / Emigrant Trail

Traffic Speed & Volumes (per lane per 20 minutes)

ROAD	DIRECTION	SPEED	CONGESTION	AUTO	MED. TRUCK	HEAVY TRUCK	BUS	MOTORCYCLE
1300 North	EB	30	No	6	3	0	0	0
1300 North	WB	30	No	10	3	1	0	0

Traffic Speed & Volumes (per lane per hour)

ROAD	DIRECTION	SPEED	CONGESTION	AUTO	MED. TRUCK	HEAVY TRUCK	BUS	MOTORCYCLE
1300 North	EB	30	No	18	9	0	0	0
1300 North	WB	30	No	30	9	3	0	0