ENVIRONMENTAL STUDY

Project Name: Bangerter Hwy @ 12600 South **PIN:** 14417

Project No.: S-0154(86)6

Prepared by: Craig Bown

For guidance in preparing this environmental study, refer to Chapter 4 of the UDOT Environmental Process Manual of Instruction:

http://www.udot.utah.gov/go/environmental

REQUIRED SIGNATURES

I have reviewed the information presented in this Environmental Study and I hereby attest that the document is complete and the details of the document are correct.

Reviewer (Signature): _____ **Date:** _____

Reviewer (Printed): _____

Firm/UDOT Region: _____

STATE FUNDED PROJECTS

As a result of this Environmental Study, UDOT finds that this project will NOT cause significant environmental impacts.

Approved: _____ **Date:** _____

UDOT Environmental Services

1. Purpose and Need for Action

The Utah Department of Transportation (UDOT) is conducting a State Environmental Study to analyze improvements at the Bangerter Highway (SR-154) and 12600 South intersection in Riverton, Utah. Currently, this intersection experiences high amounts of congestion operating at Level of Service (LOS) D, with an average AM delay of 41.0 seconds and an average PM delay of 39.5 seconds.

Traffic modeling indicates that by 2040 the intersection would operate at LOS F, with an AM average delay of 166.4 seconds, and PM average delay greater than 369.2 seconds. Additionally, this intersection has a high number of documented front-to-rear crashes due to sudden speed or lane changes associated with traffic congestion. The purpose of the project is to alleviate congestion and improve the operational safety of the Bangerter Highway and 12600 South intersection.

2. Description

UDOT is proposing to construct a grade-separated Single Point Urban Interchange (SPUI) at the existing intersection of Bangerter Highway (SR-154) and 12600 South. The new interchange would allow for unimpeded traffic flow along Bangerter Highway and is projected to operate at LOS D (average delay of 41.64 seconds) during AM travel, and LOS C (average delay of 33.52 seconds) during PM travel into the year 2040.

The project area is located approximately between milepost 6 to 7.5 on Bangerter Highway, and on 12600 South between 4150 West and 3600 West. The project includes: construction of a grade-separated interchange and exit/entrance ramps from Bangerter Highway to 12600 South; utility and storm drainage modifications; and installation of new pavement, traffic signals, ATMS equipment, and roadway signage. To accommodate the proposed upgrades, the existing pedestrian bridge over Bangerter Highway would be removed. Any decision regarding potential replacement of the pedestrian bridge would be made following coordination with Jordan School District. This project will require right-of-way acquisition.

3. Public Hearing/Opportunity for Public Hearing

Yes This project could result in public controversy or substantial impacts to adjacent properties, or substantially changes roadway geometry.

No There are significant social, economic, environmental, or other effects. If YES, a Categorical Exclusion is not applicable. Consult with UDOT Central Environmental Services.

Yes UDOT has determined that a public hearing is in the public interest.

If the answer to ANY of the above questions is YES, a public hearing or opportunity for a public hearing is required (attach documentation identifying date and location of hearing, summary of comments, and responses to substantial comments, or include certification of opportunity for hearing.)

The following types of public involvement have been provided:

Yes Public Hearing in accordance with state procedures

No Opportunity for Public Hearing

Yes Open House

Yes Other: Project specific website, email, and hotline.

Yes Documentation is attached identifying the date and location of hearing, summary of comments, and responses to substantial comments; or the Certification of Opportunity for a Hearing is attached.

Comments: A public meeting will be held on 10/24/2018 at Riverton City Hall. Public comments and responses will be included within the final document.

4. Right-of-Way

Yes Acquisition of Right-of-Way is required.

No The right-of-way required is significant because of its size, location, use, or relationship to remaining property and abutting properties. (If the right-of-way required is significant, the project does not qualify as a Categorical Exclusion.)

Comments: Right-of-way acquisition will be required from properties adjacent to Bangerter Highway to accommodate construction of the proposed interchange improvements. Partial parcel right-of-way acquisition is required from 23 parcels, (including residential and commercial) totaling approximately 5.7 acres (248,470 sqft). Full parcel right-of-way acquisition is required from 3 parcels (commercial), totaling approximately 1.98 acres (86,209 sqft). See appendix for Impacted Parcel figure.

5. Cultural

According to the UDOT Region NHPA/NEPA Specialist and/or the Architectural Historian, the Finding of Effect for the project is one of the following:

Yes No historic properties affected

No No adverse effect

No Adverse effect

Project documentation for determination of eligibility and finding of effect consists of one of the following and is attached:

Yes Memo from UDOT Region NEPA/NHPA Specialist and/or Architectural Historian stating a finding of No Historic Properties Affected.

No SHPO concurrence with the Determinations of Eligibility and Finding of Effect AND memo from UDOT Region NEPA/NHPA Specialist and/or Architectural Historic stating a finding of No Adverse Effect or Adverse Effect.

Yes Have letters for Native American Consultation been sent? Attach letters.

No Have letters for federal and state agencies, CLGs, historical societies, etc. been sent? If so attach letters.

No Do the impacts to historic properties require mitigation?

If YES, a signed Memorandum of Agreement (MOA) is attached.

Comments: Native American consultation was initiated through letters sent to the Eastern Shoshone Tribe of the Wind River Reservation, Shoshone-Bannock Tribes, Northwestern Band of Shoshone Nation, Uintah and Ouray Ute Tribes, and the Skull Valley Band of Goshute Indians (sent September 7, 2018). In addition, notification was also sent to those tribes with whom UDOT has Section 106 Programmatic Agreements: Cedar Band of Paiutes, Shivwits Band of Paiute Indian Tribe, and the Confederated Tribes of the Goshute Reservation (sent September 7, 2018). To date, none of the tribes have responded to these notifications. See Appendix for Tier I Form.

6. Paleontological

No This project is one of the 16 types of projects listed in Stipulation III of the Memorandum of Understanding (MOU) with the Utah Geological Survey (UGS) that has no effect on paleontological resources and does not require notification to the UGS. If YES, a memo from the UDOT Region NEPA/NHPA Specialist is attached (can be included in the cultural memo).

For all other projects, the UGS has been notified and has responded with the following (attach UGS letter and memo from the UDOT Region NEPA/NHPA Specialist):

Yes There are no known paleontological localities in the area of potential effects and the formations in the project area have a low potential for containing fossil remains (Class 1 or 2).

No Fossil-bearing formations (Class 3-5) and/or known paleontological localities are present in the area of potential effects, but the UDOT Region NEPA/NHPA Specialist (or paleontologist) has determined that they will not be affected by the project.

No Fossil-bearing formations (Class 3-5) and/or known paleontological localities are present in the area of potential effects and may be affected by construction activities. A survey and/or monitoring by a qualified paleontologist is required.

Comments: See Appendix for UGS letter.

7. Threatened, Endangered, or Candidate Species

For Federally or State Funded Projects:

Yes Project will have **"no effect"** to T&E species, or their critical habitats, protected under the Endangered Species Act. If YES, attach **"no effect"** memo or review/comments (in the case of local government projects) from UDOT's Wildlife Biologist.

No Project **"may affect, but is not likely to adversely affect"** T&E species, or their critical habitats, protected under the Endangered Species Act. If YES, attach BA and "concurrence" from the U.S. Fish and Wildlife Services (USFWS). List all mitigation/conservation measures.

No Project **"may affect, and is likely to adversely affect"** threatened and endangered species, or their critical habitats, protected under the Endangered Species Act. If YES, attach BA and USFWS BO. List all mitigation/conservation measures.

No The USFWS has issued a **"jeopardy"** opinion regarding this project. If YES, attach BA and BO as above. This project cannot go forward without being reconsidered.

Comments: See Appendix for Wildlife Biologist Memo.

8. Wildlife

No Project has the potential to affect state-sensitive species, important wildlife habitat, big game migration routes, habitat connectivity, migratory birds, or fish spawning habitat or fish passage.

Memo from UDOT Wildlife Biologist is attached.

Comments: See Appendix for Wildlife Biologist Clearance.

9. Invasive Species

If the project involves earthwork, grading or landscaping, there is potential to introduce or spread invasive weed species.

Yes Based upon location, this project has the potential to introduce or spread invasive species included on the noxious weed list of the State of Utah and the county noxious weed lists.

10. Noise

Projects that may affect noise levels to adjacent receptors include changes in roadway alignment, roadway widening and the addition of traffic lanes.

Yes This project has the potential to increase noise to adjacent receptors.

Yes A noise study is attached

Comments: This project is considered a Type I project that requires a Noise Study due to the construction of a new grade-separated interchange. The project would generally result in a 1.2 dBA noise level increase throughout the study area. Of the 157 receptors, 37 would be impacted by proposed action noise levels.

In accordance with the UDOT Noise Abetment Policy, noise walls have been recommended for construction within the project area and will require future balloting during the final design phase. See maps in Appendix for proposed noise walls and the compete Noise Study.

11. Wetlands, Water Resources, Storm Water, and Floodplains

Wetlands and Water Resources

No The project is a type that does not have the potential to affect or cross Waters of the United States. If YES, no concurrence letter is needed.

No Project affects waters of the United States (e.g. wetlands, mudflats, lakes, or perennial or ephemeral streams). If NO, have a UDOT Landscape Architect provide a concurrence letter stating they agree with the determination. In order to indicate "NO" on this question, answers to the following statements must also be "NO".

- **No** Project impacts perennial, intermittent, or ephemeral streams that have a riparian vegetation component. If YES, a Programmatic General Permit 40 (PGP40), also known as a Stream Alteration Permit, from the Utah Division of Water Rights will be required.
- **No** Project exceeds the impact limitations for streams or washes identified in the PGP40. If YES, both a PGP40 and a separate Department of the Army permit will be required.
- **No** Project impacts an ephemeral wash not captured under PGP40 that has an ordinary high water mark (OHWM) with a connected flow to a downstream Traditional Navigable Water and the impact below the OHWM exceeds 1/10 of an acre per crossing. If YES, a Department of the Army permit will be required.
- **No** Project impacts a perennial or intermittent stream below the OHWM less than 1/10 of an acre per crossing. If YES, notification to the U.S. Army Corps of Engineers will be required.
- **No** Project impacts navigable waters of the United States (Lake Powell, Flaming Gorge Reservoir, Bear Lake, Green River - mouth to 20 miles above Green River Station, Colorado River - mouth of Castle Creek to Cataract Canyon - 4.5 miles below mouth of Green River) below the OHWN. If YES, a Section 10 Department of the Army permit will be required.
- **No** Project impacts jurisdictional wetlands. If YES, a Department of Army Nationwide Permit (NWP) will be required for wetland impacts under the ½ acre threshold; a Letter of Permission (LOP) will be required for wetland impacts between 1/2 and 1 acre; an Individual Permit (IP) will be required for impacts greater than 1 acre.
- **No** Project impacts non-jurisdictional wetlands. If YES, wetland mitigation may still be required under the federal policy of "no net loss." Consult UDOT Environmental Section.

Storm Water Runoff

Yes Project disturbs 1 acre or more of ground surface.

If YES, a UPDES Storm Water Discharge Permit for Construction Activities is required from the Utah Division of Water Quality.

Floodplains

No This project requires new construction or alteration of existing structures within the FEMA designated 100-year flood plain.

If YES, a Development Permit is required from the local permit official.

Comments: See Appendix for Water Resource Clearance.

12. Hazardous Waste

No Has a visual inspection of the project area found substances that may be hazardous to human health and/or the environment?

Yes This project involves excavation beyond or below the existing roadway footprint.

If YES to either question 1 or 2, then site investigations and coordination with DEQ may be necessary.

Comments: A review of the Utah DEQ Interactive Map and EPA's EnviorMapper has identified the following properties within or near the project area (see Appendix for location maps):

- 3751 W. 12600 S. (Old Larco Excavating) 2 Underground Storage Tanks (UST) removed 1994
- 4091 W. 12600 S. (Tony Mascaro Livestock and Truck) 1 UST removed 1992
- 3751 W. 12600 S. (Intermountain Riverton Hospital) 2 active UST
- 3728 W. 12600 S. (Jackson's # 161) 4 active UST
- 12462 S. Creek Meadow Road (Lowe's); small generator of hazardous waste
- 12544 S. Pasture Road, Suite A (Red Hanger Cleaners #16); small generator of hazardous waste

With implementation of Standard Specification 01355, no impacts are anticipated.

13. Prime, Unique, Statewide, or Locally Important Farmland

Projects in areas whose land use maps indicate no current or future farming activities would not usually affect farmlands.

N/A This project MAY affect Prime, Unique, Statewide, or Locally Important Farmlands.

N/A The Natural Resource Conservation Service letter and Form AD1006 are attached.

14. Air Quality

Yes This project has the potential to increase particulate matter due to construction activities.

No This project adds or alters roadway capacity or will result in increased traffic volumes at signalized intersections.

If YES, the Air Quality Supplement is attached.

15. Relocations

Yes There may be relocations of residences or businesses as a result of this project.

Comments: This project anticipates acquisition of 3 parcels, totaling approximately 1.98 acres (86,209 sqft). These parcels are associated with one business relocation. See appendix for Impacted Parcel figure.

16. Land Use/Urban Policy

No This project may affect land use or urban policy.

17. Section 4(f) Properties

N/A Section 4(f) properties are impacted.

N/A An Individual Section 4(f) Evaluation AND written concurrence from UDOT Environmental Services on the Individual Section 4(f) determination is attached.

N/A A Programmatic Section 4(f) Evaluation AND written concurrence from UDOT Environmental Services on the Programmatic Section 4(f) determination is attached.

N/A The 4(f) property(s) is an historic property and the impact is considered **de minimis**.

N/A SHPO has concurred in writing on UDOT's **"no adverse effect"** determination to historic properties and has been notified of the intent to make a **de minimis** finding. Attach letter to SHPO and **de minimis** agreement letter.

N/A The 4(f) property(s) is a park, recreational area, wildlife or waterfowl refuge and the impact is considered **de minimis**.

N/A The official(s) with jurisdiction have concurred, in writing, that the project will **"not adversely affect"** the activities, features, and attributes that qualify the resource for protection under Section 4(f) and have been notified of the intent to make the **de minimis** impact finding. Letters are attached.

N/A The project sponsor has provided public notice and opportunity for public review and comment. Describe public involvement efforts in the comments below.

N/A Written concurrence from UDOT Environmental Services is attached.

18. Other Environmental Factors Considered

This Project, except as noted and explained in attachments, will have no disproportionate, serious or lasting effect on the following:

No Visual

No Social/Economic

No Title VI and/or Environmental Justice

No Natural Resources

No Construction

No Energy

No Geology/Soils

No Wild/Scenic Rivers

No Ecology

19. Conclusion

No This project may have substantial controversy or significant impacts.

MITIGATION COMMITMENTS

CONSTRUCTION		Responsible
Air Quality	Requirements outlined in Standard Specification 01572 titled "Dust Control and Watering" will be followed.	Contractor
Cultural	UDOT Standard Spec 01355, Parts 3.7 and 3.8	Contractor
Hazardous Waste	If hazardous materials are encountered, the contractor will follow UDOT Standard Specification 01355 regarding the treatment and disposal of hazardous materials.	Contractor
Invasive Species	Follow UDOT Special Provision Section 02924S NOXIOUS WEED CONTROL requirements before construction by cleaning all earthmoving construction equipment before mobilizing onto the project site and avoiding unnecessary earth disturbance.	Contractor
Water Quality	Comply with conditions identified within the Utah State Stream Alteration Permit (if applicable).	Contractor
Water Quality	Comply with all General and Special Conditions identified within the USACE Nationwide Permit (if applicable).	Contractor
Water Quality	Implement and maintain the project SWPPP, in accordance with the UCGP, throughout the construction of the project.	Contractor
Visual	Reclaim all disturbed areas per UDOT standard specifications.	Contractor

PRELIMINARY ENGINEERING		Responsible
Invasive Species	Include UDOT Special Provision Section 02924S NOXIOUS WEED CONTROL in the contract documents to require earthmoving construction equipment be properly cleaned before mobilizing onto the project site.	UDOT Program Management
Relocations	Property owners will be compensated according to the requirements of the Uniform Relocation Assistance and Real Property Acquisition Policies Act, as amended.	UDOT Right-of-Way
Water Quality	If the project proposes to impact Midas Creek, apply for and obtain a Utah State Stream Alteration Permit from the Utah Division of Water Rights. Include permit into contract documents.	UDOT Program Management

PRELIMINARY ENGINEERING		Responsible
Water Quality	If the project proposes to impact wetlands associated with Midas Creek, apply for and obtain a Nationwide Permit for the USACE, based on impacts to WoUS. Include permit into contract documents.	UDOT Program Management
Noise	As part of the final design phase, conduct noise wall balloting consistent with the procedures described in UDOT's Noise Abatement Policy.	UDOT Program Management

APPENDIX

Project Name: Bangerter Hwy @ 12600 South **PIN: 14417**

Project No.: S-0154(86)6

A. Project Figures
- Study Area
- Interchange Concept Design
- Impacted Parcels

B. Public Involvement Summary and Comment Response (Pending Meeting)

C. Resource Clearances
- Cultural Tier I Screening Form with Native American Consultation
- Utah Geological Survey Paleontological Letter
- Wildlife Biologist Clearance
- Water Resource Clearance

D. Noise Study

E. Hazardous Waste Review Figures

A. Project Figures

1 inch = 1,250 feet

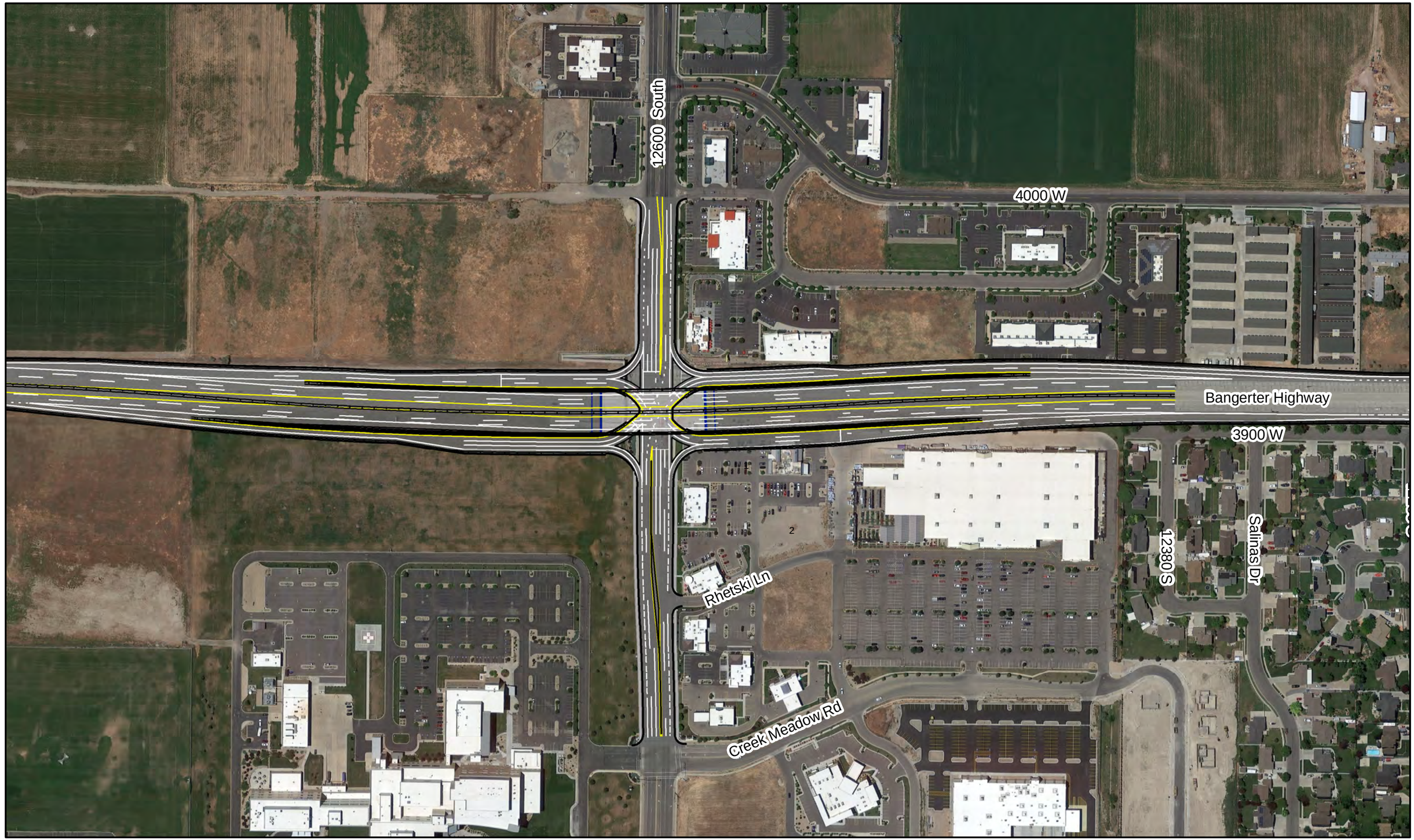
0 1,250 2,500 Feet

Bangerter Hwy @ 12600 South

Study Area

Bangerter Highway @ 12600 South Design
S-0154(86)6
PIN:14417

1 inch = 250 feet
0 0.03 0.06 0.12
Miles

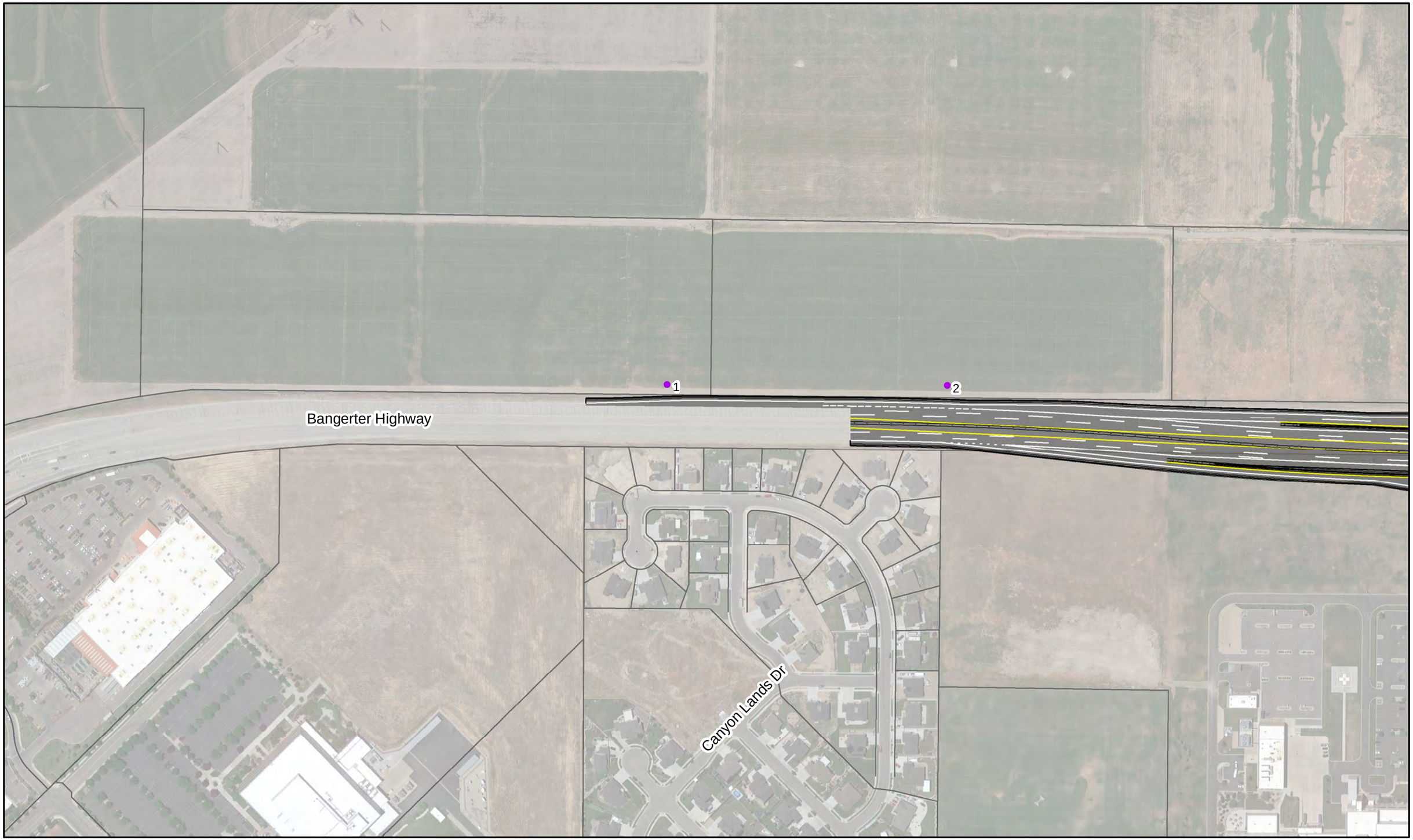


Bangerter Highway @ 12600 South Design
S-0154(86)6
PIN:14417

1 inch = 250 feet
0 0.03 0.06 0.12
Miles

Bangerter Highway @ 12600 South Design
S-0154(86)6
PIN:14417

1 inch = 250 feet
0 0.03 0.06 0.12
Miles



Bangerter Highway @ 12600 South Property Impacts
S-0154(86)6
PIN:14417

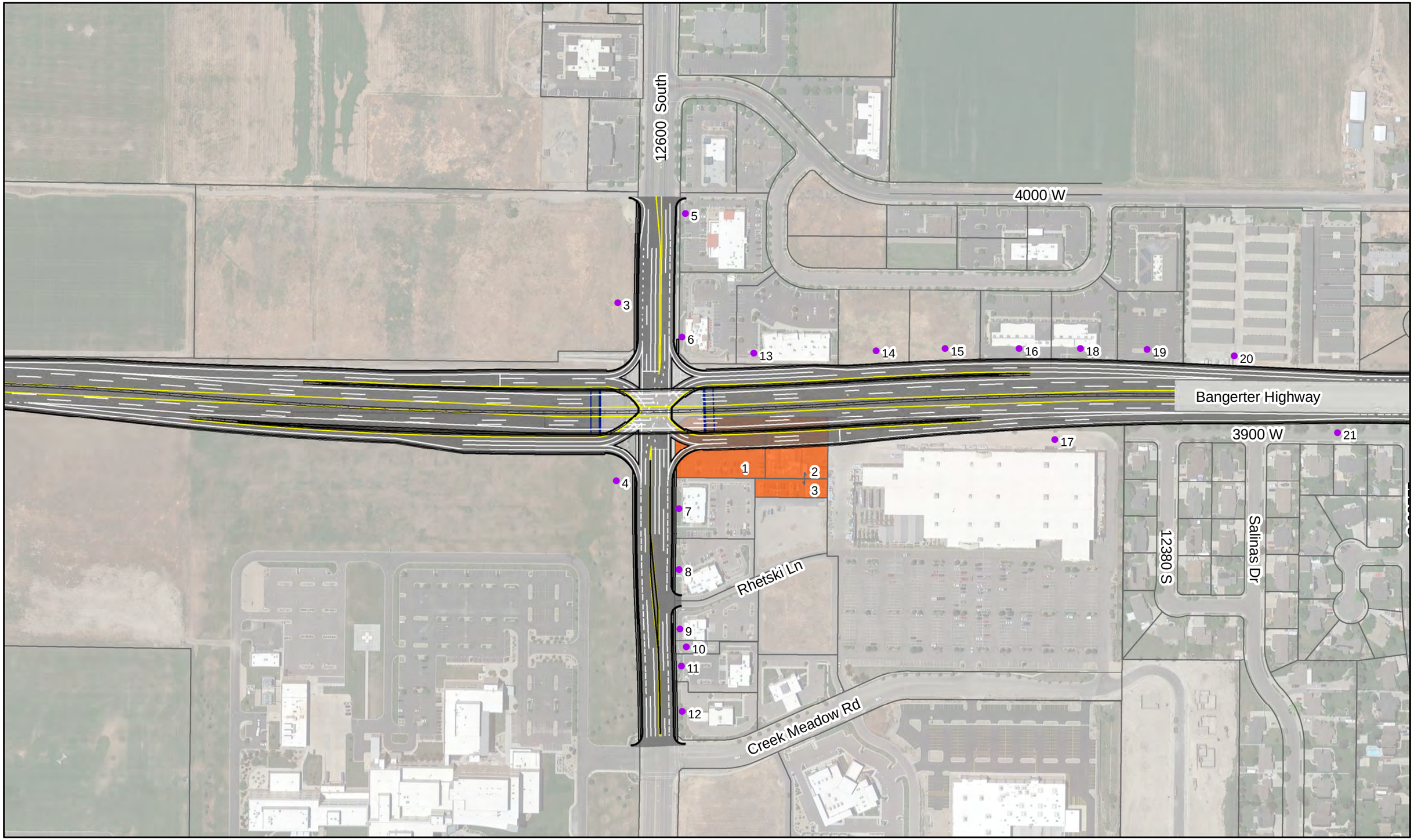
Full Acquisition

Partial Acquisition

1 inch = 250 feet

0 0.03 0.06 0.12

Miles



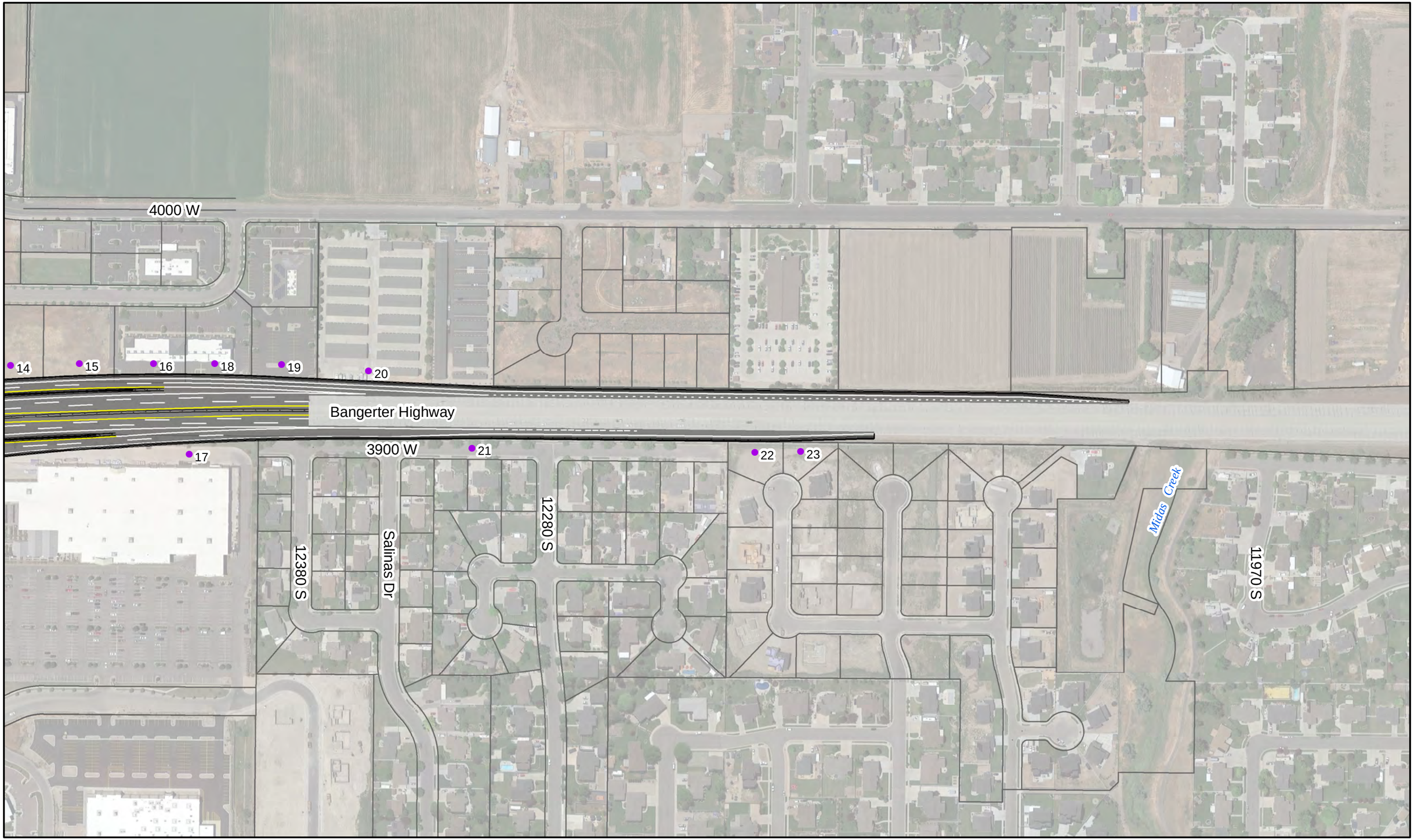
Bangerter Highway @ 12600 South Property Impacts
S-0154(86)6
PIN:14417

Full Acquisition

Partial Acquisition

1 inch = 250 feet

0 0.03 0.06 0.12 Miles



Bangerter Highway @ 12600 South Property Impacts
S-0154(86)6
PIN:14417

Full Acquisition

Partial Acquisition

1 inch = 250 feet

0 0.03 0.06 0.12 Miles

B. Public Involvement Summary and Comment Response

C. Resource Clearances

Cultural and Paleo Clearance with Tier 1 Screening Form

Pursuant to the Programmatic Agreement between the UDOT and the Utah SHPO Regarding Implementation of U.C.A. 9-8-404 for State Funded Transportation Projects in Utah, UDOT has taken into account the effects of this undertaking on historic properties and has determined that the finding of effect is No Historic Properties Affected.

Pursuant to the Memorandum of Understanding between the UDOT and the Utah Geological Survey Concerning Agency Responsibilities Pursuant to U.C.A. 79-3-508, the UDOT has taken into account the effects of this undertaking on paleontological resources. If applicable, consultation letter from UGS is included in the environmental document.

PROJECT: PIN 14417—S-0154(86)6; Bangerter Highway at 12600 South, Salt Lake County

DATE: October 19, 2018
PREPARER: Jonathan Dugmore, M.A.A.; Region 2 Archaeologist
CONTACT: 385-414-2066, jdugmore@utah.gov
REVIEWER: Elizabeth Giraud AICP, UDOT Architectural Historian *Elizabeth Giraud*

PROJECT STIPULATIONS

1) Clearance is contingent upon the contractor adhering to the proposed scope of work and remaining within cleared areas. **Notify Region Environmental of any scope changes.**
2) *UDOT Standard Specification 01355 Part 3.7, Environmental Clearances by Contractor*
3) *UDOT Standard Specification 01355 Part 3.8, Discovery of Historical Archaeological, or Paleontological Objects, Features, Sites or Human Remains*. **Notify Region Environmental immediately of any discoveries during construction.**

PROJECT DESCRIPTION

UDOT is proposing to construct a grade-separate Single Point Urban Interchange (SPUI) at the existing intersection of Bangerter Highway (SR-154) and 12600 South in Riverton, Utah. The new interchange would allow for unimpeded traffic flow along Bangerter Highway and improved Level of Service operations into the year 2040. The project area is along Bangerter Highway between approximate milepost 6 to 7.5, and on 12600 South between 4150 West and 3600 West. The project includes: construction of a grade-separated interchange and exit/entrance ramps from Bangerter Highway to 12600 South; utility and storm drainage modifications; and installation of new pavement, traffic signals, ATMS equipment, and roadway signage. This project will require right-of-way acquisition.

SCREENING PROCESS

Screened undertakings have the potential to affect historic properties, but have been determined by UDOT to require no further review or consultation under the Agreements. Screening may include any the following tasks and should be appropriate to the complexity, scale, and location of the undertaking. Documentation of the screening will be included in the project files, quarterly report submitted to SHPO, and environmental document.

Antiquities Project Number: U18HX0498

Literature Review

- ☐ Class I literature search (date completed and by whom):
- ☒ Records review (i.e. UDSH, UDOT, BLM, etc.): Preservation Pro
- ☐ Project plans
- ☐ As-built project plans
- ☒ Aerial photographs: Google Earth, various photos
- ☐ Historic Maps:
- ☒ Topographic Maps: Various, BLM GLO Maps
- ☐ ROW/Ownership/Parcel Data:
- ☐ Other:

Description of search results: The search was confined to the project APE which consists of Bangerter Highway between approximate milepost (MP) 6 to 7.5 and on 12600 South between 4150 West and 3600 West. No cultural properties were identified at this time within the project APE.

Field Review

☒ Pedestrian survey (Class III) (survey interval): 15 m
☐ Field review other than Class III (reconnaissance, windshield, etc.):
☐ Other:
☐ None

Description of survey results (If no field survey was conducted, explain why not):

Both archaeological and architectural surveys for this project was conducted by Horrocks Engineers. The archaeological survey discovered one secondary and one tertiary ditch associated with the Provo Reservoir Canal (42SL287). It has been determined eligible for the NRHP. The architectural survey resulted in two newly recorded houses, neither of which are eligible for the NRHP. The potential for cultural resources in these areas is low due to areas of surface ground disturbance.

Supporting Documentation

Reports and/or forms generated from any cultural resource inventories shall be submitted quarterly to the Utah Division of State History (UDSH) for filing.

Title of reports: *An Archaeological Investigation of the Bangerter Highway at 12600 South Project & Selective Reconnaissance Level Survey Bangerter Highway at 12600 South*

Consultation

☐ Utah SHPO (including APE consultation):
☐ Certified Local Government (CLG):
☒ Tribes: see below
☐ State/Federal Agencies:
☐ Knowledgeable Informants:
☐ Other:
☐ None:

Description of consultation efforts (If no consultation was done, explain why not):

Native American consultation was initiated through letters sent to the Eastern Shoshone Tribe of the Wind River Reservation, Shoshone-Bannock Tribes, Northwestern Band of Shoshone Nation, Uintah and Ouray Ute Tribes, and the Skull Valley Band of Goshute Indians (sent September 7, 2018). In addition, notification was also sent to those tribes with whom UDOT has Section 106 Programmatic Agreements: Cedar Band of Paiutes, Shivwits Band of Paiute Indian Tribe, and the Confederated Tribes of the Goshute Reservation (sent September 7, 2018). To date, none of the tribes have responded to these notifications.

☐ Controversy based on historic preservation issues? If yes, consultation with SHPO and UDOT Central Environmental is required. Additional consultation with FHWA may be required.

Finding of Effect

The undertaking will result in the following finding of effect:

☐ No Historic Properties Affected: no cultural resources present
☐ No Historic Properties Affected: cultural resources present but none eligible
☒ No Historic Properties Affected: historic properties present, but are completely avoided by the undertaking and the potential for substantial indirect effects is very low

Description of impacts:

While one NRHP-eligible archaeological site was identified with the project area (42SL287), construction will avoid and will not impact the site. Therefore, the UDOT has determined that this project will result in No Historic Properties Affected

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

DEPARTMENT OF TRANSPORTATION

CARLOS M. BRACERAS, P.E.
Executive Director

SHANE M. MARSHALL, P.E.
Deputy Director of Engineering and Operations

TERIANNE S. NEWELL, P.E.
Deputy Director of Planning and Investment

Tribal Notification Form

The Utah Department of Transportation (UDOT) is preparing to undertake the subject state-aid project. In accordance with the *Programmatic Agreement between the UDOT and the Utah State Historic Preservation Officer Regarding Implementation of U.C.A. 9-8-404 for State Funded Transportation Projects in Utah* (renewed January 22, 2018), the UDOT has taken into account the effects of this undertaking on historic properties and seeks consultation with Native American tribes on the undertaking.

UDOT Project: PIN 14417; S-0154(86)6, Bangerter Highway at 12600 South, Salt Lake County, Utah
Contact Name: Jonathan Dugmore — Date: September 7, 2018
Address: 2010 South 2760 West, Salt Lake City, Utah 84104
Telephone: 385-414-2066 — Email: jdugmore@utah.gov

Project Description: UDOT is proposing to construct a grade-separate Single Point Urban Interchange (SPUI) at the existing intersection of Bangerter Highway (SR-154) and 12600 South in Riverton, Utah. The new interchange would allow for unimpeded traffic flow along Bangerter Highway and improved Level of Service operations into the year 2040. The project area is along Bangerter Highway between approximate milepost 6 to 7.5, and on 12600 South between 4150 West and 3600 West. The project includes: construction of a grade-separated interchange and exit/entrance ramps from Bangerter Highway to 12600 South; utility and storm drainage modifications; and installation of new pavement, traffic signals, ATMS equipment, and roadway signage. This project will require right-of-way acquisition.

Archaeological Potential (Prehistoric or Historic Sites):

- ☐ Known prehistoric sites in the project area
- ☒ Known historic sites in the project area
- ☐ Likely to find prehistoric sites in the project area
- ☐ Likely to find historic sites in the project area
- ☒ Unlikely to find prehistoric sites in the project area
- ☐ Unlikely to find historic sites in the project area
- ☐ No expected ground disturbance
- ☐ Other:

Additional Information/Comments: The project area has been surveyed for cultural resources by the archaeologists for Horrocks Engineers. One NRHP-eligible historic site was identified within the project area – 42SL287, the Provo Reservoir Canal. No additional cultural properties have been location at this time.

Tribal Information
«AddressBlock»

Copies to: «cc_1»
«cc_2»
«cc_3»
«cc_4»

Comments:

1. Do you wish to be a consulting party on this project? ☐Yes ☐No ☐Not Sure
2. If you do not wish to be a consulting party, do you wish to continue to be involved in the development of this project? ☐Yes ☐No ☐Not Sure
   Note: If your answer is "Not Sure," UDOT will continue to provide information.
3. Are you aware of any traditional religious or culturally important places in or near the project area? ☐Yes ☐No ☐Not Sure
4. If yes, can you share details about the place (e.g., location and other characteristics) and any concerns you may have? ☐Yes ☐No
5. Is this information sensitive? ☐Yes ☐No

Additional Comments:

Name of person completing this form, if different from above:

Signature: Date:

Identical copies of the Project Notification Form sent to the following recipients:

Original to:	CC to:
Mr. Darwin St. Clair Jr., Chairman Eastern Shoshone Tribe of the Wind River Reservation P.O. Box 538/15 North Fork Rd Fort Washakie, WY 82514	Ms. Glenda Trosper, Director, Cultural Center Eastern Shoshone Tribe of the Wind River Reservation P.O. Box 538/15 North Fork Rd Fort Washakie, WY 82514
	Mr. Joshua Mann, THPO Eastern Shoshone Tribe of the Wind River Reservation P.O. Box 538/15 North Fork Rd Fort Washakie, WY 82514
Mr. Blaine Edmo, Chair Shoshone-Bannock Tribes of Fort Hall P.O. Box 306 Pima Drive Fort Hall, ID 83203	Ms. Carolyn Smith, Cultural Resource Director Shoshone-Bannock Tribes of Fort Hall P.O. Box 306 Pima Drive Fort Hall, ID 83203
Mr. Darren Parry, Chairman Northwestern Band of Shoshone Nation 707 North Main Street Brigham City, UT 84302	Ms. Patty Timbimboo-Madsen, Cultural Specialist Northwestern Band of Shoshone Nation 707 North Main Street Brigham City, UT 84302
Mr. Luke Dunkin, Chairperson Ute Indian Tribe of the Uintah and Ouray Ute Indian Reservation P.O. Box 190 Fort Duchesne, UT 84026	Ms. Betsy Chapoose, Director, Cultural Rights and Protection Ute Indian Tribe of the Uintah and Ouray Ute Indian Reservation P.O. Box 190 Fort Duchesne, UT 84026
Ms. Candace Bear, Chairwoman Skull Valley Band of Goshute Indians P.O. Box 448 Grantsville, UT 84029	None

Original to:	CC to:	Email to:
Mr. Travis Parashonts, Band Chairman Cedar Band of Paiutes 4655 North Utah Trail Enoch, UT 84720	Ms. Vala Parashonts, Cultural Resources Representative Cedar Band of Paiutes 533 South 640 West Cedar City, UT 84721	
Mr. Patrick Charles, Band Chairman Shivwits Band of Paiute Indian Tribe of Utah 6060 West 3650 North Ivins, UT 84738	Ms. Sabrina Redfoot, Cultural Resources Director Shivwits Band of Paiute Indian Tribe of Utah 6060 West 3650 North Ivins, UT 84738	mohave_paiute@yahoo.com
Mr. Rupert Steele, Chairman Confederated Tribes of the Goshute Reservation P.O. BOX 6104 195 Tribal Center Rd. Ibapah, UT 84034	Ms. Mary Pete-Freeman, Cultural Resources Coordinator Confederated Tribes of the Goshute Reservation P.O. BOX 6104 195 Tribal Center Rd. Ibapah, UT 84034	marypete@goshutetribe.com

Memorandum

Environmental Services

DATE: October 1, 2018

TO: Craig Bown, Environmental Specialist, Horrocks

FROM: Matt Howard, Natural Resources Manager

SUBJECT: Single Point Urban Interchange at Bangerter Highway and 12600 S; PIN 14417

Dear Craig,

I have reviewed the biological summary regarding a single point urban interchange (SPUI) and the project's potential impacts to species protected by the Endangered Species Act (ESA) and concur with its findings. Given the urban development in the project's action area, I agree with the summary's findings that the project would have no effect on species protected by the ESA, MBTA, or BGEPA. I have also reviewed the project to assess impacts to greater sage-grouse and have found that the project would have no impact on sage-grouse.

Sincerely,

Matt Howard
Natural Resource Manager

HORROCKS ENGINEERS

2162 West Grove Parkway, Ste 400
Pleasant Grove, Utah 84062
801-763-5100
www.horrocks.com

To: Matt Howard, UDOT Wildlife Biologist
From: Craig Bown, Environmental Specialist
Date: August 30, 2018 **Memorandum**
Subject: Threatened and Endangered Species; Migratory Birds
Bangerter Highway @ 12600 S; PIN: 14417

Project Background
UDOT is proposing to construct a grade-separate Single Point Urban Interchange (SPUI) at the existing intersection of Bangerter Highway (SR-154) and 12600 South. The new interchange would allow for unimpeded traffic flow along Bangerter Highway and improved LOS operations into the year 2040. The project area is along Bangerter Highway between approximate milepost 6 to 7.5, and on 12600 South between 4150 West and 3600 West. The project includes: construction of a grade-separated interchange, exit/entrance ramps from Bangerter Highway to 12600 South; utility and storm drainage modifications; and installation of new pavement, traffic signals, ATMS equipment, and roadway signage. This project would require right-of-way acquisition.

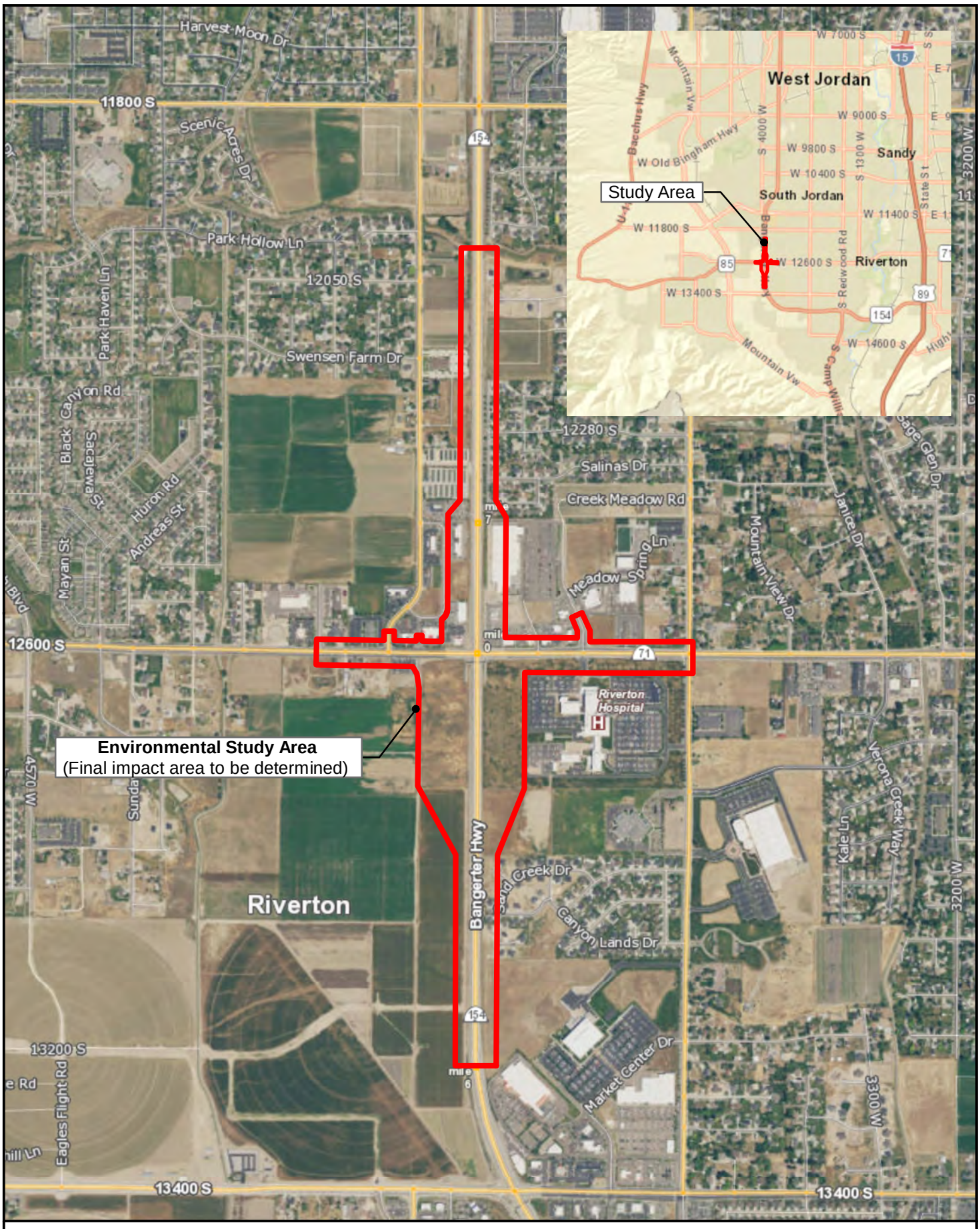
Evaluation Methods
The study area has been evaluated for federally listed species and their designated critical habitat protected under the Endangered Species Act (ESA) utilizing information obtained from U.S. Fish and Wildlife Service's (USFWS) Online Information, Planning, and Conservation system (IPaC). Aerial imagery and site photographs were also assed to determine project area habitat for federally listed species and potential nesting habitat for migratory birds.

Analyses
Study Area Habitat
The study area use is mostly roadways with surrounding uses consisting of commercial and residential developments and a few vacant lots and agricultural fields. Most of the vegetation within the study area is consistent with commercial and residential plantings (e.g. trees, shrubs, turf sod, etc.). Midas Creek is located at the north end of the study area.

Threatened and Endanger Species
IPaC data list four species for consideration in the study area. Based on a review of these species preferred habitats (see attached table) and the habitat of the study area, they are not likely to occur within the study area.

Migratory Birds
The study area does contain a few areas of potential migratory bird habitat (trees) within commercial and residential landscaped areas and near Midas creeks. If the project requires disturbance to potential nesting habitat during the migratory bird nesting season (February 1 – August 31), coordination with the UDOT biologist will be required prior to disturbance.

Conclusion
It is proposed that this project would have no-effect on federally-listed threatened and endangered species or their designated critical habitat. There would also be no long-term impacts to migratory birds.



Bangerter Hwy @ 12600 South

IPaC Species for Consideration – Bangerter Highway @ 12600 South

Species	Status	Habitat [1,2,3]	Potential Habitat within Study Area
Mammals			
Canada lynx (*Lynx canadensis*)	Threatened	Prefers moist, cool coniferous forest that support snowshoe hare populations.	IPaC results did not identify any critical habitat within the study area. Additionally, the vegetation community within the study area does not meet the classification of a coniferous forest. There is no suitable habitat within the study area.
Birds			
Yellow-billed Cuckoo (*Coccyzus americanus*)	Threatened	Riparian obligate and usually found in large tracts of cottonwood/willow habitats with dense sub-canopies.	IPaC results did not identify any critical habitat within the study area. Additionally, no suitable riparian habitat has been identified within 0.5 miles of the study area.
Fishes			
June sucker (*Chasmistes liorus*)	Endangered	Endemic to Utah Lake and the Provo River.	IPaC results did not identify any critical habitat within the study area. Additionally, these fish are found only within Utah Lake and spawn only in the connecting Provo River. There is no suitable habitat within the study area.
Flowering Plants			
Ute Ladies'-tresses (*Spiranthes diluvialis*)	Threatened	Found in wet meadows, along streams, in abandoned stream meanders, and near springs, seeps, and lake shores in sandy or loamy soils with mixed gravel. No critical habitat has been designated for this species.	Midas Creek and one potential wetland area were identified at the north end of the study area. Field observations of this location made during the wetland inventory did not identify any plant species commonly associated Ute Ladies'-tresses. These areas are not likely to be suitable habitat.

[1] UDWR - Utah Conservation Data Center (https://dwrcdc.nr.utah.gov/ucdc/)
[2] USFWS Species Fact Sheets
[3] USDA NRCS Plant Guides

D. Noise Study

NOISE STUDY

1.0 INTRODUCTION

This Noise Analysis was prepared in accordance with the UDOT Noise Abatement Policy, last revised June 15, 2017, consistent with federal regulation 23 CFR 772 and Utah Administrative Code R930-3.

2.0 DESCRIPTION OF PROJECT

UDOT is conducting a State Environmental Study to analyze improvements at the intersection of 12600 South and Bangerter Highway (see Figure 1).

The Utah Department of Transportation (UDOT) is proposing to construct a grade-separated Single Point Urban Interchange (SPUI) at the existing intersection of Bangerter Highway (SR-154) and 12600 South in Riverton, Utah.

The new interchange would allow for unimpeded traffic flow along Bangerter Highway. The study area is along Bangerter Highway between approximately milepost 6 to 7.5, and on 12600 South between 4150 West and 3600 West.

2.1 Applicability

The UDOT Noise Abatement Policy states that "noise abatement will be considered for all Type I projects where noise impacts are identified." Type I projects are projects that include any of the following: the construction of a highway at a new location; the physical alteration of an existing highway that substantially alters its alignment; the addition of a through traffic lane; the addition of an auxiliary lane; the addition or relocation of interchange lanes or ramps; or the addition of substantial alteration of a weigh station, rest stop, ride share lot, or toll plaza. This project is considered a Type I project because of the construction of a new interchange.

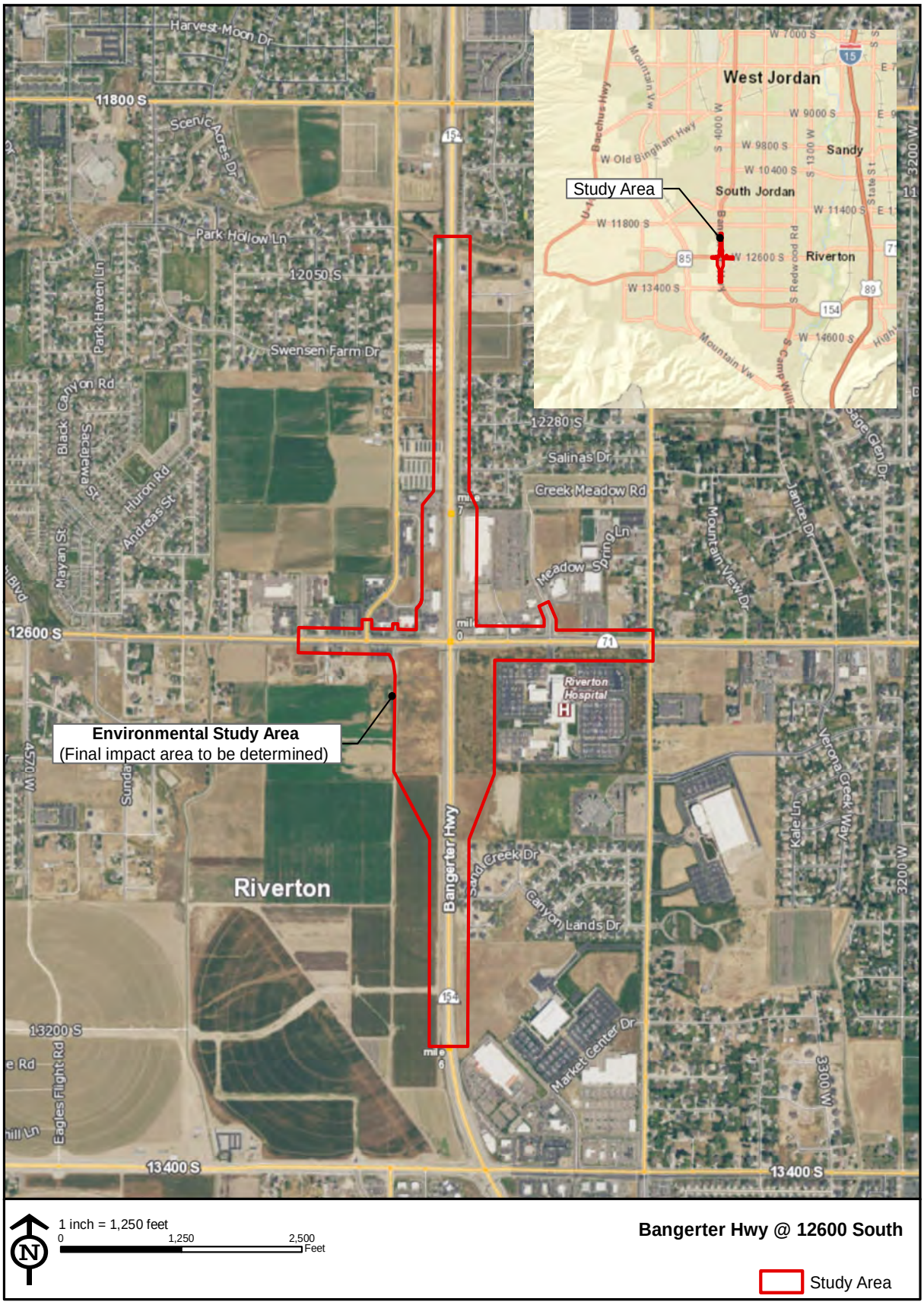


Figure 1: Study Area

3.0 ANALYSIS OF TRAFFIC NOISE IMPACTS

Traffic noise is measured in A-weighted sound levels in decibels (dBA) which most closely approximates the way the human ear hears sounds at different frequencies (see Figure 2). Since traffic noise varies over time, the sound levels for this noise analysis are expressed as "equivalent levels" or Leq, representing the average sound level over a one hour period of time. Unless noted otherwise, all sound levels in this noise analysis are expressed in the hourly equivalent noise level.

3.1 Noise Abatement Criteria

The Federal Highway Administration (FHWA) has established Noise Abatement Criteria for several categories of land use activities (see Table 1). FHWA's noise criteria is based on sound levels that are considered to be an impact to nearby property owners, also known as receptors. Primary consideration is to be given for exterior areas where frequent human use occurs.

UDOT has developed a Noise Abatement Policy for transportation projects, which conforms to FHWA noise abatement requirements outlined in 23 CFR §772.

UDOT's Noise Abatement Criteria is the noise decibel (dBA) value reflecting the approach criteria of 1 dBA below the Noise Abatement Criteria values listed in 23 CFR §772 for each land use category (see Table 1).

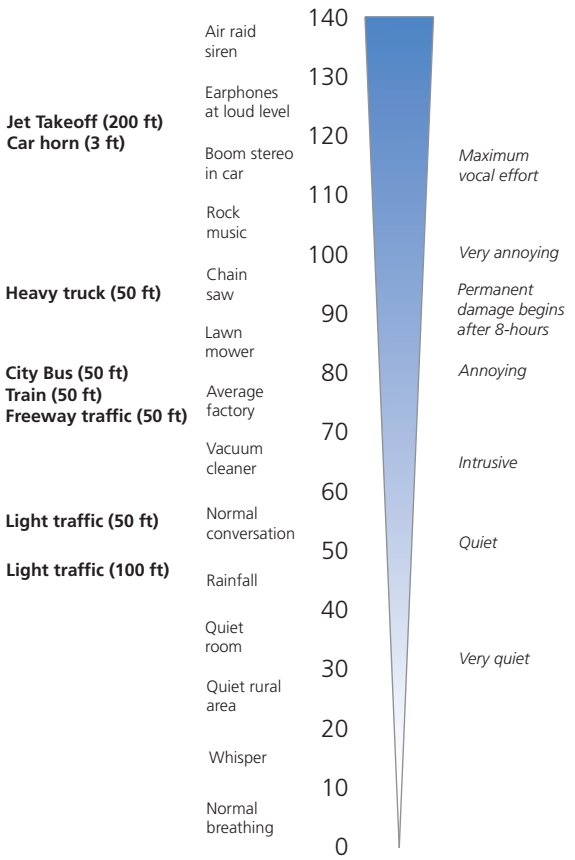


Figure 2: Sound Levels (in dBA) of Common Sounds (Compiled from Federal Transit Administration and Environmental Protection Agency Data)

UDOT's Noise Abatement Policy states that a traffic noise impact occurs when either 1) the future worst case noise level is equal to or greater than the UDOT Noise Abatement Criteria 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.

Noise impact and abatement analyses are required within Land Use Activity Categories A, B, C, D, and E (see Table 1) only when development exists or has been permitted (formal building permit issued prior to the date the final environmental

decision document is approved). Activity Categories F and G include lands that are not sensitive to traffic noise. There is no impact criteria for these land use types and an analysis of noise impacts is not required.

For the purposes of this noise wall analysis, aerial photography and on-site visits were used to identify existing land uses and structure locations.

Table 1: Noise Abatement Criteria

Activity Category	FHWA Criteria Leq(h)	UDOT Criteria Leq(h)	Evaluation Location	Activity Description
A	57	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	66	Exterior	Residential.
C	67	66	Exterior	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails and trail crossings.
D	52	51	Interior	Auditoriums, day care 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	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 Noise Abatement Policy

3.2 Noise Sensitive Land Uses

Noise sensitive land uses within each of the Activity Categories within the study area can be seen in Table 2.

Table 2: Noise Sensitive Land Uses

Activity Category	Description of Location within Study Area
A	• None
B	• Residential neighborhoods within the study area
C	• Riverton Childcare at 12523 South 4150 West (outside playground) • Blooming Minds Montessori Preschool at 12447 South Crossing Drive #4 • Church of Jesus Christ of Latter-day Saints at 4080 West 12600 South (softball fields)
D	• Larkin Mortuary at 3688 West 12600 South (interior) • Church of Jesus Christ of Latter-day Saints at 4080 West 12600 South (interior)
E	• Restaurants and offices within the study area
F	• Retail facilities • Self-storage facilities • Agricultural land
G	• Undeveloped land within the study area

The UDOT Noise Policy states that a noise impact analysis will not be required for Activity Categories F and G. However, for Activity Category G, an estimate of the distance to the approach criteria must be provided to local governments. See Section 6 of this noise analysis for additional information.

3.3 Existing Noise

The primary source of noise in the study area is automobile and truck traffic from Bangerter Highway and 12600 South. Existing traffic sound levels for each receptor in the study area were calculated with the Traffic Noise Model (TNM) 2.5 software using existing conditions (travel lane configurations and the posted speed limit). Existing noise levels were determined using the greatest hourly traffic noise condition likely to occur on a regular basis, or Level-of-Service (LOS) C traffic volumes based on roadway capacity.

On-site measurements were taken on September 25th, 2018 with an Extech Instruments SDL600 sound level meter/data logger for a duration of 20 minutes at the locations listed in Table 3 (see Appendix A for data sheets and noise measurement locations). Recorded measurements were used to verify the accuracy of the noise model and ensure it is representative of existing conditions. To be considered accurate, the field noise measurements must be within 3 dBA of the model's predicted noise.

Table 3: Field Noise Measurements

Site #	Location	Field Noise Level (DBA)	TNM Output (dBA)	Difference
1	12207 South 3900 West	63.0	60.2	2.8
2	12234 South 3950 West	57.9	57.5	0.4
3	12417 South Crossing Dr.	69.8	68.9	0.9
4	4121 West 12600 South	67.7	67.6	0.1
5	12570 South 3600 West	64.0	62.3	1.7
6	12984 S. Sand Creek Dr.	63.0	61.1	1.9

Of the 157 receptors within the study area, 26 currently experience a noise impact (see Existing Noise Levels maps in Appendix A).

3.4 Proposed Action Noise

Projected traffic noise levels for the Proposed Action were calculated with TNM 2.5 software using build conditions (travel lane configurations and traffic volumes). Noise levels were determined using the greatest hourly traffic noise conditions likely to occur on a regular basis, or LOS C traffic volumes.

The Proposed Action would generally result in a 1.2 dBA noise level increase throughout the study area. The greatest increase in noise would be 10.4 dBA at receptor 32B (see map 3 in Appendix B). This increase in noise levels is due to the removal of the existing noise wall north of 12600 South. Of the 157 receptors, 37 would be impacted by Proposed Action noise levels. Projected future worst case noise levels and impacted receptors can be seen in the Build Noise Levels maps in Appendix B.

3.5 Summary

Table 4 shows a summary of existing and Proposed Action noise levels (the letter on the map Label represents the activity category). Refer to the maps in Appendix A and B for receptor locations.

Table 4: Summary of Existing and Proposed Action Noise Levels

Map Label	UDOT Noise Abatement Criteria Leq(h)	Existing Noise Levels (dBA)	Existing Impact	Proposed Action Noise Levels (dBA)[1]	Projected Impact	
					≥ 10 dBA Increase From Existing Level	≥ UDOT Noise Abatement Criteria
1D	66.0	26	No	26.4	No	No
2B	66.0	63.1	No	63.2	No	No
3B	66.0	60.9	No	61.1	No	No
4E	66.0	69.5	No	69.7	No	No
5E	66.0	76.4	Yes	72.2	No	Yes

Map Label	UDOT Noise Abatement Criteria Leq(h)	Existing Noise Levels (dBA)	Existing Impact	Proposed Action Noise Levels (dBA)[1]	Projected Impact	
					≥ 10 dBA Increase From Existing Level	≥ UDOT Noise Abatement Criteria
6E	66.0	65.7	No	66.2	No	No
7D	66.0	27.2	No	27.8	No	No
8B	66.0	71.8	Yes	71.8	No	Yes
9B	66.0	70.0	Yes	70.1	No	Yes
10D	66.0	24.9	No	25.3	No	No
11B	66.0	65.5	No	65.5	No	No
12B	66.0	66.6	Yes	66.7	No	Yes
13B	66.0	67.8	Yes	67.9	No	Yes
14B	66.0	63.7	No	63.4	No	No
15B	66.0	69.0	Yes	68.7	No	Yes
16B	66.0	67.9	Yes	67.5	No	Yes
17B	66.0	68.2	Yes	67.9	No	Yes
18B	66.0	68.7	Yes	68.4	No	Yes
19B	66.0	68.1	Yes	67.8	No	Yes
20B	66.0	70.8	Yes	70.5	No	Yes
21B	66.0	71.4	Yes	71.2	No	Yes
22B	66.0	66.5	Yes	66.2	No	Yes
23B	66.0	59.6	No	59.2	No	No
24B	66.0	59.8	No	59.2	No	No
25B	66.0	60.9	No	61.2	No	No
26B	66.0	62.8	No	62.7	No	No
27B	66.0	62.1	No	61.7	No	No
28B	66.0	66.9	Yes	74.2	No	Yes
29B	66.0	63.3	No	67.4	No	Yes
30B	66.0	64.0	No	74.3	Yes	Yes
31B	66.0	62.2	No	67.3	No	Yes
32B	66.0	63.8	No	74.2	Yes	Yes
33B	66.0	61.9	No	67.7	No	Yes
34B	66.0	63.2	No	73.2	Yes	Yes
35B	66.0	60.7	No	66.7	No	Yes
36B	66.0	63.7	No	74	No	Yes
37B	66.0	63.8	No	73.2	No	Yes
38B	66.0	62.9	No	68.5	No	Yes
39B	66.0	60.0	No	63.7	No	No

Map Label	UDOT Noise Abatement Criteria Leq(h)	Existing Noise Levels (dBA)	Existing Impact	Proposed Action Noise Levels (dBA)[1]	Projected Impact	
					≥ 10 dBA Increase From Existing Level	≥ UDOT Noise Abatement Criteria
40B	66.0	59.8	No	64.5	No	No
41B	66.0	59.6	No	64.9	No	No
42B	66.0	63.2	No	65.4	No	No
43B	66.0	59.8	No	62.4	No	No
44B	66.0	60.3	No	61.9	No	No
45B	66.0	64.1	No	65.7	No	No
46B	66.0	64.5	No	65.4	No	No
47B	66.0	60.5	No	61.6	No	No
48B	66.0	64.8	No	66	No	Yes
49B	66.0	61.2	No	62.1	No	No
50B	66.0	66.0	Yes	66.5	No	Yes
51B	66.0	60.7	No	61.3	No	No
52B	66.0	62.8	No	63.2	No	No
53B	66.0	68.1	Yes	68.5	No	Yes
54B	66.0	67.0	Yes	67.1	No	Yes
55B	66.0	64.7	No	64.8	No	No
56B	66.0	63.5	No	63.7	No	No
57B	66.0	68.6	Yes	68.6	No	Yes
58B	66.0	64.7	No	64.8	No	No
59D	66.0	29.6	No	29.9	No	No
60B	66.0	64.0	No	64.3	No	No
61B	66.0	64.0	No	64.3	No	No
62B	66.0	65.2	No	65.6	No	No
63E	66.0	77.1	Yes	73	No	Yes
64B	66.0	63.3	No	63	No	No
65B	66.0	61.4	No	60.9	No	No
66B	66.0	60.5	No	59.9	No	No
67B	66.0	59.5	No	58.8	No	No
68B	66.0	59.7	No	58.7	No	No
69B	66.0	58.1	No	57.7	No	No
70B	66.0	59.6	No	59.3	No	No
71B	66.0	60.8	No	60.5	No	No
72B	66.0	60.5	No	60.7	No	No
73B	66.0	59.1	No	59.2	No	No

Map Label	UDOT Noise Abatement Criteria Leq(h)	Existing Noise Levels (dBA)	Existing Impact	Proposed Action Noise Levels (dBA)[1]	Projected Impact	
					≥ 10 dBA Increase From Existing Level	≥ UDOT Noise Abatement Criteria
74B	66.0	58.6	No	58.3	No	No
75B	66.0	59.5	No	59	No	No
76B	66.0	59.0	No	58.5	No	No
77B	66.0	58.9	No	58.5	No	No
78C	66.0	59.0	No	59.7	No	No
79C	66.0	58.7	No	59.1	No	No
80B	66.0	60.4	No	60.9	No	No
81B	66.0	61.3	No	65.8	No	No
82B	66.0	60.3	No	65.1	No	No
83B	66.0	60.4	No	65.4	No	No
84B	66.0	57.9	No	61.8	No	No
85B	66.0	57.7	No	61.3	No	No
86B	66.0	59.7	No	62.4	No	No
87B	66.0	58.9	No	61.2	No	No
88B	66.0	57.6	No	60.2	No	No
89B	66.0	57.2	No	60.2	No	No
90B	66.0	57.0	No	59.9	No	No
91B	66.0	56.9	No	60.5	No	No
92B	66.0	56.0	No	58.6	No	No
93B	66.0	55.9	No	58.1	No	No
94B	66.0	56.0	No	58.3	No	No
95B	66.0	56.9	No	59.2	No	No
96B	66.0	56.5	No	59.5	No	No
97B	66.0	56.2	No	58.3	No	No
98B	66.0	56.9	No	61.1	No	No
99B	66.0	56.9	No	61.3	No	No
100B	66.0	57.0	No	58.3	No	No
101B	66.0	56.3	No	57.5	No	No
102B	66.0	57.8	No	58.7	No	No
103B	66.0	56.9	No	57.8	No	No
104B	66.0	58.0	No	58.6	No	No
105B	66.0	57.0	No	57.7	No	No
106B	66.0	55.9	No	56.9	No	No
107B	66.0	59.4	No	59.8	No	No

Map Label	UDOT Noise Abatement Criteria Leq(h)	Existing Noise Levels (dBA)	Existing Impact	Proposed Action Noise Levels (dBA)[1]	Projected Impact	
					≥ 10 dBA Increase From Existing Level	≥ UDOT Noise Abatement Criteria
108B	66.0	58.5	No	59	No	No
109B	66.0	57.2	No	57.7	No	No
110B	66.0	57.5	No	57.9	No	No
111B	66.0	57.8	No	58.1	No	No
112B	66.0	60.3	No	60.7	No	No
113B	66.0	59.4	No	59.8	No	No
114B	66.0	60.4	No	60.8	No	No
115B	66.0	62.3	No	62.7	No	No
116B	66.0	66.9	Yes	67.3	No	Yes
117B	66.0	68.5	Yes	69	No	Yes
118B	66.0	63.0	No	63.2	No	No
119B	66.0	59.0	No	59.2	No	No
120B	66.0	59.0	No	59.4	No	No
121B	66.0	59.2	No	59.5	No	No
122B	66.0	61.1	No	61.3	No	No
123B	66.0	60.1	No	60.3	No	No
124B	66.0	58.7	No	58.9	No	No
125B	66.0	57.8	No	58	No	No
126B	66.0	56.5	No	56.7	No	No
127B	66.0	56.5	No	56.8	No	No
128B	66.0	65.5	No	65.6	No	No
129B	66.0	60.3	No	60.7	No	No
130B	66.0	60.8	No	61.2	No	No
131B	66.0	61.2	No	61.5	No	No
132B	66.0	61.3	No	61.6	No	No
133B	66.0	60.9	No	61.3	No	No
134B	66.0	61.3	No	61.6	No	No
135B	66.0	61.4	No	61.7	No	No
136B	66.0	61.5	No	61.8	No	No
137B	66.0	61.2	No	61.5	No	No
138B	66.0	61.7	No	61.8	No	No
139B	66.0	61.8	No	61.9	No	No
140B	66.0	61.8	No	61.9	No	No
141B	66.0	61.0	No	61.4	No	No

Map Label	UDOT Noise Abatement Criteria Leq(h)	Existing Noise Levels (dBA)	Existing Impact	Proposed Action Noise Levels (dBA)[1]	Projected Impact	
					≥ 10 dBA Increase From Existing Level	≥ UDOT Noise Abatement Criteria
142B	66.0	67.2	Yes	67.5	No	Yes
143B	66.0	68.7	Yes	68.9	No	Yes
144B	66.0	67.9	Yes	68.1	No	Yes
145B	66.0	62.6	No	62.8	No	No
146B	66.0	61.7	No	62.1	No	No
147B	66.0	63.1	No	63.5	No	No
148B	66.0	63.6	No	63.9	No	No
149B	66.0	63.3	No	63.5	No	No
150B	66.0	59.4	No	59.6	No	No
151B	66.0	59.5	No	59.9	No	No
152B	66.0	59.2	No	59.4	No	No
153B	66.0	57.6	No	57.9	No	No
154B	66.0	57.5	No	57.7	No	No
155B	66.0	57.4	No	57.7	No	No
156B	66.0	68.3	Yes	68.4	No	Yes
157B	66.0	68.5	Yes	68.6	No	Yes

[1] Some of the Proposed Action noise levels have a noticeable decrease from the existing level due to the grade-separation introduced by the new interchange. These receptors are lower in elevation than Bangerter Highway mainline and therefore experience a decrease in noise levels.
[2] Receptors with a D suffix represent the interiors of structures. Masonry buildings with double-glazed glass windows generally provide a noise reduction of approximately 35 dBA. Therefore, the interior noise levels for these buildings were estimated to be 35 dBA less than the exterior noise levels calculated by TNM.

4.0 NOISE ABATEMENT

According to the UDOT Noise Abatement Policy, specific conditions must be met before traffic noise abatement is implemented. Noise mitigation must be considered feasible and reasonable. The factors considered when determining if mitigation is feasible include:

- **Engineering Considerations:** Engineering considerations such as safety, presence of cross streets, sight distance, access to adjacent properties, wall height, topography, drainage, utilities, maintenance access and maintenance of the abatement measure must be taken into account as part of establishing feasibility. Noise abatement measures are not intended to serve as privacy fences or safety barriers. Abatement measures installed on structures will not exceed 10-feet in height measured from the top of 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 general American Association of State Highway and Transportation Officials (AASHTO) design principles.

- **Safety on Urban Non-Access Controlled Roadways:** To avoid a damaged wall from becoming a safety hazard, in the event of a failure, wall height shall be no greater than the distance from the back-of-curb to the face of proposed wall. Because the distance from the back-of-curb to the face of a proposed wall varies, wall heights which meet this safety requirement may also vary.
- **Acoustic Feasibility:** Noise abatement must be considered "acoustically feasible." This is defined as achieving at least a 5 dBA highway traffic noise reduction for at least 50% of front-row receptors.

The factors considered when determining if mitigation is reasonable include:

- **Noise Abatement Design Goal:** Every reasonable effort should be made to obtain substantial noise reductions. UDOT defines the minimum noise reduction (design goal) from proposed abatement measures to be 7 dBA or greater for at least 35% of front-row receptors.
- **Cost Effectiveness:** The cost of noise abatement measures must be deemed reasonable in order to be included in the project. Noise abatement costs are based on a fixed unit cost of $20 per square foot, multiplied by the height and length of the wall, in addition to the cost of any other item associated with the abatement measure that is critical to safety. The fixed unit cost is based on the historical average cost of noise walls installed on UDOT projects and is reviewed at regular intervals, not to exceed five years. The cost effectiveness of abatement is determined by analyzing the cost of a wall that would provide a noise reduction of 5 dBA or more for a benefited receptor. A reasonable cost is considered to be a maximum of $30,000 per benefited receptor (Activity Category B) and $360 per lineal foot for Activity Categories A,C,D or E. If the anticipated cost of the noise abatement measure is less than the allowable cost, then the abatement is deemed reasonable.

  The cost effectiveness calculation needs to take into account the cost of any items associated with the abatement measure that is critical to safety, such as snow storage. Therefore, the cost to construct items necessary for snow storage was taken into consideration as part of the cost effectiveness calculation.
- **Viewpoints of Property Owners and Residents:** As part of the final design phase, public balloting would take place if noise abatement measures appear to meet the criteria outlined in UDOT's Noise Abatement Policy.

4.1 Noise Barriers

For a sound wall to be effective, it must be high enough and long enough to block the view of the noise source from the receptor's perspective. The *Highway Traffic Noise Analysis and Abatement Policy and Guidance* states that a good rule of thumb is that the noise barrier should extend four times as far in each direction as the distance from the receptor to the barrier. For instance, if the receptor is 50 feet from the proposed noise barrier, the barrier needs to extend at least 200 feet on either side of the receptor in order to shield the receptor from noise traveling past the ends of the barrier.

Openings in noise walls for driveway and cross street accesses greatly reduce the effectiveness of noise walls. Therefore, impacted receptors with direct access onto 12600 South or adjacent to cross streets do not qualify for noise walls.

In an effort to provide an objective analysis of traffic noise reduction to impacted receptors, a variety of noise wall heights were considered. When multiple wall heights met noise abatement requirements, the shortest wall height found to be both feasible and reasonable was recommended for balloting. Noise walls considered for this project are discussed below.

Wall 1

This wall is located south of 12600 South on the east side of Bangerter Highway. (see map 1 in Appendix C). The wall is approximately 1,414 feet in length. As summarized in Table 5, walls ranging in height from 12 to 18 feet were evaluated (see Appendix D for detailed wall analyses).

Table 5: Summary of Wall 1

Barrier Height	Feasibility		Reasonable					Is Barrier Feasible & Reasonable?
	% front-row with 5 dBA reduction	Acoustically feasible? [1]	% front-row with 7 dBA reduction	Noise Abatement Design Goal? [2]	Anticipated Cost	Allowable Cost	Cost Effective? [3]	
10	20.0	No	N/A	N/A	N/A	N/A	N/A	No
12	30.0	No	N/A	N/A	N/A	N/A	N/A	No
14	30.0	No	N/A	N/A	N/A	N/A	N/A	No
16	70.0	Yes	0.0	No	N/A	N/A	N/A	No
18	90.0	Yes	20.0	No	N/A	N/A	N/A	No

[1] 5 dBA reduction for at least 50% of front-row receptors
[2] 7 dBA for at least 35% of front-row receptors
[3] Anticipated cost is less than allowable cost.

None of the wall heights evaluated for Wall 1 met the noise abatement design goal. Therefore, a wall at this location is not recommended for balloting.

Wall 2

This wall is located on the northwest corner of Bangerter Highway and 12600 South (see map 3 in Appendix C) . The wall is approximately 873 feet in length. As summarized in Table 6, walls ranging in height from 12 to 18 feet were evaluated (see Appendix D for detailed wall analyses).

Table 6: Summary of Wall 2

Barrier Height	Feasibility		Reasonable					Is Barrier Feasible & Reasonable?
	% front-row with 5 dBA reduction	Acoustically feasible? [1]	% front-row with 7 dBA reduction	Noise Abatement Design Goal? [2]	Anticipated Cost	Allowable Cost	Cost Effective? [3]	
12	50.0	Yes	0	N/A	N/A	N/A	N/A	No
14	50.0	Yes	50.0	Yes	$266,265	$314,280	Yes	Yes
16	50.0	Yes	50.0	Yes	$301,185	$314,280	Yes	Yes
18	100.0	Yes	50.0	Yes	$336,105	$314,280	No	No

[1] 5 dBA reduction for at least 50% of front-row receptors
[2] 7 dBA for at least 35% of front-row receptors
[3] Anticipated cost is less than allowable cost.

Walls ranging in height from 14 to 16 feet are considered both feasible and reasonable. **A 14 foot tall wall for Wall 2 is recommended for balloting because it is the shortest wall height found to be both feasible and reasonable.**

Wall 3

Wall 3 would replace the existing noise wall that would be removed as part of the Proposed Action construction. This wall would be 800 feet in length and located on the east side of Bangerter Highway north of 12600 South (see map 3 in Appendix C). This analysis assumes that the existing 13 foot noise wall to the north would remain in place. As summarized in Table 7, a 13 foot noise wall was evaluated (see Appendix D for detailed wall analyses).

Table 7: Summary of Wall 3

Barrier Height	Feasibility		Reasonable					Is Barrier Feasible & Reasonable?
	% front-row with 5 dBA reduction	Acoustically feasible? [1]	% front-row with 7 dBA reduction	Noise Abatement Design Goal? [2]	Anticipated Cost	Allowable Cost	Cost Effective? [3]	
13	100.0	Yes	83.3	Yes	$228,000	$390,000	Yes	Yes

[1] 5 dBA reduction for at least 50% of front-row receptors
[2] 7 dBA for at least 35% of front-row receptors
[3] Anticipated cost is less than allowable cost.

A 13 foot tall wall for Wall 3 is recommended for balloting because it matches the existing noise wall height to the north and is found to be both feasible and reasonable.

Wall 4

This wall is located on the east side of Bangerter Highway north of Wall 3 (see map 5 in Appendix C). The wall is approximately 1,342 feet in length. As summarized in Table 8, walls ranging in height from 10 to 18 feet were evaluated (see Appendix D for detailed wall analyses).

Table 8: Summary of Wall 2

Barrier Height	Feasibility		Reasonable					Is Barrier Feasible & Reasonable?
	% front-row with 5 dBA reduction	Acoustically feasible? [1]	% front-row with 7 dBA reduction	Noise Abatement Design Goal? [2]	Anticipated Cost	Allowable Cost	Cost Effective? [3]	
10	0.0	No	N/A	N/A	N/A	N/A	N/A	No
12	12.5	No	N/A	N/A	N/A	N/A	N/A	No
14	87.5	Yes	0.0	No	N/A	N/A	N/A	No
16	87.5	Yes	0.0	No	N/A	N/A	N/A	No
18	87.5	Yes	12.5	No	N/A	N/A	N/A	No

[1] 5 dBA reduction for at least 50% of front-row receptors
[2] 7 dBA for at least 35% of front-row receptors
[3] Anticipated cost is less than allowable cost.

None of the wall heights evaluated for Wall 4 met the noise abatement design goal. Therefore, a wall at this location is not recommended for balloting.

5.0 CONSTRUCTION IMPACTS

Construction noise impacts are considered temporary and will be minimized through adherence to UDOT Standard Specification 01355 Environmental Compliance, Part 3.6 - Noise Control. Extended disruption of normal activities is not anticipated, since no receptors are expected to be exposed to construction noise for a long duration of time.

6.0 INFORMATION FOR LOCAL OFFICIALS

According to the UDOT Noise Abatement Policy, an estimated distance from the edge of pavement to where the worst hour Leq(h) levels of 66 dBA and 71 dBA occurs must be provided to local governments for land uses with Activity Category G. Within the study area there are three areas of undeveloped land on the west side of Bangerter Highway.

The first area is located between 12600 South and 13400 South. According to Riverton City, no active building permits have been issued for this area. Projected traffic noise levels from the edge of pavement to a level of 66 dBA and 71 dBA would occur at between 290 and 340 feet and 70 and 160 feet, respectively (see Appendix E)

The second area is located between 12111 South and 12173 South. While this parcel has been subdivided for residential building, no active building permits have been issued for the lots directly adjacent to Bangerter Highway, as coordinated with Riverton City. Projected traffic noise levels from the edge of pavement to a level of 66 dBA to 71 dBA would occur at between 270 feet and 130 feet, respectively (see Appendix E).

The third area is situated between 12009 South and 12111 South. According to Riverton City, no active building permits have been issued for this area. Projected traffic noise levels from the edge of pavement to a level of 66 dBA and 71 dBA would occur at between 270 feet and 140 feet, respectively (see Appendix E).

7.0 CONCLUSION

The Proposed Action would generally result in a 1.2 dBA noise level increase throughout the study area. Of the 157 receptors in this study, 37 would be impacted by Proposed Action noise levels. Recommended noise walls within the study area that met the requirements of the UDOT Noise Abatement Policy are discussed below. As part of the final design phase, UDOT will conduct balloting consistent with the procedures described in UDOT's Noise Abatement Policy.

Summary of Recommended Walls

Wall 2

This wall is located on the northwest corner of Bangerter Highway and 12600 South. The wall is approximately 873 feet in length and 14 feet tall (see map 3 in Appendix C).

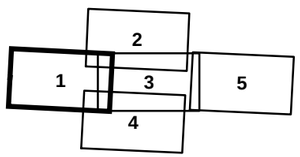
Wall 3

Wall 3 would replace the existing noise wall that would be removed as part of the Proposed Action construction. This wall would be located on the east side of Bangerter Highway north of 12600 South (see map 3 in Appendix C). The wall is approximately 800 feet in length and 13 feet tall.

APPENDIX A: NOISE MEASUREMENT DATA AND EXISTING NOISE LEVEL MAPS

Existing Impact

- No
- Yes
- Existing Privacy Fence
- Existing Noise Wall



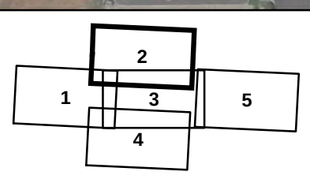
Bangerter Highway at 12600 South

Existing Noise Levels

Map 1 of 5

Existing Impact

- No
- Yes
- Existing Privacy Fence
- Existing Noise Wall



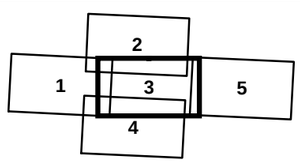
Bangerter Highway at 12600 South

Existing Noise Levels

Map 2 of 5

Existing Impact

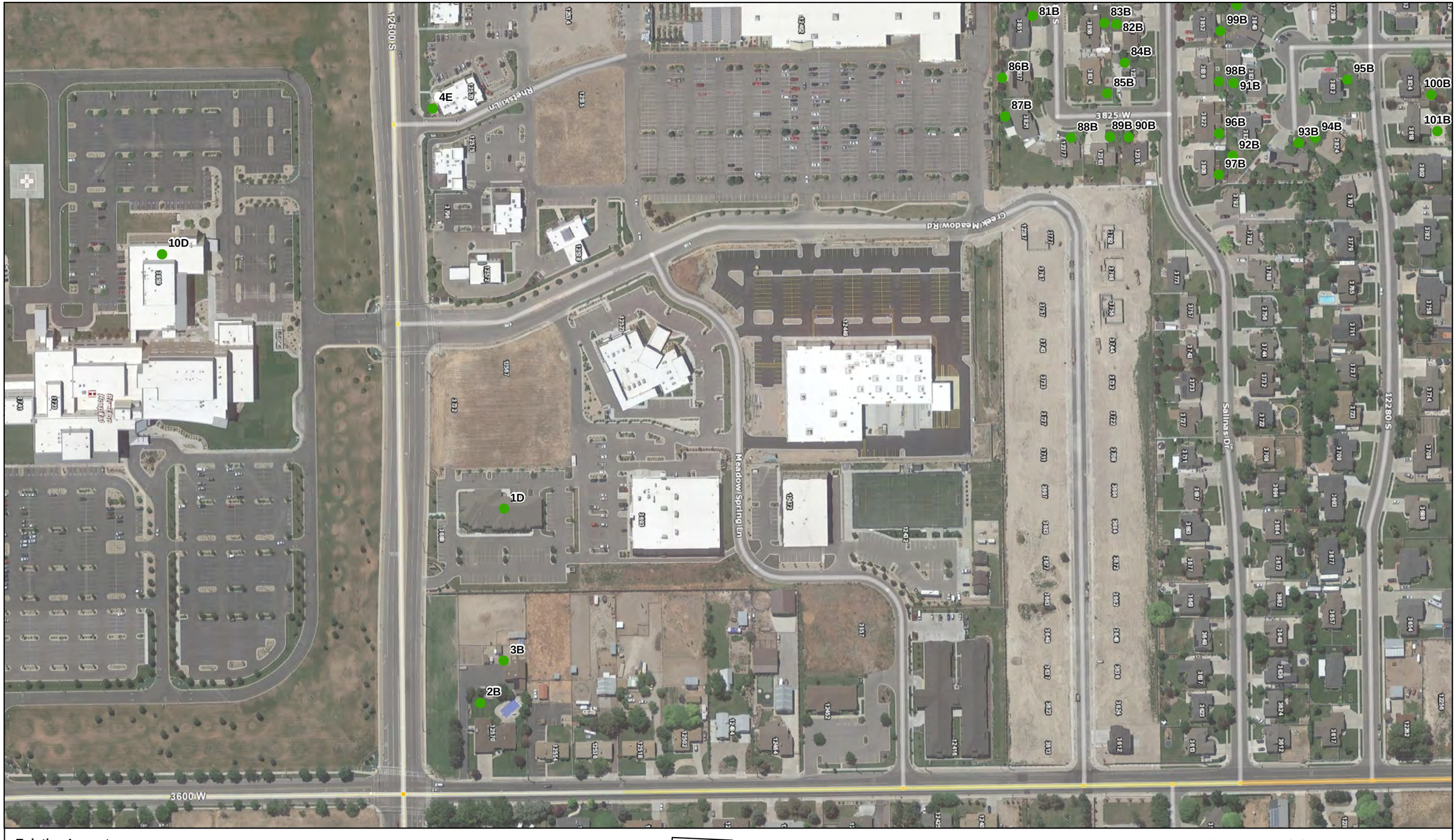
- No
- Yes
- Existing Privacy Fence
- Existing Noise Wall



Bangerter Highway at 12600 South

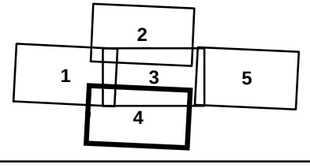
Existing Noise Levels

Map 3 of 5



Existing Impact

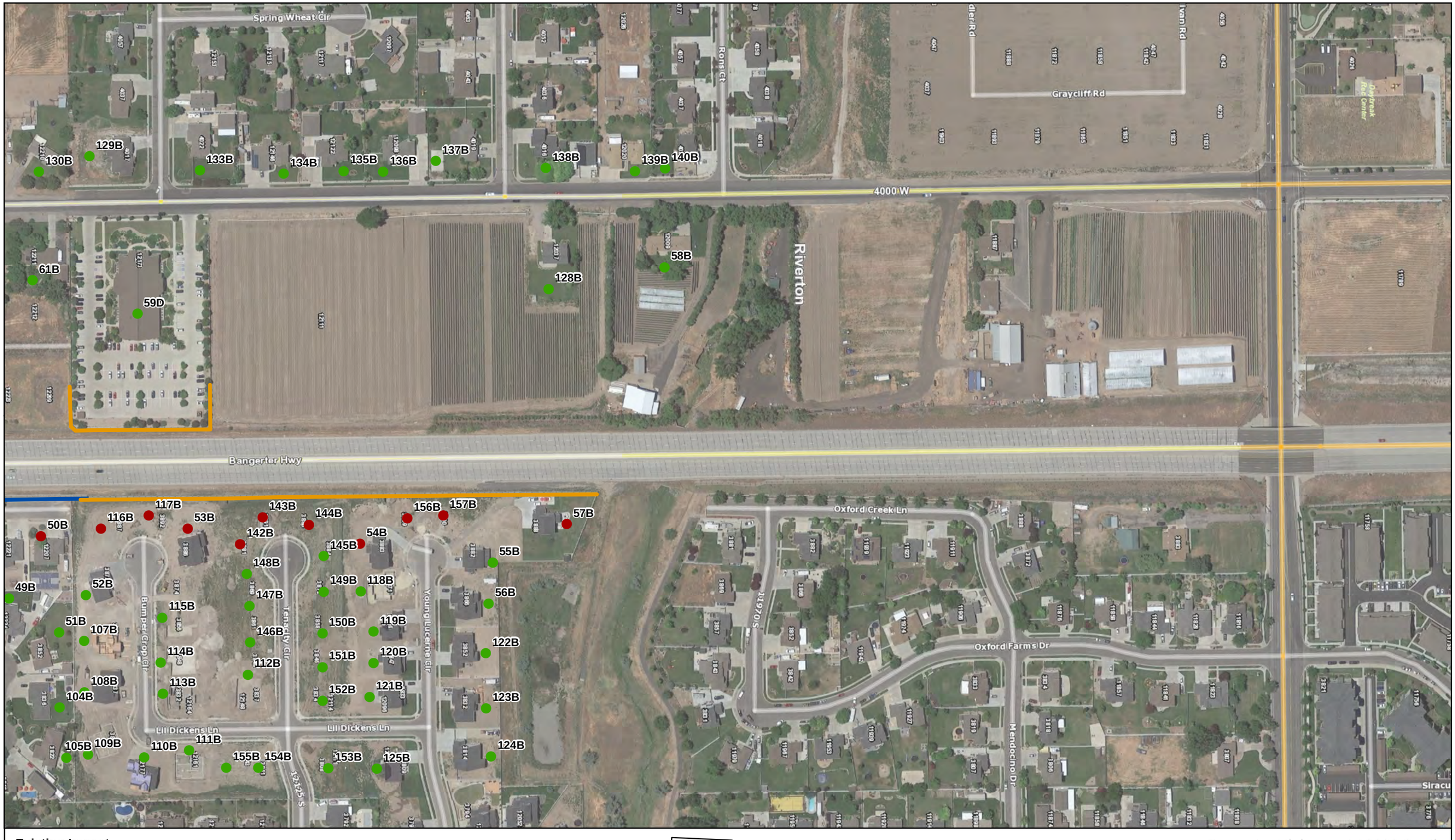
- No
- Yes
- Existing Privacy Fence
- Existing Noise Wall



Bangerter Highway at 12600 South

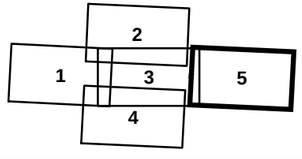
Existing Noise Levels

Map 4 of 5



Existing Impact

- No
- Yes
- Existing Privacy Fence
- Existing Noise Wall



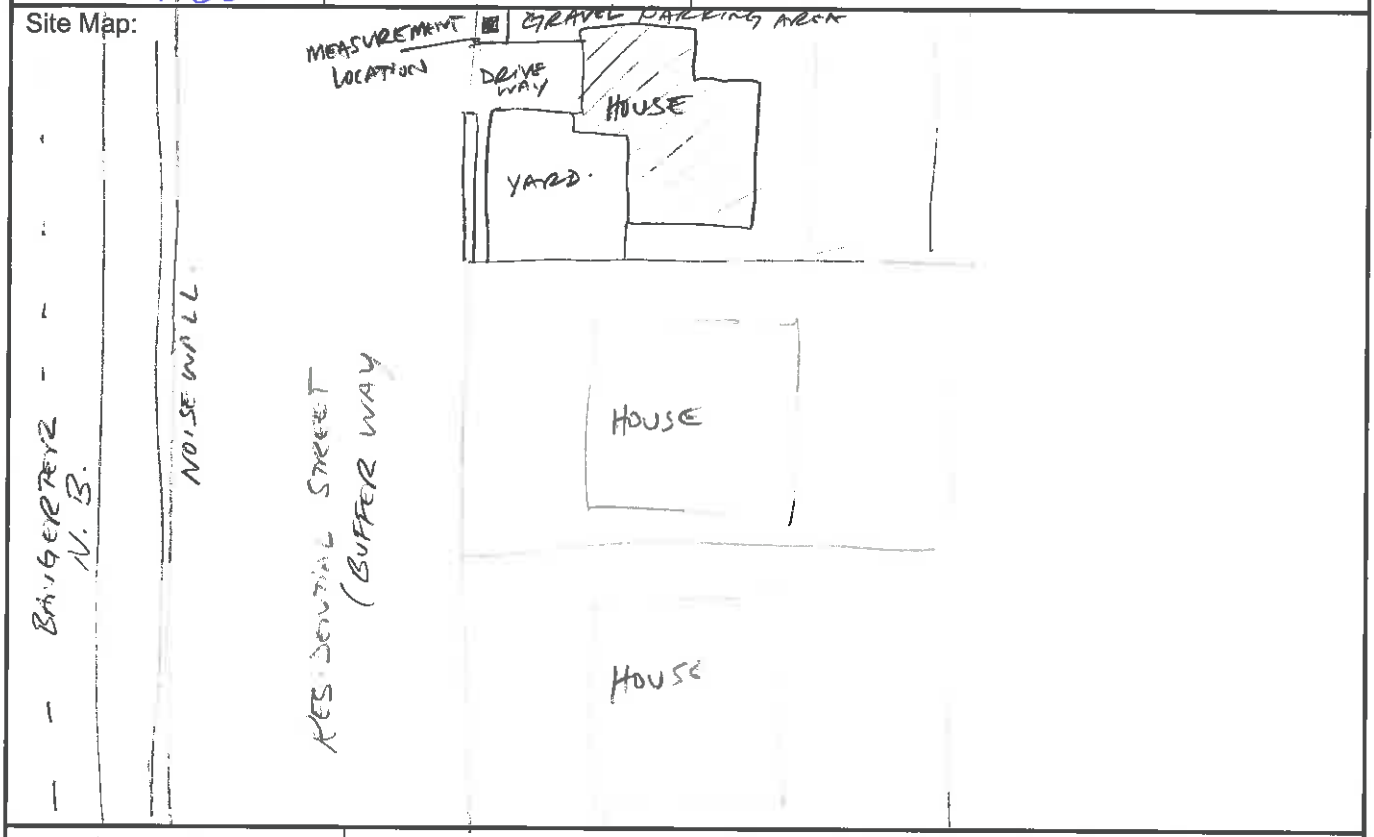
Bangerter Highway at 12600 South

Existing Noise Levels

Map 5 of 5

Test No.:	Project Name: Bangerter Hwy 12600 S	Project No.:	Sheet__of
Date: 7/25/18	Location: M1	Relative elevation to road:	
Time Started: 4:02pm	Weather Conditions: Partly cloudy, breezy 108°F 20% humidity 0-30mph winds	Site Conditions:	
Time Ended: 4:24pm		Date file was downloaded:	
Calibration		File name:	
Pre: 94.0 dBA			
Post: 94.0 dBA			

Site Map:

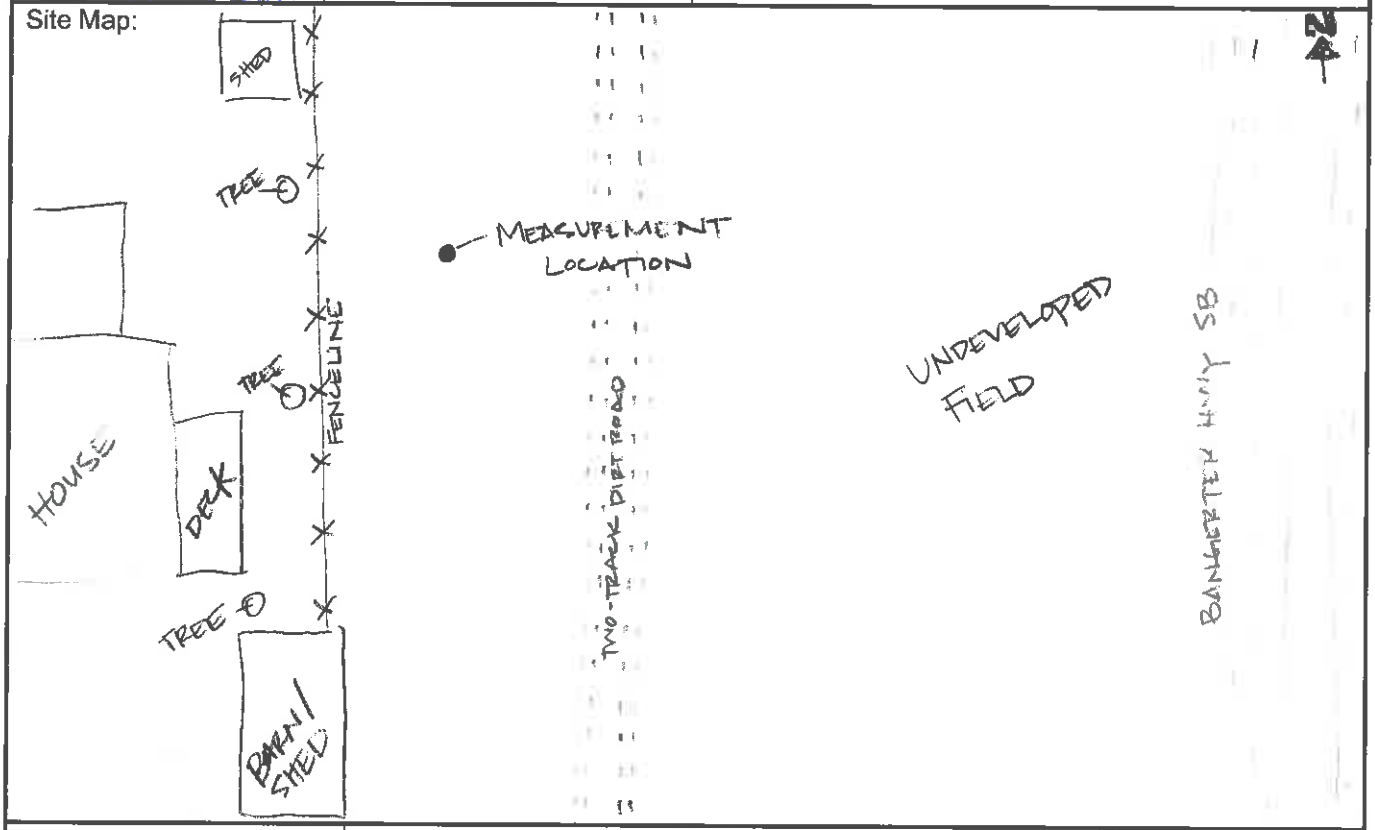


Vehicle Type	Traffic count (vehicles/ 5 min)					
Automobiles						
Heavy Trucks						
Medium Trucks						
Busses/Motorcycles						

Elapsed Time (min)	Comments	Elapsed Time (min)	Comments
1 4:04pm	tractor reverse signal	11	
2		12	
3		13	
4		14	
5		15	
6		16	
7		17	
8		18	
9		19	
10		20	

Test No.:	Project Name: Bangerter Hwy 12600S	Project No.:	Sheet__of
Date: 9/25/18	Location: M2	Relative elevation to road:	
Time Started: 2:58pm	Weather Conditions: Breezy & Sunny 66°F 21% Humidity 2-2.5mph winds	Site Conditions:	
Time Ended: 3:20pm			
Calibration		Date file was downloaded:	
Pre: 94.0 dBA		File name:	
Post: 93.9 dBA			

Site Map:



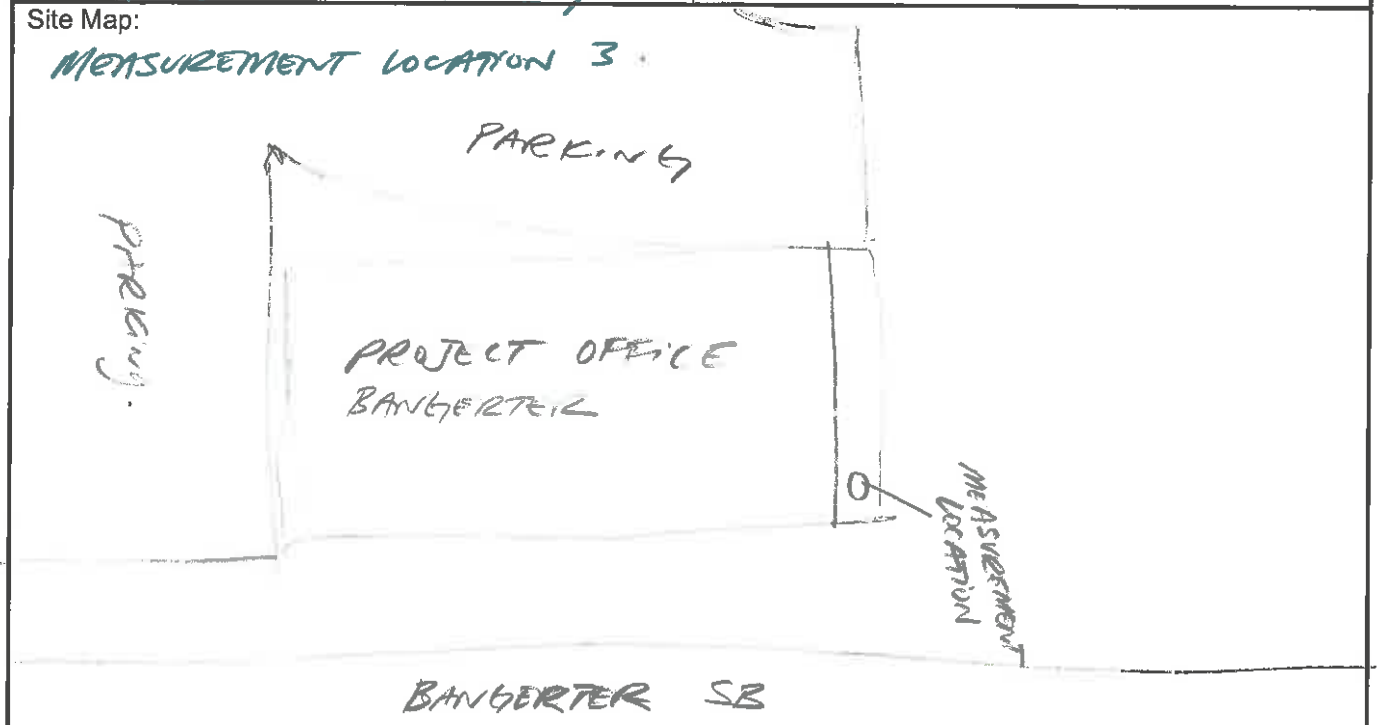
Vehicle Type	Traffic count (vehicles/ 5 min)					
Automobiles						
Heavy Trucks						
Medium Trucks						
Busses/Motorcycles						

Elapsed Time (min)	Comments	Elapsed Time (min)	Comments
1 2:58pm	dog bark	11	
2 2:59pm	dog barks	12	
3		13	
4 3:07pm	dog bark	14	
5 3:03pm	dog bark	15	
6		16	
7		17	
8		18	
9		19	
10		20	

BANGERTER PROJECT OFFICE

Test No.: 1	Project Name: BANGERTER	Project No.:	Sheet__of
Date: 9/25/18	Location: BANG. PROJECT OFFICE (M3)	Relative elevation to road:	
Time Started: 11:47.	Weather Conditions: BREEZY, SUNNY WIND 1.8-1.5 MPH	Site Conditions:	
Time Ended: 12:09.	BAROM # 63F 23% HUMIDITY.		
Calibration #4		Date file was downloaded:	
Pre: 94		File name:	
Post: 93.7			

Site Map:

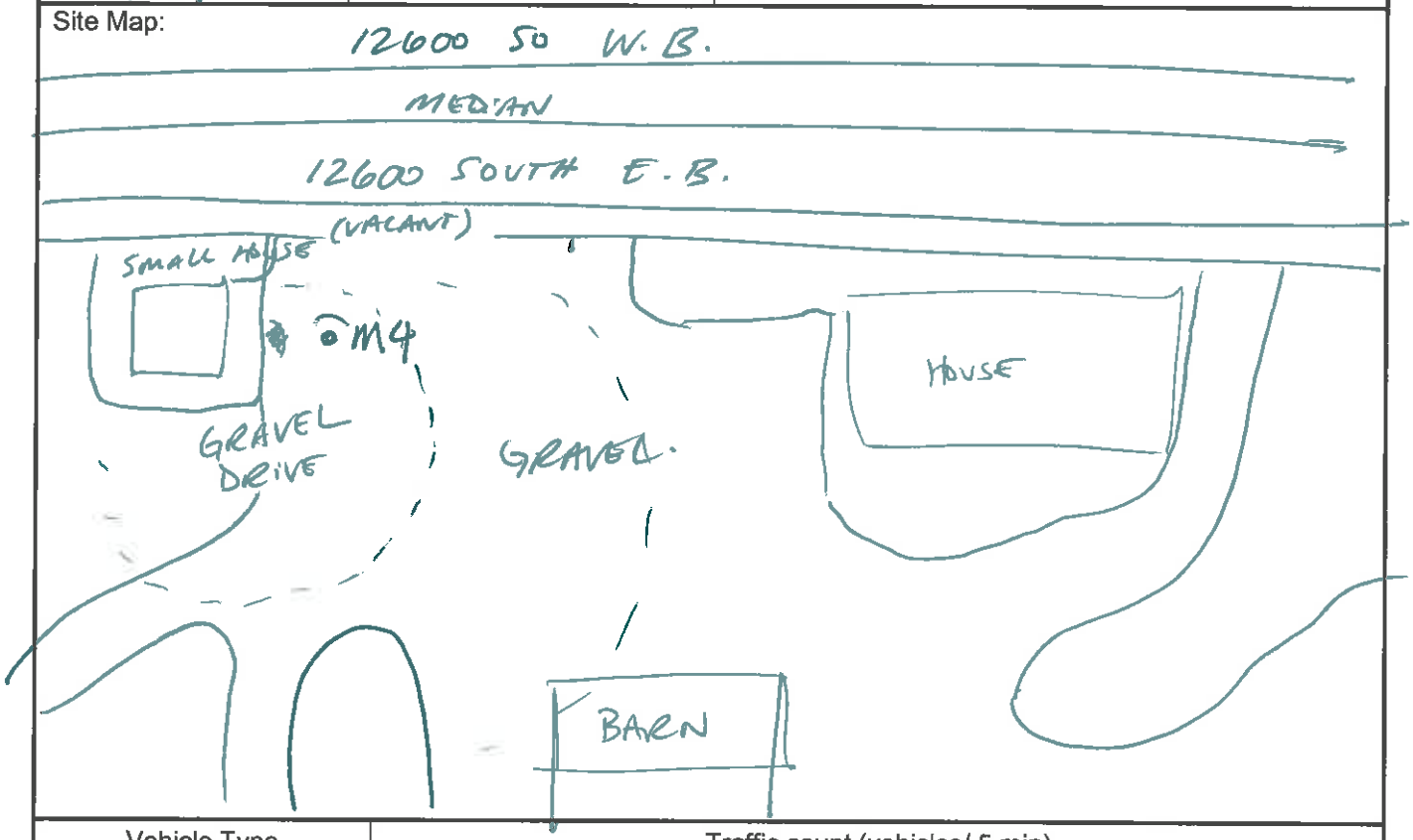


Vehicle Type	Traffic count (vehicles/ 5 min)					
Automobiles						
Heavy Trucks						
Medium Trucks						
Busses/Motorcycles						

Elapsed Time (min)	Comments	Elapsed Time (min)	Comments
1 11:57 (10 MINS)	2 HEAVY TRUCKS.	11	
2 10 MINS.	# 1 SCHOOL BUS.	12	
3 12:00.	TRUCK HORN.	13	
4 12:03	BUS	14	
5 12:04	MOTORCYCLE.	15	
6 12:04	TRUCK BRAKES.	16	
7		17	
8		18	
9		19	
10		20	

Test No.: 4	Project Name: BANG / 12600	Project No.:	Sheet__of
Date: 9/25	Location: M#4	Relative elevation to road:	
Time Started: 2:13PM	Weather Conditions: 66 F / 21% HUMIDITY GUSTY WINDS 2-3MPH	Site Conditions:	
Time Ended: 2:33PM			
Calibration		Date file was downloaded:	
Pre: 94.0		File name:	
Post: 93.9			

Site Map:

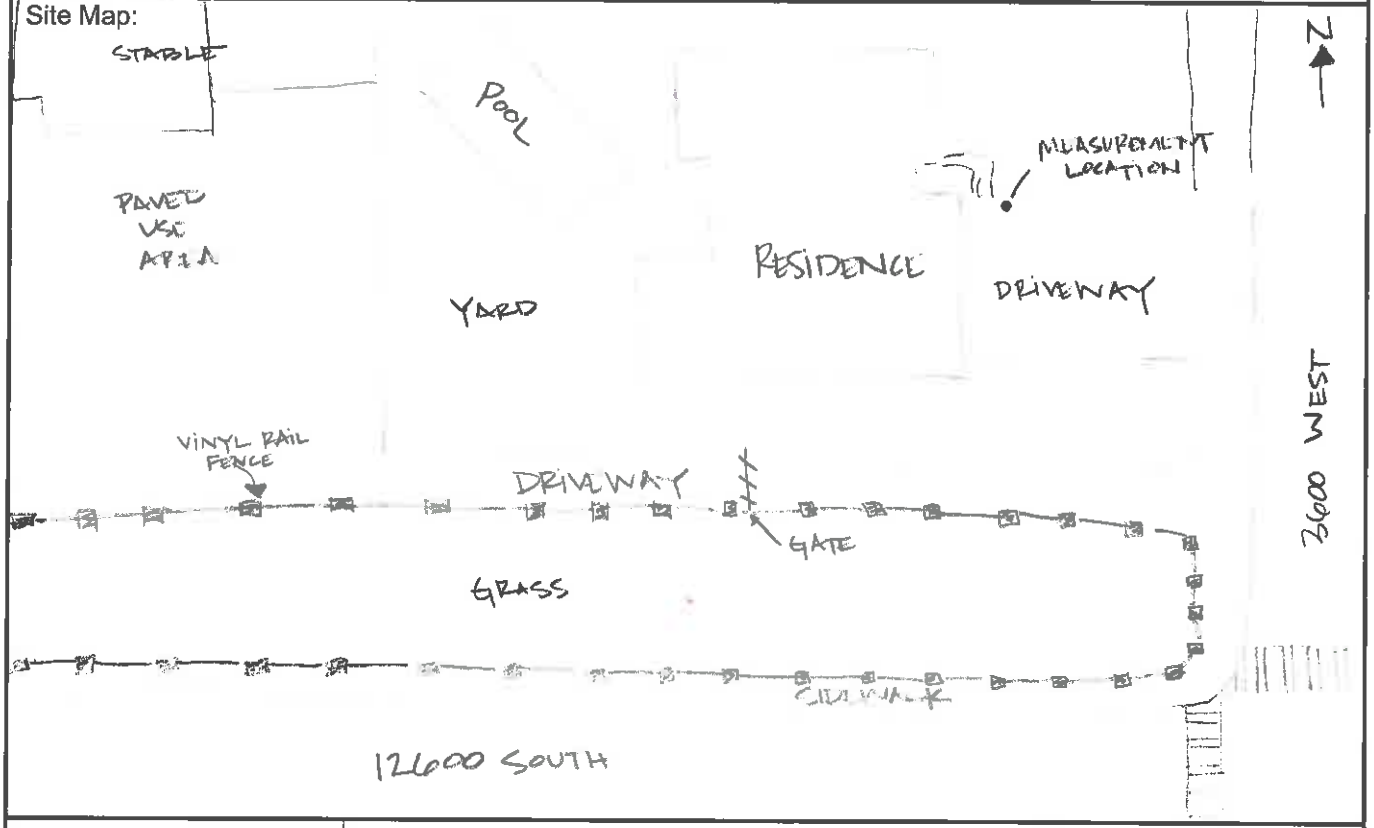


Vehicle Type	Traffic count (vehicles/ 5 min)					
Automobiles						
Heavy Trucks						
Medium Trucks						
Busses/Motorcycles						

Elapsed Time (min)	Comments	Elapsed Time (min)	Comments
1 2:16	CAR BACKING UP NEAR METER	11	
2		12	
3		13	
4		14	
5		15	
6		16	
7		17	
8		18	
9		19	
10		20	

Test No.:	Project Name: Bangerter Hwy 12600 S	Project No.:	Sheet__of
Date: 9/25/18	Location: MS	Relative elevation to road:	
Time Started: 4:41pm	Weather Conditions: Partly cloudy, breezy 68°F 20% humidity 1.5 - 5.0 mph winds	Site Conditions: LANDOWNER NOT HOME AND BACKYARD FENCED OFF. JAY RENDLESBACHER	
Time Ended: 5:01pm			
Calibration		Date file was downloaded:	
Pre: 94.0 dBA		File name:	
Post: 94.0 dBA			

Site Map:



Vehicle Type	Traffic count (vehicles/ 5 min)					
Automobiles						
Heavy Trucks						
Medium Trucks						
Busses/Motorcycles						

Elapsed Time (min)	Comments	Elapsed Time (min)	Comments
1		11	
2		12	
3		13	
4		14	
5		15	
6		16	
7		17	
8		18	
9		19	
10		20	

Test No.: 2	Project Name: BANG. 12600 SO.	Project No.:	Sheet__of
Date:	Location: M-6 BACKYARD	Relative elevation to road:	
Time Started: 1:02	Weather Conditions: WARMER - LESS BREEZY. 65F° 21% HUMIDITY.	Site Conditions:	
Time Ended: 1:23			
Calibration			
Pre: 94.0		Date file was downloaded:	
Post: 93.8-93.9		File name:	

Site Map:

BACK YARD OF RESIDENT, "MIKE" LEONARD (NO LAST NAME GIVEN) 12954 SOUTH SAND CREEK DR.

AMENABLE AND AWARE OF OTHER SURVEYING GOING ON.

Vehicle Type	Traffic count (vehicles/ 5 min)					
Automobiles						
Heavy Trucks						
Medium Trucks						
Busses/Motorcycles						

Elapsed Time (min)	Comments	Elapsed Time (min)	Comments
1	NO NOISE OUT OF ORDINARY	11	
2	TRAFFIC.	12	
3		13	
4		14	
5		15	
6		16	
7		17	
8		18	
9		19	
10		20	

HORROCKS ENGINEERS

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801-763-5100
www.horrocks.com

To: Elisa Albury, UDOT Environmental Program Manager

From: Nicole Tolley, Environmental Specialist

Date: August 27, 2018 **Memorandum**

Subject: Bangerter Highway @ 12600 South

PIN: 14417, Project No.: S-0154(86)6

Noise Monitoring Location Memo

Introduction

UDOT is proposing to construct a grade-separated Single Point Urban Interchange (SPUI) at the existing intersection of Bangerter Highway (SR-154) and 12600 South. The new interchange would allow for unimpeded traffic flow along Bangerter Highway and improved LOS operations into the year 2040. The project area is along Bangerter Highway between approximate milepost 6 to 7.5, and on 12600 South between 4150 West and 3600 West (see attached study area map). The project includes: construction of a grade-separated interchange with exit/entrance ramps from Bangerter Highway to 12600 South; utility and storm drainage modifications; and installation of new pavement, traffic signals, ATMS equipment, and roadway signage. To accommodate the proposed upgrades, the existing pedestrian bridge over Bangerter Highway would be permanently removed and is not anticipated to be reconstructed due to the lack of use. This project would also require right-of-way acquisition.

In accordance with the UDOT Noise Abatement Policy, this project is a Type I Project and requires a traffic noise analysis.

Noise Sensitive Land Uses

Noise sensitive land uses include land uses within Activity Categories A, B, C, D, and E. See Table 1 for a description of the noise sensitive land uses within the study area. See attached Activity Categories and Noise Monitoring Site Maps for the activity categories where the study team is proposing to take noise measurement.

Table 1: Description of Activity Categories within the Study Area

Activity Category	Description of Location within Study Area
A	• None
B	• Residential neighborhoods within the study area
C	• Riverton Hospital (outside playground) • Blooming Minds Montessori Preschool at 12447 South Crossing Drive #4 (outside playground) • Church of Jesus Christ of Latter-Day Saints at 4080 West 12600 South (softball fields)
D	• Larkin Mortuary at 3688 West 12600 South (interior) • Church of Jesus Christ of Latter-Day Saints at 12173 South 4000 West (interior)
E	• Restaurants and Offices within the study area
F (noise impact analysis not required)	• Retail Facilities • Self-storage facilities • Agricultural land
G (noise impact analysis not required)	• Undeveloped land within the study area

Noise Monitoring Sites

Noise measurement are proposed at 6 sites along the study corridor (see Activity Categories and Noise Monitoring Sites Maps and Table 2). These measurements will be used to create a validated traffic noise model for noise-sensitive areas near the project. Noise-sensitive areas are defined as areas where frequent exterior human use occurs and where a lowered noise level would be of benefit.

Table 2: Noise Monitoring Sites

Map ID	**Activity Category**	**Address and Description of Site**
M1	B	Residence; 12207 South 3900 West, Riverton, UT
M2	B	Residence; 12233 South 4000 West, Riverton, UT
M3	E	Outdoor seating and tables at office building; 12537 South Crossing Drive, Riverton, UT
M4	B	Residence; 4121 West 12600 South, Riverton, UT
M5	B	Residence; 12570 South 3600 West, Riverton, UT
M6	B	Residence; 12984 Sand Creek Drive, Riverton, UT

Noise Measurement Procedures

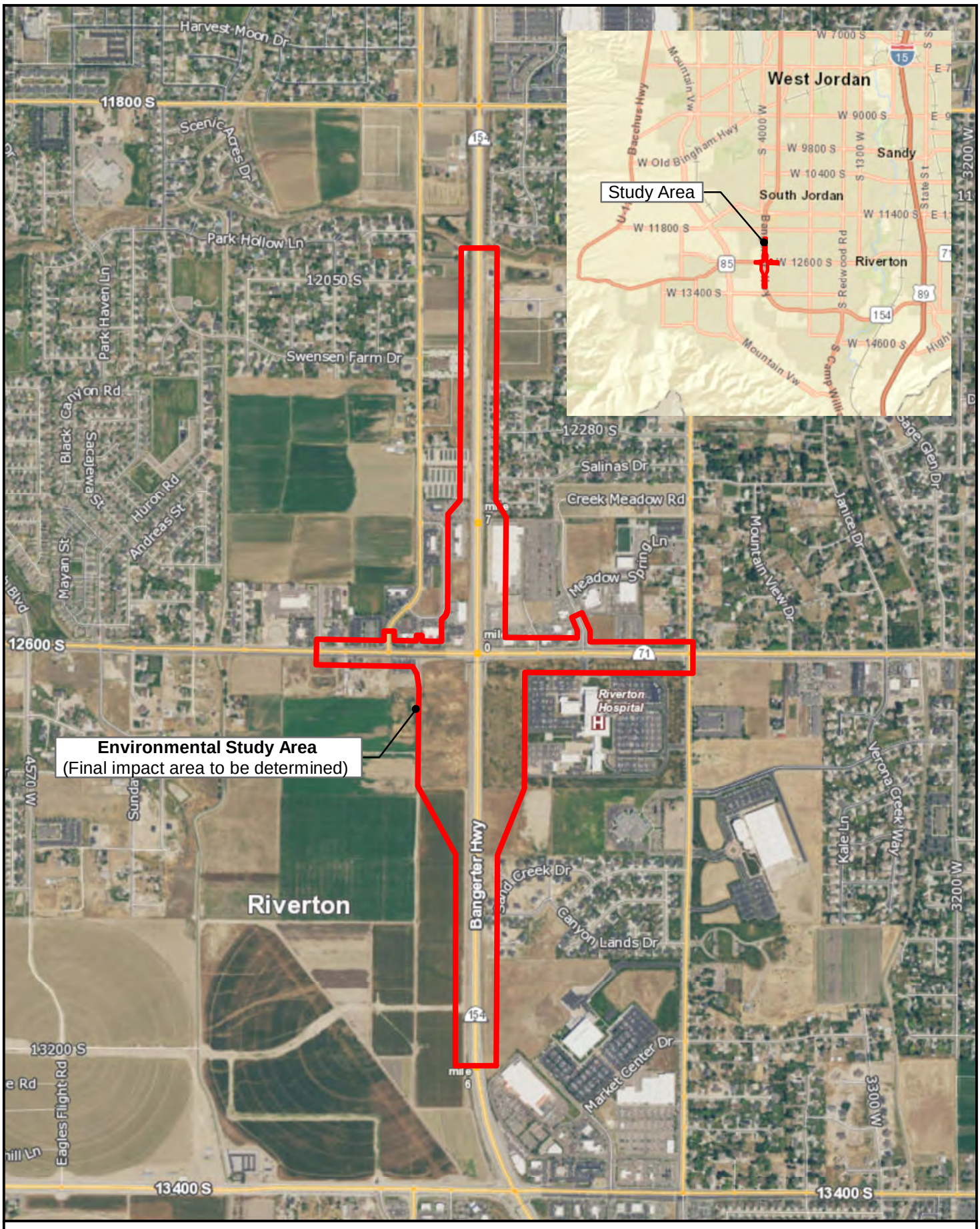
Noise measurements will be taken with an Extech Instruments SDL600 sound level meter/data logger for a duration of 20 minutes at each location. Data will be gathered for noise measurements to construct a validated noise model, including collecting traffic volumes (from UDOT Performance Measurement System, measurement site traffic counts, and mobile traffic cameras), vehicle mixes (defined by axles), and speeds; noting weather conditions; recording foliage types and density; identifying noise sources other than traffic; and recording any abnormal events which, if included in the data, would skew the results. Sketches showing monitoring locations will be prepared and photographs of the measurement area will be taken.

Noise Modeling Procedures

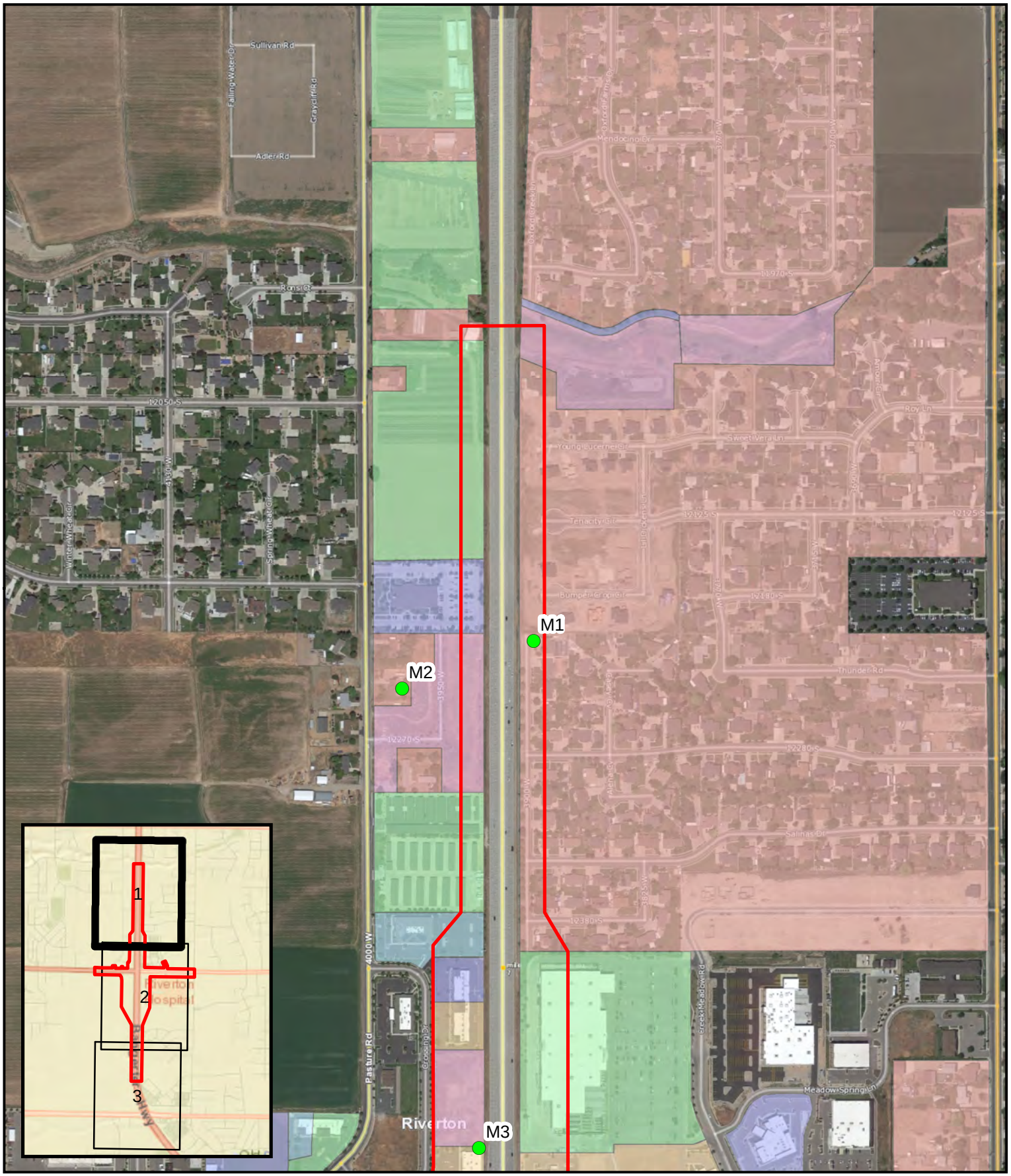
Noise modeling will be completed using the FHWA's Traffic Noise Model (TNM, v2.5) since the newer version of TNM (v3.0) is not currently available for use at this time.

UDOT Noise Policy

The noise analysis will comply with the most recent version of the UDOT Noise Abatement Policy released June 2017.



Bangerter Hwy @ 12600 South



Measurement Location

Activity Category

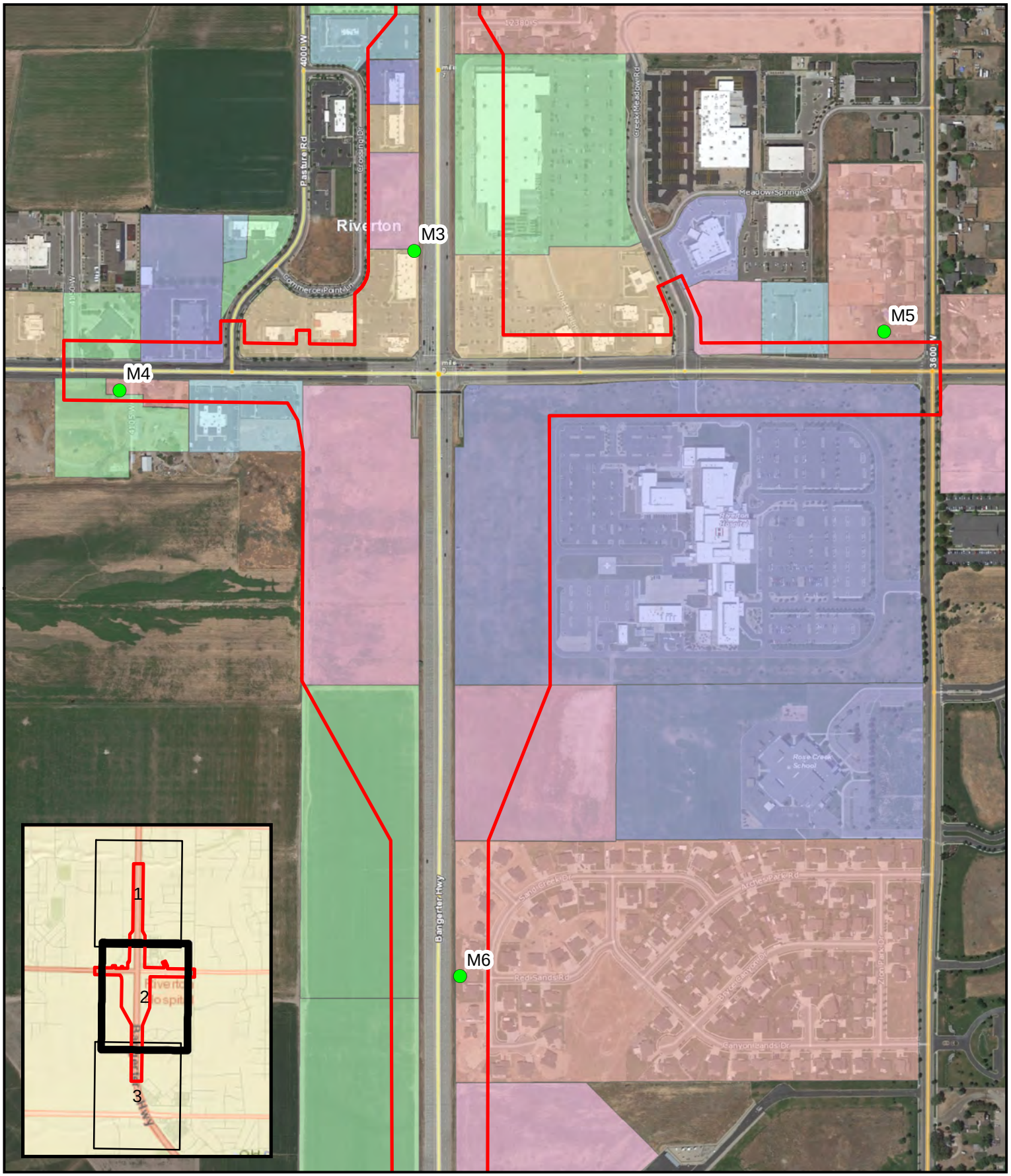
B	E
C	F
D	G

Bangerter Hwy @ 12600 South
Noise Monitoring Sites

1 inch = 533 feet

Miles

0 0.05 0.1 0.2



Measurement Location

Activity Category

B	E
C	F
D	G

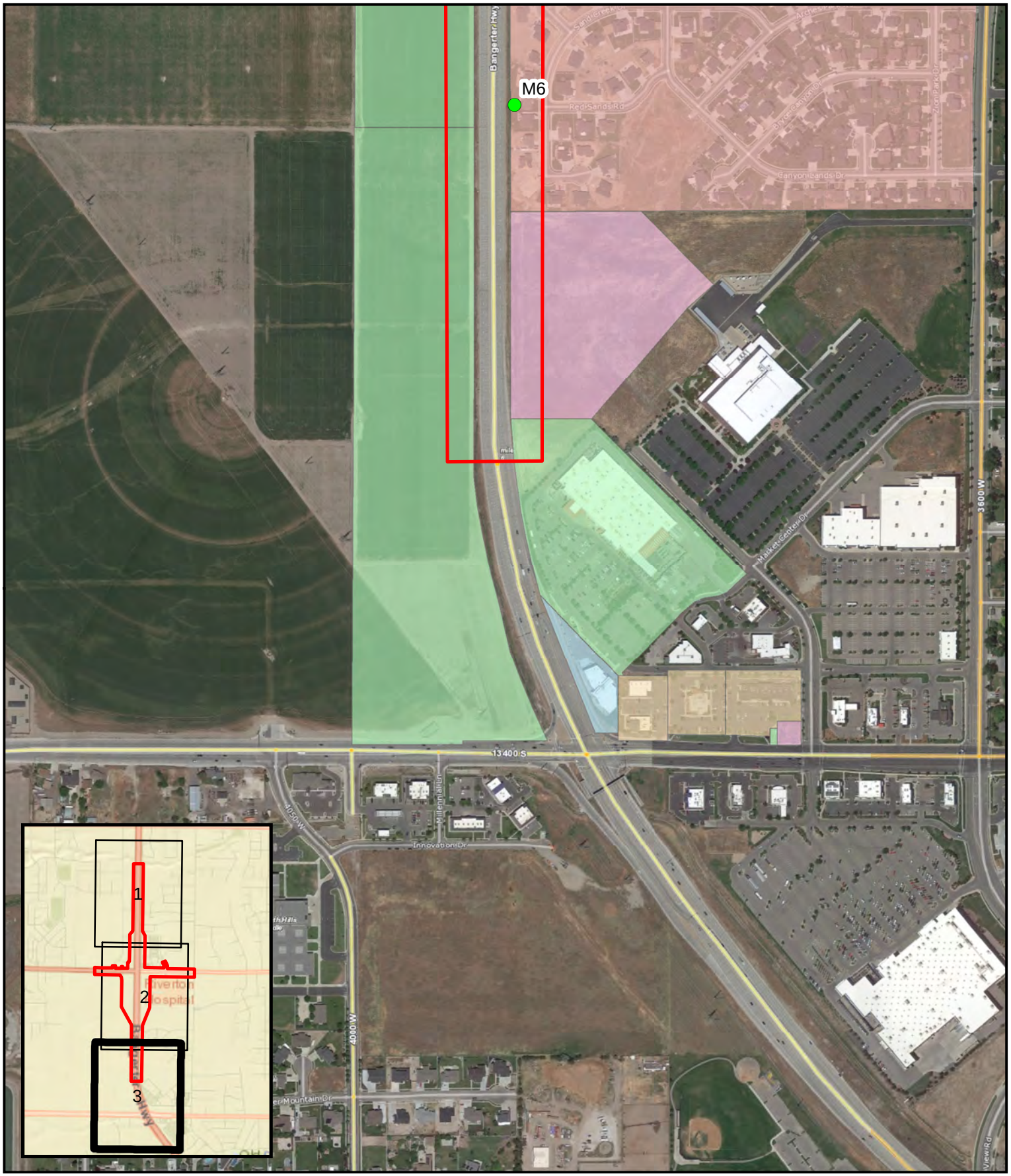
Bangerter Hwy @ 12600 South
Noise Monitoring Sites

1 inch = 533 feet

N

Miles

0 0.05 0.1 0.2



Measurement Location

Activity Category

B
C
D
E
F
G

Bangerter Hwy @ 12600 South
Noise Monitoring Sites

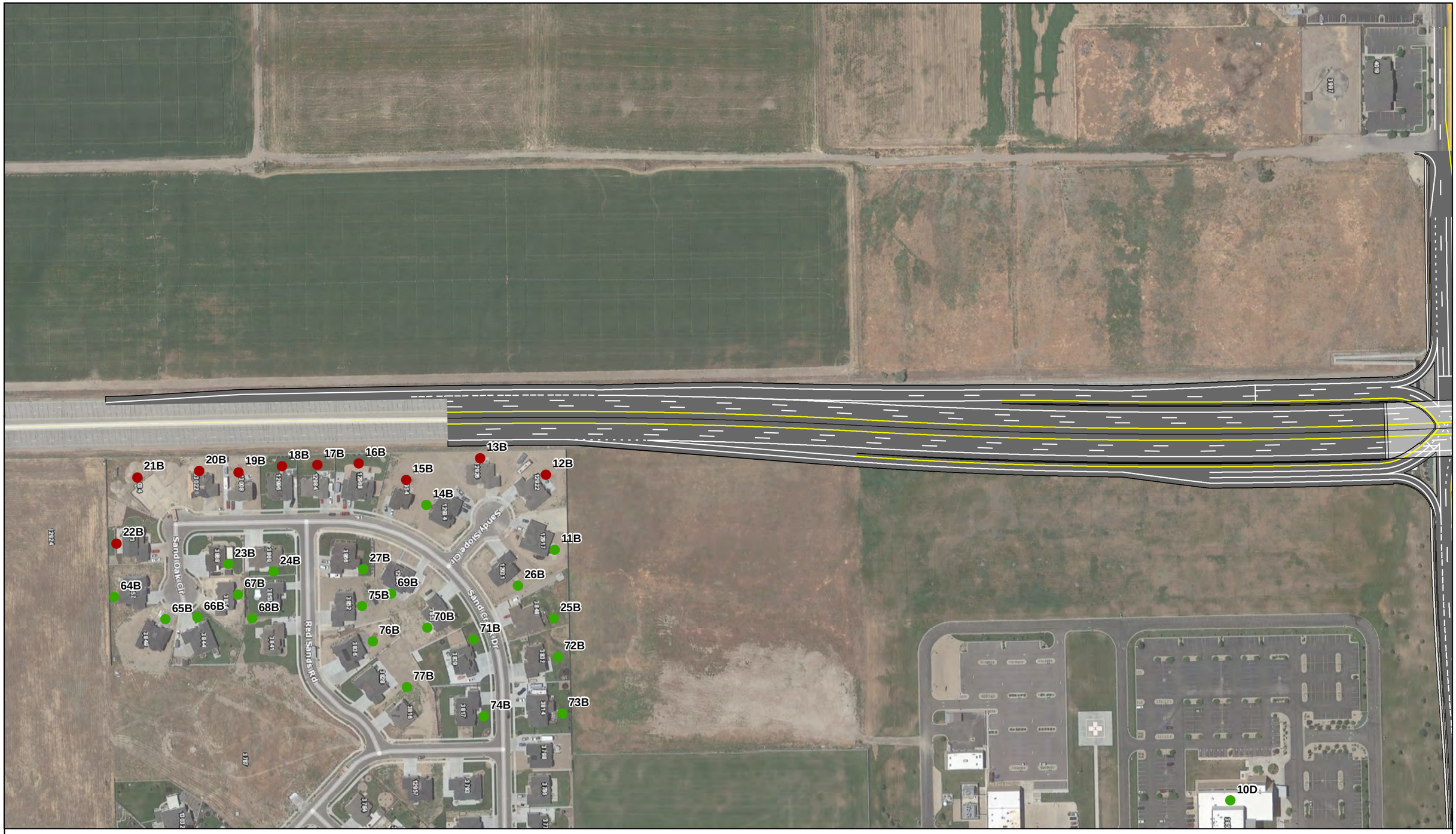
1 inch = 533 feet

N

Miles

0 0.05 0.1 0.2

APPENDIX B: BUILD NOISE LEVELS MAPS

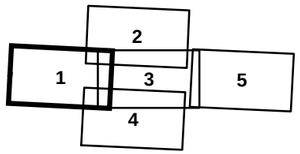


Build Impact

- No
- Yes

Existing Noise Wall to be Removed

Existing Noise Wall to Remain in Place



Bangerter Highway at 12600 South

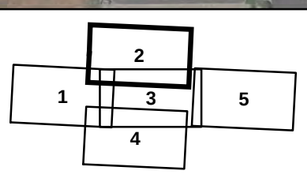
Build Noise Levels

Map 1 of 5

Build Impact

- No
- Yes

- Existing Noise Wall to be Removed
- Existing Noise Wall to Remain in Place



Bangerter Highway at 12600 South

Build Noise Levels

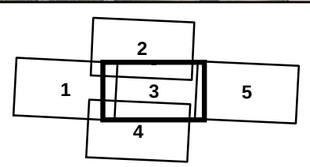
Map 2 of 5

Build Impact

- No
- Yes

Existing Noise Wall to be Removed

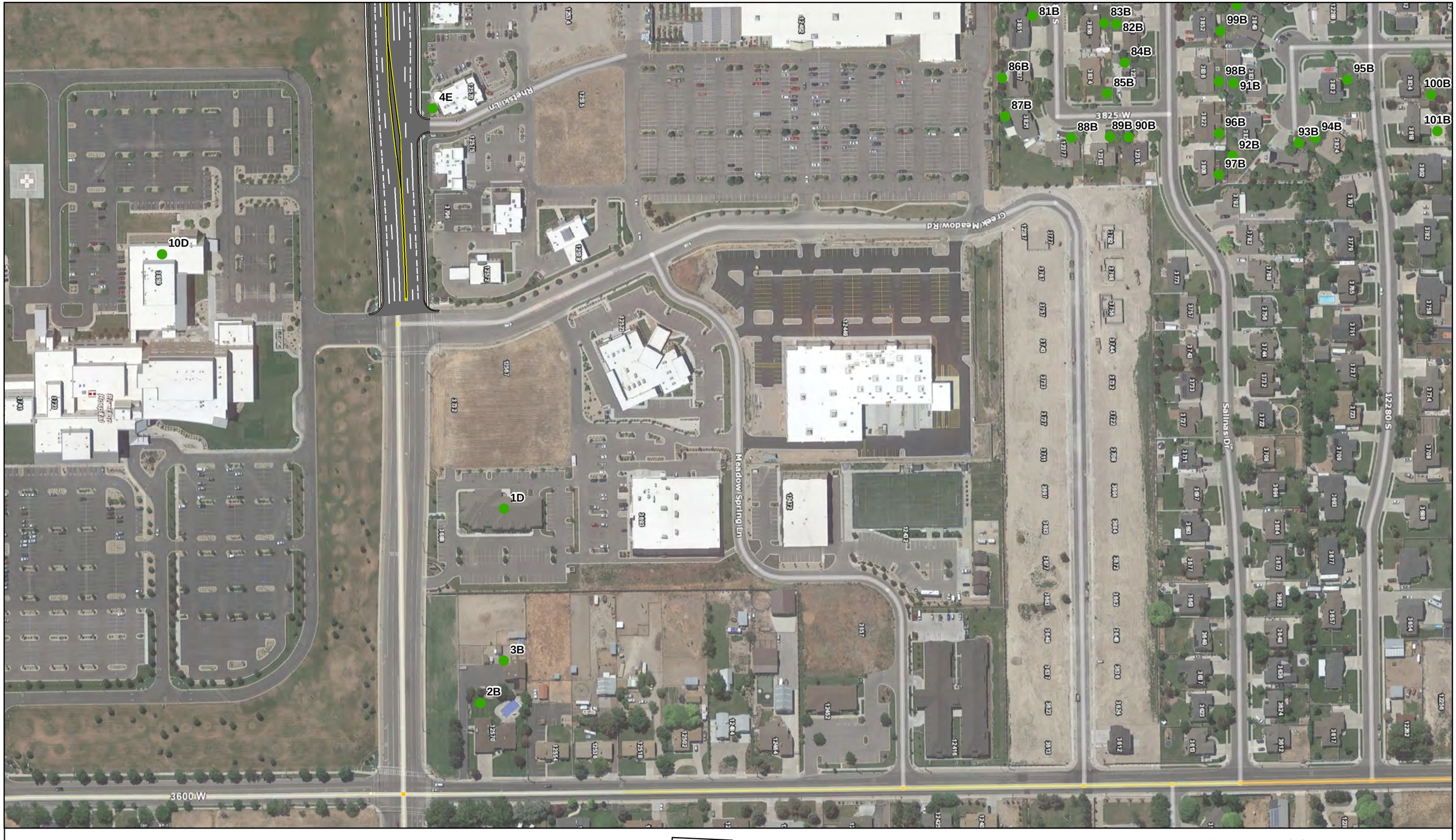
Existing Noise Wall to Remain in Place



Bangerter Highway at 12600 South

Build Noise Levels

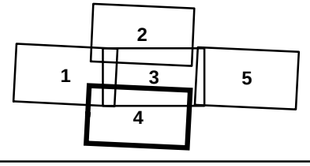
Map 3 of 5



Build Impact

- No
- Yes

- Existing Noise Wall to be Removed
- Existing Noise Wall to Remain in Place



Bangerter Highway at 12600 South

Build Noise Levels

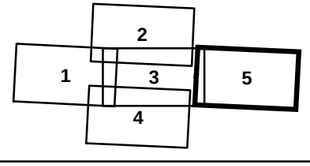
Map 4 of 5

Build Impact

- No
- Yes

Existing Noise Wall to be Removed

Existing Noise Wall to Remain in Place

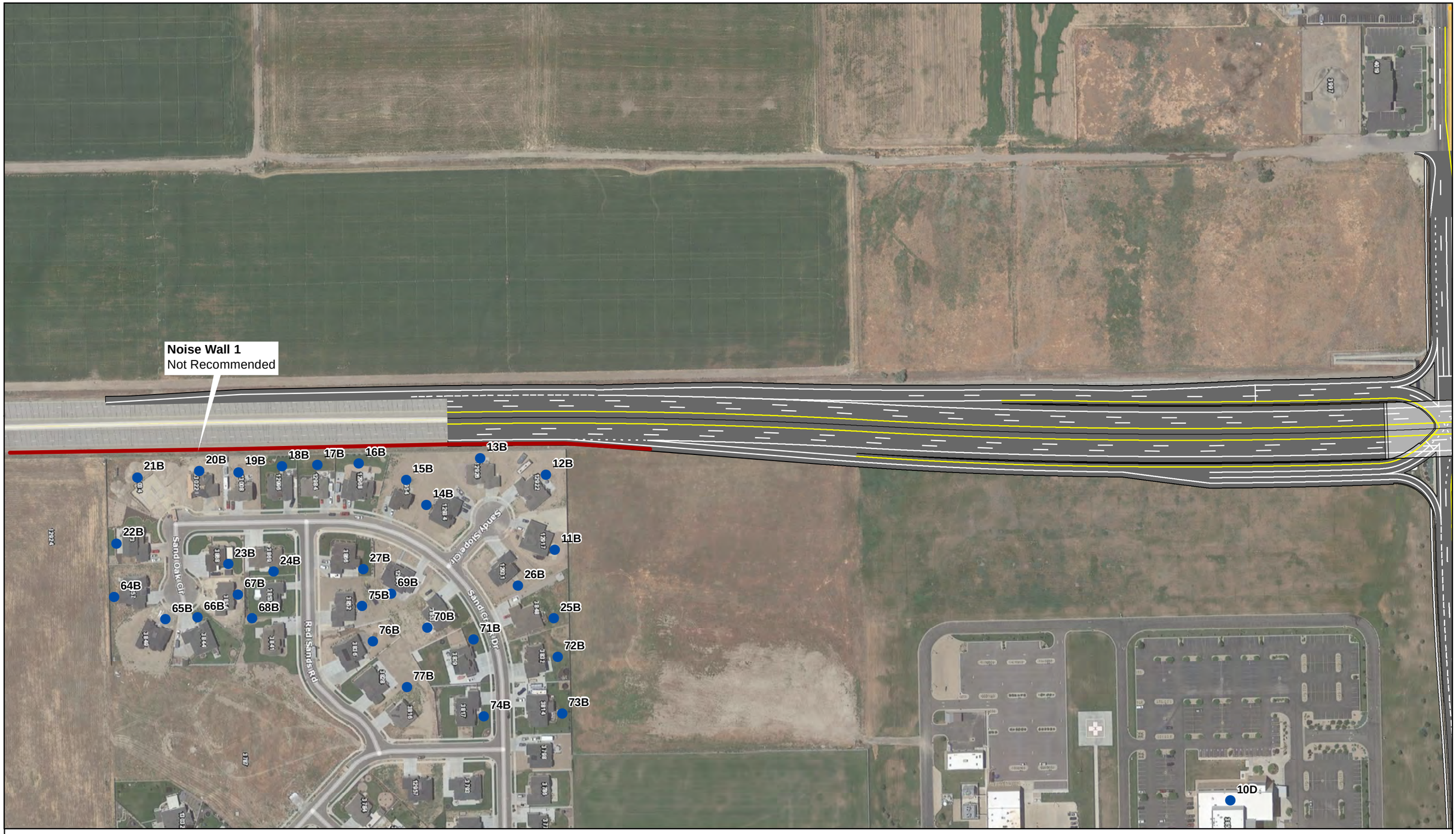


Bangerter Highway at 12600 South

Build Noise Levels

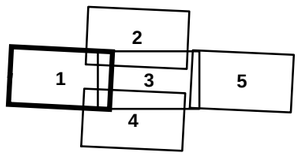
Map 5 of 5

APPENDIX C: NOISE WALL MAPS



Analyzed Noise Wall

- Feasible and Reasonable
- Not Feasible and Reasonable
- Remain in Place
- Receptor Location



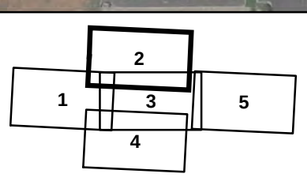
Bangerter Highway at 12600 South

Noise Wall

Map 1 of 5

Analyzed Noise Wall

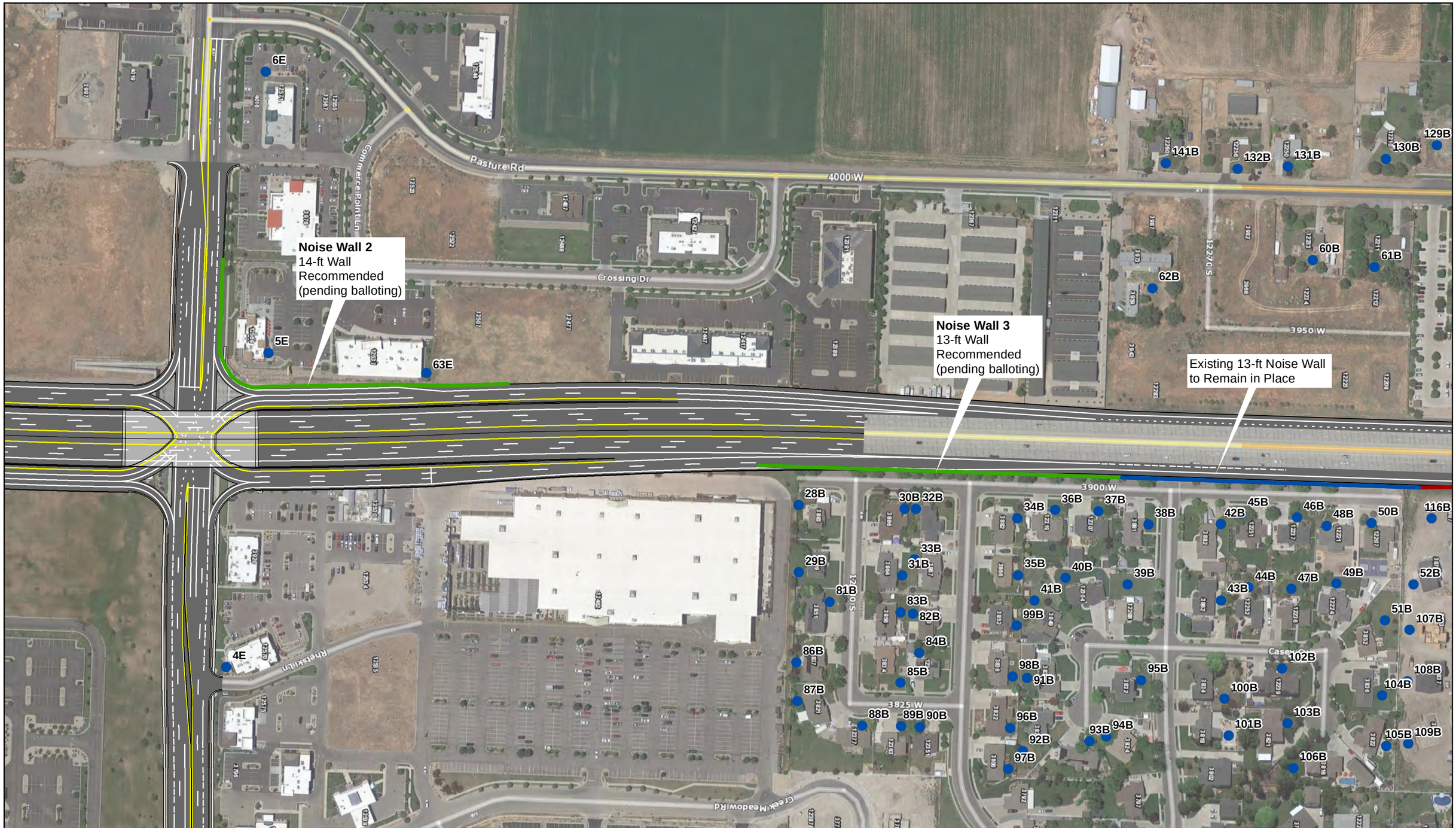
- Feasible and Reasonable
- Not Feasible and Reasonable
- Remain in Place
- Receptor Location



Bangerter Highway at 12600 South

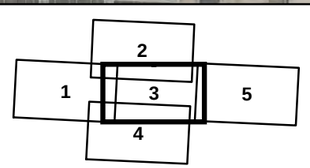
Noise Wall

Map 2 of 5



Analyzed Noise Wall

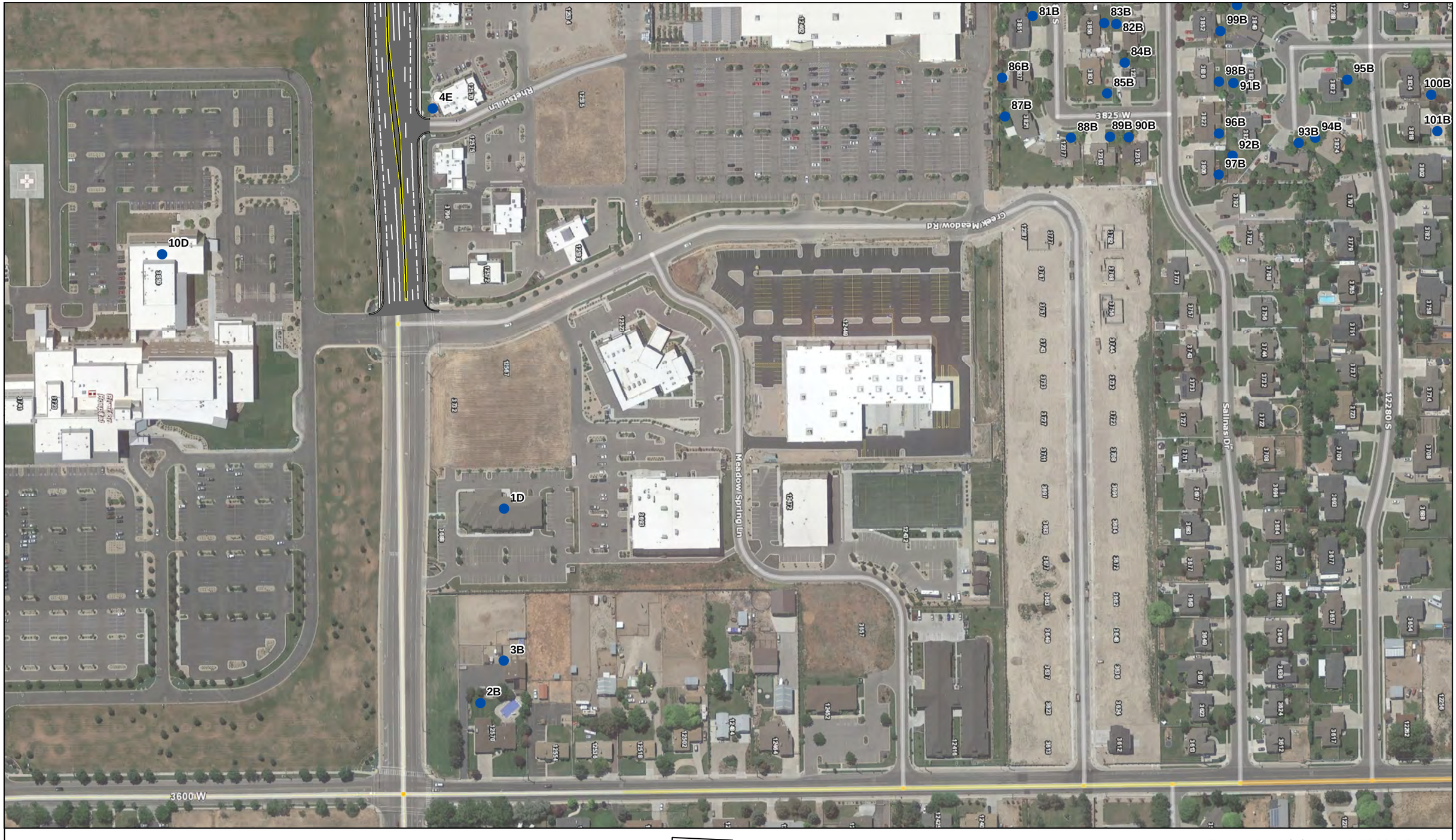
- Feasible and Reasonable
- Not Feasible and Reasonable
- Remain in Place
- Receptor Location



Bangerter Highway at 12600 South

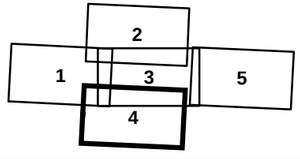
Noise Wall

Map 3 of 5



Analyzed Noise Wall

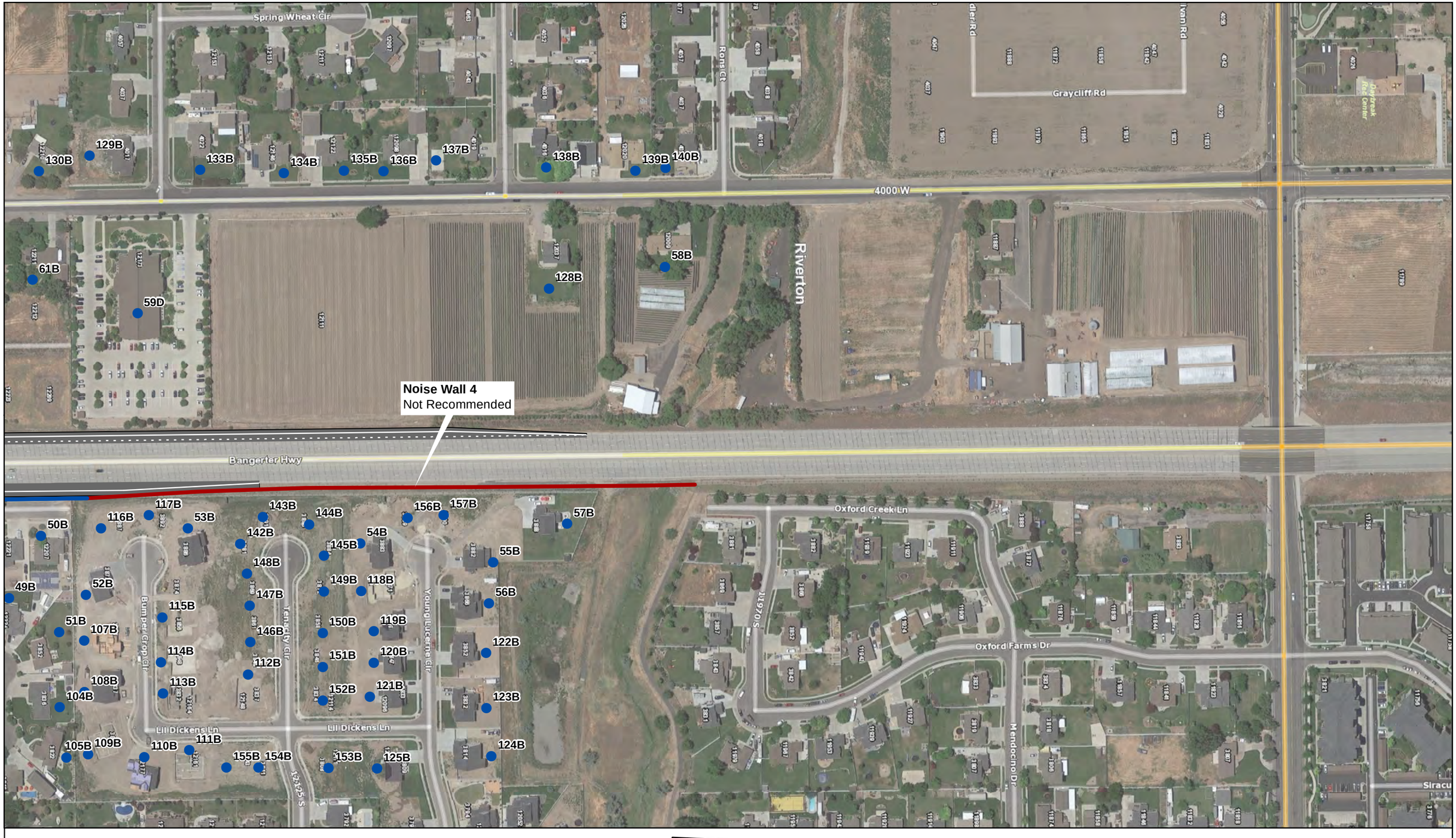
- Feasible and Reasonable
- Not Feasible and Reasonable
- Remain in Place
- Receptor Location



Bangerter Highway at 12600 South

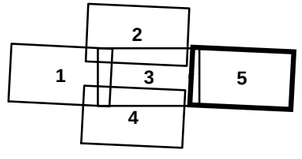
Noise Wall

Map 4 of 5



Analyzed Noise Wall

- Feasible and Reasonable
- Not Feasible and Reasonable
- Remain in Place
- Receptor Location



Bangerter Highway at 12600 South

Noise Wall

APPENDIX D: NOISE WALL ANALYSES

Noise Wall 1

Total Wall Length: 1414 ft
Wall Cost per sq ft: $20
Cost of items critical to safety: $25 ($25/ft for snow storage)
# of First Row Receivers: 10

Name	# of DU	Relocation	1st Row	# of 1st Row	10-ft Wall	Design Goal	Benefited	1st Row Design Goal	1st Row 5 dBA Reduction	12-ft Wall	Design Goal	Benefited	1st Row Design Goal	1st Row 5 dBA Reduction	14-ft Wall	Design Goal	Benefited	1st Row Design Goal	1st Row 5 dBA Reduction	16-ft Wall	Design Goal	Benefited	1st Row Design Goal	1st Row 5 dBA Reduction	18-ft Wall	Design Goal	Benefited	1st Row Design Goal	# 1st Row Design Goal	1st Row 5 dBA Reduction
11B	1			0	1.7	No	No	No	No	2.3	No	No	No	No	2.5	No	No	No	No	2.7	No	No	No	No	2.8	No	No	No	0	No
12B"	1		Yes	1	3.4	No	No	No	No	3.2	No	No	No	No	4.1	No	No	No	No	4.8	No	No	No	No	5.4	No	Yes	No	0	Yes
13B"	1		Yes	1	3	No	No	No	No	3.4	No	No	No	No	3.6	No	No	No	No	4.4	No	No	No	No	5.2	No	Yes	No	0	Yes
14B"	1		Yes	1	0.9	No	No	No	No	2.4	No	No	No	No	3.1	No	No	No	No	3.7	No	No	No	No	4.1	No	No	No	0	No
15B"	1		Yes	1	1.9	No	No	No	No	4.1	No	No	No	No	5.1	No	Yes	No	Yes	6	No	Yes	No	Yes	6.7	No	Yes	No	0	Yes
16B"	1		Yes	1	6.1	No	Yes	No	Yes	5	No	Yes	No	Yes	4.7	No	No	No	No	5.7	No	Yes	No	Yes	6.6	No	Yes	No	0	Yes
17B"	1		Yes	1	5.6	No	Yes	No	Yes	3.5	No	No	No	No	4.5	No	No	No	No	5.3	No	Yes	No	Yes	6	No	Yes	No	0	Yes
18B"	1		Yes	1	3.6	No	No	No	No	3.6	No	No	No	No	4.5	No	No	No	No	5.4	No	Yes	No	Yes	6.2	No	Yes	No	0	Yes
19B"	1		Yes	1	2.7	No	No	No	No	3.5	No	No	No	No	4.4	No	No	No	No	5.2	No	Yes	No	Yes	5.8	No	Yes	No	0	Yes
20B"	1		Yes	1	3.8	No	No	No	No	5.1	No	Yes	No	Yes	6	No	Yes	No	Yes	6.8	No	Yes	No	Yes	7.5	Yes	Yes	Yes	1	Yes
21B"	1		Yes	1	3.4	No	No	No	No	5.3	No	Yes	No	Yes	6.2	No	Yes	No	Yes	6.8	No	Yes	No	Yes	7.3	Yes	Yes	Yes	1	Yes
22B"	1			0	2.6	No	No	No	No	3.6	No	No	No	No	4	No	No	No	No	4.3	No	No	No	No	4.5	No	No	No	0	No
23B"	1			0	1.4	No	No	No	No	2.6	No	No	No	No	3	No	No	No	No	3.3	No	No	No	No	3.6	No	No	No	0	No
24B"	1			0	1.1	No	No	No	No	2.3	No	No	No	No	2.7	No	No	No	No	3.1	No	No	No	No	3.4	No	No	No	0	No
25B"	1			0	1.1	No	No	No	No	1.5	No	No	No	No	1.6	No	No	No	No	1.7	No	No	No	No	1.8	No	No	No	0	No
26B"	1			0	1.2	No	No	No	No	1.8	No	No	No	No	1.9	No	No	No	No	2.2	No	No	No	No	2.3	No	No	No	0	No
27B"	1			0	1.2	No	No	No	No	2.4	No	No	No	No	2.8	No	No	No	No	3.3	No	No	No	No	3.7	No	No	No	0	No
64B"	1			0	2.2	No	No	No	No	2.9	No	No	No	No	3.1	No	No	No	No	3.2	No	No	No	No	3.3	No	No	No	0	No
65B"	1			0	1.6	No	No	No	No	2.3	No	No	No	No	2.6	No	No	No	No	2.7	No	No	No	No	2.9	No	No	No	0	No
66B"	1			0	1.2	No	No	No	No	2	No	No	No	No	2.3	No	No	No	No	2.5	No	No	No	No	2.6	No	No	No	0	No
67B"	1			0	0.7	No	No	No	No	1.6	No	No	No	No	1.9	No	No	No	No	2.1	No	No	No	No	2.3	No	No	No	0	No
68B"	2			0	0.9	No	No	No	No	1.7	No	No	No	No	2	No	No	No	No	2.2	No	No	No	No	2.4	No	No	No	0	No
69B"	1			0	1.3	No	No	No	No	2.2	No	No	No	No	2.5	No	No	No	No	2.8	No	No	No	No	2.9	No	No	No	0	No
70B"	1			0	0.8	No	No	No	No	1.4	No	No	No	No	1.6	No	No	No	No	1.8	No	No	No	No	1.9	No	No	No	0	No
71B"	1			0	0.8	No	No	No	No	1.5	No	No	No	No	1.8	No	No	No	No	2.1	No	No	No	No	2.2	No	No	No	0	No
72B"	1			0	1	No	No	No	No	1.4	No	No	No	No	1.5	No	No	No	No	1.6	No	No	No	No	1.7	No	No	No	0	No
73B"	1			0	0.8	No	No	No	No	1.3	No	No	No	No	1.4	No	No	No	No	1.5	No	No	No	No	1.6	No	No	No	0	No
74B"	1			0	0.6	No	No	No	No	1.3	No	No	No	No	1.5	No	No	No	No	1.6	No	No	No	No	1.7	No	No	No	0	No
75B"	1			0	0.9	No	No	No	No	1.8	No	No	No	No	2.1	No	No	No	No	2.3	No	No	No	No	2.5	No	No	No	0	No
76B"	1			0	0.9	No	No	No	No	1.8	No	No	No	No	2.1	No	No	No	No	2.3	No	No	No	No	2.4	No	No	No	0	No
77B"	2			0	0.7	No	No	No	No	1.4	No	No	No	No	1.7	No	No	No	No	1.9	No	No	No	No	2	No	No	No	0	No

Feasibility Factors:

# of First-Row 5 dBA Reduction:	2	3	3	7	9
% of First-Row 5 dBA Reduction:	20.0%	30.0%	30.0%	70.0%	90.0%
Acoustic Feasibility (5 dBA reduction for 50% of front-row):	**No**	**No**	**No**	**Yes**	**Yes**
Reasonableness Factors:					
# of First-Row Design Goal:	0	0	0	0	2
% of First-Row Design Goal:	0.0%	0.0%	0.0%	0.0%	20.0%
Noise Abatement Design Goal (7 dBA reduction for 35% of front-row):	**No**	**No**	**No**	**No**	**No**
# of Benefited:	2	3	3	7	9
Cost of Noise Wall (Length x Height x $20/sq ft):	$282,800.00	$339,360.00	$395,920.00	$452,480.00	$509,040.00
Cost of any other items critical to safety:	$35,350.00	$35,350.00	$35,350.00	$35,350.00	$35,350.00
Anticipated Cost of Noise Abatement:	$318,150.00	$374,710.00	$431,270.00	$487,830.00	$544,390.00
Allowable Cost ($30,000 per benefitted receptor):	$60,000.00	$90,000.00	$90,000.00	$210,000.00	$270,000.00
Cost Effective (Anticipated Cost < Allowable Cost):	**No**	**No**	**No**	**No**	**No**
Feasible and Reasonable:	**No**	**No**	**No**	**No**	**No**

Noise Wall 2

Total Wall Length	873	ft
Length of Activity Category C Land Use:	873	ft
Wall Cost per sq ft:	$20	
Cost of items critical to safety:	$25	($25/ft for snow storage)
# of First Row Receivers:	2	

Name	# of DU	Relocation	1st Row	# of 1st Row	Baseline Noise	12-ft Wall	Design Goal	Benefited	1st Row Design Goal	1st Row 5 dBA	14-ft Wall	Design Goal	Benefited	1st Row Design	1st Row 5 dBA	16-ft Wall	Design Goal	Benefited	1st Row Design	1st Row 5 dBA	18-ft Wall	Design Goal	Benefited	1st Row Design	1st Row 5 dBA
5E	1		Yes	1		2.3	No	No	No	No	2.9	No	No	No	No	4.1	No	No	No	No	5.7	No	Yes	No	Yes
63E	1		Yes	1		6.2	No	Yes	No	Yes	7.1	Yes	Yes	Yes	Yes	7.9	Yes	Yes	Yes	Yes	8.6	Yes	Yes	Yes	Yes

Feasibility Factors:				
# of First-Row 5 dBA Reduction:	1	1	1	2
% of First-Row 5 dBA Reduction:	50.0%	50.0%	50.0%	100.0%
Acoustic Feasibility (5 dBA reduction for 50% of front-row):	**Yes**	**Yes**	**Yes**	**Yes**
Reasonableness Factors:				
# of First-Row Design Goal:	0	1	1	1
% of First-Row Design Goal:	0.0%	50.0%	50.0%	50.0%
Noise Abatement Design Goal (7 dBA reduction for 35% of front-row):	**No**	**Yes**	**Yes**	**Yes**
Cost of Noise Wall (Length x Height x $20/sq ft):	N/A	$244,440.00	$279,360.00	$314,280.00
Cost of any other items critical to safety:	N/A	$21,825.00	$21,825.00	$21,825.00
Anticipated Cost of Noise Abatement:	N/A	$266,265.00	$301,185.00	$336,105.00
Activity Category C Allowable Cost ($360/linear ft):	N/A	$314,280.00	$314,280.00	$314,280.00
Allowable Cost:	N/A	$314,280.00	$314,280.00	$314,280.00
Cost Effective (Anticipated Cost < Allowable Cost):	**No**	**Yes**	**Yes**	**No**
Feasible and Reasonable:	**No**	**Yes**	**Yes**	**No**

Noise Wall 3

Length	800	ft	Assumes existing 13-ft Noise Wall to north will remain in place
Wall Cost per sq ft:	$20		
Cost of items critical to safety:	$25	($25/ft for snow storage)	
# of First Row Receivers:	6		

Name	# of DU	Relocation	1st Row	# of 1st Row	Baseline Noise	13-ft Noise Level	13-ft Wall	Design Goal	Benefited	1st Row Design	1st Row 5 dBA
28B	1		Yes	1	74.2	67.3	6.9	No	Yes	No	Yes
29B"	1			0	67.4	63.8	3.6	No	No	No	No
30B"	1		Yes	1	74.3	64.1	10.2	Yes	Yes	Yes	Yes
31B"	1			0	67.3	61.4	5.9	No	Yes	No	No
32B"	1		Yes	1	74.2	64	10.2	Yes	Yes	Yes	Yes
33B"	1			0	67.7	61.5	6.2	No	Yes	No	No
34B"	1		Yes	1	73.2	63.7	9.5	Yes	Yes	Yes	Yes
35B"	1			0	66.7	60.5	6.2	No	Yes	No	No
36B"	1		Yes	1	74	64.2	9.8	Yes	Yes	Yes	Yes
37B"	1		Yes	1	73.2	64.3	8.9	Yes	Yes	Yes	Yes
38B"	1			0	68.5	63.3	5.2	No	Yes	No	No
39B"	1			0	63.7	60.6	3.1	No	No	No	No
40B"	1			0	64.5	60.2	4.3	No	No	No	No
41B"	1			0	64.9	59.6	5.3	No	Yes	No	No
42B"	1			0	65.4	63.6	1.8	No	No	No	No
43B"	1			0	62.4	60	2.4	No	No	No	No
44B"	1			0	61.9	60.6	1.3	No	No	No	No
45B"	1			0	65.7	64.5	1.2	No	No	No	No
46B"	1			0	65.4	64.8	0.6	No	No	No	No
47B"	1			0	61.6	60.8	0.8	No	No	No	No
48B"	1			0	66	65.6	0.4	No	No	No	No
49B"	1			0	62.1	61.5	0.6	No	No	No	No
50B"	1			0	66.5	66.3	0.2	No	No	No	No
51B"	1			0	61.3	61.1	0.2	No	No	No	No
52B"	1			0	63.2	63.1	0.1	No	No	No	No
81B"	1			0	65.8	61.8	4	No	No	No	No
82B"	1			0	65.1	60	5.1	No	Yes	No	No
83B"	1			0	65.4	60.2	5.2	No	Yes	No	No
84B"	1			0	61.8	58.2	3.6	No	No	No	No
85B"	1			0	61.3	58.2	3.1	No	No	No	No
86B"	1			0	62.4	60.2	2.2	No	No	No	No
87B"	1			0	61.2	59.3	1.9	No	No	No	No
88B"	1			0	60.2	57.9	2.3	No	No	No	No
89B"	1			0	60.2	57.4	2.8	No	No	No	No
90B"	1			0	59.9	57.1	2.8	No	No	No	No
91B"	1			0	60.5	57.3	3.2	No	No	No	No
92B"	1			0	58.6	56.1	2.5	No	No	No	No
93B"	1			0	58.1	56.2	1.9	No	No	No	No
94B"	1			0	58.3	56.2	2.1	No	No	No	No
95B"	1			0	59.2	57.2	2	No	No	No	No

Noise Wall 3

Length 800 ft Assumes existing 13-ft Noise Wall to north will remain in place
Wall Cost per sq ft: $20
Cost of items critical to safety: $25 ($25/ft for snow storage)
# of First Row Receivers: 6

Name	# of DU	Relocation	1st Row	# of 1st Row	Baseline Noise	13-ft Noise Level	13-ft Wall	Design Goal	Benefited	1st Row Design	1st Row 5 dBA
96B"	1			0	59.5	56.5	3	No	No	No	No
97B"	1			0	58.3	55.8	2.5	No	No	No	No
98B"	1			0	61.1	57.2	3.9	No	No	No	No
99B"	1			0	61.3	56.9	4.4	No	No	No	No
100B"	1			0	58.3	57.2	1.1	No	No	No	No
101B"	1			0	57.5	56.6	0.9	No	No	No	No
102B"	1			0	58.7	58.5	0.2	No	No	No	No
103B"	1			0	57.8	57.1	0.7	No	No	No	No
104B"	2			0	58.6	58.3	0.3	No	No	No	No
105B"	1			0	57.7	57.3	0.4	No	No	No	No
106B"	1			0	56.9	56.3	0.6	No	No	No	No
107B"	1			0	59.8	59.7	0.1	No	No	No	No
108B"	4			0	59	58.8	0.2	No	No	No	No
109B"	2			0	57.7	57.4	0.3	No	No	No	No
116B"	1			0	67.3	67.3	0	No	No	No	No

Feasibility Factors:

# of First-Row 5 dBA Reduction:	6
% of First-Row 5 dBA Reduction:	100.0%
Acoustic Feasibility (5 dBA reduction for 50% of front-row):	**Yes**

Reasonableness Factors:

# of First-Row Design Goal:	5
% of First-Row Design Goal:	83.3%
Noise Abatement Design Goal (7 dBA reduction for 35% of front-row):	**Yes**
# of Benefited:	13
Cost of Noise Wall (Length x Height x $20/sq ft):	$208,000.00
Cost of any other items critical to safety:	$20,000.00
Anticipated Cost of Noise Abatement:	$228,000.00
Allowable Cost ($30,000 per benefitted receptor):	$390,000.00
Cost Effective (Anticipated Cost < Allowable Cost):	**Yes**
Feasible and Reasonable:	**Yes**

Noise Wall 4

Total Wall Length: 1342 ft
Wall Cost per sq ft: $20
Cost of items critical to safety: $25 ($25/ft for snow storage)
# of First Row Receivers: 8

Name	# of DU	Relocation	1st Row	# of 1st Row	10-ft Wall	Design Goal	Benefited	1st Row Design Goal	1st Row 5 dBA Reduction	12-ft Wall	Design Goal	Benefited	1st Row Design Goal	1st Row 5 dBA Reduction	14-ft Wall	Design Goal	Benefited	1st Row Design Goal	1st Row 5 dBA Reduction	# 1st Row 5 dBA Reduction	# Benefited Receptors	16-ft Wall	Design Goal	Benefited	1st Row Design Goal	# 1st Row Design Goal	1st Row 5 dBA Reduction	18-ft Wall	Design Goal	Benefited	1st Row Design Goal	# 1st Row Design Goal	1st Row 5 dBA Reduction
50B	1			0	1	No	No	No	No	1.3	No	No	No	No	1.7	No	No	No	No	0	0	1.9	No	No	No	0	No	2	No	No	No	0	No
51B"	1			0	1	No	No	No	No	1.5	No	No	No	No	2.3	No	No	No	No	0	0	2.6	No	No	No	0	No	2.8	No	No	No	0	No
52B"	1			0	1.3	No	No	No	No	1.9	No	No	No	No	2.9	No	No	No	No	0	0	3.3	No	No	No	0	No	3.6	No	No	No	0	No
53B"	1		Yes	1	3.1	No	No	No	No	4.7	No	No	No	No	5.6	No	Yes	No	Yes	1	1	6.3	No	Yes	No	0	Yes	6.9	No	Yes	No	0	Yes
54B"	1			0	2.4	No	No	No	No	4.5	No	No	No	No	5.4	No	Yes	No	No	0	1	6.1	No	Yes	No	0	No	6.7	No	Yes	No	0	No
55B"	1			0	2.2	No	No	No	No	3.5	No	No	No	No	4.1	No	No	No	No	0	0	4.5	No	No	No	0	No	4.9	No	No	No	0	No
56B"	1			0	1.5	No	No	No	No	2.1	No	No	No	No	3.3	No	No	No	No	0	0	3.8	No	No	No	0	No	4.1	No	No	No	0	No
57B"	1		Yes	1	4	No	No	No	No	5.4	No	Yes	No	Yes	6.1	No	Yes	No	Yes	1	1	6.5	No	Yes	No	0	Yes	6.9	No	Yes	No	0	Yes
104B"	1			0	0.8	No	No	No	No	1.1	No	No	No	No	1.9	No	No	No	No	0	0	2.1	No	No	No	0	No	2.3	No	No	No	0	No
105B"	1			0	0.7	No	No	No	No	1.1	No	No	No	No	1.7	No	No	No	No	0	0	2	No	No	No	0	No	2.2	No	No	No	0	No
107B"	1			0	2	No	No	No	No	2.4	No	No	No	No	3.2	No	No	No	No	0	0	3.4	No	No	No	0	No	3.6	No	No	No	0	No
108B"	1			0	1.1	No	No	No	No	1.5	No	No	No	No	2.3	No	No	No	No	0	0	2.5	No	No	No	0	No	2.7	No	No	No	0	No
109B"	1			0	0.8	No	No	No	No	1.2	No	No	No	No	1.9	No	No	No	No	0	0	2.2	No	No	No	0	No	2.4	No	No	No	0	No
110B"	1			0	0.9	No	No	No	No	1.3	No	No	No	No	2.2	No	No	No	No	0	0	2.5	No	No	No	0	No	2.7	No	No	No	0	No
111B"	1			0	1	No	No	No	No	1.5	No	No	No	No	2.5	No	No	No	No	0	0	2.9	No	No	No	0	No	3.1	No	No	No	0	No
112B"	1			0	1.4	No	No	No	No	2.2	No	No	No	No	3.5	No	No	No	No	0	0	4	No	No	No	0	No	4.3	No	No	No	0	No
113B"	1			0	1.1	No	No	No	No	1.8	No	No	No	No	2.9	No	No	No	No	0	0	3.3	No	No	No	0	No	3.6	No	No	No	0	No
114B"	1			0	1.2	No	No	No	No	2	No	No	No	No	3.2	No	No	No	No	0	0	3.6	No	No	No	0	No	3.9	No	No	No	0	No
115B"	1			0	1.5	No	No	No	No	2.2	No	No	No	No	3.6	No	No	No	No	0	0	4	No	No	No	0	No	4.4	No	No	No	0	No
116B"	1		Yes	1	1.7	No	No	No	No	3.1	No	No	No	No	3.8	No	No	No	No	0	0	4.3	No	No	No	0	No	4.7	No	No	No	0	No
117B"	1		Yes	1	3	No	No	No	No	4.2	No	No	No	No	5.1	No	Yes	No	Yes	1	1	5.8	No	Yes	No	0	Yes	6.4	No	Yes	No	0	Yes
118B"	1			0	1.8	No	No	No	No	3	No	No	No	No	3.9	No	No	No	No	0	0	4.3	No	No	No	0	No	4.8	No	No	No	0	No
119B"	1			0	1.4	No	No	No	No	2.2	No	No	No	No	3.3	No	No	No	No	0	0	3.7	No	No	No	0	No	4	No	No	No	0	No
120B"	1			0	1	No	No	No	No	1.7	No	No	No	No	2.7	No	No	No	No	0	0	3	No	No	No	0	No	3.3	No	No	No	0	No
121B"	1			0	1.2	No	No	No	No	1.9	No	No	No	No	3	No	No	No	No	0	0	3.3	No	No	No	0	No	3.6	No	No	No	0	No
122B"	1			0	1	No	No	No	No	1.7	No	No	No	No	2.6	No	No	No	No	0	0	2.9	No	No	No	0	No	3.2	No	No	No	0	No
123B"	1			0	0.9	No	No	No	No	1.4	No	No	No	No	2.3	No	No	No	No	0	0	2.6	No	No	No	0	No	2.8	No	No	No	0	No
124B"	1			0	0.8	No	No	No	No	1.2	No	No	No	No	2	No	No	No	No	0	0	2.2	No	No	No	0	No	2.4	No	No	No	0	No
125B"	1			0	0.9	No	No	No	No	1.5	No	No	No	No	2.3	No	No	No	No	0	0	2.6	No	No	No	0	No	2.8	No	No	No	0	No
126B"	1			0	0.8	No	No	No	No	1.2	No	No	No	No	1.9	No	No	No	No	0	0	2.1	No	No	No	0	No	2.3	No	No	No	0	No
127B"	1			0	0.7	No	No	No	No	1.1	No	No	No	No	1.9	No	No	No	No	0	0	2.1	No	No	No	0	No	2.3	No	No	No	0	No
142B"	1			0	2.5	No	No	No	No	4.6	No	No	No	No	5.5	No	Yes	No	No	0	1	6.2	No	Yes	No	0	No	6.8	No	Yes	No	0	No
143B"	1		Yes	1	3.5	No	No	No	No	4.7	No	No	No	No	5.7	No	Yes	No	Yes	1	1	6.5	No	Yes	No	0	Yes	7.2	Yes	Yes	Yes	1	Yes
144B"	1		Yes	1	3.4	No	No	No	No	4.6	No	No	No	No	5.5	No	Yes	No	Yes	1	1	6.2	No	Yes	No	0	Yes	6.9	No	Yes	No	0	Yes
145B"	1			0	2	No	No	No	No	3.8	No	No	No	No	4.5	No	No	No	No	0	0	5.1	No	Yes	No	0	No	5.6	No	Yes	No	0	No
146B"	1			0	1.7	No	No	No	No	2.6	No	No	No	No	4	No	No	No	No	0	0	4.5	No	No	No	0	No	4.9	No	No	No	0	No
147B"	1			0	1.9	No	No	No	No	2.7	No	No	No	No	4.2	No	No	No	No	0	0	4.8	No	No	No	0	No	5.2	No	Yes	No	0	No
148B"	1			0	2	No	No	No	No	3.4	No	No	No	No	4.2	No	No	No	No	0	0	4.7	No	No	No	0	No	5.2	No	Yes	No	0	No
149B"	1			0	2	No	No	No	No	3.2	No	No	No	No	4.2	No	No	No	No	0	0	4.7	No	No	No	0	No	5.2	No	Yes	No	0	No
150B"	1			0	1.7	No	No	No	No	2.5	No	No	No	No	3.6	No	No	No	No	0	0	4.3	No	No	No	0	No	4.3	No	No	No	0	No
151B"	1			0	1.5	No	No	No	No	2.2	No	No	No	No	3.3	No	No	No	No	0	0	3.7	No	No	No	0	No	4	No	No	No	0	No
152B"	1			0	1.2	No	No	No	No	1.9	No	No	No	No	3.1	No	No	No	No	0	0	3.5	No	No	No	0	No	3.7	No	No	No	0	No
153B"	1			0	1	No	No	No	No	1.5	No	No	No	No	2.4	No	No	No	No	0	0	2.8	No	No	No	0	No	3	No	No	No	0	No
154B"	1			0	0.9	No	No	No	No	1.4	No	No	No	No	2.4	No	No	No	No	0	0	2.7	No	No	No	0	No	2.9	No	No	No	0	No
155B"	1			0	0.9	No	No	No	No	1.4	No	No	No	No	2.4	No	No	No	No	0	0	2.7	No	No	No	0	No	2.9	No	No	No	0	No
156B"	1		Yes	1	3.4	No	No	No	No	4.5	No	No	No	No	5.4	No	Yes	No	Yes	1	1	6.2	No	Yes	No	0	Yes	6.9	No	Yes	No	0	Yes
157B"	1		Yes	1	3.3	No	No	No	No	4.5	No	No	No	No	5.4	No	Yes	No	Yes	1	1	6.2	No	Yes	No	0	Yes	6.9	No	Yes	No	0	Yes

Feasibility Factors:

# of First-Row 5 dBA Reduction:	0	1	7	7	7
% of First-Row 5 dBA Reduction:	0.0%	12.5%	87.5%	87.5%	87.5%
Acoustic Feasibility (5 dBA reduction for 50% of front-row):	**No**	**No**	**Yes**	**Yes**	**Yes**

Reasonableness Factors:

# of First-Row Design Goal:	0	0	0	0	1
% of First-Row Design Goal:	0.0%	0.0%	0.0%	0.0%	12.5%
Noise Abatement Design Goal (7 dBA reduction for 35% of front-row):	**No**	**No**	**No**	**No**	**No**
# of Benefited:	0	1	9	10	13
Cost of Noise Wall (Length x Height x $20/sq ft):	$268,400.00	$322,080.00	$375,760.00	$429,440.00	$483,120.00
Cost of any other items critical to safety:	$33,550.00	$33,550.00	$33,550.00	$33,550.00	$33,550.00
Anticipated Cost of Noise Abatement:	$301,950.00	$355,630.00	$409,310.00	$462,990.00	$516,670.00
Allowable Cost ($30,000 per benefitted receptor):	$0.00	$30,000.00	$270,000.00	$300,000.00	$390,000.00
Cost Effective (Anticipated Cost < Allowable Cost):	**No**	**No**	**No**	**No**	**No**
Feasible and Reasonable:	**No**	**No**	**No**	**No**	**No**

APPENDIX E: NOISE LEVELS ON UNDEVELOPED LAND

63.2 dBA
63.9 dBA
64.7 dBA
65.6 dBA
66.8 dBA
68.5 dBA
70.9 dBA
73.4 dBA
75.6 dBA

66 dBA (290 ft to 340 ft from pavement)

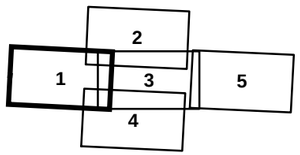
71 dBA (70 ft to 160 ft from pavement)

63.7 dBA
64.4 dBA
65.2 dBA
66.3 dBA
67.7 dBA
69.2 dBA
71.1 dBA
73.2 dBA
75 dBA

64.5 dBA
64.9 dBA
65.6 dBA
66.4 dBA
67.2 dBA
67.7 dBA
68.8 dBA
69.8 dBA
71 dBA

Undeveloped Contours

Undeveloped Points



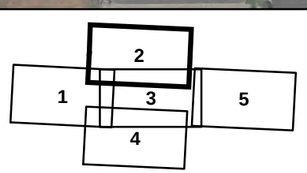
Bangerter Highway at 12600 South

Noise Levels on Undeveloped Land

Map 1 of 5

Undeveloped Contours

Undeveloped Points



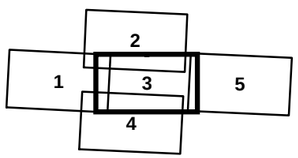
Bangerter Highway at 12600 South

Noise Levels on Undeveloped Land

Map 2 of 5

Undeveloped Contours

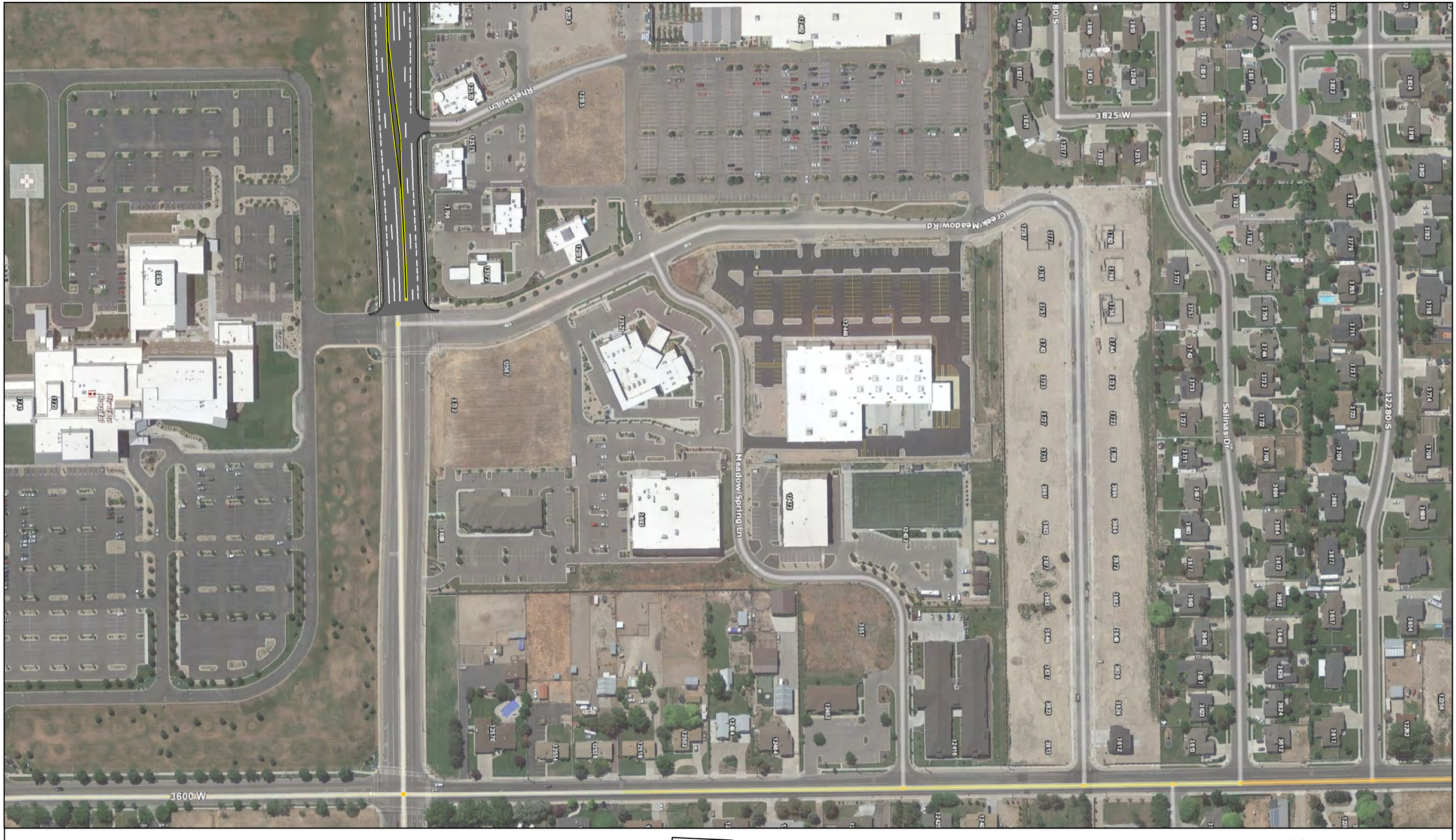
Undeveloped Points



Bangerter Highway at 12600 South

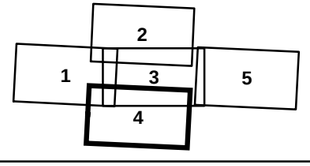
Noise Levels on Undeveloped Land

Map 3 of 5



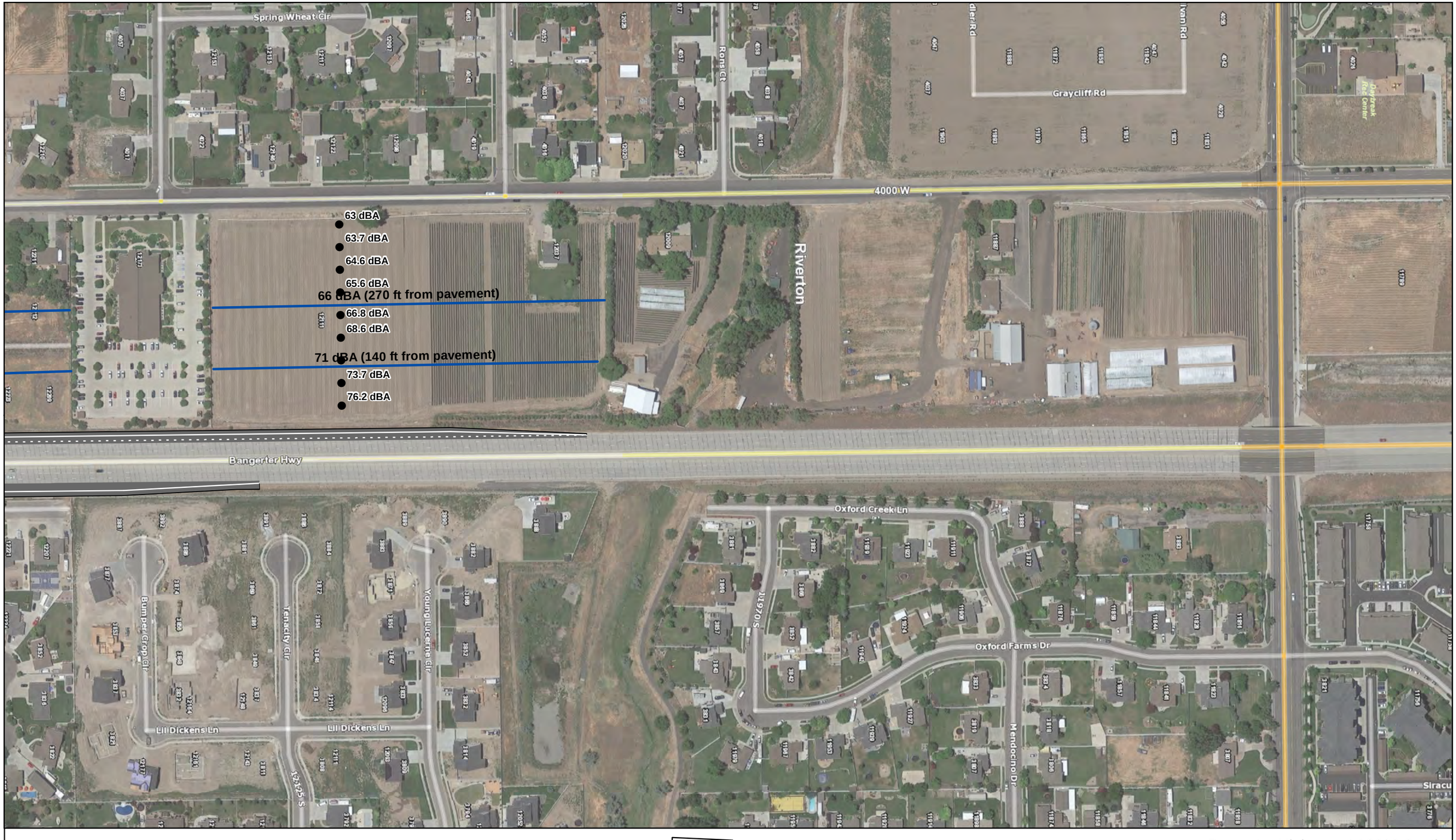
Undeveloped Contours

Undeveloped Points



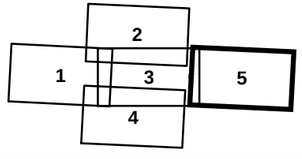
Bangerter Highway at 12600 South

Noise Levels on Undeveloped Land



Undeveloped Contours

Undeveloped Points

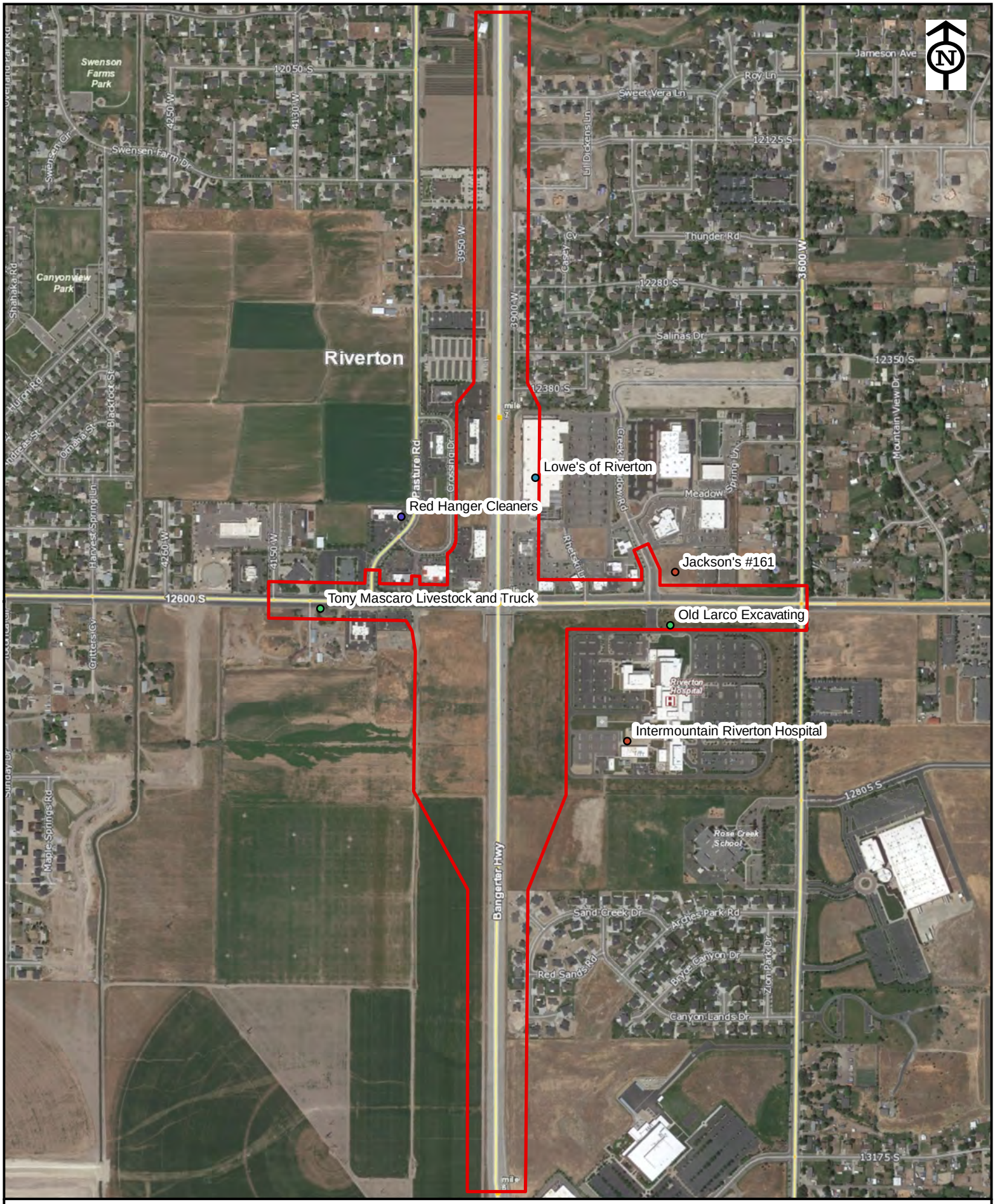


Bangerter Highway at 12600 South

Noise Levels on Undeveloped Land

Map 5 of 5

E. Hazardous Waste Review Figures



Bangerter @ 12600 South Hazardous Waste Review

Source: UT DEQ Environmental Interactive Map

Type

- Dry Cleaner
- Small quantity generator of hazardous waste
- Underground Storage Tank (active)
- Underground Storage Tank (removed)