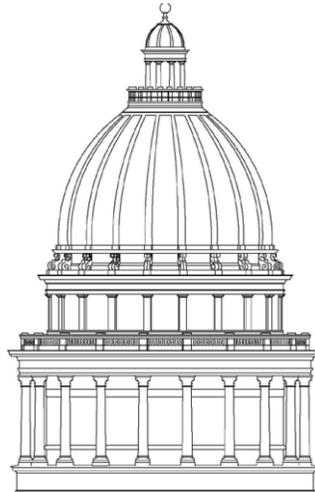


REPORT TO THE
UTAH LEGISLATURE

Number ILR 2019-A



**A Limited Review of Allegations Regarding
UDOT Noise Barrier in Summit County**

January 2019

Office of the
LEGISLATIVE AUDITOR GENERAL
State of Utah



STATE OF UTAH

Office of the Legislative Auditor General

315 HOUSE BUILDING • PO BOX 145315 • SALT LAKE CITY, UT 84114-5315
(801) 538-1033 • FAX (801) 538-1063

President Stuart J. Adams, Co-Chair • Speaker Brad R. Wilson, Co-Chair
Senator Karen Mayne • Senator Evan J. Vickers • Representative Brian S. King • Representative Francis D. Gibson

KADE R. MINCHEY, CIA, CFE
AUDITOR GENERAL

January 2019

Report No: ILR 2019-A

President Wayne Niederhauser
Speaker Greg Hughes
Members of the Legislative Audit Subcommittee

**Subject: A Limited Review of Allegations Regarding
UDOT Noise Barrier in Summit County**

Members of the Audit Subcommittee,

Transmitted herewith is our report, **A Limited Review of Allegations Regarding UDOT Noise Barrier in Summit County** (Report #ILR 2019-A). We will be happy to meet with appropriate legislative committees, individual legislators, and other state officials to discuss any item contained in the report in order to facilitate the implementation of the recommendations.

Please let me know if you have any questions.

Sincerely,

Kade R. Minchey, CIA, CFE
Auditor General

REPORT TO THE UTAH LEGISLATURE

Report No. ILR 2019-A

A Limited Review of Allegations Regarding UDOT Noise Barrier in Summit County

January 2019

Audit Performed By:

Audit Manager Brian Dean, CIA, CFE

Audit Supervisor Michael Allred

Office of
LEGISLATIVE AUDITOR GENERAL
State of Utah

**Report Number ILR 2019-A
January 2019**

A Limited Review of Allegations Regarding UDOT Noise Barrier in Summit County

The Utah Department of Transportation (UDOT) installed a noise barrier along Interstate 80 (I-80) in Summit County to mitigate freeway noise for 25 residential properties and 2 recreation areas affected by the addition of a westbound truck climbing lane. UDOT noise abatement policy¹ outlines procedures for assessing noise impacts and implementing noise abatement measures. UDOT reports that these policies and procedures are intended to be consistent with federal regulations² and *Utah Administrative Rule* R930-3,³ which adopts and incorporates the federal regulations by reference.

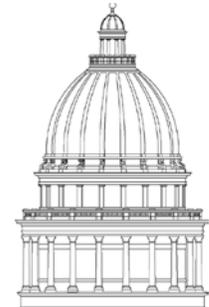
The Legislature requested limited survey work on UDOT's practices for approving and installing the noise barrier after a citizen group raised concerns that UDOT may have violated federal regulations, state laws, and/or UDOT policies. We found that UDOT followed applicable federal and state statutes and internal policies for this project. However, UDOT should clarify several provisions in its noise abatement policy to help reduce the risk of confusion about noise abatement measures.

Our review confirmed the conclusion reached by two independent engineering firms: UDOT was justified in building the noise barrier. With the conclusion of this limited review, we do not recommend a

1 Noise Abatement, UDOT 08A2-01 (2017).

2 Procedures for Abatement of Highway Traffic Noise and Construction Noise, 23 CFR § 772 (2018).

3 Highway Noise Abatement, R930-3 (2018).



UDOT complied with federal and state statutes and internal policy, but it can improve its noise abatement policy.

full audit, but we provide recommendations to help clarify and strengthen policy.

Survey Scope and Objectives

To determine whether we should recommend a full audit for this noise abatement project, we reviewed UDOT's compliance with applicable federal and state statutes. We also reviewed UDOT policies and project documentation, conducted necessary interviews, and made site visits to understand the issue more fully.

UDOT Should Clarify Its Noise Abatement Policies And Ensure Consistency with Federal Regulations

While reviewing UDOT's process for assessing noise impacts and noise abatement measures, we found variations between UDOT's noise abatement policy and federal noise abatement regulations. UDOT changed its noise abatement policy shortly after receiving the first noise assessment report and recommendation for a noise wall in Summit County, which may have contributed to confusion about noise abatement measures. UDOT should revise its noise abatement policy to provide additional clarity.

Revisions to Policy May Have Contributed to Confusion About Noise Abatement Measures

Shortly after receiving an independent engineering firm's noise assessment report and recommendation for a noise wall, UDOT revised its noise abatement policy in ways that may have contributed to concerns about this project. These revisions resulted in three relevant changes:

- A definition for "noise barrier" was added, but it did not reflect the definition in federal regulations.
- Twenty-seven instances of "barrier" were changed to "wall."
- The "cost of any other item associated with the abatement measure that is critical to safety" was added to the anticipated cost calculation.

We conducted a limited review of UDOT's process for approving and installing a noise barrier.

UDOT changed its policy during the noise abatement analysis process.

The definition for “noise barrier” in federal regulations includes “stand alone noise walls, noise berms (earth or other material), and combination berm/wall systems.”⁴ The definition added to UDOT’s noise abatement policy only includes “a wall.” Moreover, many references to “barrier” in the policy were changed to “wall.” These changes added to confusion about what noise abatement measures UDOT could consider, and whether the cost of safety measures should have been included in initial cost reasonableness calculations. UDOT should clarify its policy by ensuring that its definition for “noise barrier” mirrors the definition in federal regulations (23 CFR 772.5).

Clarification Needs to Be Added To Noise Abatement Policy

UDOT policy needs to clarify how to calculate the allowable cost for a single noise barrier that may benefit different types of receptors.⁵ Additionally, UDOT’s noise abatement policy should be revised so that anticipated cost calculations capture the whole cost of a noise abatement measure rather than only a portion.

UDOT Should Clarify How to Calculate Allowable Cost for Mixed Land Use Categories. UDOT hired an independent engineering firm for initial noise assessment and noise abatement recommendations. Concerns were raised about the method used by the first firm to calculate the allowable cost for the proposed wall. UDOT noise abatement policy explains that allowable cost for residential land use is calculated one way, while allowable costs for other land uses, such as recreation areas, are calculated another way. The policy does not clarify how to calculate allowable cost when a single noise abatement measure, such as a noise wall, is intended to benefit receptors with varying land use categories.

Policy is unclear for estimating allowable cost for mixed land use categories.

⁴ A berm is a ridge constructed of compacted natural earthen materials such as soil, stone, rock, and/or rubble. A combination berm/wall system is a noise wall on top of a berm.

⁵ A benefited-receptor is a property or area with frequent exterior human use that may receive a minimum level of noise reduction from a proposed abatement measure.

Calculations prescribed in policy may not capture the cost of a whole noise abatement measure.

UDOT Should Revise Policy to Ensure that Cost Reasonableness Calculations Capture the Whole Anticipated Cost of a Noise Abatement Measure. UDOT’s current policy focuses cost effectiveness calculations on noise walls. In this case, UDOT’s anticipated cost calculation for determining reasonableness did not include the cost of the berm that was part of the noise abatement measure. While the current policy does not include specific direction to include berm costs in anticipated cost calculations, it states that “the cost of noise abatement measures must be deemed reasonable.” Accordingly, it is logical that “noise abatement measures” for this project would include both the wall and the berm, since both mitigate the noise from the interstate.

Federal regulations specify that noise abatement measures should be cost effective. In this case and according to the federal definition for “noise barrier,” cost reasonableness calculations would include the costs of the wall and the berm, not just the wall on top of the berm. UDOT spent \$228,541 constructing the berm for this noise barrier using earthen materials leftover from construction of the truck climbing lane. UDOT reports that it would have spent \$299,725 to haul the materials away for disposal; thus, UDOT achieved a net-savings of \$71,184 on the project by using a berm as part of the noise barrier. UDOT should help reduce the risk of confusion regarding noise abatement measures by revising its policies to clarify how to calculate allowable cost for mixed land use categories, and to ensure that calculations for anticipated cost include all parts of a noise abatement measure.

UDOT saved \$71,184 by installing a berm below the noise wall.

UDOT Achieved Required Reasonableness Factors

As required by federal regulations and described in *Utah Administrative Rule*, UDOT's noise abatement policy includes reasonableness factors that must be collectively achieved for a noise abatement measure to be considered "reasonable." These factors were developed with Federal Highway Administration (FHWA) approval. The allegations for this noise abatement project question whether UDOT achieved three of the four required factors. We found that UDOT achieved the three factors in question:⁶

- Cost effectiveness
- Balloting
- Noise abatement measure

Cost Effectiveness for Noise Wall Was Reasonable

Allegations regarding this project dispute both anticipated and allowable cost calculations. UDOT's current noise abatement policy requires the anticipated cost of a noise abatement measure to be less than the allowable cost. The anticipated cost is calculated at \$20 per square foot for the wall, plus the costs of any critical safety measures (such as guardrails). Adding the costs of critical safety measures to the anticipated cost calculation was one of the revisions to the policy discussed previously. Also, as mentioned previously, the policy does not provide for including the anticipated cost of a berm when used as part of a noise abatement measure.

The allowable cost is calculated at \$30,000 per benefited residential property, and \$360 per lineal foot for benefited recreation areas. As stated previously, UDOT's policy is also not clear when it comes to calculating allowable cost for a single noise abatement measure that could benefit receptors on mixed land-use categories. This issue became clear when two firms hired by UDOT used

UDOT met the cost reasonableness requirements outlined in policy.

⁶ The fourth, unopposed factor is the noise abatement design goal, which is to achieve a minimum level of noise reduction from a proposed abatement measure for at least 35 percent of front-row receptors. Front-row receptors are noise-sensitive receptors that are located nearest to the highway.

different methods to calculate allowable costs during the vetting process for this project.

In calculating the allowable cost for a standalone noise wall (Proposal #1), the first firm only used half the length of the wall for the \$360-per-lineal-foot part of the calculation. UDOT hired a second firm, which confirmed the first firm's calculation but questioned the rationale for using only half the length of the proposed wall. The first firm used a different length for the \$360-per-lineal-foot part of the calculation when it calculated the allowable cost for a combination berm/wall system (Proposal #2). Despite the variation in methods used, both firms concluded that Proposals #1 and #2 were cost reasonable.

While the calculation methods used by both firms to determine cost reasonableness were acceptable, UDOT agreed that the current noise abatement policy permits using an even simpler method to calculate allowable cost: add the allowable cost total for residential areas to the allowable cost total for recreation areas for the entire length of a single noise wall. We used this method for the calculations in Figures 1 and 2.

Proposal #1 was for a 57,600-square-foot noise wall (3,200 feet long by 18 feet high) that could benefit 24 residential areas and 2 recreation areas. The estimated cost for critical safety measures was \$112,000. Auditor calculations for the anticipated and allowable costs of Proposal #1 are shown in Figure 1.

Figure 1 Cost Reasonableness Calculations for Proposal #1.

According to our calculations below, the estimated anticipated cost of the standalone noise wall is reasonable because it is less than the allowable cost.

Anticipated Cost:

$$57,600 \text{ ft}^2 \text{ wall} \times \$20/\text{ft}^2 = \$1,152,000$$

→ $\$1,152,000 + \$112,000^* = \mathbf{\$1,264,000}$

* estimated cost for critical safety measures

Allowable Cost:

$$\$30,000 \times 24 \text{ residential properties} = \$720,000 \text{ (residential)}$$

$$\$360 \times 3,200 \text{ feet (length of wall)} = \underline{\$1,152,000} \text{ (recreational)}$$

$$= \mathbf{\$1,872,000}$$

After receiving the recommendation for Proposal #1, UDOT presented it to the community. After receiving feedback from the community, UDOT explored alternative noise abatement measures, including shorter walls, berms, and walls atop berms to address concerns about the aesthetics of an 18-foot-high wall. After an independent engineering firm assessed the feasibility of each alternative, UDOT presented Proposal #2, a variable height, 37,198-square-foot noise wall on top of a berm⁷ that could benefit 25⁸ residential properties and 2 recreation areas. The estimated cost for critical safety measures was \$397,994. Auditor calculations for anticipated and allowable costs of Proposal #2 are shown in Figure 2.

UDOT responded to community feedback by exploring alternative noise abatement measures.

⁷ The cost of the berm was not considered in these calculations because the current policy only supports calculations based on a noise wall.

⁸ Abatement measure models predicted Proposal #1 would benefit 24 residential properties and Proposal #2 would benefit 25 residential properties.

Figure 2 Cost Reasonableness Calculations for Proposal #2.

According to our calculations below, the estimated anticipated cost of the combination berm/wall system is reasonable because it is less than the allowable cost.

Anticipated Cost:

37,198 ft² wall × \$20/ft² = \$743,960

→ \$743,960 + \$397,994* = **\$1,141,954**

* estimated cost for critical safety measures

Allowable Cost:

\$30,000 × 25 residential properties = \$750,000 (residential)

\$360 × 3,200 feet (length of wall) = \$1,152,000 (recreational)

= **\$1,902,000**

Anticipated costs were significantly less than allowable costs for both noise abatement measures considered.

Figures 1 and 2 show that, for both proposals, the estimates for anticipated costs were significantly lower than the estimates for allowable costs. Therefore, both proposed noise walls met the cost reasonability requirement. UDOT reported that the actual total cost of the noise wall⁹ was \$986,273, which was well below the anticipated and allowable cost estimates of either proposal considered. We determined that the total actual cost of the combination berm/wall system was \$915,089 after accounting for the previously mentioned net savings of \$71,184 achieved by installing the wall on a berm.

UDOT Balloted Owners and Residents of Benefited Properties According to Policy

As required by federal regulations, administrative rule, and policy, UDOT balloted owners and residents of benefited properties to determine whether they were in favor of Proposal #2. Using parameters established in policy, UDOT assessed the ballots and determined that 93 percent of those balloted were in favor of the noise abatement measure. This percentage surpassed the 75 percent threshold required to move forward with the project. Figure 3 shows the results of the balloting process.

⁹ Again, the cost of the berm was not considered in these calculations because the current policy only supports calculations based on a noise wall.

Figure 3 Balloting Results Summary. Respondents overwhelmingly favored the proposed noise abatement measure.

Benefited Properties	Owner-Occupied Properties	Owner/Renter Properties	Total Number of Ballots Mailed	Total Number of Ballots Returned	Percent of Returned Ballots
27*	25	2	29	29	100%

Returned Owner-Occupied Votes		Returned Owner/Renter Votes				Benefited Property Decision		Percent In Favor of Wall	Percent Against Wall
In Favor	Against	Owner		Renter		In Favor	Against		
23	2	2 **	0	2 **	0	25	2	93% ***	7%

*Ballots were mailed to 27 property owners and 2 tenants for a total of 29 ballots. 100 percent of the ballots were returned which met the response requirement of 75 percent.

**Property owner votes and tenant votes are weighted differently when a tenant resides on the property. Votes from the property owner have a weight of five, while tenant votes have a weight of one for the property's decision.

***This percentage surpasses the 75 percent in favor threshold required to move forward with a noise wall as per UDOT's Noise Abatement Policy.

Source: Figure from UDOT Noise Wall Balloting Report

UDOT policy allows balloting for receptors that will not benefit from a proposed noise abatement measure when they border or are directly adjacent to the end of a proposed noise abatement measure. UDOT determined there were no receptors that met these criteria. One of the allegations examined during this limited review claimed that some residential properties located northwest of one end of the wall met the criteria for balloting. UDOT determined that these properties were too elevated and far away to be considered for balloting.

For context in reviewing UDOT's determination, we visited the area, and studied various maps and images to estimate distance and elevation gain for the properties. We agree that the properties in question should not have been considered for balloting. Figure 4 illustrates the distance and elevation gain for the properties in question.

Balloted receptors overwhelmingly favored installation of the noise abatement measure.

Allegations that UDOT failed to ballot all required receptors are not supported by criteria found in policy.

Figure 4 Image Showing Distance and Elevation Between End of Wall and Properties in Question. According to an elevation profile created using the U.S. Geological Survey’s online *National Map*, these properties are about 50 feet higher than, and more than 300 feet away from, the end of the noise barrier.



Source: Photograph from auditor site visit

This figure shows that the properties in question do not border and are not directly adjacent to the end of the wall or the nearest benefited receptor. Moreover, there is a steep, undeveloped lot between the properties and the end of the wall. Therefore, the properties do not meet the balloting criteria in UDOT’s policy.

The Selected Noise Abatement Measure Is Allowable Under Federal Regulations

Concerns were raised that UDOT’s policy does not allow for the use of a combination berm/wall system as a noise abatement measure because of how UDOT defines “noise barrier.” As mentioned earlier in this report, UDOT should review variations between its policy and federal regulations. UDOT should address this particular issue in its policy by mirroring the definition of “noise barrier” found in federal regulations.

We met with UDOT, and UDOT believes that the selected noise abatement measure is allowable under federal regulation. Legislative legal counsel interprets the language the same way. The measure is allowable for three primary reasons: First, the federal regulations apply to this project and exceed UDOT’s internal policy. Second, the

Federal regulations surpass internal policies and allow for combination berm/wall systems.

definition for “noise barrier” found in federal regulations includes “combination berm/wall systems.” Third, the federal regulations allow for the use of a combination berm/wall system as a noise abatement measure.

We reviewed an additional, related allegation that UDOT should have considered “quiet pavement” instead of a noise barrier for noise abatement. The FHWA issued an opinion that “23 CFR 772 does not allow for the use of pavement type or surface texture as a noise abatement measure.”

Ultimately, we determined that cost effectiveness estimates, balloting procedures, and the noise abatement measure installed were all reasonable under UDOT’s current noise abatement policy. UDOT should clarify its policy to avoid confusion about noise abatement measures.

UDOT’s Responses to GRAMA Requests Were Consistent with Statute

Allegations were raised about UDOT’s responses to GRAMA requests for this project. To address these concerns, we reviewed statute, UDOT policy, and UDOT’s process for responding to five GRAMA requests it received during this project. We found that UDOT’s responses were consistent with statute and its policy. Allegations were raised that UDOT was unresponsive to GRAMA requests, and we found this was not the case. Additional allegations were raised that UDOT’s responses to GRAMA requests were inappropriately delayed; however, we found the delays were acceptable under statute due to extraordinary circumstances.

While *Utah Code* 63G-2-204 requires a response to public GRAMA requests within 10 business days, it also allows for delays when extraordinary circumstances exist. According to the code cited, the following are some pertinent situations that would constitute extraordinary circumstances:

- The request is for a voluminous quantity of records.
- The requester seeks a substantial number of records in requests filed within five working days of each other.
- The request requires the governmental entity to review a large number of records to locate the records requested.

UDOT’s responses to multiple GRAMA requests for voluminous records were appropriate.

- The decision to release a record involves legal issues that require the governmental entity to seek legal counsel for the analysis of statutes, rules, ordinances, regulations, or case law.
- Segregating information that the requester is entitled to inspect requires extensive editing.

For this project, one individual submitted five subsequent GRAMA requests, each containing multiple listed requests. We documented that UDOT provided 555 files to the requester and waived \$6,890.80 in fees for 84 hours spent by its employees to respond to the requests. UDOT determined that these multiple requests for a voluminous quantity and substantial number of records constituted extraordinary circumstances, and reported notifying the requester of the delays and intent to provide the records as soon as reasonably possible. UDOT reported that the requester called at least weekly or more often and was notified of delays in these phone calls, which were not documented.

We found that UDOT followed its policies and procedures for this noise abatement project. Nevertheless, variations between UDOT's policy and federal regulations should be addressed.

Recommendations

1. We recommend that the Utah Department of Transportation clarify its noise abatement policy by ensuring that its definition for and use of "noise barrier" mirrors 23 CFR 772.
2. We recommend that the Utah Department of Transportation clarify in its noise abatement policy how to calculate the allowable cost of a single noise barrier that benefits varying land use categories.
3. We recommend that the Utah Department of Transportation revise its noise abatement policy to ensure that anticipated cost calculations capture the cost for a whole noise abatement measure.

Agency Response

This Page Left Blank Intentionally



State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

DEPARTMENT OF TRANSPORTATION

CARLOS M. BRACERAS, P.E.
Executive Director

JASON E. DAVIS, P.E.
Deputy Director of Engineering and Operations

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

January 10, 2019

Kade R. Minchey, CIA, CFE
Auditor General
Office of the Legislative Auditor General
P.O. Box 145315
Salt Lake City, UT 84114-5315

Mr. Minchey:

SUBJECT: UDOT Response to Limited Review of Allegations Regarding UDOT Noise Barrier in Summit County

Thank you for providing the exposure draft of your office's report titled *A Limited Review of Allegations Regarding UDOT Noise Barrier in Summit County*. We have reviewed the report and are in agreement with its findings and recommendations.

Upon release of the formal report, UDOT will proceed with updating its Noise Policy to address the three recommendations of your office. As required by the Federal Highway Administration, a draft of the updated Policy will be submitted for their review prior to enacting the updated Policy. UDOT will also initiate the process of amending Rule R930-3 to include noise barriers other than walls.

We appreciate your thorough review of this project and our policy and thank you for your comments.

Sincerely,

Carlos M. Braceras, P.E.
Executive Director

CMB/dej

This Page Left Blank Intentionally