



Memo

Date: Tuesday, February 20, 2018

Project: UPN 6141000, West of Missoula – NW

To: Dustin Hirose, P.E., HDR Project Manager

From: Ben Copenhaver, INCE

Subject: Activity 179 Preliminary Traffic Noise Analysis Memo

The purpose of this memo is to determine if a detailed noise analysis will be needed for the proposed project in accordance with 23 CFR 772. This memo includes a project description, assessment of project classification as defined by 23 CFR 772, and provides preliminary results from a high-level noise analysis for informational purposes.

Project Description

The project is located in Missoula County, beginning on S-263 (Mullan Road) at RP 5.5, just west of the intersection with Deschamps Lane. The project extends west to RP 10.6, just west of the intersection of S-263 and S-474 (Pulp Mill Road). The proposed project has been nominated and programmed to improve the driving surface and safety by widening the roadway shoulders, flattening the side slopes, improving the horizontal and vertical alignments and upgrading the clear zone. The guardrail replacement, upgraded pavement markings, signing and fencing will also be included. The proposed improvements are intended to reduce the crash rate and crash severity on this road. The project will require full pavement reconstruction the entire project length. The project will likely require the relocation and/or the removal of irrigation canals and privately owned structures that closely parallel the roadway. This road has a substandard roadway width, side slopes and horizontal/vertical alignments. The road has a growing traffic demand and, although the ADT has declined since 2009, it is expected to double in the next 20 years. The reduction in traffic volumes are partially due to the closing of the paper mill that was located on the west end of the project limits. Traffic studies suggest that the recommended improvements will greatly decrease crashes and improve the overall safety of the road.

Project Classification

According to the Montana Department of Transportation (MDT) Traffic Noise Analysis and Abatement Policy (January 1, 2017), a detailed noise analysis is needed for Type I projects only. Per Title 23 of the Code of Federal Regulations (CFR) Part 772, Type I projects are defined as Federal or Federal-aid projects which involve:

1. The construction of a highway on new location; or,
2. The physical alteration of an existing highway where there is either:
 - a. Substantial horizontal alteration. A project that halves the distance between the traffic noise source and the closest receptor between the existing condition to the future build condition; or,
 - b. Substantial vertical alteration. A project that removes shielding, therefore is exposing the line-of-sight between the receptor and the traffic noise source. This

- is done by either altering the vertical alignment of the highway or by altering the topography between the highway traffic noise source and the receptor; or,
3. The addition of a through-traffic lane(s). This includes the addition of a through-traffic lane that functions as a high-occupancy vehicle lane, high-occupancy toll - lane, bus lane, or truck climbing lane; or,
 4. The addition of an auxiliary lane, except for turn lanes; or,
 5. The addition or relocation of interchange lanes or ramps added to a quadrant to complete an existing partial interchange; or,
 6. Restriping existing pavement for the purpose of adding a through-traffic lane or an auxiliary lane; or,
 7. The addition of a new or substantial alteration of a weigh station, rest stop, ride-share lot or toll plaza.

Based on preliminary design it is anticipated the roadway horizontal alignment could shift from the existing alignment a distance ranging from 5 to 14 feet. Changes in vertical alignment would be minor and would not substantially alter the topography between the traffic noise source and any receptor. It is important to note that the proposed alignment shift in the direction *towards* a noise receptor (residence) would not exceed 5 feet, whereas the maximum alignment shift of 14 feet is proposed to shift the alignment *away* from a noise receptor. In order for a 5-foot horizontal alignment change to be considered substantial, the nearest receptor would have to be located no more than 10 feet from the centerline of the nearest lane. The nearest receptor identified was 39 feet away from the centerline of the southbound lane (44 feet from the roadway centerline), and represented the area of frequent exterior human use for the residence at 12705 Mullan Road. In the instance of this receptor at 12705 Mullan Road the proposed alignment has not been shifted. In general alignment shifts being proposed attempt to minimize structure impacts throughout the project area.

Because none of the conditions for a Type I project are met, this project is Type III. Per 23 CFR 772, Type III projects do not require a detailed noise analysis or consideration of abatement.

Noise Analysis

HDR carried out preliminary noise modeling to determine potential traffic noise impacts of the Project using the FHWA TNM (traffic noise model). Though the project is Type III and does not require a detailed noise analysis, this analysis is included to provide a high-level identification of potential noise impacts for informational purposes only.

The model consisted of two straight, flat lanes, representing the northbound and southbound lanes of Mullan Road. The model did not include topography between roadway and receiver, curves, inclines, or other factors that could affect noise levels. Receptors were modeled in 5-foot increments perpendicularly out from the roadway to 500 feet from the roadway centerline.

Traffic volumes for the existing year (2017) and design year (2041) were calculated based on the parameters in **Table 1**, which were provided by MDT. Traffic volume was assumed to be evenly divided between the northbound and southbound lanes.



Table 1: Model Parameters

Traffic Volume	
Existing Year (2017) AADT	1670
Design Year (2041) AADT	2390
K factor	10.40%
TNM Vehicle Classifications	
Cars	90.8%
Medium Trucks	0.7%
Heavy Trucks	7%
Buses	1.5%
Motorcycles	N/A*

* Motorcycles were not distinguished from cars in the provided traffic data.

Using TNM, HDR calculated the distance from the center line of the roadway to the 66 dBA impact contour. 66 dBA is the level above which MDT policy identifies noise impacts for residential receptors. For the existing year, this was 40 feet, and for the design year, the distance increased to 50 feet. Note that these results are approximate and provided for discussion purposes only. They do not take into account topography between roadway and receiver, roadway inclines, curves, or other factors that could affect noise levels.

Receptors within the project area were identified from aerial photographs and land use data. **Table 2** presents results from the model, including the number of receptors within the 66 dBA impact contour for the existing and design years. No receptors are expected to be within the 66 dBA area in the existing year. Up to three receptors are expected to be within the 66 dBA area for the design year. For the design year, the number of potentially impacted receptors was calculated accounting for the possibility that the centerline could move up to 5 feet closer to any receptor.

Table 2: Preliminary Model Results

	Distance from Roadway Centerline to 66 dBA	Number of Potentially Impacted Receptors
Existing Year (2017)	40 feet	0
Design Year (2041)	50 feet	3

Table 3 provides more information on the receptors identified as potentially impacted based on the modeled results for the design year. The minimum distance to design centerline in this table represents the distance of the receptor to the existing centerline minus 5 feet, which accounts for the worst case of a potential alignment shift in the direction towards a receptor.



Table 3: Impacted Receptors (Design Year)

Receptor Address	Receptor Type	Distance to Existing Centerline	Minimum Distance to Design Centerline	Impact with Traffic Increase Alone?	Impact with Traffic Increase and Alignment Shift?
12705 Mullan Rd	Residential (B)	45 feet	40 feet	Yes	Yes
14090 Mullan Rd	Residential (B)	49 feet	44 feet	Yes	Yes
14516 Mullan Rd	Residential (B)	55 feet	50 feet	No	Yes

With no alignment shift, the receptor at 14516 Mullan Rd would not be impacted. Preliminary design of the alignment includes no horizontal alignment shift in the vicinity of the receptor at 12705 Mullan Rd and a 14 foot shift away from the receptors at 14090 Mullan Rd and 14516 Mullan Rd. Based on preliminary design and the aforementioned model results 14516 Mullan Rd is not anticipated to be impacted in the design year. To the extent practicable the design team will continue to minimize alignment shifts that have potential to negatively affect noise receptors as design progresses.

Conclusion

The proposed project was reviewed against the definitions found at 23 CFR 772. It was determined that the proposed project does not meet the criteria for a Type I project, and thus is a Type III project. Therefore, no detailed noise study is required.

A high-level preliminary noise study was undertaken for informational purposes only. Results showed that the proposed alignment shift in the direction towards a receptor, and in conjunction with the traffic increase, could potentially lead to noise levels considered by MDT to represent noise impacts at three residences. However, MDT has no Federal requirements to perform a full noise analysis or to consider abatement for Type III projects.