SPENARD ROAD RECONSTRUCTION PROJECT
TRAFFIC NOISE ANALYSIS

Spenard Road Reconstruction:
Minnesota Drive to Minnesota Drive On-Ramp
Alaska Department of Transportation & Public Facilities
Project Numbers: 53986 and 55138
Municipality of Anchorage Project Number: 03-21

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ACRONYMS AND ABBREVIATIONS

dBA	A-weighted Decibels
DOT&PF	Alaska Department of Transportation and Public Facilities
FHWA	Federal Highway Administration
LOS	Level-of-Service
Lounsbury	Lounsbury & Associates, Inc.
NAC	Noise Abatement Criterion
MOA	Municipality of Anchorage
NAP	March 1996 Noise Abatement Policy
PER	Preliminary Engineering Report
PND	Peratrovich, Nottingham, and Drage, Inc.
TNM	Traffic Noise Model

1.0 INTRODUCTION

The Municipality of Anchorage (MOA) is conducting engineering and environmental studies for the Spenard Road Reconstruction project in Anchorage, Alaska (Figure 1). The Federal Highway Administration (FHWA) is funding the project. The project involves reconstruction of Spenard Road between Minnesota Drive and the Minnesota Drive On-ramp and construction of a one-way couplet involving Spenard Road between Minnesota Drive and 36th Avenue, Minnesota Drive between 36th Avenue and Spenard Road, and 36th Avenue between Spenard Road and Minnesota Drive (Figure 1).

This report details the noise analysis of the Spenard Road Reconstruction project. The purpose of this analysis is to assess the potential impact that an increase in through lanes would have on noise-sensitive receivers near the proposed 36th Avenue couplet relative to the current road configuration. This report evaluates future traffic noise levels at the end of the project design life in 2028 relative to existing traffic noise levels. Scenarios evaluated in this analysis include:

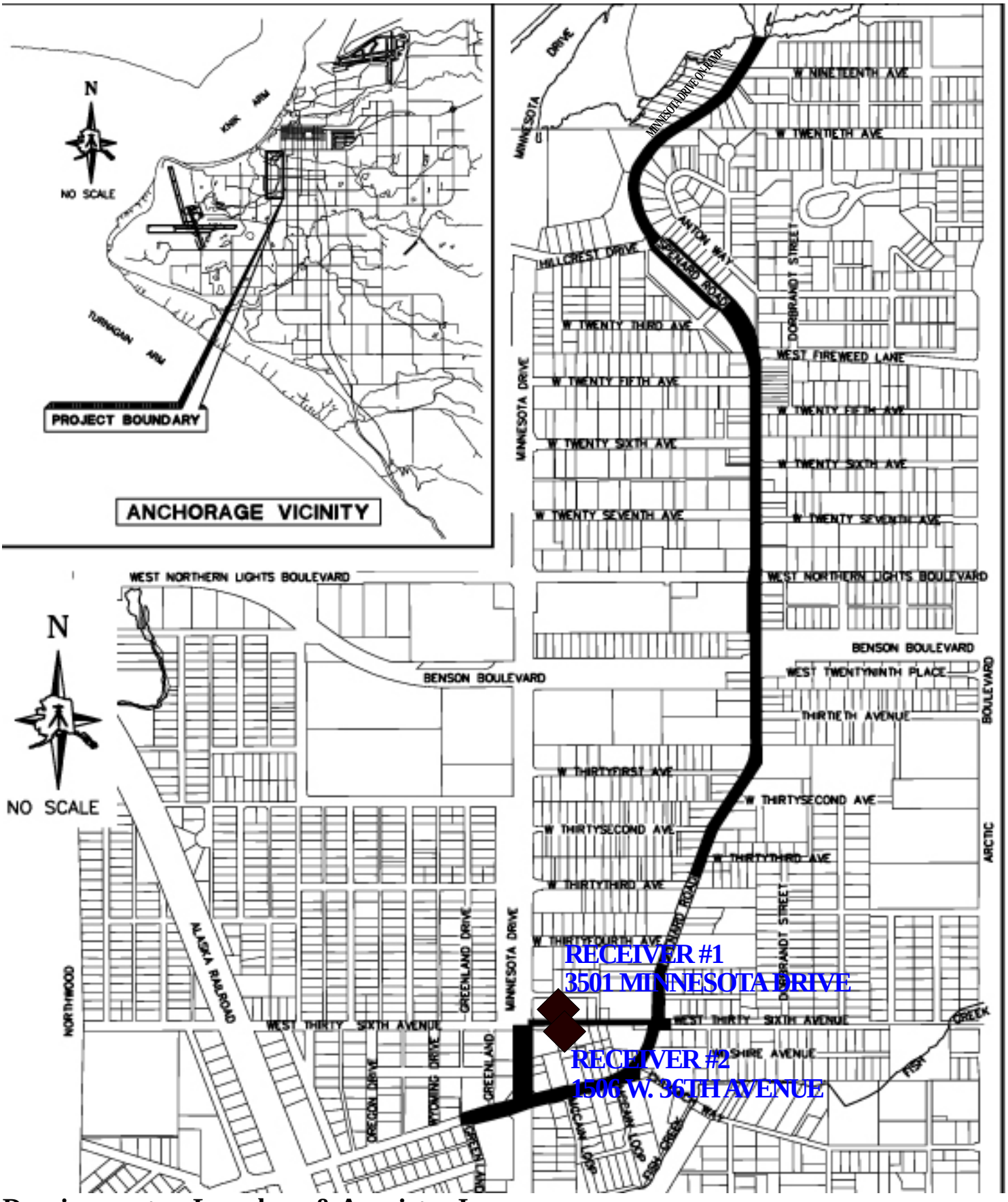
- Existing evening peak-hour traffic noise levels in 2007;
- No-action evening peak-hour traffic noise levels in 2028; and
- Build alternative evening peak-hour traffic noise levels in 2028.

Evening peak-hour traffic is generally the most congested and noisiest traffic period, and was used to model worst-case scenarios. In accordance with Alaska Department of Transportation and Public Facilities (DOT&PF) policy and FHWA requirements, all sound levels reported are in A-weighted decibels (dBA). A-weighting deemphasizes very low and very high frequencies of sound in a manner similar to the human ear. Most community noise standards utilize A-weighting, which provides a high degree of correlation with human annoyance and health effects. Noise levels in this analysis are reported in L_{eq}, the A-weighted equivalent noise level over a fixed period of time.

1.1 PROJECT DESCRIPTION

The purpose of the Spenard Road Reconstruction project is to construct a safe roadway that will accommodate traffic levels in 2028 at an acceptable level of service (LOS) and to replace worn and outdated roadway features and amenities. Creation of the couplet will reduce congestion and increase LOS at the Minnesota Drive/Spenard Road intersection.

The proposed 36th Avenue couplet shown in Figure 2 would convert portions of 36th Avenue and Spenard Road to one-way streets to alleviate congestion at the Minnesota Drive/Spenard Road intersection. Spenard Road between Minnesota Drive and 36th Avenue would be converted from a four-lane, two-way street to a two-lane one-way northbound street. Traffic lanes on Minnesota Drive would not be reconfigured, although a southbound right-turn lane would be added between 36th Avenue and Spenard Road and the 36th Avenue/Minnesota Drive intersection would be signalized.

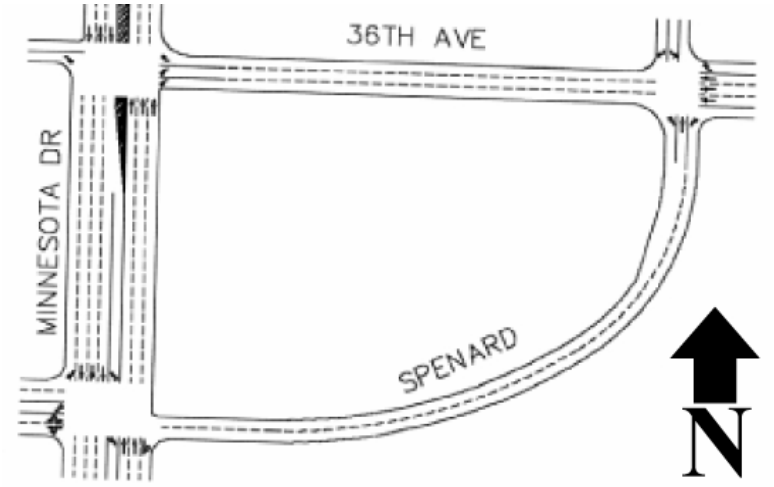


Drawing courtesy Lounsbury & Associates, Inc.

TRAVIS PETERSON ENVIRONMENTAL CONSULTING, INC. 3305 Arctic Boulevard, Suite 102 Anchorage, Alaska 99503	LOUNSBURY	**FIGURE 1** **LOCATION AND VICINITY**

PROJECT No: 1031-33A	FILE: 1031 - Lounsbury/33A - Spenard/EA-CE/Noise/Figures/Location and Vicinity	DATE: 4-11-07	NO SCALE

Figure 2: 36th Avenue Couplet



36th Avenue between Spenard Road and Minnesota Drive would be converted to a three-lane one-way westbound street. The current and proposed couplet 36th Avenue typical cross-sections are shown in Figures 3 and 4.

Figure 3: Current 36th Avenue Typical Section

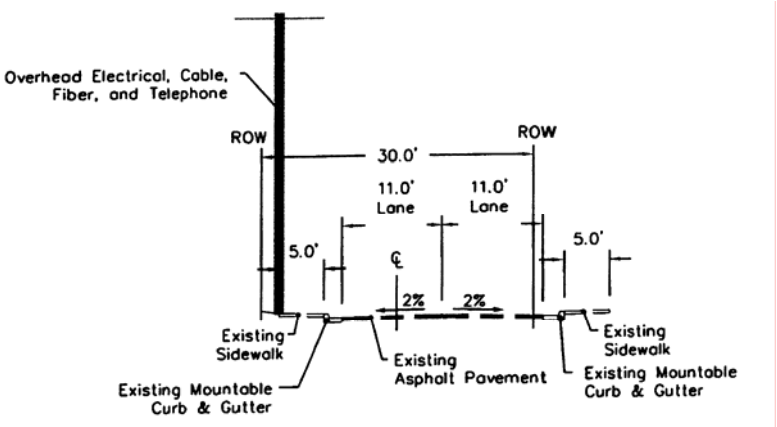
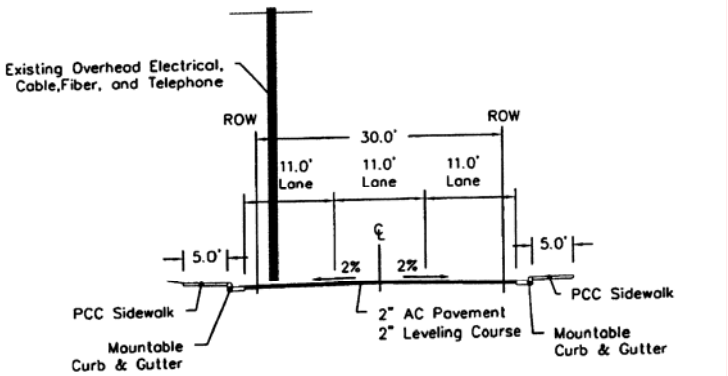


Figure 4: Proposed Couplet 36th Avenue Typical Section



1.2 DOT&PF AND FHWA NOISE LEVEL CRITERIA

The criteria for evaluating noise impacts are contained in the March 1996 DOT&PF Noise Abatement Policy (NAP) and Title 23 of the Code of Federal Regulations, Part 772 – Procedures for Abatement of Highway Traffic Noise and Construction Noise. Because exterior areas along 36th Avenue are not considered frequent human use areas, noise receivers along 36th Avenue were evaluated using Category E (interior) noise abatement criteria (NAC). The Activity Category E interior NAC is 52 dBA (L_{eq}). The FHWA and DOT&PF consider a traffic noise impact to occur if predicted traffic noise levels approach or exceed the NAC or when the predicted traffic noise levels substantially exceed the existing noise levels. DOT&PF defines "approach" as within 2 dBA of the NAC for the corresponding category. DOT&PF defines "substantial" as an increase of 10 dBA or more.

Therefore, noise abatement features will be identified and evaluated for feasibility and reasonableness if the proposed project will result in a predicted traffic noise level increase of 10 dBA or more or if the predicted interior noise level equals or exceeds 50 dBA.

2.0 METHODOLOGY

Exterior traffic noise levels were evaluated using the FHWA Traffic Noise Model (TNM) Version 2.5 Look-up Tables. The TNM program is based on reference energy emission levels for automobiles, medium (two-axle) trucks, heavy trucks (three axles or more), buses, and motorcycles with consideration given to vehicle volume, vehicle speed, roadway configuration, distance to receiver, and the acoustical characteristics of the site. The model enables the user to account for the effects of different pavement types, graded roadways, and noise attenuation by buildings and dense vegetation. The TNM Look-up Tables provide pre-calculated TNM results for simple highway geometries.

Interior noise levels were calculated using exterior noise levels generated with the TNM Look-up Tables and building noise reduction factors given in the FHWA Highway Traffic Noise Analysis and Abatement Policy and Guidance. Building noise reduction factors used were for masonry type buildings with double glazed windows, which provide a noise reduction of 35 dBA.

Project noise analysis for the project focused on properties along 36th Avenue because that portion of the project would be the only roadway to experience an increase in through lanes and a substantial increase in average daily traffic and peak-hour traffic. Traffic data used for the noise analysis was obtained from the October 2006 Spenard Road Reconstruction Draft Preliminary Engineering Report (PER) prepared by Lounsbury and Associates, Inc. (Lounsbury). Fleet mix data provided by the MOA was used to determine vehicle distribution for the noise analysis. Light-duty gasoline and diesel vehicles were considered 'automobiles,' light-duty gasoline and diesel trucks were considered 'medium trucks,' and heavy-duty gasoline and diesel vehicles were considered 'heavy trucks' in the TNM Lookup program. Fleet mix percentages are shown in Table 1 on the following page.

Table 1: Traffic Fleet Mix

Vehicle Class	Traffic Percentage
Automobile	68.9
Medium Truck	27.2
Heavy Truck	3.9

The Super 8 Motel and engineering firm Peratrovich, Nottingham, and Drage Inc. (PND) were selected as receivers along 36th Avenue (Figure 5). Secondary noise impacts from Minnesota Drive were also analyzed. Receiver offsets from the respective roadway centerlines are shown in Table 2. No exterior frequent human use areas were identified at either receiver, so both receivers were considered Activity Category E properties and evaluated using interior NAC.

Table 2: Receiver Offsets

Receiver (Number, Name, Address)	Activity Category	Spenard Offset	Minnesota Offset
1: Super 8 Motel (3501 Minnesota Dr.)	B	91.5/27.9	168.3/51.3
2: PND (1506 West 36th Ave.)	C	32.8/10.0	178.1/54.3

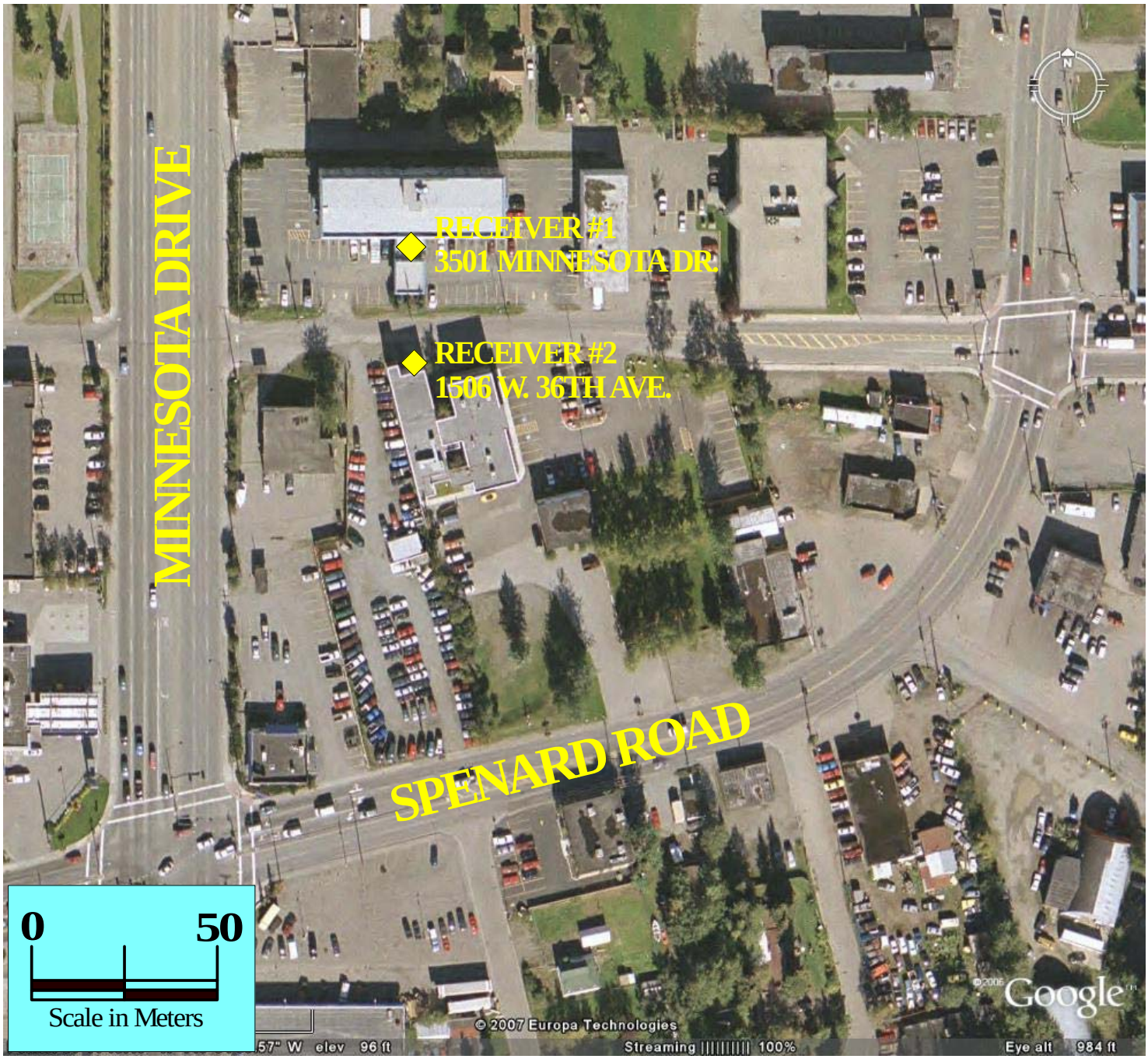
All distances in feet/meters.

Total noise levels at receivers along 36th Avenue were computed by logarithmic addition in accordance with the FHWA Highway Traffic Noise Prediction Model. Computation was performed using the following equation:

$$X_{TOTAL} = 10\log(10^{\frac{X_{36TH}}{10}} + 10^{\frac{X_{MINNESOTA}}{10}})$$

Where: X_{TOTAL} is the noise level in dBA.
X_{36TH} is the noise component from 36th Avenue traffic in dBA.
$X_{MINNESOTA}$ is the noise component from Minnesota Drive traffic in dBA.

All model runs used metric units, and reported values are given in English and metric units. The terrain around all receivers was considered 'hard.' Hard terrain describes acoustically reflective surfaces such as pavement and water, while soft terrain describes absorptive surfaces such as grass and fresh snow. Terrain surrounding 36th Avenue in the vicinity of the receivers was almost exclusively pavement. These conditions represented worst-case scenarios for noise impacts. Traffic volumes and speeds are shown in Table 3. TNM Look-up input/output sheets are available in Appendix A.



RECEIVER #1 - Category E
3501 Minneosta Dr.
2007 No-Build NAC: 34.0 dBA
2028 No-Build NAC: 35.8 dBA
2028 Build NAC: 37.3 dBA

RECEIVER #2 - Category E
1506 W. 36th Ave.
2007 No-Build NAC: 34.4 dBA
2028 No-Build NAC: 36.0 dBA
2028 Build NAC: 38.4 dBA

TRAVIS PETERSON ENVIRONMENTAL CONSULTING, INC. 3305 Arctic Boulevard, Suite 102 Anchorage, Alaska 99503	LOUNSBURY	FIGURE 5 36TH AVENUE RECEIVERS
PROJECT No: 1031-33A	FILE: 1031 - Lounsbury/33A - Spenard/EA-CE/Noise/Figures/36th Avenue Receivers	DATE: 4-11-07 | AS SHOWN

Table 3: Traffic Inputs

Roadway	No-Build Speed	Build Speed	2007 No-Build			2028 No-Build			2028 Build		
			Auto Vol.	Med. Truck Vol.	Heavy Truck Vol.	Auto Vol.	Med. Truck Vol.	Heavy Truck Vol.	Auto Vol.	Med. Truck Vol.	Heavy Truck Vol.
36th	22.0 / 35.4	15.0 / 24.1	168.1	66.4	9.5	183.3	72.3	10.4	773.1	305.2	43.8
Minnesota	12.0 / 19.3 (2007) 10.0 / 16.1 (2028)	17.0 / 27.4	2389.5	943.3	135.3	2937.2	1159.5	166.3	3422.3	1351.0	193.7

All traffic speeds in miles per hour/kilometers per hour. All traffic volumes in vehicles per hour.

3.0 EXISTING CONDITIONS

Vehicular traffic is the dominant noise source in the vicinity of the proposed 36th Avenue couplet. Other environmental noise sources contributing to the ambient noise environment include traffic on other local roadways and occasional aircraft overflights. Noise sources are not anticipated to change significantly over the design life of the project.

3.1 LAND USE

The entire project is within the Municipality of Anchorage. Zoning around 36th Avenue is designated as B-3, general commercial use exposed to heavy automobile traffic. Properties around the proposed 36th Avenue couplet include professional offices, commercial businesses, and a motel.

Spenard Road is identified in the Anchorage Bowl Comprehensive Plan as a transit-supportive development corridor. Such corridors are expected to support higher-density commercial and residential use in the future, making it unlikely that land use in the area will change significantly by the end of the design life.

3.2 TRAFFIC VOLUMES

Traffic on 36th Avenue is anticipated to increase after project construction because 36th Avenue would become part of the couplet and the total through lanes would increase. Traffic on Minnesota Drive is anticipated to increase under the build alternative because southbound traffic from Spenard Road would be directed onto Minnesota Drive. Peak-hour traffic figures used in 2028 Build and No-Build scenarios were obtained from LOS capacity analysis sheets available in Appendix H of Lounsbury's October 2006 Draft PER. Peak-hour traffic estimates are shown in Table 4.

Table 4: Peak-hour Traffic Estimates

	36th Avenue	Minnesota Dr.
2007 No-Build	244	3468
2028 No-Build	266	4263
2028 Build	1122	4967

All traffic volumes given in vehicles per hour.

4.0 NOISE IMPACTS

The Build alternative would increase the number of lanes from two to three on 36th Avenue between Spenard Road and Minnesota Drive and reroute southbound traffic from Spenard Road to Minnesota Drive via 36th Avenue. Potential noise impacts associated with the proposed project include permanent increases in peak-hour vehicular traffic and temporary project construction noise.

The FHWA TNM v2.5 Look-up Tables was used to calculate existing 2007, 2028 No-Build, and 2028 Build noise levels during peak-hour conditions. Both receivers are located at the same elevation as the roadway, with no natural or man-made barriers between the receivers and the road. The primary factors affecting the exposure of each receiver to traffic noise are traffic volume, traffic speed, and separation distance.

Very little vegetation exists along the project corridor. No significant vegetation will be cleared during project construction and clearing is not anticipated to have any effect on noise levels in the surrounding area because existing vegetation is not thick enough to act as a noise buffer. Post-construction revegetation will not significantly buffer adjacent properties against noise impacts and are not anticipated to reduce traffic noise levels in the area.

4.1 36th AVENUE

The 2028 Build and No-Build alternatives will generate more noise than the 2007 existing noise level at the PND building and the Super 8 Motel. Project construction will result in a maximum noise level increase of 3.3 dBA at the Super 8 Motel and 4.4 dBA at the PND building over existing noise levels.

At 2028 traffic volumes, noise at the Super 8 Motel would rise from 35.8 dBA to 37.3 dBA if the couplet is constructed, while noise at PND would rise from 36.0 dBA to 38.4 dBA. This represents an increase of 1.5 and 2.4 dBA, respectively, over 2028 No-Build levels and an increase of 3.3 and 4.4 dBA, respectively, over 2007 noise levels.

Interior noise levels at both the Super 8 Motel and the PND building will be below the interior NAC of 50 dBA throughout the project design life whether the couplet is constructed or not. No noise impacts will be created or intensified by project construction.

Table 5: 36th Avenue Noise Levels

Scenario	Receiver	NAC (L_{eq})	Noise Level (dBA)
2007 No-Build Alternative	Super 8 Motel	50	34.0
	PND	50	34.4
2028 No-Build Alternative	Super 8 Motel	50	35.8
	PND	50	36.0
2028 Build Alternative	Super 8 Motel	50	37.3
	PND	50	38.4

5.0 MITIGATION

5.1 TRAFFIC NOISE MITIGATION

Noise abatement features must be considered per 23 CFR 772 if project construction will result in a predicted design year noise level increase of 10 dBA, or if the design year interior noise level equals or exceeds 50 dBA at either receiver. The maximum predicted design year noise level increase is 4.4 dBA, and noise analysis did not identify noise levels above the interior NAC of 50 dBA at either receiver. Therefore, abatement measures are not required for the Spenard Road Reconstruction.

5.2 CONSTRUCTION NOISE MITIGATION

For this project, equipment operating at the project site would be required to conform to contractual specifications requiring the contractor to comply with all local sound control noise rules, regulations, and ordinances. Although construction noise impacts would be temporary, the following standard measures are recommended to minimize such impacts:

- Whenever possible, limit operation of heavy equipment and other noisy procedures to the daylight hours. If the contractor desires to work at night, the contractor will obtain a MOA Noise Permit;
- Install and maintain effective mufflers on equipment;
- Locate equipment and vehicle staging areas as far from residential areas as possible; and
- Limit unnecessary idling of equipment.

6.0 CONCLUSIONS

Noise abatement features must be considered and evaluated for feasibility and reasonableness if project construction will result in a predicted design year noise level increase of 10 dBA. Noise abatement features must also be considered if the design year noise level equals or exceeds 50 dBA at either the Super 8 Motel or the PND building. If the Build alternative is selected, neither noise receiver is predicted to experience an interior noise level increase of 10 dBA or to experience noise levels above the appropriate NAC. Noise abatement measures are not required for the Spenard Road Reconstruction project.

7.0 REFERENCES

DOT&PF, 1996. Statewide Noise Policy. Alaska Department of Transportation and Public Facilities. Juneau, Alaska. March 20, 1996.

FHWA, 1978. Federal Highway Administration Highway Traffic Noise Prediction Model. December, 1978.

FHWA, 1980. Fundamentals and Abatement of Highway Traffic Noise Textbook. September, 1980.

FHWA, 1995. Highway Traffic Noise Analysis and Abatement Policy and Guidance. June, 1995.

FHWA, 2004. Federal Highway Administration Traffic Noise Model Version 2.5 Look-up Tables. December, 2004.

FHWA, 2006. Federal Highway Administration Noise Abatement Criteria as specified in 23 CFR Part 722.

Lounsbury, 2006. Lounsbury & Associates, Inc. Spenard Road Reconstruction: Minnesota Drive to Minnesota Drive On-Ramp Preliminary Engineering Report Draft, Project HRQ-0001(172)/53986. October, 2006.