Appendix D
Highway Traffic Noise Assessment

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Note to Reader:

Changes in this document since the Draft SEIS was published in March 2015 have been highlighted in grey for easy identification by the reader. Deletions and spelling corrections are not shown for clarity purposes.

EXECUTIVE SUMMARY

The Alaska Department of Transportation and Public Facilities (DOT&PF) proposes to improve traffic movement through the Sterling Highway corridor between Mileposts (MP) 45 and 60. Four build alternatives are being considered, as well as a No Build option. This highway traffic noise assessment evaluates the potential for traffic noise impacts and noise mitigation options in accordance with the DOT&PF *Noise Policy*, dated April 2011.

Traffic noise levels were measured at eleven representative locations in the project area. Vehicle counts and classifications were performed at eight of these sites for use in validating the Federal Highway Administration (FHWA) Traffic Noise Model version 2.5 (TNM). Noise levels at the three additional sites were used to indicate ambient background levels at sites not directly adjacent to the existing highway. The FHWA TNM was used to predict and evaluate traffic noise levels at representative receptor points (noise prediction sites) under the existing condition, the four future Build alternatives, and the future No Build alternative. This traffic noise analysis conforms to FHWA and DOT&PF traffic noise analysis guidelines and requirements.

Table A shows a summary of the noise analysis results. The evaluation of the build alternatives yielded one noise impact at a commercial receptor, four noise impacts at residential receptors, and two noise impacts at recreational site receptors under the Cooper Creek Alternative; two noise impacts at recreational site receptors under the G South alternative; one noise impact at a recreational site receptor under the Juneau Creek Alternative; and one noise impact at a recreational site receptor under the Juneau Creek Variant Alternative. No feasible mitigation options were available for the noise impacts; consequently, no noise abatement is proposed as a part of the project.

Table A: Summary of Predicted Noise Impacts

NAC Class	Receptor Types		2012 Existing	2043 No Build	2043 Cooper Creek	2043 G South	2043 Juneau Creek	2043 Juneau Creek Variant
B	Residential	Meets or Exceeds NAC	1	4	4	0	0	0
		Substantial Increase	-	0	0	0	0	0
C	Campsite, Recreational areas, trails	Meets or Exceeds NAC	1	1	1	1	0	0
		Substantial Increase	-	0	1	1	1	1
E	Commercial	Meets or Exceeds NAC	0	0	1	0	0	0
		Substantial Increase	-	0	0	0	0	0
Total Number of Properties Impacted			**2**	**5**	**7**	**2**	**1**	**1**

This recommendation is based upon preliminary design information and existing policies. The recommendations will be re-evaluated during the design phase of the project to determine if they remain valid and conform to any changes in DOT&PF noise guidance.

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Abbreviations and Acronyms

°F	Degrees Fahrenheit
CFR	Code of Federal Regulations
dB	Decibels
dBA	A-weighted Decibels
DOT&PF	Alaska Department of Transportation and Public Facilities
EIS	Environmental Impact Statement
FHWA	Federal Highway Administration
KNWR	Kenai National Wildlife Refuge
Leq(h)	Hourly Equivalent Noise Level
MP	Milepost
mph	Miles per Hour
NAC	Noise Abatement Criteria
NM	Noise Monitoring
SHSP	Strategic Highway Safety Plan
SVROR	Single-vehicle Run-off-road
TNM	Traffic Noise Model

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1.0 Introduction

The Sterling Highway connects the western Kenai Peninsula to the rest of Alaska, and the Alaska Department of Transportation and Public Facilities (DOT&PF) has recognized the need to resolve several interrelated problems:

- The highway's capacity is not adequate to accommodate through traffic.
- Physical highway design features do not conform to "Rural Principal Arterial" standards.
- Local traffic cannot efficiently move on and off the highway.

The project purpose is to resolve these problems, thereby reducing congestion and providing for more consistent flow of traffic at typical highway speeds, while also accommodating the sizable minority of traffic bound for local destinations.

This report and its recommendations will be re-evaluated during the design phase of the project to reflect any updates to DOT&PF traffic noise abatement guidance.

1.1 Project Alternatives

Four alternatives are being evaluated as part of the current Environmental Impact Statement (EIS). Each alternative begins at the intersection of Quartz Creek Road with the Sterling Highway, at Milepost (MP) 45, and ends just east of the highway's intersection with Skilak Lake Road, at MP 58. A brief description of each alternative is presented below.

1.1.1 *No Build Alternative*

The No Build Alternative will not change the existing highway in the project area. The existing highway has one lane in each direction, limited shoulder space, tight curves, limited sight distance, and a posted speed limit of 35 miles per hour (mph) in areas. Although normal highway maintenance would continue along this segment of roadway, no improvements would occur. The existing bridges along the Sterling Highway will be replaced as part of the normal bridge replacement program, but would not be conducted as part of this project.

1.1.2 *Cooper Creek Alternative*

The Cooper Creek Alternative follows the existing Sterling Highway from MP 45 to the south side of the Cooper Landing Bridge, where it turns south from the existing highway and climbs the hillside to a maximum elevation of approximately 275 feet above the Kenai River. The alignment traverses the hillside before descending to cross Cooper Creek with an 846-foot-long curved bridge. The alternative rejoins the existing Sterling Highway corridor at MP 51.3. The length of the alternative, including those areas that overlap with the existing highway, would be widened to meet Rural Principal Arterial standards and would include the addition of west and eastbound passing lanes. The Cooper Landing Bridge would be replaced with a new bridge that would be 78 feet wide and 670 feet long, and would accommodate 2 lanes, 1 turning lane, and 1 center lane, as well as shoulders and a pedestrian walkway on the downstream side. The existing

Schooner Bend Bridge would be replaced with a similar structure located approximately 80 feet downstream.

Due to the terrain surrounding the alternative, frequent rock and soil cuts are necessary, with the largest cut on the east side of the Cooper Creek Bridge being 1,500 feet long and 180 feet high.

1.1.3 *G South Alternative*

The G South Alternative uses the existing highway corridor at both ends of the project area, with a new alignment north of the Kenai River between MP 46.3 and MP 51.9. In areas where the G South Alternative occupies the footprint of the existing highway, the roadway will be widened to meet Rural Principal Arterial standards, and would include west and eastbound passing lanes. The G South Alternative departs from the existing highway alignment at MP 46.3 and gradually climbs to a maximum elevation of 776 feet on the hillside north of Bean Creek, where it then descends to cross Juneau Creek Canyon. The Juneau Creek Canyon Bridge would be 1,326 feet long and 62 feet wide with 2 lanes, an additional eastbound climbing lane, shoulders on both sides of the road, and a walkway on the south side of the bridge. On the west side of Juneau Creek Canyon, the alternative flattens to a new crossing of the Kenai River shortly before rejoining the existing highway corridor at MP 51.9. The new Kenai River Bridge would be a minimum of 486 feet long and 78 feet wide, with 2 lanes, an additional eastbound climbing lane, a center turn lane, shoulders on both sides of the road, and a walkway on the upstream side of the bridge. The Schooner Bend Bridge would be replaced as part of the G South Alternative, in the same manner described for the Cooper Creek Alternative.

1.1.4 *Juneau Creek Alternative*

The Juneau Creek Alternative would straighten and widen the existing highway at both ends of the project area, with a new alignment north of the existing roadway between approximately MP 46.3 and 55.8. The alternative diverges from the existing highway at MP 46.3 and climbs the hillside to its crossing of the Juneau Creek Canyon with a new bridge (830 to 1,650 feet long, depending on the bridge type selected). The new Juneau Creek Canyon Bridge would be 62 feet wide with 2 lanes, an additional westbound climbing lane, shoulders on both sides of the road, and a pathway on the downstream (south) side of the bridge. Based on the conceptual alignment and profile for this alternative, Juneau Creek is approximately 230 feet below the canyon rim and approximately 425 feet from rim to rim of the canyon at the crossing.

On the west side of the canyon, the alignment continues to climb to its maximum elevation of approximately 300 feet above the Juneau Creek Canyon floor. The existing highway would be reconfigured to provide a T-intersection connection with the Juneau Creek Alternative at approximately MP 55.8 of the existing highway. The alignment then follows the existing highway for the remaining three miles to the end of the project.

1.1.4.1 Juneau Creek Variant Alternative

Juneau Creek Variant Alternative diverges from the Juneau Creek Alternative west of the Juneau Creek crossing. This alternative traverses the valley slope and merges with the existing Sterling Highway on the east side of the Kenai National Wildlife Refuge (KNWR) Wilderness boundary to avoid impacts to designated Wilderness. Access to Sportsman's Landing and the existing

highway is provided by a loop to the east under the Juneau Creek Variant as it nears the existing highway, intersecting the existing highway at the east end of Sportsman's Landing. Modifications to Sportsman's Landing entrance would be required to support this concept, but the property would not lose acreage.

1.2 Purpose of this Report

A traffic noise assessment was completed for the proposed Sterling Highway MP 45–60 Project to identify existing and predicted future traffic noise levels. Noise mitigation was evaluated where future traffic noise levels were predicted to approach or exceed the Federal Highway Administration (FHWA) and DOT&PF Noise Abatement Criteria (NAC).

This noise assessment is in compliance with the FHWA noise abatement regulations in 23 Code of Federal Regulations (CFR) 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise*. This assessment is also in compliance with the DOT&PF *Noise Policy* dated April 2011, which describes the implementation of the FHWA noise regulations in Alaska.

2.0 Methodology to Analyze Traffic Noise Levels and Define Traffic Noise Impacts

Noise is measured in decibels (dB) on a logarithmic scale. Because human hearing is not equally sensitive to all frequencies of sound, certain frequencies are given more or less "weight." The A-weighted scale corresponds to the sensitivity range for human hearing. Noise levels are measured in dBA, the A-weighted sound level in decibels. When noise levels change 3 dBA or less, the change is considered to be barely perceptible to an adult with normal hearing in an outdoor setting. A 5 dBA change in noise level is clearly noticeable. A 10 dBA change in noise levels is perceived as a doubling or halving of noise loudness, and a 20 dBA change is considered a dramatic change in loudness. Table 2-1 shows noise levels associated with common, everyday sources, and helps the reader more fully understand the magnitude of noise levels discussed in this report.

The hourly equivalent noise level [Leq(h)] is used to analyze traffic noise levels and identify noise impacts. The Leq(h) is defined as the equivalent steady-state sound level which, in a stated period of time, contains the same acoustic energy as the time-varying sound level during the same period. Therefore, for the purposes of this analysis, Leq can be considered the average sound level, and Leq(h) can be considered the average sound level occurring over a one-hour period. It is representative of the overall (average) traffic-generated noise level expressed on an hourly basis.

Table 2-1: Common Noise Sources and Levels

Sound Pressure Level (dBA)	Typical Sources
120	Jet aircraft takeoff at 100 feet
110	Same aircraft at 400 feet
90	Motorcycle at 25 feet
80	Garbage disposal
70	City street corner
60	Conversational speech
50	Typical office
40	Living room (without television)
30	Quiet bedroom at night

Source: Rau and Wooten, 1980

Land uses are assigned to an activity category based on the type of activities occurring in each respective land use (e.g., residences, recreational areas, churches, commercial land, and undeveloped land). Activity categories are then ordered based on their sensitivity to traffic noise levels. NAC are assigned to each activity category. These NAC represent the maximum traffic

noise levels that allow uninterrupted use within each activity category. Table 2-2 lists the seven land use categories included in the NAC, and the Leq(h) associated with each activity category. Traffic noise impacts are identified relative to the NAC and the DOT&PF *Noise Policy*.

Table 2-2: FHWA Noise Abatement Criteria

Activity Category	Leq(h)	Description of Activity Category
A	57 dBA (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[1]	67 dBA (Exterior)	Residential.
C	67 dBA (Exterior)	Active sport 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 dBA (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 dBA (Exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A–D or F.
F	None	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	None	Undeveloped lands that are not permitted.

Source: 23 CFR 772, Table 1
[1] Includes undeveloped lands permitted for this activity category.

The noise analysis modeled noise levels at receptors in the project area for Activity Category B (residential), Activity Category C (trails, campgrounds, and recreational areas), and Activity Category E (commercial).

The FHWA definition of a traffic noise impact (23 CFR 772) contains two criteria. Only one criterion has to be met to be considered an impact. Traffic noise impacts are defined as impacts that occur when the predicted traffic noise levels:

- Approach or exceed the noise abatement criteria provided in Table 2-2 (DOT&PF defines "approach" – see below); or,
- When the predicted traffic noise levels substantially exceed the existing noise levels (DOT&PF defines "substantially exceed" – see below).

The DOT&PF defines "approach" the NAC as within 1 dBA of the NAC (DOT&PF, 2011). Consequently a traffic noise impact would occur when noise levels at Activity Category B and C land uses are greater than or equal to 66 dBA and Activity Category E land uses are greater than or equal to 71 dBA. The DOT&PF *Noise Policy* defines a substantial increase in noise levels as a 15 dBA increase over existing noise levels.

3.0 Noise Prediction Method

Traffic noise levels estimated for this study reflect "peak hour" volume noise levels and are predicted as Leq(h) in terms of dBA. The FHWA Traffic Noise Model (TNM) was used to predict traffic noise levels. TNM is a three-dimensional computer model that calculates traffic noise levels using the following types of information:

- Vehicle mix and volume, using five default vehicle types;
- Vehicle speeds;
- Roadway geometry;
- Receptor locations; and
- Ground cover types and topographic terrain between roadway and receptors.

3.1 Traffic Parameters

Table 3-1 shows the traffic mix determined for this project. The vehicle mix used in this analysis was estimated for July from the DOT&PF Traffic Volume Report 2006-2008 data "E of Quartz Creek Road" location.

Table 3-1: Vehicle Mix

Roadway	Cars	Medium Trucks/RVs	Heavy Trucks	Buses	Motorcycles	Total
Sterling Hwy	80.7%	15.7%	3.3%	0.1%	0.2%	100%

Traffic volumes used in this analysis were published in the 2013 Traffic Study Update (Lounsbury & Associates, 2013). They are based on the 100th hour volumes calculated for the existing and proposed roadway segments (a 1 percent annual growth rate was used to estimate 2043 traffic volumes). Table 3-2 shows the breakdown of traffic volumes used to model both the Build and No Build alternatives. The roadway segments are defined based on highway mileposts and station numbers. Figure 1 shows the location of each highway segment used in the traffic and highway noise analysis. Traffic flow along the highway has a peak hour directional split of 67 percent eastbound and 33 percent westbound, which is depicted in the numbers reported in Table 3-2.

For the existing conditions and No Build Alternative, the analysis modeled 1 traffic lane in each direction with a pavement width of 11 feet. For the build alternatives, this analysis modeled 1 traffic lane in each direction with a pavement width of 12 feet except for those areas where passing lanes would be located, in which case an additional 12-foot-wide travel lane was included. Under all modeling scenarios the TNM default pavement type was selected. Traffic was modeled using an average speed of 45 mph on the existing alignment or 55 mph on the build alternative alignments.

Table 3-2: Vehicle Volume and Classification Data Used in TNM

Roadway Segment(s)	Cars	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Total
2012 Existing Condition						
Segment 1 EB/WB	304/150	59/29	12/6	0/0	1/0	377/185
Segments 2–5 EB/WB	315/155	61/30	13/6	0/0	1/0	391/192
Segment 6 EB/WB	328/162	64/31	13/7	0/0	1/0	407/200
2043 No Build Alternative						
Segment 1 EB/WB	414/204	81/40	17/8	1/0	1/1	513/253
Segments 2–5 EB/WB	429/211	84/41	18/9	1/0	1/1	532/262
Segment 6 EB/WB	447/220	87/43	18/9	1/0	1/1	553/273
2043 Juneau Creek Alternative/ Juneau Creek Variant						
Segment 1 EB/WB	414/204	81/40	17/8	1/0	1/1	513/253
Segments 2–5 EB/WB	306/151	60/29	13/6	0/0	1/0	379/187
Segment 6 EB/WB	447/220	87/43	18/9	1/0	1/1	553/273
2043 G South Alternative						
Segment 1 EB/WB	414/204	81/40	17/8	1/0	1/1	513/253
Segment 2 EB/WB	429/211	84/41	18/9	1/0	1/1	532/262
Segments 3–5 EB/WB	306/151	60/29	13/6	0/0	1/0	379/187
Segment 6 EB/WB	447/220	87/43	18/9	1/0	1/1	553/273
2043 Cooper Creek Alternative						
Segment 1 EB/WB	414/204	81/40	17/8	1/0	1/1	513/253
Segment 2 EB/WB	429/211	84/41	18/9	1/0	1/1	532/262
Segments 3–4 EB/WB	301/148	58/29	12/6	0/0	1/0	373/183
Segment 5 EB/WB	429/211	84/41	18/9	1/0	1/1	532/262
Segment 6 EB/WB	447/220	87/43	18/9	1/0	1/1	553/273

3.2 Adjacent Land Use

Land uses throughout the project area vary between Activity Category B (residential) and Activity Category E (commercial) along the existing highway alignment, with Activity Category C (wilderness areas, campgrounds, trails and recreational areas) further from the existing highway alignment.

4.0 Existing Traffic Noise Levels and Validation

On July 13, 15, and 20, 2001, between the hours of 11 am and 11 pm, noise sampling was conducted at multiple locations in the project area (see noise monitoring [NM] locations on Figure 2). The monitoring activities were scheduled to occur during peak travel times, which historically have been during a July weekend. A Larson Davis Model 820 sound level meter was used to collect noise monitoring data.

Existing traffic noise levels were measured at eight sites (sites NM1 through NM8) close to the existing highway and were compared against TNM predictions to verify the accuracy of the computer model. If the predicted and measured levels are within + or – 3 dBA of one another, the model is considered to be within the accepted level of accuracy.

Three additional measurements (sites A, B and C) were taken at locations remote from the existing highway to determine ambient background levels at locations where highway noise is not a significant source of ambient noise.

Meteorological data is presented here for informational purposes, and also to comply with FHWA highway noise analysis guidelines. Ambient temperatures were in the mid-fifties (measured in degrees Fahrenheit [°F]) during the first two sampling days and 60°F on July 20. Winds were calm, and there was no precipitation during the monitoring periods. The roadway surface was dry during noise monitoring, as required by FHWA traffic noise monitoring guidelines.

4.1 Field Measurements and Model Validation Results

The measured and predicted noise levels for each of the noise monitoring locations used for TNM validation are presented in Table 4-1. The difference between the measured and predicted noise levels at each location ranged from -0.1 dBA (under predicted) to +4.5 dBA (over predicted). Comparison of the measured and predicted noise levels revealed that TNM over predicted noise levels 75 percent of the time by an average value of 2.7 dBA. The general over prediction could be the result of a higher modeled traffic speed relative to actual conditions.

Table 4-1: Ambient Monitoring and Model Validation Results

Monitoring Location	Location	Leq(h) (dBA)		
		Measured	Predicted	Difference
NM1	Russian River Ferry Parking Lot	55.7	56.9	1.2
NM2	Upper Russian R. Campground parking lot	41.8	43.6	1.8
NM3	Russian R. Campground overflow lot	61.5	61.4	-0.1
NM4	Across road from Gwin's Lodge	63.0	67.5	4.5
NM5	Upper Caribou Heights Road	40.9	44.5	3.6
NM6	Access trail below private residence	43.8	46.2	2.4
NM7	D. Young Ballfield, Cooper Landing	43.3	43.3	0.0
NM8	Kenai River boat ramp parking lot	55.7	58.2	2.5

For the purposes of model validation, one decimal place is shown. For the remainder of this report and subsequent discussion, noise levels are reported as whole numbers.

All but two of the receptors were found to be within the acceptable 3 dBA tolerance range. The discrepancy at receptors NM4 and NM5 is likely due to two factors; actual traffic was slightly less than predicted peak hour volumes, and the actual speeds were less than the posted speed utilized in prediction. Because of the good correlation between predicted and actual noise levels at the other sites, no adjustment factors were utilized to adjust the model at NM4 and NM5.

Table 4-2 shows ambient noise levels measures at sites A, B and C, which are presented to give an indication of ambient noise levels in the project area at sites further from the existing highway alignment, and where highway noise is not the dominant source of ambient noise.

Table 4-2: Ambient Levels Measured Away from Sterling Highway

Monitoring Location	Location	Leq(h) (dBA)
A	West Juneau Creek Road	40
B	Resurrection Trail, Juneau Creek bridge	65
C	Opposite Cooper Creek South Campground	61

Sites B and C were located close to creeks (Juneau Creek and Cooper Creek, respectively) and reflect higher ambient noise levels from the sound of rushing water in the creeks. Site A was a forest location without significant contributions from water sources and therefore reflects more of the ambient baseline for undeveloped lands throughout the project study area.

For the purposes of characterizing noise levels in areas where existing traffic noise is not a significant source of ambient noise, the most conservative monitored level from Table 4-2 was used to represent existing ambient levels. This means that where sites are located more than 1,000 feet from the existing highway alignment, an existing Leq(h) noise level of 40 dBA was assumed. Similarly, under future conditions, where noise receptors are located more than 1,000 feet from the existing or proposed highway alignments, an ambient Leq(h) of 40 dBA is assumed based on ambient measurements in the project area.

5.0 Traffic Noise Prediction

FHWA traffic noise analysis guidelines specify that future traffic noise levels be estimated using an FHWA-approved traffic noise model. The currently approved FHWA model is TNM (version 2.5), which was used to calculate existing traffic noise levels and future traffic noise levels for all alternatives.

The following subsections summarize the results of the analysis for each alternative. Residential and commercial receptors are labeled numerically and identified in Figures 3 through 12 for the purposes of reporting predicted noise levels. Campsites, trails, recreational areas, and Department of Transportation Act Section 4(f) sites modeled are coded, and their descriptions are summarized in Table 5-1.

Table 5-1: Description of campsites, trails, recreational areas, and Section 4(f) sites modeled

Receptor ID	Location
URR N	Upper Russian River Campground North
URR E	Upper Russian River Campground East
URR S	Upper Russian River Campground South
PK SE	Princess Kenai Lodge Southeast
PK SW	Princess Kenai Lodge Southwest
PK N	Princess Kenai Lodge North
CC N	Cooper Creek Campground North
CC S	Cooper Creek Campground South
RR	Russian River Campground
KNWR 1	Kenai National Wildlife Refuge - Wilderness
KNWR 2	Kenai National Wildlife Refuge
KNWR 3	Kenai National Wildlife Refuge – Russian River Ferry
SP 1	Sportsman's Landing
SP 2	Sportsman's Landing Bluff Top
KRSMA 1	Kenai River Special Management Area - River confluence
KRRA 2	Kenai River Recreation Area #2/Beginnings
KRRA 1	Kenai River Recreation Area #1
KRSMA 2	Kenai River Special Management Area - G South Crossing
JCRA 1	Juneau Creek Falls Recreation Area Campsite
JCRA 2	Juneau Falls Recreation Area – Falls Overlook
JCRA 3	Juneau Falls Recreation Area – Resurrection Pass National Recreation Trail
BCT 1	Bean Creek Trail near Juneau Creek alignment
BCT 2	Bean Creek Trail near G South alignment
ST 1	Stetson Trail #1
ST 2	Stetson Trail #2
CLBL	Cooper Landing Boat Launch
RPT 1	Resurrection Pass Trail point closest to existing Sterling Highway
RPT 2	Resurrection Pass Trail point closest to G South alignment

5.1 Existing Highway/No Build/Cooper Creek Alternatives

Table 5-2 lists the noise sensitive receptors along the existing highway and the No Build and Cooper Creek alternatives. Included in the table are the predicted Leq(h) noise levels in terms of dBA for the existing highway (2012), No Build Alternative (2043), and Cooper Creek Alternative (2043), as well as their differences. The predicted noise levels are compared to the NAC, and levels that approach, meet or exceed the NAC are shown in bold type. Figures 3 through 12 show the location of the noise sensitive receptors along the existing highway, No Build, and Cooper Creek Alternatives.

Table 5-2: Noise Analysis Results – Existing Highway/No Build/Cooper Creek Alternative

Receptor ID	Existing Land Use (FHWA Activity Category)	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	2043 No-Build Noise Level (dBA)	2043 Cooper Creek Noise Level (dBA)	Change Between 2043 No Build and 2043 Cooper Creek	Change Between 2012 Existing and 2043 Build	Predicted Build Impact? (Yes/No)
1	Residential (B)	66	63	65	64	-1	1	No
2	Residential (B)	66	59	60	60	0	1	No
3	Residential (B)	66	51	53	53	0	2	No
4	Residential (B)	66	54	55	51	-4	-3	No
5	Residential (B)	66	53	54	50	-4	-3	No
6	Residential (B)	66	57	59	54	-5	-3	No
7	Residential (B)	66	52	53	49	-4	-3	No
8	Residential (B)	66	49	51	47	-4	-2	No
9	Residential (B)	66	54	56	51	-5	-3	No
10	Residential (B)	66	56	58	53	-5	-3	No
11	Residential (B)	66	54	56	51	-5	-3	No
12	Residential (B)	66	51	52	48	-4	-3	No
13	Residential (B)	66	51	52	48	-4	-3	No
14	Residential (B)	66	62	64	59	-5	-3	No
15	Residential (B)	66	50	52	48	-4	-2	No
16	Residential (B)	66	61	63	57	-6	-4	No
17	Residential (B)	66	63	64	59	-5	-4	No
18	Residential (B)	66	56	58	53	-5	-3	No
19	Residential (B)	66	50	52	48	-4	-2	No
20	Residential (B)	66	51	53	48	-5	-3	No

Receptor ID	Existing Land Use (FHWA Activity Category)	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	2043 No-Build Noise Level (dBA)	2043 Cooper Creek Noise Level (dBA)	Change Between 2043 No Build and 2043 Cooper Creek	Change Between 2012 Existing and 2043 Build	Predicted Build Impact? (Yes/No)
21	Residential (B)	66	65	66	61	-5	-4	No
22	Residential (B)	66	51	53	49	-4	-2	No
23	Residential (B)	66	55	56	51	-5	-4	No
24	Residential (B)	66	55	56	51	-5	-4	No
25	Residential (B)	66	55	56	51	-5	-4	No
26	Residential (B)	66	54	55	51	-4	-3	No
27	Residential (B)	66	60	61	56	-5	-4	No
28	Residential (B)	66	54	55	51	-4	-3	No
29	Residential (B)	66	52	54	50	-4	-2	No
30	Residential (B)	66	51	53	49	-4	-2	No
31	Residential (B)	66	51	52	49	-3	-2	No
32	Residential (B)	66	50	51	49	-2	-1	No
33	Residential (B)	66	43	45	53	8	10	No
34	Residential (B)	66	50	52	50	-2	0	No
35	Residential (B)	66	60	61	56	-5	-4	No
36	Residential (B)	66	58	59	54	-5	-4	No
37	Residential (B)	66	54	55	51	-4	-3	No
38	Residential (B)	66	46	49	52	3	6	No
39	Residential (B)	66	46	48	55	7	9	No
40	Residential (B)	66	59	60	55	-5	-4	No
41	Residential (B)	66	60	61	56	-5	-4	No
42	Residential (B)	66	49	52	50	-2	1	No
43	Residential (B)	66	47	49	52	3	5	No
44	Residential (B)	66	52	55	51	-4	-1	No
45	Residential (B)	66	52	53	49	-4	-3	No
46	Residential (B)	66	52	53	48	-5	-4	No
47	Residential (B)	66	52	53	49	-4	-3	No
48	Residential (B)	66	52	53	49	-4	-3	No

Receptor ID	Existing Land Use (FHWA Activity Category)	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	2043 No-Build Noise Level (dBA)	2043 Cooper Creek Noise Level (dBA)	Change Between 2043 No Build and 2043 Cooper Creek	Change Between 2012 Existing and 2043 Build	Predicted Build Impact? (Yes/No)
49	Residential (B)	66	55	56	51	-5	-4	No
50	Residential (B)	66	52	53	49	-4	-3	No
51	Residential (B)	66	53	55	50	-5	-3	No
52	Residential (B)	66	60	61	56	-5	-4	No
53	Residential (B)	66	55	57	52	-5	-3	No
54	Residential (B)	66	63	64	59	-5	-4	No
55	Residential (B)	66	57	59	54	-5	-3	No
56	Residential (B)	66	53	55	52	-3	-1	No
57	Residential (B)	66	50	51	52	1	2	No
58	Residential (B)	66	49	50	54	4	5	No
59	Residential (B)	66	48	50	54	4	6	No
60	Residential (B)	66	48	50	54	4	6	No
61	Residential (B)	66	47	49	59	10	12	No
62	Residential (B)	66	53	54	52	-2	-1	No
63	Residential (B)	66	53	55	53	-2	0	No
64	Residential (B)	66	60	61	56	-5	-4	No
65	Residential (B)	66	62	63	58	-5	-4	No
66	Residential (B)	66	61	63	58	-5	-3	No
67	Residential (B)	66	61	63	58	-5	-3	No
68	Residential (B)	66	52	54	50	-4	-2	No
69	Residential (B)	66	53	54	51	-3	-2	No
70	Residential (B)	66	52	53	50	-3	-2	No
71	Residential (B)	66	50	52	49	-3	-1	No
72	Residential (B)	66	53	54	51	-3	-2	No
73	Residential (B)	66	53	55	52	-3	-1	No
74	Residential (B)	66	59	60	56	-4	-3	No
75	Residential (B)	66	56	57	53	-4	-3	No
76	Residential (B)	66	59	61	56	-5	-3	No

Receptor ID	Existing Land Use (FHWA Activity Category)	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	2043 No-Build Noise Level (dBA)	2043 Cooper Creek Noise Level (dBA)	Change Between 2043 No Build and 2043 Cooper Creek	Change Between 2012 Existing and 2043 Build	Predicted Build Impact? (Yes/No)
77	Residential (B)	66	56	57	54	-3	-2	No
78	Residential (B)	66	61	62	57	-5	-4	No
79	Residential (B)	66	48	50	56	6	8	No
80	Residential (B)	66	54	55	53	-2	-1	No
81	Residential (B)	66	57	59	55	-4	-2	No
82	Residential (B)	66	55	56	54	-2	-1	No
83	Residential (B)	66	49	50	55	5	6	No
84	Residential (B)	66	52	53	57	4	5	No
85	Residential (B)	66	55	56	59	3	4	No
86	Residential (B)	66	52	54	54	0	2	No
87	Residential (B)	66	56	58	**67**	9	11	Yes
88	Residential (B)	66	55	57	54	-3	-1	No
89	Residential (B)	66	55	57	55	-2	0	No
90	Residential (B)	66	60	61	58	-3	-2	No
91	Residential (B)	66	60	62	60	-2	0	No
92	Residential (B)	66	60	62	61	-1	1	No
93	Residential (B)	66	53	54	55	1	2	No
94	Residential (B)	66	53	54	58	4	5	No
95	Residential (B)	66	50	51	53	2	3	No
96	Residential (B)	66	50	52	54	2	4	No
97	Residential (B)	66	53	55	56	1	3	No
98	Commercial (E)	71	62	63	67	4	5	No
99	Residential (B)	66	51	53	54	1	3	No
100	Residential (B)	66	53	55	61	6	8	No
101	Residential (B)	66	53	54	55	1	2	No
102	Residential (B)	66	56	58	59	1	3	No
103	Residential (B)	66	59	61	62	1	3	No
104	Residential (B)	66	58	59	61	2	3	No

Receptor ID	Existing Land Use (FHWA Activity Category)	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	2043 No-Build Noise Level (dBA)	2043 Cooper Creek Noise Level (dBA)	Change Between 2043 No Build and 2043 Cooper Creek	Change Between 2012 Existing and 2043 Build	Predicted Build Impact? (Yes/No)
105	Residential (B)	66	64	**66**	**68**	2	4	Yes
106	Residential (B)	66	**69**	**70**	**72**	2	3	Yes
107	Commercial (E)	71	66	68	**71**	3	5	Yes
108	Residential (B)	66	52	54	56	2	4	No
109	Commercial (E)	71	66	68	70	2	4	No
110	Commercial (E)	71	62	64	67	3	5	No
111	Commercial (E)	71	60	62	63	1	3	No
112	Residential (B)	66	58	60	61	1	3	No
113	Residential (B)	66	60	62	63	1	3	No
114	Residential (B)	66	59	60	62	2	3	No
115	Residential (B)	66	57	59	60	1	3	No
116	Residential (B)	66	59	60	59	-1	0	No
117	Residential (B)	66	56	58	56	-2	0	No
118	Residential (B)	66	57	59	57	-2	0	No
119	Residential (B)	66	65	**66**	**66**	0	1	Yes
120	Residential (B)	66	58	59	59	0	1	No
121	Residential (B)	66	58	60	58	-2	0	No
122	Residential (B)	66	59	61	58	-3	-1	No
123	Residential (B)	66	61	62	60	-2	-1	No
124	Residential (B)	66	59	60	61	1	2	No
125	Residential (B)	66	60	61	60	-1	0	No
126	Residential (B)	66	61	62	63	1	2	No
127	Residential (B)	66	58	59	61	2	3	No
128	Residential (B)	66	57	58	60	2	3	No
129	Residential (B)	66	53	54	55	1	2	No
130	Residential (B)	66	50	52	53	1	3	No
131	Residential (B)	66	48	49	51	2	3	No
132	Residential (B)	66	41	43	44	1	3	No

Receptor ID	Existing Land Use (FHWA Activity Category)	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	2043 No-Build Noise Level (dBA)	2043 Cooper Creek Noise Level (dBA)	Change Between 2043 No Build and 2043 Cooper Creek	Change Between 2012 Existing and 2043 Build	Predicted Build Impact? (Yes/No)
133	Residential (B)	66	41	42	44	2	3	No
134	Residential (B)	66	40[a]	40[a]	43	3	3	No
135	Residential (B)	66	40[a]	40[a]	43	3	3	No
136	Residential (B)	66	40[a]	40[a]	44	4	4	No
137	Residential (B)	66	40[a]	40[a]	43	3	3	No
138	Residential (B)	66	40[a]	40[a]	43	3	3	No
139	Residential (B)	66	40[a]	40[a]	43	3	3	No
140	Residential (B)	66	40[a]	40[a]	42	2	2	No
141	Residential (B)	66	40[a]	40[a]	41	1	1	No
142	Residential (B)	66	40[a]	40[a]	42	2	2	No
143	Residential (B)	66	40[a]	40[a]	42	2	2	No
144	Residential (B)	66	40[a]	40[a]	41	1	1	No
145	Residential (B)	66	40[a]	40[a]	41	1	1	No
146	Residential (B)	66	40	42	44	2	4	No
147	Residential (B)	66	40[a]	40[a]	42	2	2	No
148	Residential (B)	66	40[a]	40[a]	43	3	3	No
149	Residential (B)	66	40[a]	40[a]	42	2	2	No
150	Residential (B)	66	40[a]	40[a]	43	3	3	No
151	Residential (B)	66	40[a]	40[a]	43	3	3	No
152	Residential (B)	66	39	41	43	2	4	No
153	Hotel (E)	71	48	49	50	1	2	No
154	Residential (B)	66	44	45	45	0	1	No
155	Residential (B)	66	51	53	53	0	2	No
156	Residential (B)	66	40[a]	40[a]	44	4	4	No
157	Residential (B)	66	40[a]	40[a]	42	2	2	No
158	Residential (B)	66	40[a]	40[a]	41	1	1	No
URR N	Campground (C)	66	44	46	46	0	2	No
URR E	Campground (C)	66	40[a]	40[a]	43	3	3	No

Receptor ID	Existing Land Use (FHWA Activity Category)	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	2043 No-Build Noise Level (dBA)	2043 Cooper Creek Noise Level (dBA)	Change Between 2043 No Build and 2043 Cooper Creek	Change Between 2012 Existing and 2043 Build	Predicted Build Impact? (Yes/No)
URR S	Campground (C)	66	40[a]	40[a]	40	0	0	No
PK SE	Campground (C)	66	44	45	46	1	2	No
PK SW	Campground (C)	66	40[a]	40[a]	46	6	6	No
PK N	Campground (C)	66	40[a]	40[a]	45	5	5	No
CC N	Campground (C)	66	54	55	52	-3	-2	No
CC S	Campground (C)	66	47	48	47	-1	0	No
RR	Campground (C)	66	52	53	55	2	3	No
KNWR 1	Recreation Area (C)	66	40[a]	40[a]	40[a]	0	0	No
KNWR 2	Recreation Area (C)	66	48	50	50	0	2	No
KNWR 3	Recreation Area (C)	66	45	47	47	0	2	No
SP 1	Recreation Area (C)	66	59	60	59	-1	0	No
SP 2	Recreation Area (C)	66	59	60	60	0	1	No
KRSMA 1	Recreation Area (C)	66	51	52	52	0	1	No
KRRA 1	Recreation Area (C)	66	40[a]	40[a]	46	6	6	No
KRRA 2	Recreation Area (C)	66	**67**	**68**	**68**	0	1	Yes
KRSMA 2	Recreation Area (C)	66	49	50	50	0	1	No
JCRA 1	Campground (C)	66	40[a]	40[a]	40[a]	0	0	No
JCRA 2	Recreation Area (C)	66	40[a]	40[a]	40[a]	0	0	No
JCRA 3	Trail (C)	66	40[a]	40[a]	40[a]	0	0	No
BCT 1	Trail (C)	66	40[a]	40[a]	40[a]	0	0	No
BCT 2	Trail (C)	66	40[a]	40[a]	40[a]	0	0	No
ST 1	Trail (C)	66	40[a]	40[a]	57	**17**	**17**	Yes
ST 2	Trail (C)	66	40[a]	40[a]	47	7	7	No
CLBL	Recreation Area (C)	66	54	55	56	1	2	No
RPT 1	Trail (C)	66	64	64	63	-1	-1	No
RPT 2	Trail (C)	66	40	40[a]	40[a]	0	0	No

[a] Sites located 1,000 feet or more from existing alignment in areas where traffic noise is not a significant contributor to existing ambient noise levels were characterized using measured ambient levels as described in Section 4.1.

The results for the existing condition predict that peak noise levels at modeled receptors would range from 40 to 69 dBA. One residential receptor (106) and one recreational receptor (KRRA 2) are predicted to have noise levels above the NAC under the existing condition. Results for the No Build Alternative predict that peak noise levels in 2043 at modeled receptors would range from 40 to 70 dBA. Changes in noise levels between the existing condition and the No Build Alternative in 2043 at specific receptors range from no change to an increase of 3 dBA, and are due to changes in traffic volumes predicted to occur between 2012 and 2043. Four residential receptors (21, 105, 106 and R119) and one recreational receptor (KRRA 2) are predicted to have noise levels equal to or above the NAC under the No Build Alternative.

Under the Cooper Creek Alternative, noise levels at modeled receptors are predicted to be between 40 and 72 dBA. In some cases predicted future Build Alternative noise levels would be below 40 dBA for receptors that have existing and No Build noise levels assumed to be at 40 dBA from ambient measurement data (see Section 4.1), and actual future levels may not be as low as predicted. The low modeled results for these locations indicates that the highway would likely have little or no effect on ambient noise levels due to the distance between the proposed highway alignment and the receptors. If existing ambient levels are around 40 dBA, as assumed, then those levels would likely prevail at these locations; therefore, sound levels at these locations were changed to 40 dBA.

Changes in noise levels between the existing condition and the Build Alternative at specific receptors range from a decrease of 6 dBA to an increase of 17 dBA. Changes in noise levels between the No Build Alternative and the Build Alternative at specific receptors also range from a decrease of 4 dBA to an increase of 17 dBA. Changes in noise levels between the No Build and the Cooper Creek Alternative are due to changes in traffic volumes, changes in roadway alignments, and changes in shielding. Four residential properties (87, 105, 106, 119), one commercial property (107), and one recreational site (KRRA 2) are predicted to have 2043 noise levels approaching, equal to, or above the NAC under the Cooper Creek Alternative. One trail site (ST1) is predicted to have a substantial increase impact in 2043 under the Cooper Creek Alternative.

5.2 G South Alternative

The section of G South Alternative that is off alignment with the existing highway traverses mostly undeveloped land. Figures 3 through 12 show the location of the G South alignment and modeled receptors. Table 5-3 lists the noise analysis results for this alternative, which includes receptors along the existing alignment for comparison to the existing condition and No Build Alternative. Table 5-3 shows the computed noise levels in hourly Leq dBA for the existing highway traffic (2012), No Build Alternative (2043), and the G South Alternative (2043). The

existing highway and the 2043 No Build Alternative results are compared to the 2043 Build Alternative results and the differences are shown. The computed noise levels are compared to the NAC. Bold font identifies levels that approach, meet, or exceed the NAC.

Under the G South Alternative, noise levels at modeled receptors are predicted to be between 40 and 68 dBA. In some cases predicted future Build Alternative noise levels would be below 40 dBA for receptors that have existing and No Build noise levels assumed to be at 40 dBA from ambient measurement data (see Section 4.1), actual future levels may not be as low as predicted. The low modeled results for these locations indicates that the highway would likely have little or no effect on ambient noise levels due to the distance between the proposed highway alignment and the receptors. If existing ambient levels are around 40 dBA, as assumed, then those levels would likely prevail at these locations; therefore, sound levels at these locations were changed to 40 dBA.

Table 5-3: Noise Analysis Results –G South Alternative

Receptor ID	Existing Land Use (FHWA Activity Category)	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	2043 No Build Noise Level (dBA)	2043 G South Noise Level (dBA)	Change Between 2043 No Build and 2043 G South	Change Between 2012 Existing and 2043 G South	Predicted Build Impact? (Yes/No)
1	Residential (B)	66	63	65	64	-1	1	No
2	Residential (B)	66	59	60	61	1	2	No
3	Residential (B)	66	51	53	53	0	2	No
4	Residential (B)	66	54	55	50	-5	-4	No
5	Residential (B)	66	53	54	49	-5	-4	No
6	Residential (B)	66	57	59	54	-5	-3	No
7	Residential (B)	66	52	53	48	-5	-4	No
8	Residential (B)	66	49	51	46	-5	-3	No
9	Residential (B)	66	54	56	51	-5	-3	No
10	Residential (B)	66	56	58	53	-5	-3	No
11	Residential (B)	66	54	56	51	-5	-3	No
12	Residential (B)	66	51	52	47	-5	-4	No
13	Residential (B)	66	51	52	47	-5	-4	No
14	Residential (B)	66	62	64	59	-5	-3	No
15	Residential (B)	66	50	52	47	-5	-3	No
16	Residential (B)	66	61	63	57	-6	-4	No
17	Residential (B)	66	63	64	59	-5	-4	No
18	Residential (B)	66	56	58	53	-5	-3	No
19	Residential (B)	66	50	52	47	-5	-3	No
20	Residential (B)	66	51	53	48	-5	-3	No
21	Residential (B)	66	65	**66**	61	-5	-4	No
22	Residential (B)	66	51	53	48	-5	-3	No
23	Residential (B)	66	55	56	52	-4	-3	No
24	Residential (B)	66	55	56	51	-5	-4	No
25	Residential (B)	66	55	56	51	-5	-4	No
26	Residential (B)	66	54	55	50	-5	-4	No
27	Residential (B)	66	60	61	56	-5	-4	No

Receptor ID	Existing Land Use (FHWA Activity Category)	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	2043 No Build Noise Level (dBA)	2043 G South Noise Level (dBA)	Change Between 2043 No Build and 2043 G South	Change Between 2012 Existing and 2043 G South	Predicted Build Impact? (Yes/No)
28	Residential (B)	66	54	55	51	-4	-3	No
29	Residential (B)	66	52	54	49	-5	-3	No
30	Residential (B)	66	51	53	48	-5	-3	No
31	Residential (B)	66	51	52	48	-4	-3	No
32	Residential (B)	66	50	51	47	-4	-3	No
34	Residential (B)	66	50	52	47	-5	-3	No
35	Residential (B)	66	60	61	56	-5	-4	No
36	Residential (B)	66	58	59	54	-5	-4	No
37	Residential (B)	66	54	55	50	-5	-4	No
40	Residential (B)	66	59	60	55	-5	-4	No
41	Residential (B)	66	60	61	56	-5	-4	No
42	Residential (B)	66	49	52	46	-6	-3	No
44	Residential (B)	66	52	55	49	-6	-3	No
45	Residential (B)	66	52	53	48	-5	-4	No
46	Residential (B)	66	52	53	48	-5	-4	No
47	Residential (B)	66	52	53	48	-5	-4	No
48	Residential (B)	66	52	53	48	-5	-4	No
49	Residential (B)	66	55	56	51	-5	-4	No
50	Residential (B)	66	52	53	48	-5	-4	No
51	Residential (B)	66	53	55	50	-5	-3	No
52	Residential (B)	66	60	61	56	-5	-4	No
53	Residential (B)	66	55	57	52	-5	-3	No
54	Residential (B)	66	63	64	59	-5	-4	No
55	Residential (B)	66	57	59	53	-6	-4	No
56	Residential (B)	66	53	55	50	-5	-3	No
57	Residential (B)	66	50	51	47	-4	-3	No
62	Residential (B)	66	53	54	50	-4	-3	No
63	Residential (B)	66	53	55	50	-5	-3	No

Receptor ID	Existing Land Use (FHWA Activity Category)	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	2043 No Build Noise Level (dBA)	2043 G South Noise Level (dBA)	Change Between 2043 No Build and 2043 G South	Change Between 2012 Existing and 2043 G South	Predicted Build Impact? (Yes/No)
64	Residential (B)	66	60	61	56	-5	-4	No
65	Residential (B)	66	62	63	58	-5	-4	No
66	Residential (B)	66	61	63	57	-6	-4	No
67	Residential (B)	66	61	63	57	-6	-4	No
68	Residential (B)	66	52	54	49	-5	-3	No
69	Residential (B)	66	53	54	49	-5	-4	No
70	Residential (B)	66	52	53	49	-4	-3	No
71	Residential (B)	66	50	52	47	-5	-3	No
72	Residential (B)	66	53	54	49	-5	-4	No
73	Residential (B)	66	53	55	50	-5	-3	No
74	Residential (B)	66	59	60	55	-5	-4	No
75	Residential (B)	66	56	57	52	-5	-4	No
76	Residential (B)	66	59	61	55	-6	-4	No
77	Residential (B)	66	56	57	52	-5	-4	No
78	Residential (B)	66	61	62	57	-5	-4	No
80	Residential (B)	66	54	55	50	-5	-4	No
81	Residential (B)	66	57	59	54	-5	-3	No
82	Residential (B)	66	55	56	52	-4	-3	No
83	Residential (B)	66	49	50	48	-2	-1	No
84	Residential (B)	66	52	53	50	-3	-2	No
85	Residential (B)	66	55	56	53	-3	-2	No
86	Residential (B)	66	52	54	50	-4	-2	No
87	Residential (B)	66	56	58	53	-5	-3	No
88	Residential (B)	66	55	57	52	-5	-3	No
89	Residential (B)	66	55	57	52	-5	-3	No
90	Residential (B)	66	60	61	56	-5	-4	No
91	Residential (B)	66	60	62	57	-5	-3	No
92	Residential (B)	66	60	62	57	-5	-3	No

Receptor ID	Existing Land Use (FHWA Activity Category)	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	2043 No Build Noise Level (dBA)	2043 G South Noise Level (dBA)	Change Between 2043 No Build and 2043 G South	Change Between 2012 Existing and 2043 G South	Predicted Build Impact? (Yes/No)
93	Residential (B)	66	53	54	50	-4	-3	No
94	Residential (B)	66	53	54	50	-4	-3	No
95	Residential (B)	66	50	51	49	-2	-1	No
96	Residential (B)	66	50	52	49	-3	-1	No
97	Residential (B)	66	53	55	51	-4	-2	No
98	Commercial (E)	71	62	63	59	-4	-3	No
99	Residential (B)	66	51	53	50	-3		No
100	Residential (B)	66	53	55	51	-4	-2	No
101	Residential (B)	66	53	54	51	-3	-2	No
102	Residential (B)	66	56	58	54	-4	-2	No
103	Residential (B)	66	59	61	56	-5	-3	No
104	Residential (B)	66	58	59	55	-4	-3	No
105	Residential (B)	66	64	66	61	-5	-3	No
106	Residential (B)	66	69	70	65	-5	-4	No
107	Commercial (E)	71	66	68	63	-5	-3	No
108	Residential (B)	66	52	54	51	-3	-1	No
109	Commercial (E)	71	66	68	62	-6	-4	No
110	Commercial (E)	71	62	64	59	-5	-3	No
111	Commercial (E)	71	60	62	57	-5	-3	No
112	Residential (B)	66	58	60	55	-5	-3	No
113	Residential (B)	66	60	62	57	-5	-3	No
114	Residential (B)	66	59	60	56	-4	-3	No
115	Residential (B)	66	57	59	55	-4	-2	No
116	Residential (B)	66	59	60	55	-5	-4	No
117	Residential (B)	66	56	58	54	-4	-2	No
118	Residential (B)	66	57	59	56	-3	-1	No
119	Residential (B)	66	65	66	61	-5	-4	No
120	Residential (B)	66	5858	59	55	-4	-3	No

Receptor ID	Existing Land Use (FHWA Activity Category)	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	2043 No Build Noise Level (dBA)	2043 G South Noise Level (dBA)	Change Between 2043 No Build and 2043 G South	Change Between 2012 Existing and 2043 G South	Predicted Build Impact? (Yes/No)
121	Residential (B)	66	58	60	56	-4	-2	No
122	Residential (B)	66	59	61	57	-4	-2	No
123	Residential (B)	66	61	62	56	-6	-5	No
124	Residential (B)	66	59	60	60	0	1	No
125	Residential (B)	66	60	61	60	-1	0	No
126	Residential (B)	66	61	62	58	-4	-3	No
127	Residential (B)	66	58	59	56	-3	-2	No
128	Residential (B)	66	57	58	59	1	2	No
129	Residential (B)	66	53	54	51	-3	-2	No
130	Residential (B)	66	50	52	49	-3	-1	No
131	Residential (B)	66	48	49	50	1	2	No
132	Residential (B)	66	41	43	54	11	13	No
133	Residential (B)	66	41	42	53	11	12	No
134	Residential (B)	66	40[a]	40[a]	48	8	8	No
135	Residential (B)	66	40[a]	40[a]	47	7	7	No
136	Residential (B)	66	40[a]	40[a]	43	3	3	No
137	Residential (B)	66	40[a]	40[a]	44	4	4	No
138	Residential (B)	66	40[a]	40[a]	44	4	4	No
139	Residential (B)	66	40[a]	40[a]	44	4	4	No
140	Residential (B)	66	40[a]	40[a]	44	4	4	No
141	Residential (B)	66	40[a]	40[a]	46	6	6	No
142	Residential (B)	66	40[a]	40[a]	45	5	5	No
143	Residential (B)	66	40[a]	40[a]	45	5	5	No
144	Residential (B)	66	40[a]	40[a]	47	7	7	No
145	Residential (B)	66	40[a]	40[a]	48	8	8	No
146	Residential (B)	66	40	42	50	8	10	No
147	Residential (B)	66	40[a]	40[a]	46	6	6	No
148	Residential (B)	66	40[a]	40[a]	43	3	3	No

Receptor ID	Existing Land Use (FHWA Activity Category)	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	2043 No Build Noise Level (dBA)	2043 G South Noise Level (dBA)	Change Between 2043 No Build and 2043 G South	Change Between 2012 Existing and 2043 G South	Predicted Build Impact? (Yes/No)
149	Residential (B)	66	40[a]	40[a]	45	5	5	No
150	Residential (B)	66	40[a]	40[a]	43	3	3	No
151	Residential (B)	66	40[a]	40[a]	43	3	3	No
152	Residential (B)	66	39	41	43	2	4	No
153	Hotel (E)	71	48	49	50	1	2	No
154	Residential (B)	66	44	45	45	0	1	No
155	Residential (B)	66	51	53	53	0	2	No
156	Residential (B)	66	40[a]	40[a]	45	5	5	No
157	Residential (B)	66	40[a]	40[a]	44	4	4	No
158	Residential (B)	66	40[a]	40[a]	48	8	8	No
URR N	Campground (C)	66	44	46	46	0	2	No
URR E	Campground (C)	66	40[a]	40[a]	43	3	3	No
URR S	Campground (C)	66	40[a]	40[a]	39	-1	-1	No
PK SE	Campground (C)	66	44	45	42	-3	-2	No
PK SW	Campground (C)	66	40[a]	40[a]	42	2	2	No
PK N	Campground (C)	66	40[a]	40[a]	42	2	2	No
CC N	Campground (C)	66	54	55	51	-4	-3	No
CC S	Campground (C)	66	47	48	44	-4	-3	No
RR	Campground (C)	66	52	53	55	2	3	No
KNWR 1	Recreation Area (C)	66	40[a]	40[a]	40	0	0	No
KNWR 2	Recreation Area (C)	66	48	50	50	0	2	No
KNWR 3	Recreation Area (C)	66	45	47	47	0	2	No
SP 1	Recreation Area (C)	66	59	60	59	-1	0	No
SP 2	Recreation Area (C)	66	59	60	60	0	1	No
KRSMA 1	Recreation Area (C)	66	51	52	52	0	1	No
KRRA 2	Recreation Area (C)	66	**67**	**68**	**68**	0	1	Yes
KRRA 1	Recreation Area (C)	66	40[a]	40[a]	46	6	6	No
KRSMA 2	Recreation Area (C)	66	49	50	54	4	5	No

Receptor ID	Existing Land Use (FHWA Activity Category)	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	2043 No Build Noise Level (dBA)	2043 G South Noise Level (dBA)	Change Between 2043 No Build and 2043 G South	Change Between 2012 Existing and 2043 G South	Predicted Build Impact? (Yes/No)
JCRA 1	Campground (C)	66	40[a]	40[a]	34	-6	-6	No
JCRA 2	Recreation Area (C)	66	40[a]	40[a]	34	-6	-6	No
JCRA 3	Trail (C)	66	40[a]	40[a]	35	-5	-5	No
BCT 1	Trail (C)	66	40[a]	40[a]	35	-5	-5	No
BCT 2	Trail (C)	66	40[a]	40[a]	61	21	**21**	Yes
ST 1	Trail (C)	66	40[a]	40[a]	41	1	1	No
ST 2	Trail (C)	66	40[a]	40[a]	38	-2	-2	No
CLBL	Recreation Area (C)	66	5454	55	51	-4	-3	No
RPT 1	Recreation Area (C)	66	64	64	63	-1	0	No
RPT 2	Recreation Area (C)	66	40[a]	40[a]	42	2	2	No

[a] Sites located in areas where traffic noise is not a significant contributor to existing ambient noise levels were characterized using measured ambient levels as described in Section 4.1.

Changes in noise levels between the existing condition and the Build Alternative at specific receptors range from a decrease of 6 dBA to an increase of 21 dBA. Changes in noise levels between the No Build Alternative and the Build Alternative at specific receptors range from a decrease of 5 dBA to an increase of 21 dBA. Changes in noise levels between the No Build and the Build alternatives are due to changes in traffic volumes, changes in roadway alignments, and changes in shielding. One recreational site (KRRA 2) is predicted to have 2043 noise levels approaching, equal to, or above the NAC under the G South Alternative. One trail site (BCT 2) is predicted to have a substantial increase impact in 2043 under the G South Alternative.

5.3 Juneau Creek Alternative

The Juneau Creek Alternative is located in mostly undeveloped land. Figures 3 through 12 show the location of the Juneau Creek Alternative and modeled receptors. Table 5-4 lists the noise analysis results for the Juneau Creek Alternative, which includes receptors along the existing alignment for comparison to the existing highway and No Build Alternative. Table 5-4 shows the computed noise levels in hourly Leq dBA for the existing highway (2012), No Build Alternative (2043), and Juneau Creek Alternative (2043). The existing highway and the 2043 No Build Alternative results are compared to the 2043 Build Alternative results and the differences are shown. The computed noise levels are compared to the NAC. Bold font identifies levels that approach, meet, or exceed the NAC.

Under the Juneau Creek Alternative, noise levels at modeled receptors are predicted to be between 40 and 65 dBA. In some cases, the model predicts future Build Alternative noise levels below 40 dBA for where predicted future Build Alternative noise levels are estimated to be below 40 dBA for receptors that have existing and No Build noise levels assumed to be at 40 dBA from ambient measurement data (see Section 4.1), actual future levels may not be as low as predicted. The low modeled results for these locations indicates that the highway would likely have little or no effect on ambient noise levels due to the distance between the proposed highway alignment and the receptors. If existing ambient levels are around 40 dBA, as assumed, then those levels would likely prevail at these locations.

Changes in noise levels between the existing condition and the Juneau Creek Alternative at specific receptors range from a decrease of 6 dBA to an increase of 22 dBA. Changes in noise levels between the No Build Alternative and the Juneau Creek Alternative at specific receptors range from a decrease of 5 dBA to an increase of 22 dBA. Changes in noise levels between the No Build and the Juneau Creek Alternative are due to changes in traffic volumes, changes in roadway alignments, and changes in shielding. No receptors are predicted to have 2043 noise levels approaching, equal to, or above the NAC under the Juneau Creek Alternative. One trail site (BCT 1) is predicted to have a substantial increase impact in 2043 under the Juneau Creek Alternative.

Table 5-4: Noise Analysis Results – Juneau Creek Alternative

Receptor ID	Existing Land Use (FHWA Activity Category)	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	2043 No Build Noise Level (dBA)	2043 Juneau Creek Noise Level (dBA)	Change Between 2043 No Build and 2043 Juneau Creek	Change Between 2012 Existing and 2043 Juneau Creek	Predicted Build Impact? (Yes/No)
1	Residential (B)	66	63	65	59	-6	-4	No
2	Residential (B)	66	59	60	55	-5	-4	No
3	Residential (B)	66	51	53	48	-5	-3	No
4	Residential (B)	66	54	55	50	-5	-4	No
5	Residential (B)	66	53	54	49	-5	-4	No
6	Residential (B)	66	57	59	54	-5	-3	No
7	Residential (B)	66	52	53	48	-5	-4	No
8	Residential (B)	66	49	51	46	-5	-3	No
9	Residential (B)	66	54	56	51	-5	-3	No
10	Residential (B)	66	56	58	53	-5	-3	No

Receptor ID	Existing Land Use (FHWA Activity Category)	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	2043 No Build Noise Level (dBA)	2043 Juneau Creek Noise Level (dBA)	Change Between 2043 No Build and 2043 Juneau Creek	Change Between 2012 Existing and 2043 Juneau Creek	Predicted Build Impact? (Yes/No)
11	Residential (B)	66	54	56	51	-5	-3	No
12	Residential (B)	66	51	52	47	-5	-4	No
13	Residential (B)	66	51	52	47	-5	-4	No
14	Residential (B)	66	62	64	59	-5	-3	No
15	Residential (B)	66	50	52	47	-5	-3	No
16	Residential (B)	66	61	63	57	-6	-4	No
17	Residential (B)	66	63	64	59	-5	-4	No
18	Residential (B)	66	56	58	52	-6	-4	No
19	Residential (B)	66	50	52	47	-5	-3	No
20	Residential (B)	66	51	53	48	-5	-3	No
21	Residential (B)	66	65	**66**	61	-5	-4	No
22	Residential (B)	66	51	53	48	-5	-3	No
23	Residential (B)	66	55	56	51	-5	-4	No
24	Residential (B)	66	55	56	51	-5	-4	No
25	Residential (B)	66	55	56	51	-5	-4	No
26	Residential (B)	66	54	55	50	-5	-4	No
27	Residential (B)	66	60	61	56	-5	-4	No
28	Residential (B)	66	54	55	50	-5	-4	No
29	Residential (B)	66	52	54	49	-5	-3	No
30	Residential (B)	66	51	53	48	-5	-3	No
31	Residential (B)	66	51	52	48	-4	-3	No
32	Residential (B)	66	50	51	47	-4	-3	No
34	Residential (B)	66	50	52	47	-5	-3	No
35	Residential (B)	66	60	61	56	-5	-4	No
36	Residential (B)	66	58	59	54	-5	-4	No
37	Residential (B)	66	54	55	50	-5	-4	No
40	Residential (B)	66	59	60	55	-5	-4	No
41	Residential (B)	66	60	61	56	-5	-4	No

Receptor ID	Existing Land Use (FHWA Activity Category)	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	2043 No Build Noise Level (dBA)	2043 Juneau Creek Noise Level (dBA)	Change Between 2043 No Build and 2043 Juneau Creek	Change Between 2012 Existing and 2043 Juneau Creek	Predicted Build Impact? (Yes/No)
42	Residential (B)	66	49	52	46	-6	-3	No
44	Residential (B)	66	52	55	49	-6	-3	No
45	Residential (B)	66	52	53	48	-5	-4	No
46	Residential (B)	66	52	53	48	-5	-4	No
47	Residential (B)	66	52	53	48	-5	-4	No
48	Residential (B)	66	52	53	48	-5	-4	No
49	Residential (B)	66	55	56	51	-5	-4	No
50	Residential (B)	66	52	53	48	-5	-4	No
51	Residential (B)	66	53	55	50	-5	-3	No
52	Residential (B)	66	60	61	56	-5	-4	No
53	Residential (B)	66	55	57	52	-5	-3	No
54	Residential (B)	66	63	64	59	-5	-4	No
55	Residential (B)	66	57	59	53	-6	-4	No
56	Residential (B)	66	53	55	50	-5	-3	No
57	Residential (B)	66	50	51	47	-4	-3	No
62	Residential (B)	66	53	54	50	-4	-3	No
63	Residential (B)	66	53	55	50	-5	-3	No
64	Residential (B)	66	60	61	56	-5	-4	No
65	Residential (B)	66	62	63	58	-5	-4	No
66	Residential (B)	66	61	63	57	-6	-4	No
67	Residential (B)	66	61	63	57	-6	-4	No
68	Residential (B)	66	52	54	49	-5	-3	No
69	Residential (B)	66	53	54	49	-5	-4	No
70	Residential (B)	66	52	53	48	-5	-4	No
71	Residential (B)	66	50	52	47	-5	-3	No
72	Residential (B)	66	53	54	49	-5	-4	No
73	Residential (B)	66	53	55	50	-5	-3	No
74	Residential (B)	66	59	60	55	-5	-4	No

Receptor ID	Existing Land Use (FHWA Activity Category)	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	2043 No Build Noise Level (dBA)	2043 Juneau Creek Noise Level (dBA)	Change Between 2043 No Build and 2043 Juneau Creek	Change Between 2012 Existing and 2043 Juneau Creek	Predicted Build Impact? (Yes/No)
75	Residential (B)	66	56	57	52	-5	-4	No
76	Residential (B)	66	59	61	55	-6	-4	No
77	Residential (B)	66	56	57	52	-5	-4	No
78	Residential (B)	66	61	62	57	-5	-4	No
80	Residential (B)	66	54	55	50	-5	-4	No
81	Residential (B)	66	57	59	53	-6	-4	No
82	Residential (B)	66	55	56	51	-5	-4	No
83	Residential (B)	66	49	50	47	-3	-2	No
84	Residential (B)	66	52	53	49	-4	-3	No
85	Residential (B)	66	55	56	52	-4	-3	No
86	Residential (B)	66	52	54	49	-5	-3	No
87	Residential (B)	66	56	58	53	-5	-3	No
88	Residential (B)	66	55	57	52	-5	-3	No
89	Residential (B)	66	55	57	52	-5	-3	No
90	Residential (B)	66	60	61	56	-5	-4	No
91	Residential (B)	66	60	62	57	-5	-3	No
92	Residential (B)	66	60	62	57	-5	-3	No
93	Residential (B)	66	53	54	50	-4	-3	No
94	Residential (B)	66	53	54	50	-4	-3	No
95	Residential (B)	66	50	51	49	-2	-1	No
96	Residential (B)	66	50	52	49	-3	-1	No
97	Residential (B)	66	53	55	51	-4	-2	No
98	Commercial (E)	66	62	63	58	-5	-4	No
99	Residential (B)	66	51	53	49	-4	-2	No
100	Residential (B)	66	53	55	50	-5	-3	No
101	Residential (B)	66	53	54	50	-4	-3	No
102	Residential (B)	66	56	58	53	-5	-3	No
103	Residential (B)	66	59	61	56	-5	-3	No

Receptor ID	Existing Land Use (FHWA Activity Category)	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	2043 No Build Noise Level (dBA)	2043 Juneau Creek Noise Level (dBA)	Change Between 2043 No Build and 2043 Juneau Creek	Change Between 2012 Existing and 2043 Juneau Creek	Predicted Build Impact? (Yes/No)
104	Residential (B)	66	58	59	54	-5	-4	No
105	Residential (B)	66	64	66	61	-5	-3	No
106	Residential (B)	66	69	70	65	-5	-4	No
107	Commercial (E)	71	66	68	63	-5	-3	No
108	Residential	66	52	54	50	-4	-2	No
109	Commercial (E)	71	66	68	62	-6	-4	No
110	Commercial (E)	71	62	64	59	-5	-3	No
111	Commercial (E)	71	60	62	57	-5	-3	No
112	Residential (B)	66	58	60	55	-5	-3	No
113	Residential (B)	66	60	62	57	-5	-3	No
114	Residential (B)	66	59	60	56	-4	-3	No
115	Residential (B)	66	57	59	55	-4	-2	No
116	Residential (B)	66	59	60	55	-5	-4	No
117	Residential (B)	66	56	58	54	-4	-2	No
118	Residential (B)	66	57	59	56	-3	-1	No
119	Residential (B)	66	65	66	61	-5	-4	No
120	Residential (B)	66	58	59	55	-4	-3	No
121	Residential (B)	66	58	60	56	-4	-2	No
122	Residential (B)	66	59	61	57	-4	-2	No
123	Residential (B)	66	61	62	56	-6	-5	No
124	Residential (B)	66	59	60	61	1	2	No
125	Residential (B)	66	60	61	60	-1	0	No
126	Residential (B)	66	61	62	58	-4	-3	No
127	Residential (B)	66	58	59	56	-3	-2	No
128	Residential (B)	66	57	58	59	1	2	No
129	Residential (B)	66	53	54	50	-4	-3	No
130	Residential (B)	66	50	52	49	-3	-1	No
131	Residential (B)	66	48	49	50	1	2	No

Receptor ID	Existing Land Use (FHWA Activity Category)	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	2043 No Build Noise Level (dBA)	2043 Juneau Creek Noise Level (dBA)	Change Between 2043 No Build and 2043 Juneau Creek	Change Between 2012 Existing and 2043 Juneau Creek	Predicted Build Impact? (Yes/No)
132	Residential (B)	66	41	43	53	10	12	No
133	Residential (B)	66	41	42	53	11	12	No
134	Residential (B)	66	40[a]	40[a]	48	8	8	No
135	Residential (B)	66	40[a]	40[a]	46	6	6	No
136	Residential (B)	66	40[a]	40[a]	43	3	3	No
137	Residential (B)	66	40[a]	40[a]	44	4	4	No
138	Residential (B)	66	40[a]	40[a]	44	4	4	No
139	Residential (B)	66	40[a]	40[a]	44	4	4	No
140	Residential (B)	66	40[a]	40[a]	44	4	4	No
141	Residential (B)	66	40[a]	40[a]	45	5	5	No
142	Residential (B)	66	40[a]	40[a]	44	4	4	No
143	Residential (B)	66	40[a]	40[a]	44	4	4	No
144	Residential (B)	66	40[a]	40[a]	44	4	4	No
145	Residential (B)	66	40[a]	40[a]	46	6	6	No
146	Residential (B)	66	40	42	50	8	10	No
147	Residential (B)	66	40[a]	40[a]	42	2	2	No
148	Residential (B)	66	40[a]	40[a]	42	2	2	No
149	Residential (B)	66	40[a]	40[a]	43	3	3	No
150	Residential (B)	66	40[a]	40[a]	43	3	3	No
151	Residential (B)	66	40[a]	40[a]	43	3	3	No
152	Residential (B)	66	39	41	41	0	2	No
153	Hotel (E)	71	48	49	49	0	1	No
154	Residential (B)	66	44	45	45	0	1	No
155	Residential (B)	66	51	53	53	0	2	No
156	Residential (B)	66	40[a]	40[a]	44	4	4	No
157	Residential (B)	66	40[a]	40[a]	43	3	3	No
158	Residential (B)	66	40[a]	40[a]	44	4	4	No
URR N	Campground (C)	66	44	46	45	-1	1	No

Receptor ID	Existing Land Use (FHWA Activity Category)	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	2043 No Build Noise Level (dBA)	2043 Juneau Creek Noise Level (dBA)	Change Between 2043 No Build and 2043 Juneau Creek	Change Between 2012 Existing and 2043 Juneau Creek	Predicted Build Impact? (Yes/No)
URR E	Campground (C)	66	40[a]	40[a]	42	2	2	No
URR S	Campground (C)	66	40[a]	40[a]	40[a]	0	0	No
PK SE	Campground (C)	66	44	45	42	-3	-2	No
PK SW	Campground (C)	66	40[a]	40[a]	41	1	1	No
PK N	Campground (C)	66	40[a]	40[a]	42	2	2	No
CC N	Campground (C)	66	54	55	50	-5	-4	No
CC S	Campground (C)	66	47	48	43	-5	-4	No
RR	Campground (C)	66	52	53	52	-1	0	No
KNWR 1	Recreation Area (C)	66	40[a]	40[a]	40[a]	0	0	No
KNWR 2	Recreation Area (C)	66	48	50	57	7	9	No
KNWR 3	Recreation Area (C)	66	45	47	49	2	4	No
SP 1	Recreation Area (C)	66	59	60	56	-4	-3	No
SP 2	Recreation Area (C)	66	59	60	55	-5	-4	No
KRSMA 1	Recreation Area (C)	66	51	52	50	-2	-1	No
KRRA 2	Recreation Area (C)	66	**67**	**68**	63	-5	-4	No
KRRA 1	Recreation Area (C)	66	40[a]	40[a]	40[a]	0	0	No
KRSMA 2	Recreation Area (C)	66	49	50	45	-5	-4	No
JCRA 1	Campground (C)	66	40[a]	40[a]	40[a]	0	0	No
JCRA 2	Recreation Area (C)	66	40[a]	40[a]	43	3	3	No
JCRA 3	Trail (C)	66	40[a]	40[a]	51	11	11	No
BCT 1	Trail (C)	66	40[a]	40[a]	62	**22**	**22**	Yes
BCT 2	Trail (C)	66	40[a]	40[a]	43	3	3	No
ST 1	Trail (C)	66	40[a]	40[a]	40[a]	0	0	No
ST 2	Trail (C)	66	40[a]	40[a]	40[a]	0	0	No
CLBL	Recreation Area (C)	66	54	55	50	-5	-4	No
RPT 1	Recreation Area (C)	66	64	64	59	-5	-4	No
RPT 2	Recreation Area (C)	66	40	40[a]	38	-2	-2	No

[a] Sites located in areas where traffic noise is not a significant contributor to existing ambient noise levels were characterized using measured ambient levels as described in Section 4.1.

5.4 Juneau Creek Variant Alternative

The Juneau Creek Variant Alternative is located in mostly undeveloped land. Figures 3 through 12 show the location of the alternative and modeled receptors. Table 5-5 lists the noise analysis results for the Juneau Creek Variant Alternative, which includes receptors along the existing alignment for comparison to the existing highway and No Build Alternative. Table 5-5 shows the computed noise levels in hourly Leq dBA for the existing highway (2012), No Build Alternative (2043) and the Juneau Creek Variant Alternative (2043). The existing highway and the 2043 No Build Alternative results are compared to the 2043 Build Alternative results and the differences are shown. The computed noise levels are compared to the NAC. Bold font identifies levels that approach, meet, or exceed the NAC.

Under the Juneau Creek Variant Alternative, noise levels at modeled receptors are predicted to be between 35 and 63 dBA. In cases where predicted future Build Alternative noise levels are estimated to be below 40 dBA for receptors that have existing and No Build noise levels assumed to be at 40 dBA from ambient measurement data (see Section 4.1), actual future levels may not be as low as predicted. The low modeled results for these locations indicates that the highway would likely have little or no effect on ambient noise levels due to the distance between the proposed highway alignment and the receptors. If existing ambient levels are around 40 dBA, as assumed, then those levels would likely prevail at these locations.

Changes in noise levels between the existing condition and the Juneau Creek Variant Alternative at specific receptors range from a decrease of 6 dBA to an increase of 22 dBA. Changes in noise levels between the No Build Alternative and the Juneau Creek Variant Alternative at specific receptors range from a decrease of 8 dBA to an increase of 22 dBA. Changes in noise levels between the No Build and the Juneau Creek Variant Alternative is due to changes in traffic volumes, changes in roadway alignments, and changes in shielding. No receptors are predicted to have 2043 noise levels approaching the NAC under the Juneau Creek Variant Alternative. One trail site (BCT 1) is predicted to have a substantial increase impact in 2043 under the Juneau Creek Variant Alternative.

Table 5-5: Noise Analysis Results –Juneau Creek Variant Alternative

Receptor ID	Existing Land Use (FHWA Activity Category)	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	2043 No Build Noise Level (dBA)	2043 Juneau Creek Variant Noise Level (dBA)	Change Between 2043 No Build and 2043 Juneau Crk Variant	Change Between 2012 Existing and 2043 Juneau Crk Variant	Predicted Build Impact? (Yes/No)
1	Residential (B)	66	63	65	58	-7	-5	No
2	Residential (B)	66	59	60	53	-7	-6	No
3	Residential (B)	66	51	53	47	-6	-4	No
4	Residential (B)	66	54	55	49	-6	-5	No
5	Residential (B)	66	53	54	47	-7	-6	No
6	Residential (B)	66	57	59	52	-7	-5	No
7	Residential (B)	66	52	53	47	-6	-5	No
8	Residential (B)	66	49	51	44	-7	-5	No
9	Residential (B)	66	54	56	49	-7	-5	No
10	Residential (B)	66	56	58	51	-7	-5	No
11	Residential (B)	66	54	56	49	-7	-5	No
12	Residential (B)	66	51	52	46	-6	-5	No
13	Residential (B)	66	51	52	46	-6	-5	No
14	Residential (B)	66	62	64	57	-7	-5	No
15	Residential (B)	66	50	52	45	-7	-5	No
16	Residential (B)	66	61	63	56	-7	-5	No
17	Residential (B)	66	63	64	57	-7	-6	No
18	Residential (B)	66	56	58	51	-7	-5	No
19	Residential (B)	66	50	52	45	-7	-5	No
20	Residential (B)	66	51	53	46	-7	-5	No
21	Residential (B)	66	65	**66**	59	-7	-6	No
22	Residential (B)	66	51	53	46	-7	-5	No
23	Residential (B)	66	55	56	49	-7	-6	No
24	Residential (B)	66	55	56	49	-7	-6	No
25	Residential (B)	66	55	56	50	-6	-5	No
26	Residential (B)	66	54	55	49	-6	-5	No
27	Residential (B)	66	60	61	54	-7	-6	No

Receptor ID	Existing Land Use (FHWA Activity Category)	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	2043 No Build Noise Level (dBA)	2043 Juneau Creek Variant Noise Level (dBA)	Change Between 2043 No Build and 2043 Juneau Crk Variant	Change Between 2012 Existing and 2043 Juneau Crk Variant	Predicted Build Impact? (Yes/No)
28	Residential (B)	66	54	55	49	-6	-5	No
29	Residential (B)	66	52	54	47	-7	-5	No
30	Residential (B)	66	51	53	46	-7	-5	No
31	Residential (B)	66	51	52	46	-6	-5	No
32	Residential (B)	66	50	51	46	-5	-4	No
34	Residential (B)	66	50	52	46	-6	-4	No
35	Residential (B)	66	60	61	54	-7	-6	No
36	Residential (B)	66	58	59	52	-7	-6	No
37	Residential (B)	66	54	55	49	-6	-5	No
40	Residential (B)	66	59	60	53	-7	-6	No
41	Residential (B)	66	60	61	54	-7	-6	No
42	Residential (B)	66	49	52	45	-7	-4	No
44	Residential (B)	66	52	55	47	-8	-5	No
45	Residential (B)	66	52	53	47	-6	-5	No
46	Residential (B)	66	52	53	47	-6	-5	No
47	Residential (B)	66	52	53	47	-6	-5	No
48	Residential (B)	66	52	53	47	-6	-5	No
49	Residential (B)	66	55	56	49	-7	-6	No
50	Residential (B)	66	52	53	47	-6	-5	No
51	Residential (B)	66	53	55	48	-7	-5	No
52	Residential (B)	66	60	61	54	-7	-6	No
53	Residential (B)	66	55	57	50	-7	-5	No
54	Residential (B)	66	63	64	57	-7	-6	No
55	Residential (B)	66	57	59	52	-7	-5	No
56	Residential (B)	66	53	55	49	-6	-4	No
57	Residential (B)	66	50	51	46	-5	-4	No
62	Residential (B)	66	53	54	48	-6	-5	No
63	Residential (B)	66	53	55	48	-7	-5	No

Receptor ID	Existing Land Use (FHWA Activity Category)	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	2043 No Build Noise Level (dBA)	2043 Juneau Creek Variant Noise Level (dBA)	Change Between 2043 No Build and 2043 Juneau Crk Variant	Change Between 2012 Existing and 2043 Juneau Crk Variant	Predicted Build Impact? (Yes/No)
64	Residential (B)	66	60	61	54	-7	-6	No
65	Residential (B)	66	62	63	56	-7	-6	No
66	Residential (B)	66	61	63	56	-7	-5	No
67	Residential (B)	66	61	63	56	-7	-5	No
68	Residential (B)	66	52	54	48	-6	-4	No
69	Residential (B)	66	53	54	48	-6	-5	No
70	Residential (B)	66	52	53	47	-6	-5	No
71	Residential (B)	66	50	52	46	-6	-4	No
72	Residential (B)	66	53	54	48	-6	-5	No
73	Residential (B)	66	53	55	48	-7	-5	No
74	Residential (B)	66	59	60	54	-6	-5	No
75	Residential (B)	66	56	57	51	-6	-5	No
76	Residential (B)	66	59	61	54	-7	-5	No
77	Residential (B)	66	56	57	51	-6	-5	No
78	Residential (B)	66	61	62	55	-7	-6	No
80	Residential (B)	66	54	55	49	-6	-5	No
81	Residential (B)	66	57	59	52	-7	-5	No
82	Residential (B)	66	55	56	49	-7	-6	No
83	Residential (B)	66	49	50	46	-4	-3	No
84	Residential (B)	66	52	53	48	-5	-4	No
85	Residential (B)	66	55	56	50	-6	-5	No
86	Residential (B)	66	52	54	48	-6	-4	No
87	Residential (B)	66	56	58	52	-6	-4	No
88	Residential (B)	66	55	57	51	-6	-4	No
89	Residential (B)	66	55	57	51	-6	-4	No
90	Residential (B)	66	60	61	55	-6	-5	No
91	Residential (B)	66	60	62	55	-7	-5	No
92	Residential (B)	66	60	62	55	-7	-5	No

Receptor ID	Existing Land Use (FHWA Activity Category)	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	2043 No Build Noise Level (dBA)	2043 Juneau Creek Variant Noise Level (dBA)	Change Between 2043 No Build and 2043 Juneau Crk Variant	Change Between 2012 Existing and 2043 Juneau Crk Variant	Predicted Build Impact? (Yes/No)
93	Residential (B)	66	53	54	49	-5	-4	No
94	Residential (B)	66	53	54	49	-5	-4	No
95	Residential (B)	66	50	51	48	-3	-2	No
96	Residential (B)	66	50	52	48	-4	-2	No
97	Residential (B)	66	53	55	50	-5	-3	No
98	Commercial (E)	71	62	63	57	-6	-5	No
99	Residential (B)	66	51	53	49	-4	-2	No
100	Residential (B)	66	53	55	50	-5	-3	No
101	Residential (B)	66	53	54	50	-4	-3	No
102	Residential (B)	66	56	58	52	-6	-4	No
103	Residential (B)	66	59	61	54	-7	-5	No
104	Residential (B)	66	58	59	53	-6	-5	No
105	Residential (B)	66	64	66	59	-7	-5	No
106	Residential (B)	66	69	70	63	-7	-6	No
107	Commercial (E)	71	66	68	61	-7	-5	No
108	Residential (B)	66	52	54	50	-4	-2	No
109	Commercial (E)	71	66	68	61	-7	-5	No
110	Commercial (E)	71	62	64	57	-7	-5	No
111	Commercial (E)	71	60	62	55	-7	-5	No
112	Residential (B)	66	58	60	55	-5	-3	No
113	Residential (B)	66	60	62	56	-6	-4	No
114	Residential (B)	66	59	60	55	-5	-4	No
115	Residential (B)	66	57	59	54	-5	-3	No
116	Residential (B)	66	59	60	54	-6	-5	No
117	Residential (B)	66	56	58	54	-4	-2	No
118	Residential (B)	66	57	59	55	-4	-2	No
119	Residential (B)	66	65	66	60	-6	-5	No
120	Residential (B)	66	58	59	55	-4	-3	No

Receptor ID	Existing Land Use (FHWA Activity Category)	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	2043 No Build Noise Level (dBA)	2043 Juneau Creek Variant Noise Level (dBA)	Change Between 2043 No Build and 2043 Juneau Crk Variant	Change Between 2012 Existing and 2043 Juneau Crk Variant	Predicted Build Impact? (Yes/No)
121	Residential (B)	66	58	60	55	-5	-3	No
122	Residential (B)	66	59	61	56	-5	-3	No
123	Residential (B)	66	61	62	55	-7	-6	No
124	Residential (B)	66	59	60	61	1	2	No
125	Residential (B)	66	60	61	60	-1	0	No
126	Residential (B)	66	61	62	57	-5	-4	No
127	Residential (B)	66	58	59	55	-4	-3	No
128	Residential (B)	66	57	58	59	1	2	No
129	Residential (B)	66	53	54	50	-4	-3	No
130	Residential (B)	66	50	52	49	-3	-1	No
131	Residential (B)	66	48	49	50	1	2	No
132	Residential (B)	66	41	43	54	11	13	No
133	Residential (B)	66	41	42	54	12	13	No
134	Residential (B)	66	40[a]	40[a]	48	8	8	No
135	Residential (B)	66	40[a]	40[a]	47	7	7	No
136	Residential (B)	66	40[a]	40[a]	43	3	3	No
137	Residential (B)	66	40[a]	40[a]	44	4	4	No
138	Residential (B)	66	40[a]	40[a]	44	4	4	No
139	Residential (B)	66	40[a]	40[a]	44	4	4	No
140	Residential (B)	66	40[a]	40[a]	44	4	4	No
141	Residential (B)	66	40[a]	40[a]	45	5	5	No
142	Residential (B)	66	40[a]	40[a]	44	4	4	No
143	Residential (B)	66	40[a]	40[a]	44	4	4	No
144	Residential (B)	66	40[a]	40[a]	44	4	4	No
145	Residential (B)	66	40[a]	40[a]	46	6	6	No
146	Residential (B)	66	40	42	50	8	10	No
147	Residential (B)	66	40[a]	40[a]	42	2	2	No
148	Residential (B)	66	40[a]	40[a]	42	2	2	No

Receptor ID	Existing Land Use (FHWA Activity Category)	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	2043 No Build Noise Level (dBA)	2043 Juneau Creek Variant Noise Level (dBA)	Change Between 2043 No Build and 2043 Juneau Crk Variant	Change Between 2012 Existing and 2043 Juneau Crk Variant	Predicted Build Impact? (Yes/No)
149	Residential (B)	66	40[a]	40[a]	43	3	3	No
150	Residential (B)	66	40[a]	40[a]	43	3	3	No
151	Residential (B)	66	40[a]	40[a]	43	3	3	No
152	Residential (B)	66	39	41	41	0	2	No
153	Hotel (E)	71	48	49	50	1	2	No
154	Residential (B)	66	44	45	45	0	1	No
155	Residential (B)	66	51	53	53	0	2	No
156	Residential (B)	66	40[a]	40[a]	45	5	5	No
157	Residential (B)	66	40[a]	40[a]	43	3	3	No
158	Residential (B)	66	40[a]	40[a]	44	4	4	No
URR N	Campground (C)	66	44	46	47	1	3	No
URR E	Campground (C)	66	40[a]	40[a]	43	3	3	No
URR S	Campground (C)	66	40[a]	40[a]	41	1	1	No
PK SE	Campground (C)	66	44	45	41	-4	-3	No
PK SW	Campground (C)	66	40[a]	40[a]	41	1	1	No
PK N	Campground (C)	66	40[a]	40[a]	42	2	2	No
CC N	Campground (C)	66	54	55	49	-6	-5	No
CC S	Campground (C)	66	47	48	42	-6	-5	No
RR	Campground (C)	66	52	53	56	3	4	No
KNWR 1	Recreation Area (C)	66	40[a]	40[a]	40[a]	0	0	No
KNWR 2	Recreation Area (C)	66	48	50	50	0	2	No
KNWR 3	Recreation Area (C)	66	45	47	50	3	5	No
SP 1	Recreation Area (C)	66	59	60	59	-1	0	No
SP 2	Recreation Area (C)	66	59	60	59	-1	0	No
KRSMA 1	Recreation Area (C)	66	51	52	52	0	1	No
KRRA 2	Recreation Area (C)	66	**67**	**68**	61	-7	-6	No
KRRA 1	Recreation Area (C)	66	40[a]	40[a]	40[a]	0	0	No
KRSMA 2	Recreation Area (C)	66	49	50	44	-6	-5	No

Receptor ID	Existing Land Use (FHWA Activity Category)	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	2043 No Build Noise Level (dBA)	2043 Juneau Creek Variant Noise Level (dBA)	Change Between 2043 No Build and 2043 Juneau Crk Variant	Change Between 2012 Existing and 2043 Juneau Crk Variant	Predicted Build Impact? (Yes/No)
JCRA 1	Campground (C)	66	40[a]	40[a]	40[a]	0	0	No
JCRA 2	Recreation Area (C)	66	40[a]	40[a]	43	3	3	No
JCRA 3	Trail (C)	66	40[a]	40[a]	51	11	11	No
BCT 1	Trail (C)	66	40[a]	40[a]	62	**22**	**22**	Yes
BCT 2	Trail (C)	66	40[a]	40[a]	43	3	3	No
BCT 3	Trail (C)	66	40[a]	40[a]	40[a]	0	0	No
BCT 4	Trail (C)	66	40[a]	40[a]	40[a]	0	0	No
ST 1	Trail (C)	66	54	55	49	-6	-5	No
ST 2	Trail (C)	66	64	64	47	1	3	No
CLBL	Recreation Area (C)	66	40	40[a]	43	3	3	No
RPT 1	Recreation Area (C)	66	60	60	57	-7	-6	No
RPT 2	Recreation Area (C)	66	63	65	40[a]	0	0	No

[a] Sites located in areas where traffic noise is not a significant contributor to existing ambient noise levels were characterized using measured ambient levels as described in Section 4.1.

5.5 Rumble Strip Noise

As part of the highway construction under the project Build Alternatives, the DOT&PF anticipates installing rumble strips in compliance with their highway safety policies. DOT&PF's policy is to install shoulder rumble strips on primary high speed highways (which are those with posted speeds equal to or greater than 50 mph, and which have shoulders that are 6-foot or greater in width), and centerline rumble strips in corridors with high recorded incidences of head-on crashes.

The demonstrated purpose of rumble strips is to prevent 1/5 to 1/3 of run-off-road crashes and head-on crashes on main roads. According to the Strategic Highway Safety Plan (SHSP), approximately 40 lives are lost statewide per year due to single-vehicle run-off-road (SVROR) crashes. Another 15 lives are lost annually due to head-on collisions.

The new highway alignments included in the Sterling Highway MP 45–60 Project would qualify for shoulder rumble strips, but not centerline rumble strips unless a problem were to develop in the future. The existing alignment would be eligible for centerline rumble strip consideration.

A noise study conducted by the Texas Transportation Institute (Texas Transportation Institute, 2006) concluded the overall exterior noise was increased by road vehicles driving over rumble strips, but that the increase in noise was not significant. The noise of a road vehicle traveling at 55 miles per hour while driving over rumble strips was measured to be less than the noise of a commercial vehicle (such as a large truck) traveling on the same road without driving over the rumble strips. Additional highway noise from drivers hitting rumble strips is intermittent and random, rather than sustained.

It is not anticipated that periodic rumble strip noise will cause substantial changes in the predicted noise levels presented above.

5.6 Compression Brakes

Compression brakes (also known as exhaust or engine brakes or "jake" brakes) are used by trucks to reduce speeds on relatively steep grades (i.e., 5 or 6 percent). These brakes are considered a safety feature on trucks and, as such, the State of Alaska permits their use. The noise model calculations include vehicle type (to account for heavy trucks and buses), and deceleration, but does not account for the use of compression brakes, which are louder. However, if necessary, local communities can enact laws to prohibit their use while trucks are within their local jurisdiction.

6.0 Traffic Noise Impacts

Table 6-1 summarizes the receptors by impact type and alternative. As detailed in Section 2.0, traffic noise impacts are defined as impacts that occur when the predicted traffic noise levels:

- Approach or exceed the noise abatement criteria provided in Table 2-2. For Activity Category B (Residential) and C (Residential and Recreational) land uses, this occurs when noise levels are greater than or equal to 66 dBA, and Activity E (Commercial and Hotel) land use noise levels are greater than or equal to 71 dBA.
- When the predicted traffic noise levels substantially increase by 15 dBA or more over the existing noise levels

Table 6-1: Summary of Predicted Noise Impacts

NAC Class	Receptor Types		2012 Existing	2043 No Build	2043 Cooper Creek	2043 G South	2043 Juneau Creek	2043 Juneau Creek Variant
B	Residential	Approach or Exceed NAC	1	4	4	0	0	0
		Substantial Increase	-	0	0	0	0	0
C	Campsite, Recreational areas, trails	Approach or Exceed NAC	1	1	1	1	0	0
		Substantial Increase	-	0	1	1	1	1
E	Commercial	Approach or Exceed NAC	0	0	1	0	0	0
		Substantial Increase	-	0	0	0	0	0
Total Number of Properties Impacted			**2**	**5**	**7**	**2**	**1**	**1**

7.0 Noise Abatement Measures

Noise abatement measures are considered in areas where predicted traffic noise levels approach or exceed the noise abatement criteria, or when the predicted traffic noise levels substantially exceed the existing noise levels. Abatement measures are considered for these receptors consistent with the DOT&PF guidelines.

Where traffic noise impacts are identified, noise abatement is considered and evaluated for acoustic feasibility and reasonableness. DOT&PF policy is that abatement for Activity Category A, B, C, D or E needs to be feasible and reasonable on their own merits. Land uses not sensitive to highway traffic noise, and undeveloped lands will not be provided noise abatement.

Acoustic feasibility criteria deal primarily with physics and engineering considerations (i.e., can a substantial noise reduction be achieved given the conditions of a specific location; is the ability to achieve noise reduction limited by factors such as topography, access requirements for driveways or ramps, the presence of cross streets, or other noise sources in the area).

Reasonableness is a more subjective criterion than feasibility. It implies that common sense and good judgment were applied in arriving at a decision. Reasonableness is based on a number of factors, not just one criterion. FHWA noise regulations define three mandatory reasonableness factors that must be evaluated for a noise abatement measure to be considered reasonable. They are:

- Viewpoints of the property owners and residents of the benefitted receptors
    - Views of the property owners and residents that benefit from noise abatement measures. To determine the desires of benefited households and property owners, DOT&PF will contact all benefited households and property owners to determine the level of interest for a noise abatement measure. At least 60 percent of households and property owners surveyed must want the noise abatement measure.
- Cost Effectiveness
    - The DOT&PF policy states that the noise abatement measure cost is no more than $32,000 per benefited receptor, based upon the design engineer's estimate. A benefited receptor is defined as the recipient of an abatement measure that receives a noise reduction at or above the minimum threshold of 5 dBA.
- Noise Reduction Design Goal
    - The DOT&PF noise reduction design goal is a minimum of 7 dBA. Fifty percent or more of the benefitted receptors in the first row of structures must achieve this design goal for the noise abatement to be considered reasonable.

The DOT&PF considers these three mandatory reasonableness factors to determine reasonableness. The following reasonableness factors are also used to evaluate mitigation on state-funded projects:

- Development vs. Highway Timing

  - At least 50 percent of impacted receptors in the development (subdivision, apartment complex, etc.) were built before initial construction of the highway. The date of development is an important part of the determination of reasonableness. More consideration is given to developments that were built before the highway was built.
- Development Existence
  - At least 50 percent of impacted receptors in the development have existed for at least 10 years. More consideration is given to residents who have experienced traffic noise impacts for long periods of time.
- Absolute Predicted Build Noise Level
  - The predicted future Build noise levels are at least 66 dBA. More consideration should be given to areas with higher absolute traffic noise levels.
- Relative Predicted Build Noise Level
  - The predicted future Build noise levels are at least 10 dBA greater than the existing noise levels. More consideration is given to areas with larger increases over existing noise levels.
- Build vs. No Build Noise Levels
  - The future Build noise levels are at least 5 dBA greater than the future No Build noise levels. More consideration is given to areas where larger changes in traffic noise levels are expected to occur if the project is constructed than if it is not.

No single DOT&PF reasonableness factor is used to determine that a noise abatement measure is unreasonable.

It should be noted that noise barriers could have their own negative impacts. Barriers may interfere with the passage of air, interrupt scenic views, create objectionable shadows, contribute to increased road icing, decrease wildlife mobility, and reduce or eliminate visibility of a business from the roadway. Barriers could also create snow removal problems, cause maintenance access problems, make it difficult to maintain landscaping, create drainage problems, and provide pockets for trash and garbage to accumulate. Depending on location, noise barriers could also compromise traffic safety by reducing stopping or merging sight distance, or by reducing errant vehicle recovery room.

Noise abatement, in the form of noise barriers, was considered for all receptors predicted to be impacted under the project Build alternatives.

7.1 Discussion of Noise Barriers

7.1.1 *Existing and No Build Conditions*

While noise impacts were identified at receptors 106 and KRRA 2 under the existing condition; and at receptors 21, 105, 106, 119, and KRRA2 under the 2043 No Build Alternative, no noise abatement is proposed. The DOT&PF does not have a retrofit noise barrier (Type II) program.

7.1.2 *Cooper Creek Alternative*

Impacted receptors identified under the Cooper Creek Alternative include receptors 87, 105, 106, 107, 119, KRRA 2, and ST 1. Noise mitigation was considered but not evaluated in detail for the following reasons:

- Receptor 87 is assumed to be acquired under the Cooper Creek Alternative, given its location relative to the alignment footprint. Mitigation is not recommended for this receptor.
- Receptor 105 is located on a residential parcel (the same parcel occupied by Receptor 106) but represents a non-residential structure. Receptor 105 is a garage and therefore is not considered to be a land use sensitive to highway noise according to the DOT&PF Noise Policy. Mitigation is not recommended for this receptor.
- Receptors 106 and 119 are residences with direct driveway access onto the Sterling Highway. Noise walls for single, isolated residences are not typically able to meet cost-effectiveness (reasonableness) criteria because of the length of wall needed to meet the DOT&PF noise reduction goal. In addition, the ability of noise walls to achieve acceptable noise reduction is greatly reduced by the need for gaps in noise walls for driveway access. Consequently, noise barriers were determined not to be feasible and are not recommended for these receptors.
- Receptor 107 is a commercial property; DOT&PF does not provide mitigation for commercial properties or undeveloped lands. Mitigation is not recommended for this receptor.
- KRRA 2 is a representative location in the Kenai River Recreation Area and used to evaluate noise levels at locations near to the highway in this section of the recreation area. It does not represent a specific, discrete use area (such as a campground, picnic site, etc.). Noise abatement cannot typically be provided for large recreational areas in a cost-effective manner and therefore mitigation is not recommended for this receptor.
- ST 1 is a representative location on the Stetson Trail and used to evaluate noise levels at locations near to the highway in this section of the project area. It does not represent a specific, discrete use area (such as a campground, picnic site, etc.). A trail is also characterized as a transient use, where it is unlikely that people would congregate for extended periods of time at any one location on the trail. Furthermore, noise barriers may impede access to the trail if installed near it or along the roadway rights of way. Finally, noise abatement cannot typically be provided for large recreational areas in a cost-effective manner and therefore mitigation is not recommended for this receptor.

7.1.3 *G South Alternative*

Noise impacts were predicted at receptors KRRA 2 and BCT 2 under the G South Alternative. Noise abatement was considered at these receptors. In some cases, noise mitigation was considered but not evaluated in detail for the following reasons:

- KRRA 2 is a representative location in the Kenai River Recreation Area and used to evaluate noise levels at locations near to the highway in this section of the recreation area. It does not represent a specific, discrete use area (such as a campground, picnic site,

etc.). Noise abatement cannot typically be provided for large recreational areas in a cost-effective manner and therefore mitigation is not recommended for this receptor.

- BCT 2 is a representative location on the Bean Creek Trail and used to evaluate noise levels at locations near to the highway in this section of the project area. It does not represent a specific, discrete use area (such as a campground, picnic site, etc.). Noise barriers may impede access to the trail if installed near it or along the roadway rights of way. A trail is also characterized as a transient use, where it is unlikely that people would congregate for extended periods of time at any one location on the trail. Traffic noise will attenuate with distance, and the substantial increases in traffic noise would not occur when the hikers proceed approximately 400 feet away from the highway on the trail. Finally, noise abatement cannot typically be provided for large recreational areas in a cost-effective manner and therefore mitigation is not recommended for this receptor.

7.1.4 *Juneau Creek Alternative*

Noise impacts were predicted at receptor BCT 1 under the Juneau Creek Alternative. Noise mitigation was considered but not evaluated in detail for the following reasons:

- BCT 1 is a representative location on the Bean Creek Trail and used to evaluate noise levels at locations near to the highway in this section of the project area. It does not represent a specific, discrete use area (such as a campground, picnic site, etc.). Noise barriers may impede access to the trail if installed near it or along the roadway rights of way. A trail is also characterized as a transient use, where it is unlikely that people would congregate for extended periods of time at any one location on the trail. Traffic noise will attenuate with distance, and substantial increases in traffic noise would not occur when users proceed approximately 400 feet away from the highway on the trail. Finally, noise abatement cannot typically be provided for large recreational areas in a cost-effective manner and therefore mitigation is not recommended for this receptor.

7.1.5 *Juneau Creek Variant Alternative*

Noise impacts were predicted at receptor BCT 1 under the Juneau Creek Variant Alternative. Noise mitigation was considered but not evaluated in detail for the following reasons:

- BCT 1 is a representative location on the Bean Creek Trail and used to evaluate noise levels at locations near to the highway in this section of the project area. It does not represent a specific, discrete use area (such as a campground, picnic site, etc.). A trail is also characterized as a transient use, where it is unlikely that people would congregate for extended periods of time at any one location on the trail. Furthermore, noise barriers may impede access to the trail if installed near it or along the roadway rights of way. Traffic noise will attenuate with distance, and substantial increases in traffic noise would not occur when users proceed approximately 400 feet away from the highway on the trail. Finally, noise abatement cannot typically be provided for large recreational areas in a cost-effective manner and therefore mitigation is not recommended for this receptor.

8.0 Construction Noise

It is difficult to reliably predict levels of construction noise at a particular receptor or group of receptors. Heavy machinery, the major source of noise in construction, is constantly moving in unpredictable patterns. Daily construction normally occurs during daylight hours when occasional loud noises are more tolerable. Additionally, a slight increase in truck traffic on area roadways would also occur during construction; however, this additional traffic would not result in a perceptible change in hourly Leq sound levels. To provide context, traffic volumes on area roadways would need to double in order for there to be a barely perceptible change in sound levels (i.e., 3 dBA increase).

Blasting activities would create short-duration loud noise. Under all build alternatives, blasting would occur at a curve slated for reconstruction, near MP 45, and could occur at other locations if bedrock were encountered. Pile driving also is noisy and likely would occur for bridge construction under all build alternatives. Minor pile driving would occur during placement of guardrails.

No one receptor is expected to be exposed to construction noise of long duration; therefore, extended disruption of normal activities is not anticipated. However, provisions will be included in the plans and specifications requiring the contractor to make every reasonable effort to minimize construction noise through abatement measures such as compliance with the local noise code and maintenance of muffler systems.

9.0 Conclusion

Using the 2011 DOT&PF *Noise Policy*, this highway traffic noise analysis of the Sterling Highway MP 45 to 60 Project identified one existing noise impact to a residential receptor and one existing noise impact to a recreational receptor; and predicted four residential impacts and one recreational area impact under the 2043 No Build Alternative. Evaluation of the four Build alternatives yielded a total of four residential impacts, one commercial impact, and two recreational site impacts under the Cooper Creek Alternative; two recreational site impacts under the G South Alternative; one recreational site impacts under the Juneau Creek Alternative; and one recreational site impacts under the Juneau Creek Variant Alternative.

Noise abatement options for the impacted receptors were considered, but abatement measures were not recommended. This recommendation is based upon preliminary design information and existing policies. Recommendations will be re-evaluated during the design phase of the project to determine whether they remain valid.

10.0 Information for Local Officials

The DOT&PF noise policy requires that the distance to NAC limits be calculated for undeveloped lands (Activity Category G) near the project. The distance to traffic noise thresholds from the build alternative centerline were calculated conservatively, assuming the roadway is a straight line and that there are no topographical effects to traffic noise propagation. Table 10-1 presents the distances to the NAC thresholds. It should be noted that the distances of noise impact contours for different land uses are guidelines only. More detailed noise analysis should be performed for specific future proposed developments.

Table 10-1: Predicted Distances (feet) to Activity Category B, C, and E Noise Impact Thresholds

NAC Class	Receptor Types	2043 Cooper Creek	2043 G South	2043 Juneau Creek	2043 Juneau Creek Variant
B	Residential	150 feet			
C	Campsite, Recreational areas, Trails	150 feet			
E	Commercial	50 feet			

Note that the Activity Category B and C NAC is 66 dBA and the Activity Category E NAC is 71 dBA

11.0 References

Alaska Department of Transportation and Public Facilities (DOT&PF). 2011. *Noise Policy*. April, 2011.

Federal Highway Administration (FHWA). 23 CFR 772. *Procedures for Abatement of Highway Traffic Noise and Construction, Noise*.

Lounsbury & Associates, Inc. 2013. *Sterling Highway Milepost 45 to 60 - 2013 Traffic Study Update*. December, 2013.

Rau and Wooten (eds.), 1980. *Environmental Impact Analysis Handbook.*

Texas Transportation Institute. 2006. *Exterior Noise Created by Vehicles Traveling Over Rumble Strips.* Texas Transportation Institute, Nov 9, 2006 by M. Finley, P.E. and J. Miles, E.I.T. (presented at the Transportation Research Board annual meeting in 2007).

Figures

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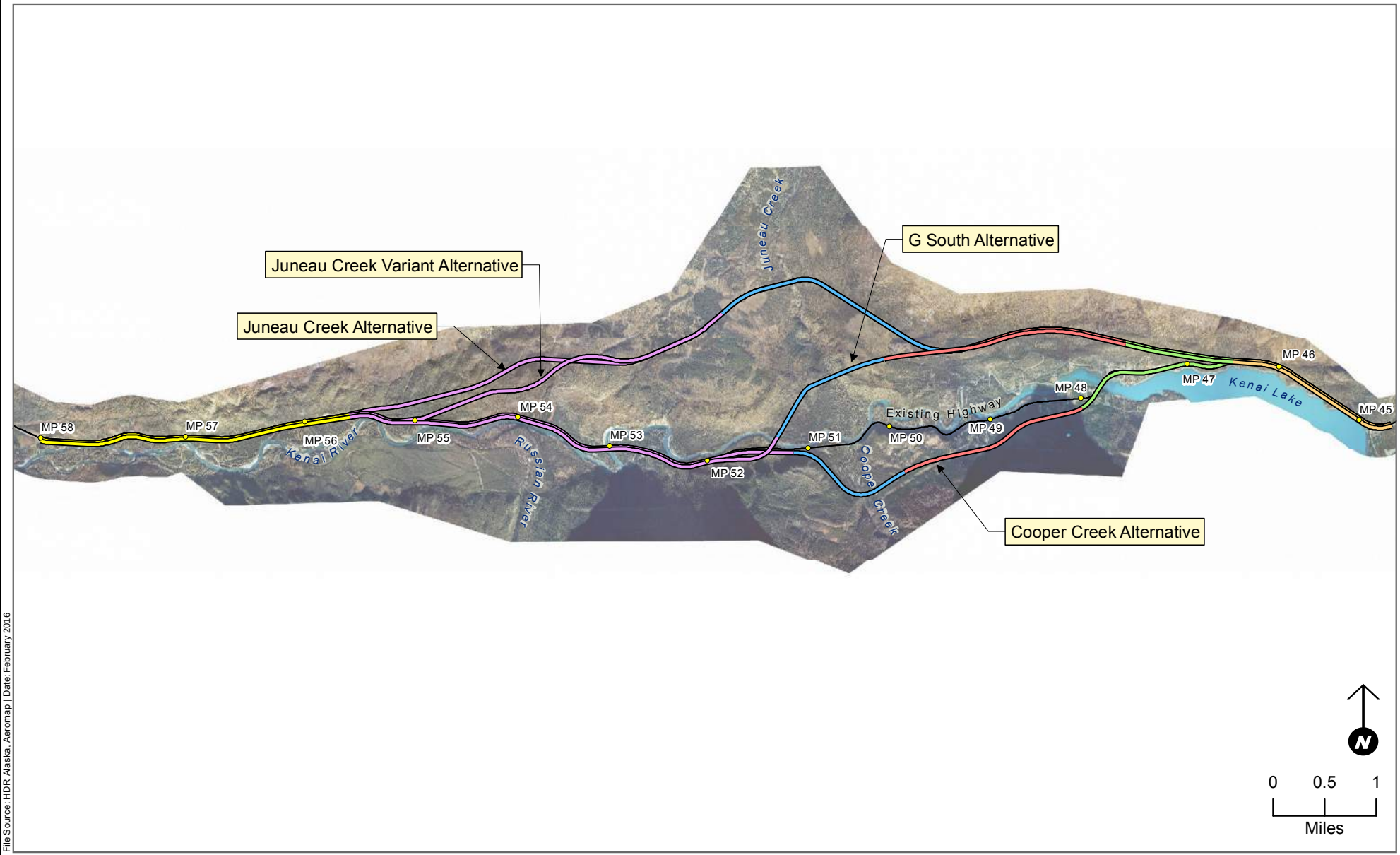
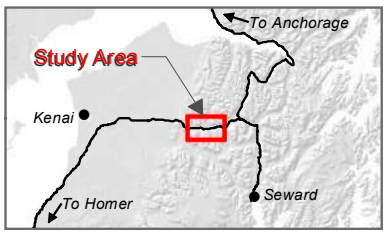


File Source: HDR Alaska, Aeromap | Date: February 2016

STERLING
HIGHWAY MILE POST 45 TO 60
ALASKA



Legend

Traffic Analysis Segments

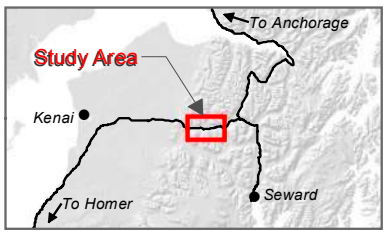
- 1
- 2
- 3
- 4
- 5
- 6
- Existing Sterling Highway

Traffic Analysis Segments

Figure 1

File Source: HDR Alaska, Aeromap, Kenai Penninsula Borough | Date: February 2016

STERLING
HIGHWAY MILE POST 45 TO 60
ALASKA



Legend

- Monitoring Locations
- Existing Sterling Highway

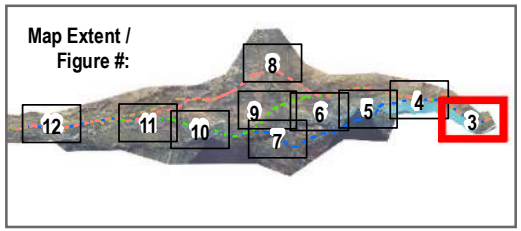
Project Alternatives

- Cooper Creek
- G South
- Juneau Creek
- Juneau Creek Variant

Noise Monitoring Locations

Figure 2

STERLING
HIGHWAY MILE POST 45 TO 60
ALASKA



Legend

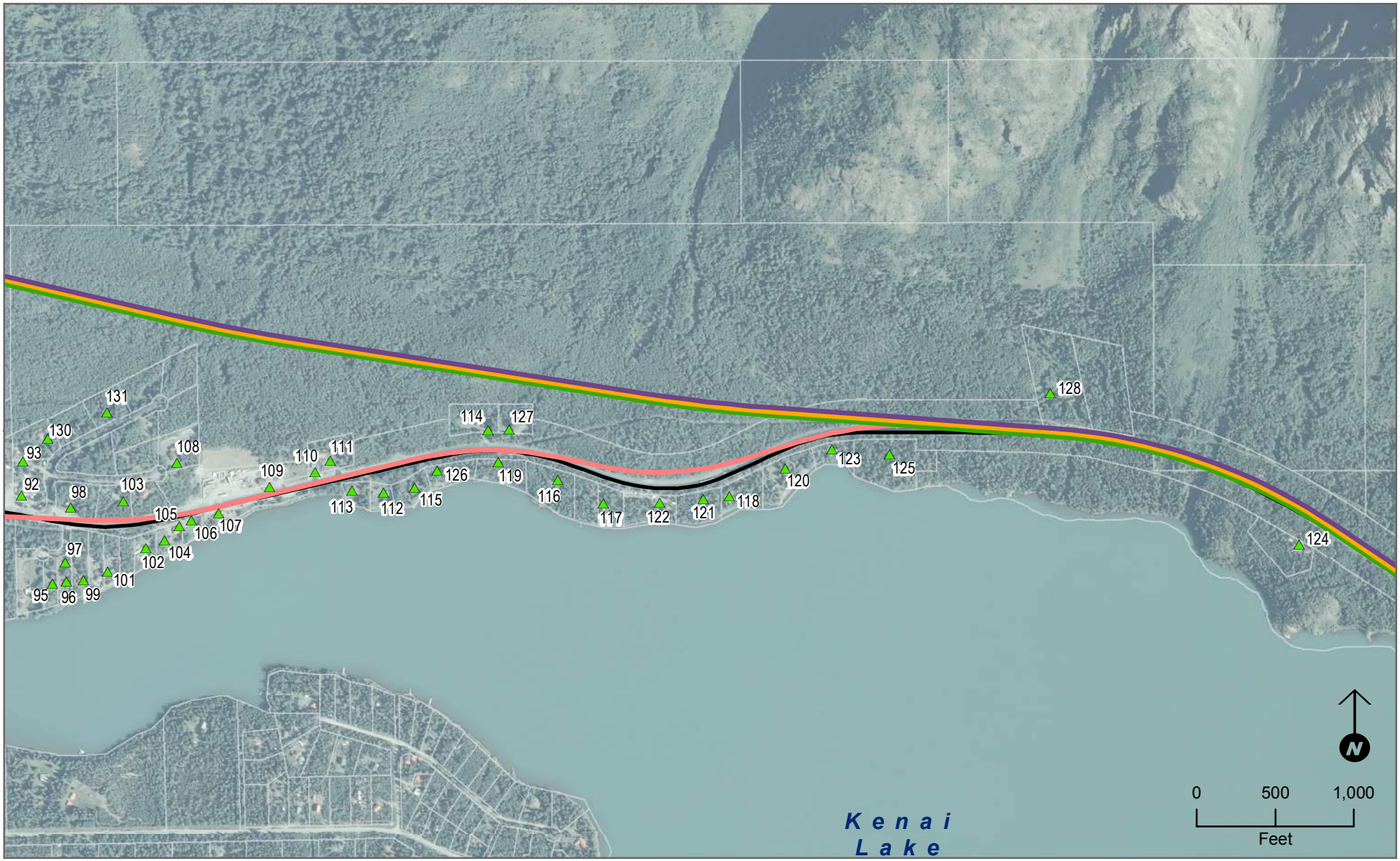
Project Alternatives

- Cooper Creek
- G South
- Juneau Creek
- Juneau Creek Variant

- Noise Sensitive Receptor (2016)
- Existing Highway
- Parcel Boundary

Noise Sensitive Receptors

Figure 3



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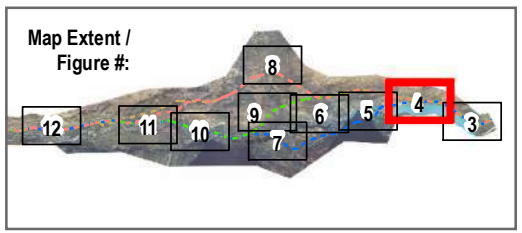

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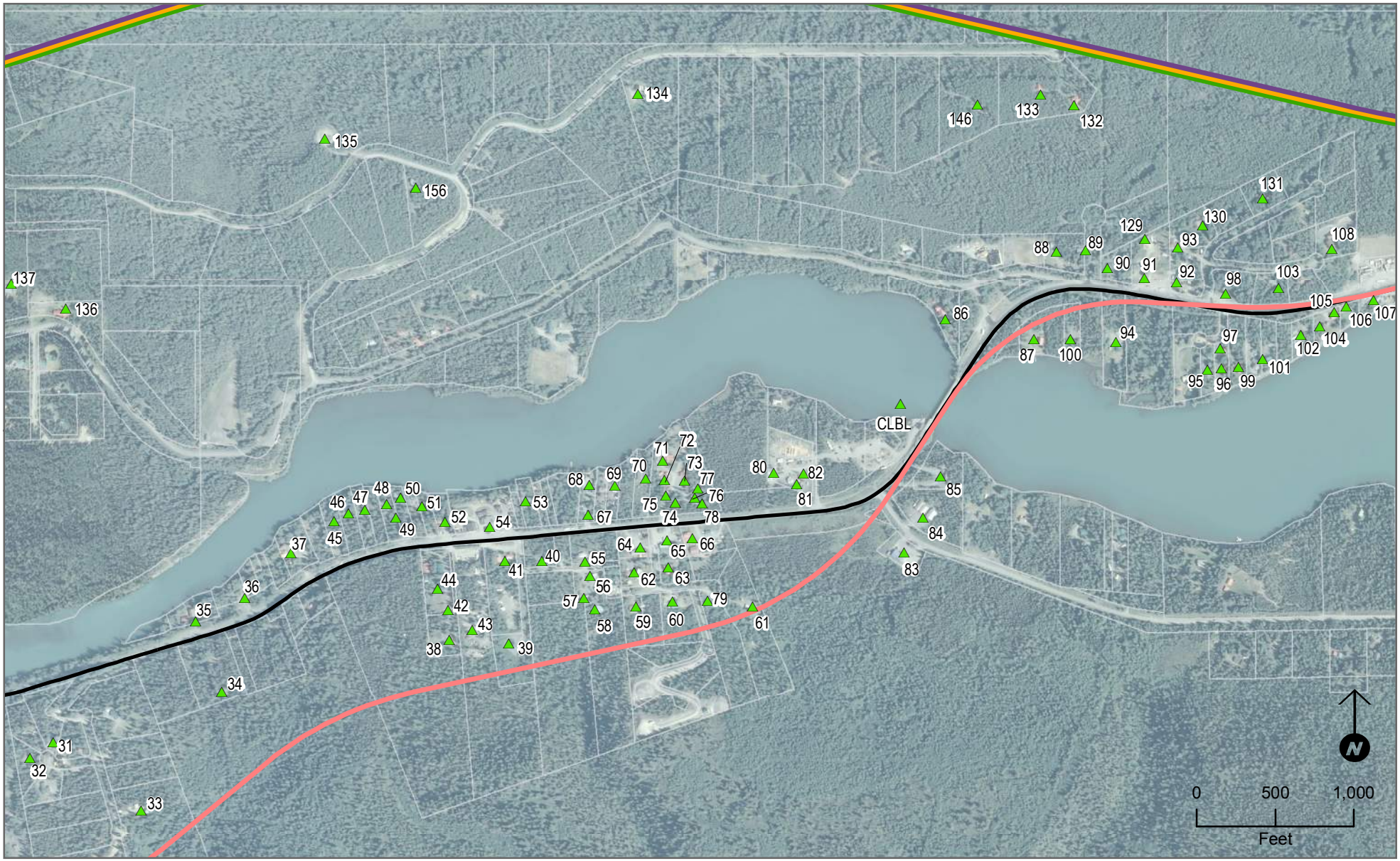
Project Alternatives

- Cooper Creek
- G South
- Juneau Creek
- Juneau Creek Variant

- Noise Sensitive Receptor (2016)
- Existing Highway
- Parcel Boundary

Noise Sensitive Receptors

Figure 4



STERLING
HIGHWAY MILE POST 45 TO 60
ALASKA

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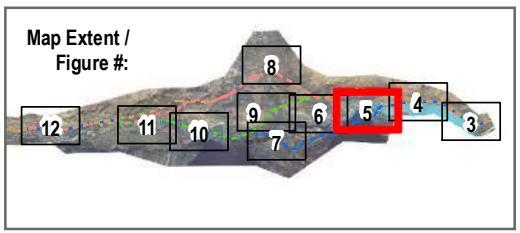

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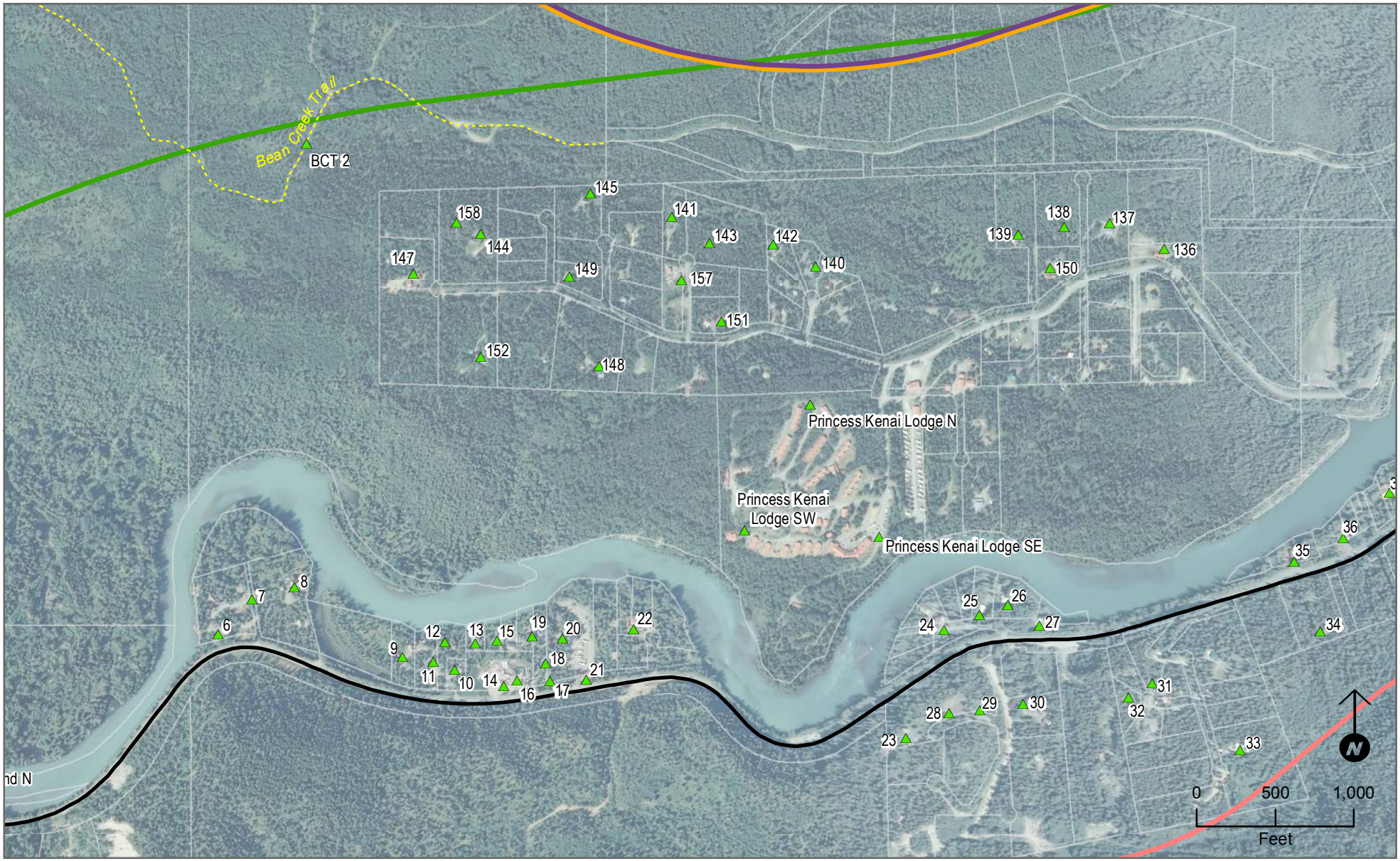
Project Alternatives

- Cooper Creek
- G South
- Juneau Creek
- Juneau Creek Variant

- Noise Sensitive Receptor (2016)
- Existing Highway
- Parcel Boundary

Noise Sensitive Receptors

Figure 5



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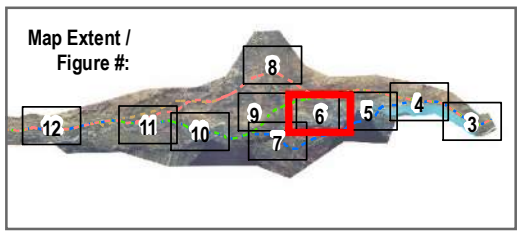
ALASKA



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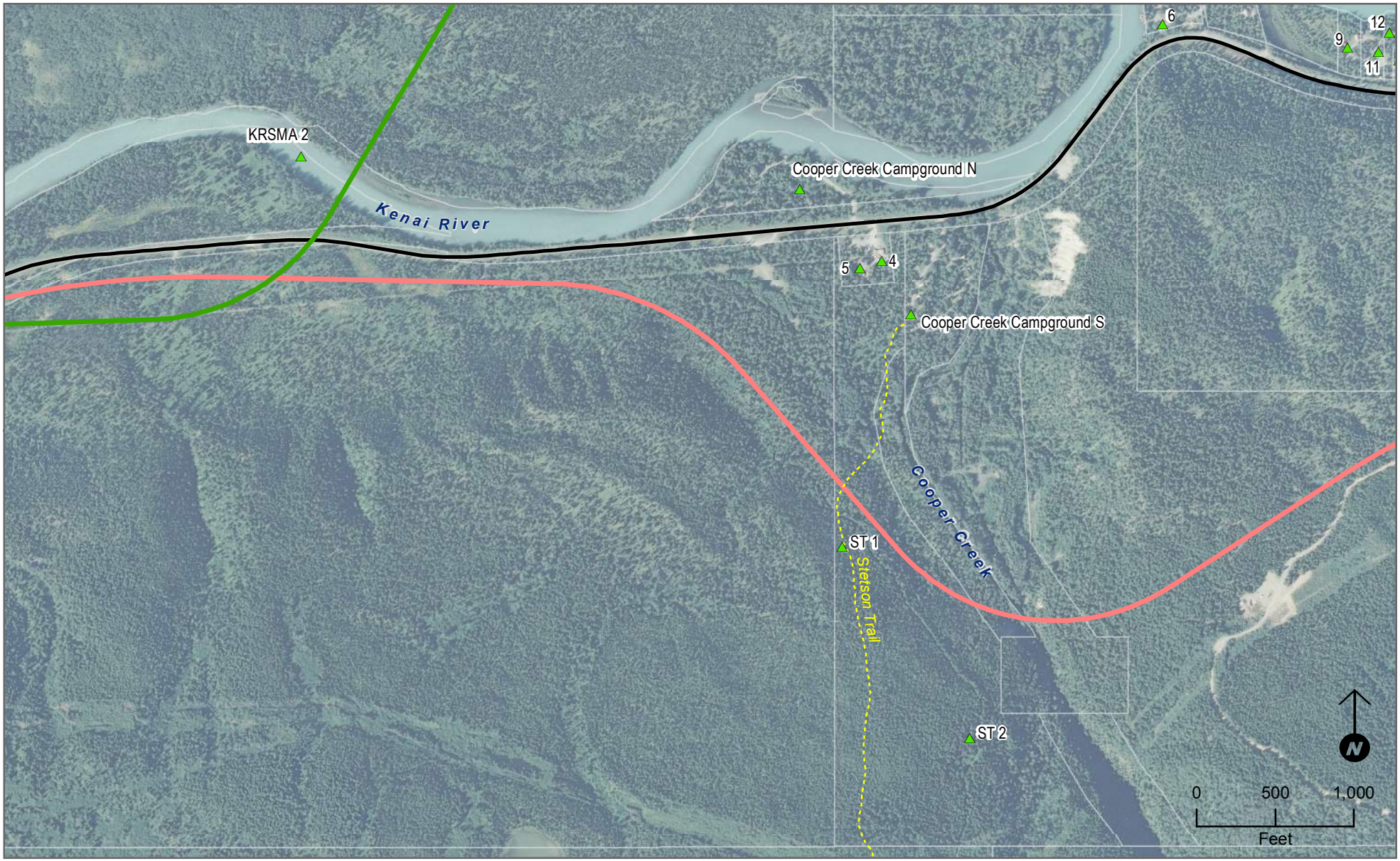
Project Alternatives

- Cooper Creek
- G South
- Juneau Creek
- Juneau Creek Variant

- Noise Sensitive Receptor (2016)
- Existing Highway
- Parcel Boundary

Noise Sensitive Receptors

Figure 6



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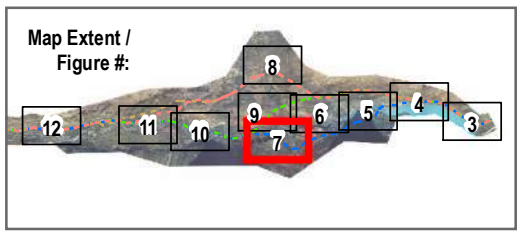

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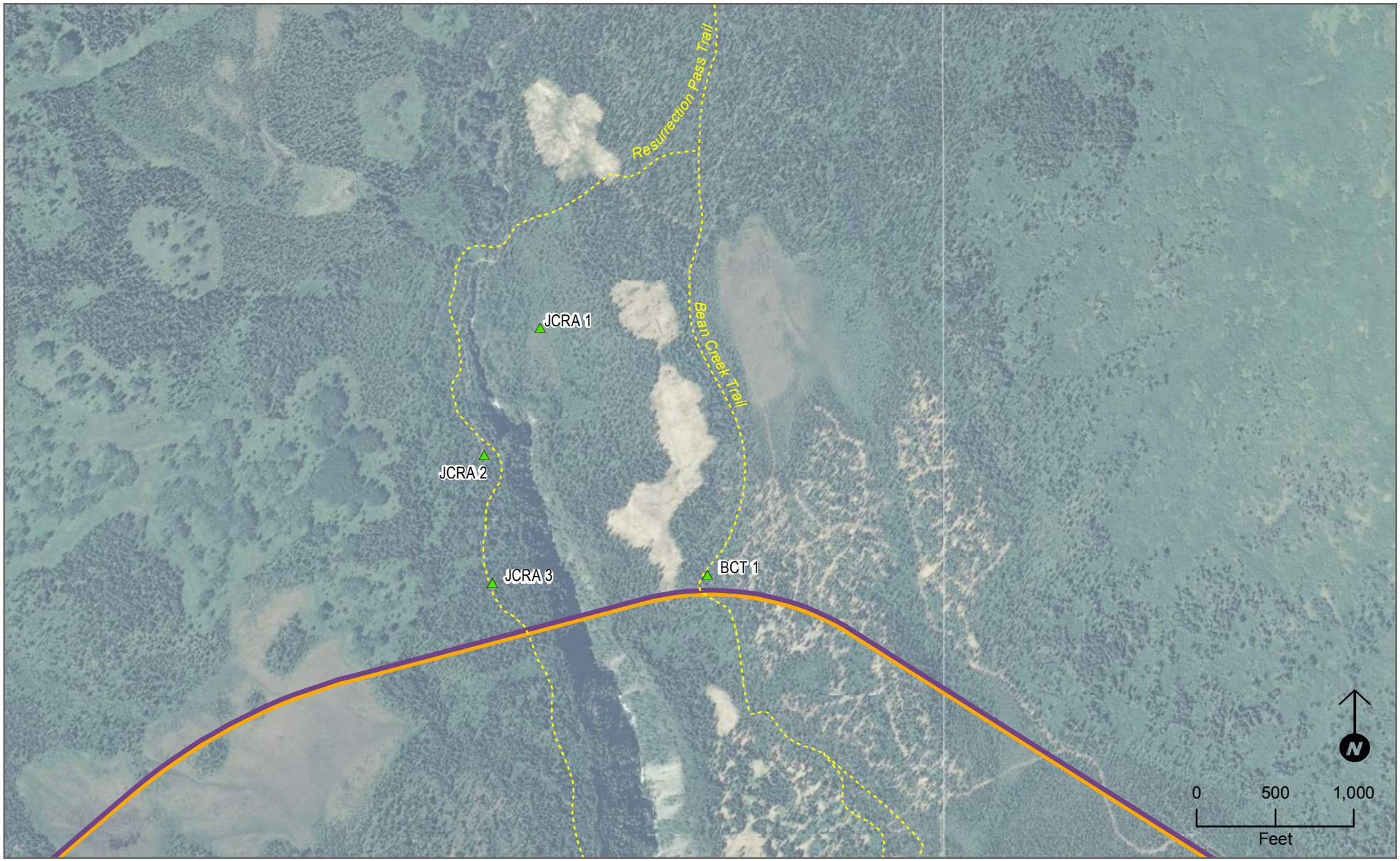
Project Alternatives

- Cooper Creek
- G South
- Juneau Creek
- Juneau Creek Variant

- Noise Sensitive Receptor (2016)
- Existing Highway
- Parcel Boundary

Noise Sensitive Receptors

Figure 7



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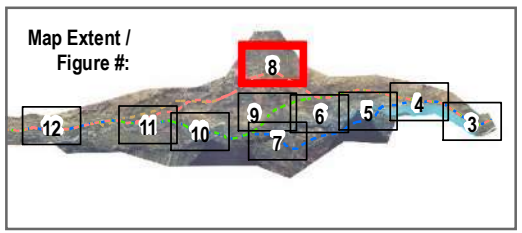
ALASKA



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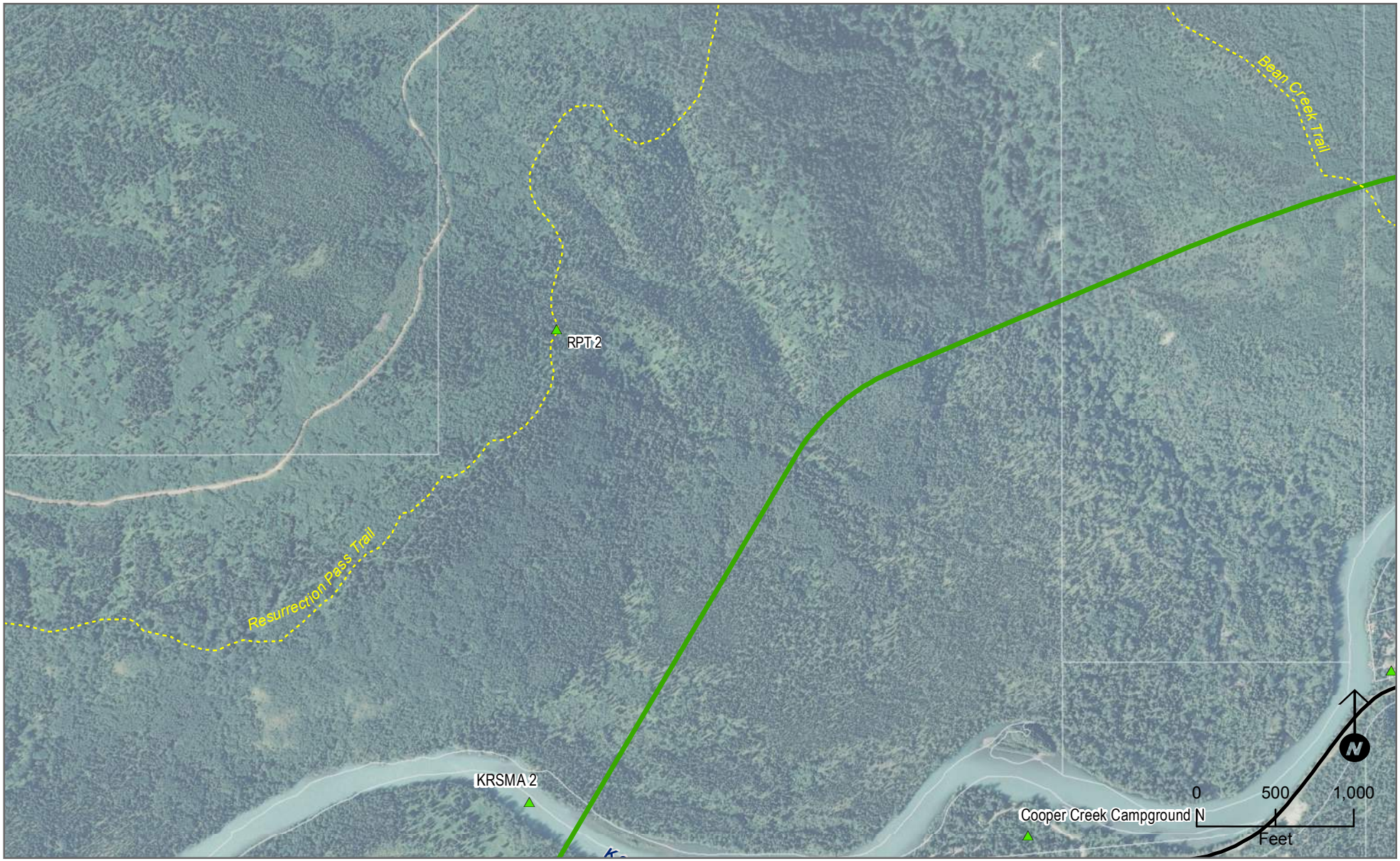
Project Alternatives

- Cooper Creek
- G South
- Juneau Creek
- Juneau Creek Variant

- Noise Sensitive Receptor (2016)
- Existing Highway
- Parcel Boundary

Noise Sensitive Receptors

Figure 8



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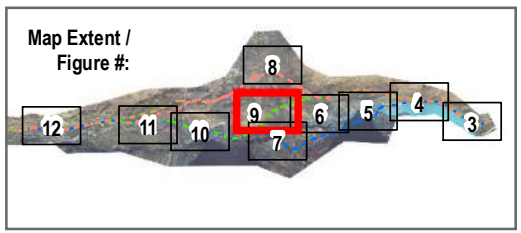
ALASKA



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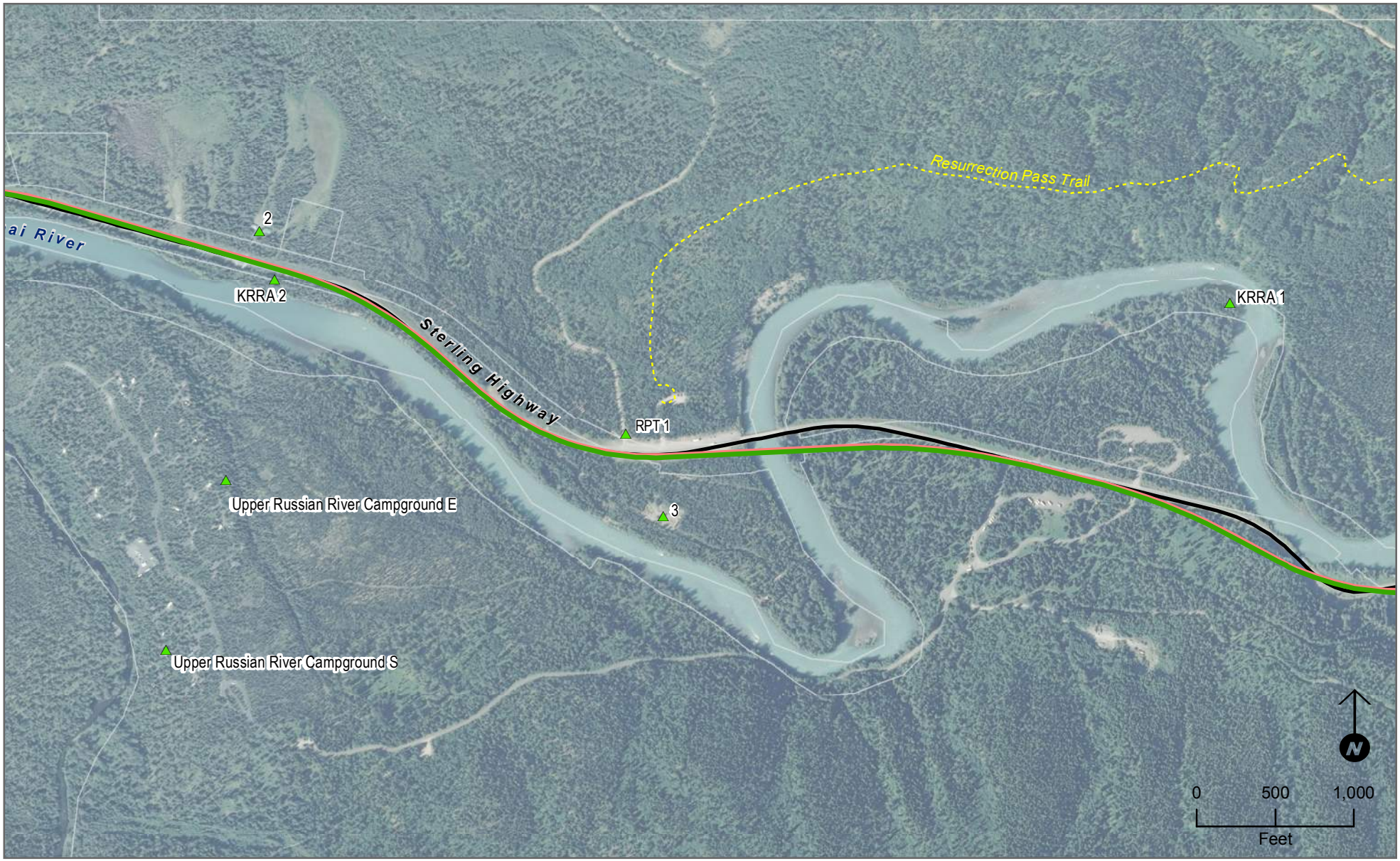
Project Alternatives

- Cooper Creek
- G South
- Juneau Creek
- Juneau Creek Variant

- Noise Sensitive Receptor (2016)
- Existing Highway
- Parcel Boundary

Noise Sensitive Receptors

Figure 9



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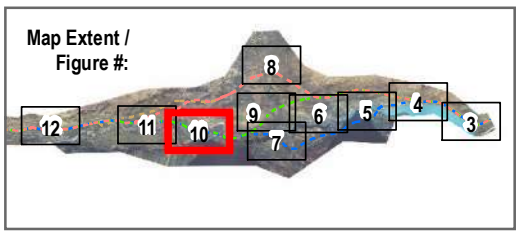

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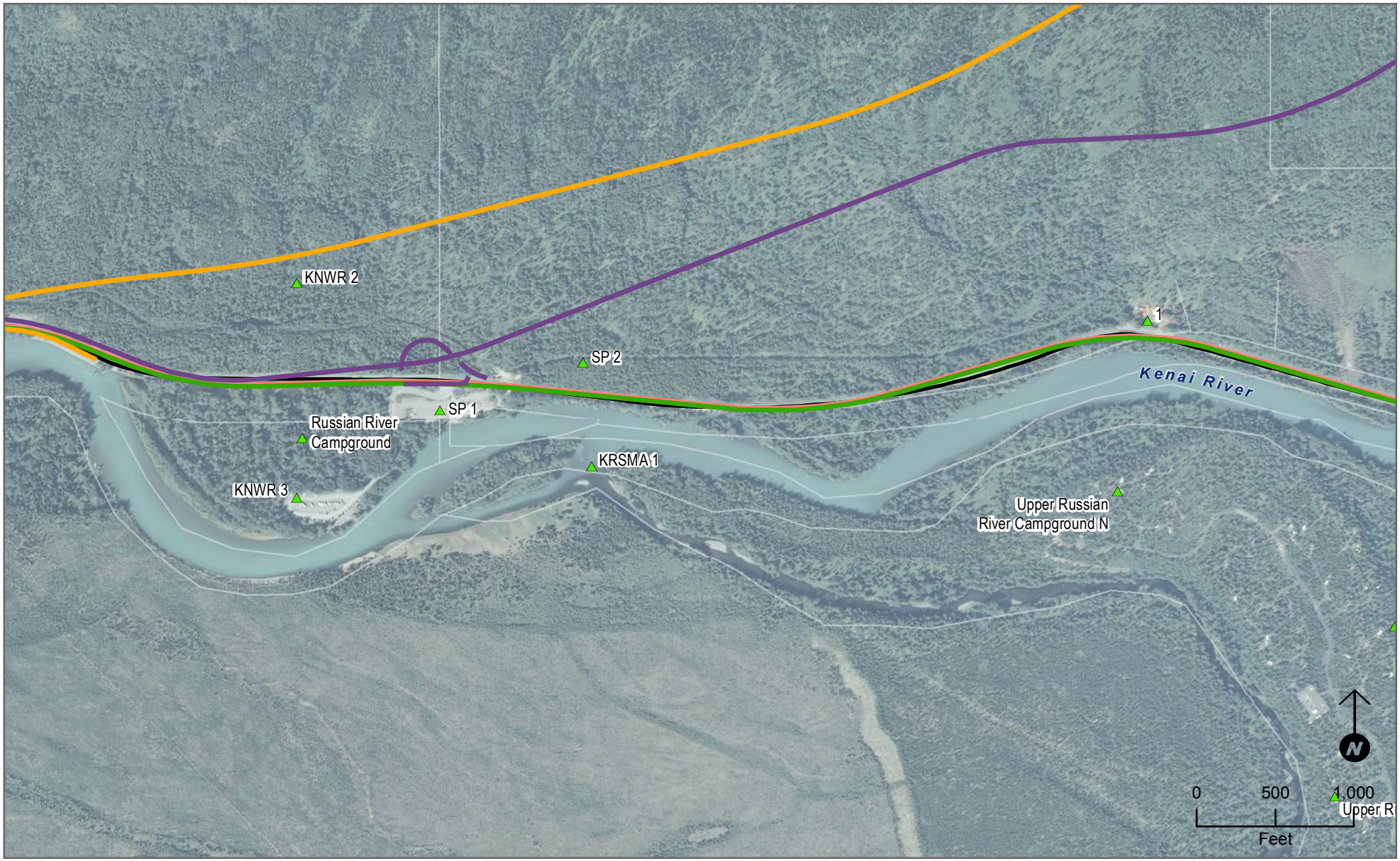
Project Alternatives

- Cooper Creek
- G South
- Juneau Creek
- Juneau Creek Variant

- Noise Sensitive Receptor (2016)
- Existing Highway
- Parcel Boundary

Noise Sensitive Receptors

Figure 10



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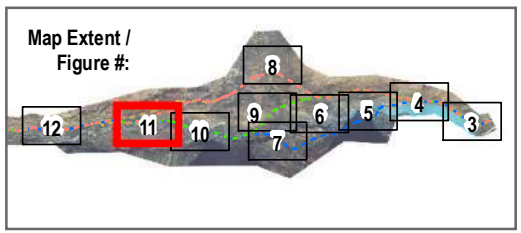

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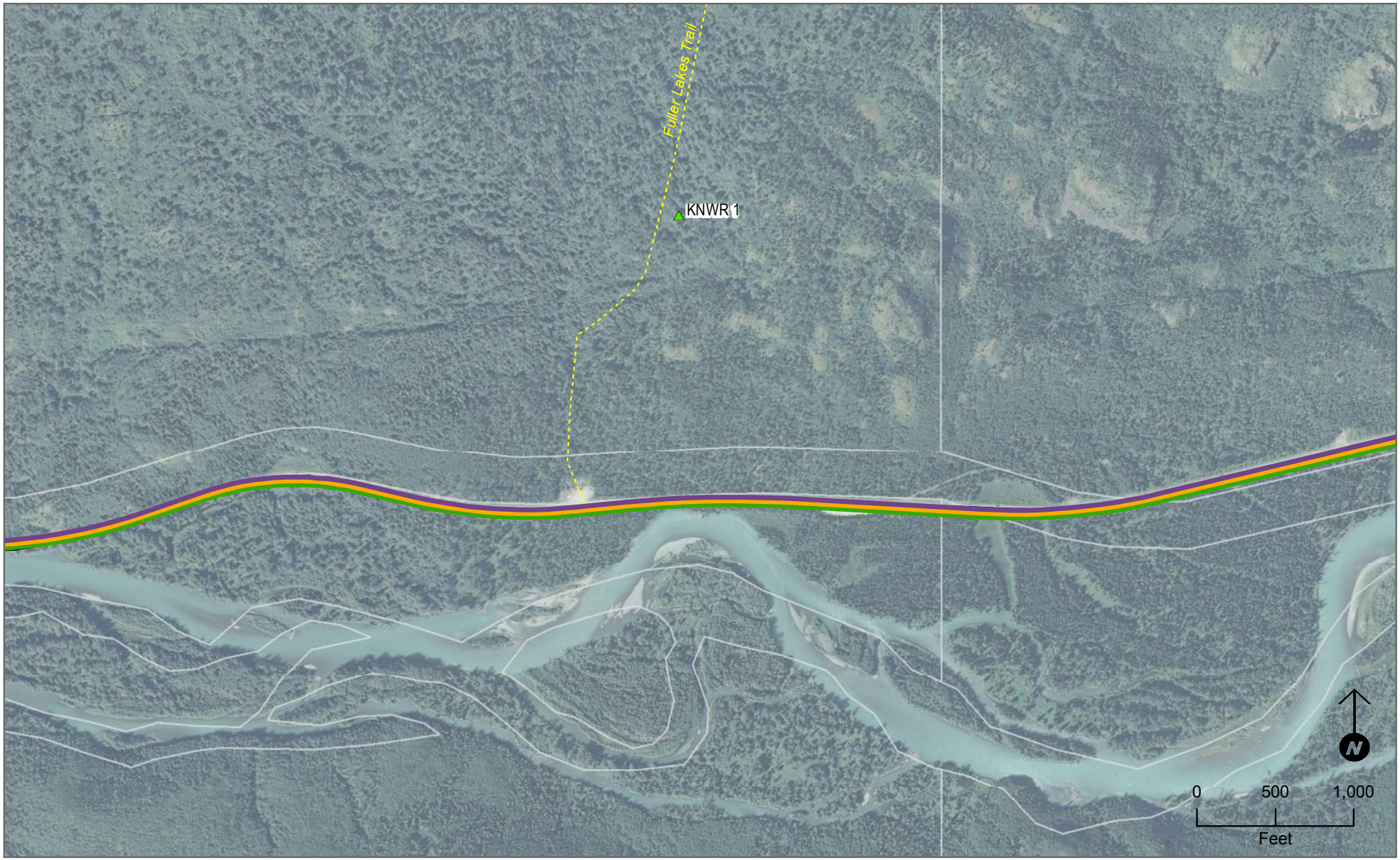
Project Alternatives

- Cooper Creek
- G South
- Juneau Creek
- Juneau Creek Variant

- Noise Sensitive Receptor (2016)
- Existing Highway
- Parcel Boundary

Noise Sensitive Receptors

Figure 11



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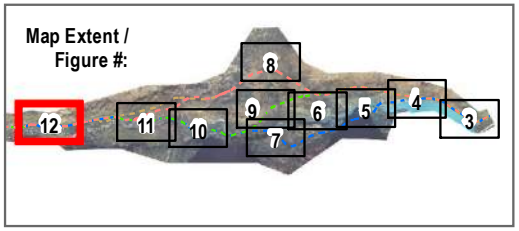

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Project Alternatives

- Cooper Creek
- G South
- Juneau Creek
- Juneau Creek Variant

- Noise Sensitive Receptor (2016)
- Existing Highway
- Parcel Boundary

Noise Sensitive Receptors

Figure 12

Attachment A

Feasibility and Reasonableness Worksheets

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Feasibility and Reasonableness Worksheet

Cooper Creek Alternative

There were 186 noise-sensitive receptors modeled for the Sterling Highway Milepost 45–60 Project alternatives. Predicted noise levels for the existing highway, No Build Alternative (2043), and Cooper Creek Alternative (2043), and their differences are reported in Table 8 of the *Highway Traffic Noise Assessment*. The following table summarizes the seven noise-sensitive receptors that were identified to have a noise impact per DOT&PF *Noise Policy*. A noise impact occurs when the predicted noise level is either approaching within 1 dBA or exceeding the Noise Abatement Criteria, or experiences an increase of 15 dBA between the design year and the existing noise level.

Table A: Cooper Creek Alternative, Impacted Noise Receptors

Receptor ID	Location/Description (see Figures 3-12)	Activity Category Type	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	Future (2043) No-Build Noise Level (dBA)	Future (2043) Build Noise Level (dBA	Is the proposed noise abatement measure acoustically feasible? (Yes/No)	Is the proposed noise abatement measure engineering feasible? (Yes/No)	Is the proposed noise abatement measure considered reasonable? (Yes/No)
87	Residence, NE of Cooper Landing bridge, S of existing & proposed highway	B	67	56	58	67	No	N/A	N/A
105	Residence, N of Kenai Lake, S of existing & proposed highway	B	67	64	66	68	No	N/A	N/A
106	Residence, N of Kenai Lake, S of existing & proposed highway	B	67	69	70	72	No	No	N/A
107	Commercial Property, N of Kenai Lake, S of existing &proposed highway	E	72	66	68	71	No	N/A	N/A
119	Residence, N of Kenai Lake, S of existing & proposed highway	B	67	65	66	66	No	No	N/A

Receptor ID	Location/Description (see Figures 3-12)	Activity Category Type	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	Future (2043) No-Build Noise Level (dBA)	Future (2043) Build Noise Level (dBA	Is the proposed noise abatement measure acoustically feasible? (Yes/No)	Is the proposed noise abatement measure engineering feasible? (Yes/No)	Is the proposed noise abatement measure considered reasonable? (Yes/No)
KRR A 2	Kenai River Recreation Area, N side of Kenai River, N of Russian River Campground	C	67	67	68	68	N/A	N/A	No
ST 1	Stetson Creek Trail, S of Cooper Creek Campground	C	66	40[a]	40[a]	57	N/A	N/A	No

[a] Sites located 1,000 feet or more from the existing alignment in areas where traffic noise is not a significant contributor to existing ambient noise levels were modeled as 40 dBA. See Section 4.1 of the *Noise Assessment* for more detail.

Impacted receptors identified under the Cooper Creek Alternative include receptors 87, 105, 106, 107, 119, KRRA 2, and ST 1. Noise mitigation was considered but not evaluated in detail for the following reasons:

- **Receptor 87** is identified as a property that would be acquired under the Cooper Creek Alternative, given its location relative to the alignment footprint. Mitigation is not recommended for this receptor.

- **Receptor 105** is located on a residential parcel (the same parcel occupied by Receptor 106) but represents a non-residential structure. Receptor 105 is a garage and therefore is not considered to be a land use sensitive to highway noise according to the DOT&PF *Noise Policy*. Mitigation is not recommended for this receptor.

- **Receptors 106 and 119** are residences with direct driveway access onto the Sterling Highway. The ability of noise walls to achieve acceptable noise reduction is reduced by the need for gaps in the walls for driveway access. Furthermore, it is assumed that building a frontage road to provide alternative access to these two receptors in addition to constructing noise mitigation (barriers) would be too expensive per DOT&PF policy. Consequently, noise barriers were determined not to be feasible and are not recommended for these receptors. In addition, noise walls for single, isolated residences are not typically able to meet cost-effectiveness (reasonableness) criteria because of the length of wall needed to meet the DOT&PF noise reduction goal.

- **Receptor 107** is a commercial property; DOT&PF does not provide mitigation for commercial properties or undeveloped lands. Mitigation is not recommended for this receptor.

- **KRRA 2** is a representative location in the Kenai River Recreation Area and used to evaluate noise levels at locations near the highway in this section of the recreation area. It does not represent a specific, discrete use area (such as a campground or picnic site) and the quantity of time for which individuals would reside in any given area is known to be of short duration—only a few minutes for any given area at most. Noise abatement cannot typically be provided for large recreational areas in a cost-effective, or reasonable, manner and therefore mitigation is not recommended for this receptor.

- **ST 1** is a representative location on the Stetson Trail and used to evaluate noise levels at locations near to the highway in this section of the project area. It does not represent a specific, discrete use area (such as a campground or picnic site) and the quantity of time for which individuals would reside in any given area is known to be of short duration—only a few minutes for any given area at most. A trail is also characterized as a transient use, where it is unlikely that people would congregate for extended periods of time at any one location on the trail. Furthermore, noise barriers may impede access to the trail if installed near it or along the roadway rights of way. Finally, noise abatement cannot typically be provided for large recreational areas in a cost-effective manner and therefore mitigation is not recommended for this receptor.

In summary, noise abatement measures are not recommended for the impacted receptors.

Brian Elliott
Regional Environmental Manager

7/11/16
Date

Kelly Pettersen
DOT&PF Project Manager

7/11/16
Date

I have determined that the use of quiet pavement to mitigate noise impacts on a State-funded project is within the cost constraints of the legislative appropriation for the proposed project.

Preconstruction Engineer[1]

Date

[1] The Preconstruction Engineer's signature is only required if quiet pavements are recommended on State-funded projects. The Preconstruction Engineer must determine whether the incorporation of quiet pavements into the State-funded project is within the cost constraints of the legislative appropriation.

Feasibility and Reasonableness Worksheet

G South Alternative

There were 186 noise-sensitive receptors modeled for the Sterling Highway Milepost 45–60 Project alternatives. Predicted noise levels for the existing highway, No Build Alternative (2043), and G South Alternative (2043), and their differences are reported in Table 9 of the *Highway Traffic Noise Assessment*. The following table summarizes the two noise-sensitive receptors that were identified to have a noise impact per DOT&PF *Noise Policy*. A noise impact occurs when the predicted noise level is either approaching within 1 dBA or exceeding the Noise Abatement Criteria, or an increase of 15 dBA between the design year and the existing noise level.

Table A: G South Alternative, Impacted Noise Receptors

Receptor ID	Location/Description (see Figures 3-12)	Activity Category Type	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	Future (2043) No-Build Noise Level (dBA)	Future (2043) Build Noise Level (dBA	Is the proposed noise abatement measure acoustically feasible? (Yes/No)	Is the proposed noise abatement measure engineering feasible? (Yes/No)	Is the proposed noise abatement measure considered reasonable? (Yes/No)
KRRA 2	Recreation Area	C	66	67	68	68	N/A	N/A	No
BCT 2	Trail	C	66	40[a]	40[a]	61	N/A	N/A	No

[a] Sites located 1,000 feet or more from the existing alignment in areas where traffic noise is not a significant contributor to existing ambient noise levels were modeled as 40 dBA. See Section 4.1 of the *Noise Assessment* for more detail.

Impacted receptors identified under the G South Alternative include receptors KRRA 2 and BCT 2. Noise mitigation was considered but not proposed for the following reasons:

- **Receptor KRRA 2** is a representative location in the Kenai River Recreation Area used to evaluate noise levels at locations near the highway in this section of the recreation area. It does not represent a specific, discrete use area, such as a campground or picnic site, which can be shielded by noise barriers. The quantity of time for which individuals would reside in any given area is known to be of short duration—only a few minutes for any given area at most. Noise abatement barriers cannot typically provide adequate noise reductions over large

recreational areas representing dispersed use in a cost-effective manner, and therefore, mitigation is not recommended for this receptor.

- **Receptor BCT 2** is a representative location on the Bean Creek Trail used to evaluate noise levels at locations near the highway in this section of the project area. It does not represent a specific, discrete use area, such as a campground or picnic site, which can be shielded by noise barriers. A trail is also characterized as a transient use, where it is unlikely that people would congregate for extended periods of time at any one location on the trail. Noise abatement barriers cannot typically provide adequate noise reduction over large recreational areas representing dispersed use in a cost-effective manner. Therefore, mitigation is not recommended for this receptor.

In summary, noise abatement measures are not recommended for the impacted receptors.

Brian Elliott — 7/11/16

Regional Environmental Manager — Date

Kelly Pedersen — 7/11/16

DOT&PF Project Manager — Date

I have determined that the use of quiet pavement to mitigate noise impacts on a State-funded project is within the cost constraints of the legislative appropriation for the proposed project.

Preconstruction Engineer[1] — Date

[1] The Preconstruction Engineer's signature is required only if quiet pavements are recommended on State-funded projects. The Preconstruction Engineer must determine whether the incorporation of quiet pavements into the State-funded project is within the cost constraints of the legislative appropriation.

Feasibility and Reasonableness Worksheet

Juneau Creek Alternative

There were 186 noise-sensitive receptors modeled for the Sterling Highway Milepost 45–60 Project alternatives. Predicted noise levels for the existing highway, No Build Alternative (2043), and Juneau Creek Alternative (2043), and their differences are reported in Table 10 of the Highway Traffic Noise Assessment. The following table identifies the one noise-sensitive receptor forecasted to have a noise impact per DOT&PF *Noise Policy*. A noise impact occurs when the predicted noise level is either approaching within 1 dBA or exceeding the Noise Abatement Criteria, or experiences an increase of 15 dBA between the design year and the existing noise level.

Table A: Juneau Creek Alternative, Impacted Noise Receptors

Receptor ID	Location/Description (see Figures 3-12)	Activity Category Type	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	Future (2043) No-Build Noise Level (dBA)	Future (2043) Build Noise Level (dBA	Is the proposed noise abatement measure acoustically feasible? (Yes/No)	Is the proposed noise abatement measure engineering feasible? (Yes/No)	Is the proposed noise abatement measure considered reasonable? (Yes/No)
BCT 1	Trail	C	66	40[a]	40[a]	61	N/A	N/A	No

[a] Sites located 1,000 feet or more from the existing alignment in areas where traffic noise is not a significant contributor to existing ambient noise levels were modeled as 40 dBA. See Section 4.1 of the *Noise Assessment* for more detail.

Noise mitigation for the BCT 1 receptor under the Juneau Creek Alternative was considered but not proposed in detail for the following reason:

- **Receptor BCT 1** is a representative location on the Bean Creek Trail used to evaluate noise levels at locations near the highway in this section of the project area. It does not represent a specific, discrete use area, such as a campground or picnic site, which can be shielded by noise barriers. A trail is also characterized as a transient use, where it is unlikely that people would congregate for extended periods of time at any one location on the trail. Furthermore, noise barriers may impede access to the trail if installed near it or along the roadway rights of way. Finally, noise abatement cannot typically be provided for large recreational areas in a cost-effective manner and therefore mitigation is not recommended for this receptor.

In summary, noise abatement measures are not recommended for the impacted receptor.

Brian Elliott — 7/11/16

Regional Environmental Manager — Date

Kelly Peterson — 7/11/16

DOT&PF Project Manager — Date

I have determined that the use of quiet pavement to mitigate noise impacts on a State-funded project is within the cost constraints of the legislative appropriation for the proposed project.

Preconstruction Engineer [1] — Date

[1] The Preconstruction Engineer's signature is only required if quiet pavements are recommended on State-funded projects. The Preconstruction Engineer must determine whether the incorporation of quiet pavements into the State-funded project is within the cost constraints of the legislative appropriation.

Feasibility and Reasonableness Worksheet

Juneau Creek Variant Alternative

There were 186 noise-sensitive receptors modeled for the Sterling Highway Milepost 45–60 Project alternatives. Predicted noise levels for the existing highway, No Build Alternative (2043), and Juneau Creek Variant Alternative (2043), and their differences are reported in Table 11 of the *Highway Traffic Noise Assessment*. The following table identifies the one noise-sensitive receptor that was forecasted to have a noise impact per DOT&PF *Noise Policy*. A noise impact occurs when the predicted noise level is either approaching within 1 dBA or exceeding the Noise Abatement Criteria, or experiences an increase of 15 dBA between the design year and the existing noise level.

Table A: Juneau Creek Variant Alternative, Impacted Noise Receptors

Receptor ID	Location/Description (see Figures 3-12)	Activity Category Type	Noise Abatement Criteria (dBA)	2012 Existing Noise Level (dBA)	Future (2043) No-Build Noise Level (dBA)	Future (2043) Build Noise Level (dBA	Is the proposed noise abatement measure acoustically feasible? (Yes/No)	Is the proposed noise abatement measure engineering feasible? (Yes/No)	Is the proposed noise abatement measure considered reasonable? (Yes/No)
BCT 1	Trail	C	66	40[a]	40[a]	61	N/A	N/A	No

[a] Sites located 1,000 feet or more from the existing alignment in areas where traffic noise is not a significant contributor to existing ambient noise levels were modeled as 40 dBA. See Section 4.1 of the *Noise Assessment* for more detail.

Noise mitigation for the BCT 1 receptor under the Juneau Creek Variant Alternative was considered but not proposed in detail for the following reason:

- **Receptor BCT 1** is a representative location on the Bean Creek Trail used to evaluate noise levels at locations near the highway in this section of the project area. It does not represent a specific, discrete use area, such as a campground or picnic site, which can be shielded by noise barriers. A trail is also characterized as a transient use, where it is unlikely that people would congregate for extended periods of time at any one location on the trail. Furthermore, noise barriers may impede access to the trail if installed near it or along the roadway rights of way. Finally, noise abatement cannot typically be provided for large recreational areas in a cost-effective manner and therefore mitigation is not recommended for this receptor.

In summary, noise abatement measures are not recommended for the impacted receptors.

Bri Elliott
Regional Environmental Manager

7/11/16
Date

Kelly Pietersen
DOT&PF Project Manager

7/11/16
Date

I have determined that the use of quiet pavement to mitigate noise impacts on a State-funded project is within the cost constraints of the legislative appropriation for the proposed project.

Preconstruction Engineer[1]

Date

[1] The Preconstruction Engineer's signature is required only if quiet pavements are recommended on State-funded projects. The Preconstruction Engineer must determine whether the incorporation of quiet pavements into the State-funded project is within the cost constraints of the legislative appropriation.

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