

Kenai Peninsula Borough

Planning Department – Land Management Division

MEMORANDUM

TO: Peter Ribbens, Assembly President
Members, KPB Assembly

THRU: Peter A. Micciche, Mayor
Robert Ruffner, Planning Director

FROM: Aaron Hughes, Land Management Officer

DATE: June 10, 2025

RE: Blueberry Hill Road Access Feasibility Study Necessary to Satisfy the Purchase Contingency as Authorized by Ordinance 2024-19-24 for Assembly Review.

Attached for your review is the recently completed Road Access Feasibility Study necessary to satisfy contingencies required for the purchase of 80 acres by the KPB in Seward.

RESPEC Corporation was awarded the feasibility study contract through a Request for Quote process by providing the lowest cost quote of \$32,700. Upon the completion of an initial desk review and one site visit, the contractor has provided the attached report identifying 3 feasible access alignment options meeting the scope of work requirements.

Option 3 (“South Loop Alignment”), was determined by RESPEC to be the most feasible route investigated. This access option satisfies current KPB Road Standards for a Category 3 Road, while requiring less cut material when compared to Option 1. As stated in the report, a substantial amount of cut material will be required along the proposed road alignment to meet category 3 road specifications. Similar cut amounts can be found in other areas of the state with similar topography and geotechnical features. This alignment option leverages both Mental Health Trust properties and the KPB property currently under contract for purchase. It provides the best access to adjacent usable properties along the alignment, and terminates in an area providing additional access to over 2,300 acres of adjacent KPB owned and managed lands.

Staff finds the attached study satisfies all scope of work, and contingency requirements necessary to proceed forward with closing. While additional engineering and geotechnical investigation will be required to appropriately identify an exact road alignment, and costs for construction, the completed feasibility study serves its intended purpose of determining road access feasibility utilizing the 80 acre parcel currently under contract.



EXTERNAL MEMORANDUM

To: Aaron Hughes
Land Management Officer
Kenai Peninsula Borough
144 N. Binkley St.
Soldotna, AK 99669

cc: Project Central File I0813.25004

From: Patrick Cotter, AICP
Principal Planner
RESPEC
1028 Aurora Drive
Fairbanks, AK 99709

Date: June 10, 2025

Subject: Blueberry Hill Residential Public Road Access Feasibility

EXECUTIVE SUMMARY

Constructing a road to Kenai Peninsula Borough (KPB) Category 3 standards is feasible but challenging due to the topography of the area. After analyzing three options, we have identified at least one route that balances access with constructability and meets the KPB's goals of access to KPB-owned land. Stormwater management will be critical during the design phase. The geology of the area is conducive to road construction.

BACKGROUND

The objective of this analysis is to assess whether a road can be constructed according to Kenai Peninsula Borough (KPB) standards from the corner of Melanie Lane and Knotwood Street to KPB-owned land to the east. This project will determine the approximate centerline for one feasible alignment that meets established Road Service Area (RSA) Standards for a category 3 road.

The KPB owns significant acreage near Seward, Alaska that currently lacks road access. However, an adjacent privately owned parcel (Subject) could potentially provide access if a road were constructed across it. This report evaluates the feasibility of building a road through the Subject parcel to KPB standards, with the primary access point from the corner of Melanie Lane and Knotwood Street. Refer to Figure 2.

Access in this area is challenging due to the topography, which features a series of steep ridges running north-south. There is also a steep pioneer road on the Subject parcel that supports a ziplining operation. Refer to Figure 3.

To identify potential road corridors, KPB LiDAR data was imported into Autodesk InRoads, and potential routes were drawn on the map. Each route's profile was reviewed to determine if they could meet RSA standards. Initial evaluations indicated that the steep terrain posed difficulties in meeting the 10% grade requirements without significant cuts. The 200' turn radius requirement also presented challenges for the pioneer road alignment. However, we identified routes and options to meet RSA standards that are feasible.

KPB Category 3 Road Standards include:

- / Maximum profile grade – 10% (grades shall not exceed at any point). Max of 4% for within 100' of an intersection.
- / Minimum horizontal curve radius – 200' (minimum of 100: tangent between curves)
- / Minimum width of 24 feet

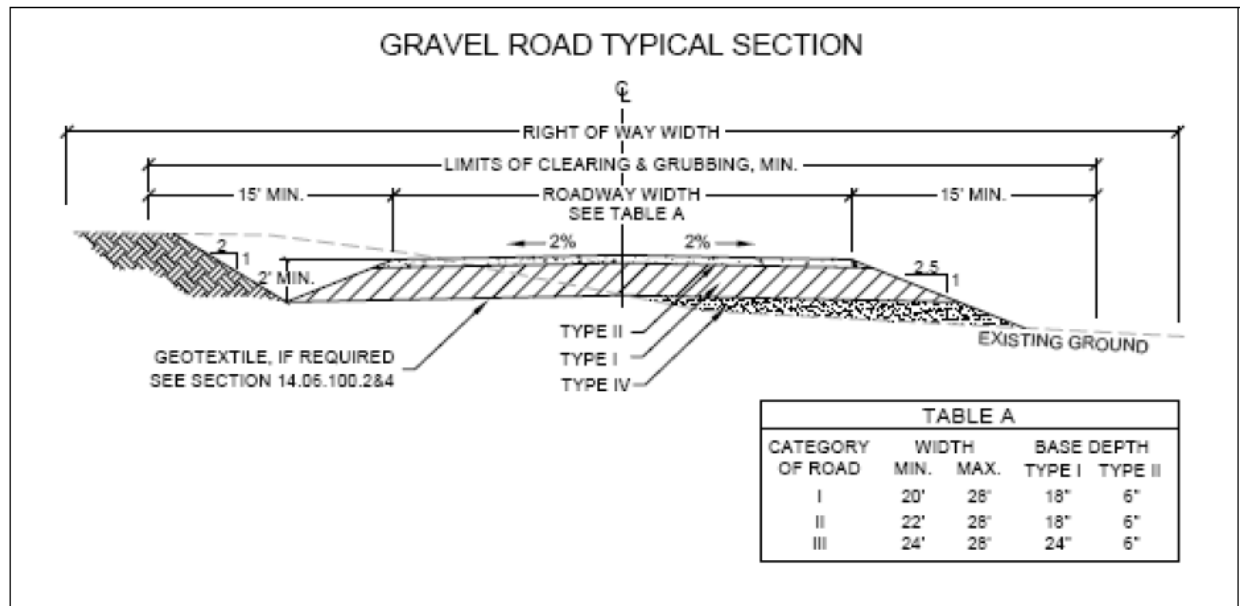


Figure 1 - KPB Category III road typical section

A site visit was conducted on April 30, 2025, to evaluate the sub-surface conditions and review the ground conditions. RESPEC, KPB, and Alaska Mental Health Trust staff participated in the site visit.

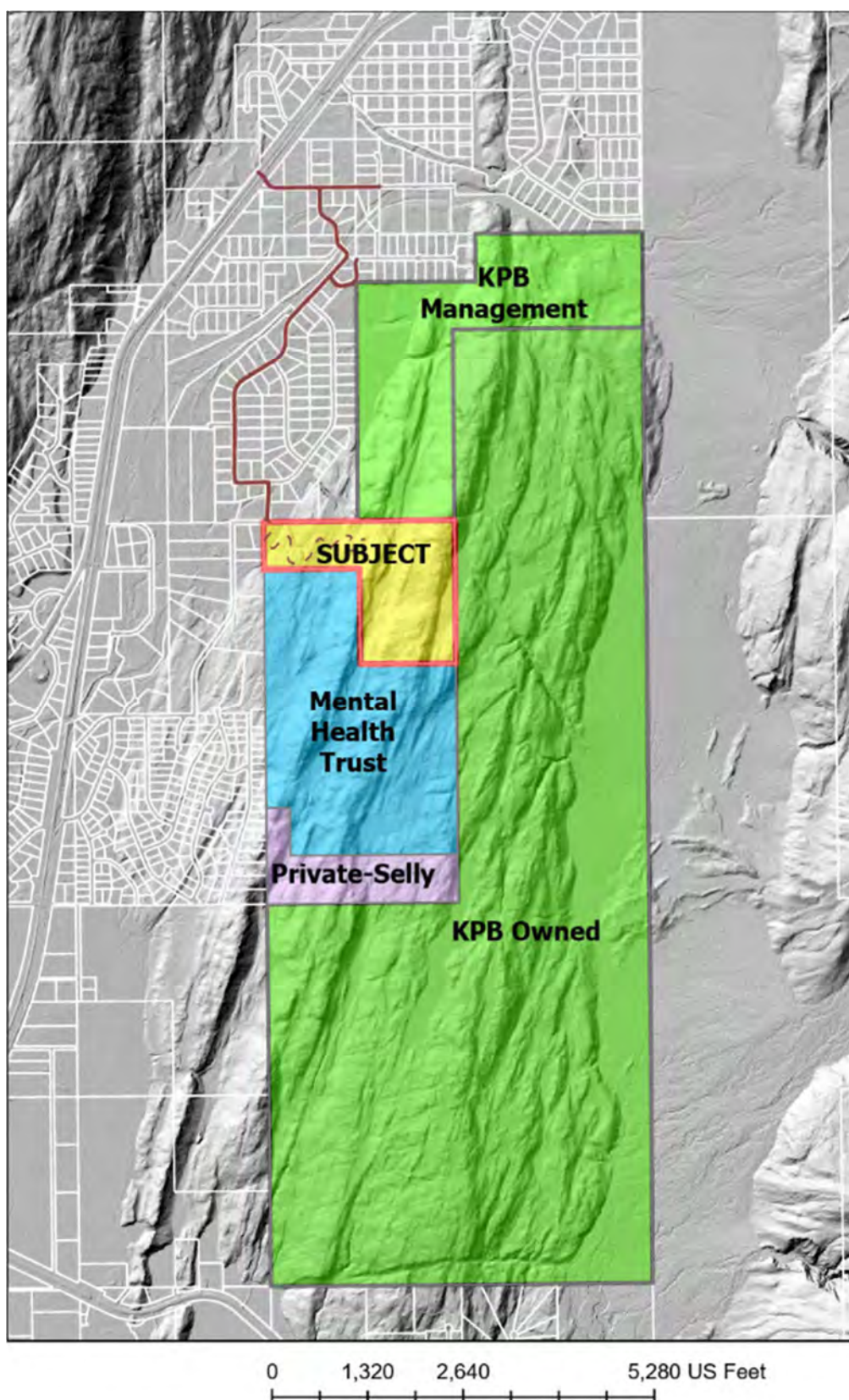


Figure 2 - The KPB owns significant land near Seward, AK

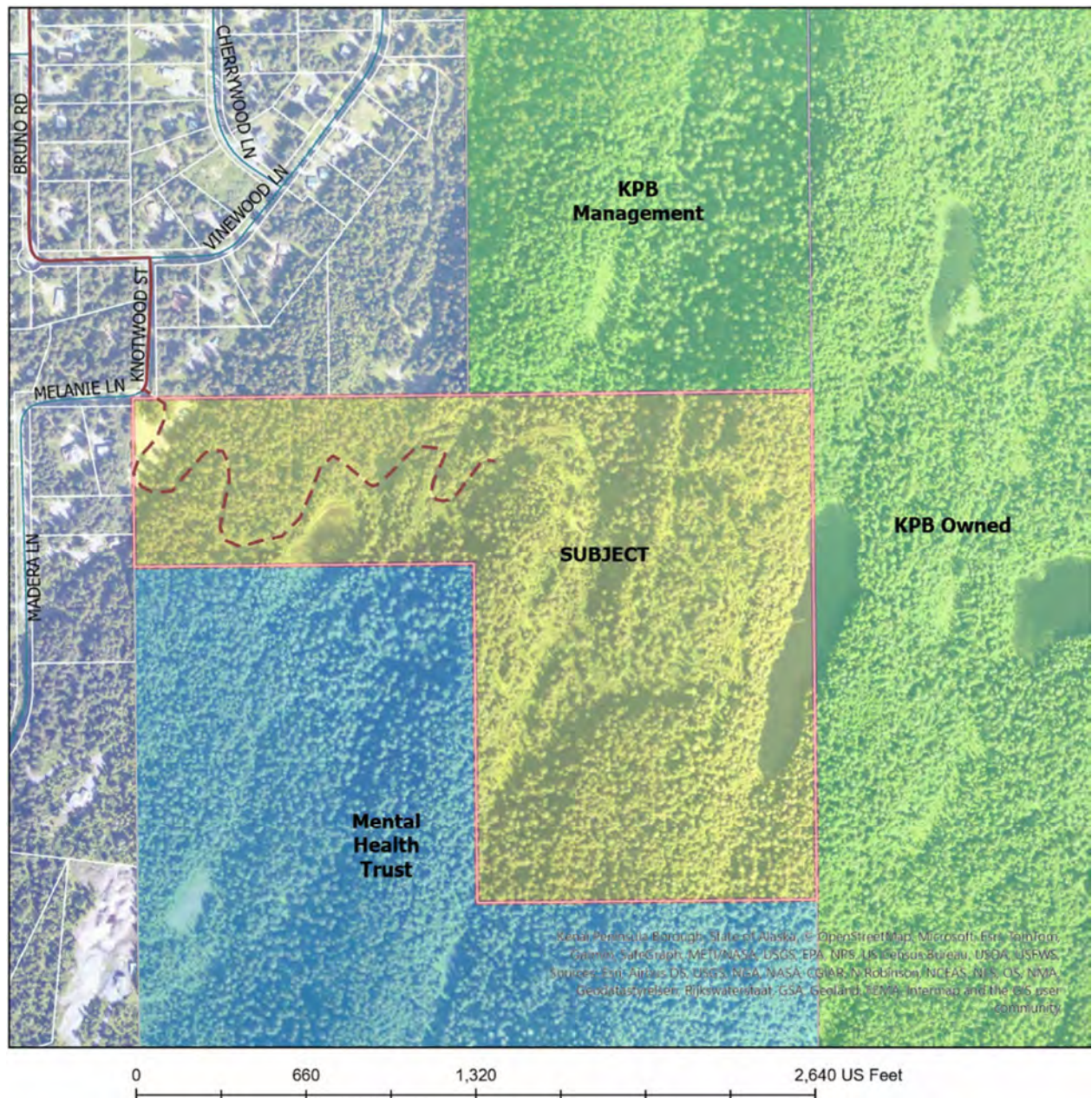


Figure 3 - The Subject parcel has road access at Knotwood Street and Melanie Lane

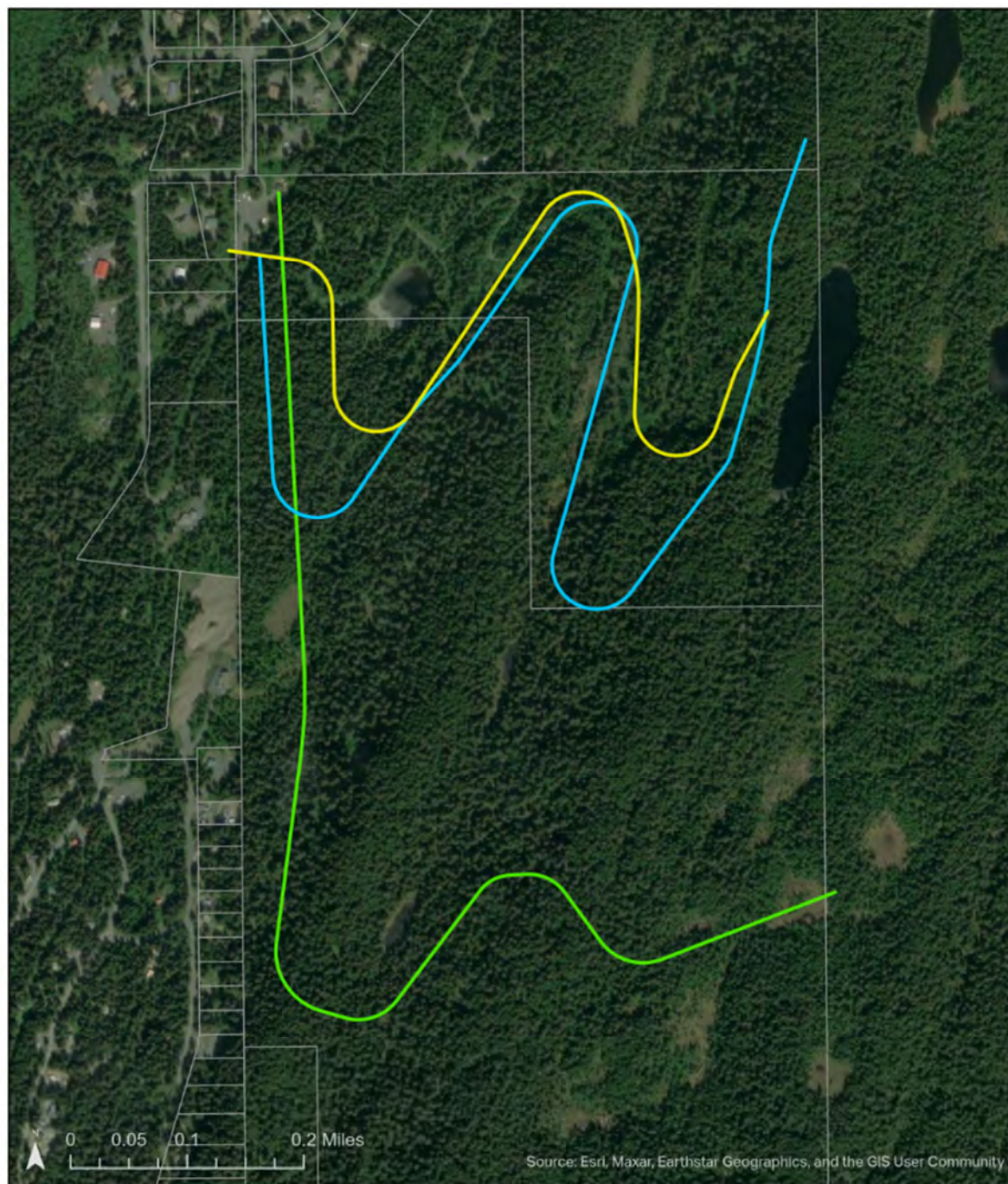
ALTERNATIVE ROUTES

The project site features steep ridges interspersed with narrow benches. An existing pioneer road traverses the site, originating from a parcel at the intersection of Knotwood Street and Melanie Lane. However, the current road alignment and profile do not comply with the KP Road Design Standards design criteria.

All proposed road options involve significant deep cuts, with limited locations for discharging drainage ditches into the existing ground. The steep grades and scarcity of discharge points necessitate careful attention to the development of the drainage design. A particular focus should be placed on velocity mitigation and drainage structure sizing for the chosen road alignment as the design progresses.

Three potential routes were identified and evaluated. The proposed alignments and profiles follow the Category III Road standards per the KBP Roadway Standards.

1. Pioneer road alignment
2. Pioneer road deviation
3. South loop alignment



LEGEND

- | | |
|--|--|
|  Parcels |  Option 2: Pioneer Road Deviation |
|  Option 1: Pioneer Road Alignment |  Option 3: South Loop Alignment |

Figure 4 - Access road options

OPTION 1 - PIONEER ROAD ALIGNMENT

Option 1 seeks to follow the existing pioneer road alignment as closely as possible. The current road features curves with a 50' radius and grades exceeding 20%. This alignment consists of minimum radius switchbacks that sidehill along steep climbs, aiming to place horizontal curves on benches.

The profile maintains a maximum grade of 10% from start to finish. While some sections involve fill, the majority are in cut, including cuts exceeding 150' in vertical height and most locations involving at least 30' cuts. Due to the deep cuts and steep ground slopes, properties along the road would be inaccessible. Additionally, spur roads cannot be constructed off this alignment to access benches because the KPB design standards require a maximum grade of 4% within 100' of intersections. Flattening the profile for 100' to construct an intersection would lead to greater cuts.

To adhere to the maximum grade of 10%, most of the road will be situated in deep cuts on both sides. These deep cuts restrict outlet locations for drainage ditches along the road. Special attention must be given to management during the design phase to ensure proper discharge concentration at limited locations where cut slopes can be daylighted to the downslope side of the road.

This option is the shortest of all three and therefore has the least estimated fill quantity. The cut quantity exceeds the fill quantity by approximately 310,000 cubic yards based on rough modeling.

OPTION 2 - PIONEER ROAD DEVIATION

Option 2 employs longer switchbacks to create an extended alignment, facilitating a more gradual ascent of the steep slopes with an increased sidehill. This elongated alignment primarily maintains a maximum grade of 10%, interspersed with sections of shallower slopes, less than 5%. Curves within this alignment adhere to a minimum radius of 200 feet. The alignment for Option 2 concludes at the highest point of the ridge, potentially providing access along the ridgeline for further parcel development.

This option involves significant earthworks, including deep cuts that exceed 100 feet vertically at the ridge's summit, with most of the road being in cuts ranging from 30 to 50 feet. Similar to Option 1, access to adjacent property will be restricted due to these substantial cut slopes. A spur road could be constructed at a lower bench to potentially facilitate access to the Mental Health Trust land to the south; however, the alignment of such spur roads was not evaluated in this feasibility study.

Overall, this option is predominantly characterized by extensive cutting, estimated at approximately 700,000 cubic yards based on preliminary modeling.

OPTION 3 - SOUTH LOOP ALIGNMENT

This option follows the southern sidehill route, staying closer to the western boundary of the KPB and Mental Health Trust land. The profile ascends at a consistent grade of 9-10%, with a brief section at 6%. After crossing the summit, the terrain becomes more level, allowing the road to continue at approximately a 3% grade.

This option ends in an area that offers access to a relatively flat and central part of the KPB parcel, which could serve as a suitable starting point for developing an access network for the surrounding land.

The option involves sections where cuts exceed 150 feet when passing through ridge lines. Most cut depths range from 30 to 75 feet, with few places where ditch lines would surface. Managing drainage



will be necessary, similar to other options, due to the steep grades of roadside ditches and limited locations for diverting water to nearby ground. The deep cut slopes will restrict accessibility to adjacent properties, as seen with other options.

This is the longest alignment but will generate less cut material than Option 2.

GEOTECHNICAL EVALUATION AND RECOMMENDATIONS

During the initial site visit, our geotechnical engineer evaluated the local geotechnical conditions based on what could be observed visually at the surface and what could be felt using a hand probe to measure the depth of surficial organics. Throughout the site visit, bedrock was either observed as exposed outcrops or identified with a hand probe near the surface. All the hand probes pushed through the surficial forest floor organics met refusal at less than 2.5 feet below the ground surface. Typically, the refusal was interpreted as bedrock. Occasionally, the refusal felt like weathered bedrock or gravel/sand; given the location and topography, we assume it was weathered bedrock.

The USGS Geologic Map of Alaska (USGS, 2025) identifies the rock in the area as the Chugach flysch formation which is from the Upper Cretaceous period and generally consists of sedimentary rocks such as lithic graywacke and siltstone (see Figure 5).



Figure 5. USGS Geologic Map of Alaska (USGS, 2025)

Based on the observed bedrock outcrops at the project site, and a recently constructed rock cut in the Chugach flysch formation along the Seward Highway approximately 13 miles north of project site (see Figure 5), we assume that the bedrock at the project site can reasonably be cut to a slope angle of 4V:1H. Rock catchment areas below steep rock cuts should be designed following the Rockfall Catchment Area Design Guide (Pierson et al, 2001). Material generated from rock cuts will be suitable for embankment fills. Pending rock quality testing, the material may also be suitable for aggregate materials such as surface course, base course, and hot mix asphalt; required rock quality tests to make this determination include Degradation (ATM 313), L.A. Abrasion (ASTM C131/AASHTO T96), and Sodium Sulfate Soundness (ASTM C88/AASHTO T104). Rock catchment areas below rock cuts should be designed following the Rockfall Catchment Area Design Guide (Pierson et al, 2001).



Assuming proper placement and compaction techniques, fill slopes constructed of the excavated rock materials may be designed for slopes no steeper than 2H:1V. Slopes as steep as 1H:1V may be permissible with a more detailed geotechnical evaluation and the potential use or reinforcing geotextiles such as geogrids or high-tensile strength woven geotextiles. However, at the planning stage, 2H:1V should be considered the maximum.

RECOMMENDATION

Option 3 is the most feasible route and provides the best balance of accessibility and constructability. It allows access from the route in several spots and terminates in a central location that can accommodate future expansion.

REFERENCES

Pierson, Lawrence A., Gullixson, C. Fred, Chassie, Ronald G., 2001. "Rockfall Catchment Area Design Guide Final Report SPR-3(032)." Oregon Department of Transportation and Federal Highway Administration, Salem, OR.

United State Geological Survey, (2025, June 5). "Geologic Map of Alaska."
https://alaska.usgs.gov/science/geology/state_map/interactive_map/AKgeologic_map.html