

Appendix B: Project Alternatives

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Project Alternatives Evaluated for the Katlian Bay Road

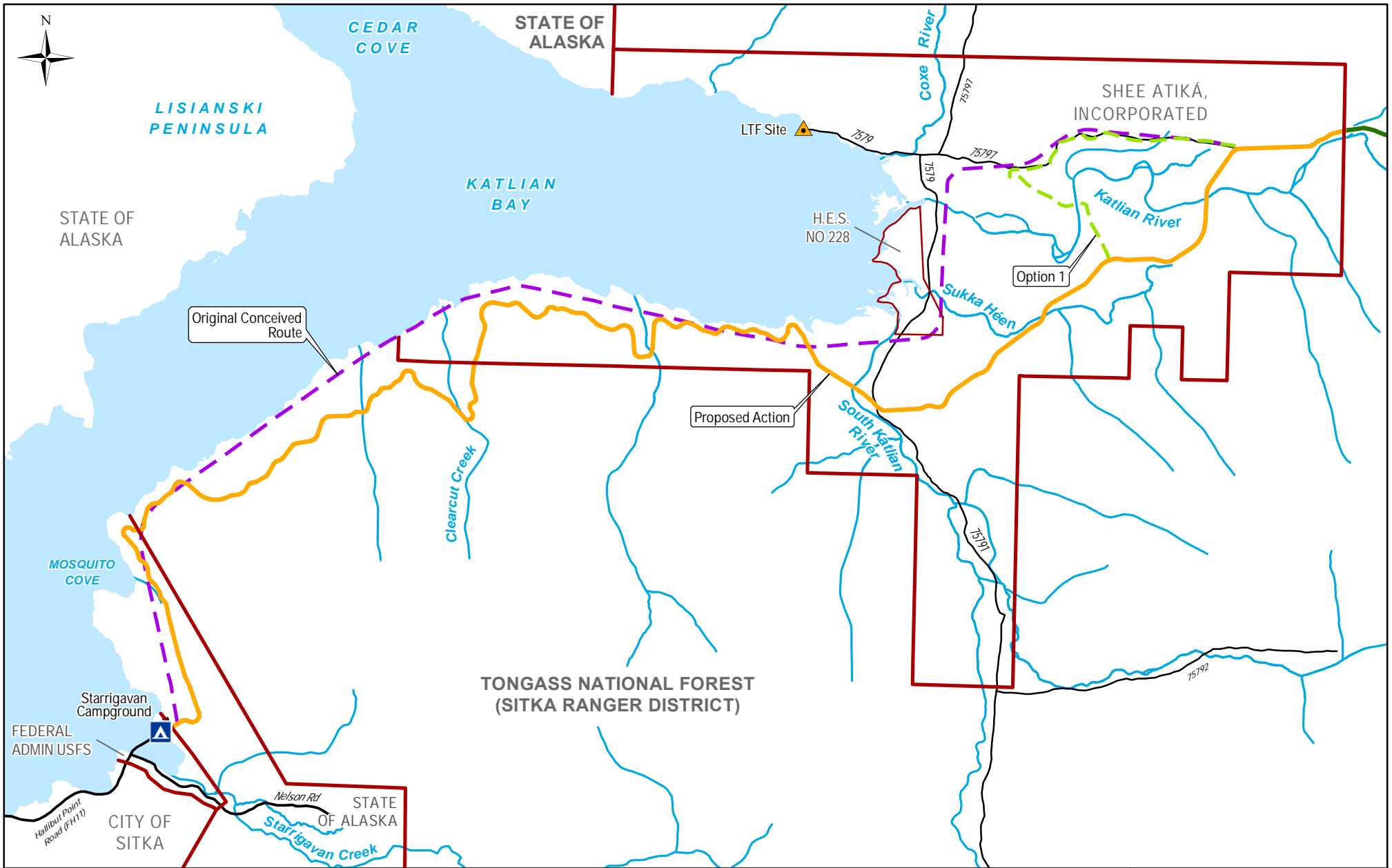
Up to four alternatives were originally considered for providing road access to a U.S. Forest Service (USFS) trail within the Katlian River watershed with a marine alternative later dropped from further consideration. The marine alternative was initially considered beginning at the western end of the previously designated National Forest System (NFS) Road No. 7579 near an existing abandoned log transfer facility (LTF). This marine alternative would consist of rehabilitation of NFS Road No. 7579 beginning at the LTF and traversing eastward to its junction with previously designated NFS Road No. 75797, a distance of about 2.5 miles. The marine alternative road would then be accessed from the abandoned LTF. Use of the LTF for access to the area would require private and/or commercial funding for a wharf upgrade and private or commercial boat service between Sitka and Katlian Bay. State funding for this type of access to the project area is not sufficient to provide public funds for boat/ferry service and wharf upgrade support needed for the LTF given the funds set aside for this project. Because access to the area could only be by a private boat, the marine alternative would not meet the project purpose, which is to provide public passenger vehicle access to USFS trails for recreational and subsistence opportunities on USFS managed land. As a result, the marine alternative was removed from further consideration.


The three remaining road alternatives include the original DOT&PF route that is close to Katlian Bay, crosses the Katlian River near the Katlian Bay estuary, and traverses north to meet with NFS Road No. 7579 (Figure B1). The route then traverses east to meet with NFS Road No. 75797 to terminate at the new proposed USFS trailhead. This route is referred to as the Original Route as designated by DOT&PF in its initial 2014 request for proposals package. A second alternative (Option 1) would move the road south and east of the Original Route to avoid steep cliffs and cross the Katlian River further inland and meet with NFS Road No. 75797 (Figure B1). A third route (Proposed Action) would traverse the south side of Katlian Bay similar to Option 1 but would cross the Katlian River further inland than Option 1 but would also be directed north to meet with NFS Road No. 75797 (Figure B1).

All three alternatives would traverse Alaska State-owned lands, USFS-managed lands, and Native Corporation (Shee Atiká) lands. Where lands are managed by the USFS, the USFS identified a specific right-of-way (ROW) easement where the new road would be allowed. All three alternatives are within this ROW. At the beginning of the project where the new road crosses Alaska State lands for approximately 1.2 miles, placement of the road was designed to avoid steep slopes and views of the road from existing campgrounds and recreational area. All three alternatives begin at the termination of Halibut Point Road.

On Native Corporation lands, three road alternatives were considered for crossing Katlian River: 1) Original Route as designated by DOT&PF; 2) Option 1, which has a crossing of the Katlian River through partial use of an abandoned unnamed road south of the river (although this road ends before the river is crossed) that is east of the Original Route; and 3) Proposed Action, which has a crossing of the Katlian River further east of the Original Route and Option 1 (Figure B1). The two options were initially selected using an office-based analysis to assess optimum bridge locations that would minimize total crossing length of the Katlian River.

Following the office-based analysis, field surveys were conducted by engineers and environmental scientists to identify benefits and constraints for the new road in its entirety. Following initial site assessments and surveys, the preferred location for the new road was based on the following two



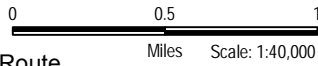


KATLIAN BAY ROAD CONSTRUCTION
FIGURE B1
 Alternatives Evaluated for Engineering and Environmental Constraints


- ▲ LTF Site
- Public Road
- National Forest System Road
- ~ Stream
- Ownership Boundary
- USFS OHV Trail

Route Alternatives

- Original Conceived Route
- Option 1
- Proposed Action



Reference:
 Alaska State Geo-Spatial Data Clearinghouse
www.asgdc.state.ak.us



criteria: 1) selecting a road location by minimizing environmental constraints within the USFS ROW easement; and 2) selecting a road location that was practicable and feasible for the Katlian River bridge crossing while also avoiding sensitive environmental areas where possible (Table 1). As a result of initial field surveys, the Proposed Action was identified as the preferred road alternative and most data collected during field surveys concentrated on the Proposed Action route. Thus, alternative comparison information shown in Table 1 for state-owned and USFS-managed lands is based on field confirmed conditions, whereas information collected for the Original Route and the Option 1 Katlian River crossing is office based.

Table 1: Preliminary Impact Summary for Katlian Bay Road Project

Criteria Evaluated	Original Conceived Route	Option 1	Proposed Route
Total Length (miles)	8	10	8.8
Total Area Impacted ¹ (acres)	79	101	137
Length of Katlian River Bridge (ft)	330	260	150
Presence of slopes > 67%	20.7	33.6	33.6
Presence of marine/estuary wetland habitat	Present	Present	None
Wetland acres impacted	17.7	23.9	5.2
No. of navigable streams crossed	1 (Katlian River)	1 (Katlian River)	1 (Katlian River)
Presence of eagle nests	6 nests are within 330 feet of ROW	2 nests are within 330 feet of the ROW	2 nests are within 330 feet of the ROW
Presence of threatened or endangered species	None	None	None
USFS land use designations	Crosses Semi-remote Recreation LUD	Crosses Semi-remote Recreation LUD	Crosses Semi-remote Recreation LUD
Presence of floodplains as defined by the FEMA	3 crossings of Zone-A floodplains	3 crossings of Zone-A floodplains	3 crossings of Zone-A floodplains
Presence of cultural and historic sites	None	None	None
Potential impacts to drinking water sources	None	None	None
Potential impacts to water quality	Temporary construction disturbances to be minimized by BMPs	Temporary construction disturbances to be minimized by BMPs	Temporary construction disturbances to be minimized by BMPs
Potential impacts to landowners	Crosses lands owned/managed by Alaska State, Shee Atiká, and USFS	Crosses lands owned/managed by Alaska State, Shee Atiká, and USFS	Crosses lands owned/managed by Alaska State, Shee Atiká, and USFS
Potential impacts to air quality, traffic, and noise	Temporary construction disturbances likely	Temporary construction disturbances likely	Temporary construction disturbances likely

Notes: ¹ For this initial alternative comparison, ROW width is estimated using a generic approach with slopes of 0%-33% having a 70-foot ROW width, slopes of 35%-55% having an 80 foot-width and slopes of 55% or greater having a 95-foot ROW width. Final ROW widths would be determined following more detailed engineering design and would likely decrease, although intervisible turnouts, lookouts, and parking areas may increase some areas of the ROW.

The Original Route, Option 1, and Proposed Action were evaluated for construction and operation feasibility during the preliminary engineering phase using direct field location by experienced roadway engineers. Direct 2014 field location included flagging of the road centerline for the roadway alignment and consideration of cuts and fills, proposed drainage structures, and major roadway structures.

Original Route

As described above, the Original Route follows an alignment very close to the Katlian Bay shoreline through the first 4 miles of the planned route and then progresses through the lower portion of the Katlian valley, crossing many major streams in the tidal influence and impacting the higher value wetlands that occur in the Katlian River estuary and delta. Roadway construction through the first 4 miles would include a combination of extreme cuts through rock cliff sections and large fills placed on stream alluvial fans. Roadway construction through the Katlian valley would consist primarily of an embankment approximately 6 feet to 8 feet in height across the valley floor, constructed predominantly from borrow excavation. Borrow sources though this area of the valley are somewhat scarce, so extensive end hauling of borrow material would be necessary from approved borrow sources.

The crossing of the Katlian River is the most significant crossing along the Original Route requiring an approximate 330-foot-long multi-span bridge. Foundations for the bridge would be set in what is estimated to be fairly deep gravels and glacial deposits. Historic aerial imagery of this crossing location show that the Katlian River channel migrates significantly across the valley floor. Therefore, bridge foundations at this location would need to be constructed to resist this migration. This structure would also be within the tidally influenced region of the river and all approaches to the structure would need to be designed and armored to withstand storm surges from the estuary. This armoring is typically in the form of riprap, which would also result in additional encroachment on estuary vegetation and its riparian function near the river. The mid-span piers for this crossing would be subject to significant debris impact and scour of the stream bed support. The previous structure in this location (which was associated with NFS Road No. 7579) was lost due to debris and scour and its location was observed to be a problematic by individuals with previous knowledge of this area. A recent aerial survey showed that there is a significant amount of woody debris in the stream at the crossing location, which would subject the Katlian River bridge to significant scour and possible collapse.

Two other major unnamed stream crossings along the Original Route in the Katlian valley appear to have experienced similar channel migrations over time, thus crossing foundations would need to be similarly constructed to resist this channel migration.

Beyond the Katlian River crossing, the Original Route follows NFS Road No. 7579 to its junction of NFS Road No. 75797 east to the planned end of project. Six debris flows were noted along this existing USFS road that have either crossed the existing road or are continuing to encroach upon the existing roadway. These flows are alluvial debris fans. Crossing these areas would require systematic maintenance that could be costly and a hazard to the safety of travelers on this route.

Option 1

Option 1 follows a route further up slope and south of the Original Route through the first 4 miles to the head of the Katlian valley. This location takes advantage of natural terrain breaks and micro-topography found upslope of the Original Route to reduce significant rock cuts. Stream crossings in the first 4 miles of Option 1 are located above alluvial fans and were established at stable and confined stream crossing locations. From the mouth of the Katlian valley, Option 1 is located further up the valley than the Original Route, taking advantage of upland terrain located east of the Original Route. The upland road location would result in a more balanced (i.e., cut and fill) road prism and would include significantly less wetland impacts. Abundant borrow sources are available along Option 1 for roadway construction. Much of this Option 1 alignment was located with the assistance of a wetland specialist to identify and avoid wetlands. Option 1 crosses the Katlian River just to the west of a major rock formation found midway up the Katlian valley. This rock formation creates a natural hard-point along the river channel that is beneficial in resisting channel migration. Foundations of this stream crossing would include a foundation set in fairly shallow rock and in a deeper soil type with a currently unknown depth to bedrock. The crossing structure at this crossing location would require an approximately 260-foot-long multi-span bridge. Option 1 would require a mid-span pier for the Katlian River crossing due to the length of the structure. Similar to the Original Route structures, this mid-span pier would be subject to debris and scour.

Crossings of other major unnamed streams are located further up the drainages away from tidal influence and would include both shallow bedrock and deeper foundations.

Proposed Action

The Proposed Action was originally evaluated as Option 2. The Proposed Action follows the Option 1 route from the beginning of the project until the major rock formation that is mid-way through the Katlian valley at which point the Proposed Action progresses further up the valley to a different Katlian River crossing. The Proposed Action crossing is the superior of the three Katlian River alternative crossings, as the Proposed Action crossing includes bridge foundations placed on shallow rock formations that would not require a mid-span pier. This crossing would require an estimated 150-foot-long single-span bridge. Similar to Option 1, Proposed Action takes advantage of upland terrain to place the roadway out of wetlands and valley bottom relic stream channels. Proposed Action also includes abundant borrow sources along the planned alignment.

Proposed Action is the preferred route because:

- The first 4 miles are located through the most favorable terrain below the 1,000 feet elevation limit.
- The first 4 miles of Proposed Action include the most favorable crossings of the major streams present along this roadway segment.
- The Proposed Action route through the Katlian valley is located in lower uplands present in the valley (compared to adjacent higher uplands in the adjacent areas) and out of the wetlands along the valley floor.
- The Katlian River crossing is the most favorable of the three crossing options in terms of span length, crossing foundations, and longterm crossing stability.

- The Katlian River crossing is located well out of the Katlian River delta, which is composed of high value wetlands in the tidal influence.
- Crossing of other major streams in the Katlian valley are located well out of tidal influence and primarily at locations with favorable foundation conditions.
- Borrow sources are abundant along the Proposed Action route.