VALDEZ GLACIER STREAM EAST ACCESS STUDY

ACCESS STUDY ASLS 79-116

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EXECUTIVE SUMMARY

ASLS 79-116, located within the Valdez city limits, has been the focus of several studies over the last few decades. In recent years, the City of Valdez has identified a strong need for economic diversity and additional housing. Undeveloped property within the northern portion of ASLS 79-116 was sold by the City of Valdez to a private developer with the intention of rezoning the property from heavy industrial to allow for a recreational resort and potential for additional residential housing. Currently, the only year-round access to the property is by use of a recreational trail that can accommodate motorized vehicles such as 4-wheelers or snow machines. The Valdez Glacier Stream offers seasonal permitted access via section line. Other seasonal or water access may be viable, but those alternatives were not evaluated.

To progress the development of the privately owned property and to facilitate any potential use or development of unused land, the City of Valdez commissioned an access study with the intention to provide different access alternatives. Throughout the study, the process was heavily focused on public engagement, environmental considerations, and overall costs of each of the alternatives. Historical documents that were not previously known and additional fish habitat information arose from the heavy public interest. Several formal and informal meetings were conducted with both City of Valdez staff, the property owners to the north, and community members.

We developed a series of alternative access routes that were subsequently evaluated and refined through a series of analyses and public input opportunities. Ultimately, four access routes were identified as viable and moved forward for additional public comment and evaluation.

- Bridge over Valdez Glacier Stream
- Roadway on top of the Valdez Glacier Stream levee
- Roadway parallel to the Valdez Glacier Stream levee
- Roadway from the Robe River Subdivision

Each of the alternatives was evaluated against criteria that considered costs, natural and social impacts, maintenance, and permitting. The bridge option was the most direct route and the most expensive due to the requirement to build a bridge over a glacially fed waterway. Although the other alternatives were slightly less expensive, the length of each of them brought about additional risks such as impacts to wetlands, presence of contaminated sites, further streambed erosion, and conflict with recreational trails. The most favored alternative with all interested parties was that of Alternative 1 – the Bridge as it carried the least overall risks to both the environment and public sentiment while providing the access needed to develop the property.

TABLE OF CONTENTS

1.0 PROJECT SUMMARY 2

1.1 Need 2

1.2 History 2

2.0 PUBLIC OUTREACH 3

2.1 Focus Group 4

2.2 Planning and zoning commission 5

2.3 Final Community Meeting 6

2.4 Scoring Matrix 6

3.0 ACCESS ALTERNATIVES ANALYSIS 7

3.1 Design standards 7

3.1.1 Assumptions 7

Suitable material is available 7

Material haul distance is minimal 7

Wetland impacts are minimal and can be mitigated 7

Large stream crossings 7

General drainage needs 7

3.1.2 Environmental Summary 8

4.0 ACCESS ALTERNATIVE DESCRIPTIONS 9

4.1 Alternative 1 - North Bridge Access 10

4.2 Alternative 2A – Levee 12

4.3 Alternative 2B – Richardson Highway 16

4.4 Alternative 3 - Robe River Subdivision 19

4.5 Additive Alternate – Four Corners North 22

5.0 CONCLUSION 24

6.0 ANNOTATED BIBLIOGRAPHY 25

APPENDIX A COMMUNITY MEETING INVITATION A1

APPENDIX B COMMUNITY MEETING PRESENTATION B1

APPENDIX C SCORING MATRIX C1

1.0 PROJECT SUMMARY

The study area is northeast of the Richardson Highway between Valdez Glacier Lake, Valdez Glacier Stream, and mountains to the east. The study area is comprised of Tracts A, B, F, and G of ASLS 79-116 of mostly undeveloped land with recreational trails, streams, and wetlands. All of the tracts are within the city limits of Valdez and are currently zoned heavy industrial. The northern portion of the study area in Tracts A and B, roughly 227 acres, were subdivided and sold to developers with the interest in creating a commercial/recreational area inclusive of residential housing development. Future land use maps in *Plan Valdez*, the 2021 Valdez Comprehensive Plan, show the area with a future residential/recreational place type with a destination resort overlay. The place type and overlay require future study and a master planning process prior to the rezone of this area. The purpose of this study is to provide alternatives for access to the privately owned properties to the north and identify considerations for each access alternative.

1.1 NEED

Rydor Enterprises LLC, Camicia Creek Land Holdings LLC, and Brandon Reese currently own the 227 acres in the northern portion of ASLS 79-116. At the time of the land sales agreements to Rydor Enterprises LLC in 2006, 2007, and 2019, the purchased parcels had platted access but no legal physical access. Per Valdez Planning Code 16.16.050.A, all lots shall have frontage on a publicly dedicated street or navigable water. Access to the subject properties is currently provided by a recreational trail that is only accessible by recreational vehicle or seasonally via the Valdez Glacier Stream. As a result, the City of Valdez has initiated this access study to determine feasible access alternatives to the property.

There are also 2,000+ acres of land in the area that are currently inaccessible other than via recreational trails. The area currently being zoned for heavy industrial with the potential for rezoning provides additional investment opportunities. If the land were accessible, the area may provide an opportunity for additional residential development to alleviate the City's housing shortage.

1.2 HISTORY

Over the last few decades, several reports and studies have been conducted on ASLS 79-116 and the Valdez Glacier Stream. In 1980, an Environmental Impact Statement (EIS) was released by the U.S. Environmental Protection Agency (EPA). At the time, Alaska Petroleum Company (ALPETCO) had interest in building an oil refining and petrochemical facility in the area and needed a New Source National Pollution Discharge Elimination (NPDES) permit. The EIS evaluated whether the permit should be issued and whether it should be issued with conditions. ALPETCO had constructed a temporary bridge across the Valdez Glacier Stream (that has since washed out) and constructed a portion of an access road from the south that locals use today for access to the recreational trails.

Several other studies have been conducted that may affect future development in the area to include but are not limited to the Alaska Department of Fish and Game's Fisheries Rehabilitation, Enhancement, and Development (FRED) Reports Assessing the Water Quality of Robe Lake 1981-1982, and U.S. Army Corps of Engineers (USACE) Baseline Erosion Assessment. Given the interest in the development of the

area and the completion of several studies, especially environment-related, any development that occurs in the area requires considerable attention to ensuring that not only the neighborhoods to the south are not adversely affected but also that the development is resilient.

2.0 PUBLIC OUTREACH

The project began in March 2021. The first community meeting was in person on June 16th at Robe River Fire Station #3. The community meeting was advertised through local radio station announcements, e-news mailers, and through the city's Facebook account. The intention of the meeting was to have an open concept discussion, but the primary take-away of the meeting was that there was a contentious history between the residents of the southern neighborhoods, the northern property owners, and the City of Valdez. As a result, more effort was placed into building public consensus and involvement.

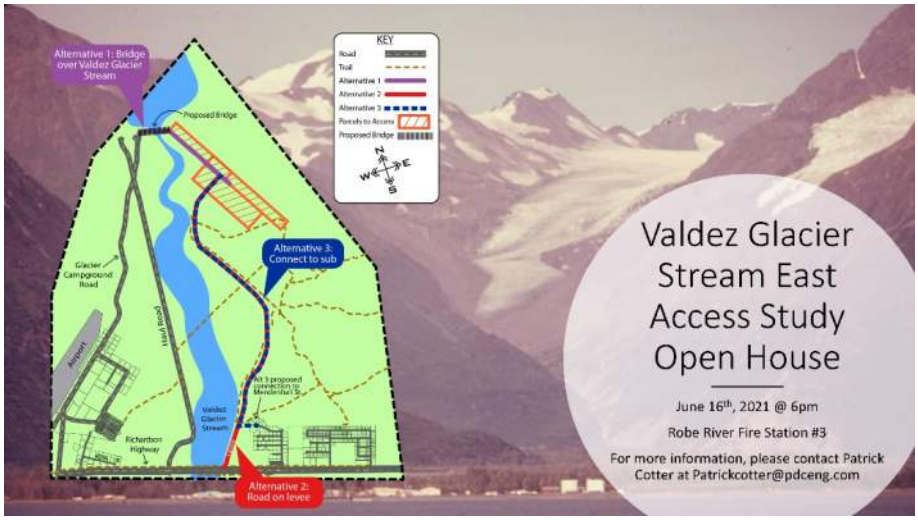


Figure 1 - Open House Invitation, July 16, 2021

A mailing list was created from the sign-in sheet at the first community meeting and was used regularly to inform residents and interested parties on project updates. The mailing list proved useful in gathering background information as there were residents that had additional historical knowledge of the area. Residents were provided project contact information and were encouraged to send additional questions and information. With the amount of public participation, it was decided that a project website would be beneficial.

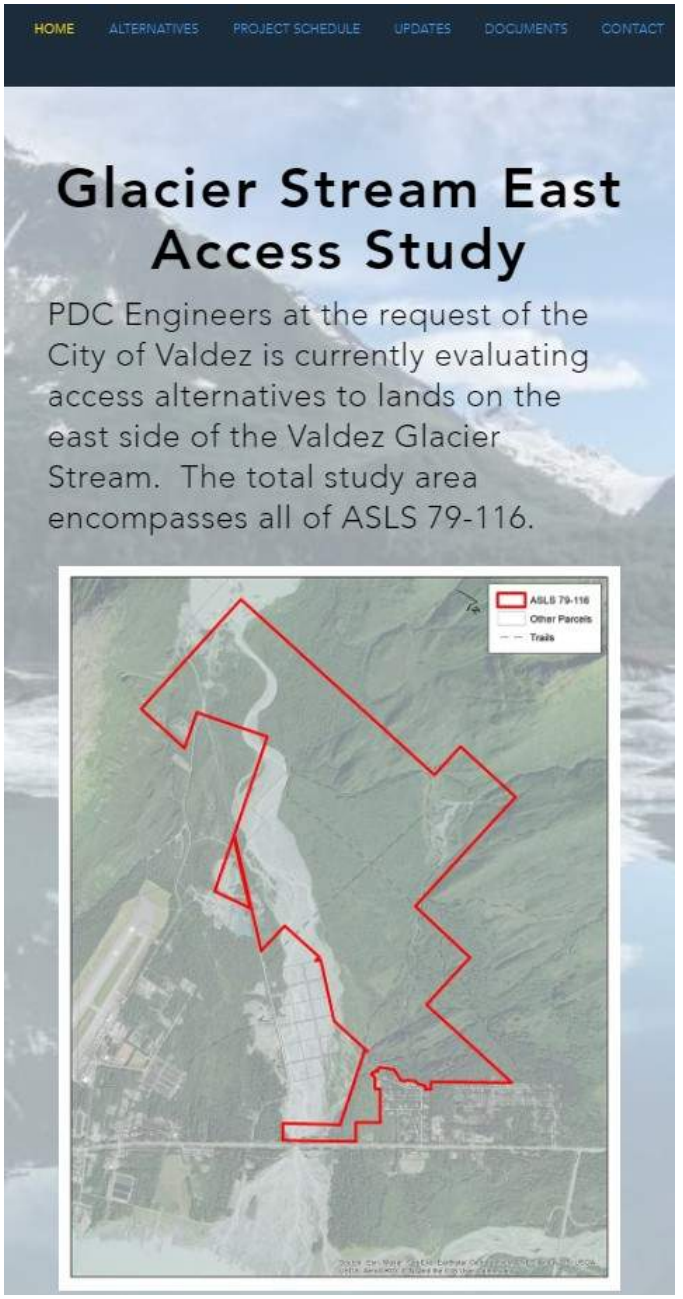


Figure 2 - Screen Shot of Front Page for Website

The project website *<valdezglacierstreamaccess.com>* became active in August 2021. It provided users with a brief description of the project, the alternatives, the project schedule, any recent updates and meeting notes, a link to all the documents that were reviewed to create the alternatives, and contact information.

Initially, there were three alternatives: the bridge to the north, the levee to the south, and another that avoided using the levee but extended from a cul-de-sac. The alternatives were later revised to include the bridge to the north and three southern options with an extension phase and removed the cul-de-sac option. The changes were presented on the website.

The project schedule remained relatively constant throughout the project except for the addition of a public meeting and a project extension into early 2022 to allow for a thorough public comment period.

Every meeting after June was updated to the website. This included meetings that were held with the focus group, which was developed from the mailings list, regarding the scoring matrix and the community meetings.

2.1 FOCUS GROUP

The focus group of 9 people was comprised of the City of Valdez staff, PDC Engineers' staff, property owners, and community members. The focus group members were selected as they showed great interest in the project from the start. They were influential throughout the process and provided important local insight.

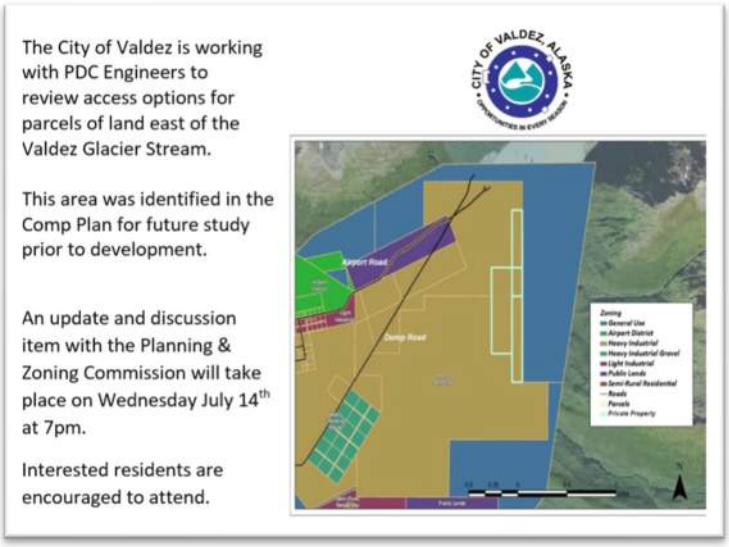
The first focus group meeting was held virtually on August 30th. A project scoring matrix was developed, and the meeting purpose was to determine how each of the scoring criteria would be weighted for each alternative. There were several criteria to consider that ranged from public sentiment to construction and included environmental factors. This meeting was useful in determining which criteria should be weighted more according to the level of impact. The focus group concluded that because each of the alternatives had different potential impacts for each of the criteria, each criterion was weighted the same to allow for balanced evaluations. Additionally, some criteria were added to the matrix because of the focus group's involvement, such as additional erosion concerns and the potential of creating additional environmental risks.

In October, there was an additional focus group meeting to include the same members and provide an opportunity for the focus group members to score the alternatives and provide comments. The focus group meeting was an informal discussion where the members were provided the discussion materials before the meeting. Although there were some technical issues with the electronic invitation, open communication was maintained, and focus group members were able to provide their feedback several weeks after the meeting was held.

2.2 PLANNING AND ZONING COMMISSION

The first formal Planning and Zoning Commission meeting was help July 14th, 2021. A brief presentation was provided to the commission that included information gathered from the community meeting held in June and additional project information and details. The meeting itself was more informational with the opportunity for question and comment at the time. Several residents who were present during the June community meeting attended. One attendee made a comment that their previous concerns were addressed. Not all of the residents spoke at the meeting.

Figure 3 - July 17th Planning and Zoning Commission Invitation



A second formal Planning and Zoning Commission meeting was also held in late October. The presentation material included a summary of the project, the outcome of public outreach efforts, including the focus group meetings, and provided the commission with the scoring matrix so the committee members could give their feedback on each of the alternatives. At this point in the outreach process, there was little push back regarding the project from either the commission or the community members and there was a noticeable increase in general support.

2.3 FINAL COMMUNITY MEETING

A final community meeting was held November 10th, as a culmination of all the materials, information, and feedback for the project. A mailing list was provided by the City of Valdez and physical mailers were sent out approximately two weeks prior to the virtual meeting. The turnout was reasonable with approximately 30 people, many of which were previously uninvolved. A short presentation was displayed for the meeting which last lasted about 40 minutes. In the last 20 minutes of the meeting, guests could make comments and share their overall opinions of the project. Several participants shared their support of the project overall with several offering their specific support for the bridge alternative – Alternative 1 with two people stating on record they were opposed to both Alternative 2A and 2B.

Figure 4 - Front of November 10, 2021 community meeting invitation

2.4 SCORING MATRIX

As a supplement to increase community engagement, a scoring matrix was created for each of the alternatives (see Appendix C). Within the matrix, each of the alternatives was scored based on the following categories: environmental, public input, natural hazards, maintenance, and construction. Each of the categories was divided into several component criteria with the entire category scored as a whole. The focus group was tasked with providing comments for the weight of each of the categories and later provided scores. It was agreed that due to the difference of each of the alternatives that to score each alternative fairly, equal weight was applied to all categories. In addition to comments provided by the focus group, members of the planning and zoning commission and City of Valdez staff also provided scores. Participants were tasked with providing higher scores according to higher impacts and/or concerns and lower scores for little to no impact. Several community members and city staff provided a scoring matrix which resulted in general support for alternative 1 as the alternative with the least concern/impacts and alternative 2B as the second least impactful.

3.0 ACCESS ALTERNATIVES ANALYSIS

3.1 DESIGN STANDARDS

Each alternative is based on the same typical section (see Figure) to enable direct comparisons between alternatives. Basic standards include:

- 12-foot lanes
- 2-foot shoulders
- 2-foot-tall embankment prism
- Gravel surfacing
- 4" leveling course
- 6" type II-a base course
- 60' wide, cleared right-of-way

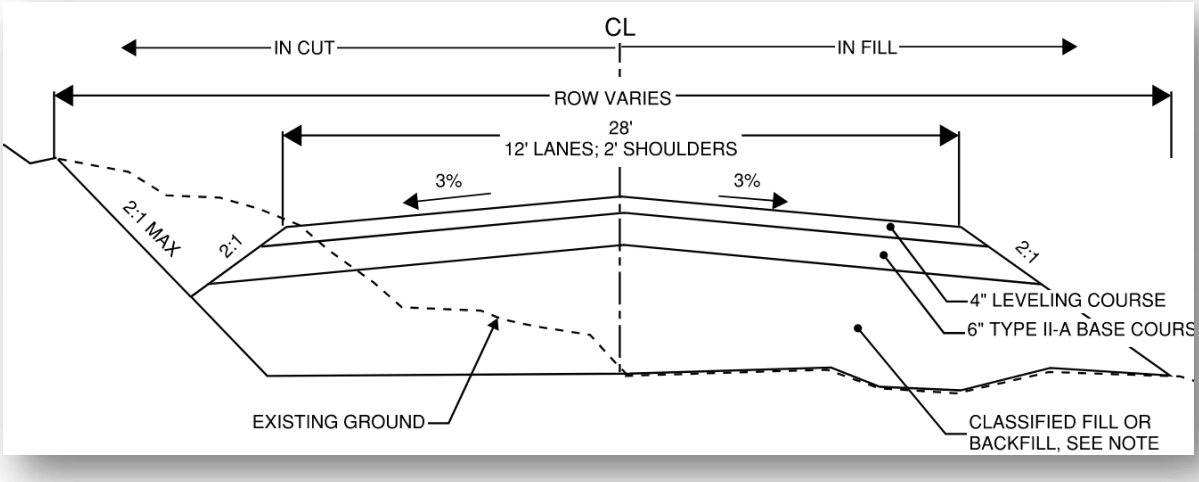


Figure 5 - Design Typical Section for the proposed access roads used for cost estimating

3.1.1 ASSUMPTIONS

Data gaps for this desktop exercise include detailed sub-surface mapping and analysis, wetland delineations, and hydrology studies of waterways or groundwater. We have reviewed numerous historic studies and investigations for portions of the study area, and we have made several assumptions to accommodate the data gaps.

SUITABLE MATERIAL IS AVAILABLE – assume that classified fill or backfill can be excavated from along the road alignment nearby to the project area. The exception is alternative 3 where the terrain is wetter and lower quality material.

MATERIAL HAUL DISTANCE IS MINIMAL – assume an average haul distance of 0.25 miles for materials excavated nearby except for alternative 3 where the terrain is wetter and lower quality material.

WETLAND IMPACTS ARE MINIMAL AND CAN BE MITIGATED – high-value wetlands are not likely present and if they are present can be avoided.

LARGE STREAM CROSSINGS – three large-diameter (72") pipes, 40' long with 2' of cover and 18" riprap armoring are sufficient for crossing Corbin Creek and Slater Creek. A full hydrology and hydraulics study would need to be completed to confirm proper sizing of culverts.

GENERAL DRAINAGE NEEDS – assume one 24" cross-culvert every 1,000 linear feet; average length of 40'

3.1.2 ENVIRONMENTAL SUMMARY

The ASLS 79-116 property and surrounding area include Valdez Glacier Stream and its tributaries, Slater Creek and Corbin Creek. Mapping from the National Wetland Inventory depicts small freshwater scrub-shrub wetlands near the Corbin Creek drainage as well as freshwater emergent and scrub-shrub wetlands on the east of the property. A wetland delineation has not been conducted and the extent of the wetland area is unknown.

Corbin Creek and Slater Creek are not in the ADF&G Anadromous waters catalog. Resident fish species may inhabit these streams. Old Corbin Creek, a tributary of Robe Lake located along the route of Corbin Creek before it was diked, is an anadromous fish stream. Robe Lake and connected spawning grounds have been identified as crucial to the Valdez sport fish economy. Old Corbin Creek is currently being treated to improve spawning habitat as part of the Robe Lake Salmon Habitat Restoration Project (COV, Alaska. [n.d.]).

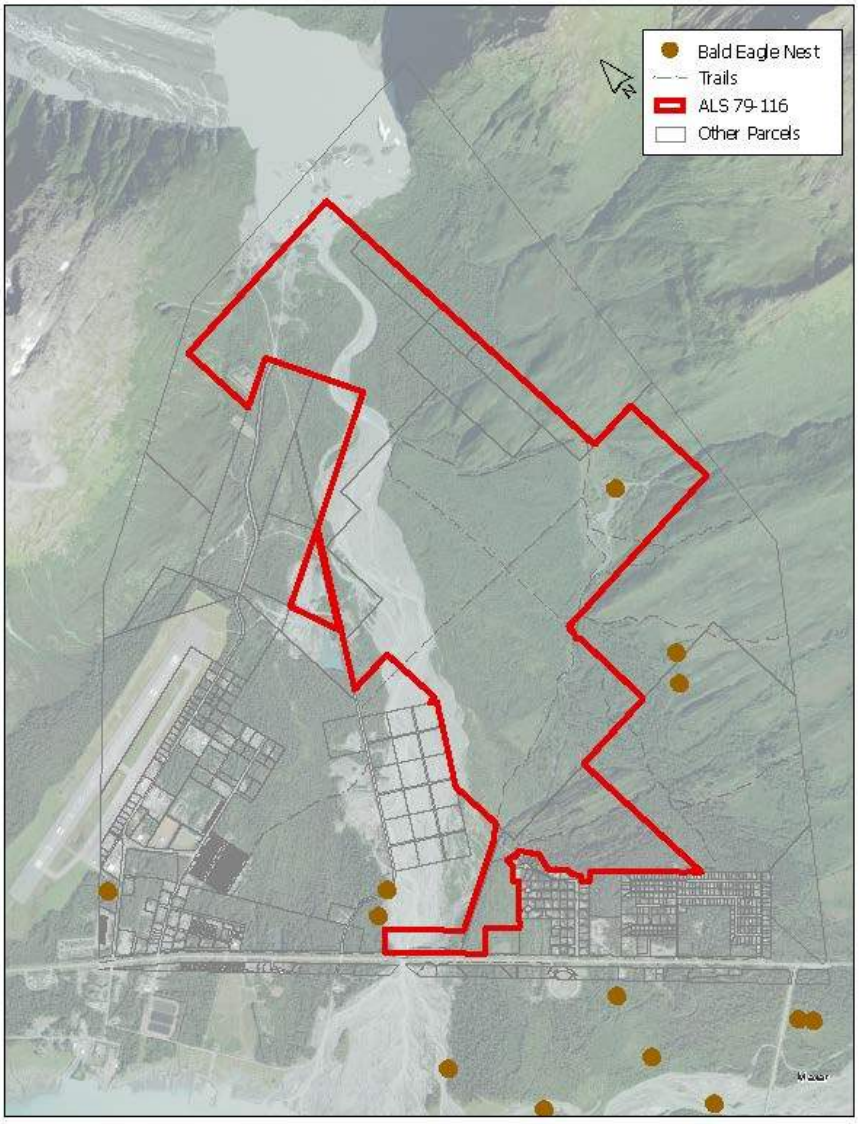


Figure 5 - Figure 6 – Study Area with Eagle Nests Indicated

The property includes flood zones of Valdez Glacier Stream (zone AE), Corbin Creek (zone A) and Slater Creek (zone A). Valdez Glacier Stream is braided, and channels can rapidly migrate location. Valdez Glacier Ice Dam Lake, upstream of Valdez Glacier Stream, is susceptible to glacial outbursts which subsequently lead to downstream flood events (USACE, 2021).

Other environmental considerations that will affect development approaches include the presence of Bald Eagle nests on the property, which are federally protected. There are three bald eagle nests along the east side of the property and two bald eagle nests at the southeast corner. Additionally, there is an old shooting range. Discarded ammunition may have resulted in lead contamination in the vicinity.

4.0 ACCESS ALTERNATIVE DESCRIPTIONS

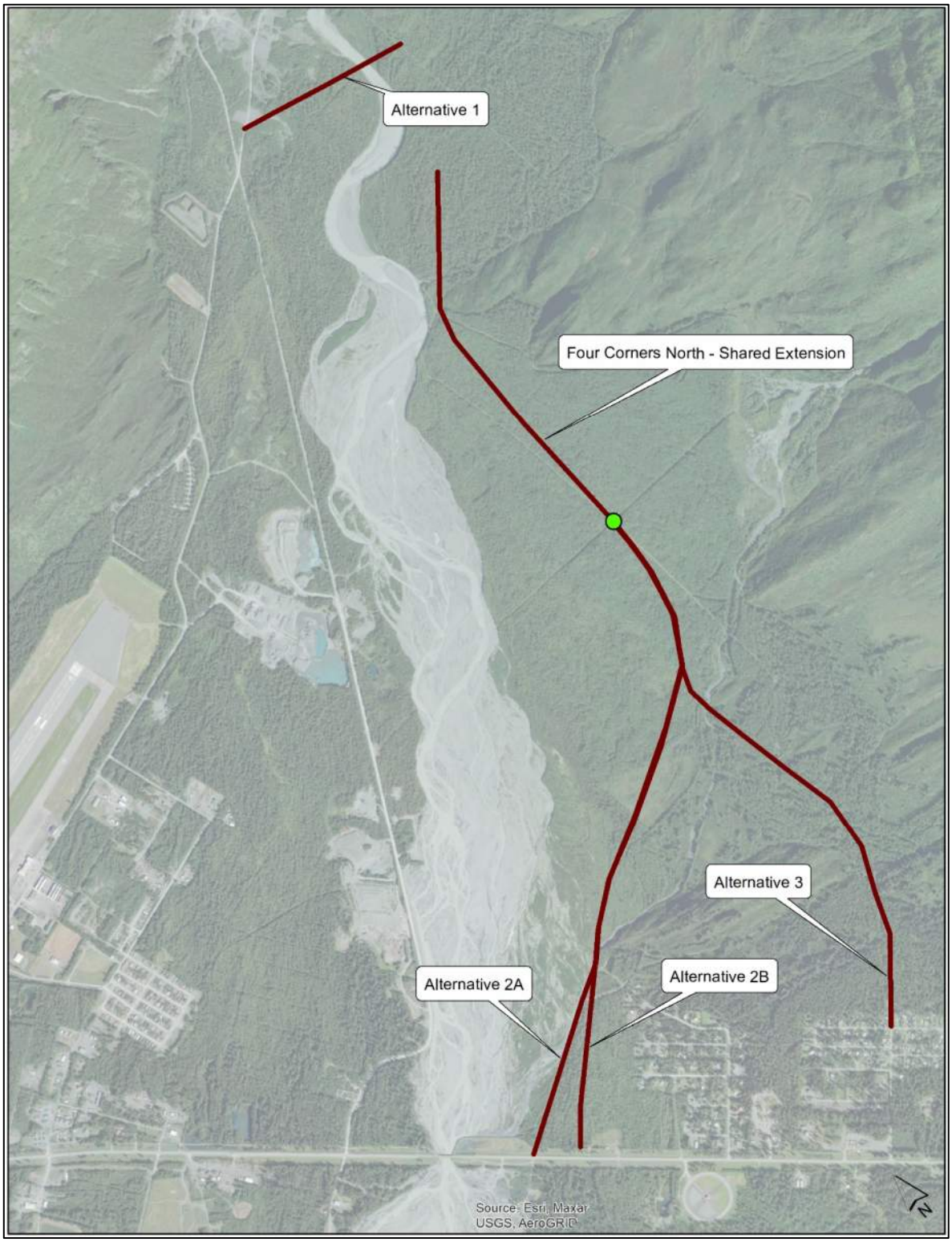


Figure 7 - Map of Alternatives

4.1 ALTERNATIVE 1 - NORTH BRIDGE ACCESS

Description: The north access alternative extends east from Haul Road and crosses Valdez Glacier Stream approximately ¼-mile downstream from Valdez Glacier Lake. This alternative is the shortest, but it includes the largest stream crossing which requires a 200-foot-long bridge to cross Valdez Glacier Stream. The road terminates at the northwest corner of parcel A-1 where an easement extends south along the west side of the parcel.

There are two options for a bridge over Valdez Glacier Stream:

- Single lane bridge, 18 feet wide
- Two-lane bridge, 32 feet wide

This option provides a second crossing of Valdez Glacier Stream, which could offer redundancy in the road network if a future southern access route were connected to the highway. It could potentially serve as a secondary evacuation route if the Richardson Highway bridge were compromised. However, Valdez Glacier Stream is classified as navigable by the Alaska Division of Mining, Land, and Water, which would require a USCG permit for bridge construction. This alternative provides the fewest conflicts with winter trails. Right-of-way across Tract A of ASLS 79-116 would be required.

Figure 8 - Downstream view of Valdez Glacier Stream looking towards a potential bridge location

Additional considerations:

Valdez Glacier Stream is a meandering waterway that will likely change its watercourse in the future. Regardless of a bridge location, the bridge will require maintenance and monitoring to ensure changes in the stream do not undermine or erode any structural supports.

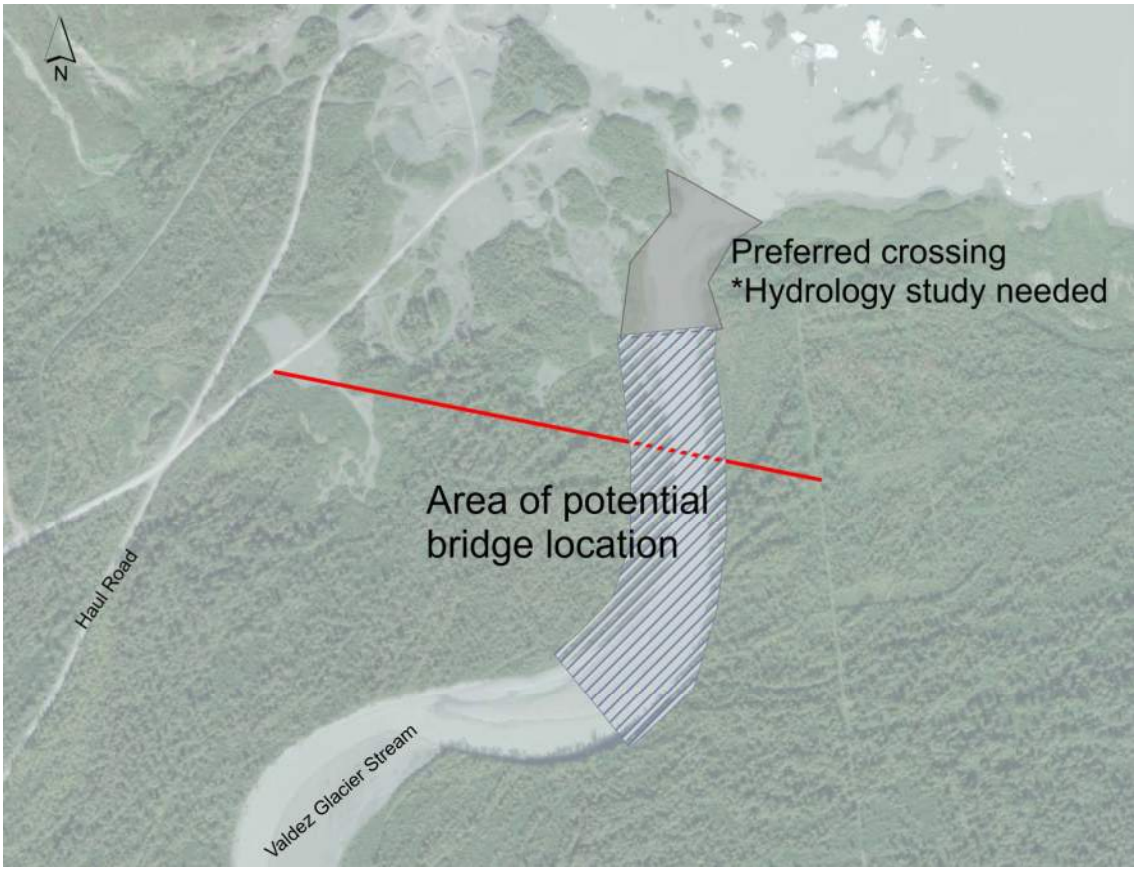


Figure 9 - Alternative 1 – North Bridge Access

Estimated construction cost:

- Single-lane bridge: $3,452,000
- Two-lane bridge: $5,453,000

Potential permits:

- Floodplain (City)
- Fish Habitat (ADF&G)
- Section 404 Wetlands (USACE)
- 401 Certificate of Reasonable Assurance (ADEC)

Additional studies needed:

- Sub-surface investigations to help determine the best location for the bridge
  Drilling will provide information about soil conditions and geology. Drilling will require hiring a drill rig operator and a geotechnical engineer to collect data in the field. A geotechnical engineer will also need to analyze and write a data report. Drilling will be confined to areas that the drill rig can access.

- Hydrology study of Valdez Glacier Stream to inform bridge engineering
  Types of relevant data that may need to be collected or compiled include topography and other physical features, land use, historical flood data, basin characteristics, precipitation data, geotechnical data, historical high-water marks, existing structures, and channel characteristics. Bridge design will require hiring a hydraulic engineer to collect and analyze data.

- Wetland delineations

Although option one encompasses the smallest delineation area of the alternatives, areas are up to half a mile from a road or trail making access more difficult. It is estimated the delineation would require two qualified environmental professionals two days of fieldwork and one day of data analysis and reporting.

FEATURE	QUANTITY	NOTES
Total Length	2,000 feet	
Bridges	1 bridge, 200' long	2 options
Culverts	80 ea.	

4.2 ALTERNATIVE 2A – LEVEE

Description: The levee access alternative begins at the Richardson Highway where the Valdez Glacier Stream levee meets the road and continues northeast along the top of the levee. A series of culverts across Corbin Creek at the north end of the levee bring the road into the flats east of Valdez Glacier Stream. The road continues northeast towards Four Corners.

There is potential contamination at the north end of the levee due to an old shooting range. However, construction on top of the levee may not disturb the contaminated soil; an investigation of potential contamination is needed.

This alternative takes advantage of the levee as a base for road construction, which reduces overall construction costs. It may also help snow removal as the prevailing winds travel down Valdez Glacier Stream and may blow the elevated levee/road surface clear.

Trail conflicts can be minimized by building this alternative parallel to but away from the winter trail system. A new recreational trail will need to be constructed adjacent to the levee. A trail in that location is identified in the Corbin Creek Subdivision master plan.

Right-of-way across Tract G and Tract B of ASLS 79-116 would be required. Additional coordination with DOT&PF is also needed in Tract G as they are the landowner.

This alternative crosses Zone A and Zone AE floodplains and is partially below the Base Flood Elevation. There is risk of erosion from Valdez Glacier Stream, particularly near the mouth of Corbin Creek.

Figure 10 - Looking northeast along the levee

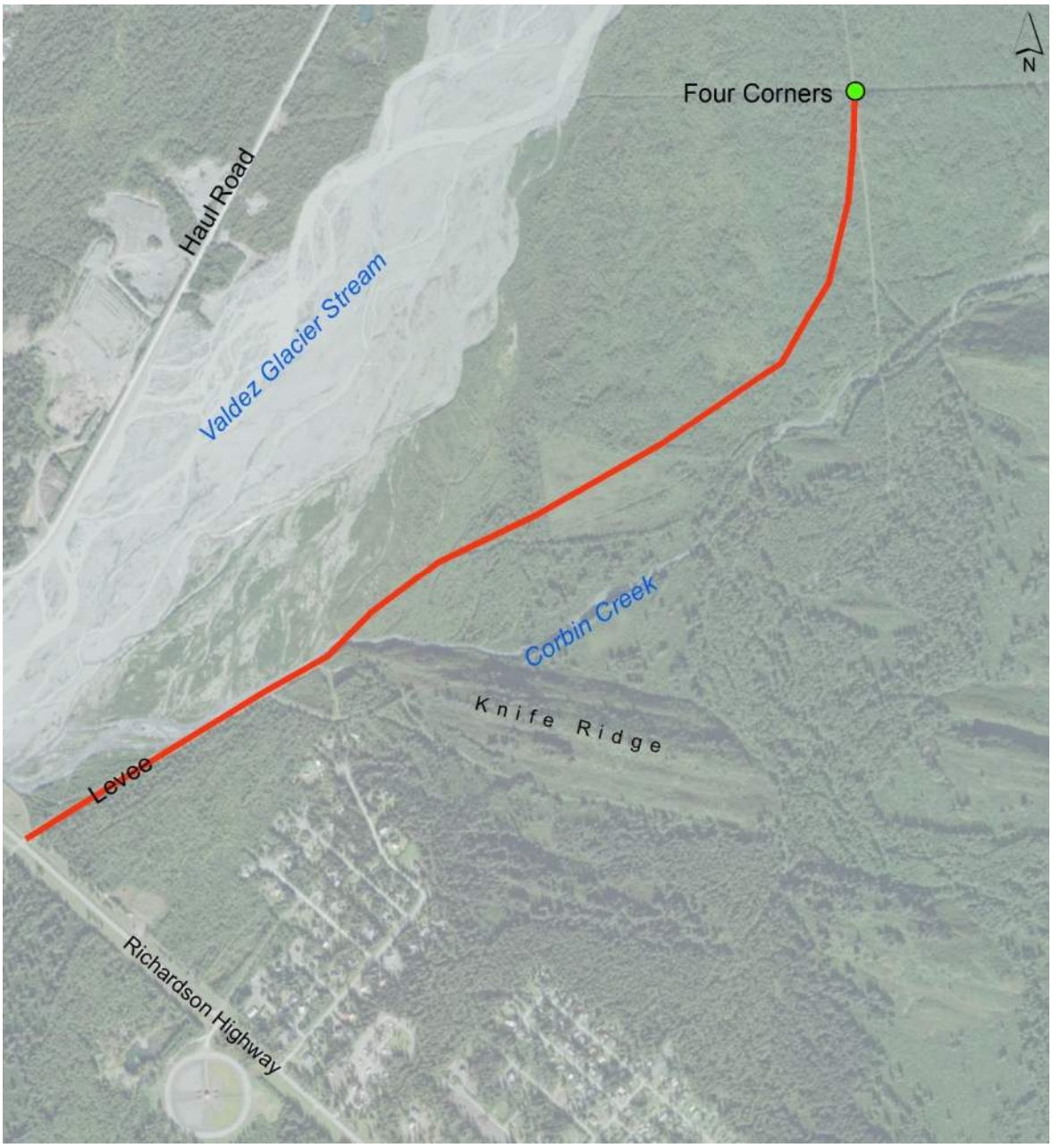


Figure 11 - Alternative 2A - Levee

Additional considerations:

Erosion by Valdez Glacier Stream into the Glacier Stream plateau may threaten the proposed road as it has done on the west side with Haul Road. Emergency construction to protect Haul Road cost more than $1 million.

Total Cost: $2,426,000

Estimated construction cost: $1,395,000

Northern extension (Figure 17) estimated construction cost: $1,031,000

Potential permits:

- Floodplain (City)
- Fish Habitat (ADF&G)
- Section 404 Wetlands (USACE)
- 401 Certificate of Reasonable Assurance (ADEC)
- Coastal Consistency Determination

Additional studies needed:

- Shooting range contamination assessment
  A Phase II site assessment should be conducted. Costs will include hiring an environmental professional to prepare a sampling plan, spend a day sampling in the field, and compiling field observations and soil chemistry data into a report. Additional cost includes sending samples to a lab for analysis.
  The shooting range, which was operated by the Valdez Police Department from the 1970's to 2002, was not identified on ADEC's Contaminated Sites database Geographic Information System (GIS) map. This levee is located along a glacially fed stream that flows into Port Valdez, which is fish-bearing water. Coordination with ADEC, followed by lead characterization for public health and environmental concerns is recommended.

- Resident fish surveys of Corbin Creek
  A resident fish survey may be achieved from an electrofishing survey done in a single visit. It will require hiring environmental professionals that are trained in electrofishing to collect and analyze data. Alternatively, fish sampling studies, using techniques such as traps or nets, could be implemented.

- Hydrology study of Corbin Creek to inform bridge engineering
  Types of relevant data that may need to be collected or compiled include topography and other physical features, land use, historical flood data, basin characteristics, precipitation data, geotechnical data, historical high-water marks, existing structures, and channel characteristics. Bridge design will require hiring a hydraulic engineer to collect and analyze data.

- Wetland delineations
  Alternative two would involve wetland delineation along a 2.15-mile stretch that is primarily accessible by trail. It is estimated this will require hiring two environmental professionals for two days of fieldwork and one day of data analysis and reporting.

- Sub-surface investigations
  Drilling will provide information about soil conditions and geology. Drilling will require hiring a drill rig operator and a geotechnical engineer to collect data in the field. A geotechnical engineer will also need to analyze and write a data report. Drilling will be confined to areas that the drill rig can access. Drilling will not be needed on the existing levee. Test pits at select locations may also be a suitable investigative method depending on geotechnical engineer recommendation.

FEATURE	QUANTITY	NOTES
Total Length	10,500 feet	
Bridges	0	Corbin Ck crossing may require a bridge pending hydro study
Culverts	340 ea.	

4.3 ALTERNATIVE 2B – RICHARDSON HIGHWAY

Description: The Richardson Highway alternative begins at the Richardson Highway on the east side of the Valdez Glacier Stream levee. The proposed road parallels the levee as it heads northeast towards Knife Ridge. Like the levee alternative, a series of culverts is needed across Corbin Creek at the west end of Knife Ridge. This alternative then follows the same alignment as Alternative 2A.

There is potential contamination at the north end of the levee where the proposed road approaches Knife Ridge. There was a shooting range in this area, but soil sampling has not been conducted.

Trail conflicts can be minimized by building this alternative parallel to but away from the winter trail system. The levee trail remains in place, but a new intersection between the trail and the proposed road is created behind the Corbin Creek Subdivision to the northwest of Mendenhall Street . Trail crossing signs would be installed and adjustments to the trail would need to be made at this new intersection. Due to the roadway being partially snow free during winter months, additional design feature would need to be considered to separate roadway and trail users to prevent user inconveniences and safey hazards.

Right-of-way across Tract G and Tract B of ASLS 79-116 would be required. Additional coordination with DOT&PF is also needed in Tract G as they are the landowner.

This alternative crosses Zones A and AE floodplains and is partially below the Base Flood Elevation. There is a risk of erosion from Valdez Glacier Stream, particularly near the mouth of Corbin Creek.

This alternative comes within 300 feet of private residential property in the Corbin Creek Subdivision. A vegetation buffer between the road and the subdivision would remain.

Figure 12 - Potential Corbin Creek crossing location for alternatives 2A and 2B; view is to the northeast looking upstream

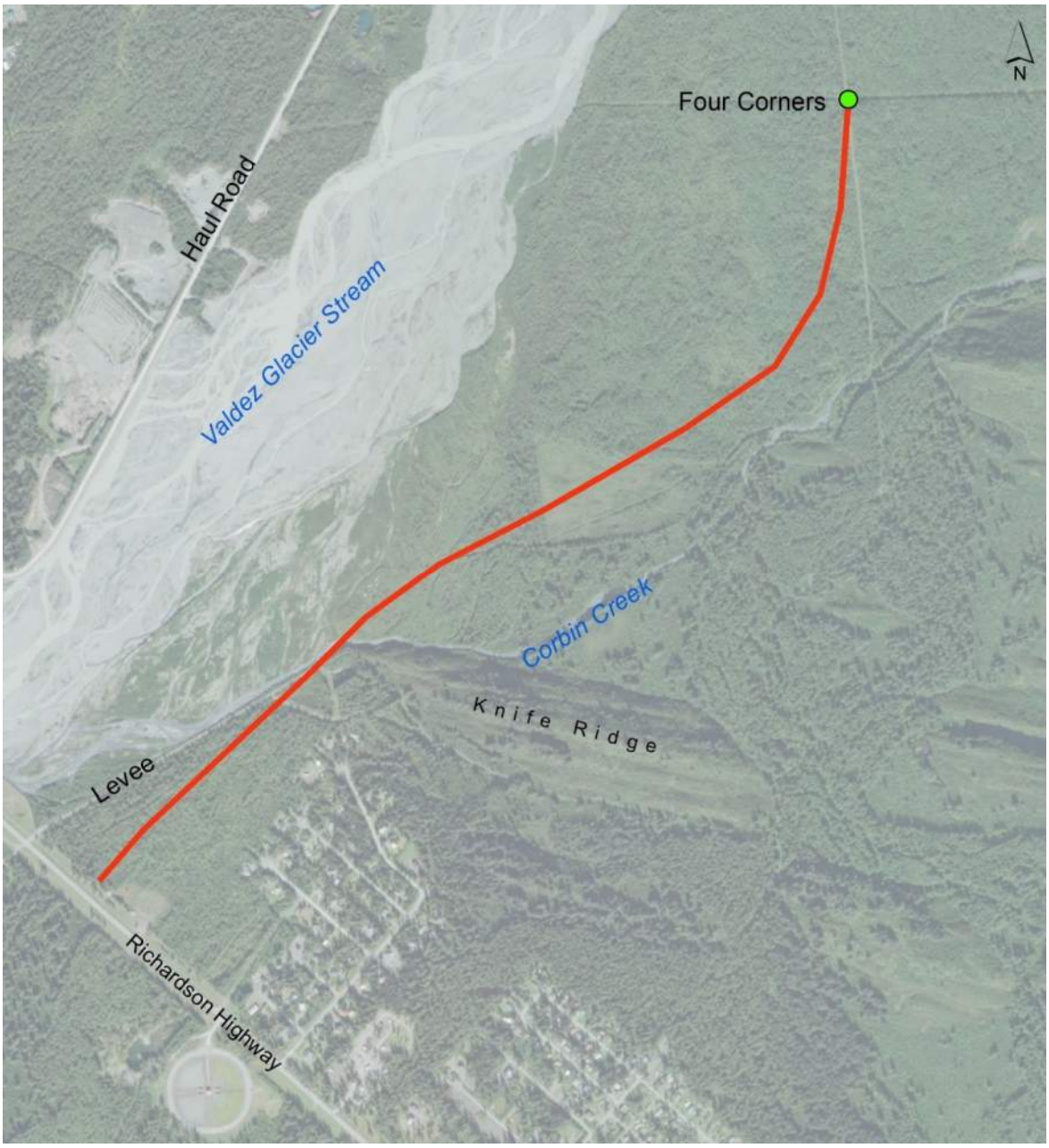


Figure 13 - Alternative 2B – Richardson Highway

Additional considerations:

Erosion by Valdez Glacier Stream into the Glacier Stream plateau may threaten the proposed road as it has done on the west side with Haul Road. Emergency construction to protect Haul Road cost more than $1 million.

The recent history of the location has shown that the area experiences high winds and severe snow drifting. During these periods, this alternative may experience low visibility, narrow roadways, and dangerous driving conditions with regard to icy roads and high winds.

Total Cost: $2,531,000

Estimated construction cost: $1,500,000

Northern extension (Figure 17) estimated construction cost: $1,031,000

Potential permits:

- Driveway (DOT&PF)
- Fish Habitat (ADF&G)
- Section 404 Wetlands (USACE)
- 401 Certificate of Reasonable Assurance (ADEC)
- Coastal Consistency Determination
- Floodplain (city)

Additional studies needed:

- Shooting range contamination assessment
  A Phase II site assessment should be conducted. Costs will include hiring an environmental professional to prepare a sampling plan, spend a day sampling in the field, and compiling field observations and soil chemistry data into a report. Additional cost includes sending samples to a lab for analysis.
  The unofficial shooting range located at the north end of the Valdez Glacier Stream levee was not identified on ADEC's Contaminated Sites database Geographic Information System (GIS) map. This levee is located along a glacially fed stream that flows into Port Valdez, which is fish-bearing water. Coordination with ADEC, followed by lead characterization for public health and environmental concerns is recommended.

- Resident fish surveys of Corbin Creek
  A resident fish survey may be achieved from an electrofishing survey done in a single visit. It will require hiring environmental professionals that are trained in electrofishing to collect and analyze data. Alternatively, fish sampling studies, using techniques such as traps or nets, could be implemented.

- Hydrology study of Corbin Creek to inform bridge engineering
  Types of relevant data that may need to be collected or compiled include topography and other physical features, land use, historical flood data, basin characteristics, precipitation data, geotechnical data, historical high-water marks, existing structures, and channel characteristics. Bridge design will require hiring a hydraulic engineer to collect and analyze data.

- Wetland delineations
  Alternative two would involve wetland delineation along a 2.15-mile stretch that is primarily accessible by trail. It is estimated this will require hiring two environmental professionals for two days of fieldwork and one day of data analysis and reporting.

- Sub-surface investigations
  Drilling will provide information about soil conditions and geology. Drilling will require hiring a drill rig operator and a geotechnical engineer to collect data in the field. A geotechnical engineer will also need to analyze and write a data report. Drilling will be confined to areas that the drill rig can access. Test pits at select locations may also be a suitable investigative method depending on geotechnical engineer recommendation.

FEATURE	QUANTITY	NOTES
Total Length	10,300 feet	
Bridges	0	Corbin Ck crossing may require a bridge pending hydro study
Culverts	412 ea.	

4.4 ALTERNATIVE 3 - ROBE RIVER SUBDIVISION

Description: This alternative begins at the north end of Dylen Drive in the Robe River Subdivision. The route closely follows the proposed roadway in the Corbin Creek Subdivision master plan by extending north/northeast from the subdivision and passes around the east end of Knife Ridge before turning north. The route crosses Corbin Creek and connects to the same route as proposed under alternatives 2A and 2B before ending at Four Corners.

This Alternative may have the most trail conflicts as it crosses two trails north of the subdivision in a narrow gap between Knife Ridge and the hill to the east. There are perennial streams that flow east along the north side of Knife Ridge that cross this route (see). A hydrology study would need to be conducted to determine the appropriate drainage needs along this section of the route. Due to the wet nature of this area, we anticipate lower quality material which would require trucking in embankment fill.

Right-of-way would be needed across Tract B and Tract F of ASLS 79-116.

Figure 14 – Old Corbin Creek crossing east of Knife Ridge

This route crosses through Floodplain Zone A at the proposed Corbin Creek crossing. This route crosses the fewest flood-prone areas of all alternatives.

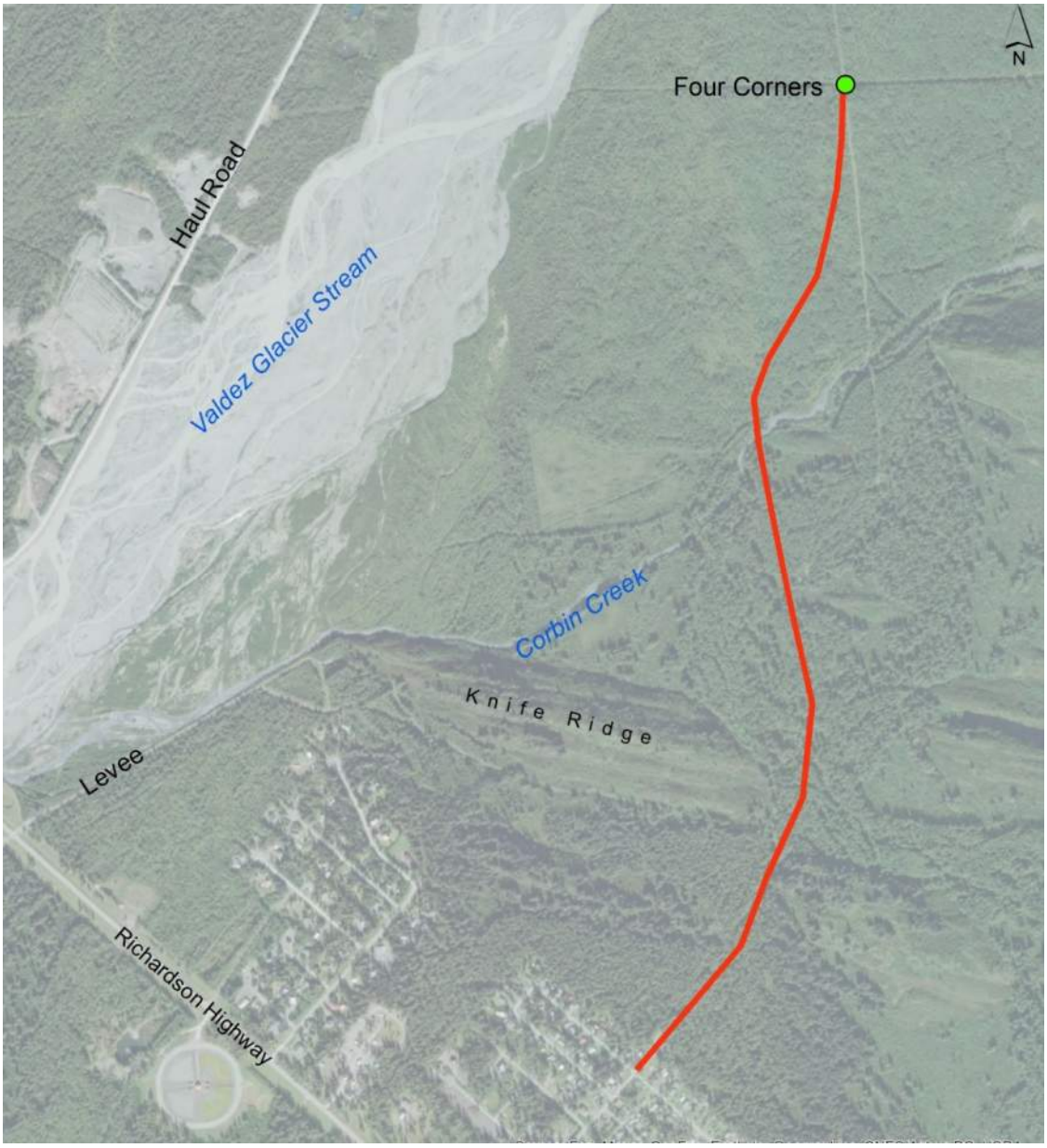


Figure 15 - Alternative 3 - Robe River Subdivision

Additional considerations:

There is an effort to re-direct some of Corbin Creek's flow back into Robe Lake. Close coordination with that effort is needed to ensure the road alignment does not preclude a stream reroute.

Total Cost: $2,971,000

Estimated construction cost: $1,886,000[1]

Northern extension (Figure 17) estimated construction cost: $1,031,000

[1] Due to the wet nature of this area and the anticipated lower quality material, assume embankment fill will be trucked in, thereby causing a higher cost per-mile than the other alternatives

Potential permits:

- Fish Habitat (ADF&G)
- Section 404 Wetlands (USACE)
- 401 Certificate of Reasonable Assurance (ADEC)
- Coastal Consistency Determination
- Floodplain (city)

Additional studies needed:

- Resident fish surveys of Corbin Creek

A fish survey may be achieved from an electrofishing survey done in a single visit. It will require hiring environmental professionals that are trained in electrofishing to collect and analyze data. Alternatively, fish sampling studies, using techniques such as traps or nets, can be implemented.

- Hydrology study of Corbin Creek to inform bridge engineering

Types of relevant data that may need to be collected or compiled include topography and other physical features, land use, historical flood data, basin characteristics, precipitation data, geotechnical data, historical high-water marks, existing structures, and channel characteristics. Bridge design will require hiring a hydraulic engineer to analyze data and determine the location and design for the bridge.

- Hydrology study of the perennial stream(s) along Knife Ridge

A study, evaluating flow and channel characteristics of perennial streams originating at Knife Ridge will inform hydrology analysis and flood expectations within the Corbin Creek drainage and address the potential of additional seasonal stream crossings along the access route.

- Wetland delineations

Alternative three includes a 1.9-mile stretch, with a larger extent of potential wetlands identified in aerial imagery compared to alternatives one and two. The proposed route includes areas up to 0.4 miles from existing trails, slowing down access in the field. It is estimated it will require hiring two environmental professionals for three days of fieldwork and one day of data analysis and reporting

- Sub-surface investigations

  Drilling will provide information about soil conditions and geology. Drilling will require hiring a drill rig operator and a geotechnical engineer to collect data in the field. A geotechnical engineer will also need to analyze and write a data report. Drilling will be confined to areas that the drill rig can access. Test pits at select locations may also be a suitable investigative method depending on geotechnical engineer recommendation. The sub-surface investigation for this route will likely be more comprehensive for this route due to observed site conditions.

FEATURE	QUANTITY	NOTES
Total Length	9,750 feet	
Bridges	0	Corbin Ck crossing may require a bridge pending hydro study
Culverts	390 ea.	

4.5 FOUR CORNERS NORTH – SHARED EXTENSION

Description: This alternative is an extension of the three southern alternatives (2A, 2B, and 3) that provides access to the private property (Parcel C of ASLS 79-116) that is currently being developed. This route extends from Four Corners north to a section line easement. Alternatives 2A, 2B, and 3 have this identical extension route with different southern routes to four corners.

The route crosses flat terrain from Four Corners and extends around the west end of a large ridge before turning northeast. Slater Creek is the only significant stream crossing. However, Slater Creek is deeply incised into the terrain near the proposed crossing and would require a hydrology study to determine the best crossing location and size of crossing structure (bridge v. culverts).

The proposed route crosses Zone A flood potential along Slater Creek.

Figure 16 – Slater Creek is a significant drainage to cross; view looking west towards the confluence with Valdez Glacier Stream

Additional considerations:

Valdez Glacier Stream is eroding the east bank of the channel considerably and is creeping towards Slater Creek. This will likely present a significant erosion issue for the proposed route and would likely require a dike for protection. More detailed surveying, hydrology, and geotechnical analyses are needed.

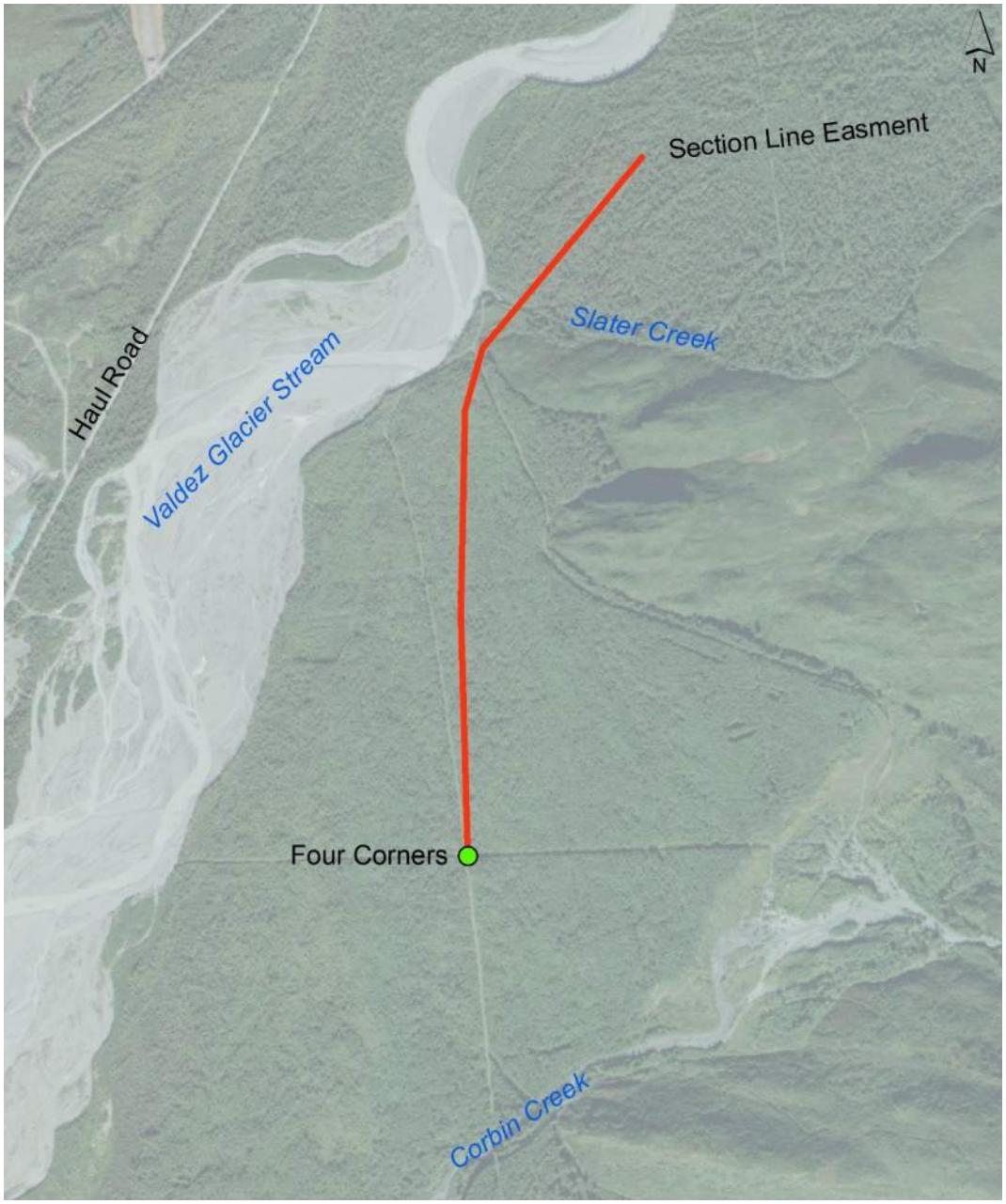


Figure 17 – Additive Alternative – Four Corners North

Estimated construction cost: $1,031,000

Potential Permits:

- Floodplain (city)

Additional Studies needed:

- Resident fish surveys of Slater Creek
  A fish survey may be achieved from an electrofishing survey done in a single visit. It will require hiring environmental professionals that are trained in electrofishing to collect and analyze data. Alternatively, fish sampling studies, using techniques such as traps or nets, can be implemented.

- Hydrology study of Slater Creek to inform bridge engineering
  Types of relevant data that may need to be collected or compiled include topography and other physical features, land use, historical flood data, basin characteristics, precipitation data,

geotechnical data, historical high-water marks, existing structures, and channel characteristics. This will require hiring a hydraulic engineer to analyze data to determine the location and design for the bridge.

- Wetland delineations
  The majority of the area is accessible by trail, but the proposed road extends an additional 0.4 miles north of trails. The delineation would require hiring two environmental professionals for two days in the field and one day of data analysis and reporting.
- Geotech/erosion study of Valdez Glacier Stream
  Valdez Glacier Stream is susceptible to channel changes and flooding and is estimated to move 2 feet per year (USACOE,2007). Several bank stabilization measures are in place, such as riprap armoring, training dikes, and a levee. The Valdez Glacier Stream and Mineral Creek Technical Assistance Valdez, Alaska, uses hydraulic modeling to perform a risk analysis and provide risk reduction measures for flood hazards of Valdez Glacier Stream (USACOE, 2021). This report, as well as localized geotechnical and hydraulic analysis, will inform the types of additional bank stabilization measures that will be most effective for protecting new development

5.0 CONCLUSION

The project area has been the focus of several studies and developmental interests. To address the access issues for potential future development, several alternatives were proposed with consideration of many criteria for each alternative. There are four alternatives with a second phase extension on three of them. Each of the alternatives had different areas of concern with a focus on environmental risks and community sentiment. Public involvement was heavy and thorough throughout the study and yielded additional information and feedback. Resident concerns for the closest alternatives were primarily levee failure/flooding and increase for snow drifts/wind reducing drivability and safety. Although overall construction costs were incorporated as one of the considerations for all the alternatives, it did not appear to be a primary focus to most who participated in the process. The most favored alternative for access was Alternative 1. The other proposed alternatives came from the south and had greater impacts on the undeveloped wilderness to the north with additional concerns such as erosion, creek crossings, and contaminated sites. Although alternative one would provide the least amount of change to the recreational user experience, all alternatives would not preclude trail use with additional trail planning/rerouting. This study is an example of how community and private development can benefit from one another as the preferred alternative preserves the recreational trail system and provides additional environmental consideration while minimizing the need for additional costly studies that could delay or halt development.

6.0 ANNOTATED BIBLIOGRAPHY

SE Group, RRC Associates, Design Alaska, McDowell Group, 2016. "Valdez Year-Round Mountain Recreation Study" *City of Valdez.*
One of the goals of this study was to determine if a mountain recreational development was feasible in Valdez and what steps could be taken to make it a reality. The study includes potential hurdles, costs, and additional opportunities for recreational development in the area. Several criteria were examined to determine feasibility that were unique to Valdez. Snow, for example, in the area is ideal for skiers and snowboarders. A larger hurdle for development would be to ensure enough people were to visit the recreational development. The remote location and potential difficulty traveling to Valdez would make attracting enough people to make the development economically feasible a challenge.

Valdez, Parks and Recreation. 2020. "Valdez, Alaska Parks and Recreation Plan" *City of Valdez*
The purpose of the plan was to take inventory of the current recreational areas and parks with the city of Valdez and determine areas of improvement. One of those areas, was to improve trail connectivity in recreational areas. The plan provides a 10-year analysis for future goals in the area, determine current and future needs, and provide a strategy to move forward.

Koenings, J.P., Barto, David., Perkins, Gerog. 1981-1982. "FRED Reports Assessing the Water Quality of Robe Lake, Alaska." *Alaska Department of Fish and Game.*
The assessment was initiated after community members noticed changes in the water of Robe Lake. The water was warming and less navigable. Although the water quality was determined to be quite good, the warming waters allowed for larger growth of aquatic weeds. The result would be higher than normal nitrogen in the water and would lead to less fish habitat. It was determined that that waters could be corrected by recommending altering the growth within the lake to allow for more diverse aquatic life.

USACE, 2021. "Valdez Glacier Stream and Mineral Creek Technical Assistance Valdez, Alaska. 2021**. "** *U.S. Amy Corps of Engineers*
Using several methods, including GIS data, USACE evaluated the historical, current, and potential future waterflow for the Valdez Glacier Stream. There were several concerns that have potential risk to both existing development to the west of the Valdez Glacier Stream using historical flow channels and risk to new development to the east of the stream through flooding and erosion. It appears that Valdez Glacier Stream has previously migrated east and west and erodes either side and carrying sediment downstream.

COV, Alaska. 2018. "Natural Hazard Mitigation Plan Update", *City of Valdez.*
Due to Valdez's unique location, an assessment update was conducted for the City of Valdez to determine natural risks. There is only one road in and out of Valdez, which adds to the current natural hazards. It is in an earthquake area, with several volcanoes nearby, and not only with the risk of tsunamis, but there is also the risk of avalanche from the surrounding mountains. The plan, evaluates and improves upon the emergency preparedness, response, recovery, and mitigation of the plan.

COV, Alaska. (n.d.) "Robe Lake Salmon Habitat Restoration Project". *City of Valdez.*
As Robe Lake is the largest freshwater lake in the Port of Valdez, it became the focus of the fish habitat restoration project. This project builds upon the historical FRED report but with more of an action plan to restore the fish population. The plan is to increase water flow from Corbin Creek, improve existing flow through channels for fish migration, and increase the size of the lake by removing vegetation overgrowth and other habitat manipulation.

EPA. 1980. "Alaska Petrochemical Company Refining and Petrochemical Facility Valdez, Alaska Final". *Environmental Impact Statement*
This is a comprehensive evaluation of the then-proposed plan to construct an oil refinery in the 1980s. The delicate and convenient location of Valdez made the location for the refinery both ideal due to its proximity to the Trans-Alaska pipeline and the port of Valdez and also the risks involved with its location being isolated and, in an earthquake, prone area. The evaluation included the need for various permits and regulations focused primarily on water and air quality, Additionally, there was also concern over the increase of water traffic to the port of Valdez and an insufficient number of housing for an increase of staff for the refinery.

CORVUS, 2021 "DRAFT Valdez Comprehensive Plan Revision." *City of Valdez.*
This is a draft update to the current Valdez Comprehensive Plan. It includes a change in the current zoning to the project area with a resort overlay implying that the plan to develop a recreational site is feasible but not yet a plan. Additionally, the update to the plan is informative of the lower availability of residential housing which has been a consistent issue in the City of Valdez due to its location and accessible lands.

COV. (n.d.) "*Valdez* Comprehensive Development Plan*." City of Valdez.*
As this is still the current comprehensive plan being executed today, the goals and objectives still stand. Those are primarily focused on creating an environment that encourages stable economic development. It provides a guide to diverse development which can enhance employment opportunities and broaden the skills of the labor force as well as monitor land use and zoning to meet the needs of the community.

USACE. 2007. "Alaska Baseline Erosion Assessment." U.S. *Army Corps of Engineers.*
Erosion has been a consistent issue along the Valdez Glacier Stream which is one of the primary focuses of this report. It was determined that the stream erodes up to 2 feet per year that are not due to storm activities and a result of the water flow. The s stream channel changes frequently shifting left to right and carries sediment from erosion activity as well as glacial material downstream.

Dames & Moore. 1999. "Corbin Creek Subdivision Master Plan, City of Valdez." A *Dames and Moore Group Company.*
Within the master plan there are several useful summaries regarding potential development in the area. Several soils samples were taken in various locations which identified areas where good development soil is located. When this master plan was released, the development covered a much larger area than what has since been constructed. There is brief mention of a shooting range that, at the time the plan was written, was regularly used but has since been abandoned and left the area with lead ground contamination. There is also brief mention of whether there are endangered species and/or historical site in the area. The responses from the coordinating agencies indicated that at the time, none have been found in the area.
USACE. 2021. "Valdez Glacier Stream and Mineral Creek Technical Assistance Valdez, Alaska. "*U.S. Army Corps of Engineers.*
The focus of this study was the Valdez Glacier Stream and Mineral Creek in the City of Valdez. Both are braided watersheds with glacial sources. Their unique location makes their water flow likely to carry sediment and glacial outwash. The braided nature and glacial outburst events of the Valdez Glacier Stream allows the stream to meander which causes erosion concerns with a potential for temporary small-scale flooding. As part of a long-term water resources management strategy, the U.S. Army Corp

of Engineers developed this study to provide flood mitigation information, risk assessment, hydraulic, economic, and additional environmental information.

APPENDIX A

COMMUNITY MEETING INVITATION

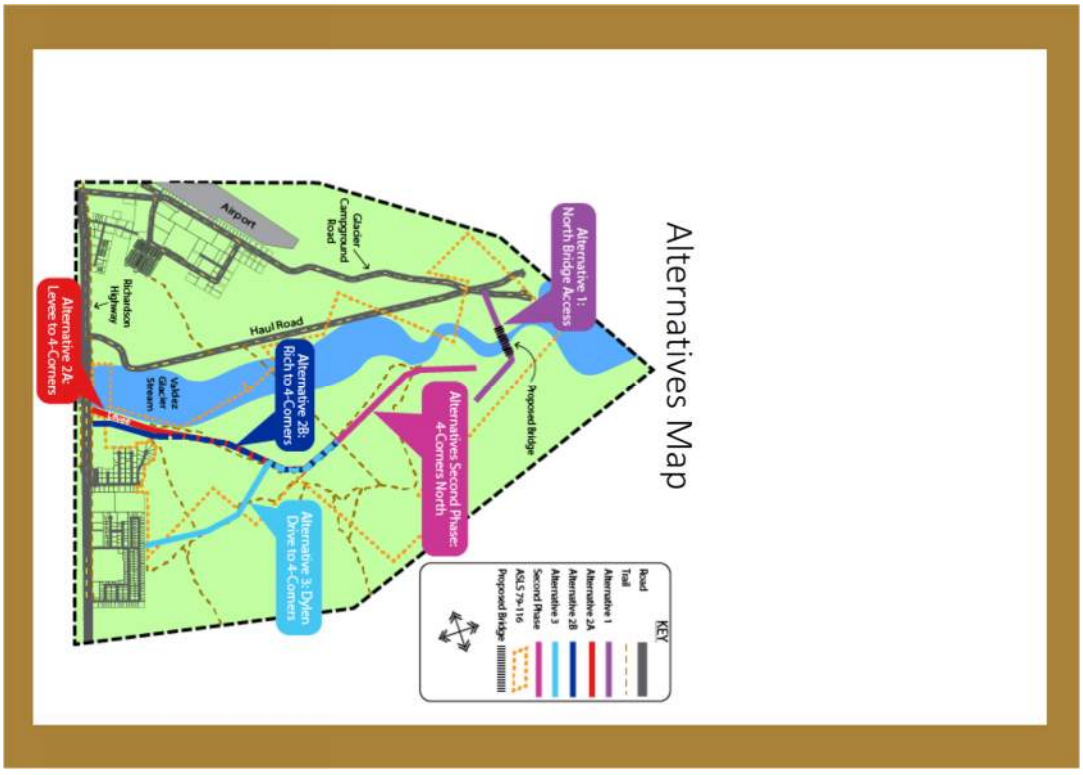
Valdez Glacier Stream East Access Study Virtual Community Meeting November 10th, 2021 @ 6pm

The City of Valdez and PDC Engineers invite you to a virtual community discussion regarding the Glacier Stream East Access Study. We have determined rough cost estimates and considerations for each of the proposed alternatives and we would like your feedback.

Please join us on Teams following the link: https://bit.ly/3peh4W9 (case sensitive)

Or call in (audio only)
(844) 594-6237 United States (Toll-free)
Phone Conference ID: 778 626 289#

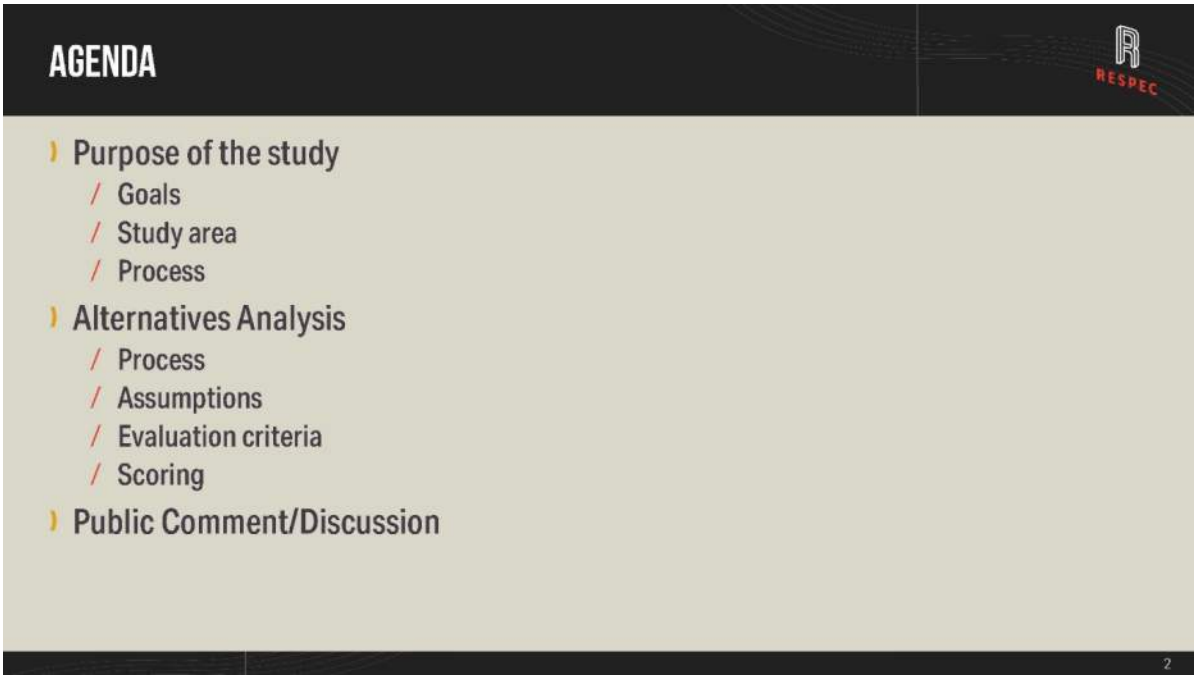
Please email Elise @ elise.blocker@respec.com for follow along material for call-ins



APPENDIX B

COMMUNITY MEETING PRESENTATION


GLACIER STREAM EAST ACCESS STUDY
ASLS 79-116
RESPEC
CITY OF VALDEZ
NOVEMBER 10, 2021
RESPEC.COM


AGENDA
RESPEC
Purpose of the study
Goals
Study area
Process
Alternatives Analysis
Process
Assumptions
Evaluation criteria
Scoring
Public Comment/Discussion
2

MEETING LOGISTICS & ETIQUETTE

- Please keep microphones muted during presentation
- Please hold questions until the discussion/comment period
- Use the chat box
- We are recording the meeting

3

STUDY GOALS

- Identify feasible access alternatives
- Evaluate alternatives based on:
  - Capital costs
  - Maintenance considerations
  - Environmental factors
  - Public sentiment
- Summarize findings

- REMINDER: this is a desktop study

4

STUDY AREA

5

PROCESS – DATA COLLECTION

- Geospatial data
- Reports/studies/plans
- Physical data
- Environmental data
- Initial site visit
- Follow-up site visit

https://www.valdezglacierstreamaccess.com/

6

PROCESS – OUTREACH

- Meetings/presentations:
  - June 16 neighborhood meeting
  - July 14 P&Z commission
  - October 27 P&Z commission
  - November 10 Public Meeting
- Interviews
  - Trail user groups
  - City staff
  - Agencies
  - Construction industry
- Focus group

7

PROCESS - ALTERNATIVES

- Develop initial routes/ideas
- Identify assumptions
- Adjust based on data/feedback/analysis
- Review + evaluate
- Present options for feedback
- Final recommendation(s)

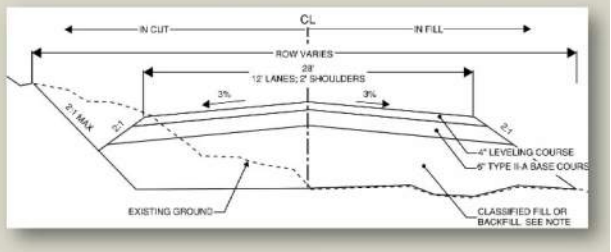
8

ALTERNATIVES ANALYSIS

9

ALTERNATIVES ANALYSIS

- Assumptions
  - Material is available
  - Wetland impacts minimal
  - Large stream crossings
  - Drainage needs



10

ALTERNATIVES ANALYSIS

- Considerations & Evaluation Criteria
  - Stream crossings + erosion
  - Wetlands + habitat
  - Trails & recreational uses
  - Maintenance
  - Construction costs
  - Contaminated sites
  - Plans
  - Public sentiment
  - Permitting

11

ALTERNATIVES ANALYSIS

- Evaluation
  - Develop criteria
    - Focus group review + input on evaluation criteria
  - Evaluate alternatives
    - Evaluation sessions w/ focus group
  - Compile evaluations

category	criterion	considerations	weight	score
Environmental	anadromous fish streams	crossings; indirect impacts; add'l studies needed	0.2	
	eagle nests	proximity		
	wetlands	extent of potential fill; need for delineations		
	wildlife	presence; impacts		
	contaminated sites	clean-up needs; permitting		
	historical/cultural resources	presence; impacts		
		environmental sub-total		
public input	public opinion	support; opposition	0.2	
	recreation impacts	trail impacts; user conflicts; etc.		
	emergency access/egress	difficulty; redundancy		
	safety concerns	add'l traffic on S/D roads; new intersections; etc.		
	compatibility with other projects	ability to enable other projects; economies of scale		
	aesthetics/viewshed impacts	changes to viewshed		
	consistency with other plans	comp plan; rec plan; S/D master plans; etc.		
		public input sub-total		
natural hazards	flooding	likelihood; flood zones	0.2	
	erosion	likelihood; mitigation needs		
	liquefaction/earthquake	likelihood; extent of potential impacts		
	avalanches	likelihood		
	landslide-induced tsunami	from Glacier Lake		
	glacier-dammed lake outbursts	likelihood; extent of potential impacts		
		natural hazards sub-total		
maintenance	snow removal and storage	needs; availability; accommodation	0.2	
	grading/surface maintenance			
	utilities	ability to co-locate for future dev.		
	impacts to adjacent facilities	blowing snow; fugitive dust; etc.		
	drainage			
		maintenance sub-total		
construction	bridge needs	length, type, etc.	0.2	
	culvert needs	length, type, etc.		
	construction costs			
	topography	challenging terrain		
	Right-of-Way	existing; new		
	opportunities for greenbelts/buffers			
	construction phasing			
		construction sub-total		
		TOTAL	**1**	

12

ALTERNATIVES ANALYSIS

Alternative	Length	Estimate	Considerations
1 – North Bridge Access	2,000'	$3.5 - $5.5M	Erosion Bridge maintenance
2A – Levee	10,500'	$1.4M	Corbin Creek x-ing Erosion Levee use
2B – Rich Highway	10,300'	$1.5M	Corbin Creek x-ing Potential contamination Proximity to neighborhood
3 – Robe River	10,000'	$1.9M	Corbin Creek x-ing Trail conflicts Wetlands Robe Lake water project

13

ALTERNATIVES ANALYSIS

- Focus group scoring feedback:
  - Alternative 1 – North Bridge Access favored

14

COMMENTS

- Use raise hand feature

15

THANK YOU!

Patrick Cotter
PDC Engineers, a RESPEC company
patrickcotter@pdceng.com
907.452.1414

Feel free to visit the project website at
www.valdezglacierstreamaccess.com

16

APPENDIX C

SCORING MATRIX

category	criterion	considerations	weight	score	Alternative 1	Alternative 2A	Alternative 2B	Alternative 3	Notes
Environmental	anadromous fish streams	crossings; indirect impacts; add'l studies needed	0.2						
	eagle nests	proximity							
	wetlands	extent of potential fill; need for delineations							
	wildlife	presence; impacts							
	contaminated sites	clean-up needs; permitting							
	historical/cultural resources	presence; impacts							
		environmental sub-total							
public input	public opinion	support; opposition	0.2						
	recreation impacts	trail impacts; user conflicts; etc.							
	emergency access/egress	difficulty; redundancy							
	safety concerns	add'l traffic on S/D roads; new intersections; etc.							
	compatibility with other projects	ability to enable other projects; economies of scale							
	aesthetics/viewshed impacts	changes to viewshed							
	consistency with other plans	comp plan; rec plan; S/D master plans; etc.							
		public input sub-total							
natural hazards	flooding	likelihood; flood zones	0.2						
	erosion	likelihood; mitigation needs							
	liquefaction/earthquake	likelihood; extent of potential impacts							
	avalanches	likelihood							
	landslide-induced tsunami	from Glacier Lake							
	glacier-dammed lake outbursts	likelihood; extent of potential impacts							
		natural hazards sub-total							
maintenance	snow removal and storage	needs; availability; accommodation	0.2						
	grading/surface maintenance								
	utilities	ability to co-locate for future dev.							
	impacts to adjacent facilities	blowing snow; fugitive dust; etc.							
	drainage								
		maintenance sub-total							
construction	bridge needs	length, type, etc.	0.2						
	culvert needs	length, type, etc.							
	construction costs								
	topography	challenging terrain							
	Right-of-Way	existing; new							
	opportunities for greenbelts/buffers								
	construction phasing								
		construction sub-total							
		TOTAL	1						