WESTERN ALASKA
ACCESS PLANNING STUDY

CORRIDOR PLANNING REPORT

EXECUTIVE SUMMARY

January 2010

Prepared by:
DOWL HKM

Prepared for:
The State of Alaska
Department of Transportation and Public Facilities

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CORRIDOR PLANNING REPORT

EXECUTIVE SUMMARY

DOT&PF Project No. 60800

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Department of Transportation and Public Facilities
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January 2010

EXECUTIVE SUMMARY

SELECTED CORRIDOR

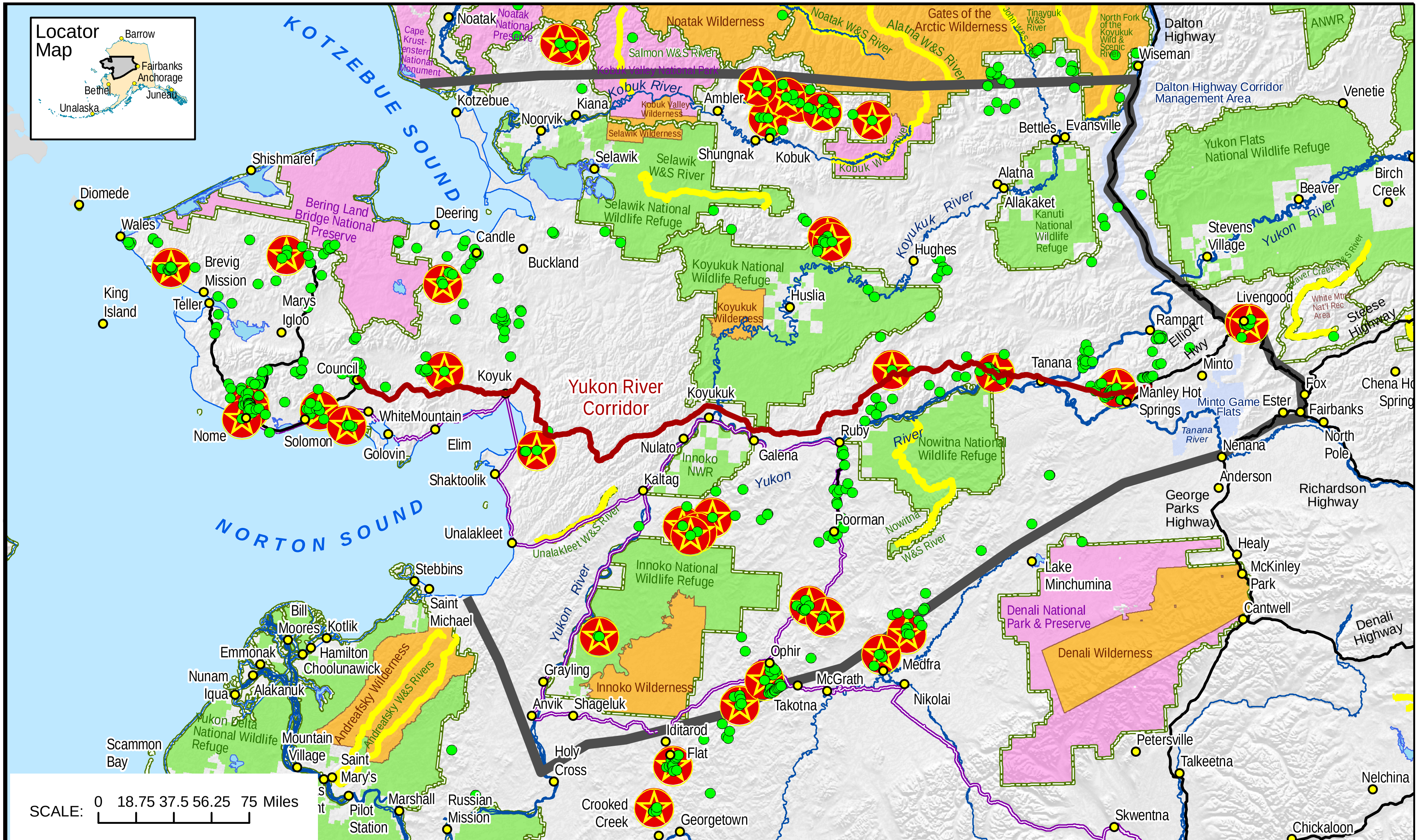
Overland access from Interior Alaska to the Seward Peninsula has long been a key element of Alaska's transportation planning maps. Previous corridors for the Dalton, Parks, and Glenn Highways were developed to address national security, for economic development, and to improve community access to goods and services. Similar benefits can be demonstrated today for extending road access to Western Alaska. The Western Alaska Access Planning Study evaluates the location and benefits of various corridor alignments to Western Alaska and recommends the Yukon River Corridor, shown in **Figure E1**. The proposed corridor, approximately 500 miles in length, begins just outside of Manley Hot Springs on the Elliott Highway and terminates at the Nome-Council Highway. The corridor generally parallels the Yukon River for much of its length, giving it the designation of the Yukon River Corridor.

The Yukon River corridor has an estimated total project cost of $2.3 to $2.7 billion. The cost range includes construction costs of the road, bridges, and maintenance stations, as well as engineering, environmental mitigation, and right-of-way acquisition costs and a 20% contingency. It would likely be built in stages based on funding availability, with each stage having independent utility.

Primary benefits of the road would be improved efficiencies, sustainability, and/or reliability of:

- Passenger transportation
- Fuel delivery
- Freight/mail delivery
- Mining support
- Energy/power infrastructure

Completion of this planning study provides a sound foundation for future tasks. Future tasks to advance the Yukon River Corridor include advanced route mapping, engineering and environmental field studies, engineering analysis, project implementation planning, and public involvement.



Communities
Study Area
Recommended Corridor Alternative
Significant Mineral Occurrence
Lesser Mineral Occurrence
National Park Service
U.S. Fish & Wildlife Service
Other Controlled Use/Management Area
Wild & Scenic Rivers
National Wilderness Preservation System
Iditarod Trail
Major Lakes
Major Rivers
Existing Roads

Data Sources Minerals: C.C. Hawley & M.K. Vant, February 2009 Land Status: Alaska Dept. of Natural Resources 2008

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WESTERN ALASKA ACCESS PLANNING STUDY
RECOMMENDED CORRIDOR

Prepared By Allied GIS

DATE: January 14, 2010

Figure E1

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Corridor Selection Process

The corridor selection process included the following steps:

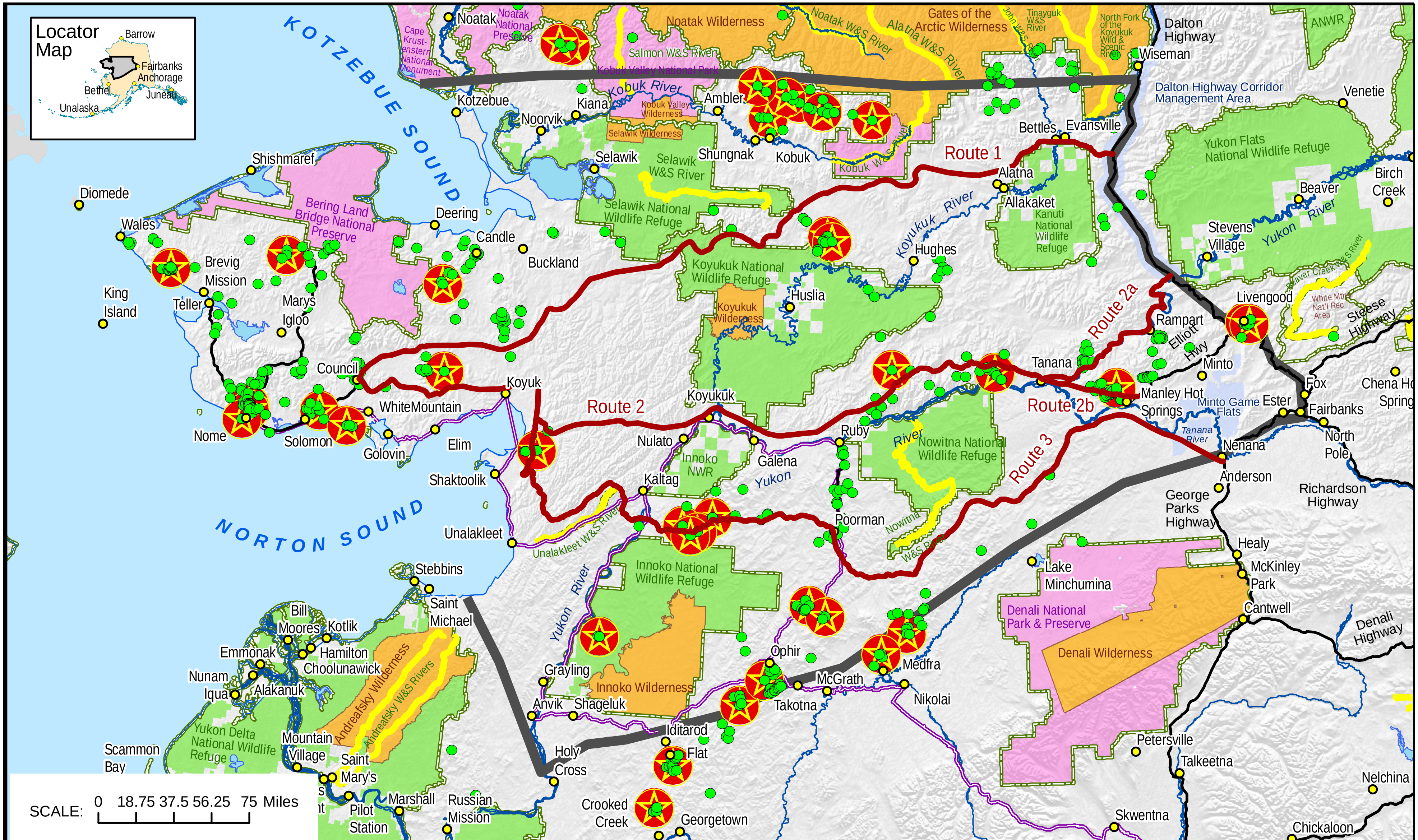
1. ***Review prior studies and historical corridors*** - over 200 documents were reviewed, including more than 80 transportation and engineering studies, and historical corridor mapping.
2. ***Identify corridor evaluation criteria*** - criteria included access to communities and mineral resources, environmental and land use constraints, and costs.
3. ***Define and evaluate preliminary corridor alternatives*** - evaluated four corridors considered in the north (Route 1), center (Routes 2a and 2b), and south (Route 3) of the study area.
4. ***Evaluate and refine the final two candidate corridors*** - evaluated Routes 1 and 2b.
5. ***Recommend corridor and next project development tasks*** - recommended Route 2b, the Yukon River Corridor.

Corridor Alternatives

The project team examined and modified historical routes to target community and resource development access while avoiding critical environmental and land management restrictions to the extent practical. East-west routes were narrowed down to four alternatives as shown in **Figure E2** and described as follows:

- Alternative ***Route 1*** in the north of the study area begins near Jim River on the Dalton Highway and trends roughly southwestward from its start point to its terminus at the Nome-Council Highway. This alternative was identified primarily for its ability to access the northern communities within the study area and the rich mineral district in the Ambler area.

- Alternative ***Route 2a*** begins just north of the Yukon River on the Dalton Highway and trends southwestward from its start point to Tanana, where it strikes out almost directly westward to its terminus at the Nome-Council Highway. Route 2a was identified primarily for its ability to access the communities and mineral resources along the Yukon River and to take advantage of the Yukon River bridge on the Dalton Highway.



Communities	National Park Service	Iditarod Trail
Study Area	U.S. Fish & Wildlife Service	Major Lakes
Preliminary Corridor Alternatives	Other Controlled Use/Management Area	Major Rivers
Significant Mineral Occurrence	Wild & Scenic Rivers	Existing Roads
Lesser Mineral Occurrence	National Wilderness Preservation System	

Data Sources Minerals: C.C. Hawley & M.K. Vant, February 2009 Land Status: Alaska Dept. of Natural Resources 2008

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WESTERN ALASKA ACCESS PLANNING STUDY
PRELIMINARY CORRIDOR ALTERNATIVES

Prepared By Allied GIS

DATE: January 14, 2010

Figure E2

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- Alternative ***Route 2b*** begins just outside of Manley Hot Springs on the Elliott Highway and trends almost directly westward from its start point to its terminus at the Nome-Council Highway. This alternative uses nearly 70 miles of existing road to reach Western Alaska. Like Route 2a, Route 2b was identified primarily for its ability to facilitate access to the communities and mineral resources along the Yukon River.

- Alternative ***Route 3*** begins near Nenana on the Parks Highway and trends westward from its start point, sweeping widely to the south to avoid mountainous terrain and federal conservation lands, then turning north near the Seward Peninsula and terminating at the Nome-Council Highway. Route 3 was identified primarily for its ability to facilitate access to the communities and mineral resources in the southern portion of the study area.

Alternatives Evaluation

Preliminary Evaluation - The project team evaluated four preliminary alternatives and selected Routes 1 and 2b for further consideration because they provided the greatest resource and community access, at the least cost, and with the fewest overall environmental and land use conflicts.

Refined Evaluation - The project team conducted a more detailed evaluation of Routes 1 and 2b, including route refinement, further engineering evaluation, potential for energy and intermodal connectivity, and costs. Although both alternatives present distinct advantages, Route 1 has several disadvantages. Route 1 crosses portions of the Koyukuk and Selawik National Wildlife Refuges, a serious weakness due to the lengthy and cumbersome process for permitting transportation access across these lands. Although Route 1 would provide access to the rich Ambler mining district, it would provide only limited community access. Additionally, it is a more circuitous route that runs 200 miles north of Fairbanks before turning west and then southwest to the Seward Peninsula.

Recommended Alternative

After careful analysis, the project team recommended Route 2b, the Yukon River Corridor, because it most directly meets the project purpose, has significant potential benefits, and minimizes environmental and land management impacts. Advantages and challenges of this recommended corridor are summarized on Page VII. The Yukon River Corridor provides the most direct access between Fairbanks and Nome, it accesses numerous communities and resources along the way, it is well-suited for phased construction, it has potential for intermodal links to barge traffic on the Yukon River and connections to Donlin Creek and the Ambler mining district, and it avoids sensitive federal conservation lands.

Project Costs

At a length of 500 miles, the Yukon River Corridor has an estimated total project cost of $2.3 to $2.7 billion. This cost range includes construction costs of the road, bridges, and maintenance stations, as well as engineering, environmental mitigation, and right-of-way acquisition costs, and a 20% contingency.

At this early planning stage, limited engineering and geotechnical information is available to develop precise cost estimates, so a cost range and large contingencies are included. As more mapping and in-field geotechnical and engineering investigations are completed in later phases, the estimated costs will become more precise. Some of the greatest cost uncertainties, to be addressed in later engineering phases, include:

- Cost effects of construction through approximately 135 miles of rolling terrain, 65 miles of mountainous terrain, and 185 miles of estimated wetlands
- Soil conditions in the corridor and the availability of construction material sources in close proximity to the corridor
- Further definition of the number and types of bridges to be constructed
- The effect of economies of scale and project phasing on costs of individual segments
- Anticipated construction climate at the time of construction (inflation, competition from other major projects such as the gas pipeline)

Annual routine maintenance costs for the Yukon River Corridor road and associated maintenance facilities are estimated at $14.9 million per year, and the annual cost for road resurfacing and rehabilitation is estimated at $25 million per year.

Yukon River Corridor (Route 2b)

Advantages	***Challenges***
• Access to communities and resource sites along Yukon River • Greatest population served of alternatives • Does not cross any federal conservation lands • Potential to enhance intermodal transportation system (Yukon River barges) • Uses approximately 70 miles of existing highway • Potential to link to Ambler mining district within the study area and to Donlin Creek Mine outside the study area • Fewest land and environment impacts • Creates shortest travel distance between Fairbanks and Nome • Appropriately situated for phased construction	• Significantly less mineral value in proximity to corridor than some other alternatives • Higher estimated cost to construct than some other alternatives • Topography (steep grades, mountainous terrain) • New Yukon River crossing required

ECONOMIC BENEFITS

Economic benefits were estimated for selected case study communities and mines accessible from the Yukon River Corridor to give a generalized indication of the benefits of the corridor. Other communities and mines accessible from the corridor would likely experience similar benefits to those for the case study targets, thus total regional benefits would exceed those presented for the case study communities and mines. Case study communities include Tanana, Ruby, Galena, Koyukuk, Koyuk, and Nome. Case study mines include Ambler, Donlin, Illinois Creek, and a placer mine example. The project team's anticipated and estimated economic benefits are summarized as follows under the headings of Communities, Mines, Energy/Power Infrastructure, and Other Socioeconomic Effects.

Communities

- ***Fuel, Freight, and Mail*** - A road would enable fuel, freight, and mail deliveries year-round by truck and at potentially lower transportation costs. ***Fuel, freight, and mail transport costs for the six case study communities would decrease by about $19.1 million per year if road transportation were used.*** This is a savings of $3,900 per person per year if a road were available, although not all of the savings would accrue to the residents of the case study communities; some savings would go to the United States Postal Service, for example. There are five additional communities with a combined population of approximately 770 within 20 miles of the Yukon River Corridor. While the benefits of the corridor would decline as one moves further away from the road, extrapolating the $3,900 annual savings per person to the population of the non-case study communities would yield an additional savings of $3 million per year.

Table E1: Estimated Annual Cargo, Fuel, and Bypass Mail Savings ($)

Category	Community Savings ($)						
	Tanana	Ruby	Galena	Koyukuk	Koyuk	Nome	Total
Fuel Savings	124,000	113,000	733,000	49,000	56,000	0	1,075,000
Cargo	152,000	85,000	665,000	79,000	367,000	7,838,000	9,186,000
Bypass Mail	215,000	420,000	498,000	130,000	452,000	7,150,000	8,865,000
Total	**491,000**	**618,000**	**1,896,000**	**258,000**	**875,000**	**14,988,000**	**19,126,000**

Source: Northern Economics, Inc., estimates, 2009, from data provided by Logistic Solution Builders, n.d.; Jansen, 2009; Sweetsir, 2009; Ruby Marine, 2009; Sweeney, 2009.

- ***Passenger Transportation -*** A road would provide more affordable and flexible options for year-round passenger travel between communities and regional hubs and to the Interior and Seward Peninsula Highway systems. ***Passenger cost savings by road will be largest for longer distance trips and where more passengers are travelling together.***

Mines

- A road would support the exploration, development, and operations of mining projects by providing a less expensive method of shipping supplies and fuel into the mines and transporting mining concentrates out of the mines. ***Transport of freight and fuel into the case study mines and concentrate out could save an estimated $120 million per year.***

Table E2: Comparison of Potential Mine Transportation Annual Cost Savings

	Inbound		Outbound	Total
	Freight	Fuel	Concentrate	
Without Corridor Cost ($)	136,200,000	57,000,000	121,600,000	314,800,000
With Corridor Cost ($)	54,870,000	38,880,000	100,900,000	194,650,000
Savings ($)	**81,330,000**	**18,120,000**	**20,700,000**	**120,150,000**

Source: Northern Economics, Inc., estimates based on North Pacific Mining, 1993; CH2M Hill, 2004; Jansen, 2009; Logistics Solution Builders, n.d.; Sweetsir, 2009; Ruby Marine, 2009; Sweeney, 2009; Office of Coast Survey, 2009; Hawley, 2009; Hughes, 2009; Fueg, 2009; Donlin Creek Mine, LLC, 2009.

Energy/Power Infrastructure

- ***Community Fuel Costs - Conversion from barged diesel fuel to trucked propane would save an estimated $13.5 million per year for case study communities, or about $2,700 per person per year.***

Table E3: Annual Fuel Cost Savings with Trucked Propane

Scenario	Community Savings ($)						
	Tanana	Ruby	Galena	Koyukuk	Koyuk	Nome	Total
Current MMBtu[1] Consumed	30,000	20,000	160,000	10,000	40,000	850,000	1,110,000
Barged Diesel Cost per MMBtu ($)	20.67	23.48	21.48	30.81	18.74	17.48	18.416
Trucked Propane Cost per MMBtu ($)	5.11	5.51	5.58	5.65	6.05	6.47	6.27
Cost Change per MMBtu ($)	-15.56	-17.97	-15.9	-25.16	-12.69	-11.01	-12.15
Total Annual Savings	**466,800**	**359,400**	**2,544,000**	**251,600**	**507,600**	**9,358,500**	**13,487,900**

Source: Northern Economics, Inc., estimates based on Alaska Village Electric Cooperative, 2009; Sweetsir, 2009; Logistic Solution Builders, n.d.

Note 1: MMBtu - million British thermal units

- ***A road corridor would reduce the costs of building pipeline and electrical transmission infrastructure by between 30% and 50%.*** For example, a road corridor could reduce the costs of a pipeline to Donlin Creek from Manley Hot Springs by between $800 million to $1 billion and the cost on an electrical transmission line by $100 million to $200 million. Communities along the pipeline or electrical route would see significant fuel/power cost reductions.

Rail Infrastructure

The potential for a rail connection to Western Alaska was investigated, but the road corridor was determined to be more practical and cost effective to construct at this time. A rail would likely require a significantly different and longer alignment at a higher construction cost per mile than the road. However, an existing road in proximity to a future rail line would contribute to substantially lower construction and maintenance costs for the rail.

Other Socioeconomic Effects

While there could be some negative subsistence and social disruption effects, potential socioeconomic benefits will be substantial, and will vary across the study area.

- Increased resource development—in particular, mining—will increase standard of living, jobs, per capita income, and financial self-sufficiency. ***Based on experience at the Red Dog Mine, case study mines would yield 1,590 new jobs with an average wage of $7,000 per month.***
- Road access could ***increase access to public services*** such as education, health care, and emergency/safety services (police, fire, rescue).
- Road access would ***reduce costs of other community capital improvements***.
- A road could provide ***increased resident access to subsistence areas***.

NEXT STEPS

The following steps are recommended to advance the Yukon River Corridor reconnaissance engineering phase.

- ***Public Involvement* -** Obtain broad public and stakeholder input on the project, particularly from Native communities, organizations, and tribal governments, and mine owners who will benefit from the project.

- ***Advance Route Mapping* -** Conduct LIDAR or other aerial photo based mapping for use in corridor refinement, preliminary engineering, and environmental studies.
- ***Field Studies* -** Begin engineering field investigations (geotechnical, topographic) of the route and conduct environmental investigations.
- ***Engineering Analysis* -** Use the field studies and mapping to further define the corridor, design criteria, and costs.
- ***Implementation Planning* -** Further define segment construction phasing, right-of-way acquisition, funding, and related implementation issues.

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