CHEFORNAK ALASKA

BIA LONG RANGE TRANSPORTATION PLANNING

NOVEMBER 2001

PREPARED BY:

KUSKOKWIM ARCHITECTS AND ENGINEERS, INC.

UNDER CONTRACT TO THE

CHEFORNAK TRADITIONAL COUNCIL

Chefornak

Long Range Transportation Plan

Prepared By

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Under Contract To

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Respectfully Submitted
November 2001

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1.0 GENERAL DESCRIPTION

1.1 Location

A Yup'ik Eskimo village, Chefornak is located in the lower portion of the Yukon-Kuskokwim Delta, very near the coast. It lies on the south bank of the Kinia River at its junction with the Keguk River, approximately 98 air miles southwest of Bethel. Geographically, it lies at approximately 60 degrees 13 minutes North Latitude, 164 degrees 12 minutes West Longitude. The Clarence Rhode National Wildlife Refuge surrounds the village

1.2 Background

Chefornak has both Tribal and City governments. The City government operates the landfill, electric service, and maintains the road and airport. The tribal council operates the water and sewer services. The Yukon Kuskokwim Health Corporation (YKHC) operates the Council owned health clinic. Chefornak lies within the Calista Region, and many of the residents are shareholders of the Calista Corporation as well as the local village Corporation (Chefarnrmute Incorporated), which were created under ANCSA. The local school is a part of the Lower Kuskokwim School District headquartered in Bethel.

The site was first occupied in the early 1950's when Alexie Amagiqchik, moved one mile inland, from a village on the Bering Sea coast, seeking a new site that would be protected from potential flooding. After he established a small general store, additional Yup'ik Eskimos moved from the old site and Chefornak was established.

The base of the Chefornak economy is government employment. Most other employment is seasonal and 32 residents hold commercial fishing permits. The village operates a fish freezer for both commercial and subsistence catches. Trapping provides an additional source of income.

1.3 Population

Chefornak's current population, of 416 is 97 %Yup'ik Eskimo, with 1% Aleut and Indians and 2% Caucasians. The population has averaged a growth rate of 42 % per decade since 1970. As a traditional Eskimo community, Chefornak residents practice a subsistence lifestyle with subsistence foods being a large part of their diet.

Using a linear projection, KAE estimates that the population of Chefornak will be approximately 593 by the year 2020.

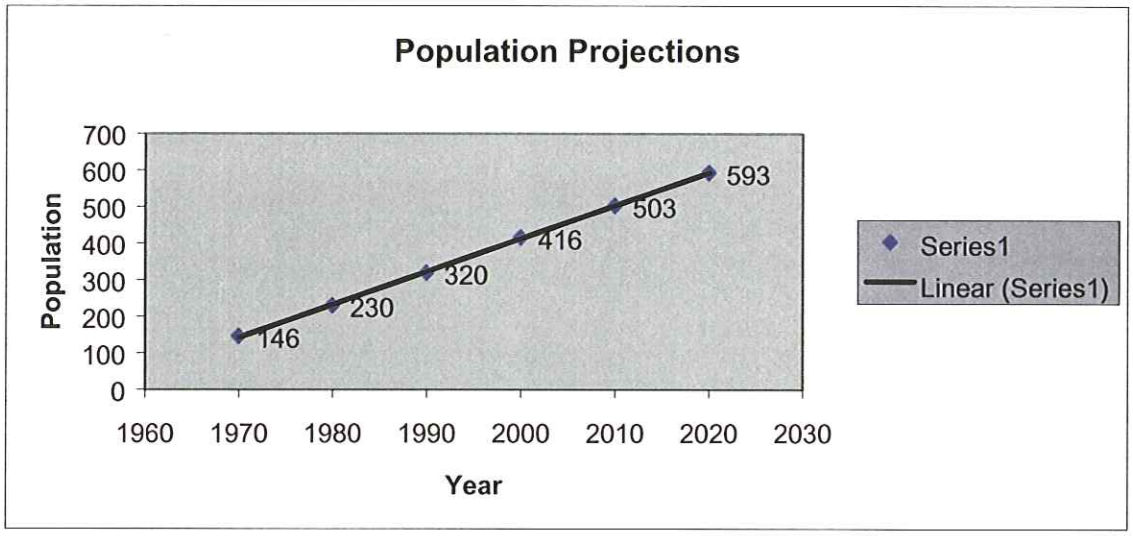


Figure 1 – Population Projection

1.4 Infrastructure

There are a total of 79 housing units in the village, 64 of which are occupied. Unlike most rapidly growing villages, 15 (or 19%) of the houses are vacant. However, 52 (or 81%) are owner occupied while 12 (19%) are renter occupied. There is an average of 6.5 residents per unit throughout. Ninety-seven percent of the units are single-family dwellings, while 1% are multiple units and 1% consists of mobile homes or boats. Slightly over 97 % of the homes do not have complete plumbing and kitchens. Only 10 % of the homes utilize public water systems while the remainder must rely on river water, cisterns or other sources. There is no public sewer system or use of septic tanks. One hundred percent of the homes are heated with fuel oil. Only 53 % the homes have phone service.

In addition to the above facilities, Chefornak has a post office, National Guard armory facility, four stores, K-12 school, City offices, Tribal and corporation offices, library, health clinic, Catholic Church, and airport.

1.5 Soils and Topography

Like many villages in the Lower Yukon and Kuskokwim valleys in areas where permafrost exists, Chefornak sits on very wet soils, primarily of intermixed layers of silts and sands, sandy silts and silty sands.

1.6 Gravel Materials Source

Embankment material may be available locally, but further exploration will be required. No gravel sources are identified in the area, so gravel for surfacing of roads will need to be barged in.

1.7 Land Use and Ownership

The Chefornak City Boundary lies entirely within Sections 19 thru 21, and 28 thru 30 of Township 1 North, Range 86 West, of the Seward Meridian, Alaska. Within the City boundary, existing surveys are listed as follows:

USS 4421 – Townsite survey

USS 4094 – School site, and National Guard Armory survey

ADL 224129 – State management right for the airport, entirely within City Boundary.

ADL 224126 – State management right for unknown use (0.235 ac)

The local Village Corporation, Chefarnrmute, Inc. holds surface rights to land surrounding Chefornak. Subsurface rights have been retained by the USFWS in accordance with provisions of ANCSA, as the City of Chefornak lies entirely within the Yukon Delta National Wildlife Range.

The State is planning an airport project that will result in the state acquiring the management rights for the property around the new airport. A portion of the existing runway will be used to access the future airport. It is not known what will happen to the balance of the existing airport property.

1.8 Climate

Chefornak has a maritime climate with annual temperature ranges of 98 degrees e.g. (-48° to 76°). Snowfall averages 43 inches, which equates to 22 inches of total precipitation per year.

The following climatic data were derived from The Environmental Atlas of Alaska and provide a summary for the area.

Mean Annual Precipitation, inches	22
Mean Annual Snowfall, inches	43
Mean Annual Temperature, degrees F	30
Thawing Index, degree days	2000
Design Thawing Index (1 year in 10), degree days	3100
Freezing Index, degree days	2600
Design Freezing Index (1 year in 10), degree days	3800

No known flooding occurs in Chefornak, however the surrounding area is extremely low, and is subject to frequent flooding.

2.0 THE PLANNING PROCESS

This document is the property of the Native Village of Chefornak, and is for use in planning transportation projects in and around the village. For the benefit of the Tribe, the Tribe is completing this project under Federal Law 93-638. It is funded as part of an effort by the Bureau of Indian Affairs (BIA) to develop a short range Transportation Improvement Program (TIP) for the Tribes of Alaska to be included with the state's State Transportation Improvement Program (STIP). This planning document will ultimately assist the BIA in allocating federal highway funding and in developing a detailed inventory of roads in and around villages.

This study will allow the Tribe to develop a long-range transportation plan that will provide local direction on transportation issues over the next twenty years. It will include components of land use, and identification of other facilities that will impact community transportation during the twenty year planning horizon.

This document should be used by the community to identify, and direct efforts in transportation, and to convey to agencies, and others, the goals of the community with respect to transportation. It is one of the tools that the community can use to communicate to others a picture of what the residents would like to see when they look out their windows twenty years from now.

The scope of work for this project is encompassed in the following three work items:

- **Preliminary Research:** Research and collect existing information from state and federal agencies, and other organizations that have pertinent information.
- **Long Range Transportation Plan:** Develop a planning document that will utilize the preliminary research and information collected directly from the village to provide the community with important information on growth of the transportation system for the next twenty years.
- **Inventory update:** Update the inventory of roadways in the village in order to provide BIA with the most current information on the community transportation system. BIA form 5704 will be prepared for the Tribe's number one priority project along with strip maps and narrative.

2.1 Regulation of Transportation Improvements

Transportation planning is guided by various federal, State, and local laws, rules, regulations, and procedures. The documents listed below provide information on Code and Regulations that apply to this project. The US Code citations can be viewed at http://www4.law.cornell.edu/uscode/, and the Code of Federal Regulations can be viewed at http://www.access.gpo.gov/nara/cfr/index.html.

23 U.S.C. 135	Statewide Planning
23 U.S.C. 202	Allocations
23 U.S.C. 204	Federal Lands Highways Program
25 U.S.C. 450	Indian Self-Determination and Education Assistance Act (P.L. 93-638)

23 CFR 450	Statewide and Metropolitan Planning Rule
25 CFR 170	Construction and Maintenance of Roads
25 CFR 900	Contracts Under The Indian Self-Determination and Education Assistance Act

The State transportation planning process is primarily driven by federal requirements Documents from the state process will be referenced as they impact the development of this local transportation plan.

2.2 Comprehensive Planning

Comprehensive planning for small communities involves assembling information for various aspects of the entire community including land use, health and safety service delivery, education, existing commerce operations, and transportation systems, and incorporating the residents vision for the future of the community.

Chefornak does not currently have a comprehensive plan.

This transportation plan will compose one component of the Chefornak Comprehensive Plan. The community should pursue funding to develop other plan components such as an Overall Economic Development Plan (Contact the Economic Development Agency, EDA at (907) 271-1351). The community may also consider utilizing other resources such as the Community Toolbox "Community Planning Guide And Form" as published by USDA-Rural Development (Contact USDA-Rural Development at (907) 761-7701).

3.0 STANDARDS FOR DESIGN AND CONSTRUCTION

The standards identified in this section are summarized from BIA Juneau Area Transportation Plan, 1993 Update, Technical Memorandum No. 2 (hereafter, Technical Memorandum 2) published in September of 1993. Modifications from these standards will be considered to meet specific local needs.

3.1 Traffic and User Characteristics

Most rural communities are not linked to the road system or other communities; therefore vehicle trips are generally short, point-to-point vehicle trips.

3.2 Design Life

Project cost estimations will use a design life of twenty years for new construction. This is a nationally recognized standard, however, it is recognized that a design life of twenty years will be difficult to achieve in rural Alaska without a strong commitment, and funding for annual maintenance and operations.

3.3 Functional Classification

BIA recognizes the following functional classification of roads that are commonly found within Native communities, and on Indian Reservation lands. This classification begins with the arterials, graduating to collector streets, and followed by local streets. As the classification progresses from the most local level, functional access to land is traded for mobility. Class 1 classification does not exist for BIA roadways.

- **Class 2** – Major and minor arterial roads providing an integrated network having the characteristics for serving traffic between larger population centers, generally without stub connections. May also link smaller towns and communities to major resort areas that attract travel over long distances and generally provide for relatively high overall travel speeds with minimum interference to through traffic movement. Generally provide for at least inter-county or interstate service and are spaced at intervals consistent with population density
- **Class 3** – Streets/roads that are located within communities serving residential or other urban type settings.
- **Class 4** – Section line and/or stub type roads that collect traffic for arterial type roads, or make connections within the grid of the Indian Reservation Road System. May serve areas around villages, into farming areas, to schools, tourist attractions or various small enterprises. Also includes roads and vehicular trails for administration of forest, grazing, mining, oil, recreation, or other utilization purposes. This classification encompasses all those public roads not falling into either Class 2 or 3 definitions set forth.
- **Class 5** – This classification encompasses all non-road type paths, trails, walkways, or other designated types of routes for public use by foot traffic, bicycles, trail bikes, or other uses to provide for general access of non-vehicular traffic.

Roads within the BIA Juneau Area (all of Alaska), will typically fall within Class 3 or 4 with Class 2 roads being found only in and around villages located on the road system, or villages with larger population.

3.4 Estimated Traffic Volumes

Estimation of Average Daily Traffic is compiled using the following methodology adopted from Technical Memorandum 2.

- **Class 2 ADT** – Estimated based on the total households located at both ends of the subject arterial road. This number is multiplied by 1.5 Vehicles Per Day (VPD) per household to estimate vehicle traffic over Class 2 roads.
- **Class 3 ADT** – Estimated based on 3.5 VPD per household. This assumption is reasonable as it yields ADTs close to those based on actual road tubes done by the ADOT/PF, where an average ADT was calculated at 3.63 vehicles per day per household. In any case, the majority of ADTs as estimated for Class 3 roads are neither less than the default value of 50 VPD, or greater than 1000 VPD.
- **Class 4 ADT** – Estimated based on household counts, but the values were determined based on 1.5 VPD per household. The calculated average based on actual road tube counts is 1.43 VPD per household. The minimum is the default value of 50 VPD.
- **Class 5 ADT** – Estimated at the default minimum value of 50 VPD.

3.5 Design Speed

Factors impacting design speed include design designation, terrain, and design traffic volumes. The design speed will establish acceptable minimums for horizontal and vertical road curvature, and will establish values for acceptable grades. The design speed will also establish minimum shoulder widths. Minimum design speeds for Class 3 and 4 roads were adopted from American Association of Highway and Transportation Officials (AASHTO).

Table 1 – Minimum Design Speeds

Speeds (mph) for Given Design Volumes
(Current ADT + 20 Year Projections)

Type of Terrain	ADT + 20 <50	ADT + 20 50-250	ADT + 20 250-400	ADT + 20 Over 400
Level	30	30	40	50
Rolling	20	30	30	40
Mountainous	20	20	20	30

3.6 Design Vehicle

The typical design vehicle for most rural communities will be the Single Unit (SU). Larger vehicles will not typically be found except along the road system, in larger communities, or communities with significant industry such as logging or mining.

Most rural communities use four-wheelers and snow machines as their primary mode of transportation. Due consideration needs to be given to moving construction equipment through the community. For purposes of cost estimation and ROW requirements, the AASHTO HS20/M18 design loading should be used in determining cover depth for culverts, and structural requirements of bridges.

Because of the use of four wheelers and snow machines, and very little use by cars and trucks, some communities may consider modifying standards by constructing narrow travel ways to reduce maintenance and construction costs.

3.7 Cross Section Design

Minimum requirements for Class 3 and Class 4 roads according to AASHTO include 18-foot wide travel way with 2-foot shoulders on each side for a total roadway width of 22 feet. Cross slopes 2-3% should be used, however, greater cross slopes may be used for roadways with low design speeds. A wider travel way increases safety, and should be considered where feasible. Cost estimates for this project will be based on a travel way of 22 feet, and shoulders of 2 feet for Class 3 and 4 roadways.

Embankment fore slopes should ideally be graded at 4:1 or shallower to decrease damage or injury from rollover accidents. A fore slope value of 4:1 will be used in preparing cost estimates.

3.8 Structural Design

Roadway structure should provide enough insulation in permafrost areas to mitigate destabilization of the roadway surface. In areas of seasonal frost, embankment thickness will need to be designed to limit penetration of frost into native soils to prevent formation of ice, and destructive results of frost heaving.

Cost estimates for Class 3 and 4 roads will be compiled using Geotextile fabric over native material in permafrost areas with a borrow thickness of 30", and gravel surfacing of 6".

Cost estimates for Class 2, low volume roads (ADT<250), will be compiled using Geotextile fabric over native material in permafrost areas with a borrow thickness of 30", and gravel surfacing of 6".

3.9 Multi-Use Boardwalk

In many communities in Alaska, transportation within the communities is accomplished using timber boardwalks. These boardwalks keep the residents and four wheeler type vehicles out of the tundra, and prevent the development of very muddy travel ways on the ground. Many of these boardwalks serve pedestrians as well as four-wheeler vehicles

that perform such functions as transporting human waste (flush and haul sanitary systems).

3.10 Other Transportation Modes

The previous discussion pertains to road projects. Other modes that are also considered will be aviation and marine. Both of these modes have funding sources that are independent of BIA, and work on aviation and marine facilities will be done independent of work that results from this plan. Therefore, discussion of standards for these two modes of project will not be pursued in this document. The sections that follow will, however, provide recommendations on when and how to use this document for the benefit of the Tribe when pursuing projects in these other modes.

3.10.1 Aviation

The Federal Aviation Administration (FAA) is predominantly responsible for aviation projects in the villages. Plans for airport projects are coordinated by the FAA, and include documents such as Airport Master Plans and Airport Layout Plans. The FAA will be responsible for relocation or reconstruction of runways in the communities. Therefore, work recommended by this report that occurs near an airport, or impacts an airport, should be communicated to the FAA by submitting a copy of this report.

In many cases, airports are owned and operated by the State of Alaska Department of Transportation and Public Facilities (ADOT/PF). For villages with state airports, copies of this planning document should also be sent to ADOT/PF if there is work recommended by this report that occurs near an airport, or impacts the airport.

Design standards for airport projects are strictly regulated by the FAA and are available from that agency.

3.10.2 Marine

The US Army Corps of Engineers (COE) is responsible for marine work such as new harbor facilities, navigation aids, and erosion control projects. If any work identified in this report impacts one of these types of projects, a copy of this report should be sent to the Alaska District of the Corps of Engineers to alert them to potential projects that may impact future COE work, or that may result in additional justification to an existing or proposed COE project.

Port development projects may not be eligible for COE funding. In these instances, communities wishing to develop commercial port opportunities may need to look to private, state, or other sources of funding for the project. Check with the COE to determine whether a desired project is eligible for COE funding.

The COE does not have specific design specifications, however, there are many books that address the topic of coastal engineering that provide engineering tools for design of marine structures including port and harbor facilities.

4.0 EXISTING TRANSPORTATION SYSTEM

The transportation system in Chefornak consists of an airport, a small number of local roads, and boardwalks. The airport is scheduled for relocation in the next 2 to 3 years. There is a barge landing area used for the supply barge. There are areas along the riverbank adjacent to the community that are used by residents for landing local fishing boats.

4.1 Mapping

Various sources were used to develop the mapping exhibits in this report. Information was gathered from the BIA, State Department of Natural Resources (DNR), and the Bureau of Land Management (BLM).

Within the community of Chefornak, there are two recorded surveys, one for the airport, and one for the school, and National Guard Armory site. Much of the lands surrounding the community have not been surveyed, but have been conveyed to Chefarnrmute Inc. in accordance with ANCSA.

Figure 2 – shows the city of Chefornak and its existing transportation system. The new airport is not shown, however it will be south of the existing runway.

4.2 Roads

Chefornak has four roads; one runs east along the Kinia River from the school through the original part of the community and ends at a boardwalk short of the old BIA school. Another runs from the current school north and connects to the barge landing area.

There is a well-used trail that runs to the landfill from a point just north of the school.

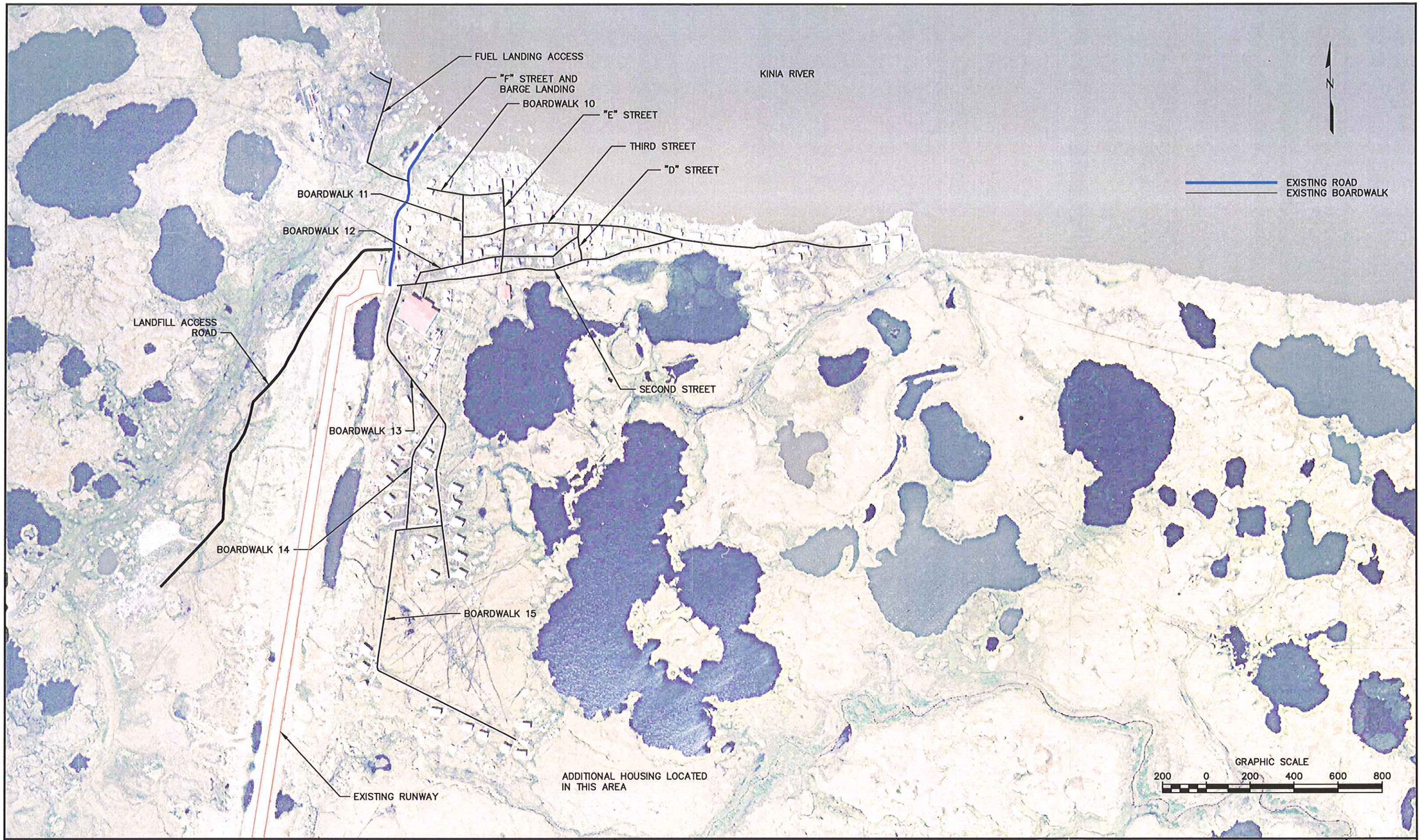
The area of town to the north of the school is connected together via a series of boardwalks, and the area to the south of the new school is connected via a series of boardwalks providing access to the growing subdivision area of town.

The roads are typically of pioneer construction and are not raised above grade. This may suit the purpose of the community, as no cars or trucks are used within Chefornak.

4.3 Airports

The only means of transport into and out of Chefornak is through the existing 2,500' runway. Therefore, the airport is vital to the health and well being of the community.

Chefornak has an existing airport with and apron in front of the school. The State and FAA are in the process of relocating the runway approximately one mile from the school, and plans are to add a crosswind runway in the future to provide additional safety for people flying in and out of the community.



CHEFORNAK TRADITIONAL COUNCIL
BIA LONG RANGE
TRANSPORTATION PLANNING

DATE	REVISIONS	APPROVED

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DATE:	11/06/01
SCALE:	AS SHOWN
DESIGNED BY:	SSK
DRAWN BY:	GCS
CHECKED BY:	SSK
Chefornak-Aerial-SK.dwg	

EXISTING
TRANSPORTATION SYSTEM
CHEFORNAK, ALASKA

FIGURE
2

4.4 Ports/Harbors/Marine

The river is a vital link for the community, providing access to commercial and subsistence fishing grounds, and providing access for the supply and fuel barges.

4.5 Trails

There are no known trails into or out of the community; however, snowmachines and four wheelers are used to travel across the tundra in the winter to gain access to subsistence areas, and for access to the villages of Toksook Bay, Nightmute, and to Tuntutuliak.

4.6 Traffic Patterns Within the Community

Residents of the community travel between their homes, the school, clinic, airport, post office, stores, landfill, community hall, the barge landing, and the riverbank.

4.7 Traffic Patterns Between the Community and Other Locations

Visitors and residents use the airport for access to the hub community of Bethel, and to Anchorage, and for occasional access to other communities in the area. The airport provides access to inpatient care facilities, school and social activities for local residents.

Local residents use snowmachines, four-wheelers, and boats to access traditional subsistence hunting and fishing grounds, and to get to other villages in the area.

4.8 Maintenance

The City of Chefornak collects a 2% sales tax that adds to the municipal assistance and revenue sharing funds received from the State and other funds received from various sources. The City is responsible for maintenance of the roads and boardwalks; however, funds have not been available to perform routine maintenance. Maintenance of the boardwalks can extend the life of the facilities, and will result in safer travel ways for local residents. Because of the lack of funding, significant amounts of road maintenance are not possible at this time. However, should revenue for road maintenance and equipment purchase become available, the community would benefit greatly from an increase in road and boardwalk maintenance.

Table 2 – Existing Road Inventory

Route Designation	Poor Condition	Fair Condition	Good Condition	Length (feet)	Length (miles)
First Street (not identifed)					
Second Street				1,292	0.24
Third Street (boardwalk)		x		1,878	0.36
A Street (not identifed)					
B Street (not identifed)					
C Street (not identifed)					
D Street (boardwalk)		x		157	0.03
E Street (boardwalk)		x		429	0.08
F Street (boardwalk)		x		742	0.14
Fuel Landing Access (boardwalk)		x		705	0.13
Boardwalk 10		x		349	0.07
Boardwalk 11		x		312	0.06
Boardwalk 12		x		812	0.15
Boardwalk 13		x		1,426	0.27
Boardwalk 14		x		545	0.10
Boardwalk 15		x		1,552	0.29
			Total	10,199	1.92

5.0 TRANSPORTATION NEEDS

The residents of Chefornak have identified the following needs as the most important transportation projects for their community. The table shows the road needs. Their descriptions and project costs are listed in this chapter along with other projects.

Table 3 – Road Needs

Route Designation		Sub-Total (miles)
Construct road to subsistence camp and cemetery on coast		6.5
Install safety markers and shelters on trails to four villages		136.0
Construct access road to proposed landfill site		0.91
Construct access road to proposed sewage lagoon		0.49
	Total	143.9

5.1 Project Priorities

The following priorities are the top three projects identified by the residents of Chefornak.

1. Construct road to subsistence camp and cemetery on coast,
2. Install trail markers and shelters on trails to four villages, and
3. Construct access to proposed landfill site.

5.2 Subsistence Access

The village of Chefornak is in need of an all-weather road leading to a historic cemetery and subsistence hunting and fishing camp on the coast of the Etolin Strait southwest of the village. Tribal members have traditionally hunted birds and fished along the tidal zone in that area, however, overland travel is difficult and the all terrain vehicles cut ruts through the tundra during the summer. This road will need to be 22 feet wide and approximately six and a half miles in length.

The complete route lies on low, flat, wet delta terrain, underlain with permafrost with no visual barriers. It will serve subsistence needs.

This road should be well marked with appropriate flags. Proper GPS waypoints should be identified and published.

Using unit cost information from Appendix A, the estimated cost per mile is $2.11 Million. For 6.5 miles of new road, the total estimated project cost is $13.70 Million.

5.3 Trail Marking

The residents of Chefornak commonly travel, on winter trails, to the neighboring villages of Toksook Bay (38 miles), Nightmute (32 miles), Tuntutuliak (47 miles) and Kipnuk (19 miles) via snowmachine. Blizzards, heavy fog and other severe weather conditions make distant cross-country travel risky unless trails are well marked.

There is a need for good quality visual marking, safety shelters and accurate GPS waypoints along all routes. Using unit costs from Appendix A for 136 miles of trail marking, the total estimated cost is $421,600. Safety shelters will also be included, one for the trail to Toksook Bay, one for the trail to Nightmute, two for the trail to Tuntutuliak, and one for the trial to Kipnuk. Using a unit cost of $7,750 per shelter and a total of five shelters, the total estimated cost for shelters is $38,750. Combining the trail marking and shelter costs, the total estimated project cost becomes $460,350.

5.4 Landfill Access

There is a need for an access road to the proposed landfill site west of the village. This road will need to be 22 feet wide and approximately 1½ miles in length. Village Safe Water is planning, and will construct the new landfill, the plans call for only a boardwalk to the site.

The complete route lies on low, flat, wet delta terrain, underlain with permafrost with no visual barriers. It will serve domestic needs.

Using a unit cost of $2.11 Million per mile for new road construction, the total estimated project cost is $3.17 Million.

5.5 Other Projects

Access Road To Proposed Sewage Lagoon: Village Safe Water is planning a new sewage lagoon approximately two miles southwest of the village, however plans call for only a boardwalk to the site. Villagers desire road access, due to the distance to be traveled.

This road will need to be 22 feet wide and approximately 1½ miles in length. The complete route lies on low, flat, wet delta terrain, underlain with permafrost with no visual barriers. It will serve domestic needs.

Using a unit cost of $2.11 Million per mile of new road construction, the total estimated project cost is $3.17 Million.

Improved And Expanded Barge Landing Site: The Chefornak Traditional Council has identified the number one priority for their Twenty-year Transportation Plan as an improvement and expansion of the new barge-landing site on the Kinia River. This will help improve the basic use and operation of sending and receiving marine freight and will help the overall economy of the village.

Currently, the barge landing is only twenty-five feet wide, making it almost impossible to turn around while off-loading supplies and equipment from the barge. There is no space for storage of freight prior to hauling and distribution.

The Council is requesting that the landing be widened to sixty feet in width. Gravel for the initial barge landing was barged to the site.

A four-foot thick pad of gravel 60 feet wide by 100 feet long would take 1,156 loose (not compacted) cubic yards of gravel. From Appendix A, gravel costs about $45 to $50 per ton delivered to the village, which is about $68 per cubic yard for materials and labor by

the time the gravel is put into place and compacted at the barge landing. Adding 35% for indirect costs and 20% for contingency costs, the price of the project will be $121,840.

Passenger Shelter At Airport: Due to its coastal and northern location, Chefornak experiences several days per year of very cold, windy and rainy or snowy days. The open terrain provides no protection for passengers and/or freight while waiting for the planes to arrive at the airstrip.

Adequate shelters are being requested to provide some protection for passengers, baggage and freight from the elements.

A reasonable shelter, such as a two room, 12 feet by 24 feet metal building can be purchased from a vendor such as the Alan Pre-Fab Building Corporation for $18,000. The pre-fabricated building weighs about 13,000 pounds, so the shipment from Seattle will cost about $13,000. Foundation work and assembly will cost another $10,000. Adding 35% for indirect costs such as administration and another 20% for contingency costs to the construction costs brings the project cost to $63,550.

Village Location Strobe Light And Tower For Safety: The severe weather, along with the very flat, typically frozen, snow-covered terrain, provides few landmarks for surface travelers. Long darkness, thick fog, and blizzards frequently make it difficult for hunters and travelers to find their way back to the village.

Residents are requesting a dependable strobe light, placed high on a pole or tower to help guide a snowmobile rider find the safety of the village from long distances away.

Titan Towers makes a 72-foot self-supporting tower, Model T500, for less than $2,000. The beacon light, probably something like the Automatic Timing Company's S200 strobe with 3,000,000 candlepower, will cost about $300 with an AC/DC power converter. Freight, labor, and seven yards of concrete for the base will run the direct construction costs to $10,000. Adding 35% for indirect costs such as administration and another 20% for contingency costs to the construction costs brings the project cost to $15,500.

Trail Improvements To The Etolin Straight: The five-mile, westerly trail towards the strait, as identified in Figure 4, needs trail markers and small bridges for three stream crossings. The Alaska Department of Transportation has joined with the BIA, in cooperation, to administer and install tripods as winter trail markers along several routes in western Alaska. Larger tripods replace the old design of rebar and plastic wand combinations for trail marking. ADOT reports that the typical labor costs are $25-35 per tripod marker and $40-60 for materials to construct a 6-foot high tripod out of 8-foot long poles. Although the spacing between tripods varies according to the terrain and the turns for 100 feet to 500 feet, an average spacing of 250 feet is used for the estimates. Each mile would get 21 markers, of which, one would be a special 6-inch diameter mile-marker with a 2-inch color-coded plate. Destination signs with distances will be at the beginning of the marked trails. Using the higher costs of each of these numbers, the direct construction costs for each mile would be $2,000. For the 5 miles from Chefornak westerly to the Etolin Strait, the direct construction costs for trail marking would be $10,000.

Small bridges built similar to boardwalks would also help safety by bridging across three small streams and drainages that, of course, would jeopardize a traveler during initial

freezing weather and during thawing months. Sections about 20 feet long by 5 feet wide and constructed of durable 3"x12" decking could be built and dragged to the crossings for less than $3,000 each. Three wooden, 20-foot long by 5 feet wide bridges would cost $9,000.

Combining the trail marking and bridge costs for the Etolin Strait trail results in $19,000. Adding 35% for indirect costs such as administration and another 20% for contingency costs to the construction costs brings this project cost to $29,450.

5.6 Exhibits

Figure 3 – shows the proposed project priority improvements for Chefornak.

Figure 4 – shows the regional trail marking project areas.

Table 4 – Summary of Proposed Project Costs

CHEFORNAK

Item Descriptions	Quantity	Units	Direct Costs	35% for Indirect Costs	20% for Contingency Costs	Estimated Project Costs
Road to subsistence camp and cemetery on coast	6.5	Miles	$8.84 million	$3.09 million	$1.77 million	$13.70 million
Safety markers and shelters on trails to four villages	136	Miles	$297,000	$103,950	$59,400	$460,350
Construct access road to proposed landfill site	1.5	Miles	$2.04 million	$714,000	$408,000	$3.17 million
Construct access road to proposed sewage lagoon	1.5	Miles	$2.04 million	$714,000	$408,000	$3.17 million
Improved and expanded barge landing site	1,156	Cubic Yards	$78,608	$27,513	$15,722	$121,840
Passenger shelter at airport	1	Each	$41,000	$14,350	$8,200	$63,550
Village location strobe light and tower for safety	1	Each	$10,000	$3,500	$2,000	$15,500
Trail improvements to the Etolin Strait	5	Miles	$19,000	$6,650	$3,800	$29,450
					Estimated Costs for Projects	$20.73 million

CHEFORNAK TRADITIONAL COUNCIL
BIA LONG RANGE
TRANSPORTATION PLANNING

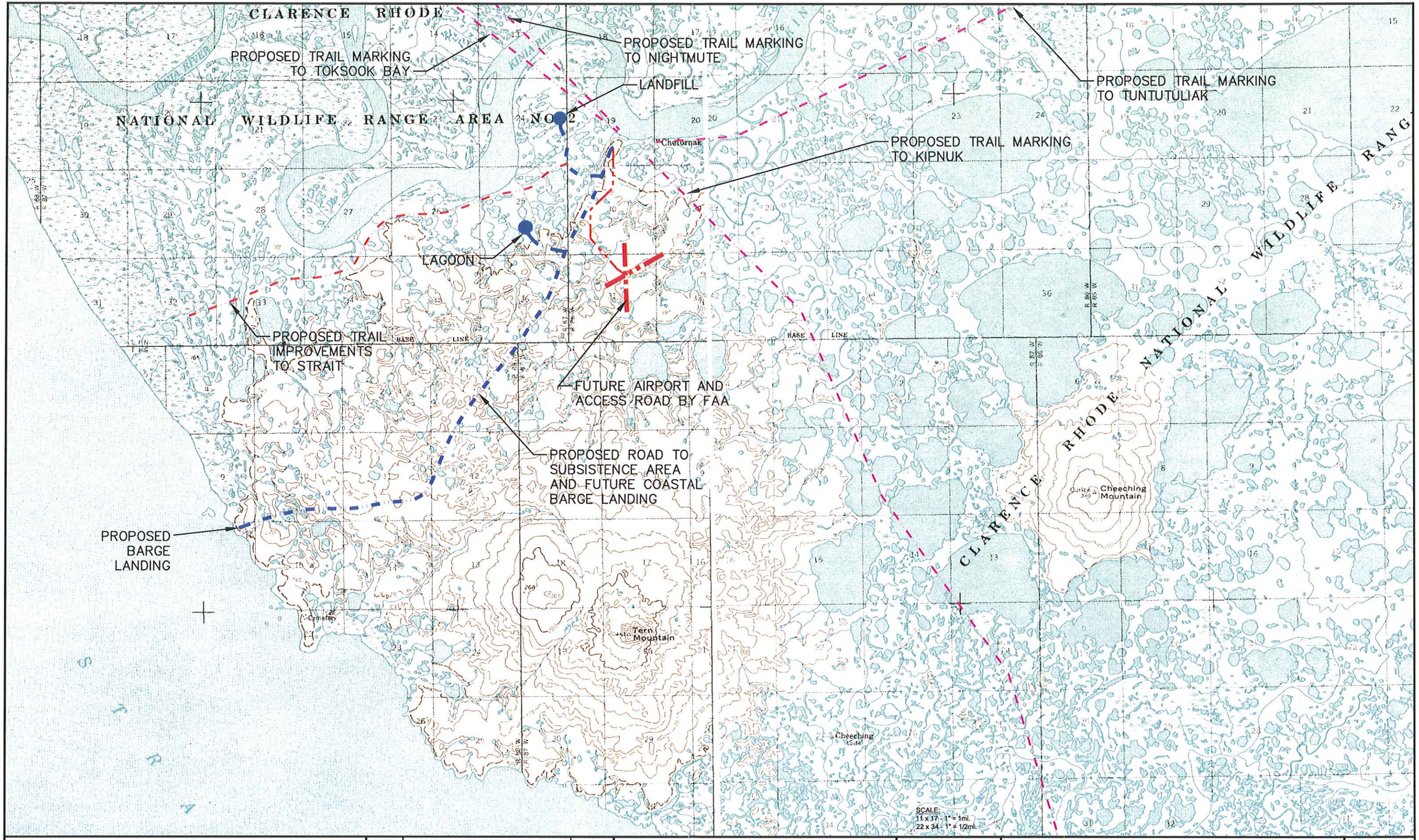
DATE	REVISIONS	APPROVED

KAE, Inc.
KUSKOKWIM ARCHITECTS AND ENGINEERS
P.O. BOX 91970, ANCHORAGE, AK 99509-1970
PH# (907) 276-2176
FAX# (907) 276-2184

PROJECT NO:	123001
DATE:	11/06/01
SCALE:	AS SHOWN
DESIGNED BY:	SSK
DRAWN BY:	GCS
CHECKED BY:	SSK
Chefornak-Aerial-SK.dwg	

PROPOSED TRANSPORTATION IMPROVEMENTS CHEFORNAK, ALASKA

FIGURE
3



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PROPOSED TRANSPORTATION IMPROVEMENTS CHEFORNAK, ALASKA

FIGURE
4

6.0 CONCLUSION AND RECOMMENDATIONS

This planning document provides a basis for development of transportation projects in Chefornak. Within the planning horizon, there are basically eight priority projects that residents would like to see in their community.

Transportation projects in Chefornak range from road construction/reconstruction to docking facilities, and a barge landing. There are various opportunities for funding of such projects. Funding options for the stated projects are outlined in the following section.

6.1 Funding Options

The estimated costs of projects range from $15,500 to $13.7 Million.

Roads: The most obvious funding source for projects in this area is from the BIA IRR program. Other possible funding sources include the State of Alaska Department of Transportation's Federal Aid Highway program, which has funding for construction of new roads as well as reconstruction of existing roads, and Village Safe Water, which has funding for sanitation facility access roads. This document will be submitted to the BIA to start the process of acquiring funding from the IRR program. The Tribe should visit the ADOT/PF Internet web site www.dot.state.ak.us to obtain information about participation in the ADOT/PF road programs. As the BIA IRR program is limited in amount of funding available, the Tribe should work directly with the Alaska Congressional Delegation to secure funding for road to the coast.

Trail marking: Funding for trail marking projects will most likely come from the State Department of Transportation and Public Facilities, Tribal funds, or both.

Passenger Shelter: Funding for miscellaneous structures can come from a variety of sources including Tribal funds, DCED Mini-Grants, DCED Community Development Block Grants or USDA community development grants.

Emergency Beacon: Funding for an emergency beacon can come from Tribal funds, DCED Community Development Block Grants, or USDA community development grants.

Marine: There is little public funding available for miscellaneous marine projects. The State Department of Community and Economic Development has the Mini-Grant program (up to $30,000 for projects that enhance economic development) and the Community Development Block Grant (DCBG) program. Other tribal-specific grants such as those available from the Economic Development Administration (EDA) and the Administration for Native Americans (ANA) will help with these types of projects. USDA Rural Development also has several flexible programs that may provide assistance.

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APPENDIX A

A) UNIT COSTS

a) Introduction

Costs can be separated into two broad categories. Direct costs are associated with or incurred during construction efforts at the jobsite. Indirect costs include planning, design, acquisition of right-of-way, administration, legal work, construction inspection, and testing. Indirect costs for the planning purposes of this report will be assumed to be 35%. Also, for planning purposes, a contingency of 20% will be assumed for unforeseen items and challenges that may occur during the project.

b) Unit Costs for New Road Construction

Unit costs were developed based upon new road construction for recent projects in rural Alaska and upon recently provided unit costs from the Alaska Department of Transportation. Assumptions used in developing the unit costs for new roads are as follows:

Gravel sources exist and are developed in the area.

Heavy equipment exists in the village area and is available for lease.

Road widths will be a minimum width of 22 feet.

New roads will have a three-foot thick gravel section.

New roads will have a minimum of utility relocations.

The estimated unit construction cost for new 22-foot wide roads is $1.36 Million per mile. Adding 35% for indirect costs and 20% for contingency, the total estimated per mile cost of road construction is $2.11 Million.

For narrower, 14-foot roads in the Bethel area, the Alaska Department of Transportation uses $930,000 per mile for cost estimates.

c) Unit Costs for Imported Gravel

Most of the communities built upon the silt-deposits of the Yukon-Kuskokwim River Delta must import their gravel. Several villages have reported paying $45 to $50 per ton for gravel to be barged to them to improve their barge landing or the access to their barge landing. Converting to loose cubic yards by using 1.3 tons per cubic yard gets $65 per cubic yard delivered to the site.

If the barge is within 500 feet of the stockpiling area, the rate to unload will be about 100 cubic yards per hour. At $100 per hour for a medium-sized loader similar to a 24,000-pound Cat 950 loader, the cost to unload is $1 per cubic yard. For placing the material on a nearby area and knocking it down, another $1 per cubic yard is reasonable.

Finish grading is about 10¢ per square foot. For an area to be filled, say 100'x100', with a placement thickness of 4 feet, there are 40,000 cubic feet of material. Dividing by 27 cubic feet per cubic yard gets 1,481 bank cubic yards. The material on the barge is loose

cubic yards, which are about 1.3 times "fluffier" than in-situ (embankment) cubic yards. Multiplying by a factor of 1.3 loose cubic yards per bank cubic yard gets 1,926 loose cubic yards, which are usually referred to as "truck cubic yards." At 10¢ per square foot, the finish grading work is worth $1,000. Apportioning the $1,000 grading work to the 1,926 cubic yards is worth about 50¢ per cubic yard, which is relatively small compared to the cost of the gravel on the barge. Again, this example is based upon a 4-foot, finished thickness.

Summarizing the imported gravel unit costs:

Gravel Materials Barged to Community	$65.00	per loose cubic yard
Barge Unloading with Loader	$1.00	per loose cubic yard
Gravel Placed at Nearby Site	$1.00	per loose cubic yard
Finish Grading	$0.50	per loose cubic yard
Unit Cost for Gravel	$67.50	per loose cubic yard

Adding 35% for indirect costs and 20% for contingency to the $68 per cubic yard construction cost, a value of $105 per loose cubic yard is used for the unit cost basis assigned to the imported gravel projects when the gravel is used near the barge facilities.

d) Unit Costs for Winter Trail Marking with Tripods

The Alaska Department of Transportation has joined in cooperation with the BIA to administer and install tripods as winter trail markers along several routes in western Alaska. Larger tripods replace the old design of rebar and plastic wand combinations for trail marking. ADOT reports that the typical labor costs are $25-35 per tripod marker and $40-60 for materials to construct a 6-foot high tripod out of 8-foot long poles. Although the spacing between tripods varies according to the terrain and the turns for 100 feet to 500 feet, an average spacing of 250 feet is used for the estimates. Each mile would get 21 markers, of which, one would be a special 6-inch diameter mile-marker with a 2-inch color code plate. Destination signs with distances will be at the beginning of the marked trails. Using the higher costs of each of these numbers, the direct construction costs for each mile would be $2,000. Adding 35% for indirect costs and 20% for contingency, a value of $3,100 per mile is used for the unit cost basis assigned to the winter trail marking with tripods.

e) Unit Costs for Emergency Shelter along a Winter Trail

An emergency shelter along the way, perhaps near the mid-point of the route could be dragged into place during a winter. The building would be small, about 8 feet by 6 feet. It would be placed, in this case, far enough out of town so that it would not get occupied or abused regularly. A reasonable cost for a small shelter with the placement along a trail would be $5,000. Adding 35% for indirect costs and 20% for contingency, a value of $7,750 per shelter is used for the unit cost basis assigned to emergency shelters along winter trails.

f) Unit Costs for Small Bridges for Creek Crossings

Small bridges built similar to boardwalks would also help safety by bridging across small streams and drainages that, of course, would jeopardize a traveler during initial freezing weather and during thawing months. Sections about 20 feet long by 5 feet wide and constructed of durable 3"x12" decking could be built and dragged to the crossings for less than $3,000 each. Adding 35% for indirect costs and 20% for contingency, a value of $4,650 per crossing is used for the unit cost basis assigned to short, wood bridges across small creeks.