

ALASKA LEGISLATURE SPECIAL COMMITTEE / SUBJECT FILES 8672

344 SCOM10: LOCAL GOVERNMENT STUDY 1079

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I. PREFACE

During the summer of 1977, decay and erosion of the waterfront area within Bethel reached such a state as to negatively affect the public and private sectors of the City of Bethel. This erosion and the assured continued erosion of the area prompted the City Council of the City of Bethel to endorse a resolution in support of disaster funds for the establishment of a new seawall within the City of Bethel's jurisdictional boundaries.

As no immediate action was taken as a result of the City Council's resolution, a citizen's committee met to discuss the serious consequences of past, current and future erosion of the Bethel waterfront, and the feasibility of the development of a permanent seawall project through the United States Army Corp of Engineers.

During the first week of September 1977, a meeting with the U. S. Army Corp of Engineers, City officials, Public Health Service officials, Governor's Representative, and private citizens met at the Governor's office in Anchorage to evaluate the proposal for an emergency and permanent seawall project.

As a result of that meeting a resolution was drafted and presented to the United States Senate Committee on Environment and Public Works requesting the United States Army Corp of Engineers to re-evaluate and make recommendations on the river bank stabilization project at Bethel, Alaska. This resolution passed September 9, 1977.

Concurrent with this development, the citizens' committee began meeting and formulating plans for the implementation of a successful permanent seawall project through the U. S. Army Corp of Engineers. During the third week of October 1977, a meeting of the committee, concerned citizens and the Corp of Engineers was held in Bethel. All perimeters of the project were discussed. It was determined that the most crucial aspect of justifying a permanent seawall project was the establishment of a favorable cost to benefit ratio.

It was agreed by the committee, and the Corp of Engineers representative, Mr. Mason Wade, at that time, that the most favorable, accurate and comprehensive presentation of the necessary data would be obtained from the community itself.

The following is a compilation of data gathered by the citizens of Bethel, the committee on erosion, and the City of Bethel for this purpose.

II. AUTHORIZATION

This report is submitted in response to the following congressional resolution passed September 9, 1977.

Resolved by the committee on Environment and Public Works of the United States Senate, that the Board of Engineers and Rivers and Harbors, created under Section 3 of the River and Harbors Act, approved June 13, 1902, be, and is hereby requested to review the reports of the Chief of Engineers on Interim Report No. 7- Yukon and Kuskokwim River Basin, Alaska, published as a House Document Numbered 219, 88th Congress, and on the Bethel Bank Stabilization and Flood Control transmitted to Congress on December 4, 1973, and other pertinent reports, with a view to determining whether any modifications of the recommendations contained therein are advisable at the present time, with particular reference to the provisions of bank stabilization improvements at and in the vicinity of Bethel, Alaska.

- (s) Jennings Randolph, Chairman
- (s) Robert T. Stafford, Ranking Majority Member

III. COMMUNITY PROFILE

LOCATION

The City of Bethel occupies a central location in the Yukon-Kuskokwim Delta Region of Southwestern Alaska and is specifically located on mile 86 of the north bank of the Kuskokwim River. (Figure 1). Bethel lies approximately 400 air miles west of Anchorage and 540 air miles southwest of Fairbanks. (Figure 2).

It is because of this central location and the fact that Bethel is the upper limit for navigation of ocean going vessels that Bethel has developed from a small trading center named Mutrehlagamiut into the center of trade, transportation, distribution, communications, administration and education for Southwest Alaska.

In 1889, the Moravian Brotherhood Mission established a church and school at Bethel. By the early years of the twentieth century, Bethel was a well organized mission and trading center located in fairly high ground along what was then, a side stream of the Kuskokwim River. Over a period of less than fifty years through constant erosion of the river bank, the site of the early community has been lost and the city is now located along the outer and eroding bend of the main channel of the Kuskokwim River. The constant erosion of the river bank has forced frequent relocation of structures back to safer ground and poses a constant and severe threat to the existing town and future development.

HISTORICAL REQUESTS

Bethel's transition from a small trading village to a major regional center has placed greater and greater importance on the waterfront.

Difficulties arising from erosion of Bethel's waterfront have been documented since 1934. At that time the Chamber of Commerce of Bethel sent a letter to Congress stating that "five hundred feet of the river bank has washed away," and, "if nothing is done Bethel is doomed." The Chamber requested an engineer be sent to Bethel for a preliminary survey of the Bethel Harbor. The request was denied initially but later approved. That year a severe storm hit Bethel from the southeast resulting in considerable damage to the Bethel waterfront, wrecking small boats and washing out homes. In 1935, the people of Bethel again asked for a government engineer to come out and survey the waterfront and also requested an appropriation of \$25,000 to construct permanent improvements to the Bethel waterfront. The survey of

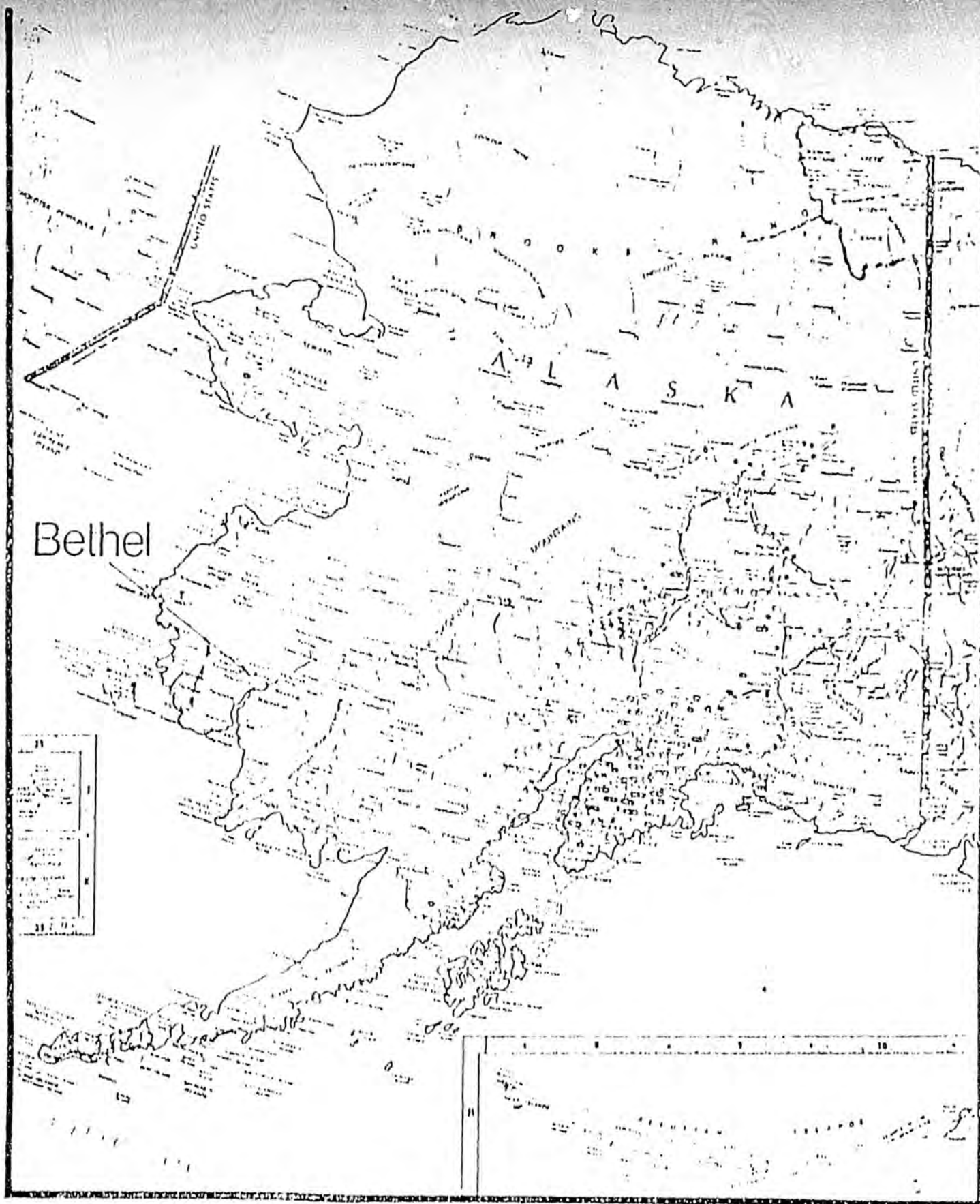
the Bethel harbor finally took place and a report was filed on October 27, 1936. The conclusions stated in the report were: "This report finds that the United States would not be justified in undertaking improvements of the locality in question at this time because it appears that the only work needed is bank protection for the benefit of local and private interests rather than the general public."

By 1939, Bethel was firmly established as the center for the Delta area, with a Bureau of Indian Affairs school, an airstrip and a new hospital under construction. Desperately the people of Bethel tried to obtain emergency funds. Neither the Bureau of Indian Affairs or the Board of Engineers had funds to give Bethel the assistance they asked for.

Requests for assistance were made from the 1930's through the 1960's when funds were obtained from the State of Alaska and the City of Bethel to construct a 2,000 foot wooden retaining wall to stem the erosion. In 1967, a study was requested from the City of Bethel for the U. S. Army Corp of Engineers study of the area asking for the construction of a permanent seawall. This study became a reality and in 1970, the Corp of Engineers finalized their report on the Bethel Bank Stabilization and Flood Control. The recommendations of that report state: "Structural measures for the bank erosion control and flood control including combinations of flood control and evacuation are not economically justified." The Corp of Engineers, at that time, gave Bethel a .1 to 1 cost to benefit ratio.

A sudden, dramatic, accelerated rate of erosion began in 1977, when an estimated twenty feet a week of riverfront property was lost in the Public Health Service Hospital area. The back road to the hospital was completely washed away, taking with it telephone and power lines.

Alarmed by the rapid increase in erosion, local citizens and municipal representatives gathered together to once again, call upon the Corp of Engineers for assistance.



Bethel: state perspective

Figure 2

POPULATION

The population of the City of Bethel has grown from less than 300 people in 1930 to an estimated 3,500 people in 1977. Table No. 1 illustrated the rapid, continuing, steady growth which Bethel has been experiencing. All indications are that Bethel will continue to grow at this rapid rate in the future.

TABLE NO. 1
POPULATION CHANGE

YEAR	TOTAL POPULATION	TOTAL PER CENT CHANGE	ASSUMED YEARLY PER CENT CHANGE
1960	1,258		
1970	2,416	92.1%	9.21%
1973	2,929	17.0%	5.6%
1975	3,200	9.0%	4.5%
1977	3,500	8.5%	4.25%

EMPLOYMENT

Previously within the City of Bethel, government was the principal employer. This has changed over time and today 42% of the employers are government organizations employing 40% of the total work force. Therefore, 58% are private employers employing 60% of the total work force. For Bethel, this reflects the fact that job opportunities are growing and expanding. Other than government, major areas of employment include transportation, construction, fishing related employment, education, communications and service establishments.

Employment in Bethel is strongly influenced by seasonal fluctuations. During the summer months fishing, fish processing and construction related activities show substantial gains. Many residents of surrounding villages migrate to Bethel for summer employment and the fact again arises that Bethel is used for services and as a seasonal employment center by residents of the entire region.

COST OF LIVING

Cost of living in Bethel is high. Shipping difficulties to such a remote area are probably responsible for this as well as higher costs due to shortages of available goods.

The Cooperative Extension Service of the University of Alaska provides average retail prices for certain food items which show that in March of 1977, residents of Bethel paid \$85.39 for groceries which in Anchorage would cost \$57.45. The high food costs are currently 193% of food costs in Seattle.

This high cost of living is also reflected in construction costs, land prices, and housing costs. The price of an average one and two bedroom home in Bethel is currently \$25,000 - \$50,000.

COMMUNITY FACILITIES AND SERVICES

Many factors have accelerated the change within Bethel from a small village into a stable regional center. Primary among these is the provision for a substantial number of community facilities and social services which substantiate the importance of Bethel. Among them are:

SCHOOLS

Bethel is the District Headquarters for the largest Rural Education Attendance Area in the State, with an annual budget in excess of \$8 million. There are four schools in Bethel with an average daily attendance of approximately 1,760 students and 133 teachers.

The Kuskokwim Community College was founded in 1970. Fall registration at the college this year was 460. KCC, in Bethel, is the largest rural community college in the University system. Students from the entire AVCP region either come to KCC for classes or are part of a village delivery system whereby teachers travel to villages and students come into Bethel for workshops and special sessions.

The College boasts a new facility completed in 1974, and an equally large addition completed in 1976. In addition to this, the college has a student union building and leases classroom space in other buildings throughout the community.

An aggressive program in community education began last year in Bethel as a joint venture between Kuskokwim Community College, the City of Bethel and the Lower Kuskokwim School District. Over fifty types of classes are offered each semester.

MUNICIPAL GOVERNMENT

The City of Bethel was incorporated in 1957, and currently is a second class city with a council/manager form of government. There exists an on-going citizen participation structure in the City in the form of standing committees.

The City of Bethel has a variety of responsibilities including the Bethel Alcohol Treatment Center, the Bethel Fire Department, the Kuskokwim Consortium Library, Parks and Recreation Department, Police Department and Jail Operations, Public Works Department, Planning Commission and the Yugtarvik Regional Museum. The municipal services provided include water delivery sewer evacuation and pick-up, garbage pick-up and animal control. Currently the city collects a 3% City Sales Tax.

PUBLIC SAFETY

The City of Bethel assumed its own municipal public safety function in 1969, with a two man police force. Since that time the City has built a public safety building which houses the police department and a regional correctional facility. The City Police Department is now staffed with eight police officers, two clerical personnel, and ten correctional personnel. Presently a new criminal justice center is planned for Bethel.

The Alaska State Troopers have an area office located in Bethel staffed by five commissioned personnel. They have a policing responsibility for 56 communities located within this service district.

JUDICIARY

At statehood, Bethel was the seat of the magistrate court. In 1967, the court system was restructured statewide and Bethel became the seat of the District Court for the Yukon-Kuskokwim area. In 1976, the City of Bethel built, and is currently leasing to the State of Alaska a new court house facility. In that same year a permanent Superior Court Seat was established in Bethel.

FIRE PROTECTION

The Municipality of Bethel, since its inception in 1957, operated a volunteer fire department. Today the city has expanded this department and retains permanent fire personnel. An appropriation from the State of Alaska for the construction of a new regional fire fighting training center has been approved.

HOUSING

The most crucial factor in developing housing is the lack of available land. There currently exists in Bethel a critical housing shortage as the development of housing cannot keep pace with the influx of new residents.

There have been substantial efforts to provide housing to the residents of Bethel. In 1969, through a joint HUD and ASHA project, 200 units were constructed for occupancy and eventual ownership by low income families in "Bethel Heights". The City of Bethel has made 137 lots available for individual home construction in City Subdivision and has a waiting list of over forty people and constant inquiries about the sale of available land. The Association of Village Council Presidents (AVCP) Housing Authority has two new subdivisions planned, "Ptarmigan Subdivision," and "Tundra View," which are planned for construction in the summer of 1978. The AVCP Housing Authority is also constructing a 24 unit elderly housing project. The Bethel Native Corporation is in the process of completing the third apartment complex within Bethel.

Regardless of the recent improvements in Bethel, housing is still difficult to find. Again, the lack of available land has led to this difficulty. Since the Alaska Native Claims Settlement Act, land surrounding Bethel has been filed upon and tied up in the selection process which will continue for some time.

COMMUNICATIONS

Bethel is linked to the outside world through a number of communication facilities. Telephone, radio, T.V., a bi-weekly newspaper, the "Tundra Drums," and the Post Office are all important.

One improvement for Bethel was the opening of the radio station KYUK in 1971. Television made its debut in 1973, and provides education, information, public affairs and entertainment programming to over 47 villages in the Calista Region. This service is currently included in the state satellite system.

HEALTH CARE

The City of Bethel is serviced with rather extensive medical care through Public Health Service, Yukon Kuskokwim Health Corporation and State Services. The Public Health Service is in the process of constructing a new hospital facility. Construction for the \$32+ million project has begun and will continue for the next four years before completion. The new Bethel Public Health Service Hospital, designated as the Comprehensive Regional Health Care Center, will

provide sufficient accute care and health maintenance capabilities when completed.

ALCOHOLISM TREATMENT CENTER

In 1973, the City of Bethel voted to become a "dry" community. The vote was reiterated in 1977. Prior to that time the alcoholism treatment center would service approximately 300 people per month. A new center providing detoxification and total treatment is now under construction for region wide treatment for alcoholics.

SOCIAL SERVICES

The base for a variety of region wide social services is in Bethel. This includes the Bureau of Indian Affairs headquarters for the largest service area in the United States. Also included are several state and local social service agencies providing financial and food assistance, employment assistance, day care and childrens' services.

ADDITIONAL COMMUNITY SERVICES

Many additional facilities exist with the City of Bethel. These include a group home, day care center, prematernal home for expectant mothers from surrounding villages and a variety of recreational programs. The City of Bethel Parks and Recreation Department is currently in the process of constructing a combined rifle range/bowling alley, and developing bike trails.

IV. TRANSPORTATION: PORT OF BETHEL

Transportation is the key to Bethel's role as a successful service and distribution center. The Bethel port which for years struggled due to lack of adequate waterfront docking facilities finally received a permanent dock in 1976. Such facility, located at the junction of Brown Slough and the main river, has already proven to be tremendously inadequate. As can be seen on the 1977 Recap Report of Port Activity, (Table No. 2) many vessels were required to discharge their cargo at other docking locations within the port. As further seen from Table No. 3, the port has sustained an average annual increase of activity of 27% over the past ten years. Thus, in light of this growth there is a clear need for further permanent docking facilities.

In 1969, the last Alaska Steamship serviced Bethel. Since that time ocean going tugs and barges with capacities ranging from 2,400 to 12,000 tons of containerized cargo have been servicing the port. Nine of these are scheduled common carrier sailings.

The remainder are charter of private interest voyages.

Redistribution of cargo and bulk fuel products to other communities on the Kuskokwim River and Bering Seacoast is a concurrent primary function of the port. During the 1977 season, the two local barge companies with common carrier authorization employed nine tugs, seven fuel barges and five general cargo barges for this distribution.

At present, immediate dock side warehousing is non-existent at the Bethel port. Although plans for the development of such a facility have been discussed with the City of Bethel and private transportation interests for the past two years, and financing is available, space is a crucial question. The obvious ideal location for such a facility would be the new City dock; however, as has been previously stated, the facility is already overtaxed with regard to space. At best, additional land contingent to the present new dock is going to have to be developed to accommodate the ongoing tonnage growth. Aside from the matter of being able to receive increased tonnage arriving at the port, the additional handling and redistribution of outgoing tonnage becomes appreciably more expensive when it has to be relocated several times within the port prior to onloading to smaller barges. The main developmental obstacle for an expanded and more efficient port is the permanent stabilization of the waterfront. Without such stabilization, long term planning and development are precluded.

An additional consideration of port usage that affects the lives of people within at least twelve nearby villages with river access to Bethel is safe and adequate small boat mooring. At present, the only access to the port that is reasonably safe for mooring for any duration is Brown Slough. This is inadequate due to its highly silted, shallow channel and physically limited shoreline. Shoreline space on the main river waterfront is often hazardous due to the amount of large vessels maneuvering as well as continuous float plane operations. The main waterfront has no protected or sheltered mooring locations for adverse weather conditions. It has long been obvious that with the successful development and permanent stabilization of the port waterfront, alternate permanent and safe small boat mooring facilities will have to be investigated.

TABLE NO. 2

PORT OF BETHEL WATER TRANSPORTATION

TONNAGE AND FUEL GALLONAGE

RECAP-1977

Company and/ or Vessel	Voyage No.	Tonnage to Port	Tonnage out of Port	Gallons Fuel to Port	Gallons Fuel out of Port	Port Location- Incoming Cargo
Foss	1	2,018.96	523.79			New Dock
Foss	2	752.94	186.05			New Dock
Foss	3	1,028.43	228.64			New Dock
Foss	4	4,815.00				Hately Dock
Alaska Cargo Line	1	3,025.07	395.09			New Dock
Alaska Cargo Line	2	1,481.36	384.56			New Dock
Alaska Cargo Line	3	2,489.01	370.37			New Dock
Pacific Ak. Line	1	418.35	283.37			New Dock
Pacific Ak. Line	2	83.80	25.33			New Dock
Pacific Ak. Line	3	285.54	69.31			New Dock
Foss Gravel Barge	1	8,250.00	310.00			Old City Dock
Foss Gravel Barge	2	9,310.00				Old City Dock
Foss Gravel Barge	3	8,940.00				Old City Dock
Yugtak Fish Co "Westward"	Total 2	138.00				New Dock
"Cape Douglas"	1	30.00				Old City Dock
APUTCO	1	119.00		800,000	800,000	Old City Dock, Std. Oil
Bering Pa- cific T&B	1	1,500.00				Hately Dock
Bering Pac. T&B Gr. Barge	Total 20	18,000.00				Hately Dock
Foss Fuel Barges	Total 8			10,278,932		Std. Oil
Total General Cargo:		18,195.46				
Total Gravel:		44,490.00				
Total Tonnage:		62,685.00				
		Seattle origin re- distributed out:	2,475.21			
		Local origin out:	945.00			
		Total for area dis- tribution - out:	3,420.21			
		Local origin south- bound-Seattle, etc.:	530.00			
		Total Tonnage Out:	4,260.21			
		Total Gallons In:	11,078,932			
		Local Barges - Gallons Out:	5,506,473			
		Total Gallons Out:	6,306,473			

TABLE NO. 3

PORT OF BETHEL WATER TRANSPORTATION
TONNAGE AND FUEL GALLONAGE
TEN YEAR PERCENTAGE INCREASE
AND PERCENTAGE OF REDISTRIBUTION

PERCENTAGE INCREASE			
	1967	1977	Percent Increase
General Cargo-Incoming:	9,500	18,195	92%
Gravel Incoming:	-0-	44,490	N/A
Total Incoming Tonnage:	9,500	62,685	560%
*Tonnage Redistributed:	1,423	3,420	140%
Bulk Fuel Incoming:	5,712,000	11,078,932	94%
Bulk Fuel Redistributed:	1,142,000	6,306,473	452%
Ten Year Total Average Increase:			<u>268%</u>
Ten Year Average Annual Increase:			<u>27%</u>

PERCENTAGE REDISTRIBUTED TO VILLAGES				
	1967% Redistributed		1977% Redistributed	
General Cargo-Incoming:	9,500		18,195	
*Tonnage Redistributed:	1,423	15%	3,420	19%
Bulk Fuel Incoming:	5,712,000		11,078,932	
Bulk Fuel Redistributed:	1,142,000	20%	6,306,473	57%

*Tonnage redistributed does not include tonnage outgoing to Seattle.

V. TRANSPORTATION: AVIATION

Bethel's role as a major air terminus began with the establishment of a light bomber base on the island opposite the city during World War II. At the termination of the war this left for civilian use, a large twin runway airport that could accommodate large, multi-engine aircraft, primarily the DC-3. In 1957, construction began on the current airport four miles west of the municipal downtown area. In 1958, paving was completed with a design specification of handling 50,000 lb. gross weight aircraft. In 1973, the main runway was both widened and lengthened to 6,400 feet by 150 feet to accommodate the Boeing 727-200 series jet aircraft with a gross weight of 130,000 lbs. In addition, a cross wind runway was added at the south end of the airport. During the past two years further rampage both on the north and south ends and additional connecting taxiways have been developed.

The Bethel airport ranks third within the State of Alaska as to total flight operations, and has for the past three years. It also ranks tenth nationally as to VFR flight operations.

Wien Air Alaska Incorporated is the sole schedule airline providing main line service from outside the area. It is also the sole schedule mail carrier within the area, and provides this service through a subcontractor. In addition, there are seven air charter services currently all FAR Part 135 certified operating from Bethel. These operators provide the majority of transportation needs of people located within Bethel. They also provide transportation for a substantial amount of passenger and freight traffic between other communities and Bethel. The primary reason for this is that scheduled air traffic to the surrounding villages is but a few times per week, passenger carrying capacity is often restricted due to mail poundage on these flights, and most scheduled flights originate and terminate at the airport some four miles west of town. Many village people who come to Bethel for goods and services prefer to land and depart from the river due to immediate access to the downtown. Further, many villages still do not have all season runways and many village airports are located far from the village proper, in some instances a matter of miles. Consequently, a substantial amount of light plane traffic originates and terminates on the river adjacent to town. Many operators maintain their main offices on the waterfront, or at both the airport and waterfront to accommodate this traffic.

During winter operations there is ample tiedown space on the river ice, and of course alternate space at the airport. The summer float plane operation is another matter. There is no developed or designated float plane basin within the Bethel area. The small lakes in and around the community do provide safe tiedown space during stormy weather. Due to their size, however, safe flight operations involving any significant weight configuration is prohibited. Therefore the river has been, and still is, the preferred and safest location for float operations. Due to the ever present bank erosion maintaining continuous float operations on the river

becomes a seasonal battle for all operators. With it, there is an annual consequence of damages as well as losses of some aircraft while moored due to sudden weather changes.

As can be determined from Table No. 4, and Table No. 5, aviation has experienced and is still experiencing an extreme rapid rate of growth. Stabilization of the waterfront so that fixed base operators may permanently locate is essential to the future development of this industry.

TABLE NO. 4
ANALYSIS OF AIR COMMERCE-
BETHEL TERMINAL ZONE

1. Tonnage of mail and freight to-from Bethel airport by schedule carrier:

<u>1976</u>			
<u>TO</u>		<u>FROM</u>	
Mail	Freight	Mail	Freight
<u>3609</u>	<u>3123</u>	<u>2280</u>	<u>1564</u>
Total: 6732		Total: 3844	
Combined Total Tons: <u>10,576</u>			

<u>1977</u>			
<u>TO</u>		<u>FROM</u>	
Mail	Freight	Mail	Freight
<u>3760</u>	<u>3049</u>	<u>2409</u>	<u>1638</u>
Total: 6809		Total: 4047	
Combined Total Tons: <u>10,856</u>			

2. Total passengers on-off at the Bethel airport by schedule carrier:

	<u>1976</u>	<u>1977</u>
Off:	32468	34953
On:	<u>31753</u>	<u>33123</u>
Total Pass. Traffic:	<u>64221</u>	<u>68076</u>

3. Total aircraft operations at Bethel airport:

<u>1967</u>	<u>1973</u>	<u>1977*</u>
7,500	24,450	47,728

*October 31, 1976 - November 1, 1977

4. Total flight service operations handled by the Bethel Flight Service Station:

<u>1967</u>	<u>1973</u>	<u>1977*</u>
23,752	92,900	240,000

*October 31, 1976 - November 1, 1977

TABLE NO. 5
BETHEL AIRPORT
TEN YEAR PERCENTAGE INCREASE

	1967	1977	Percent Increase
Mail/Freight to Airport- tons:	1,980	6,809	244%
Total Passenger on-off:	10,800	68,076	530%
Total aircraft operations:	7,500	47,728	536%
Ten Year Total Average Increase:			<u>437%</u>
Ten Year Average Annual Increase:			<u>44%</u>

VI. FISHERIES

The commercial salmon fishery of the Kuskokwim River is relatively new as compared with the statewide industry. Commercial harvest of salmon of any significant number didn't occur until 1960. Historically, a large subsistence usage of these fish has always prevailed. The Commercial Fisheries Division of the Alaska Department of Fish and Game records the Kuskokwim subsistence salmon fishery as the largest in North America and probably, by catch, the largest known in the world. All species of north Pacific salmon are found within the river--king, chums, coho, pinks, and sockeyes. The perimeter of the main commercial fishery starts approximately fifty miles above Bethel and extends to the Kuskokwim Bay approximately eighty-six miles down river. The river is divided into five subdistricts, of which three are contained in the above perimeters and are the primary commercial districts. This is an exclusive gill net fishery. As the commercial value of the fish increased, so did the quality of gear used and knowledge of new, different, and more productive fishing techniques. This became quite evident in the unit of fisherman per period catch data from a few years previous. The commercial fishery now is limited to some eight hundred limited entry permit holders. However, subsistence fishing is open to all.

There are six fish processors currently within the Bethel area. Five of these are located in various states of permanency on the Bethel waterfront. None of these currently fully process a fish pack for export. The majority of the salmon harvested is exported either semidressed (gutted) or in the round. It is estimated by industry sources that approximately one million pounds of salmon were exported in the round this year by Bethel processors. The majority of this export is by air. Although the Seattle barge companies have indicated a willingness to stage freezer vans for backhaul in Bethel, there is at present no facility or place on the waterfront for such staging.

The economic value of this natural resource to the area and to Bethel has in the past five years become strikingly evident. The value of the commercial fishery this year in money paid to the fishermen from the fish ticket audits by the Department of Fish and Game was \$4,173,000.00. The estimated value of the product to the local processors at the time of export and at the average wholesale market price at such time was \$5,871,000.00. The value of this product would be substantially increased if finished pack processing could occur at Bethel. This industry requires direct access to the river system and to other supply channels, mainly air. Before such advanced fish processing facilities can be realistically looked at, and the capital acquired for such, a permanent seawall installation must be developed. Such processing facilities as canning, freezing and smoking require strict sanitation standards and expensive equipment and facilities which necessitate long term capital

outlays. In the absence of permanent and stabilized port locations for such facilities, it has proven virtually impossible to attract long term capital investment to the industry.

The alternatives to the permanent on shore processing facility is the floater. Such type vessels per day cost of operation is many hundred percentile higher than an on shore based installation. Such vessels require adequate mooring with fresh water access and are without benefit after freeze-up. They must be either placed in a drydock situation or removed from the area at great expense. This incapacity during the winter months precludes their use for product storing, and storing of fishermen's gear and supplies during the off season.

The growth potential of this industry is readily assured for numerous reasons. There is an ever increasing world market for salmon, as in the case of most high protein foods. With the closing of the Bering Sea through the imposition of two hundred mile fishing zones by the United States and Russia, Japanese high seas interception (the largest in the world) of western Alaskan salmon stocks has been severely diminished. Other areas of high seas interception of western Alaska salmon such as the Gulf of Alaska and south are presently under re-negotiation by the International North Pacific Fisheries Convention, and it is felt from preliminary negotiating materials that total high seas abstention is being demanded by the United States and Canada.

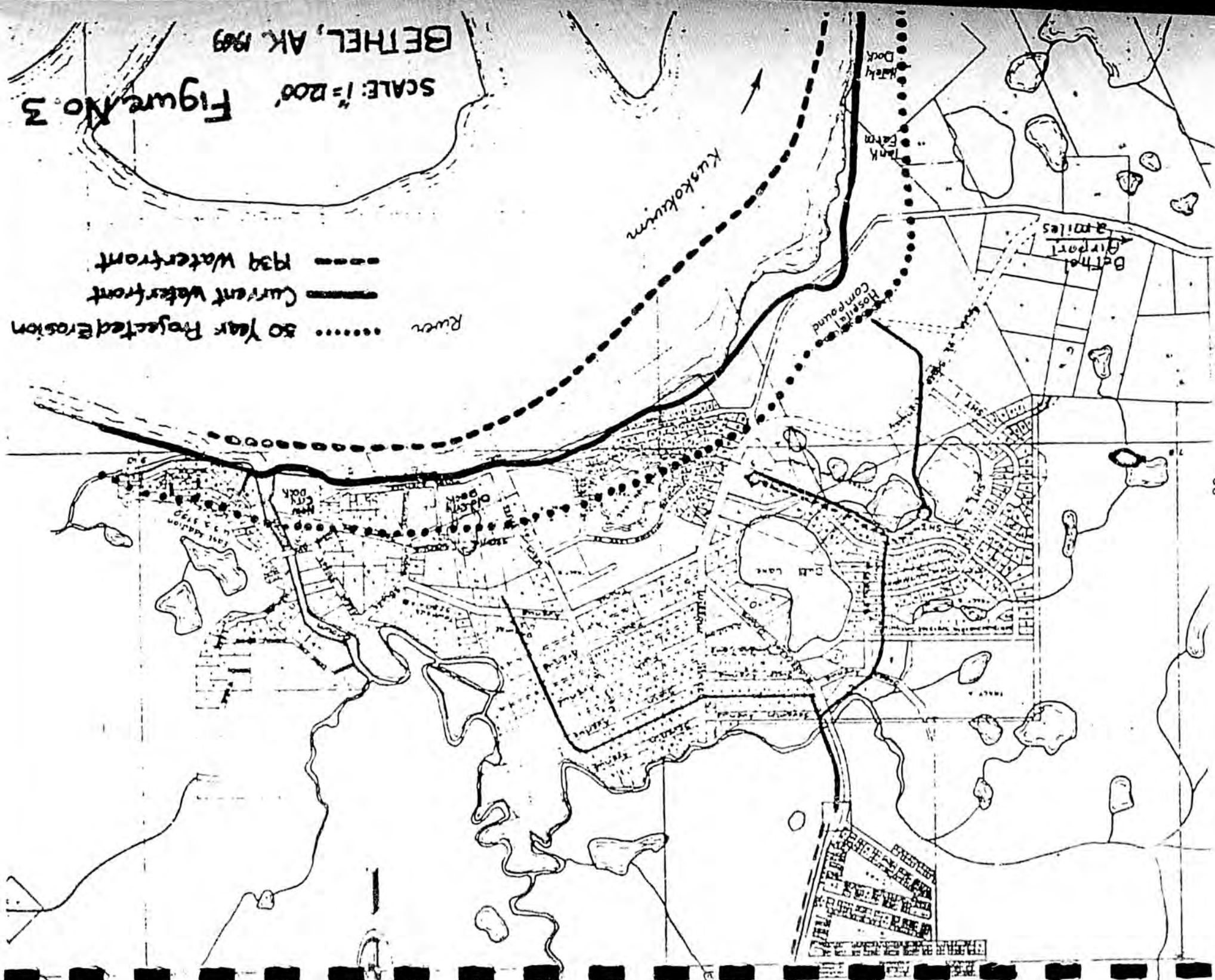
The United States per capita consumption of salmon has been at its historic lowest during the past several years at .2 pounds per capita. The main reason for this has been the overharvesting of the fish both domestically and on the high seas during the last two decades. This situation was quite devastating to the Alaskan salmon economy which produces 93% of the total North American catch. Thus, demand saw a rapid increase and price adjusted to supply. It was during this period of critical low production that the Kuskokwim commercial fisheries made its most rapid strides. Historically the management philosophy of the Kuskokwim fisheries has been extremely conservative, and there appears to be no evidence that domestic harvesting, either commercial or subsistence, has affected the run strength of any of the species.

It is this same situation, low production in other parts of Alaska, that will cause an even further development of the Kuskokwim salmon fishery including the eventual harvesting of the Kuskokwim pink salmon, which is at this point, under-harvested and is the only such surplus fishery known in the State of Alaska.

VII. ECONOMIC PROFILES: METHODOLOGY

The intent of this report is to provide an economic justification for structural solutions to bank erosion in Bethel. In order to achieve this goal this report addresses a geographic area supplied by the United States Army Corp of Engineers as the fifty year erosion limit for Bethel. (Figure No. 3). This area constitutes the impacted land and improvements which would erode if structural solutions do not occur. A fifty year limit is used by the U. S. Army Corp of Engineers as the life of a structural improvement, therefore the evaluation considers the cost of the improvement and the value of losses if no improvement is forthcoming during that time period.

In order to illustrate the value of the area considered, three alternative issues have been considered. They are, 1) Present value of land and improvements in the impacted area, 2) Replacement value of land and improvements in the impacted area, and 3) Cost to move and loss of non-moveables in the impacted area. A comprehensive overview is provided in summary form for the three issues stated, and the components of the impacted area are broken into the following headings: land, roads, utilities, residential structures, commercial structures, hospital compound, and the petroleum tank farm.



50 Year Projected Erosion
 Current Waterfront —————
 1939 Waterfront - - - - -
 Kuskokwim River

SCALE: 1"=1200'
 Figure No. 3
 BETHEL, AK 1969

VIII. REAL PROPERTY

The amount of land which would be lost due to erosion of the riverbank is calculated using information provided by the United States Army Corp of Engineers in the September 1970 report titled, "Bethel Bank Stabilization and Flood Control, Bethel, Alaska." The frontage land to be considered is 10,000 linear feet which is that area beginning at the east end of town through the petroleum tank farm property at the west end. An erosion rate of twelve feet per year is used for that waterfront area beginning at, and including U. S. S. 3790, west to the east boundary line of U. S. S. 4000. This measures approximately 7,500 feet. An erosion rate of 16 feet per year is used for U. S. S. 4000 as well as U. S. S. 4117, lot 44, which includes hospital and petroleum tank farm property. This measures approximately 2,500 feet.

The amount of land lost per year:

$$12 \text{ feet} \times 7,500 = 90,000 \text{ feet}$$

$$16 \text{ feet} \times 2,500 = 40,000 \text{ feet}$$

Total square footage eroding per year = 130,000 square feet

Amount of land lost over a 50 year time period:

$$130,000 \text{ sq. ft.} \times 50 \text{ ft.} = 6,500,000 \text{ sq. ft.}$$

VALUE OF REAL PROPERTY

The value of the real property lost is that quantity of land lost multiplied by an average square foot price based on the following "Summary of Recent Sales." (Table No. 6). The summary averages out to a price of 60¢ per square foot for land. The total value of land lost would be:

$$60¢ \times 6,500,000 \text{ sq. ft.} = \$3,900,000$$

As land that is lost due to erosion cannot be replaced, the value of the property and the replacement value are the same, \$3,900,000.

Although a replacement value can be established, this may actually be unrealistic due to tight land ownership as a result of the Alaska Native Claims Settlement Act. Much of the land surrounding Bethel has been filed upon by individual native allotments. The remainder has been filed upon by the Bethel Native Corporation. Russ Gallagher, attorney for the Bethel Native Corporation, states that "they (the government) couldn't offer us a price high enough for us to accept, our land is too important to us." If nothing else, land problems would end in a costly court battle.

It should be noted that the erosion limit crosses two lakes, Shallow Lake and Mission Lake. If the waterfront were to reach these two areas an accelerated rate of erosion would occur. For the purposes of this report, however, exact Corp of Engineers figures have been used.

SUMMARY OF RECENT SALES

Recent sales in Bethel are examined in order to determine a fair market value for land in Bethel. Fair market value is defined as "the amount estimated in terms of money that a property will bring after being exposed to the market for a reasonable time and finding a knowledgeable buyer, willing to buy from a willing and knowledgeable seller, both being aware of all the uses to which the property could be adapted and neither being under pressure or duress."

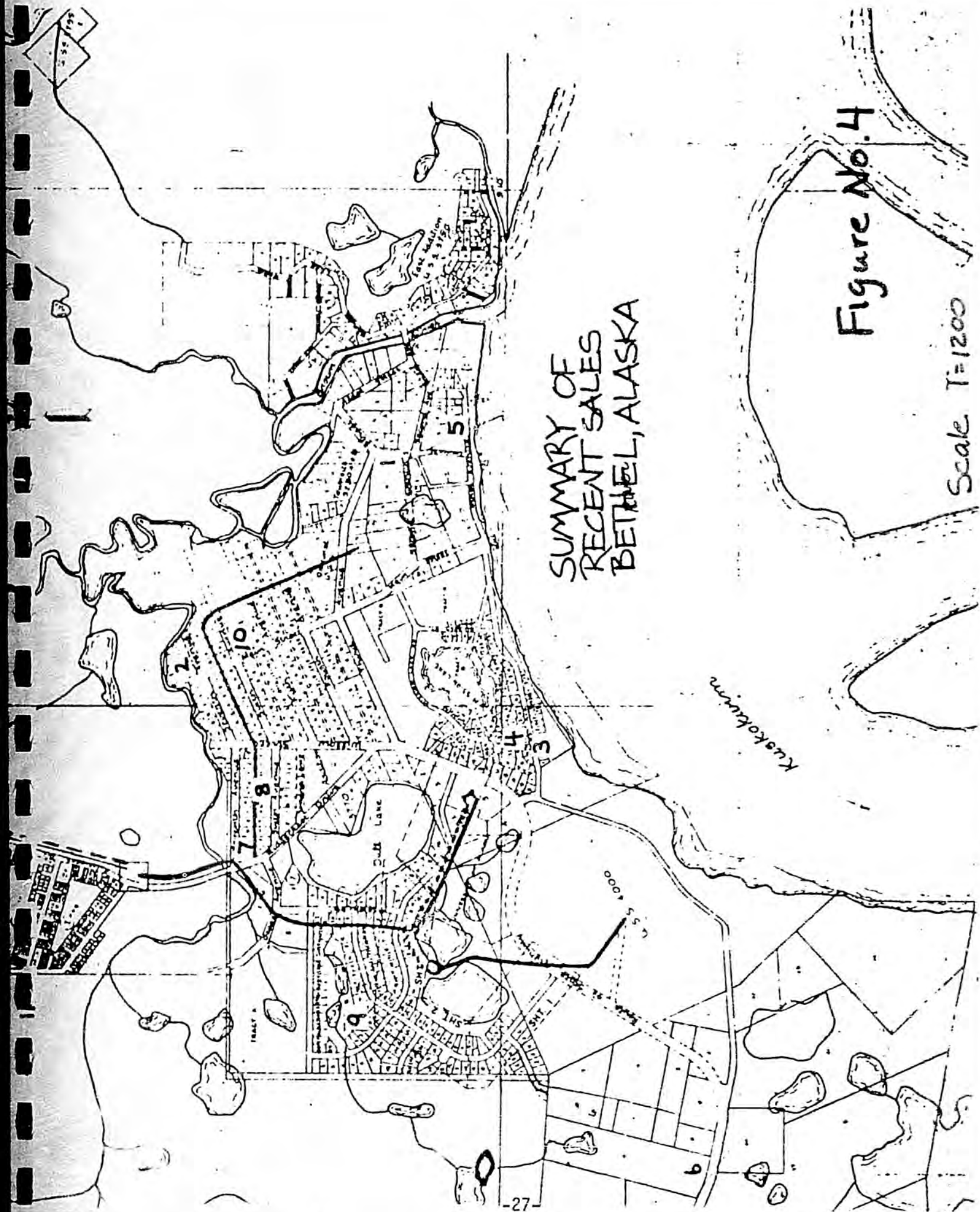
Sales in Bethel which occurred during the previous five months of 1977 are broken down in the EXAMPLES OF RECENT SALES, which provides information concerning the buyer, lot location, total price, and square footage price for the land. These sales reflect current prices being paid for land in Bethel and every effort has been made to reflect the true land value picture.

The EXAMPLES OF RECENT SALES shows varying prices per square foot being paid for land. The lowest price paid, thirty cents per square foot, has been for lots sold in the City Subdivision. Incorporating this price in the average may actually be inappropriate as these lots were sold by the City of Bethel, a governmental unit, with the price set by the Planning Commission and the City Council of the City of Bethel, to cover administration and development costs, and not on the private market. The price for lots in Ptarmigan Subdivision sold by the Association of Village Council Presidents Housing Authority, a non-profit organization, were set according to exact development and administrative costs and were also not set on the private market. These sales have been included however, because they are current sales in Bethel and have been obtained at the stated price.

An average of the square foot price for land in Bethel is sixty cents per square foot. As there is currently no zoning and no real estate taxation within Bethel, any differentiation of the use of the land into residential and commercial is not appropriate.

TABLE NO. 6
EXAMPLES OF RECENT SALES

BUYER/DATE	LOT, BLOCK, SURVEY	TOTAL PRICE	VALUE OF HOUSE	VALUE OF LAND	SQUARE FOOTAGE	PRICE PER SQUARE FOOT	COMMENTS
1. Clifton Hill summer 1977	lot 16, block 15 U.S.S. 3230	\$25,000	\$15,000	\$10,000	21,668	46¢	in flood plain
2. Joe Albrite summer 1977	lot 3, block 1 U.S.S. 3230	\$45,000	\$32,500	\$12,500	28,193	44¢	in flood plain; most sq. footage non-usage
3. Glenda Schmierbach summer 1977	lot 3, block 1 Mumtretlek	\$ 9,000	\$ 2,000	\$ 7,000	7,500	93¢	eroding, on riverbank
4. Vern Shimanek summer 1977	portion of lot 13, block 5 Mumtretlek	\$ 2,500	none	\$ 2,500	2,900	89¢	in erosion area
5. Kirk Meade 1976	lot 6, block 18 U.S.S. 3230	\$13,000	\$ 6,000	\$ 7,000	7,932	88¢	in flood plain and erosion area
6. Chet Atkins summer 1977	portion of lot 6, block 18 U.S.S. 4117					32¢	
7. Tom Kreitingner	lot 10, block 2 U.S.S. 3770	\$10,000	none	\$10,000	15,506	64¢	in flood plain
8. Ben Rowland	lot 18, block 2 U.S.S. 3770	\$10,000	none	\$10,000	15,505	64¢	
9. City Sub- division lots summer 1977			none			30¢	governmental unit selling land
10. Tom Pierce- Bulger summer 1977	lot 7, block 5 U.S.S. 3230	\$ 5,500	none	\$ 5,500	15,000	37¢	very low, in flood plain
11. A.V.C.P. Housing Authority summer 1977	Ptarmigan Subdivision	\$ 8,100	none	\$ 8,100	11,000	74¢	non-profit government housing authority selling land



IX. ROADS

In considering the fifty year erosion limit, the exact loss of roads can be established as well as the effect of the loss of roads. In terms of replacement cost, the State of Alaska, Department of Transportation, states that this figure cannot be totally accurate due to the unavailability of exact location plans, topography, and other considerations. Replacement costs are computed on a footage basis for the amount of road that would be lost even though new road systems would not take the same configuration

Those roads that would be lost as a result of continued erosion would be:

PAVED ROADS	APPROXIMATE FEET
-------------	------------------

1. State Highway, City Center Sub.	350 feet
2. Second Avenue, U.S.S. 3230	1,300 feet
3. Bridge Avenue, U.S.S. 3230	200 feet
TOTAL PAVED ROAD	<u>1,850 feet</u>

DIRT ROADS	APPROXIMATE FEET
------------	------------------

1. First Avenue	
NOTE: approximately 800 feet of First Avenue in Mumtretlek Subdivision and 300 feet in U.S.S. 400 have been recently lost due to erosion and are not reflected in these figures.	
2. Mission Lake Road/Lind Street	500 feet
3. Kilbuck Street	600 feet
4. Main Street	650 feet
5. Oscar Way	350 feet
6. East Avenue	<u>1,400 feet</u>
TOTAL DIRT ROADS	<u>10,505 feet</u>

These roads are shown in Figure No. 5. The effects of this loss of public access within Bethel would be quite far reaching. Currently there are two examples which substantiate this claim. The first of these is the erosion of First Avenue along the waterfront. Previously this road extended through Mumtretlek Subdivision, U.S.S. 1002, and into U.S.S. 3230. A portion of this road in excess of 800 feet has eroded such that access along that road no longer exists. Road access to Mumtretlek Subdivision is now through one main road only. Deprived access through other routes means that all services, deliveries, personal usage, and fire and police protection must use only one route to service existing houses. Difficulties may easily arise, and have recently done so. In the fall of 1977, First Avenue has turned to mud to such an extent that four stuck cars blocked the road in excess of twenty-four hours. City services to homes were canceled as there was no alternate means available to reach the homes. Had a fire broken out at that time in that area, the fire department would have been unable to move fire trucks to the scene. The City of Bethel Planning Commission in a recent meeting on road priorities stated that alternate road access in that area is a necessity and is in the interest of public safety.

The second and most recent example of the effect of road loss is that road located behind the Public Health Service Hospital. This road, an extension of First Avenue, provided an alternate route to the hospital, hospital housing, and to the State Highway and was totally destroyed in the summer of 1977.

Road access which would be lost due to erosion as considered in this report could prove substantially more hazardous than those already lost. If Second Avenue and Bridge Street were allowed to erode, "Lousetown," on the east side of Brown Slough, would be totally inaccessible. Those homes would be cut off from the remainder of Bethel unless further road access were developed, which would be difficult and expensive.

Additionally, access to the main body of the town is in danger if a portion of the State Highway is allowed to erode. Here again, the State Highway is the only road between the Bethel Airport and the residential and commercial areas of town.

Assuming that it would take a substantial number of years to reach these two major access roads, there are many additional damages that would be caused if gradual erosion continues. Primary among these concerns access to individual lots owned on the private market by citizens of Bethel. Private lot owners would be restrained from reaching their own property because land ownership patterns are such that it would be necessary to trespass on the property of another to reach various homes.

Public access to the river is also endangered as public lands are lost to those held in private ownership. Many residents are already experiencing difficulties obtaining access to the river due to land ownership patterns.

Problems arise in placing a monetary value on the roads as well as the reconstruction costs for replacement. Without preliminary planning the costs are only an estimate. Mr. Robert Haneline, Director, Local Service Roads and Trails of the Department of Transportation, estimates that the price for one foot of dirt road is \$70. No price is available for paved roads due to various questions, therefore, a low cost of \$70 per foot of road is used for all roads.

Assuming a total of 12,355 feet of road will be lost, the monetary loss of roads as well as the cost to replace will be:

$$12,355 \times \$70 = \$864,850$$

ROADS ENDANGERED DUE TO EROSION

Figure No. 5

Scale 1=1200

Portions
of First Ave.
Permanently Eroded

Kuskokwim

First Ave.

Mission
Lake Rd.
Lind Street

Kilbuck
Street

Main
Street

U.S. 5.1002
Access Rds.

Oscar
Way

East
Ave.

Second Ave
Bridge Street

State
Highway

-30-



X. TELEPHONE AND ELECTRICAL UTILITIES

With regard to telephone and electrical utilities, the present value, cost to replace, and the cost to move will be identical as it would be necessary to abandon these utilities rather than reuse and relocate.

There are currently seventy power poles in the erosion area considered. Bethel Utilities Company states that each pole is worth, or would have to be replaced, at a cost of \$2,000 per pole. Therefore, the value of electrical utilities is:

$$\$2,000 \times 70 \text{ poles} = \$140,000$$

This price is all inclusive of labor, equipment, and hardware.

General Telephone Company of Alaska states that telephone cable in the erosion area is worth \$92,600. As it would be necessary to abandon cable lost to erosion, the replacement value is the same.

Total value for electrical utilities and telephone is:

$$\$140,000 + \$92,600 = \$232,600$$

XI. RESIDENTIAL STRUCTURES

Within the erosion area to be considered in this report, there are currently 142 private residential homes in use. This figure does not include the hospital housing or the petroleum tank farm which are addressed later in their entirety. The type and quality of these homes vary dramatically from poor quality homes to homes valued up to \$70,000. The house numbers of these homes is attached as Table No. 7.

As previously stated, for the purposes of this report three values for residential units must be established. They are 1) present value, 2) replacement value, and 3) cost of moving.

1) Present Value: Present value of residential structures (excluding land) can only be estimated. In an effort not to inflate the value of homes, an average value for all residential structures is established at \$8,000 per structure. Therefore, the present value of residential structures in the erosion area is:

$$142 \times \$8,000 = \$1,136,000$$

2) Demolition and Replacement Value: If homes were to be replaced it would also be necessary to demolish the structures that presently exist rather than having the debris fall into the river and create future problems. A local contractor states that the cost of demolishing an average house in Bethel and removing the debris would be \$1,000. If all 142 residential homes would be demolished, the cost would be \$142,000. Replacement of the homes can be figured on a cost

per square foot basis. It is assumed that the average size of these homes equals 600 square feet. Present non-government costs for wood frame construction are between \$50-62 per square foot. Government construction is approximately \$110 per square foot for wood frame construction. Using the average of \$56 per square foot wood frame construction, the replacement costs for residential structures equals:

600 square feet X 142 homes = 85,200 square feet X \$56 per square foot = Total Replacement Cost of \$4,771,200.

Total replacement cost must then be added to demolition cost to obtain the value of complete replacement:

Demolition Cost	\$ 142,000
Replacement Cost	\$4,771,200
	\$4,813,200

3) Cost of Moving: Cost of moving a house will vary as to size and other factors; however, the cost of moving an average residential home by a local contractor is \$2,000. This entails moving the house from one location to another only.

The above cost of moving a house does not include necessary leveling, rehooking of water tanks, etc. This would take an average of three men, three days, at \$15 per hour for an additional cost of \$1,080 per house.

Additional costs incurred in moving would be the required packing and moving of household belongings which would necessitate renting a truck as well as manpower for an average price of \$300.

The total cost of moving an average house is \$3,380. If it were possible to move all 142 residential structures in the erosion area, the total cost would be \$479,960.

INTANGIBLE COSTS OF MOVING

The intangible cost of moving cannot be overstated.

Within the erosion area there are basically two neighborhoods. The first of these is U. S. Survey 3790 on the east side of Brown Slough, commonly referred to as "Lousetown." The majority of residents of Lousetown have been living in those homes since before the land was deeded by the Bureau of Land Management, Townsite Trustee. The residents of this area are often extended families living in close proximity to one another and lifelong friends.

The residents of Lousetown were originally given an opportunity to move to the Alaska State Housing Authority project, "Bethel Heights,"

so that they could live in housing which would be out of the one hundred year flood plain. Some people did move to "Bethel Heights" and it was found that they would abandon these houses to return to their old homes, for various reasons, in Lousetown. The uniqueness and sense of community found across the bridge in Lousetown, is something that could never be replaced. The tie these people have to their waterfront homes, or near-waterfront homes, provides yearly access to the river for fishing as well as a transportation route for boats and snowmachines. This way of life is a choice of this community and should not be destroyed.

Mumtretlek Subdivision is another neighborhood that would be almost totally destroyed if erosion were allowed to continue. As with Lousetown, the feeling of community and family could never be replaced and the relocation of these people away from the waterfront would seriously hamper a way of life requiring proximity to the river.

Both of these neighborhoods recognize themselves as unique and have organized on the grass roots level to express their desires for their neighborhoods. In the case of Mumtretlek Subdivision, in the summer of 1977, a local fish processor attempted to locate a fish processing plant within this neighborhood. Residents were concerned about the use of land in this manner and about the heavy, excessive use of trucks this would require on a residential road ordinarily filled with small children. Totally as a result of neighborhood efforts, this development was halted and the character of this neighborhood has been maintained.

Lousetown has organized the "Upper Lousetown Development Association" which was formed to address boat docking, launching, and storage problems in Lousetown. This organization of Lousetown residents is currently solving these problems. Lousetown also organized in the summer of 1977 to help get the Brown Slough Bridge repaired after the flood damaged it.

Alongside the lose of community would be the loss of access to the river, the lifeline of Bethel, to the current residents. Moving homes away from the river would not negate the need for river accessibility by the residents; however, it could be quite difficult to obtain. Current land owned by the municipality to provide public access is quickly eroding away, and if allowed to continue, will entirely erode.

TABLE NO. 7

HOUSE NUMBERS IN EROSION AREA

904	12105	1020	1094
907	12012	1018	1098
909	12018	2017	1100
910	10600	2015	1110
911	10604	2009	1112
912	16010	2011	1116
913	10614	2007	1118
915	10618	1017	1053
920	1160	1019	1055
921	1079	1026	1057
922	1154	600	1081
923	1152	602	1075
927	12303	608	1073
932	12311	612	1071
934	12017	1036	1069
916	12106	1038	1067
924	12104	1023	1065
926	12102	1035	1059
716	1134	1037	1061
2000	12105	1040	1124
713	12013	1042	1130
717	12011	430	1136
700	1097	437	1138
1000	1095	427	1140
1001	1091	.25	1142
1003	1107	423	1144
1005	1109	1080	1146
1009	2070	1083	1150
1002	1068	1084	1156
1014	1064	1086	1158
1012	1062	1088	12303
1016	1058	1090	12301
1022	1056	1096	12103
413	411	1092	1122
1108			
1 Quanset			
2 Trailers			

XII. COMMERCIAL AND GOVERNMENT ENTERPRISE

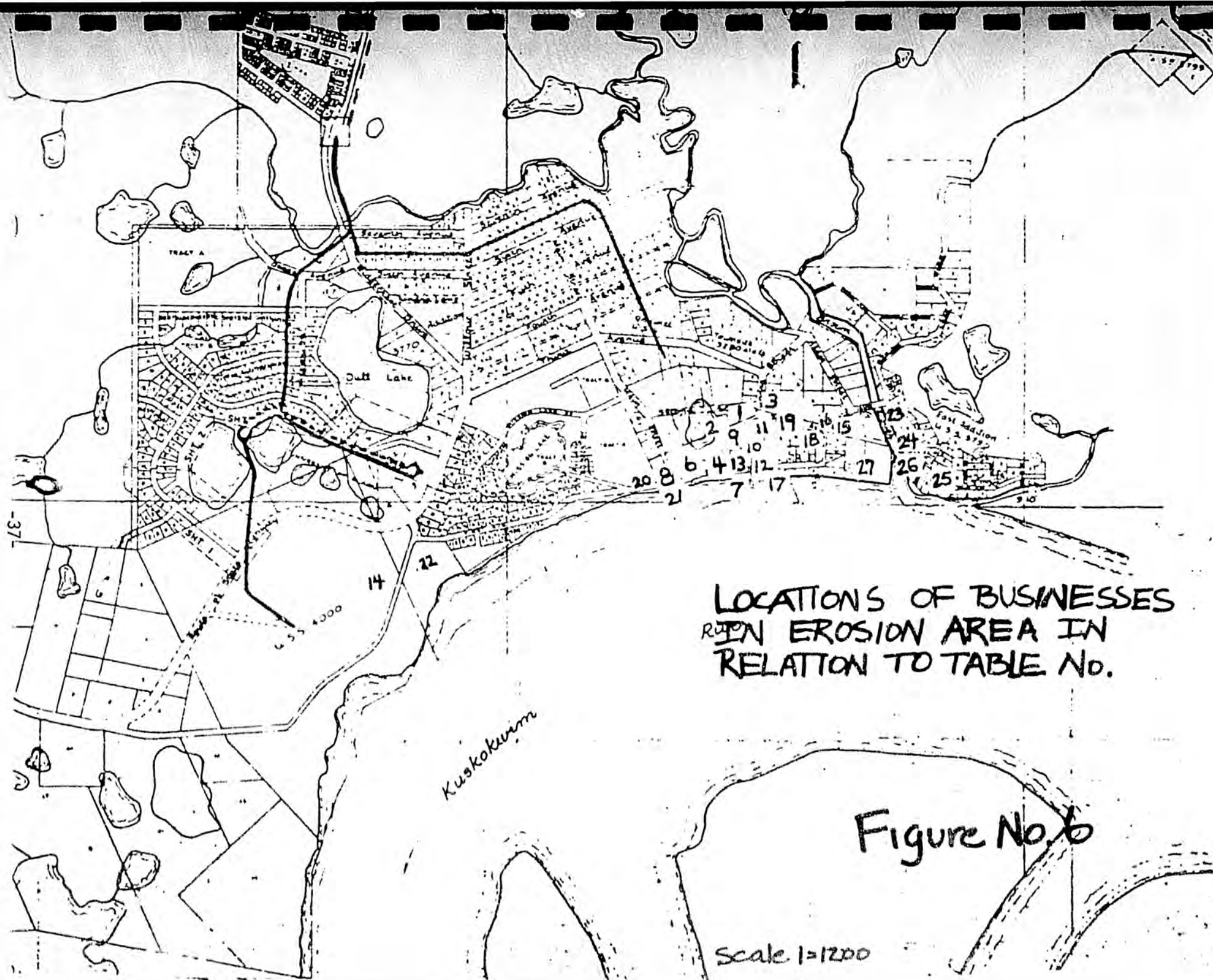
Within the erosion area there are twenty-six commercial and government enterprises, as well as the City of Bethel Dock. Figure No. 6, used with Table No. 8, show the locations for each. The hospital compound and the petroleum tank farm are treated separately due to their complexity and importance.

The majority of businesses located in the erosion area are in what is considered to be the downtown section of Bethel. This area is easily accessible to river traffic from surrounding villages, as well as to foot traffic within Bethel. Many of these businesses rely upon this location and would incur an additional cost of doing business away from the waterfront. One object of the recent Alaska Coastal Zone Management Act Section 46,36.020 (4) is "the management of coastal land and water uses in such a manner than generally, those uses which are economically or physically dependent on a coastal location are given higher priority when compared to uses which do not economically or physically require a coastal location."

The present value, cost to move, and cost to replace these businesses are presented in Table No. 8. For those businesses which it would be impossible to move the cost to replace is substituted. This table shows that the present value of businesses located in the erosion area is \$6,010,000, the replacement cost is \$7,254,000, and the relocation cost is \$6,378,500.

TABLE NO. 8
BUSINESSES IN THE EROSION AREA

NUMBER (FIGURE 6)	BUSINESS NAME	VALUE OF BUILDING	RELOCATION	REPLACEMENT
1.	Swanson's Store	\$2,000,000	\$2,000,000	\$2,000,000
2.	Catholic Church	100,000	271,000	271,000
3.	Bering Sea Bookkeeping	10,000	500	10,000
4.	Swanson's Marina	150,000	50,000	150,000
5.	Bethel Ventures	525,000	525,000	525,000
6.	Porter Electronics	138,000	138,000	138,000
7.	Checker Cab	140,000	20,000	140,000
8.	First National Bank	175,000	500,000	500,000
9.	Recreation Center No. 1	169,000	10,000	178,000
10.	Recreation Center No. 2	169,000	10,000	178,000
11.	Cowan Hut	10,000	75,000	75,000
12.	Day Care Center	70,000	10,000	70,000
13.	I.D. Variety	10,000	7,000	45,000
14.	O.E.H. Staging Ground	65,000	65,000	65,000
15.	Wild Goose Restaurant	85,000	225,000	225,000
16.	Bethel Power Products	35,000	62,000	62,000
17.	Dr. Carpenter's	15,000	4,000	22,000
18.	Nerby's Store	70,000	225,000	225,000
19.	Jay's Auto Shop	12,000	4,000	28,000
20.	Bush Air	112,000	16,000	120,000
21.	Samuelson's Flying	12,000	3,500	18,000
22.	Fish and Game	28,000	12,000	41,000
23.	Brown Slough Marina	10,000	5,500	28,000
24.	Samuelson's Store	35,000	150,000	150,000
25.	J.B. Crow and Sons	250,000	250,000	250,000
26.	City Dock	1,600,000	1,600,000	1,600,000



XIII. PUBLIC HEALTH SERVICE HOSPITAL

The Bethel Service Unit is one of seven native service units operated by the Indian Health Service in Alaska. It provides both non-acute and acute health care for the inhabitants of southwest Alaska. In Bethel the Public Health Service Hospital is currently located along the riverbank in U. S. Survey 4000. For this report, housing, water treatment facilities and the hospital are treated as a whole rather than being dispersed through other divisions in this report.

The Corp of Engineers has advised that the average rate of erosion along the riverbank of the Public Health Service property is sixteen feet per year. In fifty years this erosion would place the riverbank eight hundred feet back from the present riverbank, or in the middle of the Public Health Service compound road following the west side of the hospital building. See Figure 3. Thus, all buildings on the present Public Health Service compound would have to be either moved or destroyed. In twenty-five years the present hospital building and quarters could not be used due to height of the bank and erratic erosion.

Currently the Public Health Service is constructing a new hospital at a cost of \$32+ million. Though the present hospital will not be used for health care, it will have a commercial use value. The well and water storage facilities also have a value to the community.

By 1990, the quarters in the affected area will no longer be used by the Public Health Service but will have a value to the community. Both the quarters and the hospital buildings have about fifty years of non-health use left with proper maintenance and repair.

For purposes of the entire report, values have been placed on present value, replacement costs, and moving and loss costs. This excludes land, roads, and utilities which are considered separately.

1) Present Value of Hospital Complex:

The present value of the hospital complex is estimated by hospital officials as the cost of present wood frame construction depreciated over a twenty-five year period. Present non-government costs are between \$50-\$62 per square foot for wood frame construction. Government costs are substantially higher at \$110 per square foot wood frame construction. For the purposes of present value and replacement value for the buildings, hospital officials have chosen to use an average construction cost of \$56 per square foot for wood frame construction.

With 92,290 square feet at \$56 per square foot, the cost would be \$5,168,240. Less twenty-five years depreciation the value would be \$2,584,120 for the hospital and hospital housing. Added to this is the present value of the well and water treatment storage facilities which is \$2,500,000, for a total present value of the hospital complex at \$5,084,120.

2) Replacement Value of the Hospital Complex:

Replacement value is considered using the square footage lost multiplied by \$56 per square foot for the construction of a wood frame building. This figure does take into account the fact that this building will not be used as a hospital in future years, but that it would be used for another purpose within the community.

Hospital building	28,254 s.f.	\$1,582,224
Quarters (25)	11,978 s.f.	670,768
Service Building	12,258 s.f.	686,448
Quarters (16)	8,384 s.f.	469,504
Shop-Garage	1,440 s.f.	80,640
Storage	4,600 s.f.	257,600
Quarters (1)	1,148 s.f.	64,228
Quarters (1)	874 s.f.	48,944
Quarters (1)	780 s.f.	43,680
Quarters (3)	1,060 s.f.	59,360
Garage	640 s.f.	35,840
Warehouse	576 s.f.	32,256
Warehouse	1,900 s.f.	106,400
Quarters (4)	4,380 s.f.	245,280
Quarters (4)	4,380 s.f.	245,280
Quarters (4)	4,380 s.f.	245,280
Quarters (8)	5,138 s.f.	287,728
Water facilities		2,500,000
TOTAL REPLACEMENT COST		\$7,110,400

3) Relocation: Present basic residential moving costs are a minimum of \$3 per square foot or more, depending on distance of move and difficulty of moving. The present building could not be moved at the low figure but could probably be moved at \$30 per square foot. It would be reasonable to assume that the average cost of moving the structures would be \$30 per square foot for the move alone, not counting additional relocation expenses. The well and water treatment-storage facilities could not be moved. Therefore, the relocation costs would be:

Cost of relocating building	\$1,845,600
Water and sewer system	\$2,500,000
Heating systems	\$2,000,000
TOTAL RELOCATION COSTS	\$6,345,600

IXV. PETROLEUM TANK FARM

Chevron USA, previously known as Standard Oil Company of California, has maintained a bulk storage facility in the vicinity of Bethel for the past forty years. Such facility is the primary fuel distribution point for thirty communities on the Kuskokwim River and adjacent point for thirty communities on the Kuskokwim River and adjacent Bering Sea coast. It receives its bulk fuel products from the tank farm located at Dutch Harbor on the Aleutian Chair, an all season seaport, via ocean going barge.

The tank farm, which is located on the down river extreme of the port, is currently in a critical situation due to the excellerated bank erosion. It now contains fifteen storage tanks with another 1,512,000 gallon tank scheduled for next year, a double tank truck loading rack, a marine loading and unloading dock site, and three warehouses. It might be appropriate to say that the tank farm is Bethel's most valued commercial asset.

At present, it currently has storage capacity for 6,498,000 gallons of bulk fuel. With the addition of the previously mentioned new tank next year, the capacity will increase to 8,010,000 gallons. More than half of the farm's present storage capacity was added in the past six years. This is illustrated in Table No. 9.

TABLE NO. 9

YEAR	STORAGE INSTALLED
1970	1,134,000 gallons
1972	2,037,000 gallons
1976	840,000 gallons
TOTAL	4,011,000 gallons

This year the tank farm received 11,078,932 gallons of bulk fuel product, of which 6,306,473 gallons or 57% was redistributed via water transportation to local communities. The tank farm also received 557 tons of cased petroleum products, of which 345 tons or 61% were redistributed. With regard to incoming fuel, the tank farm has experienced a 94% average annual growth over the past ten years. Further information on this is contained within Tables 2 and 3.

Current value of the tank farm as provided by company sources is \$4,000,000, which does not include the real property involved. This appraisal is treated within the previous real property section of this report. With the addition of the previously mentioned 1,512,000 gallon tank next year, at a cost of \$500,000, the value is raised to \$4,500,000. Company engineers estimate that the cost of relocating the farm, without the cost of acquisition of real property would be \$1,150,000, if such

relocation were to occur in Bethel. However, this cost does not include the development of a pipeline, assuming that relocation due to bank erosion would have to be a substantial distance from the waterfront to anticipate future years of erosion.

Relocation of the tank farm outside the community would be an economic impossibility for Bethel. There is now a minimum storage need for winter consumption of approximately 6.5 million gallons, the current maximum capacity of the farm, with spring shortages often arising that require special fuel air lifts to Bethel.

XV. SUMMARY AND ANALYSIS

The total present value, relocation costs, and replacement costs are summarized in Table No. 10. Replacement cost is included to demonstrate total replacement of all buildings and facilities that would be lost due to erosion within a fifty year projection. Relocation costs include replacement cost of those facilities that cannot be moved, with moving cost of those that can.

TABLE NO. 10
SUMMARY OF VALUES

CATEGORY	PRESENT VALUE	REPLACEMENT	RELOCATION
Real Property	\$3,900,000	\$3,900,000	\$3,900,000
Residential	1,136,000	4,913,200	479,960
Hospital	5,084,120	11,998,992	7,045,600
Utilities	232,600	232,600	232,600
Roads	864,850	864,850	864,850
Petroleum Tank Farm	4,000,000	4,000,000	1,150,000
Commercial Buildings	6,010,000	6,393,500	7,254,000
Additional Costs			500,000
TOTALS	\$21,227,570	\$32,303,142	\$21,427,010

ANALYSIS

Cost of Construction: Estimate is based on a permanent seawall starting at the junction of the first slough above Brown Slough, recessing into the mouth of Brown Slough on both banks and extending downriver below the current location of Hatelly's Dock or the southern boundary of Lot 44, of U. S. S. 4117, a distance of approximately 10,000 feet.

Cost of construction is based on a steel sheet pile wall with driven pile deadmen behind and sand filled back. Projected cost based on local estimates for 1977 is \$550 per linear foot. This type of construction and

the estimated cost used here are purely graphical to demonstrate the cost to benefit ratio. It is understood that a total design analysis has yet to be accomplished.

PERMANENT CONSTRUCTION:

10,000 ft X \$550/linear foot	\$5,500,000
Contingencies @ 20%	1,100,000
Eng., Des., Supv. and Admin. @ 15%	825,000
TOTAL COST	\$8,425,000

Annual Cost with Interest @ 6 5/8% and a useful life of 50 years \$8,425,000 X .069	\$581,325
Estimated Annual Maintenance	45,000

TOTAL ANNUAL CHARGE	\$626,325
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Total average annual charge	\$626,325
Average Annual Benefit (at present value)	1,464,698

BENEFIT-COST RATIO	2.3 to 1
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EVACUATION-RELOCATION

Federal Costs:

Relocation Total (see Table No. 9)	\$21,427,010
Contingencies @ 20%	5,285,402
Engs., Des., Supv. and Admin. @ 15%	3,214,051
TOTAL COST	\$29,933,473

Annual Cost with Interest @ 6 5/8% for a 50 year period \$29,933,473 X .069	\$2,065,409
Estimated Annual Maintenance	45,000

TOTAL ANNUAL CHARGE	\$2,110,409
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Total Average Annual Charge	\$2,110,409
Total Average Annual Benefits	\$1,464,698

BENEFIT-COST RATIO	0.7 to 1
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1978

Supplement

REPORT
TO
UNITED STATES ARMY CORP OF ENGINEERS
ALASKA DISTRICT ENGINEER
1978 SUPPLEMENT
ON THE
COST/BENEFIT OF A PERMANENT EROSION PROJECT
AT
BETHEL, ALASKA

PREPARED BY:

City of Bethel, Office of
Planning and Citizens' Committee
on Erosion Control.

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No. 8-78	SUMMARY OF VALUES

I. INTRODUCTION

This 1978 Supplement is an update of the critical economic data that pertains solely to the establishment of the Benefit-Cost ratio of a river erosion project, port of Bethel. Little or no additional narrative material pertaining to economic intangibles to the value of this project have been added. It is felt that the 1977 report adequately covers the intangible aspects of erosion control.

The community as a whole experienced a substantial growth in population (Table No. 1-78) and capitalization both in housing starts and commercial construction. In 1978, there were in excess of 35 private homes started. The majority of these homes were in the first municipal subdivision on land which was purchased in the land lotteries prior to 1978, and the Ptarmigan subdivision. Six new homes were built in the erosion area. Approximately 25 units of commercial rentals were completed. If land were available, it is safe to assume many more new homes would have been started. Fifty-eight persons who applied for the City lots sold in December of 1978, did not get them.

Commercial capitalization was significant in many areas. Fish processors had the greatest investment in the erosion area. However the long term capital investment necessitated by advanced processing plants will not become a reality until there are permanent and stabilized port locations for such facilities. (See 1977 Report, pages 20-21.) Other commercial construction was for retail sales outlets, warehouse and storage facilities and office and residential rentals.

The City of Bethel reports a significant gain in revenues from city sales tax indicating retail sales are up. All other indicators of local economic growth are positive at this time. It is well documented, however, that the security of the upward economic trend and future economic development may be entirely dependent on the construction of a stabilized port facility. Construction of a permanent seawall was listed as the TOP PRIORITY in the 1978 Overall Economic Development Plan for Bethel.

TABLE NO. 1-78

POPULATION CHANGE

YEAR	TOTAL POPULATION	TOTAL PER CENT CHANGE
1960	1,258	
1970	2,416	92.1%
1973	2,929	17.0%
1975	3,200	9.0%
1977	3,500	8.5%
1978	3,950	12.9%

II. TRANSPORTATION

In 1978 one of the two local barge companies ceased operation in midseason. This left local fuel distribution in a critical state even though the remaining local barge company increased their floating equipment, including their fuel barge capacity by 275,000 gallons, distribution to surrounding communities was severely impaired. The resultant fuel shortage necessitated emergency airlift of fuel to villages starting in early fall and continued throughout the winter.

Although general cargo tonnage was down for 1978, scheduled sailings by Seattle carriers increased from nine in 1977 to fourteen in 1978. Due to the pressure of available equipment on the remaining barge company, approximately 670 tons of general cargo remained undistributed at freeze up.

Tables No. 2-78 and 3-78 provide data on the 1978 cargo and fuel movement in the port of Bethel.

TABLE NO. 2-78
PORT OF BETHEL WATER TRANSPORTATION
TONNAGE AND FUEL GALLONAGE
RECAP - 1978

Company and/or Vessel	Voyage No./or Not	Tonnage In Port	Tonnage out of Port	Gallons Fuel to Port	Gallons Fuel out of Port	Port Location - Incoming cargo
Foss	781	1790	600			New City Dock
Foss	782	840	258			New City Dock
Foss	783	1414	718			New City Dock
Alaska Cargo Line	8	2927	372			New City Dock
Alaska Cargo Line	10	611	136			New City Dock
Alaska Cargo Line	11	881	131			New City Dock
Alaska Cargo Line	12	2265	77			New City Dock
Alaska Cargo Line	13	663	45			New City Dock
Pacific Alaska Line	801	646	424			New City Dock
Pacific Alaska Line	802	406	260			New City Dock
Pacific Alaska Line	803	357	65			New City Dock
Pacific Alaska Line	804	758	758			New City Dock
Northland Services	6	725	677			New City Dock
Cool Barge	1	154	103	648,000	648,000	New City Dock/ Chevron Dock
NV Dolphin	48		156			Kemp Barge
NV Turpin	18		239			Kemp Barge
NV Turpin	19		252			Kemp Barge
Kaisel Maru 5	1	50	475			City Dock/Lighters Outgoing Tonnage
Bering Pac. T. E. B.	Total 15	33,000	8,000			Ilately Dock
Gravel Barges						
Bering Pac. T. E. B.	1		300			Ilately Dock
Foss Fuel Barges	Total 10			12,916,390		Chevron Dock
Total General Cargo:		14,577				
Total Gravel:		33,000				
Total Tonnage:		47,577				
Seattle origin re-distributed out:			4,140			
Local origin dis-tributed out:			1,223			
Local origin south-bound Seattle, etc.:			1,422			
Gravel redistributed out:			8,000			
Total Tonnage Out Of Port:			14,785			
Total Gallons In:				13,564,390		
Local Distribution - Gallons Out:					6,070,940	
Total Gallons Out:					6,718,940	

*Cool Barge Fuel is brought in bulk, stored for redistribution via smaller barges by single contractor, not available for resale distribution.

TABLE NO. 3-78

PORT OF BETHEL WATER TRANSPORTATION
 TONNAGE AND FUEL GALLONAGE
 ANNUAL PERCENTAGE INCREASE/DECREASE
 AND PERCENTAGE OF REDISTRIBUTION

	1977	1978	Percent Change
General Cargo- Incoming:	18,195	14,577	20% Decrease
Gravel Incoming:	44,490	33,000	26% Decrease
Total Incoming Tonnage:	62,685	47,577	24% Decrease
*Tonnage Redistributed:	3,420	5,363	57% Increase
Bulk Fuel Incoming:	11,078,932	13,564,394	22% Increase
Bulk Fuel Redistributed:	6,306,473	6,718,940	7% Increase

PERCENTAGE REDISTRIBUTED TO VILLAGES

	1977 Redstr.	1978 Redstr.
General Cargo- Incoming:	18,195	14,577
*Tonnage Redistributed:	3,420 19%	5,363 37%
Bulk Fuel Incoming:	11,078,932	13,564,394
Bulk Fuel Redistributed:	6,306,473 57%	6,718,940 50%

*Tonnage redistributed does not include tonnage outgoing to Seattle.

III. ECONOMIC PROFILES: METHODOLOGY

The intent of this report is to provide an economic justification for structural solutions to bank erosion in Bethel. In order to achieve this goal this report addresses a geographic area supplied by the United States Army Corp of Engineers as the fifty year erosion area for Bethel (See Figure No. 3, 1977 Report). This area constitutes the impacted land and improvements which would erode if structural solutions do not occur. A fifty year limit is used by the U.S. Army Corp of Engineers as the life of a structural improvement, therefore the evaluation considers the cost of the improvement and the value of losses if no improvement is forthcoming during that time period.

In order to illustrate the value of the area considered, three alternative issues have been considered. They are, 1) Present value of land and improvements in the impacted area, 2) Replacement value of land and improvements in the impacted area, and 3) Cost to move and loss of non-moveables in the impacted area. A comprehensive overview is provided in summary form for the three issues stated, and the components of the impacted area are broken into the following headings: land, roads, utilities, residential structures, commercial structures, hospital compound, and the petroleum tank farm.

IV. REAL PROPERTY

The amount of land which would be lost due to erosion of the riverbank is calculated using information provided by the United States Army Corp of Engineers in the September, 1970 report titled "Bethel Bank Stabilization and Flood Control, Bethel, Alaska." The frontage land to be considered is 10,000 linear feet which is that area beginning at, and including U. S. Survey No. 3790, west to the east boundary line of U. S. Survey No. 4000. This measures approximately 7,500 feet. A erosion rate of 16 feet per year is used for U. S. Survey No. 4000 as well as U. S. Survey 4117, lot #44, which includes hospital and petroleum tank farm property. This measures approximately 2,500 feet.

The amount of land lost per year:

12 feet X 7,500 = 90,000 feet

16 feet X 2,500 = 40,000 feet

Total square footage eroding per year = 130,000 sq. ft.

Amount of land lost over a 50 year time period:

130,000 sq. ft. x 50 ft. = 6,500,000 sq. ft.

VALUE OF REAL PROPERTY

The value of the real property lost is that quantity of land lost multiplied by an average square foot price based on the following "Summary of Recent Sales." (Table No. 4-78) The summary averages out to a price of 58¢ per square foot for land. The total value of lost land would be:

1977 60¢ X 6,500,000 sq. ft. = \$3,900,000

1978 58¢ X 6,500,000 sq. ft. = \$3,770,000

As land that is lost due to erosion cannot be replaced, the value of the property and the replacement value are the same, \$3,770,000.

The drop in the value per square foot from 60¢ in 1977 to 58¢ in 1978 is most readily accounted for by the lack of any commercial land sales.

SUMMARY OF RECENT SALES

... the 1977 Report to the United States Army Corp of Engineers on the cost/benefit of a permanent erosion project at Bethel, Alaska, a summary of recent land sales in Bethel was examined in order to determine fair market value for land in Bethel.

Fair market value is defined as "the amount estimated in terms of money that a property will bring after being exposed to the market for a reasonable time and finding a knowledgeable buyer, willing to buy from a willing and knowledgeable seller, both being aware of all the uses to which the property could be adapted and neither being under pressure or duress."

Sales in Bethel during 1978 are broken down in the "Examples of Recent Sales" chart. This provides information concerning the buyer, lot location, total price, and square footage price for the land. These sales reflect current prices being paid for land in Bethel and every effort has been made to reflect the true land value picture.

During the last year in Bethel three minor subdivisions were sold on the market. One of these is commonly known as Reichville because it was subdivided and sold by Mr. Fran Reich. His land, a supplemental plat of U. S. Survey 3230 sold for \$.42 to \$1.45 per square foot. The low price is attributed to the need for fill in order to make the land useful. The City of Bethel also opened two subdivisions for sale in the past year. Five lots were sold in the Ptarmigan subdivision for \$.40 per square foot and five lots were sold in the Tundra North Subdivision for \$.60 per square foot. Both of these minor subdivisions are represented in the "Examples of Recent Sales" chart. Other property sold within Bethel was generally sold by individual owners.

TABLE NO. 4-78
EXAMPLES OF RECENT SALES

BUYER	LOT, BLOCK, SURVEY	TOTAL PRICE	SQUARE FOOTAGE	Price Per Sq. Ft.	COMMENTS
1. Craig Boney	lot 1 block 6 U.S.S. 3790	\$ 5,000	8,833	.57	slough front in flood plain
2. Don Shantz	lot 10, block 2 U.S.S. 3770	\$11,500	15,506	.74	in flood plain
3. Tim Anderson	lot 1, block 1 Bethel Heights Western Addition	\$ 5,000	7,500	.67	restrictions
4. Harold & Jane Niebergall	lot 12, block 4 Supplemental U.S.S. 3230	\$ 7,000	16,645	.42	in flood plain
5. Dan Laughlin	lot 17, block 4 Supplemental U.S.S. 3230	\$ 7,000	15,500	.45	in flood plain
6. Dan Boyette	lot 18, block 4 Supplemental U.S.S. 3230	\$ 7,000	16,635	.42	in flood plain
7. Craig Boney	lot 8, block 6 U.S.S. 3790	\$ 3,500	3,839	.91	slough front in flood plain
8. Dick Maddox	lot 1 Tundra North	\$ 7,000	11,593	.60	real estate contract signed City of Bethel *
9. Jay Livey	lot 4 Tundra North	\$ 7,000	11,593	.60	real estate contract signed City of Bethel *
10. John Burrows	lot 8, block 2 Ptarmigan Sub.	\$ 7,500	17,638	.43	real estate contract signed City of Bethel *
11. Chet Adkins	lot 1 & 2 block 2 Ptarmigan Sub.	\$13,600	22,414	.61	access to sewer & water

Average price per. sq. ft. = .58

* restricted, residential use only

V. ROADS

In considering the fifty year erosion limit, the exact loss of roads and effect is essentially the same as reflected in the 1977 Report. (See page 28.)

Those roads that would be lost as a result of continued erosion would be:

<u>PAVED ROADS</u>	<u>APPROXIMATE FEET</u>
1. State Highway, City Center Sub.	350 feet
2. Second Avenue, U.S.S. 3230	1,300 feet
3. Bridge Avenue, U.S.S. 3230	200 feet
TOTAL PAVED ROADS.....	1,850 feet

<u>DIRT ROADS</u>	
1. First Avenue (Note: Many parts of this road have already eroded. It no longer runs continuously across town.)	6,900 feet
2. Mission Lake Road/Lind Street	500 feet
3. Kilbuck Street	600 feet
4. Main Street	650 feet
5. Oscar Way	350 feet
6. East Avenue	1,505 feet
TOTAL DIRT ROADS.....	10,505 feet

The effects of such loss can be summarized as:

1. Lack of access to private property.
2. Disruption of City services (water, sanitation, oil, fire and police protection.)
3. Encroachment on property of others by owners unable to gain access to their own property.
4. Loss of access by public to river.
5. Loss of access by consumers to commercial area.
6. Loss of access by commerce for transportation of goods to and from places of business.
7. Eventual loss of access of main portion of town to State Highway leading to airport.

With the exception of number 7, all of these effects are being experienced at this time to a great extent.

Several businesses and homes are already encroaching on State roads in an effort to pull back from the erosion and save their building.

Mission Road or Front Avenue has eroded to the point where private owners are gaining access to their dwellings by driving through the property of their neighbors. Loss of roadway on Front Avenue had made it nearly impossible to maneuver large vehicles to load or unload goods. In many places traffic is stopped whenever any vehicles, even a taxicab, stops loading or unloading.

The Corp has the most accurate update on the actual number of feet eroded from Front Avenue in their recently completed survey.

The replacement costs are computed on a footage basis for the amount of road that would be lost even though the new road would not take the same configuration. The exact replacement cost cannot be totally accurate because of the unavailability of exact location plans, topography, and other considerations. A big unknown cost in relocating roads would be the acquisition of right-of-ways in order to build new roads. The 1977 figure of \$70.00 per running foot of dirt roads was provided by the Alaska Department of Transportation. This figure was for a 28 foot roadbed with four feet of silt and a gravel surface.

The 1978 figure is based on the actual cost of road construction in Bethel based on bid information supplied by the City of Bethel, Office of the City Planner. The actual cost of road construction in Bethel, not including engineering, surveying and administration, is \$67 per running foot. This does include the necessary resurfacing to pack and bind the gravel for a permanent gravel surface. Since this cost is for a 24 foot roadbed and the 1977 figure was for a 28 foot roadbed, we added the additional 16.6% cost in order to compare the figures. The actual cost for road construction then is \$78 per square foot at this time. Since no figures were available for paved roads, the low figure for gravel roads is being used.

Assuming a total of 12,355 feet of road will be lost, the monetary loss of roads as well as the cost to replace will be:

1977	12,335 x \$70 = \$864,850
1978	12,355 x \$78 = \$962,330

VI. TELEPHONE AND ELECTRICAL UTILITIES

With regard to telephone and electrical utilities, the present value, cost to replace, and the cost to move will be identical as it would be necessary to abandon these utilities rather than reuse and relocate. There were an additional five power poles added in 1978 making a total of 75 poles in the erosion area. Bethel Utilities Company states that each pole would have to be replaced at a cost of \$2,500 per pole. Therefore, the value of electrical utilities is:

1977	\$2,000 x 70 poles = \$140,000
1978	\$2,500 x 75 poles = \$187,500

This price includes labor, equipment, and hardware.

In 1978 Bethel Utilities Company experienced a 15 % growth in electrical output. The national growth figure for 1978 was 7%. In 1979, Bethel Utilities will add another 8400 kw and 2400 kw in generator capacity.

General Telephone Company of Alaska states that telephone cable in the erosion area is now worth \$101,800. Since it would be necessary to abandon cable lost to erosion, the replacement value is the same.

Total value for electrical utilities and telephone is:

1977	\$140,000 + \$ 92,600 = \$232,600
1978	\$187,000 + \$101,900 = \$288,900

VII. RESIDENTIAL STRUCTURES

Within the erosion area to be considered in this report, there are currently 148 private residential homes in use. This figure does not include the hospital, housing or the petroleum tank farm which are addressed later in their entirety. The type and quality of these homes vary dramatically from poor quality homes to homes valued up to \$70,000. The house number of these homes is attached as Tables No. 5-78.

As previously stated, for the purposes of this report, three values for residential units must be established. They are 1) present value, 2) replacement cost, and 3) cost of moving.

1) Present Value: Present value of residential structures (excluding land) can only be estimated. In an effort not to inflate the value of the homes, given the range of dwellings included in the erosion area, a figure of \$8,000, average per home was arrived at. This report assumes that of the 142 homes in the 1977 report some appreciated in value, while others depreciated due to their further deterioration, and that these changes in value cancel each other out. All of the new homes in the 1978 report, however, have a much higher average value. The average value of the six new homes is \$30,000 each on a per square foot basis. This figure added to the total value of last year's homes and divided by the total number of homes this year, raises the average value per dwelling to \$8,900. Therefore, the present value of residential structures in the erosion area is:

$$\begin{array}{rclcl} 1977 & 142 & \times & \$8,000 & = & \$1,136,000 \\ 1978 & 148 & \times & \$8,900 & = & \$1,317,000 \end{array}$$

2) Demolition and Replacement Value: If homes were to be replaced it would also be necessary to demolish the structures that presently exist rather than having the debris fall into the river and create future problems. Local contractor's report a 10% rise in the average cost per dwelling for demolition and removing the debris. If all 148 homes in the erosion area were demolished for \$1,100 each, the total cost would be \$162,800.

Replacement of the homes can be figured on a cost per square foot. It is assumed that the average size of these homes equals 600 square feet. Present non-government costs for wood frame construction is between \$54-\$66 per square foot. This reflects an increase in building costs of 7% average which is the minimum increase agreed upon by most contractors. Using the average of \$60 per square foot wood frame construction, the replacement costs for residential structures equals:

$$\begin{aligned} 600 \text{ square feet} \times 148 \text{ homes} &= 88,800 \text{ sq. ft.} \\ \times \$60 \text{ per sq. ft.} &= \text{Total Replacement Cost} \\ &\$5,328,000 \end{aligned}$$

Total replacement cost must then be added to demolition cost to obtain the value of complete replacement:

Year	Demo. Cost	Replace Cost	Total Cost
1977	\$142,000	+ \$4,771,200	= \$4,813,200
1978	\$163,000	+ \$5,328,000	= \$5,491,000

3) Cost of Moving: Cost of moving a house will vary as to the size and other factors; however, the cost of moving an average residential home by a local contractor is \$2,200 or 10% over last year's figure. This entails moving the house from one location to another.

The cost of providing the necessary leveling, reconnecting of water, oil, etc., would take an average of three men, three days, at \$16 per hour for an additional cost of \$1,150 per house.

Additional costs incurred in moving would be the required packing and moving of household belongings which would necessitate renting a truck as well as the manpower for an average price per household of \$330.

The total cost of moving the average house is \$3,680. If it were possible to move all 148 structures, the total cost would be:

$$\begin{aligned} 1977 \quad 142 \times \$3,380 &= \$479,960 \text{ Total Moving Cost} \\ 1978 \quad 148 \times \$3,680 &= \$544,640 \text{ Total Moving Cost} \end{aligned}$$

TABLE NO. 5-78

HOUSE NUMBERS IN EROSION AREA

904	12105	1020	1094
907	12012	1018	1098
909	12018	2017	1100
910	10600	2015	1110
911	10604	2009	1112
912	16010	2011	1116
913	10614	2007	1118
915	10618	1017	1053
920	1160	1019	1055
921	1079	1026	1057
922	1154	600	1081
923	1152	602	1075
927	12303	608	1073
932	12311	612	1071
934	12017	1036	1069
916	12106	1038	1067
924	12104	1023	1065
926	12102	1035	1059
716	1134	1037	1061
2000	12105	1040	1124
713	12013	1042	1130
717	12011	430	1136
700	1097	437	1138
1000	1095	427	1140
1001	1091	425	1142
1003	1107	423	1144
1005	1109	1080	1146
1009	2070	1082	1150
1002	1068	1084	1156
1014	1064	1086	1158
1012	1062	1088	12303
1016	1058	1090	12301
1022	1056	1096	12103
413	411	1092	1122
1108			
1 Quanset			
2 Trailers			

ADDITIONS IN 1978:

1054A	1054D
1054B	1073
1054C	1140

VIII. COMMERCIAL AND GOVERNMENT ENTERPRISE

Within the erosion area there are thirty commercial and government enterprises. The hospital compound and the petroleum tank farm are treated separately due to their complexity and importance.

As shown in the 1977 Report, most of these businesses are located in what is to be considered the downtown section of Bethel which is easily accessible to river and foot traffic. There is significant economic development in this area which is readily demonstrated in this report. There are five new businesses in the erosion area, four of them in the downtown section. Four businesses in the erosion area significantly expanded or renovated their structures in 1978. All of this activity reflects a growing economic investment in what business perceives to be essential location in the downtown area. Local proprietors report a healthy growth in sales. This growth can be accounted for both by the rise in population in Bethel and the fact that goods and services have become developed, diversified and readily available to the point that there is more traffic from surrounding villages.

The present value, cost to move, and cost to replace these businesses are presented in Table No. 6-78. Present value is determined by the appraised value, insurance coverage, or aquisition cost, if recently sold. Cost to move is substituted by replacement cost in those instances where it would be impossible to move the business. Replacement cost has been inflated by 7% over 1977 figures. This is the minimum inflation figure agreed on by local contractors.

Table 6-78 shows that the present value of businesses in the erosion area is \$8,289,000. This is \$2,279,000 over the 1977 value of businesses in the erosion area. The replacement cost is \$9,983,100 which is \$2,729,100 over the 1977 figure. The relocation cost is \$8,799,300 which is \$2,420,800 over the 1977 amount.

	PRESENT VALUE	COST TO MOVE	REPLACEMENT COST
1977	\$6,010,000	\$6,378,500	\$7,254,000
1978	\$8,289,000	\$8,799,300	\$9,983,100

TABLE NO. 6-78
BUSINESSES IN THE EROSION AREA

IMPROVE. OR EX- PANDED	BUSINESS NAME NO.	VALUE OF BUILDING	RELOCATION	REPLACEMENT
*	1. Swanson's Store	\$2,750,000	\$2,750,000	\$2,750,000
	2. Catholic Church	100,000	290,000	290,000
*	3. Swanson's Marina	250,000	250,000	250,000
	4. Porter Electronics	138,000	147,700	147,700
	5. Checker Cab	170,000	22,000	170,000
	6. First National Bank	175,000	535,000	535,000
	7. Recreation Center No. 1	169,000	11,000	190,000
	8. Recreation Center No. 2	169,000	11,000	190,000
	9. Cowan Hut	10,000	80,300	80,300
	10. Day Care Center	70,000	11,000	74,900
*	11. T.W.C.	20,000	7,700	69,500
	12. O.E.H. Staging Ground	65,000	65,000	65,000
	13. Wild Goose Restaurant	85,000	240,000	240,000
	14. Bethel Power Products	35,000	66,300	66,300
	15. Dr. Carpenter's	15,000	4,400	23,500
	16. Nerby's Store	70,000	240,800	240,800
	17. Jay's Auto Shop	12,000	4,400	30,000
	18. Bush Air	112,000	16,000	128,400
	19. Samuelson's Flying	12,000	3,900	19,300
	20. Fish and Game	28,000	13,200	43,900
	21. Brown Slough Marina	10,000	6,100	30,000
	22. Samuelson's Store	35,000	160,500	160,500
*	23. J.B. Crow and Sons	325,000	325,000	325,000
	24. City Dock	1,600,000	1,760,000	1,760,000
**	25. Elm Fisheries	750,000	750,000	750,000
**	26. Brown's Bus Barn	200,000	200,000	200,000
**	27. Yugtak Fisheries	105,000	200,000	200,000
**	28. A.C. Marina	72,000	144,000	144,000
	29. United Transportation	212,000	284,000	284,000
**	30. Swansons Furniture Store	525,000	525,000	525,000
		8,289,000	8,799,300	9,983,100

* indicates businesses which have expanded
** indicates new businesses

IX. PUBLIC HEALTH SERVICE HOSPITAL

The Public Health Service Hospital is located along the riverbank in U. S. Survey 4000. The whole plant includes the hospital, housing and water treatment facilities. As shown in the 1977 report at the rate of 16 feet erosion per year, the present hospital compound would have to be moved or destroyed. Because of the erratic erosion on this part of the riverbank, it is estimated that the complex would not be useable in twenty-five years.

The new hospital being constructed by the Public Health Service will eventually replace the old hospital. However, the hospital, quarters, and water treatment plant will have a commercial use value of approximately fifty years with proper maintenance

For the purposes of this report, values have been placed on present value, replacement costs, and moving and loss costs. This excludes land, roads, and utilities which are considered separately.

1) Present Value of Hospital Complex: The present value of the hospital complex is estimated by hospital officials as the cost of present wood frame construction depreciated over a twenty-five year period. Present non-governmental costs are between \$54-\$66 per square foot for wood frame construction. Government costs are substantially higher at \$120 per square foot for wood frame construction. For the purposes of present value and replacement value for the buildings, hospital officials have chosen to use an average construction cost of \$60 per square foot for wood frame construction.

With 92,290 square feet at \$60 per sq. foot, the cost would be \$5,479,940. Less the twenty-five years depreciation the value would be \$2,729,938. Added to this is the present value of the well and water treatment storage facilities which is \$2,750,000, for a total present value of \$5,479,940.

2) Replacement Value of the Hospital Complex: Replacement value is considered using the square

footage lost multiplied by \$60 per square foot for the construction of a wood frame building. This figure does take into account the fact that this building will not be used as a hospital in future years, but that it would be used for another purpose within the community.

Hospital building	28,254 s.f.	\$1,695,240
Quarters (25)	11,978 s.f.	718,680
Service building	12,258 s.f.	735,480
Quarters (16)	8,384 s.f.	503,040
Shop-Garage	1,440 s.f.	86,400
Quarters (1)	1,148 s.f.	68,880
Quarters (1)	874 s.f.	52,440
Quarters (1)	780 s.f.	46,800
Quarters (3)	1,060 s.f.	63,600
Garage	640 s.f.	38,400
Warehouse	576 s.f.	34,560
Warehouse	1,900 s.f.	114,000
Quarters (4)	4,380 s.f.	262,800
Quarters (4)	4,380 s.f.	262,800
Quarters (4)	4,380 s.f.	262,800
Quarters (8)	5,138 s.f.	308,280
Storage	4,600 s.f.	286,000
Water facilities		2,750,000

TOTAL REPLACEMENT COST	\$8,280,200
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3) Relocation: In 1977, hospital officials estimated the cost of moving the hospital on a per square foot basis at \$1,845,600. This did not count additional relocation expenses. They estimate the cost of moving the hospital in 1978 to be 10% above the cost in 1977. The well and water treatment-storage facilities could not be moved, nor could the heating plants. Therefore, the relocation costs would be:

Cost of relocating building	\$2,845,600
Water and sewer system	2,750,000
Heating systems	2,000,000

TOTAL RELOCATION COSTS	\$6,345,600
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X. PETROLEUM TANK FARM

Chevron USA as stated in the 1977 report (page 39) that it planned the development of an additional 1,512,000 gallon tank in 1978. This was completed on schedule and brings the tank farm total storage to 8,010,000 gallons. Chevron also stated that another tank of similar capacity was scheduled for 1980.

TABLE NO. 7-78

<u>YEAR</u>	<u>STORAGE INSTALLED</u>
1970	1,134,000 gallons
1972	2,037,000 gallons
1976	840,000 gallons
1978	<u>1,512,000 gallons</u>
TOTAL	5,523,000 gallons

This year the tank farm received 12,916,391 gallons of fuel of which 6,070,940 gallons was redistributed via water transportation. The greatest increase in type fuel intake was aviation. There was 64% increase in aviation 100/130 and a 56% increase in aviation 80/87. Bulk packaged goods increased from 557 tons in 1977 to 739 tons this year, and redistribution of packaged bulk goods, via water transportation increased to 348 tons from 345 tons in 1977.

Chevron also undertook temporary emergency repairs on their dock loading site to forestall their critical erosion situation at a reported cost of \$53,750. This involved driving steel casing and constructing a small retaining wall with back fill to establish a safe mooring point for their floating dock/pumping station for both receiving and discharging fuel.

Current value of the tank farm as provided by company sources is \$5,335,000 less the real property involved. Relocation cost, if feasible, is projected at \$1,720,000.

XI. SUMMARY AND ANALYSIS

The total present value, relocation costs, and replacement costs are summarized in Table No. 8-78. Replacement cost is included to demonstrate total replacement of all buildings and facilities that would be lost due to erosion within a fifty year projection. Relocation costs include replacement costs of those facilities that cannot be removed, with moving costs of those that can.

TABLE NO. 8-78

SUMMARY OF VALUES

Category	Present Value	Replacement	Relocation
Real Property	3,770,000	3,770,000	3,770,000
Residential	1,317,000	5,491,000	544,640
Hospital	5,579,940	8,280,200	6,345,600
Utilities	476,400	476,400	476,400
Roads	962,330	962,330	962,330
Petroleum Tank Farm	5,335,000	5,335,000	1,720,000
Commercial Buildings	8,289,000	9,983,100	8,799,300
Additional Costs			750,000
TOTALS	\$25,729,670	\$34,298,030	\$23,368,270

ANALYSIS: Future Loss in Present Dollar Equivalent

The future loss in present dollar equivalent is derived from the amount of total property lost within 10 year increments. The area loss per increment is computed from the Corp's projected loss by erosion as explained within Chapter IV, Real Property. The values used are present values as presented in Table 8-78.

An appreciation figure of 10% per annum and a discount figure of 7% interest per annum is employed in deriving the factor, with an adjustment to five years per increment so that present equivalent dollars are expressed as an average of the 10 year periods.

1988, 10 year loss @present
value = \$8,813,260 x 1.14 =
average present dollar equivalent of: \$10,047,116

1998, 20 year loss @present
value = \$18,387,890 x 1.32 =
average present dollar equivalent of: \$24,272,014

2008, 30 year loss @present
value = \$19,822,650 x 1.55 =
average present dollar equivalent of: \$30,725,108

2018, 40 year loss @present
value = \$21,185,010 x 1.55 =
average present dollar equivalent of: \$35,590,817

ANALYSIS: Cost of Construction

Cost of Construction: Estimate is based on a permanent seawall starting at the junction of the first slough above Brown Slough, recessing into the mouth of Brown Slough on both banks and extending downriver below the current location of Hately's Dock or the southern boundary of Lot 44, of U. S. Survey 4117, a distance of approximately 10,000 feet.

Cost of construction is based on an elliptical or half circle design, sheet pile wall. Each half circle having the approximate diameter of 60 feet with sheet pile cylinders located approximately every 300 feet for blow out protection. Wall would be sealed and back filled with existing river sand and silt. Projected costs have been increased over the 1977 figure of \$550.00 per foot by 60%. This new cost per foot of \$880.00 is used purely for graphical reasons as it is understood that a complete design and cost analysis is yet to be completed by the Corp.

ANALYSIS: Benefit/Cost Ratio

PERMANENT CONSTRUCTION:

10,000 feet x \$880/linear foot	\$8,800,000
Contingencies @20%	\$1,760,000
Eng., Des., Supv., and Admin. @15%	\$1,320,000

TOTAL COST	\$11,880,000
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Annual cost with interest @7% and a useful life of 50 years \$11,880,000 x 07.	\$831,600
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Estimated annual maintenance	\$65,000
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TOTAL ANNUAL CHARGE	\$896,000
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Total average annual charged	\$896,000
Average annual benefit (at present value)	\$1,801,077

BENEFIT-COST RATIO	2.01
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EVALUATION-RELOCATION

Federal Costs:

Relocation total (Table 7-78)	\$23,368,270
Contingencies @20%	\$4,673,654
Eng., Des., Supv. and Admin. @15%	\$3,505,240

TOTAL COST	\$31,547,164
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Annual Cost with interest @.07 for a 50 year period, \$31,547,164 x .07	\$2,208,301
Estimated annual maintenance	\$65,000

TOTAL ANNUAL CHARGE	\$2,273,301
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Total Average Annual Charge	\$2,273,301
Total Average Annual Benefit	\$1,635,779

BENEFIT-COST RATIO	0.7 to 1
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XII. LOCAL PARTICIPATION

Certain local assurances that are the general requirements of Federally funded projects and particularly of this project need be provided by the Community. They are as follows:

1. Enact necessary zoning ordinances to control development within that portion of the project that lies within the designated flood plan.

This has been accomplished with the enactment by the City of the Uniform Flood Control Ordinance.

2. Provide all necessary lands, easements, and right-of-ways required for construction and subsequent maintenance of the project, including necessary soil disposal areas.

For the most part the community envisions this construction primarily as a land reclamation project as well as a retaining wall. It is felt that this would be the most expedient and less costly alternative than attempts to construct on existing debris that has been employed over the years in attempt to contain the erosion. It would also add valuable land to the waterfront/port area where it is most urgently needed. Further benefits to the reclamation method would be a disposal site for dredge material at the construction site and from across the river directly in front of the city where siltation has caused the rise of vast sand bars that continually force the river channel against the city side of the river ox bow.

3. Hold and save the United States free from damages that may result from construction and maintenance of the project.
4. Provide, maintain, and operate upon completion of the project, as needed, adequate public access and public use shore facilities open to all on equal terms.

All land running the full length of the project and at a minimum depth of 25 ft. from the completed retaining wall would remain public property and treated as to its use and disposal in accordance with existing local ordinance and State law.

5. Establish regulation concerning discharge of treated and untreated sewage, garbage, and other pollutants in the river waters contingent to the project.

Such regulation has been so established.

ADDITIONS TO BIBLIOGRAPHY

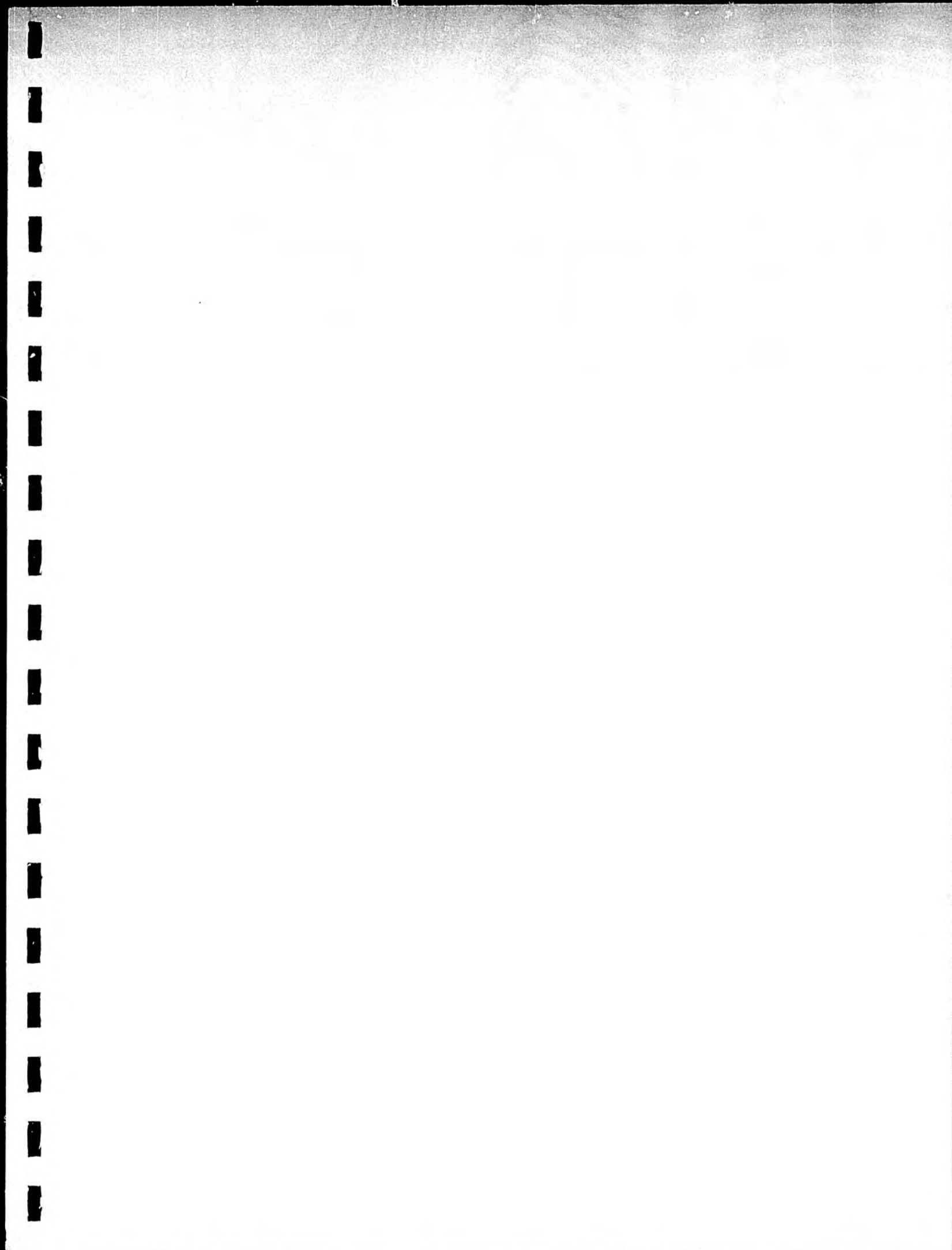
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*Background - L.A.S.
Rec'd at Bunk - Oct 1979*

see at Bunk

SUMMARY OF MAJOR ITEMS DISCUSSED AT BETHEL LISTENING SESSION

Standby Power for New ATC Tower: The operator of the local power plant indicated that he had been involved in discussions and had viewed plans that indicated that the planned facility would not have a standby power unit. He indicated that a standby power unit was needed to carry both the tower and field lights during periods when the primary power source was out of service.

Response: The new tower plans do include capabilities to operate on standby power. Also, a 30 Kw generator will be installed as a part of the ADAP project scheduled for the 1980 construction season. This will serve as a standby generator for the field lights.

Frequency Congestion and Delays: It was stated that the requirement for one specialist to work 123.6 and 122.2 simultaneously appeared to add to the problems of frequency congestion. He questioned our staffing level, if it did not provide the number of specialist required to man the dual positions established when the FSS was remodeled. It was further stated that the frequency congestion created an unsafe condition in that some time persons needing enroute weather or other information had to wait while flight plan

information was exchanged.

Response: Current staffing level will support operation of dual position. The primary problem is in the number of trainees at the facility. It was stated that a significant number specialists bid into higher graded facilities after they complete their training at Bethel, which means that we continually have a high percentage of trainees at the facility. The long range solution is the opening of the tower which will relieve the FSS of the Airport Advisory Service. The short range solution appears to be the effective use of the present staffing.

Need for Additional Navigation Aids: The need for additional navaids was addressed by several persons, including the representative from the community of Kipnuk. The need for aids to support VFR as well as terminal IFR operations was included in the comments.

Response: Plans for the establishment of TVORs in the area were reviewed. A map was provided for them to take a closer look at during the break.

Why TVORs instead of VOR, why TVORs instead of NDBS?

Since VORs provide more extensive coverage, our decision to install TVORs was questioned. Our decision to install TVORs which operate on a "line of sight principal" as opposed to NDBs that provide better coverage and service at low altitudes was also questioned.

Response: The use of TVORs instead of VOR was a technical and economical decision. The terminal use that they are designed for do not require the coverage that the VOR is designed for, and we can install two or three TVORs for the money that it would take to install one VOR.

On the question of the NDB vs TVOR, we discussed the problems encountered with the use of the NDBs in the past and the more precise position reference provided by the TVOR. However, we did indicate that NDBs were still being installed and that we would review our plan to make sure we would get the best possible service from the planned system.

Additional Comment From Participants on NDBs: It was stated the Wien had an extensive system of NDBs when they operated the bush routes. However, they ceased to operate them when they went to the contractor concept. (The comments appeared to support the NDB system over the TVOR System).

Status of Bethel ATCT: Questions were asked about the commissioning date of the Bethel Airport Traffic Control Tower and the kind of services it would provide.

Response: The target date for the commissioning of the Bethel ATCT is the fall of 1980. It will probably be opened as a VFR (Visual Flight Rule) tower and be upgraded to a nonradar approach control facility within 6 months. The Alaska Region's Ten Year Plan identifies Bethel as a possible candidate for radar in the late 1980s.

Community Sponsorship of Navaid Installation: The question of community sponsorship of an ADAP project to install and operate a NDB was asked.

Delete ~~Response: The potential for this type of project was reviewed with emphasis on the type cooperation that would be required between the community, state as the sponsor, and the FAA.~~

Response: It was advised that terminal Navaids could be installed under the ADAP program with the Alaska DOT acting as sponsor, or possibly with the village and the state acting as joint sponsors. Private individuals can also install Navaids, but if they are used for commercial

operations they must be flight checked by FAA. ADAP funds cannot be used for operation and maintenance activities.

Runway Conditions at Bethel: It was stated that the main runway at Bethel had a number of rough areas that need a major repair effort instead of piecemeal attempts to deal with the problem.

Response: The request for \$5 million multiyear ADAP project for Bethel was discussed, and it was noted that the application contains an item for "reconstruction of areas of primary runway 18/36." The project scope described at the listening session was later revised to include widening of the northwest apron and construction of a new 25,000 square yard G.A. apron. Paving of the aprons and taxiways has been deleted from the revised project. A copy of the final grant agreement will be forwarded to the FSS so that individuals can examine the scope of the project planned for 1980.

Runway Conditions at Village Airports: General comments on the runway conditions at the villages and how they were affected by seasonal conditions and poor or infrequent maintenance. Specific comments related to: Kipnuk, Nunapitchuk, and Chevak.

Nunapitchuk: Drainage has caused serious erosion at several places along the runway. The state has not responded to the request for repairs. Response by State Maintenance and Operations Staff. They were not aware of the problem, but would schedule a visit to determine how the problem could be eliminated. (Nunapitchuk is not included in National Airport System Plan (NASP) since the village is served by the Akolmiut Airport.)

Kipnuk: Runway conditions are often poor due to the impact of weather has on the surface. This problem is accentuated by aircraft using the runway during these periods. Often the villagers will mark the runway as being closed, but the aircraft will continue to use the runway, which only causes more damage to the runway. (See attachment 1 for list presented by Kipnuk representative.)

Response by State Maintenance and Operations Staff: The level and amount of maintenance work possible is dictated by the amount of funds available for the work. The amount allocated is determined by the Administration and the Legislature.

FAA Response: An ADAP project at Kipnuk is a part of our FY79 program. This \$510,803 project will include runway

reconstruction, a new apron, segmented circle, wind cone, reflective markers, and lenosion control.

Chevak: This runway has a very narrow width (30 or 40 feet) and is constructed of poor materials. It is in marginal condition much of the time. The question of FAA responsibility or reaction to strips that are unsafe due to poor maintenance after the airport is constructed with ADAP funds.

Response: By State: Chevak was not constructed with ADAP funds. In these cases projects often start as line items in the budget but do not always contain sufficient funds for a first class project. This leads to getting the job done as best as possible, but often results such as Chevak are the product. There is little that can be done in the situation.

By FAA: For ADAP Airports we do annual inspection to assure that they are being maintained in compliance with the grant agreement stipulations. In other cases where an operating certificate is required, we also conduct inspections to determine that airport conditions meet guidelines. We also described the 5010 Airport Master Record Program

If unsafe conditions are uncovered during FAA inspections

the sponsor is advised in writing of the deficiency and requested to take corrective action. The FAA also encourages the reporting of unsafe conditions by any person or organization.

The FAA will only participate in development projects which meet the national safety standards for design and construction. Among other things, the standards include runway and safety area width, length, cross section, and profile. In very unusual situations a runway slightly less than the minimum 100' x 2,400' safety area may be approved due to precipitous terrain or adjacent bodies of water.

Additional Comments on Airport Maintenance: It was generally indicated that more money was needed for airport maintenance.

Runway lights and flare pots: Several comments stressed the need for runway lights ^{at} the village strips. Factors contributing to this need are the general need for assistance in locating and identifying runways and the requirement for emergency airlift at night.

Requests have been made to GADO on use of flare pots by Part 135 operators. No decision has been received.