FINAL
SANITATION FEASIBILITY STUDY
AND ENVIRONMENTAL REVIEW

FOR

TUNUNAK, ALASKA

Prepared For

Tununak Traditional Tribal Elders Council
P.O. Box 97
Tununak, AK 99681

and

Village Safe Water
3601 "C" Street, Suite 310
Anchorage, AK 99503

Prepared By

Phukan Consulting Engineers & Associates, Inc.
203 W. 15th Ave., Suite 104
Anchorage, AK 99501

March 22, 1993

AGENDA

For the Joint Public Meeting of the
Traditional and *I.R.A.* Councils of Tununak
Thursday, October 17, 2002, 7:00 p.m.
Gregory Angaiak Memorial Building (Armory)

1. Call to order

2. Invocation

3. Roll call

4. Establishment of quorum

5. Approval and adoption of agenda

6. People to be heard to think over the water and sewer systems
   A. Peter Pitka, Natural Resources Department of the Native Village of Tununak
   B. Jim Patterson, *ADEC/Village Safe Water Program*
   C. Mark Baron, *Cowater Alaska, Inc./Flush Tank and Haul™ System*
   D. Jillian Kinghorn, Troy Ritter, and/or Allan Paukan, *YKHC/Office of Environmental Health and Engineering*
   E. Paul Chimuigak, *ADCED/Rural Utility Business Advisor*

7. Unfinished business
   A. James Kaercher, *Kuskokwim Architects & Engineering, Inc.*
   Re: Board Walks

9. New business
   A. Nominations for *CVRF* Board Representative
   B. Bingo nights

10. Open session

11. Time and place of next meeting

12. Door Prizes

13. Closing Prayer

14. Adjournment

ROUTE THRU: Bernie
TO: File – Tununak
"Study Files"

Rec'd 3/23/93 VSW

PHUKAN CONSULTING ENGINEERS & ASSOCIATES, INC.
Civil • Geotechnical • Surveying • Environmental

Note:
Have sent prior copies of study to:

- Greg Capito, VSW Juneau
- Lori Tellier, FCA Juneau
- Deb Verilli, EPA Juneau
- Mike Lewis, WDO/SERO Anch.
- Nova J. Blazej, AVCP Bethel
- Tom Coolidge, PHS Anch.

VSW 3/23/93

March 23, 1993
W.O. # P-92516

Village Safe Water
3601 "C" Street, Suite 310
Anchorage, Alaska 99503

Attn: Mr. Jim Patterson, P.E.

Subject: Final Sanitation Feasibility Study and Environmental Review

Dear Jim:

Please find enclosed two additional copies of the referenced final report per your request. We appreciate your constructive comments regarding our previous draft submittals. We now look forward to commencing the design phase of this project.

Please contact us if you have questions regarding the enclosed reports.

Sincerely,

PHUKAN CONSULTING ENGINEERS & ASSOCIATES, INC.

Dr. Arvind Phukan, P.E.
Principal

Enclosures

203 W 15th Ave., Suite 104 • Anchorage, Alaska 99501 • **(907) 272-7111** / FAX 277-3177

CHAPTER I
SUMMARY AND RECOMMENDATIONS

This Sanitation Feasibility Study and Environmental Review was funded for the Yupik Village of Tununak, Alaska under EPA/ISA Wastewater Project #85901, and performed under contract with the Tununak Traditional Elders Council dated October 27, 1992. Tununak is located on the Bering Sea coast in western Alaska, on the northwest side of Nelson Island and 115 miles northwest of Bethel.

Different wastewater disposal options were evaluated for Tununak, including completion of an existing incomplete underground gravity sewer, construction of new above ground gravity sewers and buried pressure sewers, as well as installation of a sewage haul system. Engineering findings, including costs of various alternatives, were discussed with the Tununak Traditional Elders Council, and the sewage haul system was recommended as the most cost effective option. The Elders Council subsequently passed a resolution, contained in Appendix B of this report, accepting this recommendation.

A strategic sanitation plan, including four construction phases, is proposed for Tununak. The scope of work, capital cost, and operation and maintenance cost for each phase is summarized in Table I-1. Phases I and II would be funded by the $475,000 in construction funding included in the existing EPA/ISA grant. (EPA has yet to grant the $475,000 to the State of Alaska). Funding for Phase III would be requested in 1993 or 1994, and funding for Phase IV would be requested one year after Phase III funding. Phases II, III, and IV would be contingent on community acceptance of Phase I.

The reader will note that monthly operation and maintenance cost estimates are quite high, $50 or more per month. These costs are based on a sewage haul system fully operated by the Traditional Elders Council or its designee. Monthly operating and maintenance costs could be reduced by approximately one-half if qualified individuals were allowed to haul sewage for themselves and their families under a controlled process in which the Traditional Elders Council issued haul licenses after individuals successfully completed safety and sanitary procedures training.

TABLE 1-1
Estimated Capital and Operation and Maintenance Costs for Recommended Phased Alternative (1993 Dollars)

Phase of Funding	Description of Improvements	Capital Cost	Monthly O & M Cost
I.	Basic Improvements to Existing Facilities, Installation of Four Sewage Haul Units, and Facilities for Final Sludge Disposal.	$343,000*	$50
II.	Installation of Ten Additional Sewage Haul Units.	$132,000*	$56
III.	Installation of Twelve Additional Sewage Haul Units, Decommissioning of Five Honey-Bucket Bunkers, Additional Sewage Disposal Improvements.	$465,700**	$57
IV.	Installation of Sixty Three Additional Sewage Haul Units, Decommissioning of Five Additional Honey-Bucket Bunkers.	$717,800**	$57
GRAND TOTAL		**$1,658,500**	

$32,500 x 63 units each = $2,047,500

* Funded by EPA/ISA Wastewater Project #85901.
** Future funding request. Includes design engineering.

V Rejuvenate Washeteria with new water tank. $2,000,000

VI Solid waste landfill with access road. $1,000,000

CHAPTER II
INTRODUCTION

The water quality and related health problems in Tununak are well known by local residents and federal, state, and regional agencies. Some reports on the subject include:

- Community Environmental Health Profile and Priority Projection, Yukon-Kuskokwim Delta Service Unit, October 1991.
- Project Summary, Sanitation Facilities Construction, U.S. Public Health Service, March 1989.
- Design Concepts and Cost Estimates for a Water and Sewer System, Meridian Engineering, 1984.
- Project Summary, Sanitation Facilities Construction, U.S. Public Health Service, June 1977.

In spite of the studies done over the last 15 years, Tununak still does not have a functional sanitary procedure for disposing of wastewater from homes, businesses, or most public buildings. Individual and public health problems resulting from poor sanitation are common. According to 1990 U.S. Census data, 83 of 87 households in Tununak lacked complete plumbing facilities. Nearly all commercial and institutional buildings in Tununak also lack plumbing facilities. The standard method for human waste disposal is the "honey bucket," typically a 5-gallon pail with a plastic seat, lined with a disposable garbage bag. Waste is typically treated with a household cleaner like Pine-Sol, to reduce odor, and disposed of every day or two. Disposal facilities consist of ten (10) wooden bunkers that are in close proximity to homes, children's play areas, and surface waters. For some households, bunkers are either too distant and/or too disgusting, so bags of human waste are left on beaches for disposal by the outgoing tide. To the author's knowledge, no facilities or equipment have ever been provided for periodic maintenance of "honey-bucket" bunkers, so their condition has become progressively worse. (The U.S. Public Health Service does recommend that spills and leaks be promptly cleaned up and disinfected with "milk of lime" as described in Chapter VI, Section K.)

Water supply facilities in Tununak are more developed than wastewater disposal facilities but still primitive by standards in the vast majority of the U.S. Water is pumped from a small stream and treated in a central water treatment plant. Treated water is distributed to the school and a series of watering points in the "main" village. From watering points, main village residents carry buckets of water to their homes. Another part of the village, the "23-home

subdivision," has no functioning water system. Typically, water is hauled from streams for home use. In the summer, rainwater from roof catchment systems supplements hauled water.

The most urgent sanitation needs for Tununak are as follows:

- Facilities for disposal of human waste and wastewater that protect the health of the people and the environment.
- Decommissioning of existing waste bunkers when an alternative waste disposal system is available.
- Facilities for final disposal of sludge resulting from treatment of wastewater and decommissioning of bunkers.
- Improvements to the water system that will provide unpolluted year-round supply, improved distribution, and fire-fighting capabilities to the entire village.

A contract was awarded to Phukan Consulting Engineers and Associates, Inc. (PCA) by the Tununak Traditional Tribal Elders Council through the auspices of VSW on October 27, 1992, to perform a Sanitation Feasibility Study and Environmental Review. The contract is between PCA and the Tununak Traditional Elders Council with VSW assisting with technical and administrative oversight. Accordingly, PCA completed a Sanitation Feasibility Study and Environmental Review of the village of Tununak. The scope of the work is included in the contract between PCA and the Council.

This report presents the results of PCA's study which was made possible by a grant from the U.S. Environmental Protection Agency (EPA) through the Village Safe Water program (VSW) of the State of Alaska. EPA funding is being made available to address wastewater disposal problems in Tununak, and that is the primary focus of this report. Summary and recommendations are included in Chapter I which precedes this introduction chapter (Chapter II). Chapter III provides background information. Chapters IV through VIII consider various aspects of and solutions to existing sanitation problems.

CHAPTER III
DESCRIPTION OF PLANNING AREA

A. LOCATION AND DESCRIPTION

Tununak is located in western Alaska, on the northwest coast of Nelson Island, and directly on the Bering Sea coast. Latitude and longitude are 60° 35′ North, and 165° 16′ West, respectively. The village is about 519 miles west of Anchorage and approximately 115 miles northwest of Bethel. Tununak is located primarily in Section 28, T6N, R91W, Seward Meridian, Alaska, although the municipal boundaries extend into several of the adjoining sections. Figure III-1 shows the key location of Tununak within the State of Alaska.

Figure III-2 shows the community itself. The community is generally divided into two parts: the "main" village on a narrow spit of land between the Tununak River and the Tununak Bay, and the "new" village, or 23-home AVCP Subdivision, is located on the northeast regions of the main village along the North Fork of the Tununak River and at the base of the foot slope to Ugchirnak Mountain.

B. CLIMATE

Tununak is located in a region of transitional climate between the "warm" marine climate of Bristol Bay and the "cold" continental climate of Interior Alaska. Table III-1 presents temperature and precipitation data for Tununak. (Ref. Environ. Atlas of Alaska, 1984.)

TABLE III-1
Tununak Temperature and Precipitation Data

Mean Annual Temperature	29°F
Mean January Temperatures	
- Low	4°F
- High	16°F
Mean July Temperatures	
- Low	47°F
- High	55°F
Mean Diurnal Variation	11°F

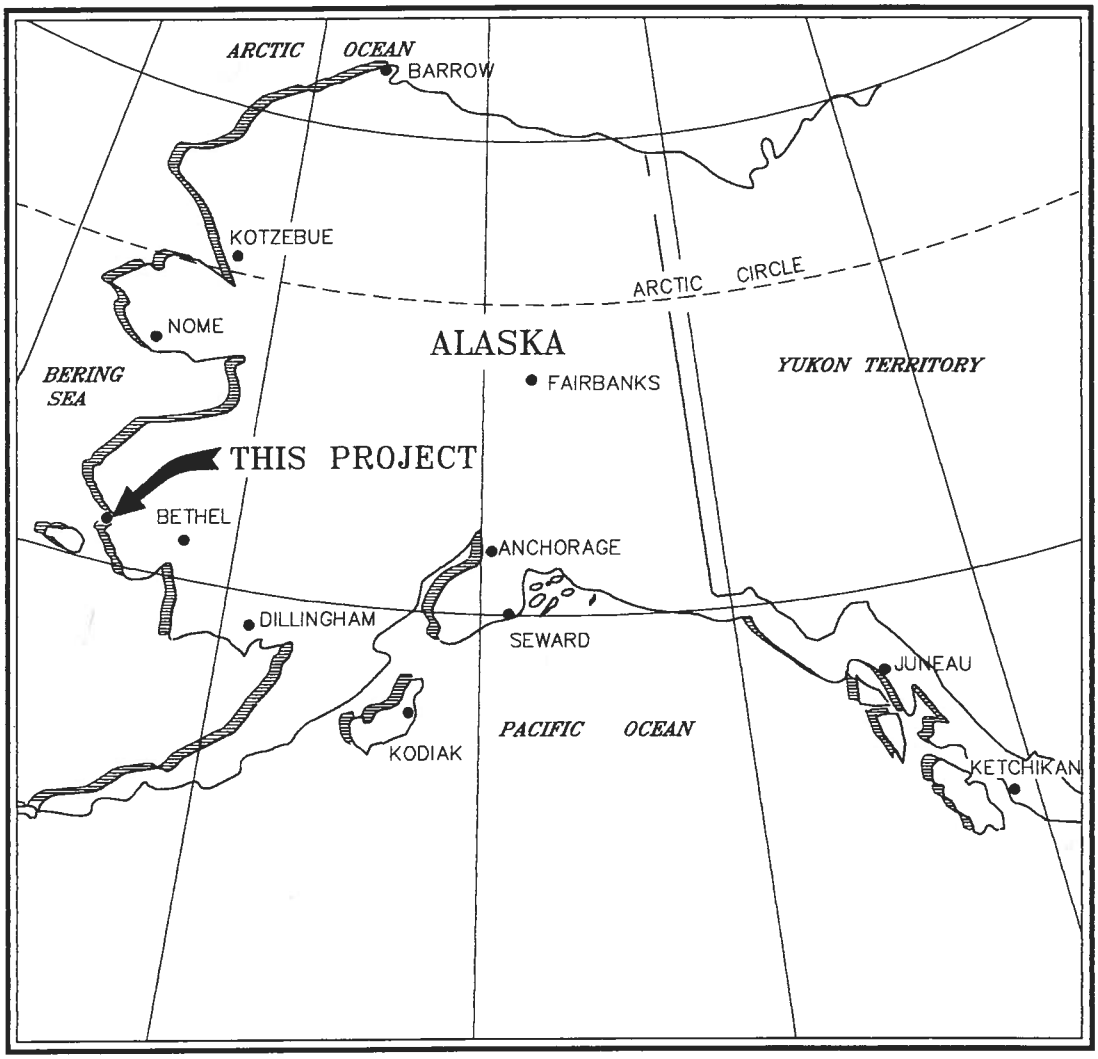

FIGURE III–1: TUNUNAK SANITATION FEASIBILITY STUDY PROJECT LOCATION

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W.O. 92516	COMP. FILE 516III–1	SCALE NTS	DATE 1/21/92	BY SMM

NOTES

1. BUILDING LOCATIONS, SHORE LINE, AND RIVER ARE DIGITIZED FROM AERIAL PHOTOGRAPHY AND ARE FOR GRAPHIC REPRESENTATION ONLY.

LEGEND

RECORD BOUNDARY

RECORD CENTERLINE

BLM RECORD MEANDERS

N

BERING SEA
(TUNUNAK BAY)

MAIN VILLAGE

TUNUNAK RIVER

ROAD

AIRSTRIP

TUNUNAK RIVER

U.S.S. 4028 MUNICIPAL RESERVE

TRACT

U.S.S. 4054

TEACHER HOUSING

PAUL T. ALBERT MEMORIAL SCHOOL

WASHATERIA (WATER TREATMENT PLANT & LAUNDROMAT)

VACANT SUBDIVISIONS

UNNAMED CREEK

TRACT D

NEW VILLAGE U.S.S. 4028
23 HOME A.V.C.P. SUBDIVISION

APPROXIMATE SCALE
0 250 500 750 1250
(IN FEET)
1 inch =500 ft.±

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TUNUNAK SANITATION FEASIBILITY STUDY
COMMUNITY MAP

DRAWN	GRID	COMP FILE NO. 516III-2	FIGURE III-2
SCALE 1"=500'±	DATE 12-21-92	FILE DRAWER NO.	
F.B. PG.	W.O. H92516		

Record Temperatures	
- Low	-35°F
- High	80°F
Mean Annual Precipitation	20 inches
Mean Annual Snowfall	60 inches
Mean Annual Snow Accumulation	28 inches

Rainfall occurs primarily from July to October, averaging 2½ to 5 inches per month. Snowfall occurs primarily from October through March, averaging 6 to 10 inches per month.

Table III-2 presents engineering design criteria related to climate (Ref. Environ. Atlas of Alaska, 1984):

TABLE III-2
Climatic Engineering Design Criteria

Freezing Index	
- Typical Year	3,000°F-days
- Design Year	4,000°F-days
Thawing Index	
- Typical Year	2,000°F-days
- Design Year	2,800°F-days
Heating Degree Days	13,000°F-days
Design Ground Snow Load	
- 10 Year Recurrence	74 psf
- 25 Year Recurrence	93 psf
- 50 Year Recurrence	117 psf
Design Wind Speed	
- 10 Year Recurrence	90 mph
- 25 Year Recurrence	100 mph
- 50 Year Recurrence	110 mph

The freezing index is the number of days per year when the temperature is below freezing (32°F) multiplied by the average temperature difference below freezing. The thawing index is the number of days per year above freezing multiplied by the average temperature difference above freezing. Heating degree days are calculated by multiplying the number of days per year below 65°F by the average temperature

difference below 65°F. The freezing degree days are calculated by multiplying the number of days per year above 40°F by the average temperature difference above 40°F.

Tununak is situated along a major storm track from the Bering Sea. Winds are very strong as well as variable. Prevailing winds during winter are north-northeast reaching 60--70 mph; during summer winds are southwest. (Ref. National Weather Service data.)

C. REGIONAL GEOLOGY AND LOCAL SOIL CONDITIONS

Nelson Island, located in the western coastal portion of the Yukon-Kuskokwim Delta Region, consists of graywacke-siltstone geological sequence formed in the early cretaceous age. (Ref. U.S.G.S., 1957.) Near the village of Tununak, the siltstone deposits are overlain by volcanic rocks. Due to volcanic activity in the late Tertiary or early Quaternary ages, basalt deposits encountered near the vicinity of Tununak village are highly weathered.

The Environmental Atlas of Alaska, 1984, indicates that Nelson Island lies in the area generally underlain by continuous permafrost. However, discontinuous permafrost is encountered in the village of Tununak.

The Village of Tununak encompasses two major soil types. The first soil type underlies the "main village" which is located on a spit between the Tununak River and Tununak Bay, consists of beach deposits of sand and gravel. These soils are generally free of permafrost.

The second soil type underlies the "new" portion of the village, specifically the area northwest of the main village on the lower slope of Ugchirnak Mountain. This area is underlain by peat, silts, and clays. Warm permafrost typically occurs at 2 to 7 feet below the surface. Permafrost temperatures range between 30.5°F and 32°F. Solifluction, or downslope movement of the active layer is clearly present in this area. A substantial amount of groundwater is present in the active layer.

D. FLOOD, SEISMIC, AND OTHER HAZARDS

According to longtime residents of Tununak, the community is generally not subject to river flooding. However, flooding due to storm-driven waves, in combination with high tides, has occurred in the main village. The maximum height of storm driven flooding in the main village is on the order of six inches maximum according to residents. The 1990 Community Profile designates a small area adjacent to the Tununak River, as a "Flood Hazard Area." The U.S. Army Corps of Engineers rates flood hazard at Tununak as low average (ref. Alaskan Community Flood Hazard Pertinent Data, 1977).

The Uniform Building Code includes the vicinity of Tununak in Seismic Zone 1 implying relatively low probability of a major earthquake. The Environmental Atlas of Alaska categorizes the area in Seismic Zone 2, with "moderate possible damage to structures in a maximum earthquake of 4.5 to 6.0 on the Richter Scale".

Tsunamis pose a potentially devastating threat to Tununak. According to local residents, a tsunami struck the area of Tununak in or about the year 1800, destroying what had been a substantial village at the time.

Wind is another hazard, one that constantly faces the residents of Tununak. Wind is a personal hazard causing rough seas in the warmer months and blizzards and shifting ice pack in the colder months. The Uniform Building Code designates the entire Bering Sea coast of Alaska as an area with a 2% annual probability of experiencing 110-mile-per-hour (mph) "basic wind speeds". The 110 mph basic wind speed is the highest category designated by the Uniform Building Code.

Additional hazards in Tununak are human health hazards due to lack of water and wastewater facilities. Residential water supply is generally obtained by hauling water, either from watering points or a piped distribution system in the main village, or from nearby creeks. Human waste is disposed of in open sewage bunkers or on the beaches. At least partially because of these conditions, the incidence of disease related to poor sanitation is quite high. Please see Appendix G for recent Indian Health Service (IHS) sanitation and health reports for Tununak.

A lack of adequate water supply for fire-fighting also presents a hazard to the community. The operational parts of the water distribution system include no fire-fighting capabilities, and storage capacity is inadequate for the required fire flows. Two fatal fires have occurred in Tununak since the 1970's. The only fire-fighting equipment available to the school and homes is hand-held fire extinguishers.

E. ECONOMY

The economy of Tununak includes subsistence and cash generated activities. Cash generating activities include federal, state, and local government employment, related social service employment, related sales and service employment, and construction employment. Trapping, basket weaving, and ivory carving activities generate additional cash.

According to 1990 census data, a total of 111 persons (over the age of 16) were in the work force. Of these, 107 were in the civilian labor force and 4 were in the armed forces. Ninety-two of the 107 civilians were employed and the remaining 15 were unemployed.

The 1991 Community Profile lists the 64 to 67 "permanent" jobs within Tununak, and 19 additional "part time" jobs with the National Guard.

In 1989, the median household income was $18,750. The median family income was $22,708 and the median non-family household income was $5,753. The mean per-capita income was $5,866. Poverty status was investigated for a total of 300 persons, of which 79 were found to be below the poverty level.

The Lower Kuskokwim School District and Tununrmiut Rinit Corporation (the local ANCSA Village corporation) are the two largest employers.

Three stores are located in Tununak. These stores sell groceries, hardware, fuel, lumber, clothing, hunting and fishing equipment and supplies. Other permanent commercial enterprises include a cafe, two airline agencies, and telephone and electric utilities. A cold storage facility has been constructed by the Bering Sea Fishermen's Association; but the facility is not presently in service.

Cash income is supplemented by subsistence activities which include hunting for seals, walrus, musk-ox, waterfowl, and ptarmigan, and fishing for salmon, halibut, herring, tom cod, northern pike, whitefish, other fin fish, and shellfish. Other subsistence activities include berry, wild green, and edible root picking; driftwood collection for firewood; fox trapping; gathering of waterfowl eggs and basket grass. These products provide food, clothing, heat, and craft materials for residents.

F. PUBLIC FACILITIES/HOUSING

Public facilities in Tununak include the following:

(1) A post office.

(2) An 80-foot by 2,200-foot lighted gravel air strip.

(3) A 65-foot single lane bridge over the Tununak River. The bridge is rated for AASHTO HS15-44 loading and was inspected by State of Alaska, Department of Transportation and Public Facility (ADOT/PF) Engineers in 1992.

(4) 8,000 feet of 20-foot-wide gravel road.

(5) 4,000 feet of 4-foot wide boardwalk.

(6) An armory.

(7) The Paul T. Albert Memorial School, including kindergarten through grade 12. The school currently has an enrollment of 87 students with 17 full-time faculty and staff, and 9 part-time faculty and staff.

(8) A "Headstart" preschool facility.

(9) A health clinic. The clinic has a total staff of 5, including 2 health aides.

(10) An electrical power generating and distribution system. The present power plant includes one 150 kw diesel primary generator, one 150 kw diesel back-up generator, and one 75 kw diesel emergency generator. All generators produce 240 volt single phase power that is transformed to 7,200 volt single phase power for primary distribution. Power is then transformed back to 120/240 volt single phase for individual residential, commercial, and institutional service. Nine fuel tanks, with a total capacity of 73,000 gallons, supply diesel fuel to the generators.

(11) A telephone system.

(12) An 8-tank 66,000 gallon heating oil storage facility and a 5-tank 49,000 gallon gasoline storage facility.

(13) A community center.

(14) A public safety building.

(15) A solid waste disposal facility.

(16) An in-service water supply system. This system includes an intake structure, force main, water treatment plant, 50,000 gallon water storage tank, circulating distribution systems to the main village and school, and 16,000 gallon fuel storage facilities. The water treatment plant is housed in the washateria building. Water service is periodically interrupted, sometimes for extended periods of time, because of difficulties associated with cold weather operation.

(17) An in-service laundromat with public toilets and showers The laundromat is housed in the washateria building and is operated when water is available from the water treatment plant.

(18) An in-service wastewater disposal system serving the Paul T. Albert Memorial School, washateria, and teacher housing. The system includes sewer lines, man holes, septic tanks, and a drain field.

(19) Ten existing wood bunkers for disposal of human "honey-bucket" waste.

(20) An incomplete water distribution and wastewater disposal system for the 23-home subdivision. The water distribution system includes a circulating water line that is not connected to the water treatment plant or individual homes. The wastewater disposal system includes gravity sewers, manholes, a pump station and force main, septic and dosing tanks, and drain fields All phases of the system are incomplete.

(21) Other miscellaneous facilities include boat storage areas, fish drying racks, an area reserved for gathering basket grass, and a cemetery.

Per 1990 census data, a total of 78 housing units were occupied in Tununak. The Community Survey conducted in 1992 by Village Safe Water tallied 80 occupied homes total. Per 1990 census data, four homes had running water with modern kitchen and bathroom facilities, while the remainder relied on hauled water supply and waste disposal. Fifty-seven of the homes are equipped with telephone. More than 80% of the housing units were built prior to 1980. Of the 78 occupied units, 59 were owner-occupied and 19 were occupied by renters. Average occupancy rates in owned and rented homes were 4.69 and 2.05 persons per unit respectively. Overall occupancy rate was 4.05 persons per unit. Median monthly owner costs were $269 for mortgaged units and $131 per month for non-mortgaged units. Median monthly gross rent for 5 cash-paying renters was $738, while 14 renters apparently paid no cash rent.

The Association of Village Council Presidents (AVCP), Bethel, AK, is the agency responsible for housing authority. AVCP currently has no definite plans to construct additional housing in Tununak.

G. PUBLIC ADMINISTRATION

Public administration in Tununak is divided between federal, state, regional, and local entities. The federal government is responsible for administration of the post office. The State of Alaska Department of Transportation and Public Facilities administers the airstrip and conducts bi-annual inspections of the Tununak River bridge.

The Alaska Army National Guard administers the armory. The Lower Kuskokwim School District (LKSD) operates the school. The "Headstart" preschool is operated by the Association of Village Council Presidents (AVCP). The health clinic is operated jointly by the Yukon Kuskokwim Health Corporation and the Tununak Traditional Tribal Elders Council. The power plant and electrical distribution system are operated by Alaska Village Electric Cooperative Inc. (AVEC). The telephone system is operated by United Utilities Inc. Heating oil and gasoline storage facilities are operated by Tununrmiut Rinit Corporation (TRC), the local village corporation. The incomplete cold storage facility will be operated by the Bering Sea Fishermen's Association when completed. The boardwalk, the community center, the public safety building, the solid

waste disposal facility, the in-service water supply system, laundromat, and wastewater disposal system are operated by the Tununak Traditional Tribal Elders Council.

A second class city was incorporated in the Village in 1975, but ceased to operate in 1988. To date, the city government has not been officially dissolved in accordance with Title 29 of the Alaska State Statutes according to Mr. Luke Smith, Alaska Department of Community and Regional Affairs, Bethel.

As indicated above, the Traditional Elders Council is currently the governing local body in Tununak. According to Mr. Harry Lincoln, the Tununak Traditional Tribal Elders Council liaison for this feasibility study, municipal elections were held to dissolve the City government and certify the Elders Council as the governing body of the Village. Per Mr. Lincoln, election records are available for public review at the Council offices in Tununak.

An IRA Council also exists in Tununak. The IRA Council owns and operates the Tununak Native Store and a snowmobile repair shop. The IRA Council also locally sponsors the Yukon Kuskokwim Health Corporation Community Youth Advocate Program (for drug and alcohol abuse prevention) and the Indian Child Welfare Act Tribal Family Services Program.

H. POPULATION

The 1990 census for Tununak indicated a total of 316 residents. The 1980 census recorded 298 residents. According to Mr. Greg Williams, State Demographer, population growth for the village could reasonable be estimated for the planning period by linearly projecting the 1980-to-1990 growth rate which is 1.8 residents per year. On this basis, the planning period population is estimated as follows:

Year	Estimated Population
1993	321
2003	339
2013	357

Of the 316 residents in 1990, 304 were Yupik Eskimo, 11 were white, and one was of Asian or Pacific Islander descent. Age distribution was as follows: 17 years of age and under - 128 persons, 18 to 44 years of age - 123 persons, 45 to 64 years of age - 46 persons, and 65 years of age or over - 19 persons. The median age was 24.2 years. The census recorded 170 males and 146 females.

I. ACCESS

Access to Tununak from the "outside world" is primarily by air travel. Four commuter airlines, ERA, Mark Air, Yute Air, and Camai Air, currently provide scheduled daily service between Bethel and Tununak. These airlines provide mail service and limited freight service in conjunction with passenger service. Additional "freight runs" are made by these airlines on an "as-needed" basis. The standard aircraft for service to Tununak is a DeHavilin Twin Otter.

Additional air taxi service is available to Tununak from various charter services operating out of Bethel or Anchorage, depending on the type of aircraft that is needed.

A one-way airfare on a scheduled flight from Tununak to Bethel or vice versa will cost between $55 and $70. A full round trip airfare on scheduled flights from Tununak to Anchorage, or vice versa, will cost between $500 and $600.

One-way air freight costs between Tununak and Bethel were recently quoted as follows: under 63 lbs. - $26, 64 to 100 lbs. - $0.41/lb., over 100 lbs. - $0.33/lb (Mark Air, November 1992). Rates are subject to increase depending on the type and dimensions of actual cargo.

Air freight service for large bulky cargo is available with specialized aircraft such as the Shorts Brothers SC-7 Skyvan, which can carry a 3,500 lb. payload with envelope dimensions of 6' x 6' x 18', utilizing a 1,600-foot runway. A one way haul between Tununak and Bethel was recently quoted at $1,445 lump sum (North Star Air Cargo, December 1992).

Barge service is provided to Tununak on an as-needed basis, typically two to four times per year. The barge typically carries fuel, vehicles, and supplies for the stores, and school, Alaska Village Electrical Cooperative (AVEC), and the Traditional Elders Council. Since no dock exists, the barge lands on the beach. Freight is typically barged from ports such as Anchorage or Seattle to Bethel by large carriers, and then transferred to local carriers such as United Transportation and Kipnuk Corporation for barge service from Bethel to Tununak. Barge service from Anchorage to Tununak for approximately 120 tons of freight was recently quoted at approximately $78,000 (Northland Services Inc., December 1992).

Access between Tununak and Bethel is provided by snowmobile in winter and small boat in summer. The journey is quite risky because of unpredictable weather, ice, and wind conditions, and a one-way trip typically would require one day in good weather.

Snowmobiles and small boats are used to access other villages in the general vicinity of Tununak, depending on the season. Likewise, snowmobiles, "four-wheelers", and pickup trucks provide transportation within the village.

CHAPTER IV
SCHEDULED CAPITAL PROJECTS

Currently, the only capital project that can be definitively scheduled is the initial wastewater disposal system construction, with funding by the U.S. Environmental Protection Agency funding in the amount of $600,000. Of this amount, $80,000 has been allocated for the feasibility study phase, $45,000 has been allocated for the design phase, and the remaining $475,000 has been allocated for actual construction. **(NOTE:** This study is being completed with funding from that grant.) The EPA funding will be utilized as described in Section M., Chapter VI. A tentative schedule for wastewater disposal improvements is presented in Section E., Chapter VII.

CHAPTER V
EXISTING FACILITIES AND PLANNING CONDITIONS

A. EXISTING WASTEWATER DISPOSAL FACILITIES

The following facilities currently exist in Tununak:

(1) The incomplete sewer system within the 23-home AVCP subdivision.

(2) The incomplete septic system designed to serve the AVCP subdivision.

(3) The in-service sewer and septic system serving the Paul T. Albert Memorial School, the washateria, and teacher housing (formerly the B.I.A. school).

(4) The ten (10) honey bucket disposal bunkers.

(5) Commercial, institutional, and residential sanitation facilities.

Each of these facilities is discussed below. Locations of the incomplete and in-service sewer and septic systems, as well as honey bucket disposal bunkers, are shown in Figure V-1.

A.1 <u>Incomplete Sewer System</u> - This system includes a pump station, force main, gravity sewer manholes, a clean-out, and approximately 1,300 LF of gravity sewer and is shown in detail in Figure V-2.

The pump station is an 8′ diameter precast concrete manhole with a wooden structure atop. The station is designed for an installation of duplex 2.5 HP submersible sewage pumps manifolded together and discharging into a common 3" force main. The pump station is presently about 80% complete. The following items are not installed: pumps, pump lifting rails, nonembedded piping controls, the wet-well access ladder, and the wet-well exhaust fan. Electrical work is incomplete. The grout at the gravity sewer connection to the manhole is shrunken and pulled away from piping.

Prior to inspection of the pump station, standing water, approximately 10 feet deep, was observed in the pump station. The water was pumped out by PCA personnel with a portable dewatering pump to facilitate inspection of the pump station. After pump-out, approximately 5 GPM of apparent ground water infiltration was observed entering the pump station from the gravity sewer.

BERING SEA (TUNUNAK BAY)

TUNUNAK RIVER

U.S.S. 4028 MUNICIPAL RESERVE
U.S.S. 877
U.S.S. 4028 TRACT A
U.S.S. 4054
U.S.S. 4028 TRACT D
MUNICIPAL RESERVE
TRACT

1 INCOMPLETE SEPTIC SYSTEM NOTE FIGURE V-3
IN-SERVICE SEPTIC SYSTEM (LOCATION APPROXIMATE)
TEACHER HOUSING
IN-SERVICE UNDERGROUND SEWER.
TEACHER HOUSING
PAUL T. ALBERT MEMORIAL SCHOOL
IN-SERVICE ABOVE GROUND SEWER
WASHATERIA (WATER TREATMENT PLANT & LAUNDROMAT)
ALLAQ ROAD
AJACAO LANE
ATAQ LANE
ANUNG ROAD
INCOMPLETE UNDERGROUND SEWER SYSTEM
INCOMPLETE PUMP STATION
23 HOME A.V.C.P. SUBDIVISION
UNNAMED CREEK
SS

NOTES

1. BUILDING LOCATIONS, SHORE LINE, AND RIVER ARE DIGITIZED FROM AERIAL PHOTOGRAPHY AND ARE FOR GRAPHIC REPRESENTATION ONLY.
2. BOUNDARY AND MEANDER INFORMATION IS FROM RECORD BLM PLATS AND FIELD NOTES OF USS 877, USS 4054 & USS 4028.

LEGEND

- SEWAGE BUNKER
- SEPTIC TANK
- GATE VALVE
- SEWER MAN HOLE
- SS — EXISTING SEWER LINE
- RECORD BOUNDARY
- RECORD CENTERLINE
- BLM RECORD MEANDERS
- (3) U.S. SURVEY BLOCK

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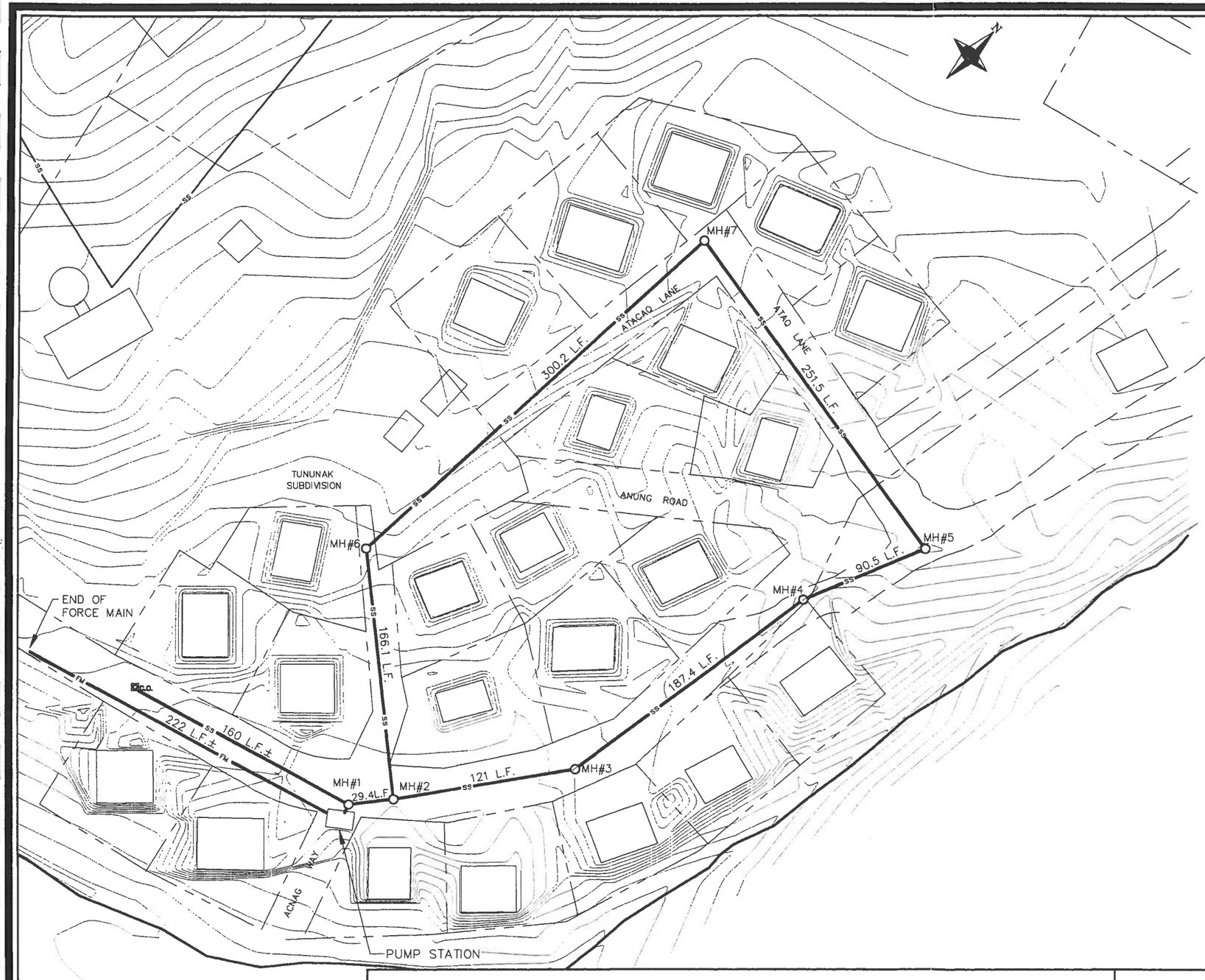
TUNUNAK SANITATION FEASIBILITY STUDY
EXISTING SANITATION FACILITIES

DRAWN	GRID	COMP FILE NO. 516V-1	FIGURE V-1
SCALE 1"=200'	DATE 12-21-92	FILE DRAWER NO.	
F.B. PG.	W.O. H92516		



MANHOLE #	ELEVATIONS RIM	ELEVATIONS INVERT	SUMMARY OF CONDITION
1	15.5'	8.9'	PIPE IS NOT CONTINUOUS THRU MANHOLE, BUT IS CUT OFF INSIDE MANHOLE WALLS. CONCRETE CHANNEL IS INSTALLED IN PRECAST MANHOLE BASE. PIPE FROM MH#1 TO PUMP STATION AND TO MH#2 IS STRAIGHT AND TRUE. SIGNIFICANT GROUNDWATER INFILTRATION IS APPARENT AT THE MANHOLE.
2	15.6'	9.1'	PIPE IS CONTINUOUS THRU MANHOLE BUT HAS 2"x6" SLOT CUT IN TOP. CONCRETE IS NOT POURED INSIDE PRECAST MANHOLE BASE TO SUPPORT PIPE AS PER DESIGN. SIGNIFICANT GROUNDWATER INFILTRATION IS APPARENT.
3	16.9'	10.8'	PIPE IS CONTINUOUS THRU MANHOLE. CONCRETE IS NOT POURED INSIDE PRECAST MANHOLE BASE TO SUPPORT PIPE AS PER DESIGN. 5 G.P.M. GROUNDWATER INFILTRATION WAS MEASURED.
4	21.2'	15.2'	PIPE IS CONTINUOUS THRU MANHOLE. CONCRETE IS NOT POURED INSIDE PRECAST MANHOLE BASE TO SUPPORT PIPE AS PER DESIGN. SIGNIFICANT GROUNDWATER INFILTRATION IS APPARENT.
5	23.2'	17.3'	PIPE IS CONTINUOUS THRU MANHOLE. CONCRETE IS NOT POURED INSIDE PRECAST MANHOLE BASE TO SUPPORT PIPE AS PER DESIGN. SOME GROUNDWATER INFILTRATION IS APPARENT.
6	20.1'	13.4'	PIPE IS CONTINUOUS THRU MANHOLE. CONCRETE IS NOT POURED INSIDE PRECAST MANHOLE BASE TO SUPPORT PIPE AS PER DESIGN. SIGNIFIGANT GROUNDWATER INFILTRATION IS APPARENT.
7	29.0'	22.9'	PIPE IS NOT CONTINUOUS THRU MANHOLE, BUT IS CUT OFF AT INSIDE MANHOLE BASE WALLS. BASE INTERIOR REQUIRES FINISHING WITH CONCRETE. MINOR GROUNDWATER INFILTRATION IS APPARENT. PIPE FROM MH#7 TOWARD MH#5 AND MH#6 APPEARS SUBSTANTIALLY BOWED UPWARD.

PUMP STATION ELEVATIONS AND CONDITIONS

FINISHED FLOOR EL.= 17.0'
FORCE MAIN ℄ EL. = 12.6'
GRAVITY SEWER ℄ EL.= 8.5'
WET WELL FLOOR EL.= 4.3'

PUMP STATION IS 8'ø CONCRETE MANHOLE WITH 12'0"x17'6" WOODEN FRAME STRUCTURE OVER TOP. STATION WAS DESIGNED FOR TWO SUBMERSIBLE SEWAGE GRINDER PUMPS, 240 VOLT, 1ø, 2.5 H.P., 42 G.P.M. @ 15' TDH. THE FOLLOWING ITEMS ARE INCOMPLETE: PUMPS ARE NOT INSTALLED, NON-EMBEDDED PIPING IS NOT COMPLETE, WET WELL FAN IS NOT INSTALLED, PUMP CONTROLS ARE NOT INSTALLED, AND ELECTRICAL WORK IS NOT COMPLETE. SIGNIFICANT GROUNDWATER INFILTRATION IS APPARENT.

NOTES:

1. ALL ELEVATIONS ARE RELATIVE, AND BASED ON AN ASSUMED FINISH FLOOR ELEVATION OF 35' AT THE WASHATERIA.
2. BUILDING LOCATIONS AND INTERIOR LOT LINES WERE DIGITIZED AND ARE FOR GRAPHIC REPRESENTATION ONLY.
3. ALL GRAVITY SEWER PIPING IS 8"ø HDPE ARCTIC PIPE.
4. ALL MANHOLES ARE 4'ø CONCRETE W/ECCENTRIC CONES AND CAST IRON RIMS AND COVERS.
5. ORIGINAL DESIGN REQUIRES PIPE TO EXTEND CONTINUOUSLY THRU MANHOLE WITH ACCESS HOLE TO BE CUT IN TOP OF PIPE. PRECAST MANHOLE BASE IS TO BE FILLED WITH CONCRETE UP TO LEVEL OF ACCESS HOLE FOR SUPPORT OF PIPE PER ORIGINAL DESIGN.
6. FORCE MAIN IS 3"ø HDPE ARCTIC PIPE.

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TUNUNAK SANITATION FEASIBILITY STUDY
INCOMPLETE SEWER SYSTEM, AVCP 23 HOME SUBDIVISION

DRAWN MBP	GRID	COMP FILE NO. 5161I-2	FIGURE V-2
SCALE NTS	DATE 12-31-92	FILE DRAWER NO.	
F.B. PG.	W.O. H92516		

Additional seepage into the station was observed through cracked grout around the gravity sewer piping penetration.

The force main is 3" HDPE arctic pipe. Approximately 200 LF are installed from the pump station. An additional 1,050 LF would be required to complete the force main.

Gravity sewer manholes are 4′ diameter precast concrete with eccentric cones and cast iron rims and covers. All seven required manholes are installed. Manhole #1, nearest the pump station, is essentially complete. All other manholes require concrete work in the bases. In Manholes #2 through #6, piping runs continuously through manholes, and inspection hatches must be cut in the pipe to comply with the original design.

Major ground water infiltration is evident at Manholes #1 through #6. In several of these manholes, standing water was observed above the top of the pipe. Manhole #3 was pumped out for inspection but refilled at a rate of about 3 vertical feet per hour. Water appeared to be entering primarily through shrinkage cracks around pipe penetrations.

Gravity piping between manholes is 8" HDPE arctic pipe. All required gravity piping is installed, but the lines must be re-excavated and cut for installation of building service tees. Four runs of piping between manholes were available for visual inspection to verify trueness of the lines. Two of these runs appeared straight and true (Pump Station to Manhole #1 and Manhole #1 to Manhole #2), while two runs demonstrate significant evidence of frost heaving (Manhole #7 toward Manhole #5 and Manhole #7 toward Manhole #6).

The gravity sewer is typically buried in a common trench with the incomplete underground circulating potable water distribution main described in Section B.9 of this chapter. The incomplete underground raw water force main described in Section B.3 of this chapter occupies the same trench between Manholes # 1, 2, 3, 4, and 5 and between Manhole #1 and the clean-out.

The typical sewer trench was designed to be about 10 feet deep and constructed as follows. The trench was first excavated to a depth of 3.25 ft. below sewer invert. The trench was then lined with geotextile fabric and approximately 6" of sand or gravel was placed in the trench bottom. An "Arctic Foundations" 2" diameter heat tube was then placed in the trench. An additional 1.5 ft. of sand or gravel was then placed in the trench. Next, 2" insulation board was placed on the backfill surface, and in some areas, partially up the trench walls. Next, an additional 1.0 ft. of sand or gravel backfill was placed. The sewer pipe was then laid on the backfill at this level. The trench was then backfilled and water lines

were installed at elevations 1.5 ft. to 2 ft. above the sewer line. Backfill was completed with sand and gravel to finished grade.

Heat tubes mentioned above were placed on approximately 40 ft. centers. Tubes are typically 68.3 ft. in total length with a 40 ft. buried "horizontal" section installed below the pipe, an intermediate buried sloping section that is 90 degrees to the horizontal section, and a vertical section that transitions from underground to above-ground. A 53 square foot radiator is installed at the top of the vertical above-ground section.

The sewer clean-out piping mentioned above is complete, but a cover fitting and insulating plug must be installed to complete the installation.

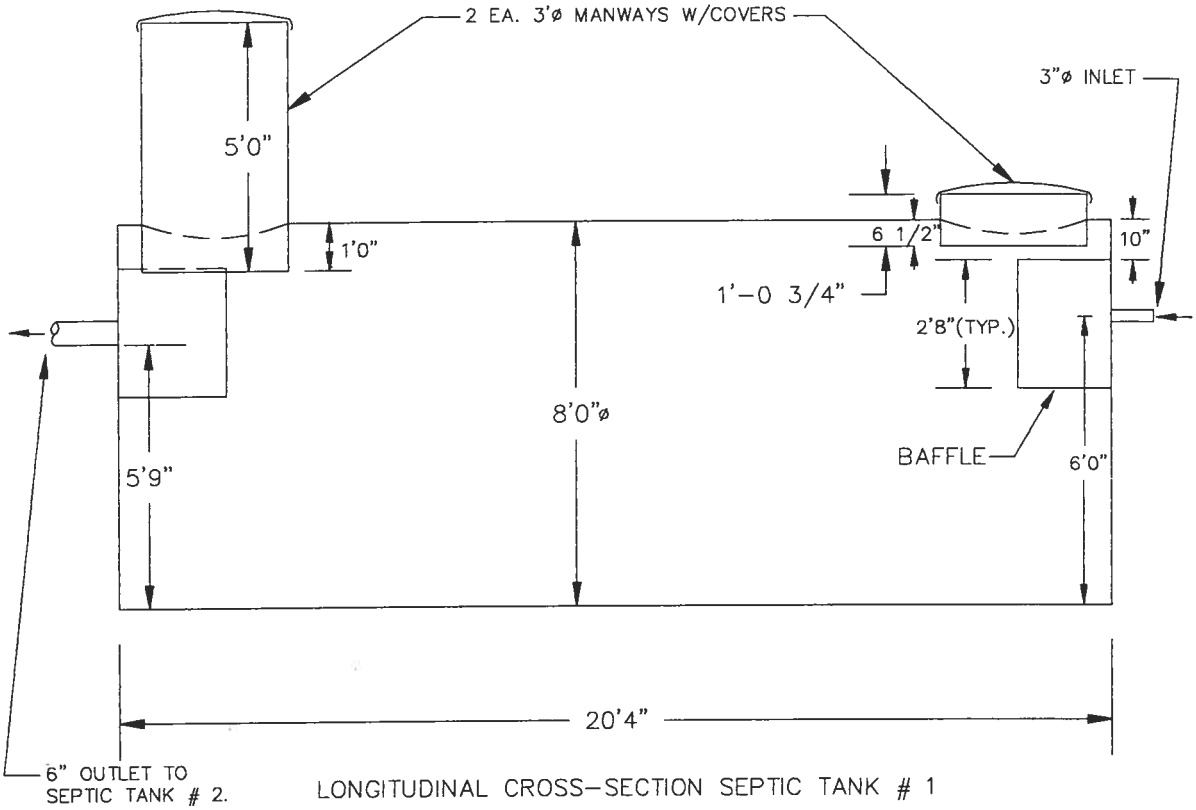
As stated above, no service tees are installed in the gravity piping, and no house service lateral piping is installed. Sanitary piping is stubbed out from under houses but must be enclosed for freeze protection.

A.2 Incomplete Septic System - This system consists of two 6,000-gallon septic tanks, a 21 ft. long by 8 ft. diameter dosing tank, and three 60 ft. by 100 ft. drain fields. The system is shown on Figure V-3,4,5, and-6. The septic tanks are installed in series with one another, followed by the dosing tank which distributes effluent to the three parallel drain fields. All three tanks are constructed of welded steel plate and are lined with coal tar pitch. Each of the septic tanks has two 36" diameter manways, one at each end. The dosing tank has a single 36" diameter manway at the downstream end. The interiors of all three tanks appear to be in good condition with regard to corrosion.

The second septic tank has a 6" baffled inlet and twin 2" outlets. Within the second septic tank, the 2" tank outlets are connected by 2" flexible hoses to two PVC "Orenco Systems, Inc.," effluent filters as shown on Figure V-5 and Photographic Plate V-1. These filters are accessible via a 36" diameter access manhole, and both filters are removable for cleaning and maintenance.

The dosing tank has two 2" inlets that correspond to the 2" outlets of the second septic tank. The tank has three "Orenco Systems, Inc." 8" outlet siphon assemblies that individually dose effluent to the three drain fields. Flow to each drain field is controlled by a separate buried gate valve outside of the dosing tank.

The drain fields are buried and could not be inspected but, per conversations with local personnel employed in construction, the fields were constructed per plan. Per August 29, 1988 field notes by the construction superintendent, Mr. Lowell Rader, the total excavation for all three drain fields measured 100 ft. by 200 ft.



LONGITUDINAL CROSS-SECTION SEPTIC TANK # 1

NOTES

(1) TANK IS FABRICATED OF 1/4" STEEL PLATE.
(2) TANK IS LINED WITH COAL TAR PITCH.
(3) APPROXIMATE INLET ELEVATION = 12.1'
(4) APPROXIMATE OUTLET ELEVATION = 11.8'

FIGURE V-4 TUNUNAK SANITATION FEASIBILITY STUDY
INCOMPLETE SEPTIC SYSTEM: SEPTIC TANK #1

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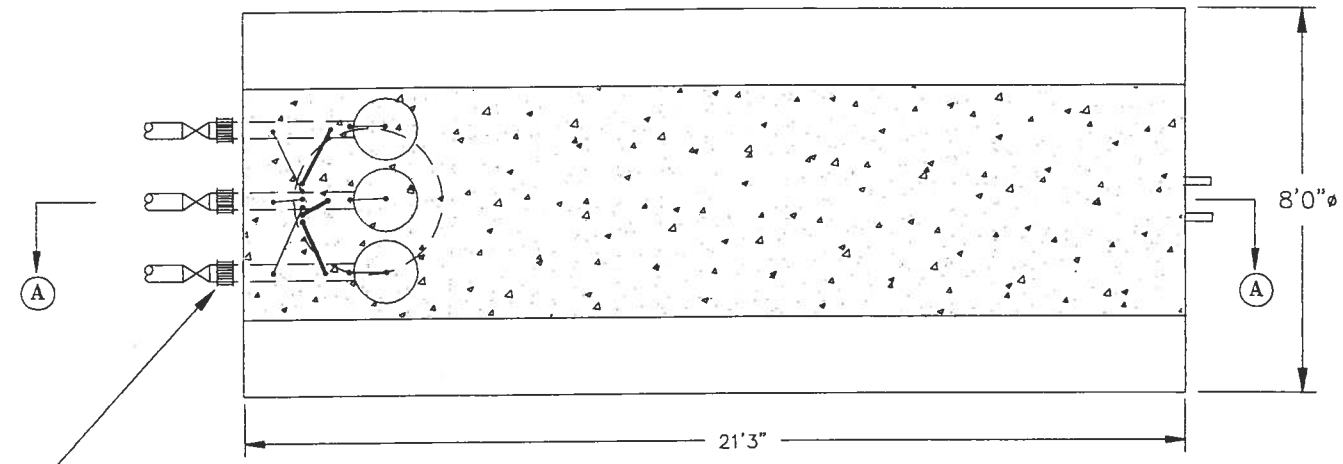
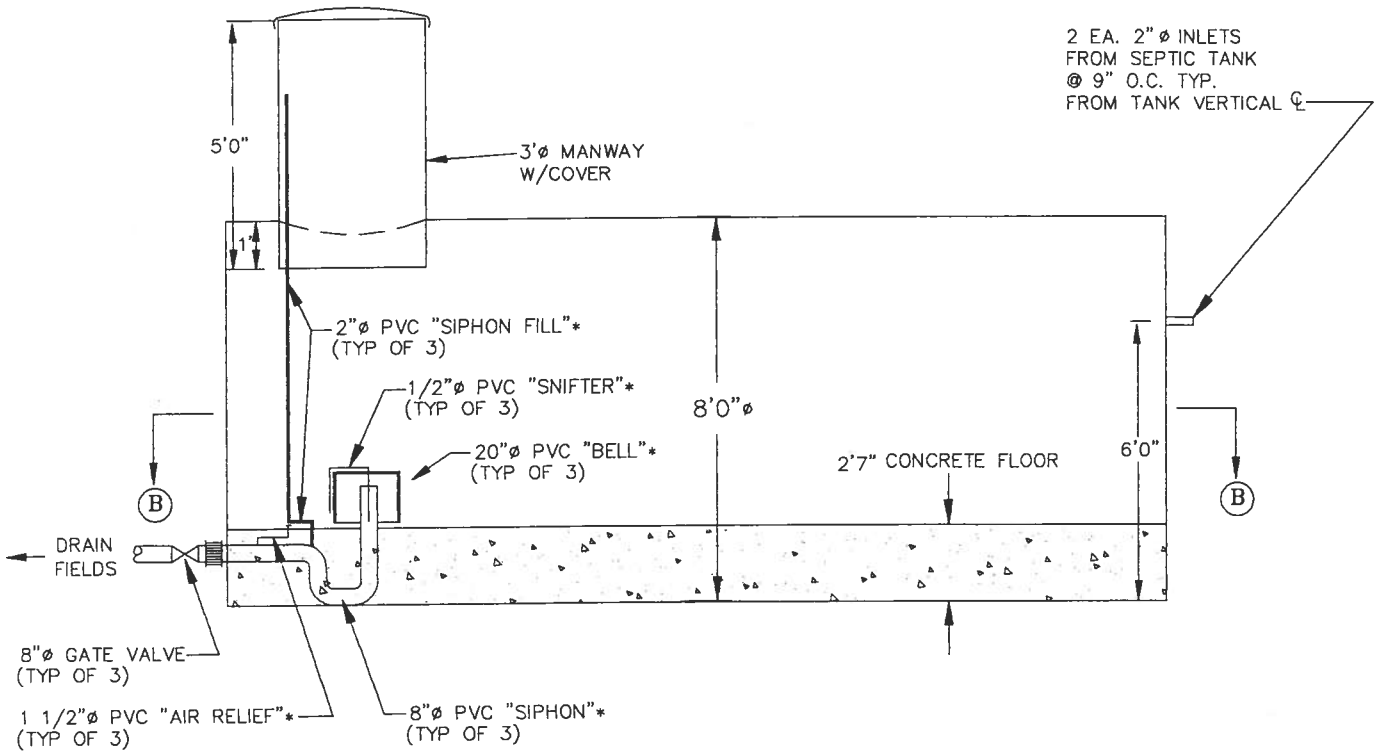
W.O. 92516	COMP. FILE 516V-4	SCALE NTS	DATE 12/21/92	BY MBP



SECTION B–B (PLAN VIEW)



SECTION A–A (SIDE VIEW)

NOTES

(1) TANK IS FABRICATED OF 1/4" STEEL PLATE.
(2) TANK IS LINED WITH COAL TAR PITCH.
(3) * INDICATES COMPONENT PART OF ORENCO SYSTEMS INC. DOSING SIPHON. 3 INSTALLED IN THIS TANK.
(4) APPROXIMATE INLET ELEVATION = 12.0'
(5) APPROXIMATE OUTLET ELEVATION = 8.0'

FIGURE V–6 TUNUNAK SANITATION FEASIBILITY STUDY
INCOMPLETE SEPTIC SYSTEM: DOSING TANK

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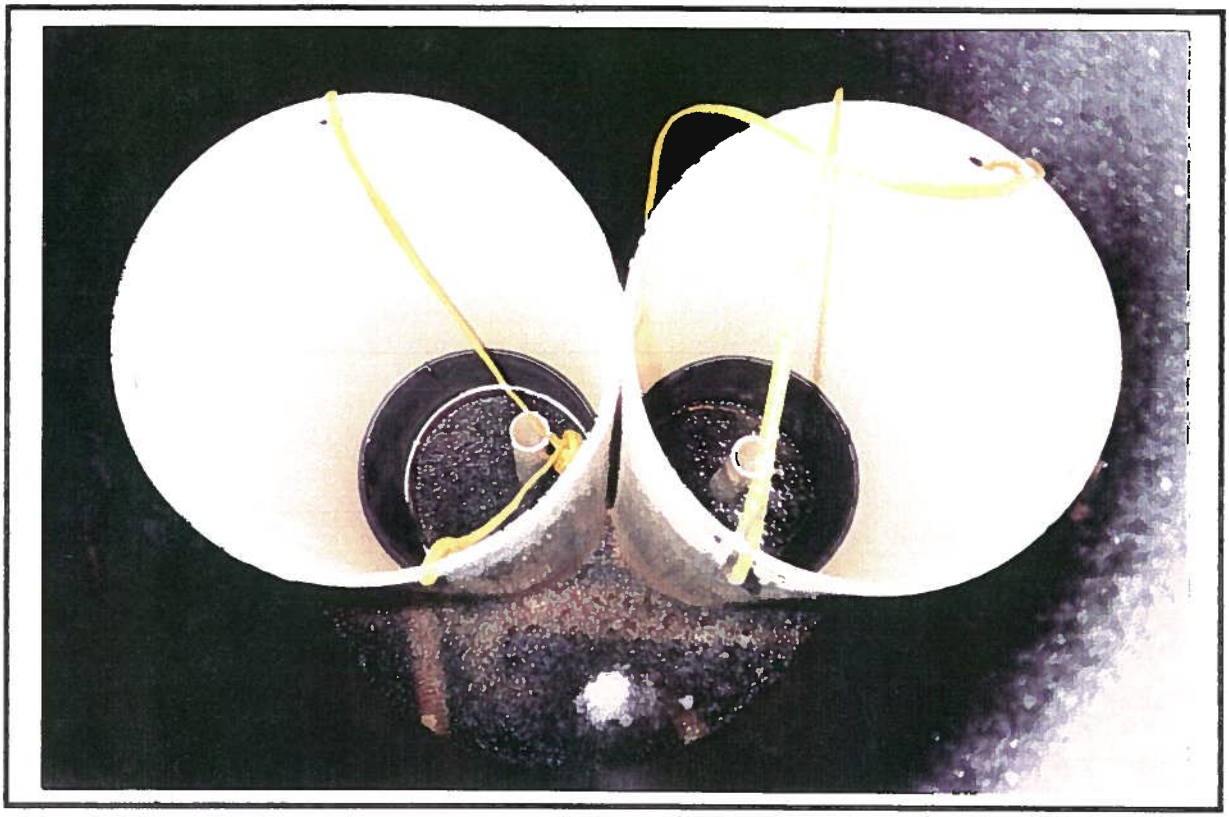

PHOTOGRAPHIC PLATE NO.V-1 : ORENCO SYSTEMS INC. EFFLUENT STRAINERS IN INCOMPLETE SEPTIC TANK No. 2

TUNUNAK SANITATION FEASIBILITY STUDY

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by 5 ft. to 6 ft. deep. Each 60 ft. by 100 ft. field was designed to include approximately 1,800 LF of 3" perforated pipe.

When septic and dosing tanks were opened for inspection, all contained a substantial amount of ground water, 6 ft. deep in the septic tanks and approximately 1 ft. deep in the dosing tank. In all probability, water accumulated by ponding on the ground above the tanks during spring snowmelt, flooding the manways, and flowing into the septic tanks. This problem could be corrected by extending the heights of these manways and completing fill over the tanks per original design.

Mr. Harry Lincoln, resident of Tununak, reports that spring snowmelt water tends to pond over the drain field area. This area should be filled and contoured to provide proper surface water drainage.

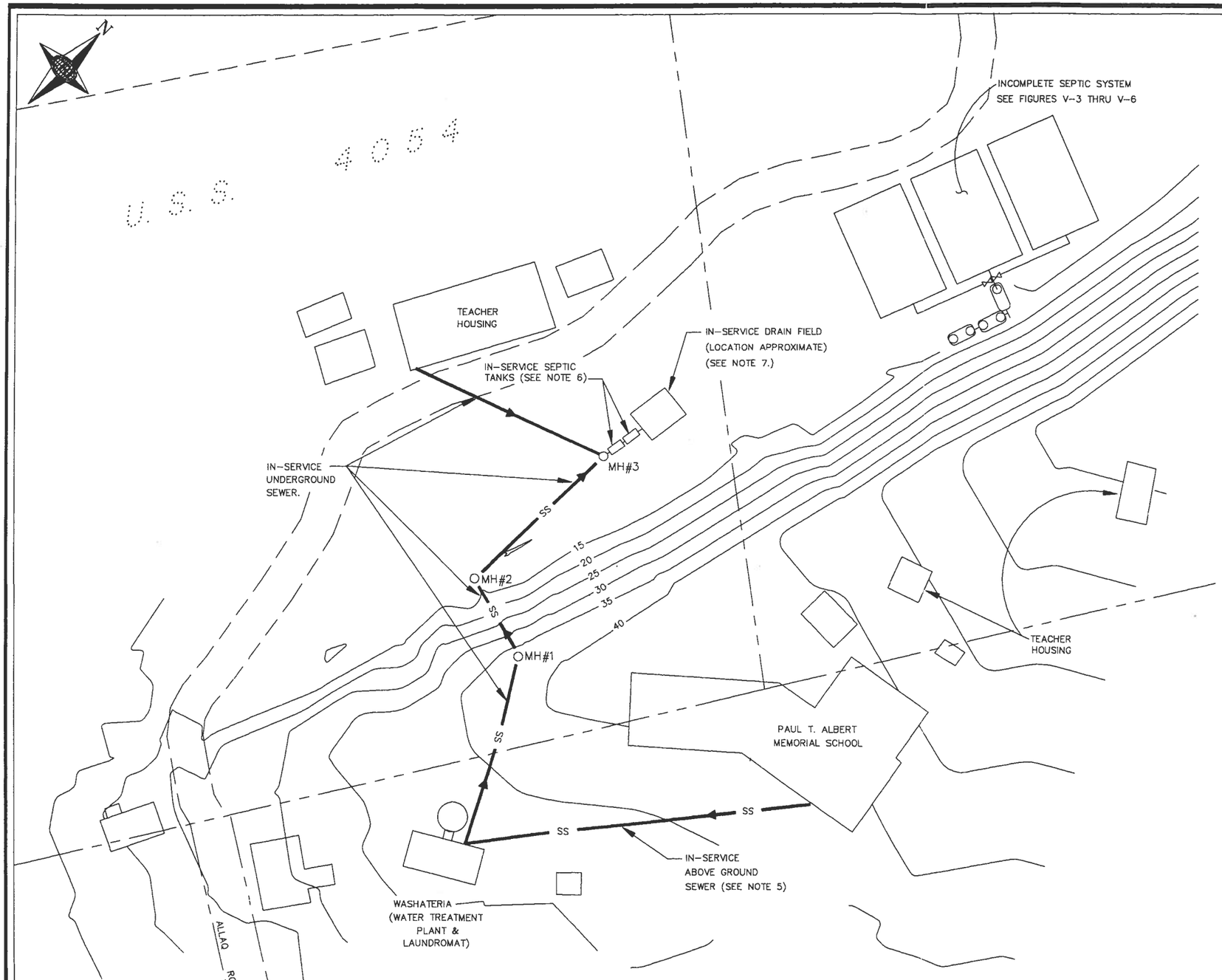
The septic system was designed to serve a total of 34 homes at a total design flow of 14,800 GPD. The design percolation rate of the drainfields was 1.2 GPD/SF.

A.3 **Sewer and Drain Field for School, Washateria, and Teachers' Housing** This system includes an above-ground sewer from the school to washateria; an underground sewer, including three manholes, from the washateria to the septic system; an underground service lateral from teacher housing to the underground sewer; and a septic tank and drain field system. This entire system is completely separate from the incomplete systems described above. See Figure V-7.

The above-ground sewer system includes approximately 300 LF of 4" PVC arctic pipe constructed on 2" tubular steel supports. The system is presently in operation, but portions have apparently moved due to solifluction or other causes. The line should be straightened and the grade readjusted to prevent blockage. See Photographic Plate V-2.

The underground sewer system includes approximately 400 LF of 4" PVC arctic pipe. Two of the associated manholes are constructed of 42" diameter galvanized CMP with concrete channeled floors and lumber /plywood covers. The third manhole is constructed of 3/4" plywood and is badly deteriorated.

The septic tanks and drain field are buried and could not be inspected. Per the water and sewer systems operator, Mr. Victor Kanrilak, Sr., two septic tanks are installed. USPHS as-built drawings for the system show only a single 4,000-gallon steel septic tank. The USPHS as-builts also indicate the drain field is 30' by 30', with a total of 150 LF of 4" perforated pipe. The USPHS as-builts are of questionable accuracy because they show the washateria, sewer, and septic systems in the wrong locations.



MANHOLE #	ELEVATIONS RIM	ELEVATIONS INVERT	SUMMARY OF CONDITION
1	39.5±	32.0±	42"ø CMP WITH CONCRETE CHANNELED FLOOR AND WOODEN COVER IN FAIR CONDITION.
2	13.5±	12.0±	42"ø CMP WITH CONCRETE CHANNELED FLOOR AND WOODEN COVER IN FAIR CONDITION. 1 G.P.M.± GROUNDWATER INFILTRATION WAS OBSERVED.
3	14.0'±	7.0±'	48" x 48" SQUARE PLYWOOD MANHOLE IN POOR CONDITION.

NOTES:

1. ALL ELEVATIONS ARE RELATIVE, AND BASED ON AN ASSUMED FINISH FLOOR ELEVATION OF 35' AT THE WASHATERIA.
2. BUILDING LOCATIONS WERE DIGITIZED AND ARE FOR GRAPHIC REPRESENTATION ONLY.
3. ALL GRAVITY SEWER PIPING IS 4"ø PVC ARCTIC PIPE.
4. SEWER LINES IN THE VICINITY OF MH # 2 ARE SUBJECT TO FREEZING BECAUSE OF SHALLOW COVER.
5. SEWER LINE FROM SCHOOL TO WASHATERIA IS INSTALLED ABOVE GROUND ON TUBULAR STEEL SUPPORTS AT FIVE FEET ± O.C.
6. PER WATER/SEWER OPERATOR, TWO SEPTIC TANKS ARE INSTALLED, RATHER THAN ONE 4,000 GALLON TANK AS PER U.S.P.H.S. AS-BUILTS.
7. EXISTING IN-SERVICE DRAIN FIELD IS 30' x 30' W 150 L.F. OF 4" PERFORATED PIPE PER U.S.P.H.S. AS-BUILTS.

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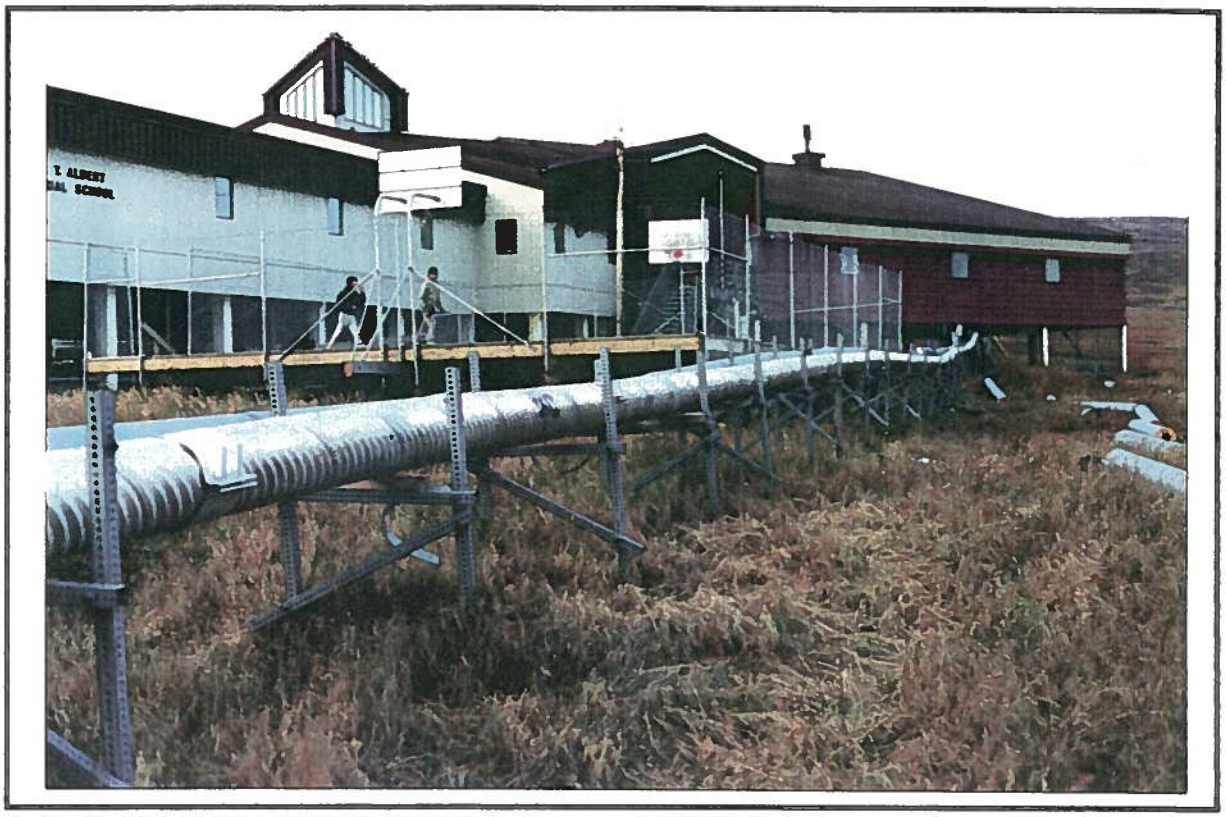
TUNUNAK SANITATION FEASIBILITY STUDY
IN-SERVICE SEWER & SEPTIC SYSTEM

DRAWN MBP	GRID	COMP FILE NO. 516V-7	FIGURE V-7
SCALE NTS	DATE 12-21-92	FILE DRAWER NO.	
F.B. PG.	W.O. H92516		



PHOTOGRAPHIC PLATE NO.V-2 :

ABOVE GROUND SEWER AND WATER LINES BETWEEN WASHATERIA AND SCHOOL

TUNUNAK SANITATION
FEASIBILITY STUDY

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According to Ms. Donna Murphy, Principal, Paul T. Albert Memorial School, plugging problems have been experienced in the above-ground sewer. As stated above, the potential clearly exists for blockage in the future.

According to Mr. Kanrilak, the underground sewer is subject to plugging between the first and second manholes downstream of the washateria. In this area, the sewer traverses a steep hill and has less than one foot of ground cover.

According to Mr. Kanrilak, the septic tanks have not been pumped for two years. After the last pumping, sludge was apparently disposed of above ground in uncomfortably close proximity to the school, housing, and an area used by the village children for play. Sludge from previous pumping was disposed of on the beach.

When the sewer system was inspected, infiltration of ground water appeared to be minimal and was estimated at 1 GPM at the second manhole downstream of the washateria.

A.4 **Honey Bucket Disposal Bunkers** - A total of ten honey bucket disposal bunkers are located in Tununak, five distributed throughout the main village, and five east of the 23-home AVCP subdivision. See Figure V-1. Bunkers are constructed of plywood and lumber. They are typically 12′ x 16′ x 6′ deep with 2′ x 2′ openings on the top. Bunkers are open at the bottom to allow drainage and percolation. Bunkers for the AVCP subdivision were constructed on gravel pads placed on permafrost.

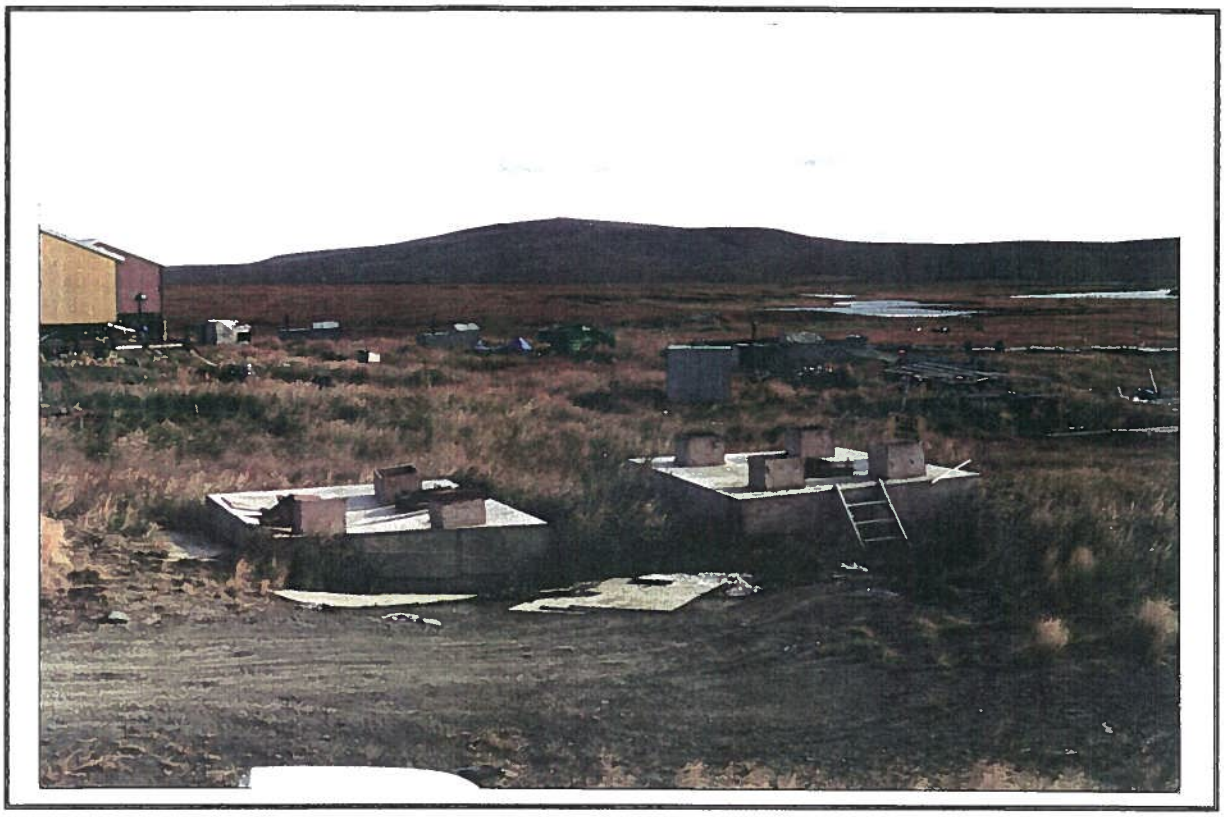
The bunkers are in fair to poor shape. All are open to flies and other pests. Some are collapsing from snow and other loads. See Photographic Plate V-3.

A.5 **Individual Building Sanitation Facilities** - The following buildings are served by the existing in-service sewer and septic system described in Section A.3 above: the washateria, the school, and the two teacher housing units.

The Alaska Army National Guard Armory, which was constructed in about 1990, is equipped with a composting toilet manufactured by "Riverbend Engineering". The old armory also has a composting toilet that is no longer in use.

The post office has purchased a composting toilet, which is not currently installed, so a honey bucket is still used there.

Homes in the 23-home subdivision have been plumbed for sewer service, but have no toilets, and utilize honey buckets. All other occupied buildings in the village have no sanitary plumbing and strictly utilize honey buckets.



PHOTOGRAPHIC PLATE NO.V-3 : TYPICAL HONEYBUCKET DISPOSAL BUNKERS (NOTE HOMES IN BACKGROUND)

TUNUNAK SANITATION FEASIBILITY STUDY

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Homes in the 23-home subdivision have been plumbed for sewer service, but have no toilets, and utilize honey buckets. All other occupied buildings in the village have no sanitary plumbing and strictly utilize honey buckets.

B. EXISTING WATER SUPPLY SYSTEMS

The existing water system includes the following components:

(1) An in-service raw-water intake structure at a small unnamed creek east of the 23-home AVCP subdivision.

(2) An in-service above-ground raw-water force main from the intake structure to the washateria.

(3) An incomplete raw-water force main from the intake structure to the washateria.

(4) An in-service water treatment plant at the washateria where the raw water is filtered, chlorinated, fluoridated, stored in a 50,000-gallon steel tank and distributed. The water treatment plant also includes two heat exchangers to provide makeup heat to the water system.

(5) An in-service laundromat at the washateria.

(6) Boilers and associated hot water appurtenances housed at the washateria.

(7) An in-service above-ground circulating potable water distribution main from the washateria to the Paul T. Albert Memorial School and back again.

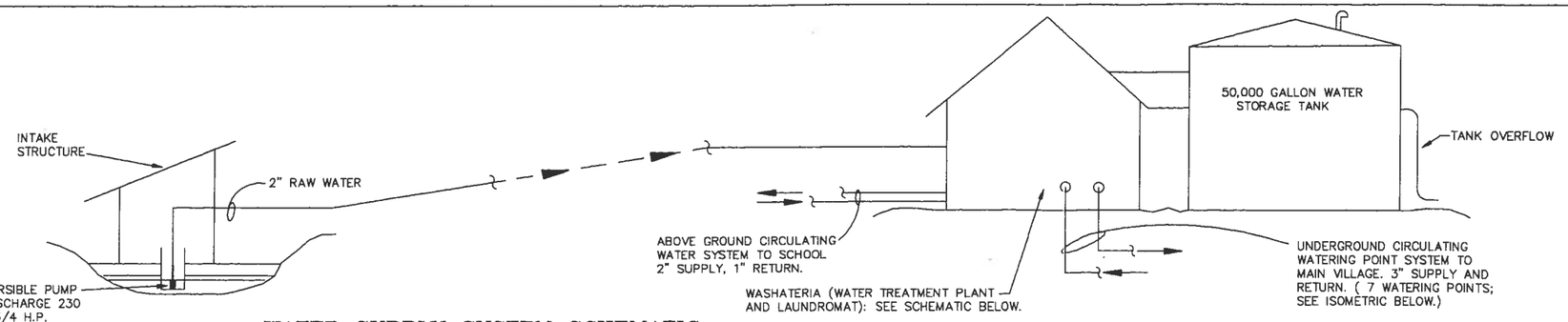
(8) An in-service underground and above-ground circulating potable water distribution system from the washateria through the main village and back again.

(9) An incomplete underground circulating potable water distribution main from the washateria through the 23-home AVCP subdivision and back again.

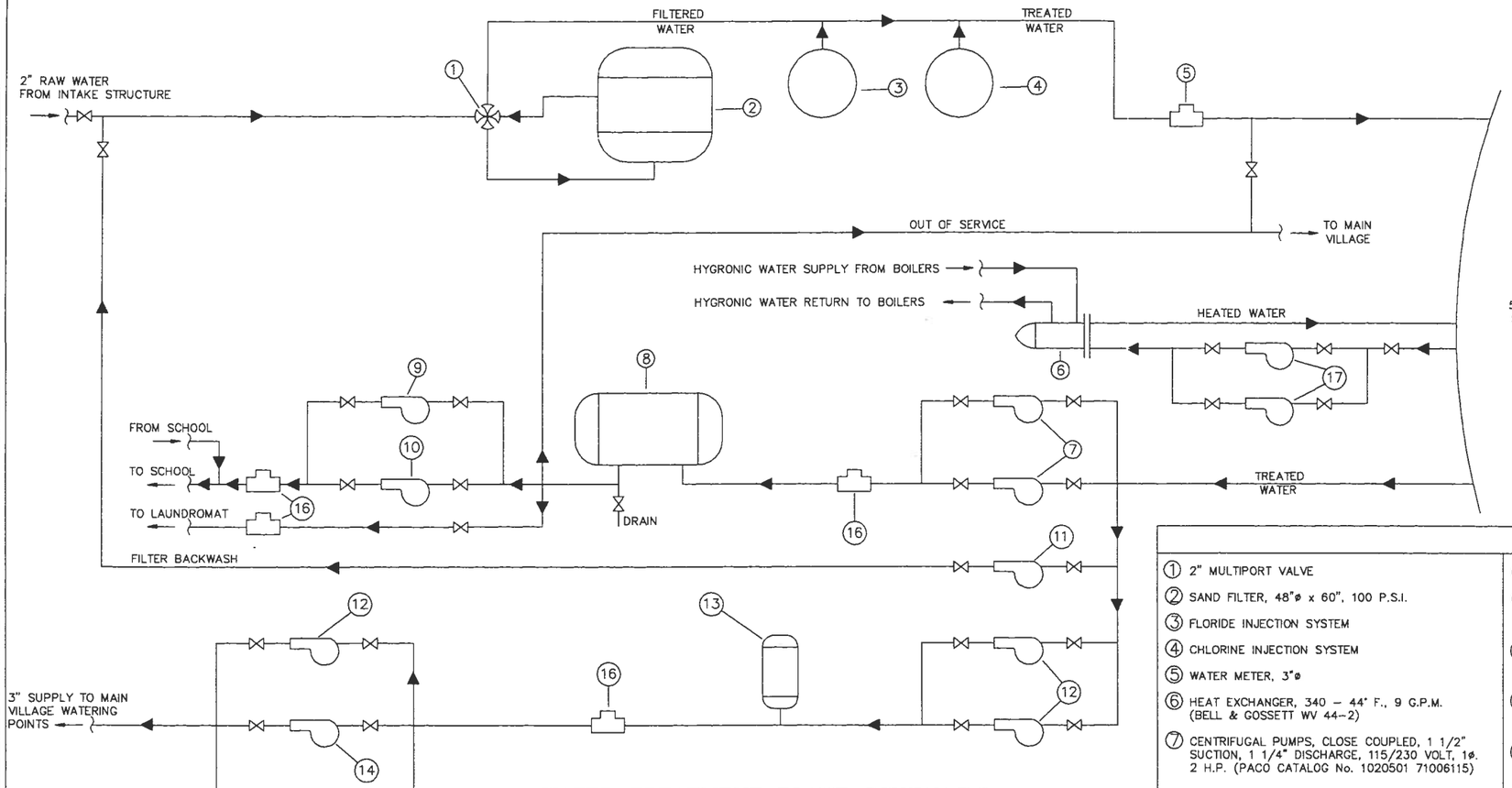
(10) An in-service, drilled well serving the teachers' housing complex (formerly the BIA school).

(11) Plumbing and water service facilities in various buildings.

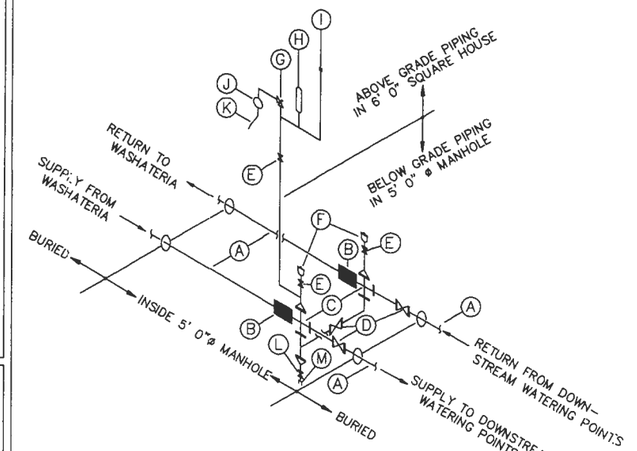
Items (1), (2), (4), (6), and (7), mentioned above, are schematically illustrated on Figure V-8. Each of the components are described in greater detail under the following headings:



WATER SUPPLY SYSTEM SCHEMATIC



WATER TREATMENT PLANT SCHEMATIC



TYPICAL MAIN VILLAGE WATERING POINT ISOMETRIC

WATER TREATMENT PLANT EQUIPMENT LIST

- (A) 3"ø HDPE INSULATED ARCTIC PIPE, HEAT TREATED.
- (B) 3"ø FLEXIBLE CONNECTIONS.
- (C) 3"ø GALVANIZED CROSSES, FLANGED.
- (D) 3"ø GATE VALVES, FLANGED.
- (E) 1"ø GATE VALVES, THREADED.
- (F) 1"ø AIR VACUUM VALVES.
- (G) 1"ø "WHISTLE STOP" VALVE, THREADED.
- (H) WATER HAMMER ARRESTOR
- (I) AIR CHAMBER
- (J) 1"ø VACUUM BREAKER
- (K) 1"ø HOSE
- (L) 3/4"ø GATE VALVE, THREADED.
- (M) 3/4"ø HOSE CONNECTION.

WATER TREATMENT PLANT EQUIPMENT LIST

1. 2" MULTIPORT VALVE
2. SAND FILTER, 48"ø x 60", 100 P.S.I.
3. FLORIDE INJECTION SYSTEM
4. CHLORINE INJECTION SYSTEM
5. WATER METER, 3"ø
6. HEAT EXCHANGER, 340 – 44° F., 9 G.P.M. (BELL & GOSSETT WV 44–2)
7. CENTRIFUGAL PUMPS, CLOSE COUPLED, 1 1/2" SUCTION, 1 1/4" DISCHARGE, 115/230 VOLT, 1ø. 2 H.P. (PACO CATALOG No. 1020501 71006115)
8. PRESSURE TANK, 42"ø 620 GALLON, 100 P.S.I.
9. CENTRIFUGAL PUMP, 5–STAGE, 2" SUCTION AND DISCHARGE, 230 VOLT, 1ø, 5 H.P. (GRUNDFOS CP8KU MODEL 8–50)
10. CENTRIFUGAL PUMP, CLOSE COUPLED, 2" SUCTION, AND DISCHARGE, 230 VOLT, 1ø. 2 H.P. (BERKLEY)
11. CENTRIFUGAL PUMP, CLOSE COUPLED, 3" SUCTION, 2" DISCHARGE, 115/240 VOLT, 1ø. 3 H.P. (PACO CATALOG No. 1020501 710061 15)
12. CENTRIFUGAL PUMPS, IN LINE, 1 1/2" SUCTION, AND DISCHARGE, 115/240 VOLT, 1ø. 1 H.P. (BELL & GOSSETT I.D. # 172544)
13. PRESSURE TANK, 22"ø, 80 GALLON BLADDER – TYPE.
14. MISSING
15. HEAT EXCHANGER, 175 – 45±, 5 G.P.M. @ 1.5' H.L. (BELL & GOSSETT CHX 308–4L)
16. WATER METER, 2"ø
17. CENTRIFUGAL PUMPS, CIRCULATING, 1 1/2" SUCTION, AND DISCHARGE, 240 VOLT, 1ø. 1 1/2 H.P. (BELL & GOSSETT)

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TUNUNAK SANITATION FEASIBILITY STUDY
EXISTING WATER SYSTEM

DRAWN	MBP	GRID		COMP FILE NO. 516V–8	FIGURE V–8
SCALE	NTS	DATE	12–22–92	FILE DRAWER NO.	
F.B.	PG.	W.O.	H92516		

B.1 **Raw-Water Intake Structure** - This is a wood frame structure built on timbers placed across the unnamed creek. The structure includes a 42" slotted CMP wet well. A submersible well pump is placed in the wet well and connected to the force main to fill the storage tank at the washateria. The pump is removed in cold weather when not filling the tank. The current pump is a 4" submersible with 1½" discharge (Jacuzzi 7S4D6) and a 230-volt, single-phase, 3/4-HP electric motor.

The Traditional Elders Council has expressed concern about the location of the intake structure. The Council believes that run-off during wet weather carries pollution from the 23-home subdivision into the watershed above the intake structure. This concern was the basis of the Council's capital budget grant request to relocate the village water source to the Muskox Creek.

B.2 **In-Service Above-Ground Raw-Water Force Main** - This line consists of a 2" HDPE water pipe inside a 4" PVC arctic pipe. Non-regulating heat trace is also run inside the PVC pipe. The PVC arctic pipe is supported above ground on timber cribs.

The force main is badly deteriorated. The 2" HDPE pipe has been broken or cut many times and subsequently repaired. The 4" PVC pipe and insulation are broken or missing in several locations, exposing the 2" line to freezing. Heat trace has been cut and spliced repeatedly and is less than satisfactory because it is not self-regulating. All the above combine to make the water service to the washateria very labor intensive in cold weather. Consequently, water service in the fall, winter, and spring is unreliable.

B.3 **Incomplete Underground Raw-Water Force Main** - This line consists of approximately 1,200 LF of 2" HDPE arctic pipe and is buried from the existing intake structure to the washateria. The line is not tied in but is capped above ground at both ends. For part of its length, the force main is buried in the same trench as the gravity sewer described in Section A.1 above.

The line was apparently designed to rely completely on heat trace to prevent freeze-up when water is not flowing through the line. The line includes a "low point" that extends from the intake structure to the washateria, and no provisions are provided to drain the line. Because of high groundwater conditions along the route, problems with heat trace reliability could be anticipated. In summary, the line could be subject to freeze-up when the water was not flowing.

B.4 **Water Treatment Plant** - Raw water currently enters the plant and passes through a 4′ diameter pressure filter. Filtered water is chlorinated and fluoridated and then enters the 50,000-gallon storage tank. Treated water is withdrawn from

the tank and enters a header system that distributes it to five different pumps depending on the particular usage.

One of these pumps is the filter backwash pump, a close-coupled, centrifugal (Paco) with 3" suction, 2" discharge, and a 3-HP electric motor.

Two additional pumps are piped in parallel to pressurize the systems serving the school and the laundromat portion of the washateria. These pumps are close-coupled centrifugals (Paco) with 1½" suctions, 1¼" discharges, and 2-HP electric motors. These pumps discharge into a 620-gallon hydropneumatic pressure tank.

The other two pumps on header system are piped in parallel to pressurize the main village distribution system. One of these pumps is an in-line centrifugal (Bell and Gossett) with 1½" suction and discharge and a 1-HP electric motor. The other pump is also an in-line centrifugal (Grundfos) but has 2½" suction and discharge; the horsepower of this pump is unknown. An 80-gallon hydropneumatic pressure tank (Well Xtrol type) is "teed" off from the discharge manifold of these pumps.

From the 620-gallon hydropneumatic pressure tank described above, treated water discharges directly to the laundromat or via booster pumps to the school. The school booster pumps are piped in parallel. One school booser pump is a five-stage centrifugal (Grundfos) with 2" suction and discharge and a 5-HP electric motor. The other school booster pump is a close-coupled centrifugal (Berkley) with 2" suction and discharge and a 2-HP electric motor.

Two "slots" are provided in the water treatment plant for circulating pumps for the main village distribution main. In one of these slots, an in-line centrifugal pump (Bell and Gossett) with 1½" suction and discharge and a 1-HP electric motor is installed. The other slot is vacant, apparently due to failure and non-replacement of the original pump.

A heat exchanger is installed to circulate heated water through the 50,000-gallon water storage tank. This heat exchanger is fabricated of 4" steel pipe and is approximately 36" long. It has 2½" FNPT connections for hydronic water supply and return. Actual hydronic water supply and return lines are 1½" diameter. The heat exchanger has 1" FNPT connections for supply and return of potable water from and to the 50,000-gallon tank. Supply and return lines are also 1" diameter. The heat exchanger was manufactured by Bell and Gossett and has a pressure rating of 150 PSI at 375°F on the shell and tube sides. Two circulating pumps are installed in parallel to transfer potable water through the heat exchanger.

Another heat exchanger is installed to provide make-up heat to the main village circulation distribution system. This heat exchanger has 3/4" hydronic water and potable water connections. It was also manufactured by Bell and Gossett, has a pressure rating of 150 PSI at 175°F, and is designed to transfer 10°F at 5 GPM with a head loss of 1.5′. Two circulating pumps are piped in parallel to transfer hydronic water through the heat exchanger. They have a design capacity of 5 GPM at 7′ TDH. These pumps were manufactured by Bell and Gossett and have 1/20-HP electric motors.

The water treatment plant is in poor to fair condition. Piping is routed awkwardly, resulting in a facility that is difficult to maintain due to access problems. Many of the pumps give the appearance of being mechanically deteriorated. One circulating pump for the main village distribution system is completely missing. Per Mr. Victor Kanrilak, a system operator, the other main village distribution system pump is subject to frequent breakdown and is seldom used. The heat exchanger system for the main village distribution system is mechanically incomplete and out of service. Also, per Mr. Kanrilak, the chlorination and fluoridation injection systems do not dose properly at low flows resulting in improperly treated water. The following components appear visually to be in relatively good condition: the pressure filter, both hydropneumatic tanks, the filter backwash pump, and both pressure pumps discharging to the 620-gallon hydropneumatic pressure tank.

B.5 Laundromat - This facility includes four commercial token-operated washing machines, two commercial coin-operated dryers, four coin-operated showers, and two flush toilets.

As with the water treatment plant, the laundromat is in poor mechanical condition. Two of four washers are out of service. One of the two dryers are out of service. Three of four showers are out of service due to broken piping. Toilets are in service, but need repairs such as new tank covers.

B.6 Hot Water System -The washateria houses two boilers, a hot-water heater, and miscellaneous piping to supply hot water to heat exchangers in the water treatment plant, baseboard and unit heaters throughout the washateria, and a hot-water generator. Both boilers are manufactured by Burnham Corporation, Lancaster, Pennsylvania. The lead boiler has a gross output of 342 to 370 MBH with ASME maximum working pressures of 15 PSI steam and 30 PSI water. The lag boiler has a gross output of 375 MBH with ASME maximum working pressures of 15 PSI steam and 50 PSI water. The hot-water generator is a 36" diameter, 325-gallon pressure vessel with an ASME rating of 125 PSI.

Visually, the boilers appear to be in poor condition, while the hot-water generator appears to be in fair condition.

B.7 Circulating Above-Ground Potable Water Distribution Main to School - This line consists of 300 LF of 2" HDPE water supply pipe and 300 LF of 1" HDPE water return pipe in 4" PVC arctic pipe running above ground from the water treatment plant to the Paul T. Albert Memorial School. The line is laid on the same tubular steel supports as the above-ground sewer line described above. (See Paragraph A.3 above and Photographic Plate V-2.)

B.8 Circulating Underground and Above-Ground Potable Water Distribution System for Main Village - This system consists of 5,200 LF of 3" HDPE arctic pipe, including supply and return piping. The system extends 2,600 LF from the washateria through the main village. Supply and return lines are buried in a common trench except for the last 200 LF of the system within the main village which crosses the cemetery above-ground on timber cribs. This pipe is heat traced with 5-watt per lineal foot non-regulating heat trace.

Six "watering" points are located along the distribution system within the main village. Each watering point includes a 5′ diameter CMP manhole through which the supply and return lines pass (or terminate). Each manhole has a concrete floor. An insulated wood-frame structure, 6′ square with a plywood floor, is constructed on grade above each manhole. One-inch piping with appropriate valves and fittings extends from the 3" supply line in the manhole up into the wood-frame structure. This piping is used to withdraw water from the system. Each watering point includes 3" gate valves in the supply and return lines to isolate the distribution system beyond that watering point. Also, each watering point includes 3" crossover piping, including a gate valve, so that water can continue to circulate through the system to that point, even if the system beyond the particular watering point is isolated or frozen.

Three "midpoint hand holes" are provided to facilitate access to the heat trace system. These hand holes are provided between the washateria and the first three watering points. Each hand hole includes a 30" diameter insulated CMP manhole through which the supply and return lines pass. Each hand hole has a concrete floor, a concrete rim, and a wood cover. Four heat trace terminations are located in each hand hole, two for the supply line and two for the return lines.

The system has one significant defect. Uninsulated galvanized steel piping at watering points is not heat traced and tends to freeze up. This problem could be corrected relatively simply by heat tracing and insulation to this piping. Other than this freeze-up problem, the system appears to perform satisfactorily.

B.9 **Incomplete Under-Ground Circulating Potable Water Distribution Main for 23-Home AVCP Subdivision** - This system consists of about 2,100 LF of 4" HDPE arctic pipe buried in a loop that starts and ends at the washateria and extends through the 23-home subdivision. The loop piping is not tied into the washateria, and no circulating pumps or piping for the loop are currently installed in the water treatment plant at the washateria. For most of its length, this line is buried in the same trench as the gravity sewer described in Section A.1 above. Where the water line is not buried with the sewer line, it is buried with the 2" force main described in Section B.3 above. Trench design is similar to that described for the sewer system and includes heat tubes.

Redundant freeze protection for the line would include a heat tracing system which is presently incomplete.

The water system includes several fire hydrant assemblies that are essentially complete. However, no building services are connected to the line. To complete house services, the 4" distribution main must be excavated near each home, tapped in two locations (with mechanical tapping saddles), and corp stops with pit orifices must be installed in the main. Supply and return lines, consisting of 1" HDPE pipe must be run from the main to each house inside a 4" HDPE arctic pipe, and tied to house plumbing.

This system appears to be well designed. However, since the heat trace would be operating under submerged conditions, problems with that particular system could be anticipated.

B.10 **In-Service Well for Teachers' Housing** - This well supplies water for teachers' housing in the former BIA School at the northeast end of the main village. Few details are available about the well; but the well logs indicate that it is 36.6' deep, screened, and had a 2' drawdown at 6 GPM when tested.

B.11 **Individual Building Water Service Facilities** - The washateria and school are served directly by the public water distribution facilities described in Sections B.4 and B.7 above. Two teacher housing units at the northeast end of the main village are served directly by the well described in Section B.10 above. Two additional teacher housing units north of the school have inside running water that is hauled and stored in individual on-site tanks.

Homes in the 23-home AVCP subdivision are partially plumbed for public water supply, but use rainwater or hauled water as their current source. Other buildings in the village have no inside plumbing, and rely on rainwater or hauled water for their supplies.

C. OPERATION AND MAINTENANCE CAPABILITIES

The Traditional Elders Council employs a full-time water supply and wastewater system operator, Mr. Victor Kanrilak. Mr. Kanrilak received state certification in 1986, but the certification has since expired. Mr. Kanrilak has a good working knowledge of the existing facilities but is constantly handicapped by a badly deteriorated system, lack of the proper equipment to operate the system, and a chronic shortage of funds to operate the facilities. For instance, the in-service raw-water force main, that is described in Paragraph B.2 above, is in such poor condition that filling of the 50,000-gallon storage tank in cold weather is a monumentally difficult task. Also, no sludge pumping and hauling equipment has ever been provided so that septic tank sludge is disposed of in a most unsanitary way, as described in Paragraph A.3 above. Finally, charges for water supply and wastewater disposal must be developed so that funds are available to properly operate the system. For further discussion of water and wastewater charges, see Section E of this chapter.

D. ADEQUACY OF THE EXISTING FACILITIES

As described above, nearly all wastewater disposal and water supply systems in Tununak are badly deteriorated and in serious need of major modifications, repairs, or servicing. Each of these systems are discussed below in the context of adequacy and unmet needs.

D.1 <u>Incomplete Sewer System</u> - The cost effectiveness of completing this system will be discussed in Chapter VI. However, if the system were completed, numerous tasks should be accomplished as discussed below. The force main must be completed mechanically and heat traced, and an air vacuum valve and drain valve should be added. The pump station must be completed mechanically and electrically. The trench section, described in Paragraph A.1 above, should be modified to prevent lateral movement of the pipe and manholes. Building service tees must be installed in the lines. Lateral piping must be installed from all service tees to house plumbing connections, tied in, and weather protected. The pump station wet-well piping connections should be sealed properly to reduce potential for groundwater infiltration. Piping at Manholes #1 through #7 should be modified to provide access to the line while reducing the potential for major groundwater infiltration. Frost heaving in the vicinity of Manhole #7 and elsewhere should be corrected as appropriate. Some method of wastewater disposal should be provided for the Tununak Native Store and Public Safety Building, both of which are adjacent to the 23-home subdivision.

Correction of frost heaving would include excavation and removal of the manhole and adjacent water line, sewer pipe, and heat tubes. The subgrade would be excavated to competent permafrost. New filter fabric would be reinstalled in the trench bottom, and the trench would be re-backfilled with non-frost susceptible material. Backfill would be compacted in one-foot maximum lifts. Heat tubes, insulation, pipe, and the manhole would be reset at the proper elevations. During this entire operation, the trench be dewatered by use of excavated bell holes and portable dewatering pumps.

D.2 Incomplete Septic System - This system appears to be adequate, at least for the present, to provide wastewater treatment provided that the following modifications are completed. The "short" manways on the two 6,000-gallon septic tanks should be extended to prevent flooding by snowmelt water or groundwater in the spring. The area above the tanks and drain fields should be filled and contoured to eliminate ponding of snowmelt water. Vents should be equipped with charcoal filters or some other odor control system.

This septic system was designed to serve 34 single-family homes with a design population of 148 and a design flow of 14,800 gallons per day of wastewater. If the entire village was served with piped water and sewer service, additional treatment capacity would, in all probability, be required.

D.3 Sewer and Drainfield for School, Washateria, and Teachers' Housing - This system is apparently adequate to remain in service provided the following tasks are accomplished:

(1) The above-ground sewer between the school and the washateria must be re-leveled and straightened.

(2) Additional ground cover and/or insulation should be added in the vicinity of Manhole #2 to reduce the possibility of freeze-ups. This would also require the extension of Manhole #2.

(3) The plywood structure at Manhole #3 should be removed and replaced with a structure similar to Manholes #1 and #2.

(4) Septic tanks must be pumped and sludge must be properly disposed of as soon as possible.

(5) Since the system was constructed in 1977, reconstruction of the drainfield should also be considered.

The condition of septic tanks is unknown.

D.4 Honey Bucket Disposal Bunkers - The five bunkers in the 23-home subdivision should be decommissioned and removed as soon as an alternate means of wastewater disposal is provided. Bunkers in the main village should be handled similarly, but timing is less critical because the natural percolation of the underlying sands and gravels reduces health hazards somewhat.

Procedures for decommissioning of honey-bucket bunkers are included in Chapter VI, Section K.

D.5 Individual Building Sanitation Facilities - Specific modifications will depend on the type of wastewater collection system to be utilized. Standard plumbing fixtures would be appropriate for a piped sewer system, while specialized fixtures would be necessary for the sewage haul system addressed in Chapter VI.

D.6 Raw-Water Intake System - This structure should be relocated to the Muskox Creek. A second intake structure should be considered on the existing unnamed stream where the current intake structure is located but approximately 1,200 LF further upstream. The new intake structure(s) could be constructed similar to the existing one. Pump control should be automated to assure a continuous water supply at the treatment plant. Some method of maintaining the wet well in a thawed condition should be installed.

D.7 In-Service Above-Ground Raw-Water Force Main - This line should be abandoned and demolished. A new above-ground force main should be installed from the new intake structure(s) to the water treatment plant.

D.8 Incomplete Underground Raw-Water Force Main - This line should be abandoned. The line would very likely be subject to freeze-up since it is not a circulating line, would not operate continuously, and would not drain. Heat-trace problems that might occur could not be easily corrected since the line is buried.

D.9 Water Treatment Plant - This facility is in need of major modifications. Piping and most of the pumps should be removed, and a simple piping arrangement with interchangeable pumps should be installed. Pumps, piping, and heat exchangers should be added for the incomplete circulating distribution main to the 23-home subdivision. Pressure filter media should be changed, and consideration should be given to adding an additional filter (or filters). Chlorination and fluoridation systems should be tested to assure that they dose properly at all flow rates, and should be replaced if necessary. An additional storage tank should be included.

D.10 Laundromat - Condition of washers and dryers should be evaluated and necessary repairs, modifications, and/or replacements should be made. Damaged plumbing fixtures should be replaced. Out-of-order showers should be returned to service, because they are a revenue source with a small incremental cost compared with the overall fixed operating costs for the washateria, and because they promote improved personal hygiene in the village.

D.11 Hot Water System - Boilers should be evaluated by an expert, but they appear to be in poor condition and in need of replacement. The hot-water generator appears to be in fair to good condition from exterior appearances. Various hot water system appurtenances, such as a hydronic water circulating pump, pressure relief valves, and piping insulation, are either completely missing or in obviously poor condition.

D.12 In-Service, Circulating, Above-Ground Potable-Water Distribution Main to School - This system is in reasonably good condition and seems to work well when water is available from the water treatment plant. However, tubular steel supports should be straightened and the line should be regraded to eliminate trapped air in the line.

D.13 Circulating Underground and Above-Ground Potable-Water Distribution System for Main Village - Insulation and heat tracing should be added at watering points to eliminate freeze-up of steel piping. Other worthy improvements would be to add fire hydrants at watering points for emergency use, and to install a heat exchanger system at the AVEC power plant to provide make-up heat to the water system by recovering waste heat from electrical power generation.

D.14 Incomplete Underground Circulating Potable-Water Main for 23-Home AVCP Subdivision - This system should be hydrotested to verify line integrity. If line integrity is proven, the system should be completed by tying it into the water treatment plant as described in Paragraph D.9, above. Also, to complete the system, the line must be re-excavated at selected locations. Two corp stop/pit orifice assemblies must be installed for each house. Circulating lateral lines must be extended from corp stops to house plumbing and tied in at both ends. The entire system must then be heat traced, insulated, weather protected, and backfilled. (NOTE: Installation of watering points along the distribution main might be a possible interim alternative to supplying running water to each home.)

D.15 In-Service Well for Teachers' Housing - Based on a limited amount of available information, the well and associated piping, supply adequate water for the current usage. Discussions with Lower Kuskokwim School District personnel indicate that water from this well may be piped to the Paul T. Albert Memorial

School to supply a back-up source when water is not available from the water treatment plant. If this cross-tie is made, water usage from the well may need to be limited to avoid salt water intrusion.

E. ADEQUACY OF EXISTING SANITATION SERVICES FEE STRUCTURE

At the present time, the Traditional Elders Council charges for the following sanitation services: water supply to the Paul T. Albert School, and laundromat services including the token operated washing machines and coin operated dryers and showers. Water supply to the school is invoiced monthly based on water meter readings at a rate of $0.05 per gallon, with an average usage estimated at 26,000 gallons per month, thus generating about $1,300 per month when water is available to the washateria and when school is in session.

Clothes washer token sales generated slightly more than $3,640 for the months May thru October 1993. Tokens sell for $2.50 per each.

Clothes dryers and showers generated just under $660 for the months May thru October 1993. Showers cost $1.00 for 10 minutes. Dryers cost $0.25 per cycle.

The Elders Council's ability to generate these revenues is directly related to supply of water to the washateria. Continued deterioration of the water supply system will result in continued loss of revenues, while water supply improvements would enhance revenues.

Appendix H includes the original agreements between the Indian Health Service, City of Tununak, Lower Kuskokwim School District, and Bureau of Indian Affairs. These agreements address charges by the City to the School District for water and sewer service. (As noted in Section G, Chapter III, the "City" of Tununak has ceased to operate).

F. FUTURE NEEDS

This topic is partially addressed previously in this Chapter but is summarized for completeness.

F.1 **Wastewater Disposal** - All residential, commercial, and institutional buildings in Tununak, other than the Paul T. Albert Memorial School, the washateria, and teacher housing, require major wastewater disposal improvements. The system currently serving the school, washateria, and teacher housing requires significant modifications and maintenance to continue providing adequate service.

F.2 **Water Supply** - The basic system for collecting and treating potable water requires major renovation. Completion of a water distribution system for the 23-

home subdivision is also a major priority. The correction of freeze-up problems and the addition of fire-fighting capability for the main village distribution system would be highly desirable. Recovery of electrical power generation waste heat for water distribution system make-up heat should be investigated.

F.3 **Final Sludge Disposal** - Facilities and equipment for final disposal of sludge have never been provided for Tununak. Given the favorable soils conditions in the portions of the village adjacent to the beach, sludge burial would appear to be the most suitable means of disposal, provided that sludge could be buried at elevations above the water table in accordance with ADEC regulations. To facilitate this method of sludge disposal, a septage pump truck or trailer must be obtained. Sludge disposal could be managed in the summer to avoid problems associated with vacuum valves in cold weather. Earth moving equipment presently in the village could be used for sludge burial, although a dump truck would be required if large quantities of fill were required at the disposal site. Sludge disposal will be addressed in greater detail in Chapter VI.

CHAPTER VI
SANITATION FACILITY ALTERNATIVES/CAPITAL AND O&M COSTS

A. GENERAL

This chapter addresses specific solutions to Tununak's various wastewater disposal needs which were discussed in Chapter V. These specific solutions to specific problems are then combined to provide three separate alternative overall approaches to Tununak's overall needs. Several of the specific solutions considered in the various sections of this chapter are common to all three alternatives referenced above. The final section of this chapter presents specific conclusions and recommendations for implementation of the EPA grant described in Chapter IV.

Prior to discussion of specific solutions and options, a set of proposed design criteria and a list of cost-estimating assumptions are presented to provide background for the later discussion.

B. PROPOSED DESIGN CRITERIA

Table VI-1 presents proposed design criteria for evaluation of the various sanitation facility alternatives discussed below.

The population estimates are based on census data referenced in Appendix G and on Village Safe Water Sanitation Facility Survey results summarized in Appendix C. Per discussions with the Traditional Elders Council, the most probable area for village expansion is the vacant subdivision adjacent to the 23-home AVCP subdivision; see Figure III-2. This assumption is reflected in population, water usage, and sewage generation design criteria presented in Table VI-1.

Estimated per capita daily water usages for hauled water are based on Village Safe Water Facility Survey results; the 3 GPD/capita figure includes an allowance for increased usage for flush toilets. The 60 GPD/capital usage for a piped water system is based on typical usage described in MOP FD-12: Alternative Sewer Design, Water Pollution Control Federation, 1986. Estimated total daily water usage records for the washateria are extrapolated from Traditional Elders Council financial records; no reliable water meter records are available. Estimated total daily water usage records for the Paul T. Albert School are based on analysis of water invoices derived from water meter records.

TABLE VI-1
Proposed Design Criteria

Estimated Population	**1993**	**2003**	**2013**
Main Village	197	200	203
New Village	124	139	154
TOTALS	**321**	**339**	**357**
Estimated Per Capital Daily Water Usage (GPD/Capita)			
Hauled Water Supply		3 GPD/Capita	
Piped Water Supply		60 GPD/Capita	
Estimated Total Daily Water Usage for Hauled Water System (GPD)	**1993**	**2003**	**2013**
Residential (Main & New Village)	960	1,020	1,070
Washateria	600	640	670
Paul T. Albert Memorial School	1,180	1,250	1,310
TOTALS	**2,740**	**2,910**	**3,050**
Estimated Total Daily Water Usage for Piped Water System (GPD)			
Main Village Residential/Commercial	11,820	12,000	12,180
New Village Residential/Commercial	7,440	8,340	9,240
Paul T. Albert Memorial School	1,180	1,250	1,310
TOTALS	**20,440**	**21,590**	**22,730**
Estimated Per Capita Sewage Generation (GPD/Capita)			
Sewage Haul System		1 GPD/Capita	
Piped Sewer System		60 GPD/Capita	
Estimated Total Daily Sewage Generation for Sewage Haul System (GPD)	**1993**	**2003**	**2013**
Residential	60	340	360
Washateria*	600	640	680
Paul T. Albert Memorial School*	1,180	1,250	1,350
TOTALS	**1,840****	**N/A**	**N/A**

* These facilities are presently served by piped water and sewer, and would continue to have piped water and sewer even if a sewage haul system was installed for the remainder of the village.

** Design flow rate for improvements to existing in-service septic system drain field. (Includes capacity for 14 sewage haul home units).

Estimated per capita sewage generation for a sewage haul system is based on an estimated number of flushes per day per capita of the "one-pint" flush toilet. The assumption is made that "gray water" will be disposed of by methods presently used which would not affect sewage haul. Estimated per capita sewage generation for a piped sewage system is based on the assumption that all residential and commercial water usage will become sewage.

Water usage and sewage generation is projected to increase with time linearly in proportion with population growth.

Groundwater infiltration for the underground sewer system in the 23-home subdivision (see Figures V-1 and V-2) is assumed to increase from "0" initially to 1 GPM/each for the pump station and Manholes #1 through #6 in the year 2013. This increase would result from leakage due to sewer system deterioration related to freeze-thaw cycles and solifluction ground movement.

C. COST-ESTIMATING ASSUMPTIONS

Cost estimates presented in subsequent sections were based on the following assumptions:

(1) Construction will be by "force account".

(2) Local hire construction craft personnel were assumed to have an average burdened rate of $24/hour including straight time (40 hours per week), overtime (20 hours per week), payroll taxes (FICA, FUTA, and ESC), and workers' compensation insurance.

(3) Non-local construction craft personnel were assumed to fill positions of journeyman electrician and certified welder. These positions were assumed to have an average burdened rate of $42/hour including the same items listed above for local hire labor.

(4) The project superintendent was assumed to have a burdened rate of $54/hour, including straight time (65 hours per week), payroll raxes (FICA, FUTA, and ESC), and workers' compensation insurance.

(5) Local maintenance personnel were assumed to have an average burdened rate of $11/hour including straight time (40 hours per week), payroll taxes (FICA, FUTA, and ESC), and workers' compensation insurance.

(6) General liability insurance coverage for force account construction of facilities is assumed to be provided by the State of Alaska at no cost to the village or the project. See Appendix I for procurement standards.

(7) Equipment rental rates were taken from a current copy of the Rental Rate Blue Book for Construction Equipment, with the appropriate area factor for Tununak. Rental rates were calculated from monthly Blue Book rates. The following rental and operating cost rate composites were used: front-end loader - $63/hour, hydraulic excavator - $56/hour, dump truck - $35/hour, and crawler dozer - $22/hour.

(8) A composite rental and operating cost of $10/hour was assumed for a septic tank pumper trailer. This trailer is assumed to be pulled by the crawler dozer mentioned above.

(9) A suitable source of non-frost susceptible gravel (4,000 to 7,000 CY) is assumed to be available locally at no royalty cost to the village or project. Round trip haul time is assumed to be one hour.

(10) Electrical power was assumed to cost $0.40/KW hour.

(11) Operation and maintenance costs include 5 percent for local administration.

(12) All costs are estimated in 1993 dollars.

D. IMPROVEMENTS TO EXISTING IN-SERVICE SEWER AND SEPTIC SYSTEM

The existing in-service sewer and septic system is shown in Figure V-1 and V-7. As discussed in Chapter V, Section D.3, the system could continue in service, provided some improvements are made. These improvements include straightening and re-leveling the above-ground sewer, placement of additional fill material and insulation of Manhole #2, replacement of Manhole #3, and reconstruction of the drainfield. Estimated capital costs for this work, not including supervision, engineering, local administration, and contingencies, are presented in Table VI-2 as follows.

TABLE VI-2
Capital Costs for Improvements to Existing In-Service Sewer and Septic System

Item	Estimated Cost
Re-level and Straighten Above-Ground Sewer	$1,600
Extend Manhole #2 and Add Fill Material and Insulation	5,200
Replace Manhole #3	3,800
Reconstruct Drainfield	6,000
TOTAL	**$16,600**

The septic tanks are assumed to be in adequate condition, and no costs are included for septic tank repair or replacement.

Operation and maintenance of the system would include periodic septic sludge pumping and disposal and periodic re-leveling and straightening of the above-ground sewers. Sludge pumping and disposal is addressed in Section J - Final Sludge Disposal Facilities. Costs of periodically re-leveling and straightening the above-ground gravity sewer are estimated at $1,600/year

E. IMPROVEMENTS TO EXISTING INCOMPLETE SEPTIC SYSTEM

The existing incomplete septic system, shown in Figures V-1 and V-3 through V-6, should ultimately become part of any wastewater disposal system selected for Tununak. However, several basic improvements would be necessary for use of the system. These improvements are discussed in Chapter V, Section D.2, and they include extending two septic tank manways, adding activated carbon filters to vents, and filling/grading over tanks and the drainfield. Estimated capital costs for this work, not including supervision, engineering, local administration, or contingencies, are as shown in Table VI-3 below.

TABLE VI-3
Capital Costs for Improvements to Existing Incomplete Septic System

Item	Estimated Cost
Extend Septic Tank Manways & Add Filters to Vents	$8,700
Place Fill and Grade Over and Around Tankers and Drainfield	48,000
TOTAL	**$56,700**

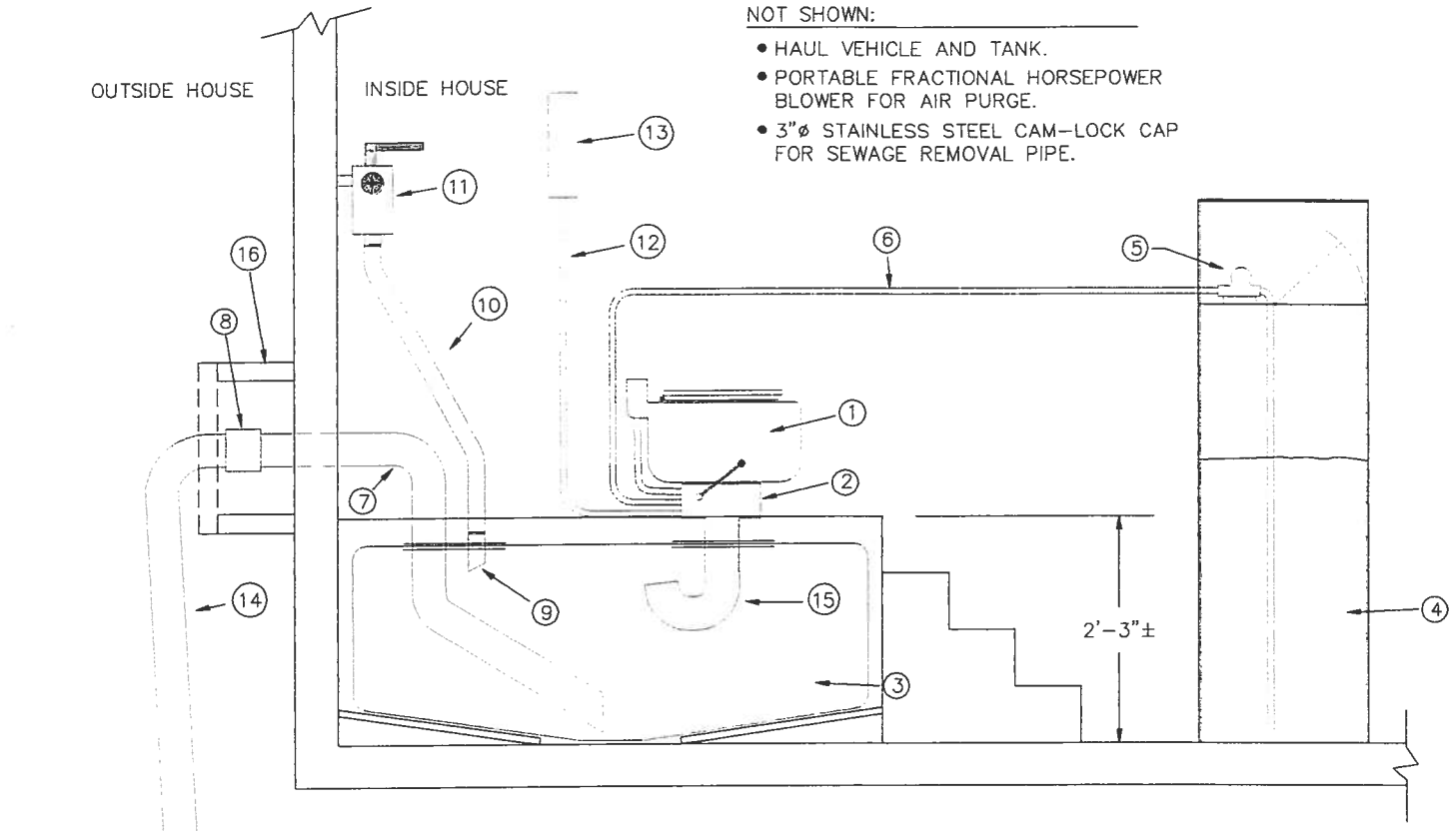
The capital costs presented above do not include costs to increase the size of the drainfield which was designed for a daily flow of 14,800 GPD. The required additional drainfield area is a function of the type of sewage collection system. As such, incremental costs for drainfield expansion are addressed in the sections below where appropriate.

Costs of operating and maintaining the septic system would include periodic sludge pumping and replacement of activated carbon filter cartridges. Sludge pumping costs are included in Section J - Final Sludge Disposal Facilities. The cost for periodic replacement of filter cartridges is estimated at $400/year.

F. SEWAGE HAUL SYSTEM

Figure VI-1 and Photographic Plate No. VI-1 illustrate a typical flush toilet system recently developed for a water and sewage haul system. The system includes a toilet that requires only one pint of water per flush and a rubber bladder holding tank that is capable of storing approximately 80 gallons of sewage. The system uses hauled water that is stored in a 40-gallon reservoir for flushing. After each flush, the user operates a valve that resupplies the toilet with water for the next flush.

The bladder holding tank is emptied on a regular schedule or more often depending on individual water usage. A haul vehicle, such as a "four-wheeler" or snowmobile with a trailer or sled that carries a specially designed haul tank with a capacity of about 90 gallons, is used to haul sewage from the holding tank to the disposal site. The transfer of sewage from the bladder holding tank to the haul tank is performed with a transfer hose connected to a "cam-lock" style fitting on the solids removal pipe, and to another cam-lock fitting on the haul tank fill port. The bladder is then charged with 4 PSI of air pressure which causes the sewage to begin siphoning out from the bladder to the haul tank. When the bladder is empty, the transfer hose is drained into the haul tank, disconnected, and stored away. The haul tank is then sealed to prevent spillage, and hauled to a disposal site where the contents are discharged. The haul tank and trailer or



1. FLUSH TOILET, 1 PINT FLUSH
2. FLUSH VALVE (LEVER DOWN TO FLUSH, UP TO FILL)
3. RUBBER BLADDER, 80 GALLON, W/STAINLESS STEEL FITTINGS
4. FIBERGLASS WATER RESERVOIR, 40 GALLON, W/ REMOVEABLE COVER.
5. DIAPHRAM PUMP, 110 VOLT FRACTIONAL HORSEPOWER, W/ PRESSURE SWITCH CONTROL
6. FLUSH WATER SUPPLY LINE
7. 3"ø STAINLESS STEEL SEWAGE REMOVAL PIPE
8. 3"ø STAINLESS STEEL CAM-LOCK FITTING
9. 1 1/2"ø STAINLESS STEEL AIR PURGE INJECTION FITTING
10. 1 1/2"ø STAINLESS STEEL AIR PURGE HOSE
11. 1 1/2"ø P.V.C. 2-WAY DIVERTER VALVE
12. VENT HOSE
13. ODOR REDUCING VENT FILTER
14. 3"ø TRANSFER HOSE TO HAUL VEHICLE
15. TOILET TRAP
16. INSULATED ENCLOSURE

FIGURE VI-1: TUNUNAK SANITATION FEASIBILITY STUDY SCHEMATIC SIDE ELEVATION OF TOILET INSTALLATION FOR HAUL SYSTEM WITH INSIDE BLADDER

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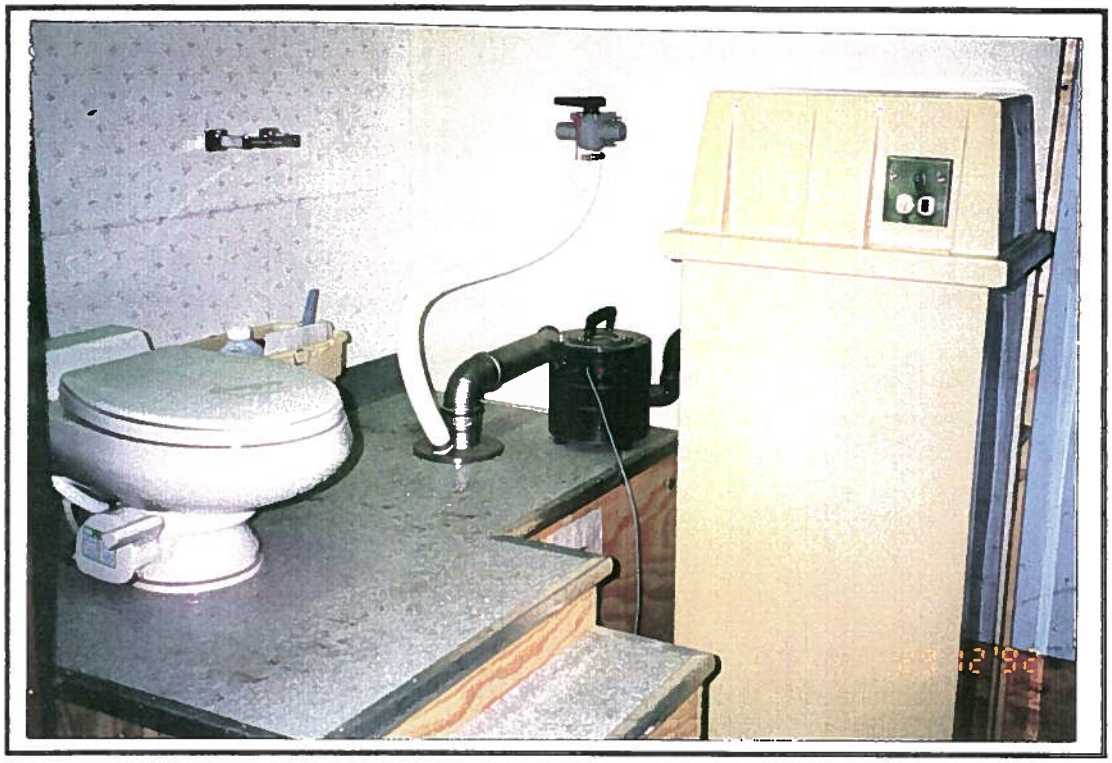

PHOTOGRAPHIC PLATE NO.VI-1 : "ONE PINT" TOILET AND FIBERGLASS WATER RESERVOIR FOR SEWAGE HAUL SYSTEM

TUNUNAK SANITATION FEASIBILITY STUDY

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W.O. H92516	COMP. FILE 516PHOTO	SCALE NTS	DATE 12-30-92	BY MBP

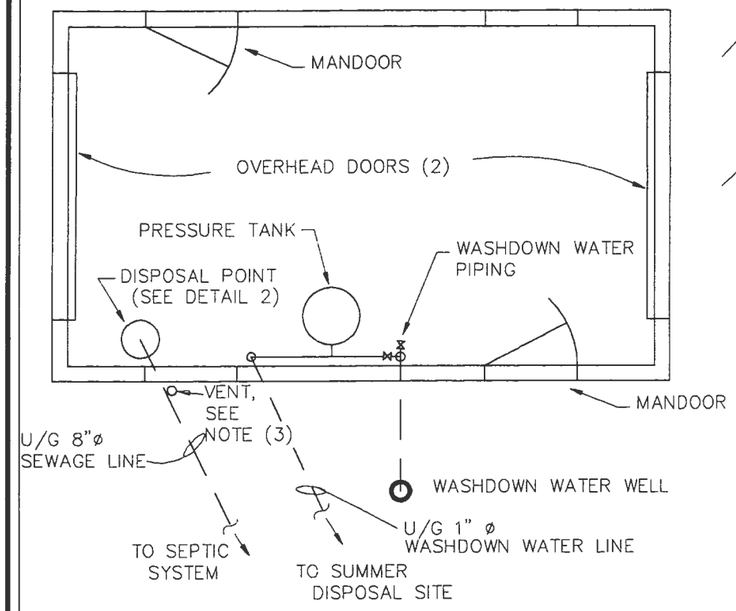
sled are specially designed so that the risk of spillage is minimized when the system is properly operated.

The system shown in Figure VI-1 is just one possible configuration that has been installed in the Village of Mekoryuk, Nunivak Island, a neighboring village of Tununak. Another variation of the system that is being developed replaces the rubber bladder with a heated and insulated sewage holding tank which is located outside of the living area.

Figure VI-2 illustrates a possible system for disposing of hauled sewage. The existing incomplete septic system would be modified to provide winter and summer disposal points for hauled sewage. Both are necessary because the area around the septic tanks, where the summer dumping point is proposed, is subject to major snow drifting in the winter.

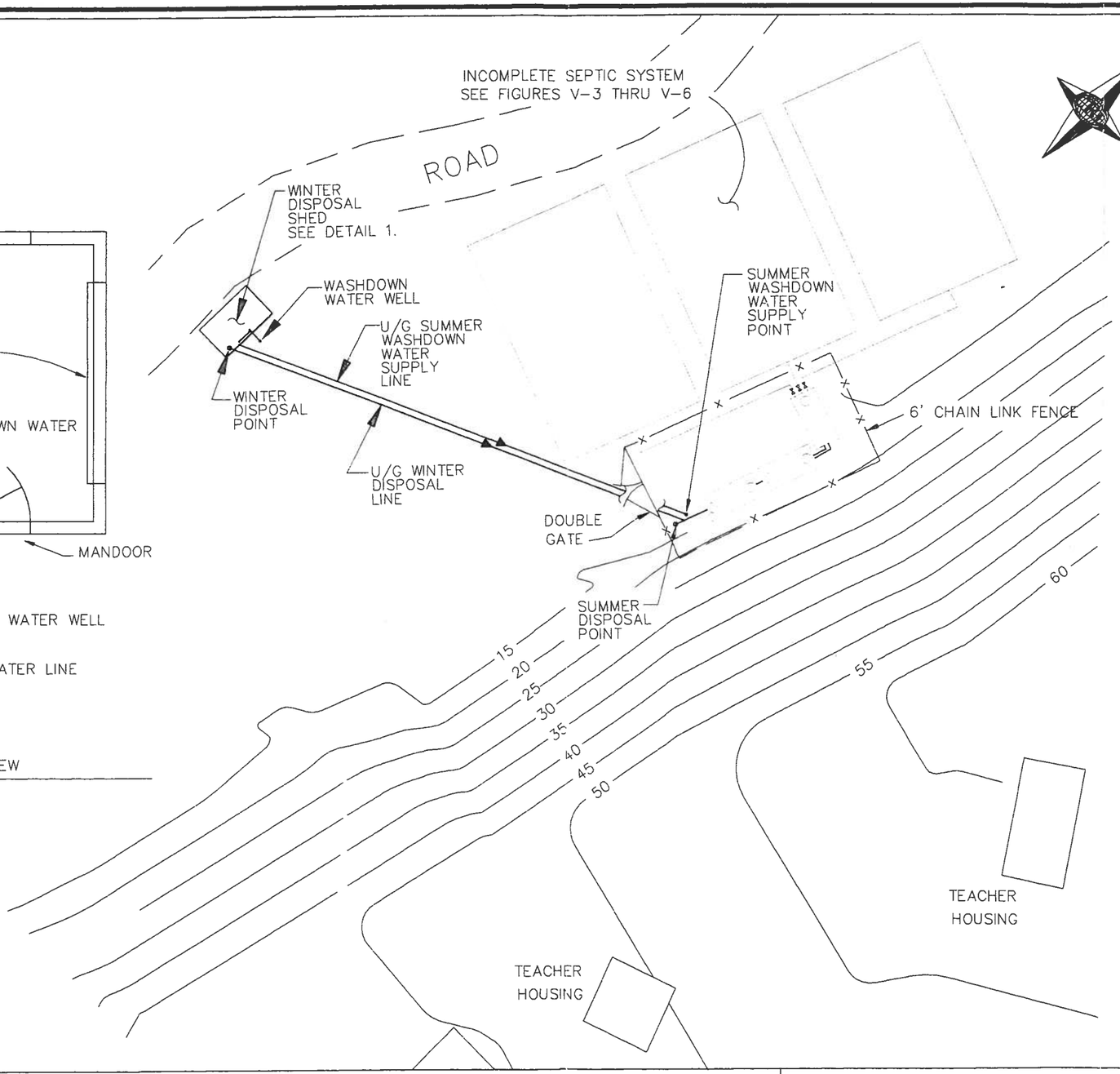
Sewage from the haul vehicle would drain into disposal piping by gravity. The winter disposal line would be heat traced to prevent freezing. A wash-down water supply would be available at both winter and summer disposal points.

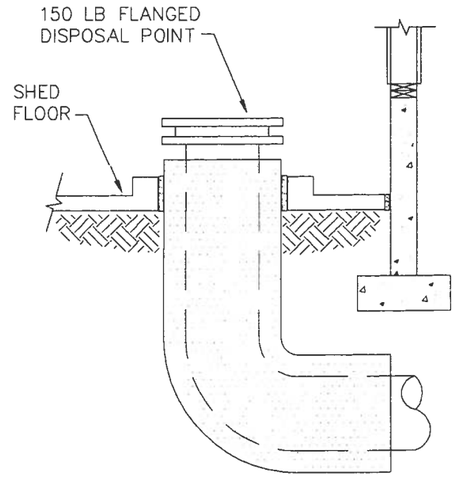
Capital costs are presented in Table VI-4 for a sewage haul system for the entire Village of Tununak including: 76 residential units (80 total, minus 4 with existing, inside plumbing) 3 stores, the cafe, public safety building, church, community hall, Traditional Tribal Elders Council office, IRA Council office, National Guard Armory, post office, clinic, and Headstart school--a total of 89 units. Capital costs presented below do not include supervision, engineering, local administration, or contingencies.



DETAIL 1 – WINTER DISPOSAL SHED – PLAN VIEW

N.T.S.





DETAIL 2 – WINTER DISPOSAL POINT SIDE ELEVATION

N.T.S.

NOTES:

1. ALL ELEVATIONS ARE RELATIVE, AND BASED ON AN ASSUMED FINISH FLOOR ELEVATION OF 35.00' AT THE WASHATERIA.
2. BUILDING LOCATIONS WERE DIGITIZED AND ARE FOR GRAPHIC REPRESENTATION ONLY.
3. INSTALL 4"ø GOOSENECK VENT WITH ACTIVATED CARBON FILTER.

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TUNUNAK SANITATION FEASIBILITY STUDY
HAUL SYSTEM DISPOSAL FACILITIES

DRAWN MBP	GRID	COMP FILE NO. 516VI-2	FIGURE VI--2
SCALE 1"=40'	DATE 1-25-93	FILE DRAWER NO.	
F.B. PG.	W.O. H92516		

TABLE VI-4
Capital Costs for Sewage Haul System

Item	Unit Cost	Quantity	Estimated Cost
Flush Toilet, Storage Bladder, Water Reservoir, Piping, & Appurtenances per Figure VI-1, Material and Installation	$5,000/Ea	89 Ea	$445,000
Additional for Outside Holding Tanks	500/Ea	50 Ea	25,000
Structural Renovations, Older Buildings	1,500/Ea	55 Ea	82,500
Structural Renovations, Newer Buildings	500/Ea	34 Ea	17,000
Haul Sleds (for winter use)	2,000/Ea	2 Ea	4,000
Haul Trailers (for summer use)	$2,000/Ea	2 Ea	4,000
Purge Blowers	$200/Ea	2 Ea	400
Modifications to Incomplete Septic System for Sewage Haul Disposal, per Figure VI-2	LS	1 Ea	108,500
TOTAL			**$686,400**

The existing drainfields of the incomplete septic system would not require expansion to accommodate a sewage haul system as proposed herein.

Operation and maintenance costs for the sewage haul system would include rental of snowmobiles and four-wheelers; labor to empty home tanks, haul and dispose of sewage; electrical power to heat outside storage tanks and the winter sewage disposal facilities; periodic repairs to individual systems; and periodic repairs to the haul sleds, haul trailers, purge blowers, and disposal facilities.

Assuming an average of about 4 persons per home and a sewage generation rate of 1 GPD/Capita, an 80-gallon storage tank would be filled in approximately 20 days. Conservatively, an "average" home would require about 20 haul trips per year. The total number per year for the entire system (89 units) is estimated at 1,800 haul trips, or 150 trips per month. An average haul trip, including transferring of home tank contents to the haul tank, actual hauling, disposing, and returning, was assumed to be as follows: October through May - 1.0 hours per haul trip, and; June through September - 0.5 hours per haul trip.

A daily rental rate of $50/day was assumed for the haul vehicle. Outside tanks (50 total) were assumed to have 100-watt heaters that would run continuously for 5 months/year. Periodic repairs to individual systems were estimated to be $50/unit per year. Periodic repairs to haul sleds, haul trailers, purge blowers, and disposal facilities were estimated at $1/haul trip. Using these assumptions, annual costs for sewage haul, not including final sludge disposal, septic system activated carbon filter maintenance, local administration, or contingencies, were estimated at $45,400.

Major snow drifting in the village would be a significant disadvantage of the haul system; see Photographic Plate VI-2. However, the ability of the haul system to function adequately with the existing inadequate water system is a significant advantage.

G. COMPLETION OF UNDERGROUND SEWER SYSTEM FOR 23-HOME SUBDIVISION

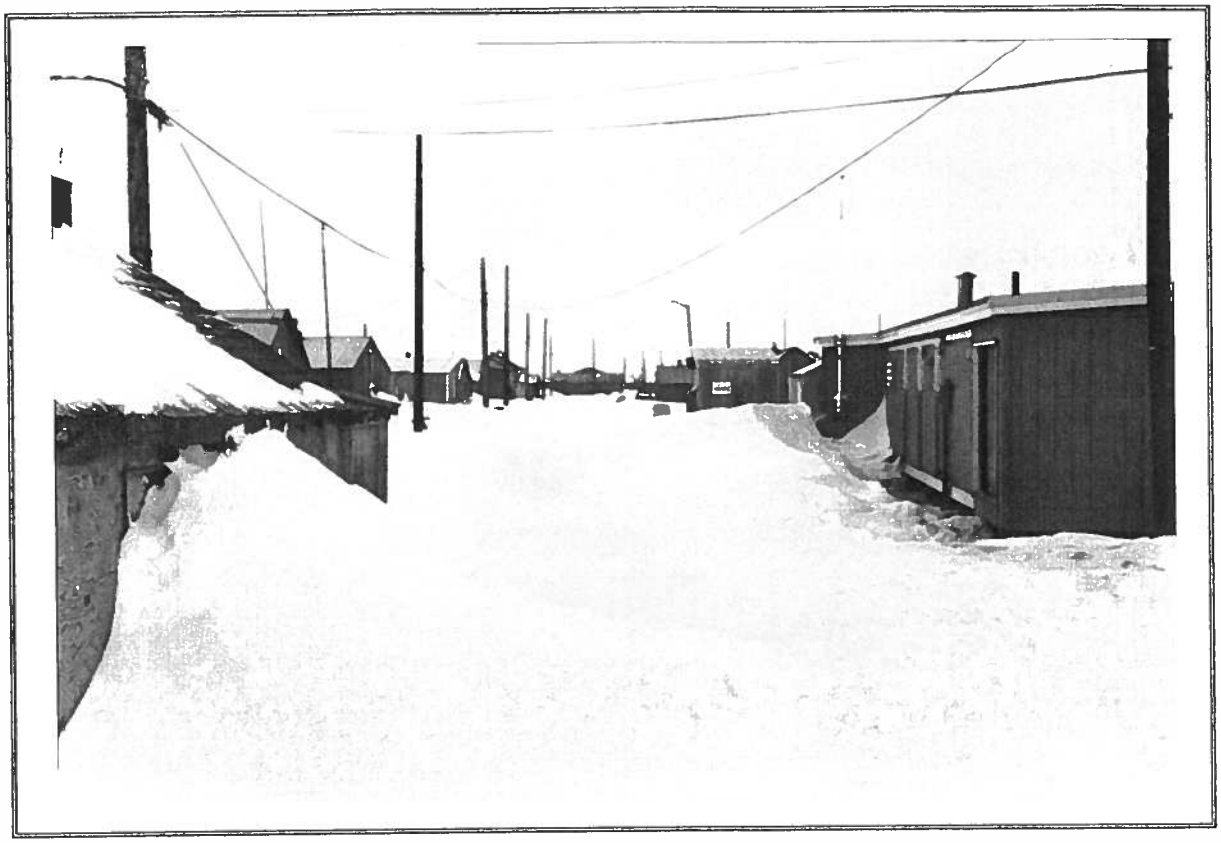
The existing incomplete gravity sewer system is shown in Figures V-1 and V-2. Figure VI-3 shows the completion plan for the sewer in general accordance with the original design. Specific tasks required to complete the system, to provide adequate protection against lateral movement due to solifluction, to correct existing defects, and to service all required buildings in the area, are listed below.

(1) The force main must be completed and heat traced. Air/vacuum and drain valves must be added as shown in Figure VI-3.

(2) The pump station must be completed structurally, mechanically, and electrically. Piping and valves should be installed to permit draining of the force main back into the pump station. The gravity sewer penetration into the pump station should be redone with a proper water stop.

(3) Because the sewer pipe is buried at an elevation above the top of the permafrost, the trench section should be "buttressed" against lateral movement due to solifluction by modifying the original section as shown in Figure VI-3. All sections of sewer trench should be modified except the one between Manholes #2 and #6; the latter section runs perpendicular to the ground slope, while all other sections are parallel (or nearly parallel) to the slope.

(4) Frost heaving in the vicinity of Manhole #7 should be corrected as follows. The water line, sewer pipe, manhole, and heat tubes should be uncovered and removed. The underlying material should be removed to solid permafrost. The trench bottom should be relined with filter fabric. Approximately one foot of non-frost-susceptible (NFS) gravel shall then be placed in the trench bottom and compacted, followed by reinstallation of the heat tube. Backfill and compaction



PHOTOGRAPHIC PLATE NO.VI-2 : SNOW DRIFTING IN MAIN VILLAGE (POST OFFICE IS BLUE BUILDING ON RIGHT, PHOTO TAKEN DECEMBER 17, 1992)

TUNUNAK SANITATION FEASIBILITY STUDY

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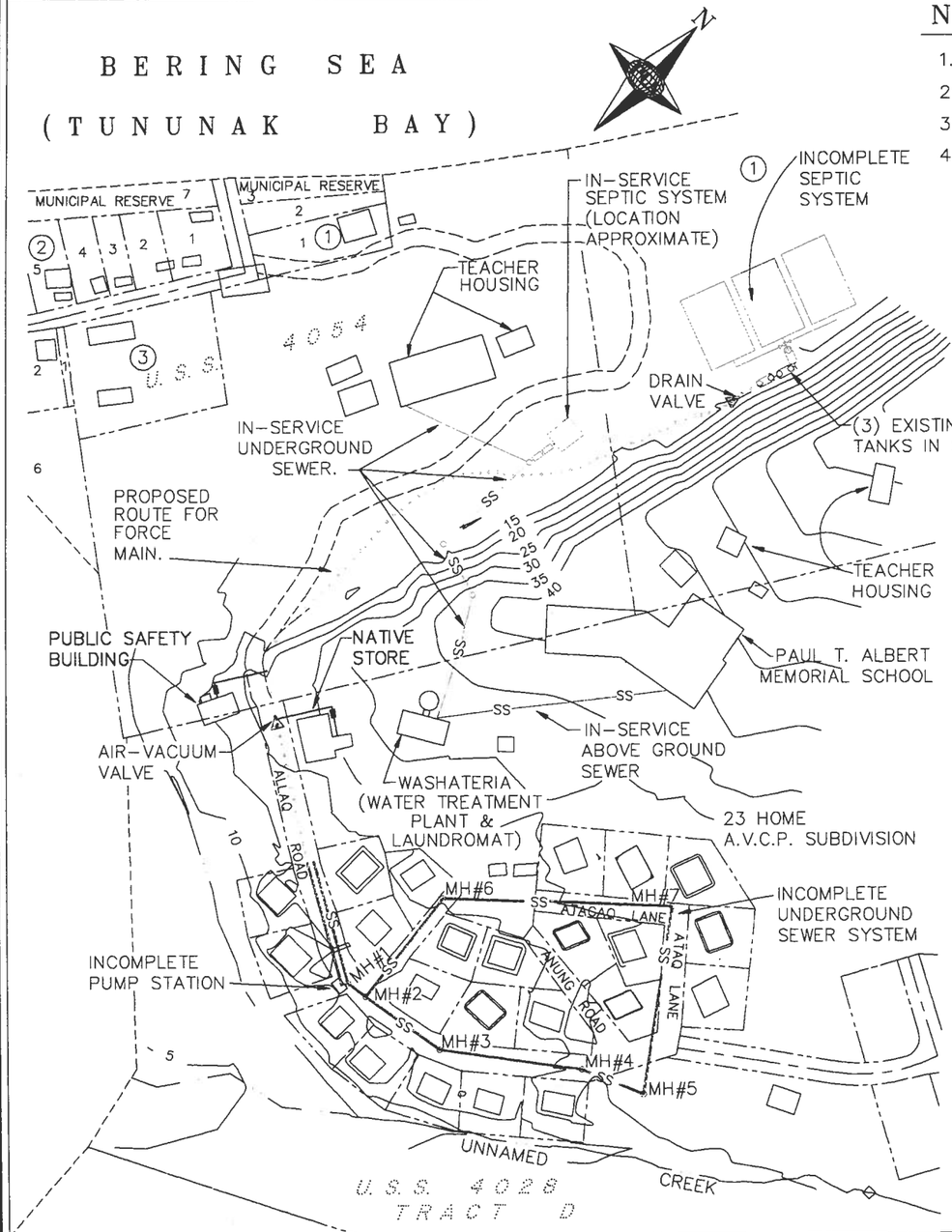
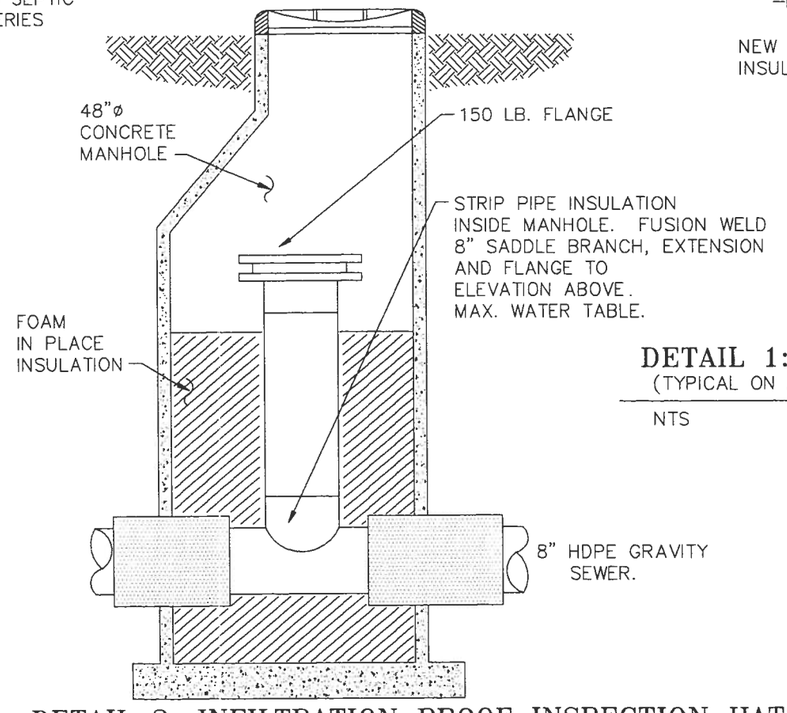


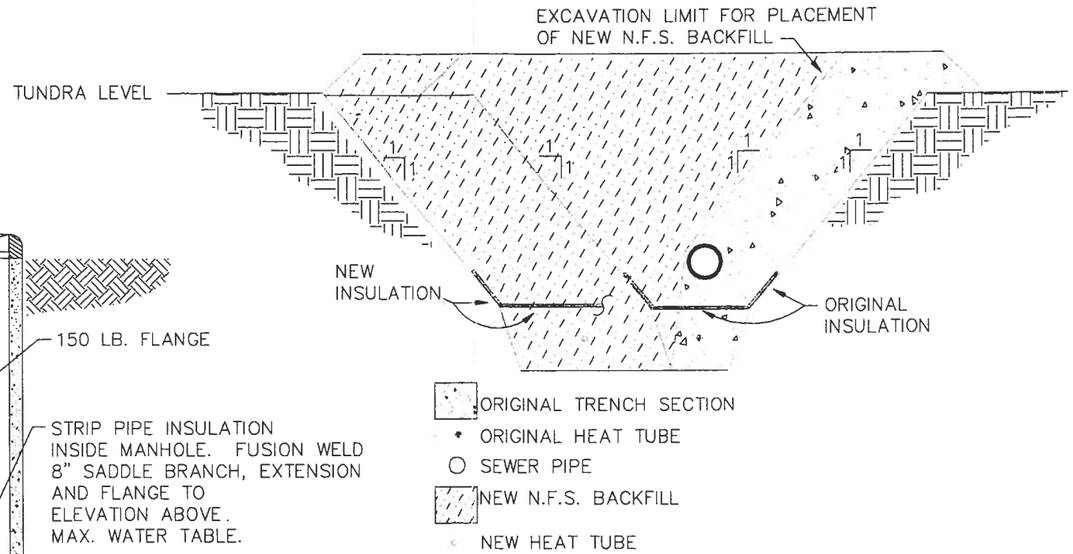
NOTES

1. BUILDING LOCATIONS, SHORE LINE, AND RIVER ARE DIGITIZED FROM AERIAL PHOTOGRAPHY AND ARE FOR GRAPHIC REPRESENTATION ONLY.
2. BOUNDARY AND MEANDER INFORMATION IS FROM RECORD BLM PLATS AND FIELD NOTES OF USS 877, USS 4054 & USS 4028.
3. CONTOUR INTERVAL IS FIVE FOOT AND BASED ON A T.B.M. OF 35.00' AT THE FINISH FLOOR OF THE WASHATERIA.
4. WATER LINE(S) NOT SHOWN, DETAIL 1.



DETAIL 2: INFILTRATION PROOF INSPECTION HATCHES
MH# 1 THRU MH# 7

NTS



DETAIL 1: MODIFIED SEWER TRENCH SECTION
(TYPICAL ON ALL SEWER LINES EXCEPT MH#2 TO MH#6)

NTS

LEGEND

- SEPTIC TANK
- AIR VACUUM VALVE STRUCTURE OR DRAIN STRUCTURE
- SEWER MAN HOLE
- SS — EXISTING SEWER LINE
- RECORD BOUNDARY
- RECORD CENTERLINE
- BLM RECORD MEANDERS
- PROPOSED ROUTE FOR FORCE MAIN
- S.T.E.P. SYSTEM

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TUNUNAK SANITATION FEASIBILITY STUDY
COMPLETION PLAN FOR INCOMPLETE BELOW GROUND SEWER

DRAWN	GRID	COMP FILE NO. 516VI-3	FIGURE VI-3
SCALE 1"=200'	DATE 1-3-93	FILE DRAWER NO.	
F.B. PG.	W.O. H92516		

would then continue to an elevation one foot below the bottom of the sewer pipe.

Insulation board would then be laid on the backfill and two feet up the sides of the trench wall, followed by additionally compacted NFS material. The manhole, sewer pipe, and water line would be re-installed at the proper elevations. New sewer piping should run continuously thru the manhole.

(5) Existing piping at Manhole #1 should be removed and replaced with continuous piping to eliminate infiltration.

(6) Saddle branches and flanged inspection ports should be installed at all manholes to permit access to the sewer pipe, but reduce infiltration; see Figure VI-3. Manholes should be filled with foam insulation around piping as shown.

(7) Service tees and lateral piping must be installed to serve individual homes. Lateral lines should be run above-ground when outside of the road area to avoid damage due to solifluction.

(8) Individual septic tank effluent pump (S.T.E.P.) systems should be installed to serve the Public Safety Building and Tununak Native Store. S.T.E.P. systems would discharge directly into the force main.

(9) The drain field should be expanded to provide the necessary capacity for projected flows in the year 2013. Additional drain field area requirements are estimated at 5,400 SF for an incremental flow of 4,520 GPD (9,240 GPD wastewater plus 10,080 GPD infiltration minus 14,800 GPD existing capacity; see Table VI-1). The occurrence of infiltration is included herein as an added contingency to the commissioning of the underground gravity sewer. Infiltration can probably be eliminated initially, but should be anticipated as the facilities age, due to the combined or separate effects of solifluction and fatigue introduced by freeze-thaw cycles.

(10) Toilets must be installed in buildings to be served.

Capital costs for completion of this system are presented in Table VI-5 on the following page.

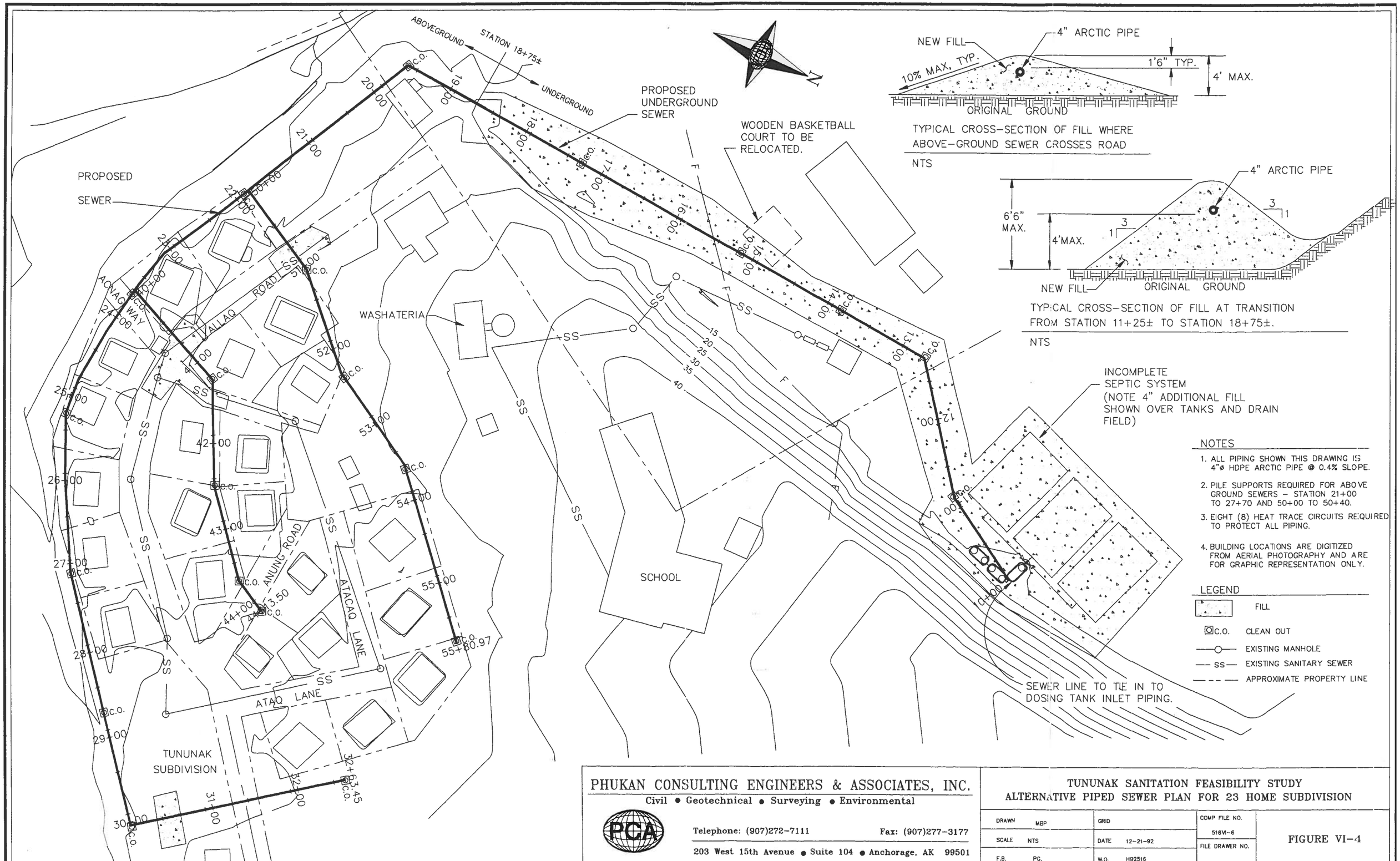
TABLE VI-5
Capital Costs for Completion of
Underground Sewer System for 23-Home Subdivision

Item	Estimated Cost
Complete Force Main	$51,600
Complete Pump Station Electrical and Mechanical, and Properly Seal Sewer Penetration	19,200
Modify Trench Section	253,700
Correct Frost Heaving Near Manhole #7	15,400
Modify Piping at Manhole #1	5,000
Install Infiltration-Proof Inspection Ports at all Manholes	15,200
Install Service Tees and Lateral Piping	125,400
Add S.T.E.P. systems for Native Store and Public Safety Building	25,300
Increase Size of Drainfield	18,200
Install Toilets in Buildings	8,100
TOTAL	**$537,100**

Operation and maintenance for this system would include routine maintenance of station and S.T.E.P. systems, electrical power for pumping, heat tracing, and pump station heating, and periodic repairs. These costs are estimated to total $18,100 per year. That amount does not include final sludge disposal, activated carbon filter replacement, local administration or contingencies.

H. ALTERNATIVE SEWER SYSTEM FOR 23-HOME SUBDIVISION

Figure VI-4 illustrates an alternative to the gravity sewer discussed in the previous section for the 23-home subdivision. Details of this system are shown in Figure VI-5. This alternative gravity system consists of above-ground pipe supported on timber cribs and steel pilings in the area underlain by permafrost, and underground pipe (or pipe buried in fill) in non-permafrost areas. All houses, as well as the Native Store and Public Safety Building, would be equipped with above-ground gravity septic tanks. Septic tanks are needed to remove solids so that the possibility of line blockage is greatly reduced if the pipe supports should jack or otherwise move, thus creating "bellies" in the



TYPICAL CROSS-SECTION OF FILL WHERE ABOVE-GROUND SEWER CROSSES ROAD

NTS

TYPICAL CROSS-SECTION OF FILL AT TRANSITION FROM STATION 11+25± TO STATION 18+75±.

NTS

NOTES

1. ALL PIPING SHOWN THIS DRAWING IS 4"ø HDPE ARCTIC PIPE @ 0.4% SLOPE.
2. PILE SUPPORTS REQUIRED FOR ABOVE GROUND SEWERS – STATION 21+00 TO 27+70 AND 50+00 TO 50+40.
3. EIGHT (8) HEAT TRACE CIRCUITS REQUIRED TO PROTECT ALL PIPING.
4. BUILDING LOCATIONS ARE DIGITIZED FROM AERIAL PHOTOGRAPHY AND ARE FOR GRAPHIC REPRESENTATION ONLY.

LEGEND

- FILL
- C.O. CLEAN OUT
- EXISTING MANHOLE
- SS EXISTING SANITARY SEWER
- APPROXIMATE PROPERTY LINE

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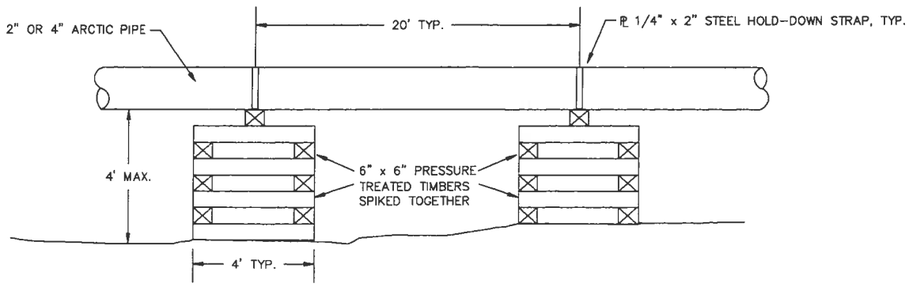
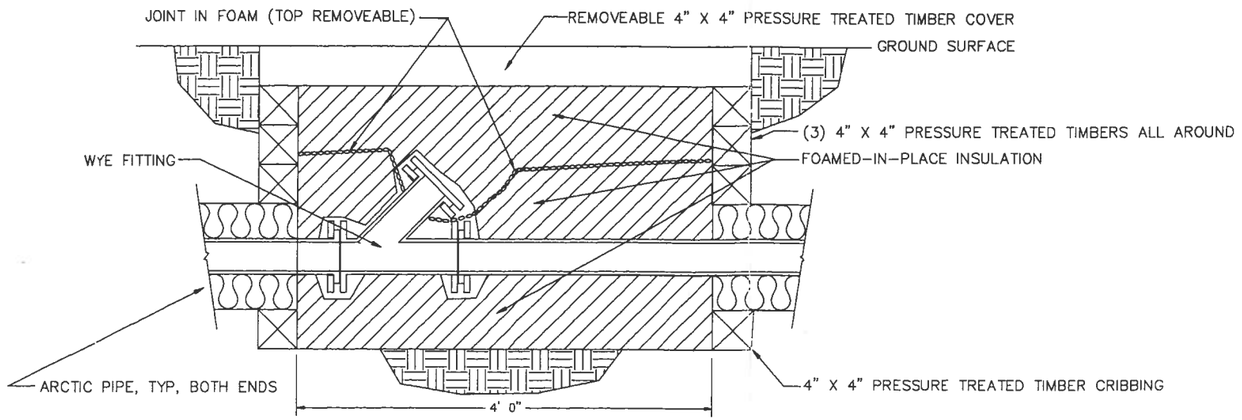
TUNUNAK SANITATION FEASIBILITY STUDY
ALTERNATIVE PIPED SEWER PLAN FOR 23 HOME SUBDIVISION

DRAWN MBP	GRID	COMP FILE NO. 516VI-6	FIGURE VI-4
SCALE NTS	DATE 12-21-92	FILE DRAWER NO.	
F.B. PG.	W.O. H92516		



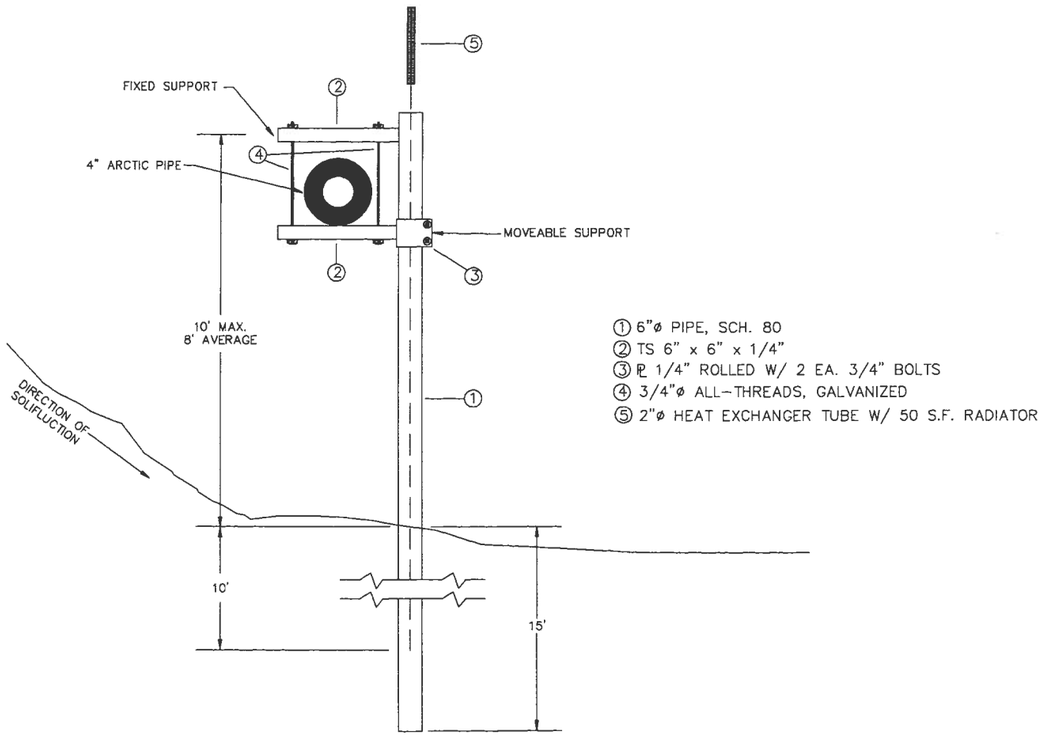
TYPICAL SIDE ELEVATION OF ABOVE GROUND SEWER ON TIMBER SUPPORTS

NTS



TYPICAL BELOW GROUND CLEAN OUT

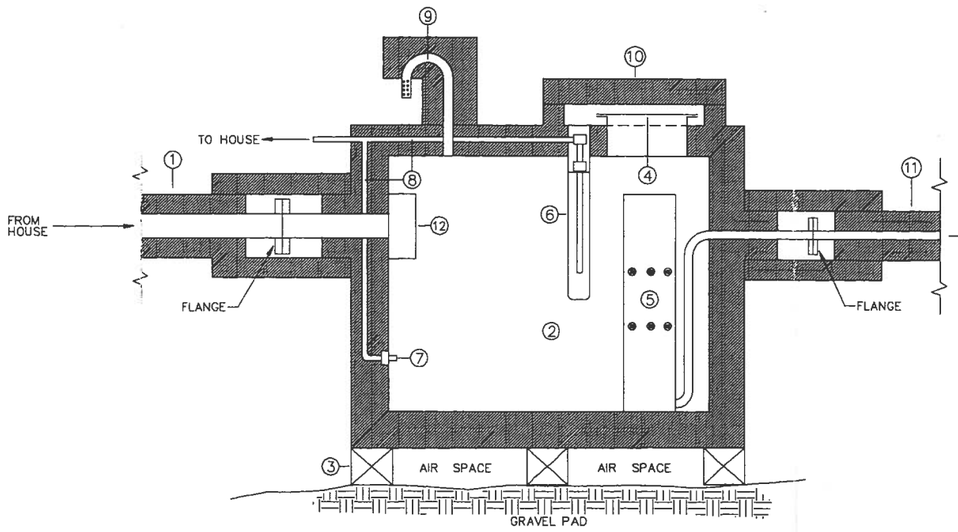
NTS



① 6"ø PIPE, SCH. 80
② TS 6" x 6" x 1/4"
③ ℄ 1/4" ROLLED W/ 2 EA. 3/4" BOLTS
④ 3/4"ø ALL-THREADS, GALVANIZED
⑤ 2"ø HEAT EXCHANGER TUBE W/ 50 S.F. RADIATOR

TYPICAL END ELEVATION OF ABOVE GROUND SEWER ON PILE SUPPORTS

NTS



INDIVIDUAL HOUSE SEPTIC TANK FOR ABOVE GROUND SEWERS

NTS

① 3"ø BUILDING SEWER, INSULATED
② 900 GALLON RECTANGULAR ABOVE GROUND SEPTIC TANK, INSULATED 6" ALL AROUND.
③ 6" x 6" TREATED TIMBER SUPPORT SKIDS, TYP. 3 PLCS.
④ 16"ø FLANGED ACCESS HATCH
⑤ 12"ø EFFLUENT SCREEN, ORENCO SYSTEMS INC. OR EQUAL
⑥ 500 WATT IMMERSION HEATER, THERMOSTATICALLY CONTROLLED, IN 6"ø STEEL GLYCOL FILLED
⑦ THERMO COUPLE
⑧ ELECTRICAL CONDUIT
⑨ 2"ø INSULATED VENT WITH REPLACEABLE CHARCOAL CANNISTER.
⑩ 6" THICK REMOVEABLE INSULATED COVER.
⑪ 2"ø EFFLUENT LINE TO 4" SEWER MAIN, HEAT TRACED.
⑫ INFLUENT BAFFLE

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TUNUNAK SANITATION FEASIBILITY STUDY
DETAILS FOR ALTERNATIVE PIPED SEWER FOR 23 HOME SUBDIVISION

DRAWN MBP	GRID	COMP FILE NO. 516VI-7	FIGURE VI--5
SCALE NTS	DATE 12-15-92	FILE DRAWER NO.	
F.B. PG.	W.O. H92516		

line. Above-ground tanks are necessary to provide the required head elevation for a gravity system. The tanks would be internally heated and all sewer lines from tanks to the septic system would be protected by heat tracing.

Capital costs for the system are shown in Table VI-6. For comparability to sewage haul and existing gravity sewer capital cost estimates, costs of installing toilets in homes are included. These costs do not include supervision, engineering, administration, or contingency.

TABLE VI-6
Capital Costs for Alternative
Sewer System for 23-Home Subdivision

Item	Estimated Cost
Above-Ground Pipe Supports	$162,100
Above-Ground Sewer	119,800
Above-Ground Septic Tanks & Building Tie-Ins	176,800
Fill for Underground Sewer	40,200
Underground Sewer	8,000
Heat Trace	8,200
Install Toilets in Homes	8,100
TOTAL	**$597,800**

The proposed design criteria in Table VI-1 indicate sewage flows ranging from 7,440 GPD in 1993 to 9,240 GPD in 2013. Groundwater infiltration would be insignificant to nonexistent since the sewer line would have no manholes and would be above ground or buried in fill (or a very shallow trench). Because the 14,800 GPD design capacity of the drainfields should not be exceeded, no capacity increase to the existing drainfield would be required.

Operation and maintenance of this system would include routine maintenance, periodic adjustment of above-ground sewer grades, electrical power for septic tank heating and sewer heat tracing, and periodic repairs. Annual operation and maintenance costs are estimated at $26,800 per year. These costs do not include final sludge disposal, septic system activated carbon filter maintenance, local administration, or contingency.

I. SEWER SYSTEM FOR MAIN VILLAGE

Figures VI-6 and VI-7 illustrate a piped sewer system for the main village. The system proposed herein is a septic tank effluent pump (S.T.E.P.) system. This selection was made on the basis of criteria from M.O.P. No. FD-12, Alternative Sewer Systems, Water Pollution Control Federation, 1986. Determining criteria were: simplicity of operation and maintenance, limited availability of space for excavation, low power requirements, and ability to accommodate longer power outages than other systems. The S.T.E.P. system would be completely buried because permafrost and solifluction are absent in the main village. The following buildings would be equipped with individual "lift station tanks" as shown in Figure VI-7: 53 homes, 2 stores, the Traditional Tribal Elders Council, the IRA Council offices, the Headstart School, the clinic, the community hall, the church, the post office, the National Guard armory, and the cafe, a total of 64 units.

For consistency with previous sections, costs will be estimated for installing toilets in all 64 buildings. An estimated 55 of these are older buildings which would probably require more extensive renovation than newer units.

This system could conceivably be constructed in conjunction with either of the piped sewer systems described in the previous sections. Assuming the existing 23-home subdivision gravity system was completed, the main village would require an additional 14,600 square feet of drainfield based on the projected 2013 sewage flow of 12,180 GPD. If the alternative gravity sewer were constructed in the 23-home subdivision, the drainfield would only require an 7,900 square foot expansion, based on an incremental flow of 6,620 GPD (9,240 GPD wastewater from new village plus 12,180 GPD wastewater from main village minus 14,800 GPD design capacity).

Capital costs for the system are presented in Table VI-7.

NOTES

1. BUILDING LOCATIONS ARE DIGITIZED FROM AERIAL PHOTOGRAPHY AND ARE FOR GRAPHIC REPRESENTATION ONLY.
2. MAIN LINE IS 3"ø HDPE ARCTIC PIPE WITH 5 WATT/LF HEAT TRACE, BURIED 4'0"±.
3. LATERAL LINES ARE 1"ø HDPE ARCTIC PIPE WITH 3 WATT/LF HEAT TRACE, BURIED 4'0"±.

LEGEND

- PRESSURE SEWER MAIN
- PRESSURE SEWER LATERAL
- LIFT STATION TANK
- DRAIN VALVE
- AIR VACUUM VALVE

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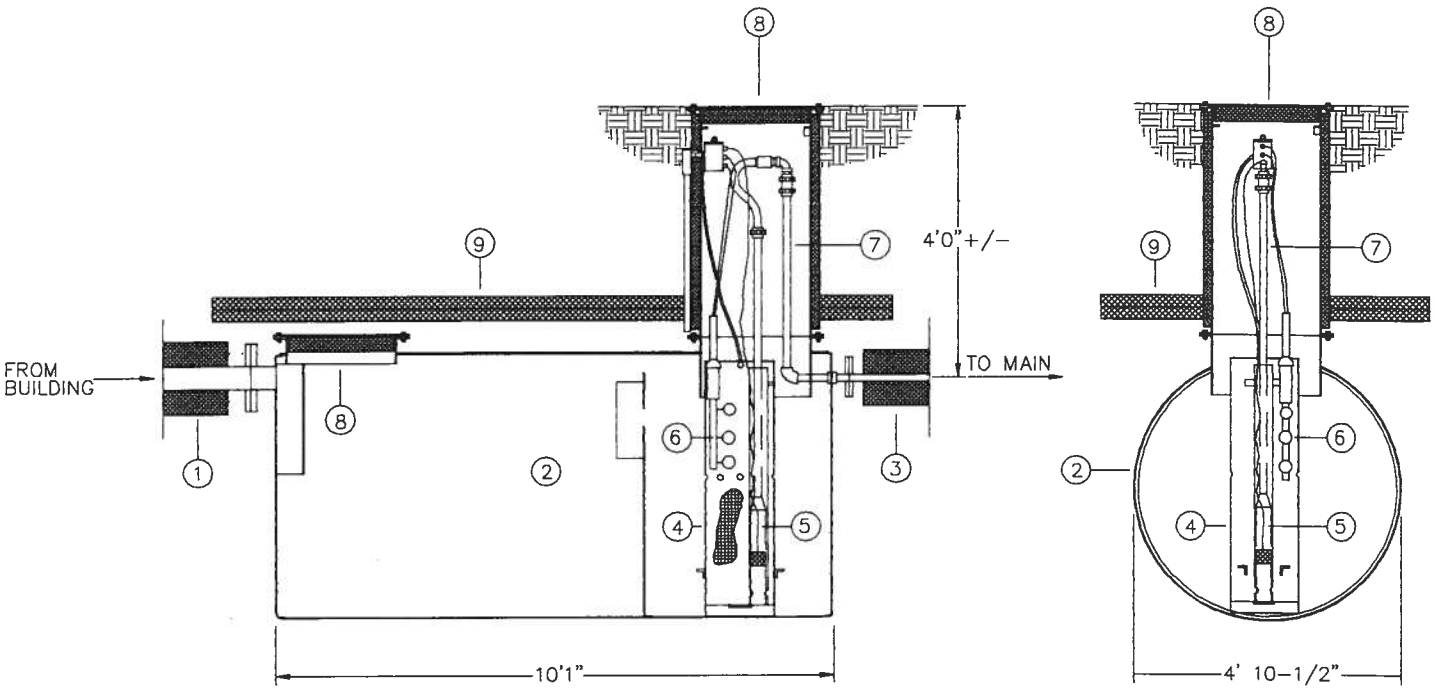
TUNUNAK SANITATION FEASIBILITY STUDY
BELOW GROUND SEWER PLAN FOR MAIN VILLAGE

DRAWN MBP	GRID	COMP FILE NO. 516VI-4	FIGURE VI-6
SCALE 1"=200'	DATE 12-31-92	FILE DRAWER NO.	
F.B. PG.	W.O. H92516		



1. 3"ø HDPE ARCTIC PIPE (BUILDING SEWER).
2. 1250 GALLON 2 COMPARTMENT SEPTIC TANK W/ BAFFLED INLET.
3. 1" HDPE ARCTIC PIPE PRESSURE LATERAL
4. ORENCO SYSTEMS INC. EFFLUENT SCREEN
5. EFFLUENT PUMP, 1/2 H.P.
6. FLOAT CONTROLS
7. 1"ø EFFLUENT PIPING
8. 20" WATERTIGHT MANHOLE
9. 4" "BLUEBOARD" INSULATION

FIGURE VI-7: TUNUNAK SANITATION FEASIBILITY STUDY
LIFT STATION TANK SECTIONS & DEATILS

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W.O. 92516	COMP. FILE 516VI-5	SCALE NTS	DATE 1/2/93	BY SMM

TABLE VI-7
Capital Costs for Sewer System in the Main Village

Item	Estimated Cost
3" Force Main	$287,700
1,250-Gallon Lift Tanks	331,900
3" Building Sewer	147,200
1" Pressure Lateral	200,600
Toilets in Older Buildings	55,000
Toilets in Newer Buildings	3,200
Drainfield Modifications	49,100*
TOTAL	****$1,074,700**

* Estimated costs would be $26,500 because of lower infiltration rate if alternative gravity sewer were constructed in 23-home subdivision.

** **TOTAL is $1,052,100** if alternate gravity sewer is constructed in 23-home subdivision.

Operation and maintenance of the S.T.E.P. system for the main village would include routine maintenance, power for pumps and heat trace, and periodic repairs. Annual operating costs are estimated to be approximately $40,600 per year, not including final sludge disposal, septic system activated carbon filter maintenance, local administration, or contingencies.

J. FINAL SLUDGE DISPOSAL FACILITIES

Figure VI-8 illustrates two general sites that were preliminarily considered as sites for final sludge disposal. Site "A" is located near the existing solid waste disposal site for the village, an area underlain by free draining soils.

Site "B" is located on a bluff overlooking Tununak Bay and currently has no specific uses by the village other than for recreational and subsistence access to Ugchirnak Mountain. This site is underlain by silts and clays over fractured bedrock. Site B is unsuitable for sludge disposal due to unfavorable soil conditions, high costs to develop access, and inconsistency with other land use.

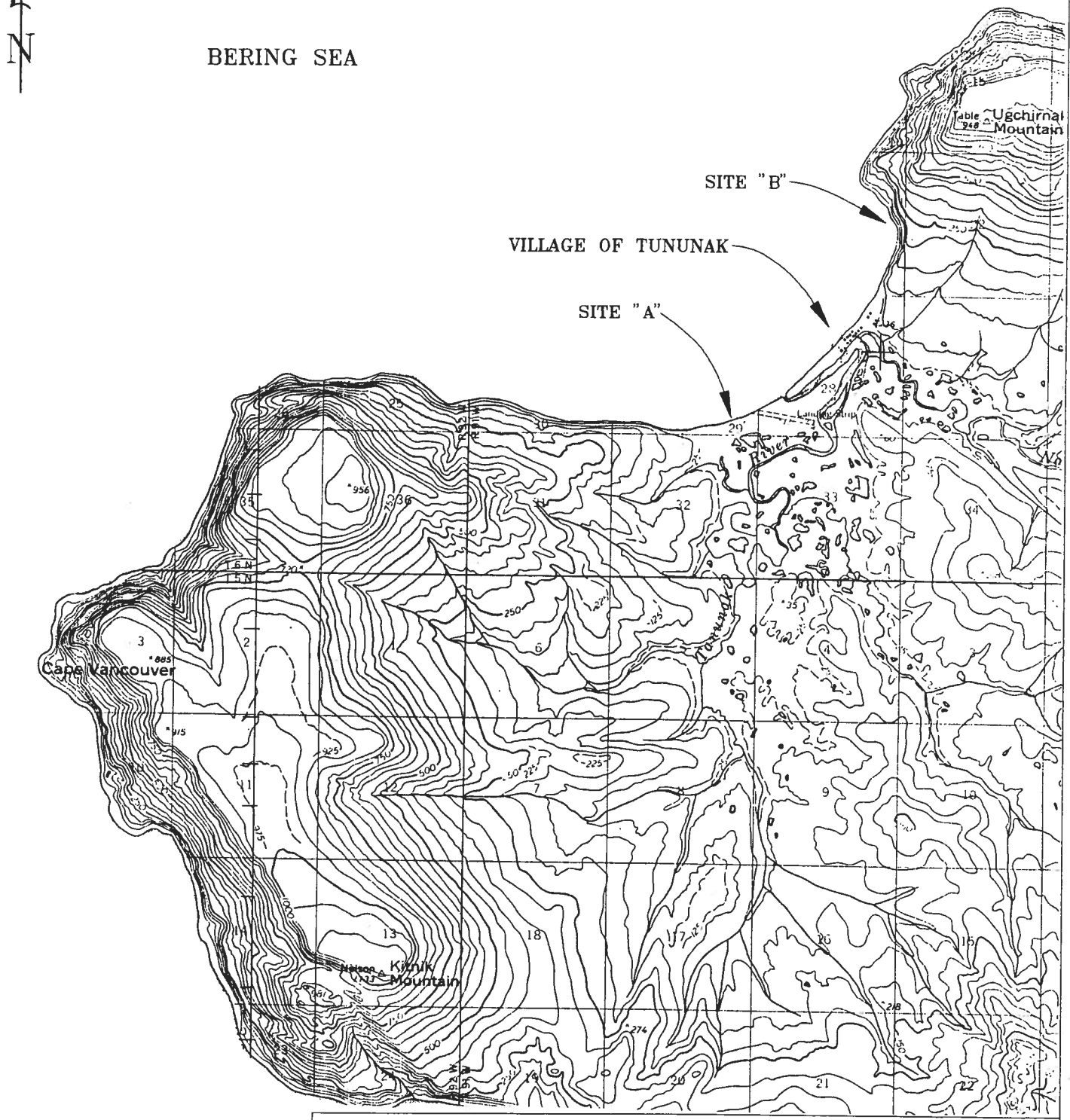

FIGURE VI–8 TUNUNAK SANITATION FEASIBILITY STUDY
PROPOSED SLUDGE DISPOSAL SITES

REFERENCE:
U.S.G.S. TOPO MAP
NUNIVAK ISLAND (C–1), QUANDRANGLE
ALASKA 1954

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Subsequent discussions with the Traditional Tribal Elders Council have indicated that other sites in the general vicinity of the airstrip and the solid waste disposal site may be acceptable to the village. However, Site A, because of its location, is an optimal choice, assuming that legal access to the site (for the purposes of sludge disposal) can be obtained. The 1991 Tununak Community Profile indicates that Site A lies on a Native Allotment owned by R. Blumenstein. Research done for preparation of the Land Status Map for this study (see Appendix D), indicates that the Native allotment has not been patented to R. Blumenstein.

Figure VI-9 illustrates a typical method of final sludge disposal frequently utilized in Alaskan bush villages, and proposed for Tununak.

Capital costs for final sludge disposal facilities would include site access and grading improvements and purchase of a sludge pumper vehicle.

During construction and operation of a sludge disposal site, extreme care must be exercised when crossing the Tununak River Bridge with heavy construction equipment. Heavy equipment will exceed the rated AASTHO "H15" capacity of the bridge. (The "H15" loading is for a 2 axle vehicle with 6,000 and 24,000 lb. axle loads, and 14 ft. center-to-center between axles). Per Mr. Harry Lincoln of Tununak, the hydraulic excavator and front end loader, currently in operation in the Village, have been successfully moved across the bridge on numerous occasions. Likewise, a loaded 10 CY dump truck, previously used by the Village, crossed the bridge on numerous occasions without apparent damage to the bridge.

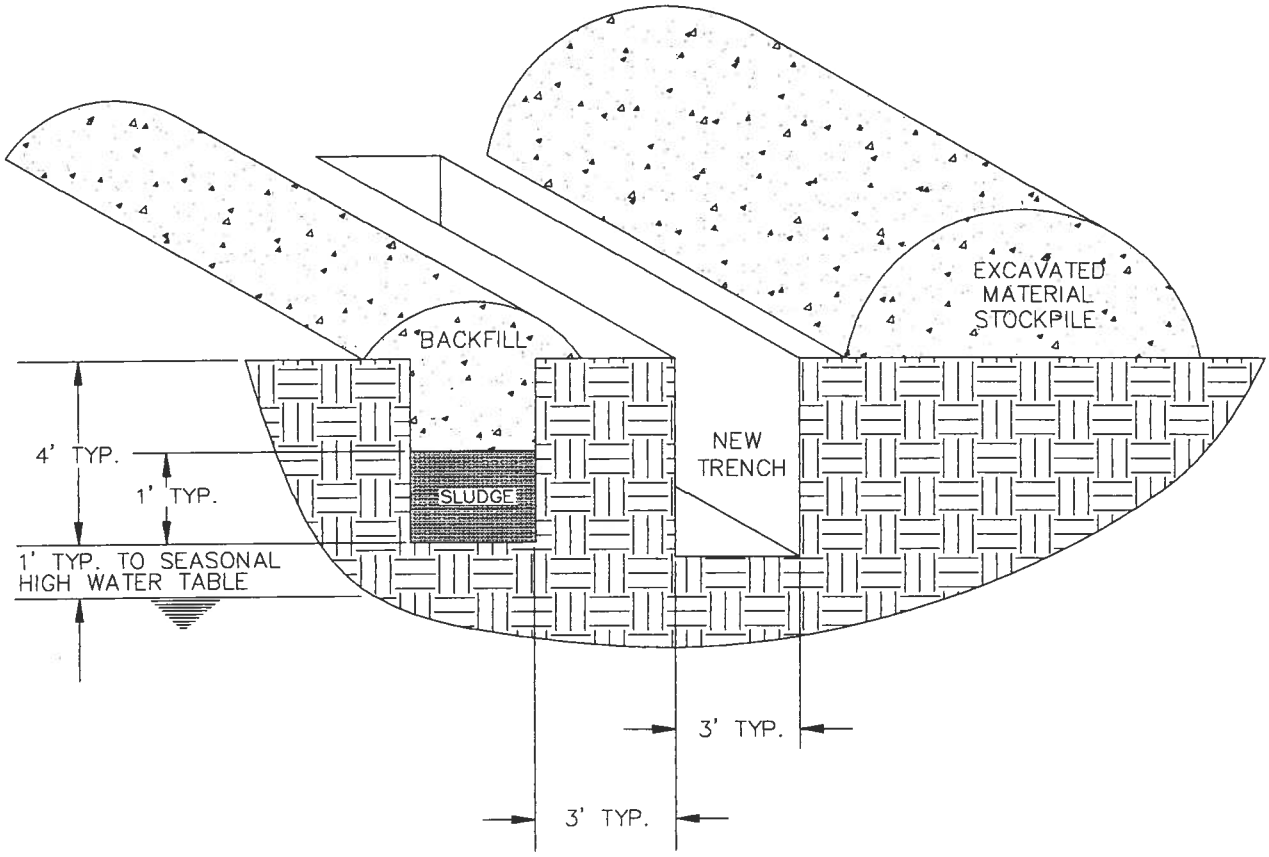
Capital costs for final sludge disposal facilities are presented in Table VI-8 below:

TABLE VI-8
Capital Costs for Final Sludge Disposal Facilities & Equipment

Item	Estimated Cost
Site Improvements	$14,000
Pump Trailer Purchase and Delivery	20,600
TOTAL	**$34,600**

The capital costs presented above do not include supervision, engineering, local administration, or contingencies.

Operating costs for the sludge disposal facility would vary depending on the type of wastewater collection system installed. These costs would consist of labor and equipment



NOTE: 400 TO 1000 LF OF TRENCH REQUIRED PER YEAR DEPENDING ON TYPE OF SEWER SYSTEM.

FIGURE VI-9 TUNUNAK SANITATION FEASIBILITY STUDY
NARROW TRENCH SLUDGE DISPOSAL SYSTEM

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costs to excavate and backfill a trench, labor and equipment costs to pump and haul the sludge, and agricultural line for treatment of sludge.

The existing in-service septic system serving the washateria, school, and teachers' housing has historically been pumped on a two-year schedule with good results, according to Mr. Victor Kanrilak, Traditional Tribal Elders Council waste and sewer system operator. Operation and maintenance costs to biannually dispose of sludge from this facility are estimated to be $1,800 per year ($3,600 biannually). These costs should be invoiced proportionately to the school, the washateria, and residents of teachers' housing.

If a sewage haul system were implemented and utilized the existing, incomplete septic system for waste disposal, the septic system would be receiving the biological oxygen demand (BOD) and solids loading from a population of 321 to 357 people. The design service population of the system for 148 people. Consequently, pumping of the septic tanks on a yearly basis would be highly advisable. Annual costs for sewage haul system final sludge disposal are estimated at $5,300 per year. These costs should be assessed to all residents served by the haul system.

If the existing, incomplete gravity sewer were completed, the service population would range from 124 to 154 people, essentially within or very close to the design parameters for the system. Under this scenario, a biannual pumping of the septic tanks would be acceptable. Annual costs would be half of those presented for the sewage haul system, or $2,600 per year. These costs should become part of the overall cost for operation of the entire piped sewer.

If the alternative sewer system for the 23-home subdivision were constructed, yearly pumping of above-ground tanks would be advisable since their capacity (900 gallons) is quite small, while families in the subdivision tend to be quite large. Annual sludge disposal costs would be approximately $10,300 which, again, should be included in the entire cost of operating and maintaining the piped sewer system.

Because of their larger size, septic tanks in the main village could be pumped biannually. Annual costs for sludge disposal would be $14,500 ($29,000 biannually). These costs should, of course, be included in overall costs for piped sewer operation and maintenance.

K. HONEY BUCKET BUNKER DECOMMISSIONING

When other methods of wastewater disposal are available, bunkers should be decommissioned as soon as possible. Bunkers should be decommissioned as follows:

(1) Workers should be vaccinated and thoroughly oriented before beginning the work. All workers should be required to wear hard hats, gloves, steel-toed boots, full rain suits or coveralls, and safety glasses as appropriate for specific tasks. The work area should be suitably barricaded.

(2) The "roofs" on bunkers should be removed, hauled away, and disposed of by burning or burial in a designated sludge disposal site.

(3) Sludge should be excavated using a hydraulic excavator, placed in a sealed dump truck, hauled to the designated sludge disposal site, treated with lime, and buried as shown in Figure VI-9. The recommended dosage is 200 lbs. of dry lime per bunker applied in a "milk of lime" solution (one part agricultural lime to four parts water by volume).

(4) Bunker walls should be cut apart with chain saws, hauled away, and disposed of by burning or burial in the designated sludge disposal site.

(5) Any bunker debris should be thoroughly cleaned up, and the area and equipment should be disinfected by spraying with a "milk of lime" solution.

(6) The depression created by removal of the bunker should be backfilled with clean import gravel, compacted and graded to match the adjacent ground.

One-time costs for decommissioning all honey-bucket bunkers are estimated at $13,400, not including supervision, engineering, local administration, or contingencies.

L. COST COMPARISONS OF VARIOUS OPTIONS FOR SERVICE TO ENTIRE VILLAGE

This section presents the total estimated capital costs for three complete wastewater disposal alternatives for the Village of Tununak, including supervision, engineering, local administration, and contingencies. Capital costs are estimated assuming that construction will not be phased due to availability of funding.

The estimated duration of construction for this alternative is 4 months.

Total estimated annual operating costs and corresponding monthly residential charges are presented in Table VI-11.

TABLE VI-11
Annual Costs and Monthly Charges for Sewage Haul Alternative

Item	Estimated Annual Cost
Septic System Activated Carbon Filter Maintenance	$400
Sewage Haul	45,400
Final Sludge Disposal	5,300
Subtotal	51,100
Local Administration @ 5%	2,600
Contingency @ 15%	7,700
TOTAL Annual	**$61,400**

Estimated Monthly Charge = ($61,400)/(12 months x 89 users) = $57/month.

The monthly estimated costs for the sewage haul system are quite high because the system is labor intensive. However, the system does have two major advantages. First, the system could operate very satisfactorily with the current water supply and distribution system in Tununak. Second, the system is not centralized, so individual system malfunctions do not impact the entire system.

L.2 Piped Sewer System, Including Existing, Incomplete Sewer System in 23-Home Subdivision

Table VI-12 displays estimated capital costs for a piped system for the entire village.

TABLE VI-12
Total Capital Costs for Piped Sewer System
Including Existing, Incomplete Sewer System

Item	Estimated Cost
Completion of Existing, Incomplete Sewer System	$537,100
Main Village Sewer System	1,074,700
Common Items (See Table VI-9)	121,300
Supervision	173,100
Subtotal	1,906,200
Engineering @ 10%	190,600
Local Administration @ 5%	95,300
Contingency @ 15%	285,900
TOTAL	**$2,478,000**

The duration for construction of this alternative is estimated to be 8 months, or two full construction seasons.

Annual costs and monthly charges are estimated in Table VI-13.

TABLE VI-13
Annual Costs & Monthly Charges for Piped Sewer System Including Existing, Incomplete Sewer System

Item	Estimated Annual Cost
Septic System Activated Carbon Filter Maintenance	$400
Completed Gravity Sewer System for 23-Home Subdivision	18,100
Pressure Sewer System for Main Village	40,600
Sludge Disposal, Completed Septic System	2,600
Sludge Disposal, Pressure Sewer System for Main Village	14,500
Subtotal	76,200
Local Administration @ 5%	3,800
Contingency @ 15%	11,400
TOTAL ANNUAL	**$91,400**

Estimated Monthly Charge = ($91,400)/(12 months x 89 users) = $86/month

The costs for this proposed piped sewer system are substantially higher than the sewage haul system. In addition, the piped sewer system is only feasible if a major investment is made in the village water system.

L.3 Piped Sewer System, Including Alternative Gravity Sewer System in 23-Home Subdivision

Costs for this final option are addressed in Table VI-14.

TABLE VI-14
Total Capital Costs for Piped Sewer System
Including Alternative Gravity System

Item	Estimated Cost
Alternative Sewer System in 23-Home Subdivision	$597,800
Main Village Sewer System	1,052,100
Common Items (See Table VI-9)	121,300
Supervision	173,100
Subtotal	$1,944,300
Engineering @ 10%	194,400
Local Administration @ 5%	97,200
Contingency @ 15%	291,600
TOTAL	**$2,527,500**

The duration for construction of this option is also estimated to be 8 months, or two full construction seasons.

O&M costs for this final option are presented below:

TABLE VI-15
Annual Costs & Monthly Charges for Piped Sewer System
Including Alternative Gravity System

Item	Estimated Annual Cost
Septic System Activated Carbon Filter Maintenance	$400
Alternative Gravity Sewer System for 23-Home Subdivision	26,800
Pressure Sewer System for Main Village	40,600
Sludge Disposal, Alternative Gravity Sewer System	10,300
Sludge Disposal, Pressure Sewer System for Main Village	14,500
Subtotal	92,600
Local Administration @ 5%	4,600
Contingency @ 15%	13,900
TOTAL ANNUAL	**$111,100**

Estimated Monthly Charge = $111,100/(12 months x 89 users) = $104/month.

This system, like the other piped sewer system, has the disadvantage that major water system improvements are necessary to make the alternative system practical.

M. CONCLUSIONS

Section L above indicates that a sewage haul system is the most cost effective alternative for wastewater disposal in Tununak. The purposes of this section are to assess the adequacy of the sewage haul system to meet community sanitation goals, to define a strategic plan for implementation of sanitation goals(including estimated capital costs for phased construction), to present operation and maintenance costs for various phases of the project, and to discuss how these operation and maintenance costs might be reduced.

Household attitudes regarding sanitation system improvements for the village were surveyed in November and December 1992 by Mr. Harry Lincoln of Tununak, who was contracted to perform the survey by Village Safe Water. Results of the survey are presented in Appendix C. Forty-eight of the sixty-five respondents replied to the question: "In what way would you suggest that the community's waste disposal be improved?" From responses to this question, the following community sanitation goals were qualitatively established:

(1) Provide sanitary flush toilets to all houses.

(2) Eliminate or improve existing honey-bucket bunkers, to enhance village sanitation and quality of life, and reduce pollution.

(3) Provide water system improvements to the village.

(4) Provide a piped sewer system for the village.

(5) Improve maintenance of village water and sewer facilities.

(6) Provide affordable water and sewer service.

On March 10, 1993, a public meeting was held by the Tununak Traditional Elders Council to discuss the conclusions and recommendations of the 95% Sanitation Feasibility Study. Following public discussion, the Elders Council passed Resolution 93-01, included in Appendix B, accepting the sewage haul system concept as described in Section F of this chapter. This alternative, if fully implemented, would meet the major sanitation goals identified by the Village Safe Water Survey, including installation of flush toilets, elimination of honey-bucket bunkers, and most affordable wastewater

disposal. Water system improvements are outside of the scope of this study (other than a qualitative review of the system contained in Chapter V). A piped sewer system is shown, in Section L of this chapter, not to be cost effective at this time. Improved maintenance of the existing water and sewer systems requires strengthening of community management infrastructure, which is largely an internal village problem.

Implementation of a sewage haul system for Tununak should be phased to assure community acceptance and to take a realistic account of funding availability. The entire project can logically be broken into four phases, the first two of which can be funded with the existing EPA/ISA grant described in Chapter IV of this report, and an additional two of which are conceptual at this time. Various phases are described below:

Phase I - Provide basic improvements to existing in-service sanitation system. Provide final sludge disposal facilities to support existing system. Provide a minimal number of home "flush toilet/sewage holding tank" systems to assess community acceptance. Provide sewage haul equipment to support home units. Implement Phase I in 1993. Fund with existing EPA/ISA grant.

Phase II - Assess community acceptance of sewage haul facilities. Modify as appropriate. Provide as many additional home "flush toilet/sewage holding tank" units as funding permits. Concentrate new units in 23-home subdivision. Implement Phase II in 1994. Fund with existing EPA/ISA grant.

Phase III - Continue assessment of community acceptance of system and improve as required. Install sufficient home units to complete service to 23-home subdivision. Complete improvements to existing incomplete septic system to serve as main sewage disposal site for village. Decommission honey-bucket bunkers in 23-home subdivision. Apply for State/Federal Phase III funding in 1993. Implement Phase III in 1994 or 1995 as funding availability permits.

Phase IV - Continue receiving feedback and improving system. Install home units in all remaining buildings requiring sanitation service. Decommission honey-bucket bunkers in main village. Apply for State/Federal Phase IV Phase III funding in 1994. Implement Phase IV in 1995 or 1996 as funding availability permits.

Estimated costs for each of the four phases are presented below.

To account for the higher costs of phased construction, each of the phases includes a separate allowance for "Additional Transportation and Mobilization".

Phase I of this project would include repair and purchase of heavy construction equipment (to construct and operate proposed facilities), improvement of the existing in-service sewer and septic system as described in Section D of this chapter, construction of a final sludge disposal site and purchase of a sludge haul trailer as described in Section J of this chapter, installation of four sewage haul home "flush toilet/sewage holding" units as described in Section F of this chapter, purchase of sewage haul equipment to compliment the home units, and associated cost items including field supervision and engineering, transportation, local administration, and contingencies. Estimated construction costs for Phase I (in 1993 dollars) are presented in Table VI-16.

TABLE VI-16
Proposed Budget for Phase I Improvement

Item	Cost
Purchase and Repair of Heavy Construction Equipment.	$100,000
Improvements to Existing In-Service Sewer and Septic System.	25,000*
Construction of Home Flush Toilet/Sewage Holding Units: 4 EA @ $6,000/EA.	24,000**
Purchase of Sewage Haul Equipment.	10,000***
Construction and Purchase of Final Sludge Disposal Facilities and Equipment.	35,000
Additional Transportation and Mobilization.	30,000
Supervision.	40,000
Subtotal	264,000
Field Engineering @ 10% +/-	26,200
Local Administration @ 5%	13,200
Contingencies @ 15%	39,600
TOTAL, PHASE I CONSTRUCTION	**$343,000**

* Includes $16,600 for basic repairs described in Section D of this chapter, plus $8,400 allowance for sewage haul disposal improvements.

** Includes $5,000/EA for basic sanitation system, plus $500/EA for outside tanks, plus $500/EA for structural renovations.

*** Includes $7,600 allowance for haul vehicles, $2,000 allowance for haul trailer/sled, and $400 allowance for purge blowers.

Heavy equipment to be purchased during Phase I would include a dump truck needed for improvements to the existing in-service septic system and construction of the final sludge disposal site. The remoteness of Tununak and the relatively long duration of the project preclude leasing or rental as cost-effective alternatives to purchase of equipment.

Heavy equipment to be repaired would include the hydraulic excavator, front end loader, and crawler dozer existing in the village. These would also be necessary for improvements to the existing septic system, construction of the final sludge disposal site, and final sludge disposal operations. (Replacement of the crawler dozer may be more cost effective than repair).

Phase I improvements to the existing in-service septic system would include modifications to allow for disposal of hauled sewage at that facility.

In Phase I, two "home units" are assumed to be installed in the main village and two are assumed to be installed in the 23-home subdivision.

Fees for design and permitting of Phase I improvements are estimated at $30,000.

Phase II of this project is conditioned on acceptance of Phase I improvements, and would include installation of an estimated ten additional home "flush toilet/sewage holding" units in the 23-home subdivision, as well as associated cost items including field supervision and engineering, transportation, local administration, and contingencies. Estimated construction costs for Phase II (in 1993 dollars) are presented in Table VI-17.

Table VI-17
Proposed Budget for Phase II Improvements

Item	Cost
Construction of Home "Flush Toilet/Sewage Holding" Units: 10 EA @ $6,000/EA.	$60,000
Additional Transportation and Mobilization.	20,000
Supervision.	18,000
Subtotal	98,000
Field Engineering @ 10%	9,800
Local Administration @ 5%	4,900
Contingencies @ 20% +/-	19,300
TOTAL, PHASE II CONSTRUCTION	**$132,000**

* Includes $5,000/EA for basic sanitation systems, plus $500/EA for outside tanks, plus $500/EA for structural renovations.

Fees for design and permitting of Phase II improvements, including assessment of community acceptance of Phase I improvements, are estimated at $15,000.

The proposed Phase III would include construction of an additional twelve home "flush toilet/sewage holding tank" units in the 23-home subdivision, thus completing sanitary service to all homes and the only business (Tununak Native Store) in the subdivision. Five existing honey-bucket bunkers in the 23-home subdivision would be decommissioned as described in Section K of this chapter. The existing incomplete septic system would be improved as described in Sections D and F of this chapter to serve as the main sewage haul disposal site for the village. Table VI-18 presents estimated costs (in 1993 dollars) for implementation of Phase III.

Table VI-18
Proposed Budget for Phase III Improvements

Item	Cost
Construction of Home "Flush Toilet/Sewage Holding" Units: 12 EA @ $6,000/EA*.	$72,000*
Basic Improvements to Existing Incomplete Septic System.	56,700
Improvements to Incomplete Septic System for Sewage Haul Disposal.	108,500
Decommissioning of Five Honey-Bucket Bunkers.	6,700
Additional Transportation and Mobilization.	40,000
Supervision.	42,000
Subtotal	$325,900
Field Engineering @ 10%	32,600
Local Administration @ 5%	16,300
Contingency @15%	48,900
TOTAL, PHASE III CONSTRUCTION	**$423,700**

* Includes $5,000/EA for basic sanitation systems, $500/EA for outside tanks, and $500/EA for structural renovations.

Design and permitting fees for Phase III are estimated at $42,000, bringing the total Phase III capital cost to $465,700.

The proposed Phase IV would include installation of an estimated 63 additional "flush toilet/sewage holding" units to complete sanitation serviced to the entire village. In addition, the five remaining honey-bucket bunkers in the main village would be decommissioned. Estimated construction costs for Phase IV (in 1993 dollars) are presented in Table VI-19.

Table VI-19
Proposed Budget for Phase IV Implementation

Item	Cost
Construction of Home "Flush Toilet/Sewage Holding" Units:	
8 EA @ $6,000/EA*	$48,000
39 EA @ $6,500/EA**	253,500
16 EA @ $7,000/EA***	112,000
Decommissioning of Five Honey-Bucket Bunkers.	6,700
Additional Transportation and Mobilization.	40,000
Supervision.	42,000
Subtotal	$502,200
Field Engineering @ 10%	50,200
Local Administration @ 5%	25,100
Contingency @ 15%	75,300
TOTAL, PHASE IV CONSTRUCTION	**$652,800**

* Includes $5,000/EA for basic sanitation systems, $500/EA for outside tanks, and $500/EA for structural renovations.

** Includes $5,000/EA for basic sanitation systems and $1,500/EA for structural renovations.

*** Incldes $5,000/EA for basic sanitation systems, $500/EA for outside tanks, and $1,500ludes EA for structural renovations.

Design and permitting fees for Phase IV are estimated at $65,000, bringing the total Phase IV capital cost to $717,800.

After Phase I of the project has been completed, and prior to commencing the design of Phase II, a thorough evaluation of Phase I improvements should be made by the design engineer. This evaluation should include the following elements:

(1) Community and individual homeowner attitudes regarding the sewage haul system's technical and financial aspects should be solicitated and analyzed.

(2) Technical and financial input should be obtained from the system operator(s) and evaluated.

(3) Based on community, individual, and operator input, recommendations for continued improvement of the system should be developed.

(4) A report should be compiled and presented to the Tununak Traditional Elders Council and Village Safe Water, recommending design improvements for Phase II of the project.

This feedback procedure should be duplicated prior to Phases III and IV to ensure maximum community involvement and acceptance.

Estimated operation and maintenance costs for the proposed Phase I of the project (in 1993 dollars) are presented in Table VI-20. These costs are based on the assumption that the sewage haul system would be operated by the Traditional Elders Council or its designee.

Table VI-20
Estimated Annual Operation and Maintenance Cost
for Sewage Haul System, Phase I

Item	Cost
Sewage Haul	$2,000
Sludge Disposal N/C	
Subtotal	$2,000
Local Administration @ 5%	100
Contingency @ 15%	300
TOTAL ANNUAL COST, PHASE I	**$2,400**

Estimated Monthly Cost = $2,400/12 Months/4 Units
= $50/Month/Unit

The Estimated Monthly Cost presented above is based on 20 sewage hauls per year. Haul labor costs are estimated at $15/month/unit and haul vehicle costs are estimated at $9/month/unit. The actual monthly costs would be higher in the winter and lower in the summer due to heating of outside tanks. Heating costs are estimated to be $29 per/month/home for five months per year. (Mr. Dale Smith, City Administrator, Mekoryuk, Alaska, reports that a "Cowater" sewage haul unit with outside tank, recently installed in that village, increased the monthly electric bill by $25 per month for tank heating). No costs are included for sludge disposal, because sludge will be removed from the existing in-service septic system during construction of improvements.

Estimated operation and maintenance costs for the proposed Phase II of the project (in 1993 dollars) are presented in Table VI-21. These costs are based on the assumption that the sewage haul system would be operated by the Traditional Elders Council or its designee.

Table VI-21
Estimated Annual Operating and Maintenance Cost for Sewage Haul System, Phase II

Item	Cost
Sewage Haul	$7,000
Sludge Disposal	900
Subtotal	7,900
Local Administration @ 5%	400
Contingency @ 15%	1,200
TOTAL ANNUAL COST, PHASE II	**$9,500**

Estimated Monthly Cost = $9,500/12 Months/14 Units
= $56/Month/Unit

As with the Phase I monthly costs, Phase II costs are based on 20 hauls per year, monthly labor and haul vehicle costs of $15 per month and $9 per month respectively, and monthly heating costs of $29 per month for five months. Sludge disposal costs are allocated equally to the Paul T. Albert Memorial School on one hand, and the fourteen homes served by sewage haul units on the other.

As Phases III and IV are completed, the monthly estimated costs would be expected to increase to the $57/month/unit figure derived in Section L.1 of this chapter. These costs are based on the assumption that the system would be operated by the Traditional Elders council or its designee.

Operation and maintenance costs presented above are well above the $40/month average amount that village residents indicated they were willing to pay for improved water and sewer service as indicated in Section E., Chapter VIII. Monthly estimated charges include approximately $15/month and $9/month (in 1993 dollars) for sewage haul labor and haul vehicle rental respectively. Therefore, monthly charges could be reduced to the range of $25 to $33/month if individuals were allowed to haul sewage from their homes to the sewage disposal facilities with their own vehicles. Haul trailers and sleds would be provided by the Traditional Elders Council, and other activities such as final sludge

disposal would continue to be handled by the Traditional Elders Council or its designee. To assure that the sewage haul system was operated safely and sanitarily, training and licensing of individuals would be advisable. Training and licensing could be addressed as follows.

(1) A safety, sanitation, and proper procedures training course could be developed during the design of Phase I. This training course could be developed by Village Safe Water (VSW), the Indian Health Service (IHS) or a consultant, in conjunction with the Traditional Elders Council.

(2) During start-up of the various phases of the project, training courses could be held for interested individuals by VSW, IHS, or the consultant.

(3) Upon successful completion of training, individuals could be licensed by the Traditional Elders Council to haul sewage for specific homes.

(4) The water and sewer system operator employed by the Traditional Elders Council could monitor individual haulers. Individual licenses could be revolked for unsafe and/or unsanitary operations.

Individual licensing of hualers would, in all probability, greatly increase the community acceptance of a sewage haul system.

CHAPTER VII
REQUIRED PERMITS AND ANTICIPATED SCHEDULE

A. FEDERAL AGENCY APPROVALS AND PERMITS

Funding for this project is provided by the U.S. Environmental Protection Agency (EPA). Therefore, EPA approval of the proposed facilities will be required.

The U.S. Army Corps of Engineers (COE) is frequently involved in permitting for construction of wastewater disposal facilities. One aspect of this project that may involve COE permitting is construction of a sludge disposal facility. The optimal locations for sludge disposal are all in the vicinity of surface waters including the Bering Sea, Tununak River, and various ponds and small lakes, so that COE permit requirements must be considered.

Tununak is surrounded by the Yukon Delta National Wildlife Refuge on the uplands, and the Alaska Maritime National Wildlife Refuge (Bering Sea Unit) on the coasts. Therefore, a letter of non-objection would be required from the U.S. Fish and Wildlife Service for development and operation of a sludge disposal site, and for borrow materials sites needed for construction.

The entire project is within the Coastal Zone, so submittal of a completed Coastal Zone Questionnaire to the COE might be required.

B. STATE AGENCY APPROVALS AND PERMITS

The status of state approvals and permit requirements is unclear because of the assertion of tribal sovereignty rights by the Village of Tununak. One agency, Village Safe Water, is clearly involved in the approval process as the grant administrator for EPA. Assuming that state approvals and permits were required, the following agencies might likely be involved: Department of Environmental Conservation, Division of Environmental Quality, Western District Office (for plan approval); Department of Transportation and Public Facilities, Leasing Airport Review Committee (for permission to cross airport lease holdings during construction and sludge disposal activities); Department of Natural Resources, Division of Land (for right-of-ways on state land); Department of Natural Resources, State Historical Preservation Office (for archaeological considerations); Department of Fish and Game (for approval of plans if fish or game habitat is potentially affected); and the Division of Governmental Coordination.

C. REGIONAL AGENCY AGREEMENTS

Any construction in the 23-home subdivision would definitely require an agreement with the Association of Village Council Presidents (AVCP) which is the record owner of the homes and the entire subdivision.

Any construction on school property in Tununak would require an agreement with the Lower Kuskokwim School District.

D. LOCAL ENTITY AND INDIVIDUAL AGREEMENTS

Construction on privately-owned property would require that the proper easements and agreements be obtained from owners. This requirement would apply to both "on-lot," individual disposal facilities and final sludge disposal facilities that would service the entire village.

If a sewage haul system were selected as the preferred alternative, a maintenance contract with a local private entity might be desirable. Tununrmiut Rinit Corporation (T.R.C.) could possibly provide maintenance services if operation of a sewage haul system were privatized. T.R.C. does not presently have other "haul" services such as individual fuel or water delivery.

E. ANTICIPATED SCHEDULE

The anticipated schedule for proposed Phases I and II, as described in Section M, Chapter VI, is presented in Table VII-1. Phases III and IV cannot be realistically scheduled because funding for these phases has not yet been applied for or secured.

TABLE VII-1
Wastewater Disposal Improvements Proposed Schedule

Activity	Proposed Dates
Complete Feasibility Study	3/93
Complete Design, Phase I	3-6/93
Complete Archaeological Survey	6/93
Obtain Permits & Approvals, Phase I	4-7/93
Purchase Materials & Equipment, Phase I	5-7/93
Ship Materials & Equipment, Phase I	5-7/93
Construct Facilities, Phase I	7&8/93
Phase I Assessment Report	2/94
Complete Design, Phase II	3&4/94
Obtain Permits & Approvals, Phase II	4&5/94
Purchase Materials & Equipment, Phase II	5-7/94
Ship Materials & Equipment, Phase II	5-7/94
Construct Facilities, Phase II	6&7/94

CHAPTER VIII
LOCAL COMMITMENT

A. LOCAL CONCERNED CITIZENS

The Tununak Traditional Elders Council has delegated Mr. Harry Lincoln of Tununak as their liaison for the project. Mr. Lincoln was a foreman on the construction of the incomplete sewer and septic system. He managed the Village Safe Water Sanitary Facility Survey done in conjunction with this project. Harry Lincoln has shown himself to be knowledgeable about the previous work, well aware of the village sanitation problems, and reliable.

Another member of the community who has shown special interest in the project is Harry Lincoln's father, Mr. Dick Lincoln. Dick Lincoln also a thorough understanding of the project and is usually chosen to translate project meetings into the Yupik language for the benefit of Elders who do not speak English.

Many people in Tununak have a deep concern for this project. The recognition of Dick and Harry Lincoln here is not meant to minimize the concern of others.

B. COHESIVE COMMUNITY

Tununak has shown very strong local support for the project. The Village Safe Water survey referenced above is being completed in conjunction with this study to determine community attitudes regarding this project. Responses have been received to date from 65 households. Of these, 61 expressed support for wastewater disposal improvements. The remaining 4 households expressed no opinion. No opposition to wastewater improvements has been expressed in the context of the Village Safe Water questionnaires or otherwise.

Like most "small towns," Tununak has "factions" within the village that disagree on issues that affect the community. The IRA Council in Tununak holds views that differ from those of the Traditional Elders Council regarding other, unrelated matters. However, the IRA Council strongly supports the implementation of wastewater disposal improvements and has passed a resolution supporting the Traditional Elders Council with regard to this matter. This resolution is attached in Appendix B.

C. STRONG LOCAL PERCEPTION OF PROBLEM

The residents of Tununak are very much aware of the need for water supply and wastewater disposal facilities. Numerous comments on the Village Safe Water

questionnaires indicate that the community clearly understands that it has a major sanitation problem.

D. TOP LOCAL PRIORITY

Results of the Village Safe Water survey indicate that wastewater disposal and water supply improvements are both top priorities of the village. Since funds are "in-hand" for wastewater disposal design and construction, these improvements would take priority over water supply improvements at the present time.

E. PUBLIC AND PRIVATE WILLINGNESS TO PAY INCREASED COSTS

Formal discussions have been held with the Traditional Elders Council regarding costs to operate and maintain the various wastewater disposal systems. Naturally, the Council is concerned about the affordability of operations and maintenance costs; but it also recognizes the need for generating sufficient revenues to operate the system.

Individual households were questioned in the Village Safe Water survey regarding the maximum affordable monthly piped water and sewer charges. Table IX-1 presents the responses received to date regarding this question.

TABLE IX-1
Affordable Monthly Charges for
Piped Water and Sewer Service

Maximum Charges	Households
$15/month	2
$29/month	29
$49/month	19
$69/month	3
$80/month	3
No Response	9
TOTAL	**65**

The results of Table IX-1 indicate that village residents are generally willing to pay an average of $40/month additional for water and sewer service.

F. EFFECTIVE LOCAL COUNCIL

To date, the Tununak Traditional Elders Council (T.T.E.C.) has shown effectiveness in implementing the project. An agreement was negotiated with the IRA Council, designating the Traditional Elders Council as recipient of the EPA Grant. The Traditional Elders Council subsequently accepted a wastewater facilities planning and design grant offered by Village Safe Water. Phukan Consulting Engineers and Associates, Inc., has been retained to complete the Sanitation Feasibility Study and Environmental Review.

Meetings have been held with a quorum of the Traditional Elders Council to discuss various aspects of the Feasibility Study. Decisions have been made by the Council in a timely manner after appropriate internal discussion. Some of the decisions made by the Council are listed below:

(1) T.T.E.C. Resolution Number 92-07 was passed on October 27, 1992, applying for C.I.P. grant funding for related water system improvements.

(2) T.T.E.C. Resolution Number 92-09 was passed on December 17, 1992, applying for a R.E.D.I. grant for purchase and repair of construction equipment needed to implement the EPA grant.

(3) T.T.E.C. Resolution Number 93-01 was passed on March 10, 1993, accepting the Sanitation Feasibility Study and the sewage haul recommendation included therein, after a public meeting was conducted by the Traditional Elders Council.

Tununak Traditional Elders Council Resolution Number 93-01 is included in Appendix B of this report. T.T.E.C. minutes from various meetings relating to the EPA Grant and Sanitation Feasibility Study are included in Appendix K of this report.

APPENDIX A: SUBSURFACE INVESTIGATION

Representative samples were obtained from the auger cuttings and transported to our laboratory for testing and further classification. During the sampling and drilling process, relative density or consistency of the soil stratum was visually examined. At the end of drilling, a thermistor string was installed in each of the three test holes (TH #1 through TH #3) as noted on the test hole logs.

The attached boring logs are based on the drilling action, inspection of the samples, and laboratory tests. The boring logs include soil descriptions, depth of soil type changes, and the properties of some recovered soil samples. Changes in soil strata may be gradual and may considerably vary horizontally.

3.0 SUBSURFACE CONDITIONS

The geological background of the site is previously described in Chapter III, Section C.

Soil conditions encountered near TH #1 and TH #2 consist of organic soils (peat) underlain by clayey silt. Soil conditions near TH #3 and TH #4 are consistent, and they consist of silt underlain by silt with sand or silt with sand and gravel. Near TH #5, the soil consisted of silt with organics underlain by silt to silt with sand. The permafrost was encountered in all test holes at a depth of about 5 to 7 feet below the existing ground surface except near TH #4 and TH #5 where no frozen soils (permafrost) were encountered to a depth of approximately 12 feet (drilled depth). The initial thermistor readings show that the permafrost temperature is close to freezing temperatures and is warm.

The thickness of compressible or very soft organic soils (peat) varied from 8 to 9 feet near TH #1 and TH #2, whereas the thickness of silt to silt with organic layers varied from 6 to 8 feet near TH #3 through TH #5. Near TH #3 through TH #5, the silty layer is underlain by silt with sand or silt with sand and gravel to the depth drilled.

The soils encountered at the PCA test holes are very similar to the soil descriptions given in the previous reports (Ref. [1] and [2]). Figures A-2 and A-3 compare results of PCA test holes with test hole results from previous reports.

4.0 EVALUATION OF SOLIFLUCTION

Soil conditions near the investigated site consist of generally organic soils (peat) to fine-grained silt underlain by silt with sand to clayey silt. The existing new home site is on ground which slopes gently towards the river. Based on our site inspections, solifluction is evident near the existing school location and the new home site (ref. Photo Plate Nos. 1 through 4). The school site is located at a higher elevation than the 23-home subdivision and the solifluction movements against the H-Pile supports could be easily seen (ref. Photo Plate Nos. 1 and 2). Due to the snow cover, the solifluction movements could not be observed near the new home site locations.

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[1] Soil investigation report of February 21, 1979. To AVCP by Harding-Lawson.

[2] Subsurface Exploration Report of September 1986 to City of Tununak by Hart Crowser.

However, the use of heat tubes along the road, and near the new homes, indicate that such movements might have taken place and the heat tubes were placed to minimize thermal degradation of permafrost conditions and thereby solifluction movements.

Potential solifluction is always evident in the active layer of permafrost regions or seasonally frozen layers located on a sloping ground when the soil encountered in these areas consist of high water content fine-grained soils to organic, compressible soft soils. These precise conditions are present near the 23-home subdivision where the solifluction movements are observed. Some of the remedial measures that can be used to minimize solifluction potential are reduction of thermal degradation of active layer, reduction of existing ground slopes, and proper drainage of degraded active layer with NFS granular materials. Any above-ground supports placed near the potential solifluction area must be designed against the active earth pressure exerted by the solifluction movements, or active measures may be used to eliminate the solifluction movements of thermally degraded soils around the supports. Similarly, the underground sewer/water pipeline systems must be buried deep or otherwise protected to avoid the surficial solifluction movements of ground. In other words, they must be installed below the active layer and the frozen ground condition around the pipe systems must be maintained at all times during the operations of the pipeline. Another alternative would be to "buttress" the trench section, as shown in Figure VI-3 (Detail 1), Chapter VI, with additional compacted NFS sand and/or gravel.

Although solifluction movements of the surficial soils are evident near the 23-home subdivision, either above-ground or underground sewers are technically feasible at the site. Some of the remedial measurements mentioned in the previous paragraph must be applied to mitigate solifluction in the vicinity of any sewer or water pipeline system. The thermal degradation and/or solifluction movement near the incomplete, underground sewer must be prevented before the system could be reused.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the limited subsurface investigation during this feasibility study and the previous investigations, we conclude that either compressible organic soils (peat) or high frost-susceptible, silty soils exist in the upper layer (5 to 10-feet), underlain by clayey silt to silt with sand. The warm permafrost is generally encountered at a depth of about 5 feet near the 23-home subdivision, whereas no permafrost is observed near the foot of the bluff area. The upper layer of permafrost is ice-rich, compressible, frost susceptible, and thaw unstable. As such, thermal considerations must be taken into accounts in the design and construction of sewer/water pipeline systems in the area.

We recommend that piles with heat tubes should be used for design of above-ground sewer pipeline system to minimize frost heave forces as well as thermal degradation of ice-rich, warm permafrost at the site. Similarly, proper insulation and heat tubes would be required for the underground sewer pipeline system if installed at the site.

LEGEND

○ SOILS TEST HOLES

PHUKAN CONSULTING ENGINEERS & ASSOCIATES, INC.

Civil • Geotechnical • Surveying • Environmental

Telephone: (907)272-7111 Fax: (907)272-3177

203 West 15th Avenue Suite 104 Anchorage, AK 99501

TUNUNAK SANITATION FEASIBILITY STUDY
SOILS TEST HOLES - LOCATION MAP

DRAWN	GRID	COMP FILE NO. 516A-1	FIGURE A-1
SCALE 1"=200'	DATE 1-2-92	FILE DRAWER NO.	
F.B. PG.	W.O. H92516		

PHUKAN CONSULTING ENGINEERS & ASSOCIATES, INC.
Civil • Geotechnical • Surveying • Environmental
203 W 15th., Suite 104, Anchorage, Ak., 99501
Tele: (907) 272-7111 Fax: (907) 277-3177

PROJECT: Tununak Sanitation Feasibility Study
W.O.: P92516
LOCATION: Tununak

DATE: 11/11/92
LOG NO.: T.H.#1
TOP EL.:

DEPTH (ft.)	GRAPHIC LOG	THERMAL STATE	SOIL DESCRIPTION	BLOW COUNT (NO/FT)	SAMPLES	MOISTURE CONTENT	DEPTH (ft.)
0			TOP SOIL		1		0
5			Organic Soils (Peat) – Dark Brown, Saturated, Soft – Frozen Below 5 ft.		2		5
10			End of Test Hole 9 ft. Note: Installed Thermister String				10
15							15
20							20
25							25

Temperature Readings

Date	Depth (ft)	Tempurature (°F)
11/13/92	4	32.06
11/13/92	9	31.96

COMMENTS:

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203 W 15th., Suite 104, Anchorage, Ak., 99501
Tele: (907) 272-7111 Fax: (907) 277-3177

PROJECT: Tununak Sanitation Feasibility Study
W.O.: P92516
LOCATION: Tununak

DATE: 11/12/92
LOG NO.: T.H.#3
TOP EL.:

DEPTH (ft.)	GRAPHIC LOG	THERMAL STATE	SOIL DESCRIPTION	BLOW COUNT (NO/FT)	SAMPLES	MOISTURE CONTENT	DEPTH (ft.)
			TOP SOIL				
5			Silt (ML) – Brown, Saturated, Soft		1		5
					2		
10			Silt With Sand & Gravel (ML) – Grey to Brown, Saturated		3		10
			End of Test Hole 12 ft.				
			Note: Installed Thermister String				
15							15
			Temperature Readings				
			Date Depth (ft) Tempurature(°F)				
			11/13/92 5 32.19				
			11/13/92 10 31.95				
20							20
25							25

COMMENTS:

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Civil • Geotechnical • Surveying • Environmental
203 W 15th., Suite 104, Anchorage, Ak., 99501
Tele: (907) 272-7111 Fax: (907) 277-3177

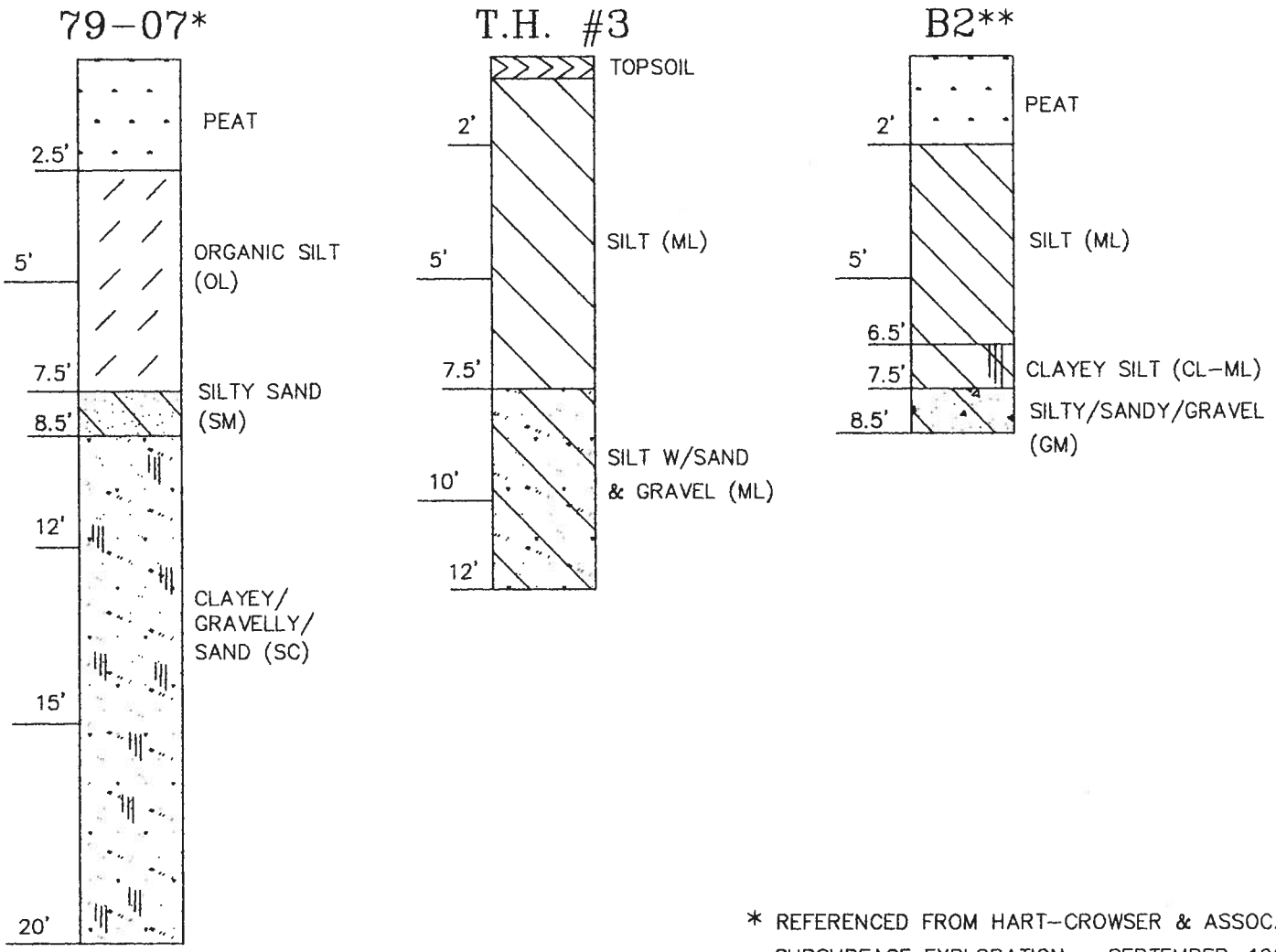
PROJECT: Tununak Sanitation Feasibility Study
W.O.: P92516
LOCATION: Tununak

DATE: 11/12/92
LOG NO.: T.H.#4
TOP EL.:

DEPTH (ft.)	GRAPHIC LOG	THERMAL STATE	SOIL DESCRIPTION	BLOW COUNT (NO/FT)	SAMPLES	MOISTURE CONTENT	DEPTH (ft.)
0			TOP SOIL				0
5			Silt to Silt With Sand (ML) – Brown to Grey, Saturated		1 2		5
10							10
			End of Test Hole 12 ft.				
15							15
20							20
25							25

COMMENTS:

FIGURE A-3: TEST HOLE CROSS SECTIONS



* REFERENCED FROM HART-CROWSER & ASSOC. SUBSURFACE EXPLORATION - SEPTEMBER, 1986

** REFERENCED FROM HARDING-LARSON ASSOC. SOIL INVESTIGATION - FEBRUARY, 1979

TUNUNAK SANITATION FEASIBILITY STUDY

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W.O. 92516	COMP. FILE 516FXSEC	SCALE NTS	DATE 1/7/92	BY EKB

PHOTOGRAPHIC PLATE NO. A-1 :
SOLIFLUCTION NEAR H-PILE FOUNDATIONS FOR PAUL T. ALBERT MEMORIAL SCHOOL

TUNUNAK SANITATION FEASIBILITY STUDY

PHUKAN CONSULTING ENGINEERS & ASSOCIATES, INC.
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W.O. H92516	COMP. FILE 516PHOTO	SCALE NTS	DATE 12-31-92	BY MBP

PHOTOGRAPHIC PLATE NO. A-2 :
SOLIFLUCTION NEAR H-PILE FOUNDATIONS FOR PAUL T. ALBERT MEMORIAL SCHOOL

TUNUNAK SANITATION FEASIBILITY STUDY

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W.O. H92516	COMP. FILE 516PHOTO	SCALE NTS	DATE 12-31-92	BY MBP

PHOTOGRAPHIC PLATE NO. A-3 : HEAT TUBES PLACED ON NATURAL GROUND

TUNUNAK SANITATION FEASIBILITY STUDY

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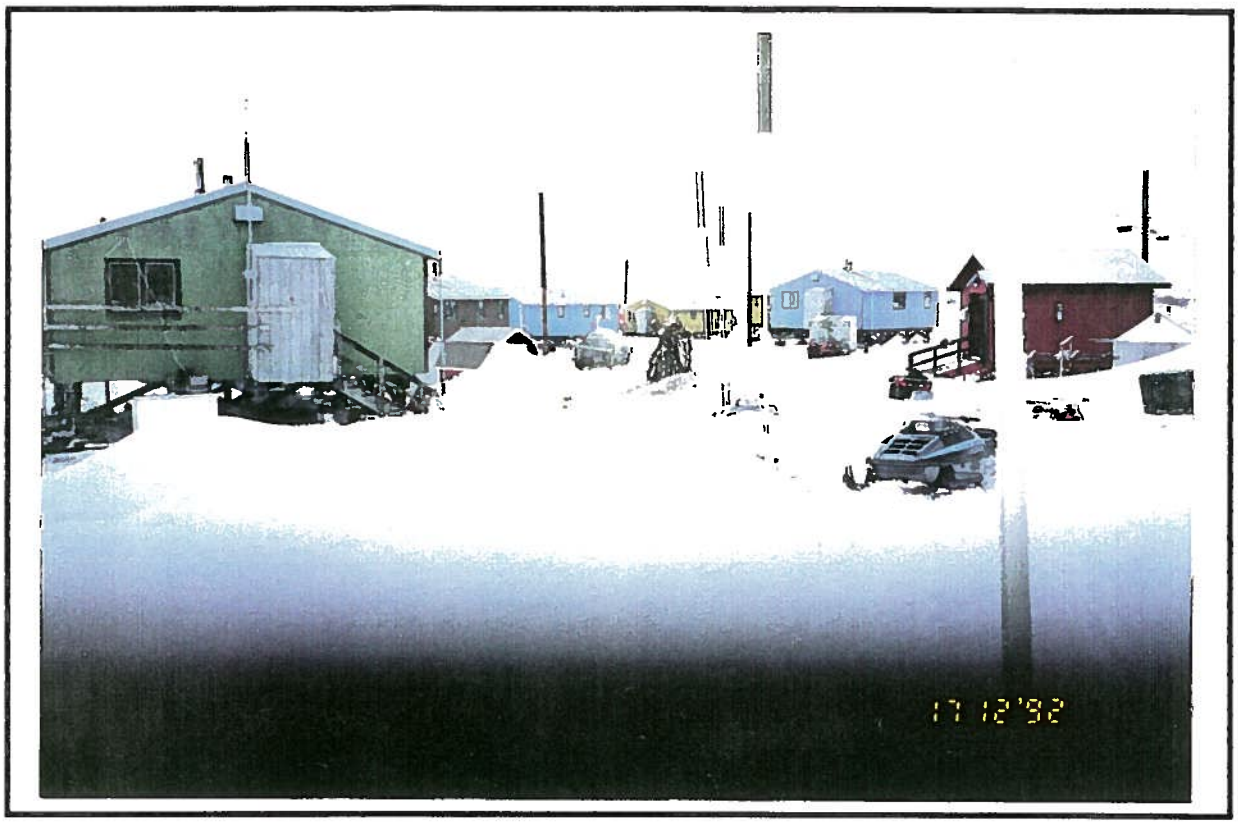
W.O. H92516	COMP. FILE 516PHOTO	SCALE NTS	DATE 12-31-92	BY MBP



PHOTOGRAPHIC PLATE NO. A-4 :

HEAT TUBES INSTALLED ALONG A ROAD FOR THE 23-HOME SUBDIVISION

TUNUNAK SANITATION FEASIBILITY STUDY

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W.O. H92516	COMP. FILE 516PHOTO	SCALE NTS	DATE 12-31-92	BY MBP

APPENDIX B: LOCAL RESOLUTIONS

TUNUNAK TRADITIONAL ELDERS COUNCIL
RESOLUTION # 93-01

WHEREAS: The Tununak Traditional Elders Council is the governing body for the indigenous Yupik village of Tununak and,

WHEREAS: A " Sanitation Feasiblity Study & Environmental Review" has been prepared by Phukan Consulting Engineers and Assoc., Inc, and

WHEREAS: The study has been reviewed this day 10 March 1993 with PCA Engineer Steve Miller and VSW Engineer Jim Patterson and

WHEREAS: The Elders Council accepts the study as complete with exception noted on the attached page and

WHEREAS: The Elders Council has reviewed the alternatives and accepts the "Cowater" flush tank and haul system alternative,

THEREFORE BE IT RESOLVED: The Tununak Elders Council has accepted the Engineering Feasibility documents and requests Village Safe Water to pursue the "Cowater" flush tank and haul system.

I, the undersigned, hereby certify that the Council is composed 7 members, of whom 6 constituting a quorum were present and that the foregoing resolution passed and approved by the Council of Tununak, Alaska this 10 day of March 1993.

Vote: 6 Yeas 0 Nays

Signed: George Ulak
Chairman of the Elders Council

Attest Council Clerk

Council Member

Tununak IRA Council

NATIVE VILLAGE OF TUNUNAK
P.O. Box 77
TUNUNAK, ALASKA 99681
(907) 652-6527

ADOPTED THIS RESOLUTION 91 - 12 - 09 on this date:

A RESOLUTION SUPPORTING THE VOTE OF THE PEOPLE PRESENT AT THE MEETING OF NOVEMBER 27, 1991 NAMING THE TUNUNAK TRADITIONAL TRIBAL ELDERS COUNCIL TO BE THE RECEPIENT OF THE STATE OF ALASKA DEPARTMENT OF ENVIROMENTAL CONSERVATION WASTE WATER PROJECT.

WHEREAS: the Tununak I.R.A. Council is the federally recognized governing body of the Native Village of Tununak under the Indian Reorganization Act of 1934, as amended in 1936; and

WHEREAS: the Council met with representatives of the Department of Enviromental Conservation and of the Elders Council in Anchorage to be informed of the EPA grant for a Waste Water Project in Tununak; and

WHEREAS; the Department is seeking an non-profit entity to administer this project this because of an absence of a municipal government; and

WHEREAS: the Council wrote to the Department expressing its concern that the Elders Council was not a qualified incorporated non-profit entity as specified in Title 29 of Alaska Statutues; and

WHEREAS; it has been passed on to the Department that the main concern and the role of the IRA Council is to ensure that the project, which is needed by our people, get started and completed;

NOW THEREFORE BE IT RESOLVED by the Tununak I.R.A. Council that it supports the vote of the people present at the meeting of November 27, 1991 naming the Tununak Traditional Tribal Elders Council to be the recepient of the State of Alaska Department of Enviromental Conservation Waste Water Project; and

BE IT FURTHER RESOLVED that the Department does further research and seek legal advise of our concerns as it relates to Title 29; and

BE IT FURTHER RESOLVED that the Council stresses that it wants to work with whomever is legally accepted to administer the project;

BE IT FURTHER RESOLVED that if Elders Council are legally accepted that this representation only applies to this project.

PASSED AND ADOPTED THIS 8TH DAY OF December, 1991.

Joseph J. Post
President

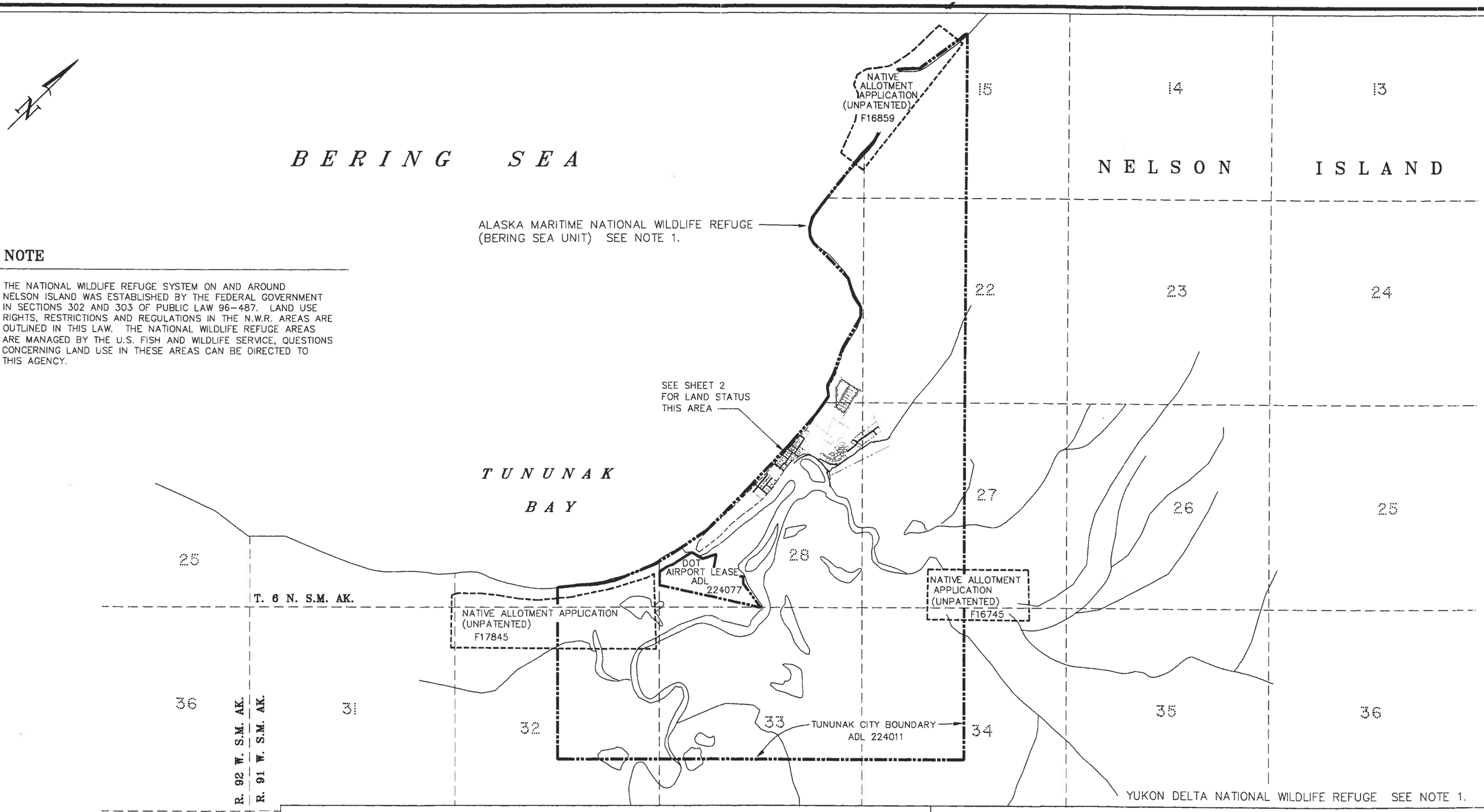
Felix E. Albert
Secretary

APPENDIX C: VILLAGE SAFE WATER SANITARY FACILITY SURVEY RESULTS

SUMMARY OF VILLAGE SAFE WATER SANITARY FACILITY SURVEY, TUNUNAK, ALASKA, NOVEMBER & DECEMBER 1992

HOUSE#	NAME	NUMBER OF OCCUPANTS	PRESENT WATER SOURCE							PRESENT WATER CONSUMPTION		SUGGESTED WATER IMPROVEMENTS	PRESENT SEWAGE DISPOSAL	SEWER PREFERENCE			MAX AFFORDABLE MONTHLY WATER/SEWER CHARGES
			WINTER			SUMMER											
			HAUL COMMUN	HAUL RIVER/LK	OTHER	HAUL COMMUN	HAUL RIVER/LK	RAIN	OTHER	GAL/WK	GPD/C			HAUL	BELOW GROUND	ABOVE GROUND	
1	David Kanrilak	2		X			X	X		50	3.6	PIPED SYSTEM	BUNKERS	3	1	2	29
2	Dick Lincoln	7	X			X		X		25	0.5	PIPED SYSTEM	BUNKERS			1	29
3	Karl & Dorathy Slats	4	X	X		X		X		25	0.9	PIPED SYSTEM	BUNKERS	3	1	2	29
4	Harry Kincoln	9		X		X		X		40	0.6	PIPED SYSTEM	BUNKERS	3	2	1	49
5	Simon & Winnie Billy	10		X			X	X		90	1.3	PIPED SYSTEM	BUNKERS	2	3	1	49
6	John F. Hooper	4		X			X			60	2.1	PIPED SYSTEM	BUNKERS			1	49
7	Mike Angiak Sr.	5		X			X	X				PIPED SYSTEM	BUNKERS	3	1	2	
8	Hooper George	7		X			X			100	2	PIPED SYSTEM	BUNKERS			1	29
9	Paul Sunny	6		X			X	X		30	0.7	PIPED SYSTEM	BUNKERS			1	29
10	Simion Fairbanks Jr.	3	X	X		X	X	X		50	2.4	PIPED SYSTEM	BUNKERS	1			29
11	Joseph Oscar	2	X			X		X		40	2.9	PIPED SYSTEM	BUNKERS			1	49
12	Albina J. Chikoyak	4	X	X		X		X		40	1.4	PIPED SYSTEM	BUNKERS		1		49
13	Charlie Post	2					X			40	2.9	PIPED SYSTEM	BUNKERS		1		29
14	Victor Kanrilak	7		X				X		25	0.5	PIPED SYSTEM	BUNKERS			1	15
15	No Response																
16	Theresa M. Whitman	5		X			X			120	3.4	PIPED SYSTEM	BUNKERS	3	2	1	29
17	Hubert Hooper	7		X			X			35	0.7	PIPED SYSTEM	BUNKERS			1	49
18	Thommy S. Angaiak	9		X			X	X		40	0.6	PIPED SYSTEM	OTHER		1		29
19	No Response																
20	Alphonse Menegak	6		X			X			60	1.4	PIPED SYSTEM	BUNKERS	3	2	1	49
21	Bob Hooper	4		X			X			35	1.3	PIPED SYSTEM	BUNKERS		1		29
22	Jack Angaiak	4			X			X	X	40	1.4	PIPED SYSTEM	OTHER				29
23	Pitka James	6		X			X			25	0.6	PIPED SYSTEM	BUNKERS		3	1	69
24	Hugh Dyment	1	X			X		X		25	3.6	PIPED SYSTEM	BUNKERS	3	2	1	49
25	Dinna Murphy	1	X		X	X			X	50	7.1	PIPED SYSTEM	BUNKERS	3	2	1	80
26	Felicia Griffith	1			X				X			PIPED SYSTEM	BUNKERS	3	2	1	
27	Ben Orr	5			X				X			PIPED SYSTEM	BUNKERS		1		
28	No Response																
29	No Response																
30&31	John M. Evvans	5		X		X		X		20	0.6	PIPED SYSTEM	BUNKERS/BEACH		3	2	29
32	Cecilia & James James	5	X	X		X		X		100	2.9	PIPED SYSTEM	BUNKERS		1	2	29
33	Urban Albert	1		X		X				50	7.1	PIPED SYSTEM	BUNKERS		1	3	29
34	Emma Isackson	3		X		X		X		120	5.7	PIPED SYSTEM	BUNKERS		1		29
35	Clara Aluska	1	X	X		X		X		25	3.6	PIPED SYSTEM	BUNKERS	3	1	2	49
36	Martin & Anna Albert	2	X	X		X				60	4.3	PIPED SYSTEM	BUNKERS		1	2	
37	Philip James	5		X		X		X		60	1.7	PIPED SYSTEM	BUNKERS		1		
38	No Response																
39	No Response																
40	Edward Hooper	4		X		X	X	X		70	2.5	PIPED SYSTEM	BUNKERS/BEACH		1	3	49
41	Alexander Hooper	1		X		X				25	3.6	PIPED SYSTEM	BUNKERS		1	2	69
42	George Hooper	5		X				X		80	2.3	PIPED SYSTEM	BUNKERS		2	1	49
81	John J. Oscar	6	X	X		X		X		30	0.7	PIPED SYSTEM	BUNKERS	3	2	1	29
44	Philip M. Kuspak	7	X			X				35	0.7	PIPED SYSTEM	BUNKERS		1		29
45	No Response																
46	Mathias James	4		X		X				70	2.5	PIPED SYSTEM	BUNKERS				29
47	George Usugan	7	X	X		X	X	X				PIPED SYSTEM	BUNKERS		3	1	49
48	Charlie Fairbanks	1	X	X		X		X		20	2.9	PIPED SYSTEM	BUNKERS			1	29
49	Peter H. Angaiak	1		X			X			25	3.6	NEW WATER PNTS	BUNKERS			1	69
50	Tommy P. Pitka	3	X	X		X		X		150	7.1	PIPED SYSTEM	BUNKERS		1		80
51	No Response																
52	Dick Lincoln	3	X							50	2.4	PIPED SYSTEM	BUNKERS	3	1	2	49
53	Lawrence Kanrilak	4	X			X				30	1.1	PIPED SYSTEM	BUNKERS		1		49
54	Leo Kanrilak	3	X	X		X		X		100	4.8	PIPED SYSTEM	BUNKERS			1	29
55	Herman	4	X		X	X		X		50	1.8	PIPED SYSTEM	BUNKERS			1	
56	No Response																
57	No Response																
58	Stacy & Elizibeth Aside	6		X		X		X		30	0.7	PIPED SYSTEM	BUNKERS		2	1	15
59	Jens Flynn	5		X		X				30	0.9	PIPED SYSTEM	BUNKERS		3	1	29
60	Henry & Maria Inakak	7	X			X		X				PIPED SYSTEM	BUNKERS			1	29
61	Victor & Alma Kanrilak	6		X		X				25	0.6	PIPED SYSTEM	BUNKERS		1	2	29
62	No Response																
63	Henry Albert	6	X	X		X		X		100	2.4	PIPED SYSTEM	BUNKERS		1		80
64	John Walter Sr.	3		X						70	3.3	PIPED SYSTEM	BUNKERS		1	2	
65	No Response																
66	John & Edna Flynn	8		X		X		X		200	3.6	PIPED SYSTEM	OTHER	3	1	2	
67	Mathew & Lucy Friend	4	X	X		X		X		75	2.7				1		29
68	Theodore Angaiak	4	X			X		X		40	1.4	PIPED SYSTEM	BUNKERS			1	49
69	No Response																
70	Pete Walter	6		X			X	X		60	1.4	PIPED SYSTEM	BUNKERS			1	29
71	No Response																
72	Joseph J. Post	8	X			X				30	0.5	PIPED SYSTEM	BUNKERS		1		49
73	Eliza Fairbanks	3		X				X		90	4.3	PIPED SYSTEM	BUNKERS		1		
74	Andrew J. Chikoyak	2	X	X		X				20	1.4	PIPED SYSTEM	BUNKERS		1		29
75	Thomas P. Oscar Sr.	5	X			X		X		40	1.1	PIPED SYSTEM	BUNKERS			1	49
76	No Response																
77	Stanly & Amy	2	X	X		X		X		150	10.7	PIPED SYSTEM	BUNKERS		3	1	29
78	Martin M. Hooper	1		X		X				25	3.6	NEW WATER PNTS		3	1	2	29
79	Peter G. Angaiak	1	X	X		X				45	6.4	PIPED SYSTEM	BUNKERS		1		49
80	David Moses	5	X			X		X		60	1.7	PIPED SYSTEM	BUNKERS	1	2	3	49

APPENDIX D: LAND STATUS MAP



NOTE

1. THE NATIONAL WILDLIFE REFUGE SYSTEM ON AND AROUND NELSON ISLAND WAS ESTABLISHED BY THE FEDERAL GOVERNMENT IN SECTIONS 302 AND 303 OF PUBLIC LAW 96–487. LAND USE RIGHTS, RESTRICTIONS AND REGULATIONS IN THE N.W.R. AREAS ARE OUTLINED IN THIS LAW. THE NATIONAL WILDLIFE REFUGE AREAS ARE MANAGED BY THE U.S. FISH AND WILDLIFE SERVICE, QUESTIONS CONCERNING LAND USE IN THESE AREAS CAN BE DIRECTED TO THIS AGENCY.

PHUKAN CONSULTING ENGINEERS & ASSOCIATES, INC.

Civil • Geotechnical • Surveying • Environmental

PCA

Telephone: (907)272–7111 Fax: (907)272–3177

203 West 15th Avenue Suite 104 Anchorage, AK 99501

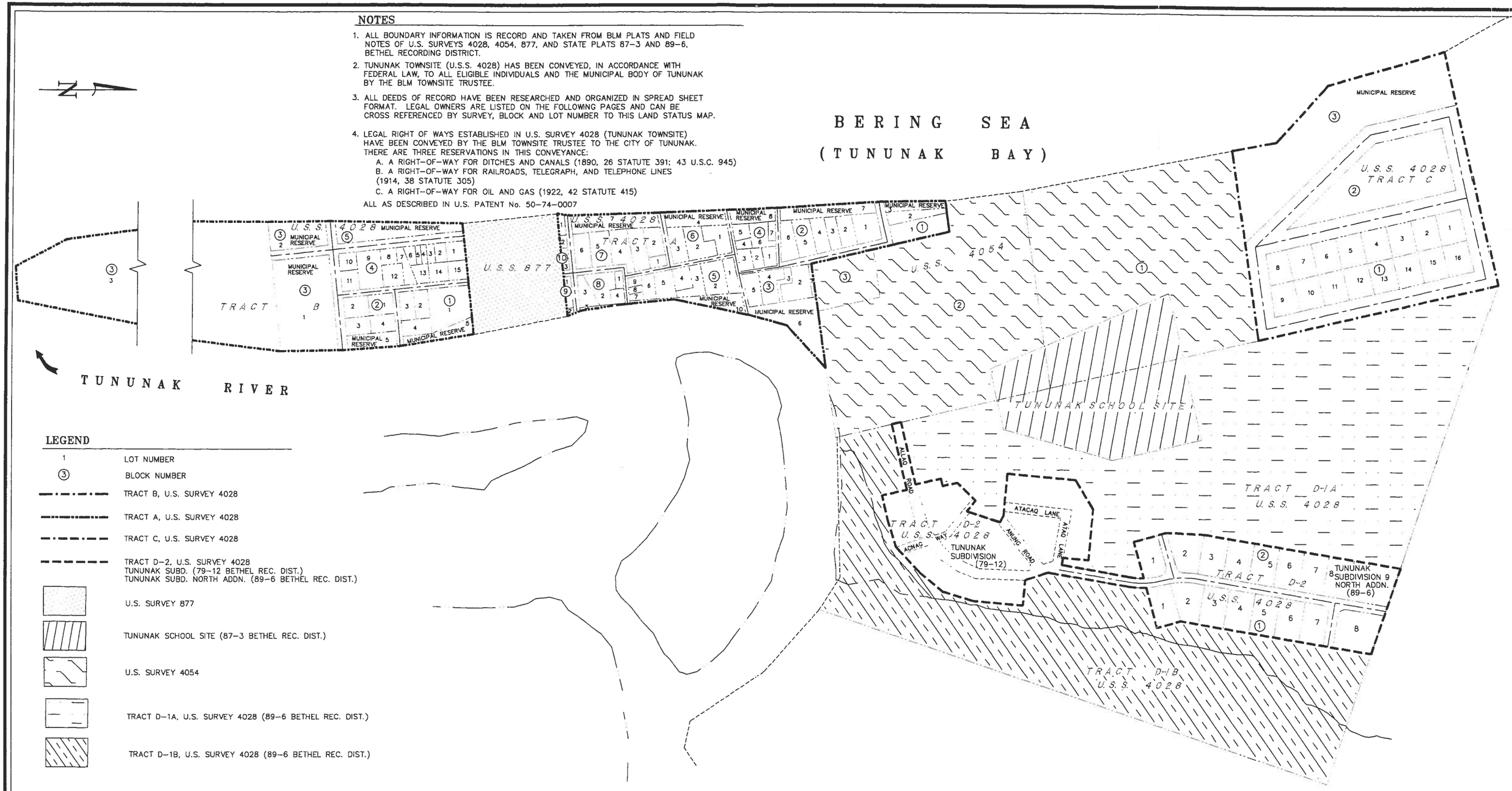
TUNUNAK SANITATION FEASIBILITY STUDY
LAND STATUS MAP

DRAWN MBP	GRID	COMP FILE NO. 516STAT1	SHEET 1 OF 2
SCALE 1"=2500'	DATE 1–18–93	FILE DRAWER NO.	
F.B. PG.	W.O. H92516		

NOTES

1. ALL BOUNDARY INFORMATION IS RECORD AND TAKEN FROM BLM PLATS AND FIELD NOTES OF U.S. SURVEYS 4028, 4054, 877, AND STATE PLATS 87-3 AND 89-6, BETHEL RECORDING DISTRICT.
2. TUNUNAK TOWNSITE (U.S.S. 4028) HAS BEEN CONVEYED, IN ACCORDANCE WITH FEDERAL LAW, TO ALL ELIGIBLE INDIVIDUALS AND THE MUNICIPAL BODY OF TUNUNAK BY THE BLM TOWNSITE TRUSTEE.
3. ALL DEEDS OF RECORD HAVE BEEN RESEARCHED AND ORGANIZED IN SPREAD SHEET FORMAT. LEGAL OWNERS ARE LISTED ON THE FOLLOWING PAGES AND CAN BE CROSS REFERENCED BY SURVEY, BLOCK AND LOT NUMBER TO THIS LAND STATUS MAP.
4. LEGAL RIGHT OF WAYS ESTABLISHED IN U.S. SURVEY 4028 (TUNUNAK TOWNSITE) HAVE BEEN CONVEYED BY THE BLM TOWNSITE TRUSTEE TO THE CITY OF TUNUNAK. THERE ARE THREE RESERVATIONS IN THIS CONVEYANCE:
   A. A RIGHT-OF-WAY FOR DITCHES AND CANALS (1890, 26 STATUTE 391; 43 U.S.C. 945)
   B. A RIGHT-OF-WAY FOR RAILROADS, TELEGRAPH, AND TELEPHONE LINES (1914, 38 STATUTE 305)
   C. A RIGHT-OF-WAY FOR OIL AND GAS (1922, 42 STATUTE 415)

   ALL AS DESCRIBED IN U.S. PATENT No. 50-74-0007



LEGEND

- 1 — LOT NUMBER
- ③ — BLOCK NUMBER
- TRACT B, U.S. SURVEY 4028
- TRACT A, U.S. SURVEY 4028
- TRACT C, U.S. SURVEY 4028
- TRACT D-2, U.S. SURVEY 4028
  TUNUNAK SUBD. (79-12 BETHEL REC. DIST.)
  TUNUNAK SUBD. NORTH ADDN. (89-6 BETHEL REC. DIST.)
- U.S. SURVEY 877
- TUNUNAK SCHOOL SITE (87-3 BETHEL REC. DIST.)
- U.S. SURVEY 4054
- TRACT D-1A, U.S. SURVEY 4028 (89-6 BETHEL REC. DIST.)
- TRACT D-1B, U.S. SURVEY 4028 (89-6 BETHEL REC. DIST.)

PHUKAN CONSULTING ENGINEERS & ASSOCIATES, INC.
Civil • Geotechnical • Surveying • Environmental
PCA
Telephone: (907)272-7111 Fax: (907)272-3177
203 West 15th Avenue Suite 104 Anchorage, AK 99501

TUNUNAK SANITATION FEASIBILITY STUDY
LAND STATUS MAP

DRAWN MBP	GRID	COMP FILE NO. 516STAT2	SHEET 2 OF 2
SCALE 1"=300'	DATE 1-18-93	FILE DRAWER NO.	
F.B. PG.	W.O. 492516		

TUNUNAK SANITATION FEASIBILITY STUDY, LAND STATUS MAP SPREAD SHEET	
USS 4028, TRACT A	
Legal Description	Legal Owner
Blk 1 Lot 1	CITY OF TUNUNAK
Blk 1 Lot 2	CITY OF TUNUNAK
Blk 1 Lot 3	CITY OF TUNUNAK
Blk 2 Lot 1	JOSEPH/CHRISTINE PATRICK
Blk 2 Lot 2	MARTINA ANGAIAK
Blk 2 Lot 3	GEORGE/ELSIE HOOPER
Blk 2 Lot 4	BOB K. & MATILDA HOOPER
Blk 2 Lot 5	JOSEPH EVAN
Blk 2 Lot 6	PETER/LUCY POST
Blk 2 Lot 7	CITY OF TUNUNAK
Blk 3 Lot 1	CITY OF TUNUNAK
Blk 3 Lot 2	CARL/MEDINA FLYNN
Blk 3 Lot 3	PETER/LUCY POST
Blk 3 Lot 4	PAUL/EMMA ALBERT
Blk 3 Lot 5	MIKE/SUSIE ANGAIAK
Blk 3 Lot 6	CITY OF TUNUNAK
Blk 4 Lot 1	GEORGE/CLARA ALUSKA
Blk 4 Lot 2	MICHAEL/SUSIE ANGAIAK
Blk 4 Lot 3	MICHAEL/SUSIE ANGAIAK
Blk 4 Lot 4	CITY OF TUNUNAK
Blk 4 Lot 5	CITY OF TUNUNAK
Blk 4 Lot 6	JIM/LUCY INAKAK (DESEASED)
Blk 4 Lot 7	CITY OF TUNUNAK
Blk 4 Lot 8	CITY OF TUNUNAK
Blk 5 Lot 1	EDWARD/THERESA HOOPER
Blk 5 Lot 2	CITY OF TUNUNAK
Blk 5 Lot 3	GEORGE/BERTHA HOOPER
Blk 5 Lot 4	CITY OF TUNUNAK
Blk 5 Lot 5	CITY OF TUNUNAK
Blk 5 Lot 6	MATHIAS/LUCY JAMES
Blk 5 Lot 7	SIMEON/MARIA FAIRBANKS
Blk 5 Lot 8	SIMEON/MARIA FAIRBANKS
Blk 5 Lot 9	CITY OF TUNUNAK
Blk 5 Lot 10	CITY OF TUNUNAK
Blk 6 Lot 1	CITY OF TUNUNAK
Blk 6 Lot 2	GEORGE/BERTHA HOOPER
Blk 6 Lot 3	CITY OF TUNUNAK
Blk 6 Lot 4	CITY OF TUNUNAK
Blk. 7 Lot 1	HERMAN & SOPHIE J. OSCAR
Blk. 7 Lot 2	GEORGE/GERL.USUGAN

Blk. 7 Lot 3	CITY OF TUNUNAK
Blk. 7 Lot 4	JACK/MARY ANGAIAK
Blk. 7 Lot 5	ANDY Sr. & ROSE
Blk. 7 Lot 6	CITY OF TUNUNAK
Blk. 7 Lot 7	CITY OF TUNUNAK
Blk. 8 Lot 1	CITY OF TUNUNAK
Blk. 8 Lot 2	BEN & RITA AGIMUK
Blk. 8 Lot 3	CITY OF TUNUNAK
Blk. 8 Lot 4	CITY OF TUNUNAK
Blk. 8 Lot 5	CITY OF TUNUNAK
Blk. 9 Lot 1	DICK & MARIA LINCOLN
Blk. 9 Lot 2	CITY OF TUNUNAK
Blk. 10 Lot 1	CITY OF TUNUNAK
Blk. 10 Lot 2	CITY OF TUNUNAK
Blk. 10 Lot 3	CITY OF TUNUNAK
USS 4028, TRACT B	
Blk 1 Lot 1	CITY OF TUNUNAK
Blk 1 Lot 2	CITY OF TUNUNAK
Blk 1 Lot 3	CITY OF TUNUNAK
Blk 1 Lot 4	CITY OF TUNUNAK
Blk 1 Lot 5	CITY OF TUNUNAK
Blk 2 Lot 1	CITY OF TUNUNAK
Blk 2 Lot 2	CITY OF TUNUNAK
Blk 2 Lot 3	CITY OF TUNUNAK
Blk 2 Lot 4	CITY OF TUNUNAK
Blk 2 Lot 5	CITY OF TUNUNAK
Blk 3 Lot 1	CITY OF TUNUNAK
Blk 3 Lot 2	CITY OF TUNUNAK
Blk 3 Lot 3	CITY OF TUNUNAK
Blk 4 Lot 1	CITY OF TUNUNAK
Blk 4 Lot 2	CITY OF TUNUNAK
Blk 4 Lot 3	CITY OF TUNUNAK
Blk 4 Lot 4	CITY OF TUNUNAK
Blk 4 Lot 5	CITY OF TUNUNAK
Blk 4 Lot 6	CITY OF TUNUNAK
Blk 4 Lot 7	CITY OF TUNUNAK
Blk 4 Lot 8	CITY OF TUNUNAK
Blk 4 Lot 9	CITY OF TUNUNAK
Blk 4 Lot 10	CITY OF TUNUNAK
Blk 4 Lot 11	CITY OF TUNUNAK
Blk 4 Lot 12	CITY OF TUNUNAK
Blk 4 Lot 13	CITY OF TUNUNAK
Blk 4 Lot 14	CITY OF TUNUNAK
Blk 4 Lot 15	CITY OF TUNUNAK

Blk 5 Lot 1	CITY OF TUNUNAK
USS 4028, TRACT C	
Blk 1 Lot 1	CITY OF TUNUNAK
Blk 1 Lot 2	CITY OF TUNUNAK
Blk 1 Lot 3	CITY OF TUNUNAK
Blk 1 Lot 4	CITY OF TUNUNAK
Blk 1 Lot 5	CITY OF TUNUNAK
Blk 1 Lot 6	CITY OF TUNUNAK
Blk 1 Lot 7	CITY OF TUNUNAK
Blk 1 Lot 8	CITY OF TUNUNAK
Blk 1 Lot 9	CITY OF TUNUNAK
Blk 1 Lot 10	CITY OF TUNUNAK
Blk 1 Lot 11	CITY OF TUNUNAK
Blk 1 Lot 12	CITY OF TUNUNAK
Blk 1 Lot 13	CITY OF TUNUNAK
Blk 1 Lot 14	CITY OF TUNUNAK
Blk 1 Lot 15	CITY OF TUNUNAK
Blk 1 Lot 16	CITY OF TUNUNAK
Blk 2	CITY OF TUNUNAK
Blk 3	CITY OF TUNUNAK
USS 4028, TRACT D-1A (PLAT 89-6)	CITY OF TUNUNAK
USS 4028, TRACT D-1B (PLAT 89-6)	CITY OF TUNUNAK
USS 4028, TRACT D2 TUNUNAK SUBDIVISION	
PLAT 79-12	
PLAT 79-12 (LOT & BLOCK NOT PLATTED)	AVCP- OCCUPIED BY DAVID KANRICAK
PLAT 79-12 (LOT & BLOCK NOT PLATTED)	AVCP- OCCUPIED BY DICK LINCOLN
PLAT 79-12 (LOT & BLOCK NOT PLATTED)	AVCP- OCCUPIED BY KARL & D. SLATS
PLAT 79-12 (LOT & BLOCK NOT PLATTED)	AVCP- OCCUPIED BY HARRY LINCOLN
PLAT 79-12 (LOT & BLOCK NOT PLATTED)	AVCP- OCCUPIED BY SIMON/WINNE BILLY
PLAT 79-12 (LOT & BLOCK NOT PLATTED)	AVCP- OCCUPIED BY JOHN/EVELYN HOOPER
PLAT 79-12 (LOT & BLOCK NOT PLATTED)	AVCP- OCCUPIED BY MIKE ANGAIAK SR.
PLAT 79-12 (LOT & BLOCK NOT PLATTED)	AVCP- OCCUPIED BY
PLAT 79-12 (LOT & BLOCK NOT PLATTED)	AVCP- OCCUPIED BY PAUL SUNNY
PLAT 79-12 (LOT & BLOCK NOT PLATTED)	AVCP- OCCUPIED BY SIMSON FAIRBANKS SR.
PLAT 79-12 (LOT & BLOCK NOT PLATTED)	AVCP- OCCUPIED BY JOSEPH OSCAR
PLAT 79-12 (LOT & BLOCK NOT PLATTED)	AVCP- OCCUPIED BY A. CHIKOYAT/ P. LINCOLN
PLAT 79-12 (LOT & BLOCK NOT PLATTED)	AVCP- OCCUPIED BY
PLAT 79-12 (LOT & BLOCK NOT PLATTED)	AVCP- OCCUPIED BY
PLAT 79-12 (LOT & BLOCK NOT PLATTED)	AVCP- OCCUPIED BY
PLAT 79-12 (LOT & BLOCK NOT PLATTED)	AVCP- OCCUPIED BY THERESA WHITMAN
PLAT 79-12 (LOT & BLOCK NOT PLATTED)	AVCP- OCCUPIED BY HURBERT HOOPER
PLAT 79-12 (LOT & BLOCK NOT PLATTED)	AVCP- OCCUPIED BY TOMMY ANGAIAK
PLAT 79-12 (LOT & BLOCK NOT PLATTED)	AVCP- OCCUPIED BY
PLAT 79-12 (LOT & BLOCK NOT PLATTED)	AVCP- OCCUPIED BY ALPHONSE MENEGAK

PLAT 79-12 (LOT & BLOCK NOT PLATTED)	AVCP- OCCUPIED BY BOB HOOPER
PLAT 79-12 (LOT & BLOCK NOT PLATTED)	AVCP- OCCUPIED BY JACK ANGAIAK
PLAT 79-12 (LOT & BLOCK NOT PLATTED)	AVCP- OCCUPIED BY
USS 4028, TRACT D-2 TUNUNAK SUBDIVISION NORTH ADDITION	
PLAT 89-6	
Blk 1 Lot 1	AVCP
Blk 1 Lot 2	AVCP
Blk 1 Lot 3	AVCP
Blk 1 Lot 4	AVCP
Blk 1 Lot 5	AVCP
Blk 1 Lot 6	CITY OF TUNUNAK
Blk 1 Lot 7	AVCP
Blk 1 Lot 8	AVCP
Blk 1 Lot 9	AVCP
Blk 2 Lot 1	AVCP
Blk 2 Lot 2	AVCP
Blk 2 Lot 3	AVCP
Blk 2 Lot 4	AVCP
Blk 2 Lot 5	AVCP
Blk 2 Lot 6	AVCP
Blk 2 Lot 7	AVCP
Blk 2 Lot 8	AVCP
TUNUNAK SCHOOL SITE (PLAT 87-3)	CITY OF TUNUNAK
USS 877	PIONEER EDUCATIONAL SOCIETY
USS 4054 TRACT 1	TUNUNRMIUT RINIT CORP.
USS 4054 TRACT 2	STATE OF ALASKA
USS 4054 TRACT 3	U.S. ARMY WITHDRAWL (ARMORY)

APPENDIX E: CORRESPONDENCE WITH STATE HISTORICAL PRESERVATION OFFICER

STATE OF ALASKA

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF PARKS AND OUTDOOR RECREATION
Office of History and Archaeology

WALTER J. HICKEL, GOVERNOR

3601 C STREET, Suite 1278
ANCHORAGE, ALASKA 99503
PHONE: (907) 762-2622

MAILING ADDRESS:
P.O. Box 107001
ANCHORAGE, ALASKA 99510-7001

December 16, 1992

File No.: 3130-2R DEC (Village Safe Water)

Subject: Tununak Sanitation Feasibility Study

Steven M. Miller, P.E.
Phukan Consulting Engineers & Associates, Inc.
203 W. 15th Ave., Suite 104
Anchorage, AK 99501

Dear Mr. Miller;

Tununak is underlain by a number of large archaeological sites. The largest runs along the beach ridges on the left bank of the Tununak River, under the airstrip, and further south to the proposed Sludge Disposal Site "A". Abundant prehistoric house pits are clearly visible on the Community Profile air photo. An alternate location further west or further inland could be found. There are no known archaeological resources in the vicinity of Disposal Site "B".

Much if not all of the older part of the village along Tununak Bay contains evidence of prehistoric occupation as well. Various elders told BIA archaeologists in 1985 that graves, now unmarked, are present in the northern blocks of USS 4028, Tract A, at the base of the spit. This area is currently proposed for underground sewage service. We recommend considering above-ground sewage service. It would cause much less damage to the archaeological and human remains.

The archaeological issues do not make the project infeasible. We do recommend that it be designed to cause as little subsurface disturbance as possible. An archaeological survey will probably be necessary where disturbance cannot be avoided. Please contact Tim Smith at 762-2625 if there are any questions or if we can be of further assistance.

Sincerely,

Judith E. Bittner

Judith E. Bittner
State Historic Preservation Officer

JEB:tas

PHUKAN CONSULTING ENGINEERS & ASSOCIATES, INC.
Civil • Geotechnical • Surveying • Environmental

November 30, 1992
W.O. #92516.20

State of Alaska
Department of Natural Resources
Division of Parks and Recreation
Office of History and Archeology
P.O. Box 107001
Anchorage, AK 99510-7001

Attn: Ms. Judith E. Bittner
State Historic Preservation Officer

Re: Tununak Sanitation Feasibility Study

Dear Ms. Bittner:

Our firm has been retained by the Tununak Traditional Elders Council to perform the referenced feasibility study, which is administered by Village Safe Water. One purpose of this study is to determine the most suitable method of wastewater collection for the village for a twenty year planning period. Another purpose is to locate a suitable site for wastewater sludge disposal. Your input will be greatly appreciate for the finalization of the Feasibility Study.

At present, we are just entering the phase of the project where we assist the Elders Council in deciding what types of facilities will be constructed, and we have formulated some concepts on the Feasibility Study. Attached are seven drawings with an overview of our preliminary study:

- Figure 1 is a vicinity map showing the location of Tununak.

- Figure 2 illustrates the existing town site. Based on our preliminary investigation of the area, we have delineated a part of town where we believe above-ground sewers are appropriate, and another part of town where we believe underground sewers should be considered. As stated above, these are preliminary conclusions and may change as we proceed with the study.

- Figure 3 is an excerpt form a U.S.G.S. topographic map and shows the general vicinity of Tununak and two potential sludge disposal sites, Site "A" and Site "B", that have

been preliminarily investigated. Site "A" appears to be much more acceptable from an engineering and accessibility point of view. These sites have not been reviewed by the Elders Council.

- Figure 4 includes some of the information presented in Figure 2, but at a larger scale. Please note that a number of underground wastewater disposal facilities already exist in the village in various stages of completion. For instance, the part of the village that we are considering for above ground sewers (see Figure 2) has a partially completed underground system (see Figure 4). We will consider the costs and benefits of completing this underground system as opposed to building an above-ground sewer. Completing the incomplete gravity sewer system would involve excavation only in areas disturbed by previous construction.

- Figure 5 illustrates a conceptual design of the above-ground sewers.

- Figure 6 illustrates a conceptual design for underground sewers.

- Figure 7 illustrates a conceptual method of sludge disposal. This method of sludge disposal would require about one acre over the 20 year planning period based on our calculations.

We are required to submit a 65% Feasibility Study to the Elders Council and Village Safe Water by December 22, 1992. Our deadline for completion of the Final Feasibility Study is February 1, 1992.

Your inputs and cooperation would be greatly appreciated to assist us in meeting these goals.

Please contact us at 272-7111 if you have any questions or comments.

Sincerely,

PHUKAN CONSULTING
ENGINEERS & ASSOCIATES, INC.

Steven M. Miller, P.E.
Project Manager

cc: Mr. George Usugan, President
Tununak Traditional Elders Council

Mr. Jim Patterson, P.E.
Village Safe Water

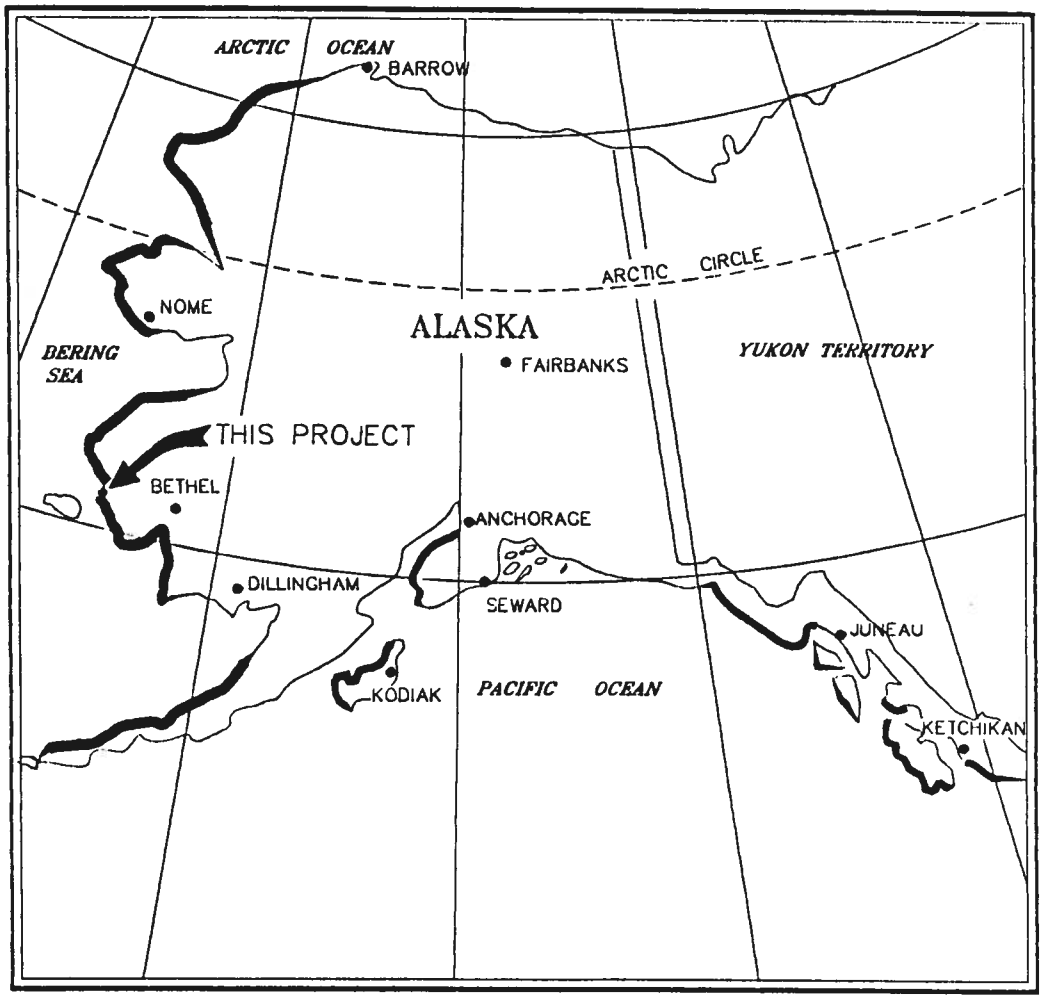


FIGURE 1: TUNUNAK SANITATION FEASIBILITY STUDY
PROJECT LOCATION

PHUKAN CONSULTING ENGINEERS & ASSOCIATES, INC.
Civil • Geotechnical • Surveying • Environmental
PCA
203 W 15th., Suite 104, Anchorage, Ak., 99501
Tele: (907) 272-7111 Fax: (907) 277-3177

W.O. 92516	COMP. FILE 516VIC2	SCALE NTS	DATE 11/27/92	BY SMM

NOTES

1. HOUSE LOCATIONS, SHORE LINE, AND RIVER ARE DIGITIZED FROM AERIAL PHOTOGRAPHY AND ARE FOR GRAPHIC REPRESENTATION ONLY.

LEGEND

- SEWAGE BUNKER
- SEPTIC TANK
- GATE VALVE
- SEWER MAN HOLE
- SOILS TEST HOLE
- APPROXIMATE WATER LINE
- RECORD BOUNDARY
- RECORD CENTERLINE
- BLM RECORD MEANDERS
- SS — EXISTING SEWER LINE
- PROPOSED AREA FOR ABOVE GROUND SEWERS
- PROPOSED AREA FOR UNDER GROUND SEWERS

TUNUNAK BAY

TUNUNAK RIVER

ROAD

LANDING STRIP

TUNUNAK RIVER

TRACT

U.S.S. 4678 MUNICIPAL RESERVE

U.S.S. 4677

U.S.S. 4054

TEACHER HOUSING

IN-SERVICE SEPTIC SYSTEM (LOCATION APPROXIMATE)

INCOMPLETE SEPTIC SYSTEM

IN-SERVICE UNDERGROUND SEWER

TEACHER HOUSING

PAUL T. ALBERT MEMORIAL SCHOOL

WASHATERIA (WATER TREATMENT PLANT & LAUNDROMAT)

IN-SERVICE ABOVE GROUND SEWER

INCOMPLETE UNDERGROUND SEWER SYSTEM

INCOMPLETE PUMP STATION

GAME A.V.C.P. SUBDIVISION

TRACT D U.S.S. 4028

PRELIMINARY

PHUKAN CONSULTING ENGINEERS & ASSOCIATES, INC.

Civil • Geotechnical • Surveying • Environmental

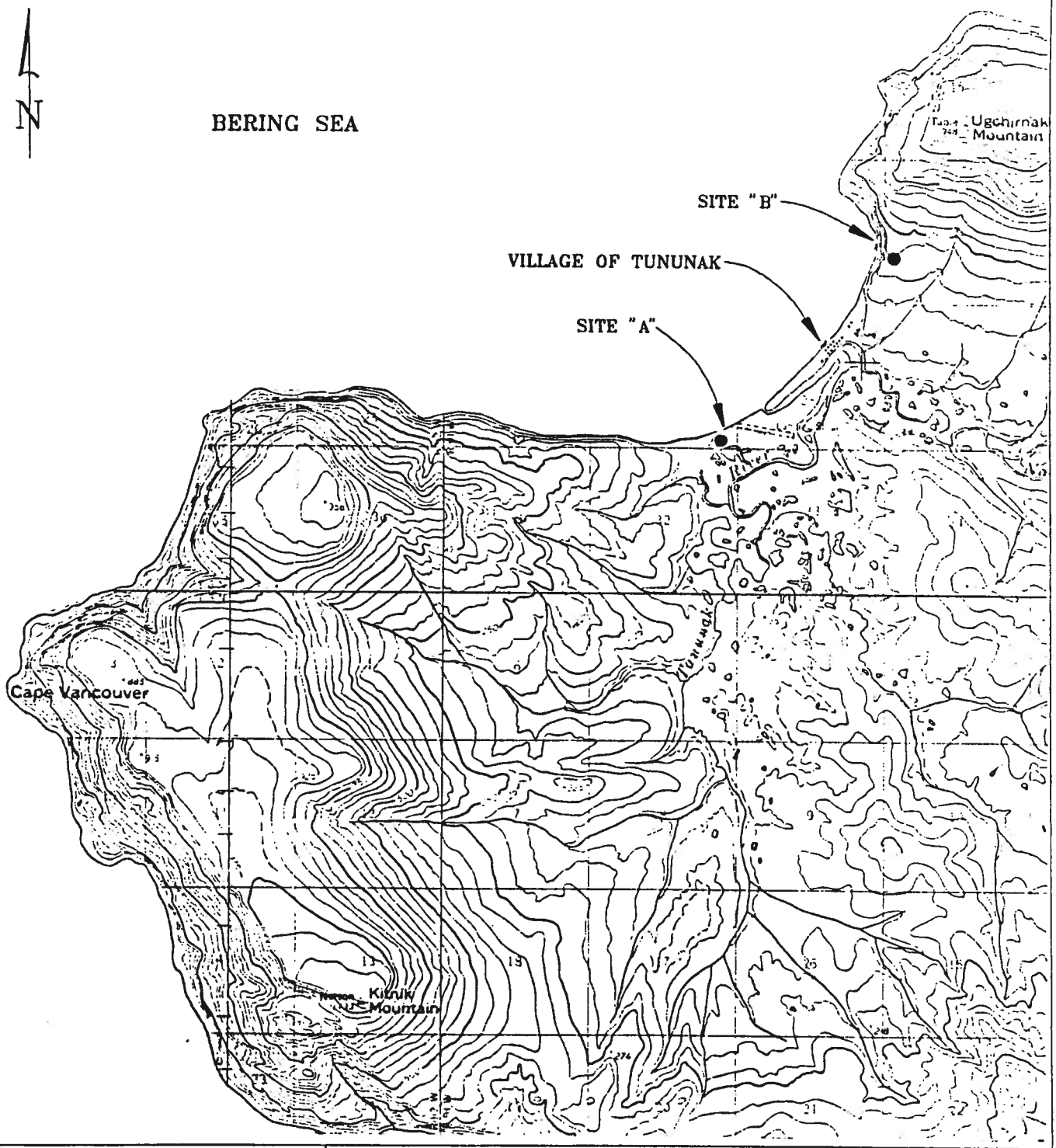
PCA

Telephone: (907)272-7111 Fax: (907)272-3177

203 West 15th Avenue Suite 104 Anchorage, AK 99501

TUNUNAK SANITATION FEASIBILITY STUDY
PROPOSED AREAS FOR SEWER CONSTRUCTION

DRAWN	GRID	COMP FILE NO. 516DGTS	FIGURE 2
SCALE NTS	DATE 11-24-92	FILE DRAWER NO.	
F.B. PG.	W.O. H92516		



REFERENCE:
U.S.G.S. TOPO MAP
NUNIVAK ISLAND (C-1), QUANDRANGLE
ALASKA 1954

QUANDRANGLE LOCATION

FIGURE 3 TUNUNAK SANITATION FEASIBILITY STUDY
PROPOSED SLUDGE DISPOSAL SITES

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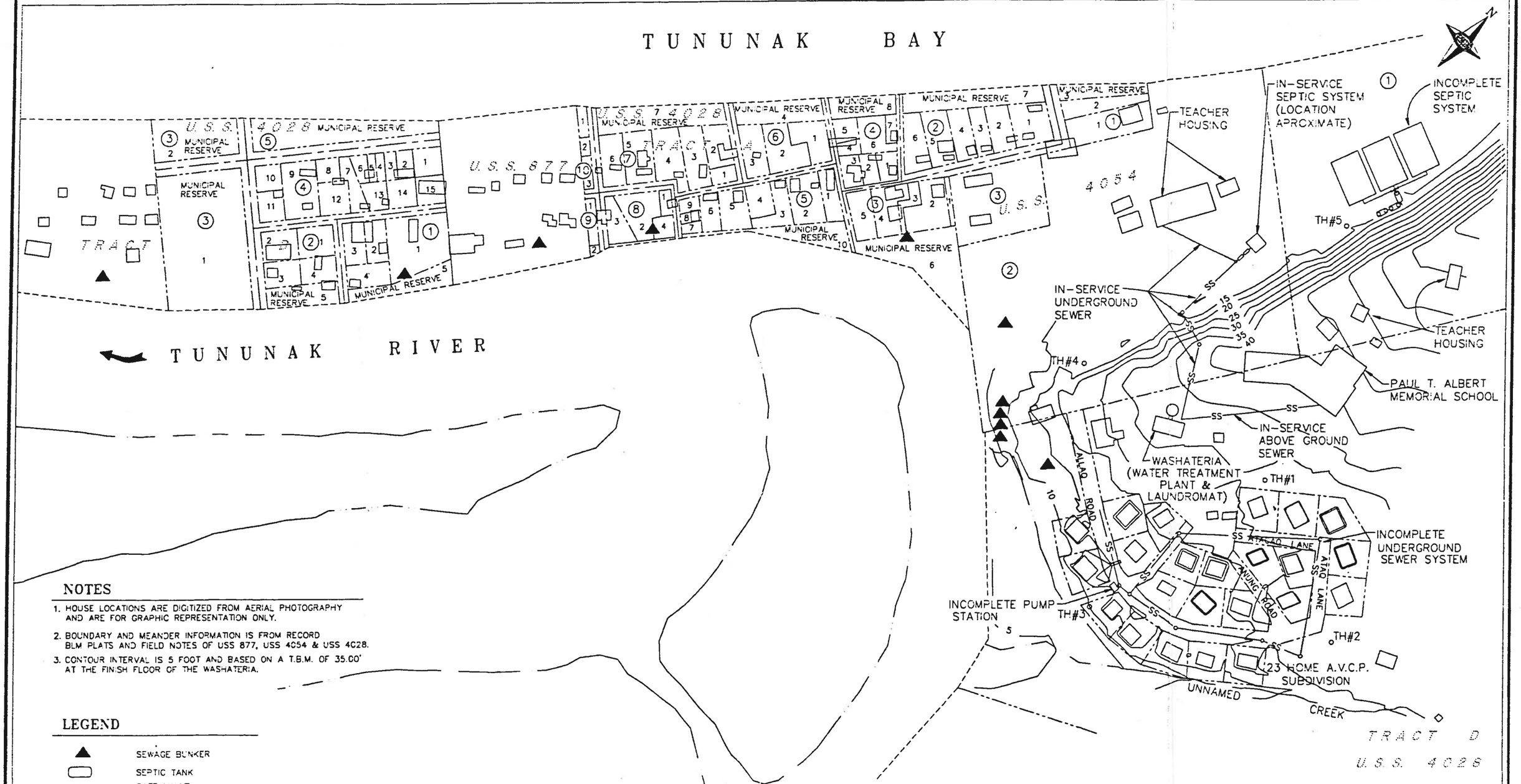
W.O. H92516	COMP. FILE 516SDS	SCALE NTS	DATE 11/24/82	BY EKB



NOTES

1. HOUSE LOCATIONS ARE DIGITIZED FROM AERIAL PHOTOGRAPHY AND ARE FOR GRAPHIC REPRESENTATION ONLY.
2. BOUNDARY AND MEANDER INFORMATION IS FROM RECORD BLM PLATS AND FIELD NOTES OF USS 877, USS 4054 & USS 4028.
3. CONTOUR INTERVAL IS 5 FOOT AND BASED ON A T.B.M. OF 35.00' AT THE FINISH FLOOR OF THE WASHATERIA.

LEGEND

- SEWAGE BUNKER
- SEPTIC TANK
- GATE VALVE
- SEWER MAN HOLE
- SOILS TEST HOLE
- APPROXIMATE WATER LINE
- RECORD BOUNDARY
- RECORD CENTERLINE
- BLM RECORD MEANDERS
- SS — EXISTING SEWER LINE

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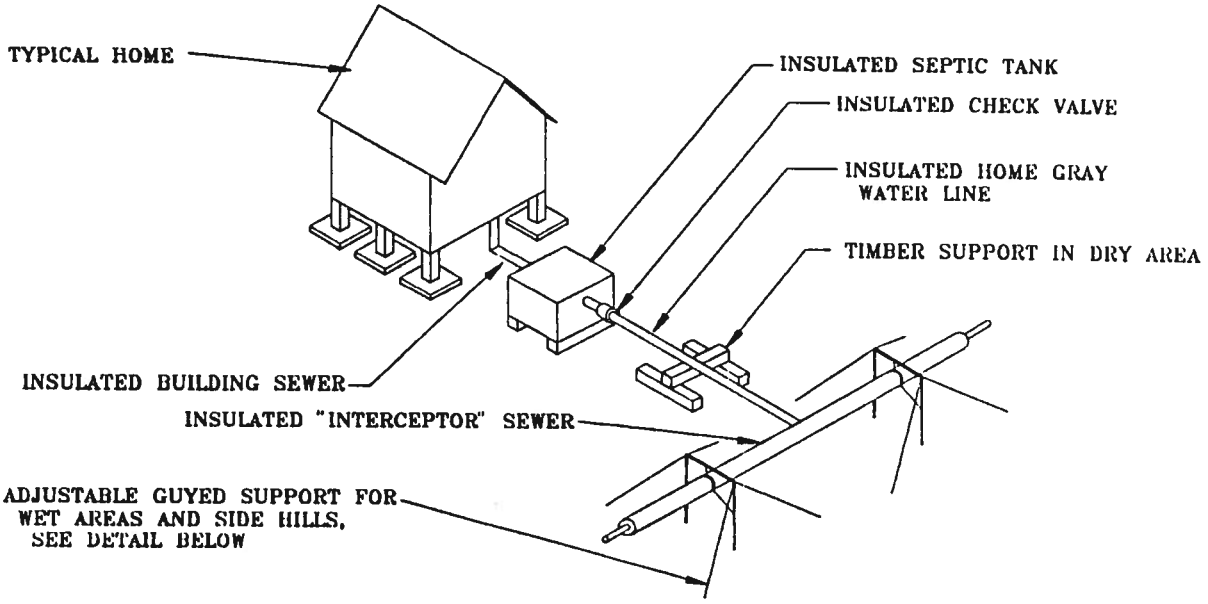
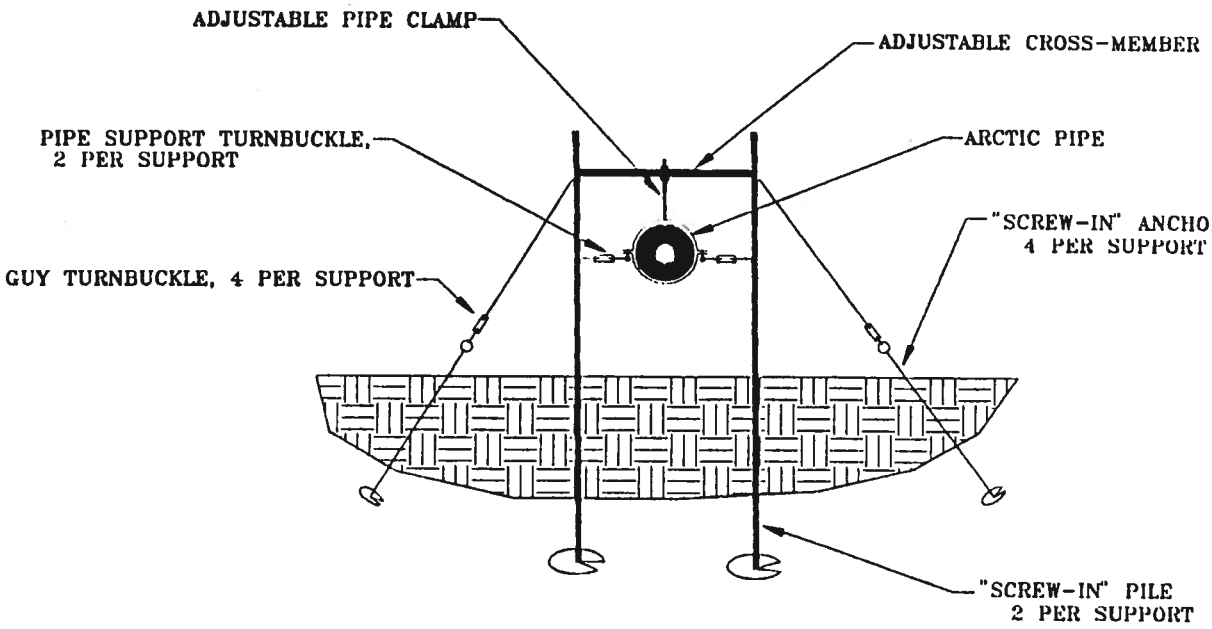
TUNUNAK SANITATION FEASIBILITY STUDY
EXISTING SANITATION FACILITIES

DRAWN MBP	GRID	COMP FILE NO. 516FIELD	FIGURE 4
SCALE 1" = 200'	DATE 11-24-92	FILE DRAWER NO.	
F.B. PG.	W.O. H92516		





ADJUSTABLE GUYED SUPPORT DETAIL

FIGURE 5 TUNUNAK SANITATION FEASIBILITY STUDY
CONCEPTUAL ABOVE-GROUND SEWER SYSTEM

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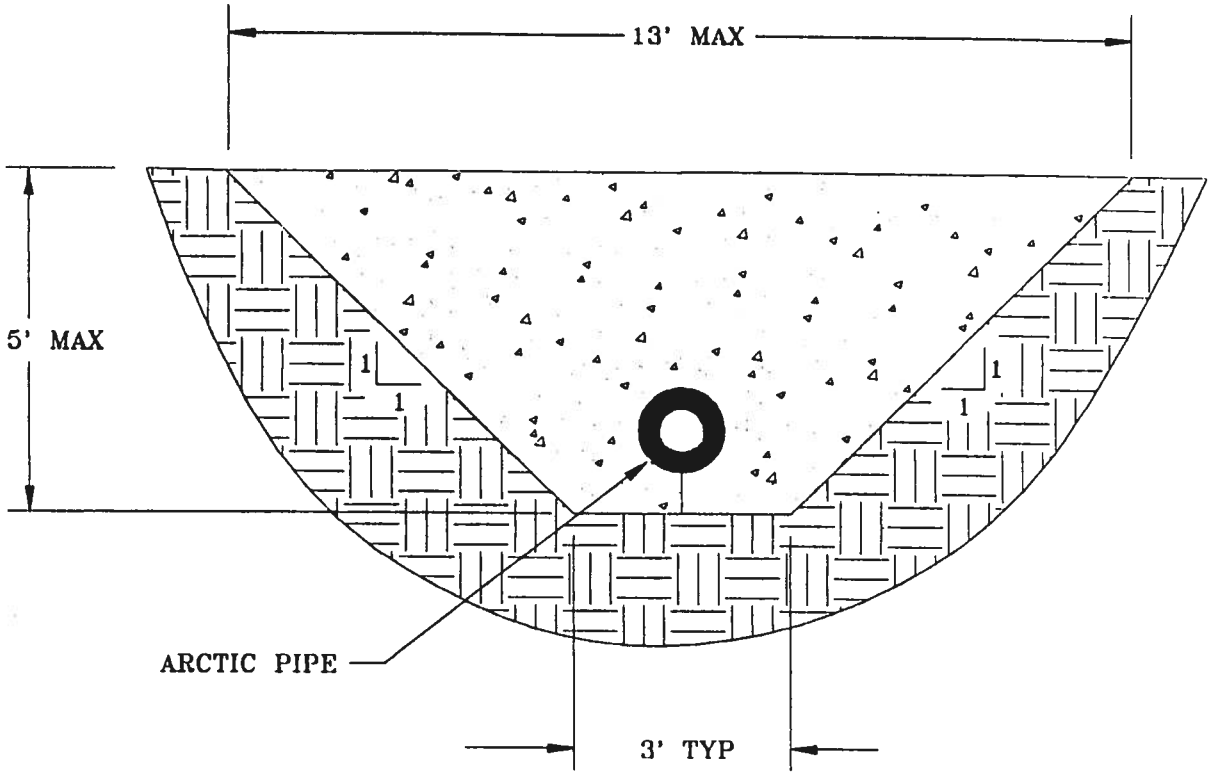
W.O. 92516	COMP. FILE 516DTL2	SCALE NTS	DATE 11/27/92	BY SMM



PRELIMINARY

FIGURE 6 TUNUNAK SANITATION FEASIBILITY STUDY
CROSS-SECTION, CONCEPTUAL UNDERGROUND SEWER

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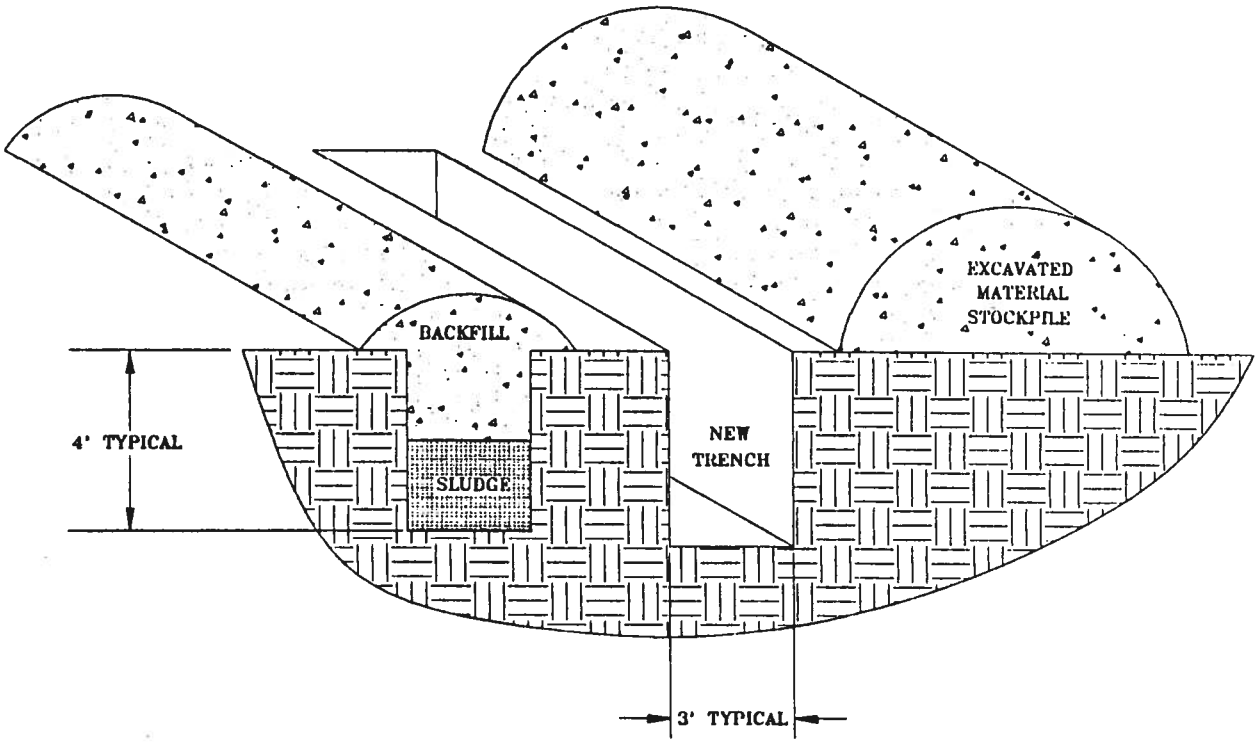

PRELIMINARY

FIGURE 7 TUNUNAK SANITATION FEASIBILITY STUDY
NARROW TRENCH SLUDGE DISPOSAL SYSTEM

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Civil • Geotechnical • Surveying • Environmental
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W.O. 92516	COMP. FILE 516DTL2	SCALE NTS	DATE 11/27/92	BY SMM

APPENDIX F: ENVIRONMENTAL REVIEW ENGINEER'S CHECKLIST

Environmental Review
Engineer's Checklist

Project Name: Tununak Sanitation Feasibility Study
Brief Project Description: Construction of sewage haul facilities and sludge disposal site. Improvements to existing sewer and septic systems
Will the project adversely affect:

Y	N	
__	X	Cultural resource areas, such as archeological sites. **See attached comments.**
__	X	Natural landmark sites.
__	X	Endangered or threatened species and their habitats.
__	X	Flood plains, wetlands, or aquifer recharge zones.
__	X	A site classified as a wilderness preserve. **See attached comments.**
__	X	A classified wild & scenic river.
__	X	Local ambient air quality and noise levels.
__	X	Surface or groundwater quantity.
__	X	Surface or groundwater quality.
__	X	Fish, shellfish, and/or wildlife, and their habitats.
__	X	Will this action have a significant adverse effect on the quality of the surrounding environment?
__	X	Will the project significantly affect the pattern and type of land use or growth and distribution of population?
__	X	Will the project conflict with local, regional, or State land use plans? *Attach a note identifying the land use plans reviewed.* **See attached comments.**
__	X	Is the project highly controversial?

Dr. Arvind Phukan, P.E., Principal
Phukan Consulting Engineers & Associates, Inc.

3/22/93
Date:

Steven M. Miller, P.E., Project Manager
Phukan Consulting Engineers & Associates, Inc.

3/22/93
Date:

TUNUNAK SANITATION FEASIBILITY STUDY
ENVIRONMENTAL REVIEW COMMENTS

Archeological Sites - Prior to any excavation, the State Historical Preservation Officer (S.H.P.O.) will be notified in a timely manner. No excavation will proceed until authorization is received from the S.H.P.O. Excavations will be carefully monitored for artifacts. If artifacts are encountered, excavation will be suspended at the specific site and the S.H.P.O. will be notified. Excavation will not resume until authorization is received from the S.H.P.O.

Wilderness Preserve - The area around Tununak is a National Wildlife Refuge as indicated by the Land Status Map, Appendix D. A letter of non-objection for construction and operation of facilities will be obtained from the U.S. Fish and Wildlife Service.

Land Use Plans - The following organizations were contacted regarding land use plans for Tununak: Village Safe Water (Mr. Jim Patterson, P.E.), the Department of Community and Regional Affairs, Bethel Office (Mr. Luke Smith), Calista Regional Native Corporation (Ms. June McAtee), Tununrmuit Rinit Corporation (Mr. Anthony Angaiak), the Tununak IRA Council (Mr. Mark Charlie), and the Tununak Traditional Elders Council. None of the above were aware of any existing specific land use plans for Tununak.

COMMUNITY ENVIRONMENTAL HEALTH PROFILE AND PRIORITY PROJECTION FOR TUNUNAK, ALASKA

PREPARED BY:

Jessica Wanserski

ENVIRONMENTAL HEALTH SPECIALIST

YUKON-KUSKOKWIM DELTA SERVICE UNIT

October 8, 1991

TABLE OF CONTENTS

REVIEWED BY:

_____ _____

Mr. Mike Albert, Chairman
Tununak Elders Council

Date

REVIEWED BY:

_____ _____

Joe Ryan, Service Unit Director
Yukon-Kuskokwim Delta Service Unit

Date

II. GENERAL INFORMATION

A. Geographical Information

The village of Tununak is located on the northwest coast of Nelson Island on the Bering Sea. The city is approximately 110 miles west of Bethel and eight miles north of Toksook Bay above Cape Vancouver.

Tununak is situated on a 400 foot wide spit bounded on one side by Tununak Bay and on the other by a slough formed by the mouth of the Tununak River. The village population center has migrated approximately one-half mile upland with the construction of modern housing units. The area around the community is characterized by marshy tundra, lakes and streams with upland tundra rising to about 1500 feet above the village. Permafrost underlies the area with a 1-2 foot active ground layer.

Tununak has a transitional climate. The mean July maximum temperature is 52 degrees F., and the mean January minimum temperature is 4 degrees F. but severe -40 degrees F. temperature occurs.

B. Communication

Telephone service is provided by United Utilities, Inc. of Bethel, Alaska, via a receiver station. Long distance service is provided through Alascom 24 hours a day. The Tununak Elder's Council office phone number is 652-6312. Citizen band radios facilitate communication within the village. The village health clinic number is 652-6929.

Tununak receives radio stations KICY and KNOM from Nome and KYUK from Bethel. Television, via the Rural Alaska Television Network satellite (RATNET). Cable TV is also provided to subscribers by United Utilities via satellite. The village also monitors VHF channel 7.

Mail is delivered an average of 6 days per week by one of the local air carriers.

C. Transportation

Tununak is dependent on air and water transportation much of the year. A 2,400 foot gravel runway, located 1.5 miles from the village, accommodates regularly scheduled and chartered air service during the full year. The following airlines provide service to Tununak; ERA, MarkAir Express, Yute Air, Artic Air, and Camai Air. Summer barge service is provided by major shipping lines. Boats, snowmobiles, and all-terrain vehicles are the main forms of individual transportation to other villages. The town has a short road system linking the airport, downtown, and new housing areas.

D. Government

The community of Tununak has experienced political turmoil during recent years. At the time of the survey, the Tununak Traditional Elder's Council was administering the majority of the services for the community. In addition to the TTEC an IRA Council also exists in Tununak, although their function is limited. According to Alaska Department of Community and Regional Affairs the city of Tununak is still incorporated, but is non-functional. DCRA also stated that the only governing entity officially recognized by the state of Alaska is the IRA Council.

E. Education

Education in Tununak is provided through the Lower Kuskokwim School District and the Tununak Headstart Program. The AVCP Headstart provides preschool instruction for students ages three and four years old. The AVCP Headstart program has an enrollment of 20 students. The LKSD school also has a preschool which has an enrollment of 10 students. The current LKSD Paul T. Albert Memorial School enrollment (K-12) is 86 students.

F. Commercial/Industrial Enterprises and Government Agencies

The following commercial and/or public buildings are located in Tununak:

Paul T. Albert Memorial School
Tununak Elementary School
Washeteria/Pumphouse
St. Joseph Catholic Church
Oceanview Video/Charlies Sales
Tununrmuit Rinit Corporation (TRC) Store
U.S. Post Office
Public Safety Building
National Guard Armory
Carl Flynn Memorial Headstart Center
AVEC Power Plant
Tununak IRA/City Office Building
Tununak Community Hall
Sea Side Coffee Shop
Tununak Village Health Clinic
United Utilities Telephone Exchange
Airport Terminal Shelter
Airport Garage
Coldstorage Facility
IRA Snowmachine Shop
Tununak Native Store
Tununak Traditional Elder's Council Office

III. HOUSING SANITATION FACILITIES STATUS

City/Village Name Tununak, Alaska

Prepared by: Jessica Wanserski Date: October 8, 1991

Population: 318 No. of Families: Native 54 Non-Native 7

Total Existing Homes: 73 Homes Occupied Full Time: 73

Home Status by Category	EXISTING	PROPOSED
1. HUD Constructed Homes	23	
2. BIA Constructed Homes	5	4
3. BIA Renovated Homes	3	
4. Other Native Homes, New Construction		
A. Constructed/Renovated with State Funding	17	
B. Constructed/Renovated with HUD Block Grant Funding		
C. Constructed with non-HUD/BIA Federal Funding (specify source)		
D. Renovated with non-HUD/BIA Federal Funding (specify source)		
E. Constructed/Renovated with Tribal/Corporation Funding		
F. Constructed/Renovated by Homeowner	55	
5. Other Native Homes, Old Construction	15	
6. Non-Native Homes	5	
7. Non-Residential Units (stores, community buildings, etc.) Refer to Section II, Item F.	22	

IV. COMMUNITY SANITATION FACILITIES STATUS

Type of Existing Facilities or Service:

Water: The village of Tununak utilizes a stream and an infiltration gallery as their main source of water. The raw water is pumped from the infiltration gallery through artic PE transmission line to the washeteria. The water is then filtered, chlorinated, and fluoridated before it is pumped into a 60,000 gallon storage tank. A water service line was also connected to the LKSD school facility. Six all weather water points served the lower town as far as the cemetery.

Existing Problems and/or Needed Improvements: At the time of the survey the washeteria facility had a history of positive fecal and total coliform water samples. The washeteria lacked a supply of calcium hypochlorite to chlorinate the water.

Sewage: The community of Tununak is equipped with 10 sewage bunkers, and a septic tank and drainfield system which serves the washeteria and the LKSD school. The septic system serving the washeteria and school consisted of a 4,000 gallon septic tank, a 2,000 gallon septic tank, 460 feet of sewer main, and 932 linear feet of drainfield. Plans had been made to connect the HUD housing project to the sewer system. At the time of the survey, sewer main had been installed throughout the HUD project but had not been completed and hooked up due to disputes between local governing bodies. As a result of these disputes the project has never been completed.

Existing Problems and/or Needed Improvements: A sewage pumper needs to be purchased for the village in order to safely clean out accumulated sludge in the septic tanks as needed. Any dumping of honeybuckets on the beach and or the ocean needs to be stopped immediately.

Solid Waste: The solid waste disposal facility for the community of Tununak consisted of a fenced dump site one-half mile from town. Residents are responsible for the transport of their own solid waste to the site. The City of Tununak had previously provided a collection service to all residents for a monthly fee of $7.50. The collection service and maintenance of the solid waste disposal site has been terminated.

Existing Problems and/or Needed Improvements: A fence with a gate needs to be constructed surrounding the solid waste disposal site. A solid waste disposal site operator should be assigned to collect garbage and maintain the disposal site.

V. NOTIFIABLE COMMUNICABLE DISEASES (LAST FIVE YEARS) (1985-1989)

DISEASE	APC NO.	1985		1986[1]		1987		1988		1989	
		No.	Rank	No.	Rank	No.	Rank	No.	Rank	No.	Rank
Tuberculosis,* Active	005 008							1	3	1	5
Bacillary Dysentery	013										
Gastro-Enteritis, Diarrhea	014	1	6					1	3	1	5
Infectious Hepatitis	015					1	5				
Ecto-Parasitic	020										
A/O Infect. Parasitic Strep Throat	022	4	5			3	4	1	3	5	1
Food Poisoning (Bact.)	034										
Hydatidosis	034										
Salmonellosis	054										
Scabies	055									1	5
A/O Infect. Parasitic Disease	067	7	3			4	3	5	1	2	4
Otitis Media	250	17	1			20	1	1	3	3	3
Upper Resp. Infection	300	8	2			8	2	3	2	4	2
Influenza	303	1	6								
Pneumonia	306	5	4			8	2			1	4
Impetigo	500	4	5							2	5

[1] Information unavailable

VI. UNINTENTIONAL INJURIES RESULTING IN HOSPITALIZATION

Fiscal Years 1981 -1988

ICDE CODE	CAUSE OF INJURY	TOTAL PATIENTS	TOTAL INPATIENT DAYS
820	NONTRAF ACC INVOL MOTOR-DRIV SNOW VEH	1	2
850	ACC POIS,ANALGESIC,ANTIPYRETIC,ANTIREU	1	3
878	SURG OPER/PROC CAUSE ABNORM REACT AFT OP	1	1
884	OTH FALL, ONE LEVEL TO ANOTHER	1	4
885	FALL SAME LEVEL, SLIPPING,TRIPPING	1	3
915	FOREIGN BODY ACC ENTERING OTHER ORIFICE	1	2
917	STRIKE AGAINST/STRUCK ACC BY OBJ/PERSON	1	7
924	ACC BY HOT SUBS.CAUSTIC/CORROS MAT/STEAM	3	19
928	OTH & UNSPECIF ENVIRONMENTAL & ACC CAUSES	2	4
950	SUICIDE/SELF INFL INJ-POIS BY SOLID/LIQ	5	19
960	HOMOCIDE, INJ PURP INFL-FIGHT,BRAWL,RAPE	1	4
967	HOMICIDE, INJ PURP INFL-CHILD BATT/MALTRT	1	1
	TOTAL	19	69

VII. OTHER ENVIRONMENTAL CONCERNS

During this visit two lay vaccinators, VPO Vincent Billy and VPO Daniel Lincoln, were trained to give rabies vaccinations. During this training twelve dogs were vaccinated and supplies were left for the remaining dogs in the village. This office will maintain close contact with the VPOs to insure that the rabies vaccinations are given in a timely manner.

VIII. PROGRAM ACCOMPLISHMENTS

Village Health Clinic Survey
Community Water System Survey
Solid Waste Disposal System Survey
Community Sewer System Survey
Rabies Clinic/Lay Vaccinator Certification
Community Environmental Profile
Bacteriological Water Testing
Technical Assistance provided to the Water Operator

SUBMITTED BY:

10-16-91
Date

Ron Perkins for Jessica Wanserski
Field Sanitarian

REVIEWED BY:

10/11/91
Date

Keith W. Cook
Acting Service Unit Sanitarian

REVIEWED BY:

10/16/91
Date

Erv Moore
Director
Division of Environmental Services

APPROVED BY:

10-18-91
Date

Daniel R. Rogness, P.E.
Director
Environmental Health & Engineering Branch

DEPARTMENT OF
HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE

COMMUNITY SANITATION FACILITIES SURVEY REPORT TUNUNAK ALASKA FEBRUARY 8-11, 1993

BY
TOM FAZZINI
ENVIRONMENTAL HEALTH SPECIALIST
YUKON KUSKOKWIM HEALTH CORPORATION
OFFICE OF ENVIRONMENTAL HEALTH
MSC 3021
BOX 287
BETHEL, ALASKA

DRAFT

COMMUNITY
SANITATION FACILITIES SURVEY REPORT

TUNUNAK, ALASKA

TABLE OF CONTENTS

I. INTRODUCTION

A Sanitation Facilities Survey was conducted in the village of Tununak Alaska on February 8-11, 1993 by Tom Fazzini, Environmental Health Specialist, Yukon Kuskokwim Health Corporation (YKHC), Office of Environmental Health (OEH). Recommendations to correct deficiencies were based on the Indian Health Service Guideline, Survey of Sanitation Facilities & Operation and Maintenance Organizations, State of Alaska Department of Environmental Conservation Regulations, and general sanitation principles.

II. SUMMARY AND PRIORITIES

Conditions noted during this survey involve operational and capital improvements. Capital improvements should be corrected as funds become available. Operational improvements should be corrected immediately.

Emphasis should be placed on the following Priorities:

- **8 of the 10 bunkers throughout the village were full and overflowing.** When bunkers become full,(within two feet of the top), they should be closed out. Many diseases such as hepatitis A and shigellosis, can be spread very easily through sewage. Due to the nature of these diseases, many times individuals who are carriers show no symptoms. Because of their lack of symptoms these diseases can spread unknowingly to other villages residents through improper sewage handling and disposal practices. Indiscriminate dumping should be discouraged. Additional information and assistance can be obtained through OEH.

- **Stray dogs should be eliminated.** Since rabies are easily transmitted to people through dogs and cats (and since these strays are more likely to encounter rabid, wild animals) they should either be restrained and vaccinated against rabies or eliminated.

- **The city council should address the problem of unprotected fuel tank farms in and around the village.** A leak or spill could contaminate the river and be a costly clean-up. For help with planning and assistance, call OEH collect, at 543-4117.

- **Sand and gravel in the sand filter needs to be replaced.** The present filter media has solidified making it ineffective in removing impurities. When this is done, the manhole gasket will need replacing also. For assistance in ordering material and installation, call OEH collect.

- **Organization of the pumphouse/washeteria.** Specificate areas should be set up for water testing, record keeping, safety equipment, tools and chemicals. For assistance with this project call OEH collect at 543-4117.

- **A solid waste operator should be hired and trained.**
This should help with the proper collection and disposal of solid waste throughout the village.

III. SURVEYS

WATER SYSTEM SURVEY

SYSTEM DESCRIPTION:
The community water system consisted of the following: an 8 x 8 foot infiltration gallery which used a surface stream as the water source, a 1,200 foot water transmission line, a 32x52 foot pumphouse/ washeteria and a 50,000 gallon storage tank, which was refilled as water was used. Water treatment consisted of filtration, chlorination, and fluoridation. A water service line provided water to the high school at a cost of .05 cents a gallon. Six all weather watering points served the lower town. Each watering point was housed in a 6x6 foot enclosed plywood shelter. The shelters were heated by electrical baseboard heaters. A return loop circulated water back to the water plant. Both the supply and return lines were below ground.

A special thanks to Victor Kanrilak for his cooperation and dedication to the overall operation of the Tununak Pumphouse.

FINDINGS AND RECOMMENDATIONS:

The following is list of deficiencies requiring correction.

1. **Priority Item: Organization of the pumphouse/washeteria.** Specific areas should be set up for water testing, record keeping, safety equipment, tools and chemicals. For assistance with this project call OEH collect at 543-4117.

2. **Priority item: Sand and gravel in the sand filter needs to be replaced.** The present filter media has solidified making it ineffective in removing impurities. When this is done, the manhole gasket will need replacing also. For assistance in ordering material and installation, call OEH collect.

3. Maintain a free chlorine residual throughout the entire water system (i.e. at the high school).

4. Replace both differential pressure gauges with one capsahulic gauge. This type gauge will better indicate when to backwash the sandfilters. For assistance with installation and ordering call OEH.

5. Flow meter to the storage tank should be cleaned out. A operational flow meter can help determine water usage patterns and help with trouble shooting problems, such as leaks.

6. Repair corroded and rusted pipes. For information on the cleaning process call OEH.

7. Repair Alarm System. This will let the operator know part of the system is in need of attention.

8. Obtain a complete fist aid kit and store in an obvious place.

9. Cover all open electrical outlets with approved electrical covers

LIQUID WASTE DISPOSAL SURVEY

DISPOSAL METHOD:

The community of Tununak was equipped with 10 sewage bunkers, and a septic tank and drainfield system which served the washeteria and the Lower Kuskokwim School District's School. At the time of the survey, a sewer main had been installed throughout the Housing and Urban Development (HUD) project but had not been hooked up. Completion of this project was still pending. This project was the top priority of the city administrator Andrew J. Chikoyak. Individual residents were responsible for the transport of their honeybuckets waste to the sewage bunkers.

Findings and Recommendations

1. **Priority Item:** 8 of the 10 bunkers throughout the village were full and overflowing. When bunkers become full,(within two feet of the top), they should be closed out. Many diseases such as hepatitis A and shigellosis, can be spread very easily through sewage. Due to the nature of these diseases, many times individuals who are carriers show no symptoms. Because of their lack of symptoms these diseases can spread unknowingly to other villages residents through improper sewage handling and disposal practices. Indiscriminate dumping should be discouraged. Additional information and assistance can be obtained through OEH.

2. The dumping of honeybuckets into the ocean, river, or streams should be discouraged. The dumping of raw sewage into waterways from which village residents harvest fish presents a serious health hazard.
Also, dumping domestic wastewater honeybuckets into surface water without a permit is a violation of Alaska Administrative Code 72.010.

3. All sewage spills should be disinfected with milk of lime. Directions for preparation are Attached.

SOLID WASTE DISPOSAL SURVEY

SITE DESCRIPTION:

The solid waste disposal facility for the community of Tununak consisted of a fenced dump site one-half mile from town. Residents are responsible for the transport of their own solid waste to the site.

FINDINGS AND RECOMMENDATIONS: (see "Solid Waste Guideline" attached)

1. **Priority item:** A solid waste operator should be hired and trained. This should help with the collection and disposal of solid waste.

2. Designate Areas for solid waste. The city council should agree on one location where the residents/operator should dump household waste, large appliances and a burn pile for dead animals.

3. A new larger fence with a locakable gate should be constructed at the solid waste site. A locakable gate would effectively control the presence of stray dogs and foxes, reduce the scattering of trash and prevent scavenging.

4. Trash such as old fuel drums and snowmachines scattered throughout the village should be collected and taken to the dump. This will help reduce the risk of injury, reduce habitats for rodents and improve the physical environment of Tununak.

5. To improve the sanitation in the village and to reduce the hazards of the present site the city council should consider starting a waste reduction program by recycling. For example, items being landfilled which can be recycled are: soda cans, waste oil, batteries, fuel drums. For more information call (OEH) collect at 543-4117.

6. Signs should be posted at the site entrance to identify the site and to identify dumping procedures.

7. Investigate ways to obtain grant monies to purchase heavy equipment.

HAZARDOUS MATERIAL REPORT

FINDINGS AND RECOMMENDATIONS: (also see Alaska Native Health Board publication " The Good Earth Project" included)

1. **Priority Item: Fuel containment facilities: The city council should address the problem of unprotected fuel tank farms in and around the village.** The owners of fuel tank farms are liable for any damage that may occur due to fuel spills from their facilities. This liability includes, but is not limited to, payment of any necessary clean-up procedures due to the fuel leakage. The following guideline is one alternative that owners of fuel tank farms may want to consider. The guideline is intended to protect the environment from the effects of a fuel spill, but will also help protect the owner from expensive clean-up costs. The city may want to consider adopting the guideline as a city ordinance.

   Fuel storage tank farms greater than 500 gallons in capacity should be surrounded by a berm capable of containing the total capacity of the largest tank in the fuel farm. The berm should be lined with an impermeable liner designed to contain petroleum products. The containment structure should also be equipped with a drain for which the valve is located outside the containment structure. The containment structure should be maintained so that excess debris, snow, or water is not allowed to minimize the capacity of the berm.
   All bulk fuel storage facilities should also be equipped with signs prohibiting smoking and warning residents of the danger associated with bulk fuel.

   Presently the Alaska Department of Environmental Conservation (ADEC) requires all noncommercial fuel quantities of 500 gallons or more to be located at least 100 feet from any well. To comply with this regulation the fuel tanks should be moved or, if kept in the same place, a wavier should be sought from ADEC.

   If the city chooses to adhere to OEH guidelines the following recommendations should be complied with.

   Those facilities that lack a containment structure large enough to contain the total capacity of the tank farm should be required to reconstruct a berm (preferably of soil) that can contain the total capacity of the farm.

   Those facilities that lack an impermeable liner should be required to install one that covers the sides of the berm enough to hold the total capacity of the tank farm.

Those facilities that lack a drain valve capable of draining the entire contents of the berm (containment structure) should be required to install one.

NOTE: Unprotected fuel tanks (of any quantity) should not be stored near areas sensitive to contamination, such as drinking water sources and rivers, if avoidable.

2. **Vehicle batteries** - A few batteries were found around the village. These batteries pose a health risk since they contain strong acids and lead. All discarded batteries should be gathered and stored in a designated location. One suggested method is to use empty 55 gallon drums as containers to place the batteries in and then store the drums in a cool, inaccessible shelter. Later the batteries can be taken, by boat, to a battery reclaimer in Bethel.

3. **Waste oil** - Discarded empty (dry) 55 gallon drums could be used for waste oil (used crank case oil) collection. Waste oil can be economically used (since it is free) as a heating fuel in a waste oil heating unit. Using this type of heating system can save the city money. Call OEH collect for Waste oil heating unit information.

4. **Unidentified Material-** The empty, dry 55 gallon drums scattered around in the village should be put to use. Some of these uses are; containment of batteries or used oil (as mentioned previously). They could also be made into burn barrels (see attached instructions) for burning of medical waste or used for burnable waste reduction. If not used the barrels should be taken to the solid waste site and placed in a designated area. Barrels can be compacted by removing the ends and flatting the barrel. A non sparking deheader or other non-sparking mechanism should be used when removing the ends of barrels that contained flammable liquids.

NOTE: An excellent forum for addressing hazardous waste issues is provided by the Alaska Native Health Board. The Alaska Native Health Board has put together several publications which give guidance to a community in organizing a hazardous materials committee. The publications give direction to the committee in looking for hazardous materials and in deciding how to prevent and be prepared for chemical or fuel accidents. Forming such a committee is a right given to the community by the "Emergency Planning and Community Right-to-Know Act". **For further information contact the Alaska Native Health Board at 1-800-478-2864 or YKHC, OEH collect at 543-4117.**

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SAFETY REPORT

1. **Priority Item: Stray Animals. All stray and unvaccinated dogs around the village should be kept restrained and vaccinated or they should be eliminated.**

2. Fire Extinguisher Inspections - The fire extinguishers located in public buildings (examples: water plant, clinic, and city office) should be inspected, using a method referred to as a "QUICK CHECK", on a monthly basis by the VPSO/VPO. The clinic standards require the extinguishers to be inspected on a MONTHLY BASIS. The date of the inspection should be recorded on the attached tag. (see "QUICK CHECK" attachment).

IV. COMMENTS

Help provided by the residents and employees of Tununak for the preparation of this report was much appreciated.

**** If there are any questions regarding this report, recommendations or other environmental concerns please call OEH collect at 543-4117.**

V. ATTACHMENTS

SOLID WASTE DISPOSAL GUIDELINE

The following information explains some basic methods to use in operating a waste disposal site. If implemented, closer compliance with state regulations can be expected as well as a much more environmentally safe program.

ACCESS ROAD/ Signs Posted/ Litter Controlled - Signs should be posted at the site entrance to discourage the practice of indiscriminate dumping along the entrance and around the site itself.

SITE/ Method of Operation - The site should be located outside of the village in a well drained area. A tall fence with a secure gate should surround the site to help keep trash in and children and wild animals (such as rabid foxes) out. Signs identifying the site and basic rules of operation should be posted so that users may properly maintain the premises.

Specialized waste should be disposed of as following

Animal remains -Should be placed in a designated section of the site (i.e. in the metal burner at the back of the site). The remains should be burned with a gasoline and fuel oil mixture.

Large appliances and Automobiles -Should be placed in a designated section of the site (i.e. next to the junked snowmachines at the back of the site). All refrigerator doors and car trunk lids should be removed so that playing children can not be locked inside and suffocate.

Infectious waste/ Clinic waste (used bandages, etc.) Should be burned in a designated area (i.e. the large metal burner at the back of the site).

Burnable (paper, cardboard, wood) -Can be burned next to the solid waste site by the city workers to reduce the volume of the waste. See the attached burn barrel construction design. NOTE: fires producing black smoke should be put out. Do not burn during dry months.

Aluminum cans -Can be sent to Anchorage for recycling (free of charge) by local air carriers. Contact MarkAir, or other air carriers in your area for more information.

If possible, waste volume should be reduced by compaction with heavy equipment. Periodically the waste remains should be covered with fill soil and compacted further.

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WATER, WASTE WATER & SOLID WASTE OPERATION & MAINTENANCE GUIDELINE

The following is an explanation of how an operation and maintenance organization could be developed and used by the city.

OPERATION - At the time of the survey the village was keeping some records of O&M for the water, waste water, and the solid waste disposal site. The village should keep track of the city utilities to help insure that these services be provided to the residents at the highest possible quality and at a reasonable cost to the village. Record keeping of the following items should be kept.

1. A maintenance schedule
2. Designation of operators and description of their duties
3. The collection of user fees
4. The expenditure of revenues collected from user fees
5. A record of all income generated and all expenditures.

This information even in a simple form, helps to improve the efficiency with which the sanitation facilities are operated. Through the use of such records the city could use it's financial resources in the most effective manner possible. This allows the city to anticipate, and plan for, the financial expenditures associated with maintaining the present systems.

RECORDS - Accurate records can greatly assist the village in identifying problems and budgeting expenses. This office recommends that the traditional council keep complete and accurate records of the following items:

Related to the water system -

1. Flow meter readings
2. Storage tank levels
3. Chemical usage: chlorine, polymer other
4. Fees collected
5. Expenditures
6. Consumer complaints
7. Preventative maintenance

FOR EXAMPLE - Daily chlorine level (ppm) readings should be recorded and sent to OEH each month with the monthly water sample. These readings are required by Alaska Department of Environmental Conservation (ADEC) and the Environmental Protection Agency (EPA). Monthly forms are included in the water packs sent out by this office each month.

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The following is a list of some basic records that provide beneficial information to the operator and to the city:

Related to the water system

1. electricity used during month _____ kwh used
   _____ cost
2. water pumped during month _____ gallons
3. chemicals used during the year _____ pounds chlorine (Calcium Hypochlorite)
6. major problems:

Related to the sewer system -

1. Preventative maintenance
2. Fees collected
3. Expenditures
4. Consumer complaints
5. Other

By keeping records it is easier to determine where money is being wasted or saved. It can also indicate possible equipment (parts) problems such as pumps, heaters or when supplies need to be ordered.

FEES EXPENSES AND TOTALS - This office also recommends that the village keep complete and accurate financial records for the water system, the sewer system and the solid waste system. A common stumbling block for village operated sanitation facilities is a lack of accurate complete financial records. Financial records should be kept on the following expenses.

1. Parts and Supplies
2. Equipment
3. Chemicals
4. heating fuel
5. Freight, etc...
6. Wages

FOR EXAMPLE - dollars per year spent by the city to employ water, sewer and solid waste operators.

The city should be able to determine the total yearly costs of operating the water, sewer and solid waste facilities. User fees should be used to help make these services more self-supporting (if practical).

**Technical Assistance operating and maintaining water, sewer and solid waste systems may be obtained through this office by calling OEH collect at 543-4117.

SURVEY CHECKLIST DATA

DATE: February 8-12 1993 SURVEYED BY: Tom Mazzini
LOCATION: Tununak CITY ADMINISTRATOR: Andrew J. Chikoyak
OPERATORS: Victor Kanrilak Sr. TELEPHONE: City Office : 652-6312
POPULATION : 354 SERVICE FEES: NONE
HOMES: 73 PUBLIC BUILDINGS: 2 OTHER UNITS:

WATER SYSTEM CHECKLIST

SERVICE CONNECTIONS: HOMES: NONE BUSINESSES: NONE PUBLIC BUILDINGS: NONE
WATER POINTS 6 POPULATION SERVED: all SERVICE FEES: NONE
OPERATORS: Victor Kanrilak Sr.

A. SOURCE

1. SURFACE WATER ____
   a. Lake/Pond/Reservoir ____
   b. River/Stream X
   c. Other ____
   d. Siltation Controlled ____

2. GROUND WATER ____
   a. Drilled Well ____
   b. Dug Well ____
   c. Driven ____
   d. Properly Sealed/ Protected ____
   e. Other ____

3. DISTANCE FROM NEAREST POLLUTION SOURCE ~ 200 feet

4. ADEQUATE QUANTITY/QUALITY ____

B. PUMPHOUSE

1. Electricity Provided Y
2. Heating Adequate Y
3. Electric Pump(s)/Motor(s) Y
4. Flow Meter Operational X
5. Equipment/Supply Storage X
6. Pipes Free of Corrosion X
7. Restricted Access Y
8. First Aid Equipment Available X
9. Housekeeping X
10. Fuel Consumption Recorded Y
11. Alarm System Operational X
12. Safety Equipment Available Y
13. Other ____

C. TREATMENT AND TESTING

1. CHLORINATION Y
   a. Gas ____ Batch Y Other ____
   b. Chemical Pump Y
   c. Type/Model Number A151- 91FS LMI
   d. Free Chlorine Level 0.2 X ppm
   e. Pump Setting SK 100 SD 45
   f. Gas Alarm ____
   g. Adequate Chemical Supply Y

2. FLUORIDATION Y
   a. Chemical Pump ____
   b. Type/Model Number A151-91FS LMI
   c. Pump Setting SK 20 SD 20
   d. Fluoride Level 1.2 ppm
   e. Batch Y Saturator ____
   f. Adequate Chemical Supply Y

3. FILTRATION Y
   a. Type SAND FILTERS
   b. Backwash Frequency MONTHLY

4. BACTERIA ANALYSIS Y
   a. As Required by State, EPA X
   b. Lab OEH,YKHC,BETHEL
   c. Compliance with Regs. Y

5. WATER SOFTENING N
6. METER READINGS (RECORDED)
   a. Water (Gallons) ____
   b. Gallons/Minute ____

D. WATER STORAGE

1. Storage Tank 50000K
2. Compound Maintained Y
3. Restricted Access Y
4. Liquid Level Indicator N

E. OPERATION

1. As Builts Available Y
2. Valves/Boxes N/A
3. Hydrants Operational N/A
   a. Flushed as Required ____
4. Infiltration/Exfiltration Controlled Y

Received by: Victor Kanrilak Sr.

COMMUNITY LIQUID WASTE DISPOSAL SURVEY

SERVICE CONNECTIONS: HOMES: NONE BUSINESSES: NONE PUBLIC BUILDINGS: _____
POPULATION SERVED: 354 SERVICE FEES: NONE
OPERATOR: NONE

A. COLLECTION

1. HONEY BUCKETS Y
   - a. Premise storage adequate N
   - b. Collection frequency N
   - c. Haul vehicle N
     - 1. Adequate size N
     - 2. Proper design N
   - d. Waste handled properly Y
   - e. Waste properly disposed of X

2. SEWERS N
   - a. Manholes
     - 1. Located ____
     - 2. Free of debris ____
     - 3. Proper covers ____
     - 4. Surface erosion controlled ____
   - b. Service lines/mains
     - 1. Maintained ____
     - 2. Size _____
   - c. Infiltration controlled ____

3. LIFT STATIONS N
   - a. How many ____
   - b. Ventilated ____
   - c. Secured ____
   - d. Pumps operational ____
   - e. Warning System Operation ____
   - f. Size meets demand ____
   - g. Safety equipment available ____
   - h. Lighted ____
   - i. Other ____

4. PRIVIES N
   - a. Sound construction ____
   - b. Ventilated/screened ____
   - c. New pit dug as needed ____
   - d. Old pit properly covered ____
   - e. Location ____

B. TREATMENT

1. SEPTIC TANK N
   - a. Surfacing sewage ____
   - b. Inspection holes located ____
   - c. Inlet/outlet clear ____
   - d. inspected/pumped as necessary ____
   - e. Surface drainage directed

2. LAGON School
   - a. Access road maintained Y
   - b. Controlled access Y
   - c. Warning signs posted Y
   - d. Liquid/odor controlled N
   - e. Brush/weeds controlled N
   - f. Proper overflow drainage Y
   - g. Effluent chlorinated N
   - h. Surface drainage controlled Y

3. SECONDARY TREATMENT N
   - a. Type of system _____
   - b. Building sound? ____
   - c. Controlled access ____
   - d. Warning signs posted ____
   - e. Electricity provided ____
   - f. Heating adequate ____
   - g. Housekeeping adequate ____
   - h. Liquid odor and color satisfactory ____
   - i. Pump/motor/blower operational ____
   - j. System properly sized to the hydraulic load ____
   - k. Final effluent chlorinated ____

C. DISPOSAL

1. Discharge lines 2 - school and pumphouse
   - a. locations: school to lagoon next to fuel farm. Backwash line from pumphouse lagoon

2. SEWAGE PIT/BUNKER/DIKE Y
   - a. Properly located Y
   - b. Location X
   - c. Controlled access X
   - d. Odors objectionable Y

D. OPERATION

1. State waiver on treatment or testing N
   - a. Effective date _____
2. Sewer lines flushed NA
   - a. Frequency ____
3. Septic tank pumped NA
   - a. Frequency ____
4. As builts not locate

Received by: Andrew J. Chikoyak

COMMUNITY
SOLID WASTE DISPOSAL SURVEY

SERVICES: HOMES: All PUBLIC BUILDINGS: All OTHER UNITS: All
POPULATION SERVED: All COLLECTION/DUMPING FEES: NONE
OPERATOR: none Stanley Kanrilak Burns all Medical Waste

A. STORAGE NA

N
1. Covered containers
2. Dumpsters
3. Storage areas free of debris
4. Other

B. COLLECTION

1. Frequency none
2. Covered haul vehicle N
3. Compactor N
4. Equipment maintained NA

C. ACCESS ROAD

1. Passable Y
2. Signs posted X
3. Litter controlled X

D. SITE X

1. Nearest residence ~1.0 MILE
2. Nearest surface water 200 FEET
3. Controlled access N
4. Fenced X
5. Signs Posted X
6. Rodents/insects controlled N
7. Animals Controlled N
8. Proper Surface Drainage
9. leaching Y
10. Suitable cover material available N
11. Locking gate N

E. METHOD OF OPERATION X

1. Open dump Y
2. Trenching N
3. Area fill N
4. Other
5. Equipment available and maintained Y
6. Operator assigned/trained X
7. Refuse scatter controlled N
8. Compaction adequate N
9. Trenches dug perpendicular to prevailing wind N
10. Completed fill properly covered N
11. Separate site for disposal of large appliances, autos demolition debris, etc. N
12. Dumping controlled N
13. Burning controlled N
14. Scavenging controlled N
15. Separate dead animal pit N
16. Separate sludge pit NA

Received by: Andrew J. Chikoyak

LEGEND: Y=YES N=NO N/A=NOT APPLICABLE X=SEE COMMENTS

OPERATION AND MAINTENANCE

A. OPERATION — Y

1. O&M ORG. ESTABLISHED — N
2. OPERATOR TRAINED/ASSIGNED — Y
3. EQUIPMENT: — Y
   a. MAINTAINED — Y
   b. PM SCHEDULED — N
4. SPARE PARTS AVAILABLE — SOME
5. ADEQUATE TOOL INVENTORY — N
6. SAMPLES/TESTS TAKEN AS REQUIRED BY STATE/EPA: — Y
   a. CHLORINE — Y
   b. FLUORIDE — Y
   c. BACTERIOLOGICAL — Y
   d. EFFLUENT — NA
7. SEWER LINE FLUSHED — NA
8. SEPTIC TANKS PUMPED — NA
   a. FREQUENCY — _____
9. HAUL VEHICLE FLUSHED AFTER EACH USE — NA
10. SEWAGE RECEPTACLES RINSED AND SANITIZED — N
11. EMERGENCY GENERATOR — N
    a. GASOLINE POWERED — N
    b. DIESEL POWERED — NA
    c. TESTED MONTHLY UNDER LOAD — NA

B. RECORDS — Y

1. FLOW METER — N
2. PREVENTATIVE MAINTENANCE — N
3. FEES COLLECTED — N
4. EXPENDITURES — Y
5. CONSUMER COMPLAINTS — N
6. STORAGE TANK LEVELS — N
7. CHEMICAL USAGE: — Y
   a. CHLORINE — Y
   b. POLYMER — N
8. OTHER — Y

C. FEE COLLECTION — LAUNDRY

1. FLAT RATE: — $ Y
   a. WATER — $ NONE
   b. SEWER — $ NONE
   c. SOLID WASTE — $ NONE
   d. WATER & WASTE — $ NA
2. METERED/1000 GALLONS: — N
   a. WATER — $ N
   b. SEWER — $ NA
   c. WATER & SEWER — $ NA
3. OTHER COLLECTIONS: — N
   a. NA
   b. NA

D. EXPENSES — Y

1. WAGES — $ Y
2. ELECTRICITY — $ Y
3. PARTS AND SUPPLIES — $ Y
4. EQUIPMENT — $ Y
5. EQUIPMENT O&M — $ N
6. CHEMICALS — $ Y
7. HEAT — $ Y
8. OTHER EXPENSES — $ Y
   a. MISC. — $ _____
   b. _____ — $ _____

E. TOTALS — Y

1. TOTAL COLLECTED — $ Y
2. TOTAL SPENT — $ Y
3. TOTAL AHEAD — $ Y
4. TOTAL LOSS — $ Y

LEGEND: Y=YES N=NO N/A=NOT APPLICABLE X=SEE COMMENTS

VIII. HAZARDOUS MATERIAL AND SAFETY REPORT

LOCATION OF HAZARD(S):

/	A. Water Treatment Plant
/	B. Village Power Plant
/	C. School (High and Elementary)
/	D. Village Proper
/	E. Individual Home/Premises
/	F. Local Business Corporation
/	G. Landfill (solid waste site)
/	H. Other

TYPE OF HAZARD:

	1. Material Spill (liquid)
X	2. Improper Disposal of Hazardous Material/Waste
X X	3. Fuel Oil Containment Facilities
X	4. Unidentified Material (drums, barrels, etc.)
	5. Infectious/Biological Material
	6. Toxic Gas/Vapor/Fume Presence
	7. Electrical Hazards
	8. Structural Hazards (boardwalks, steps, etc.)
X	9. Fire Extinguishers Not Provided/Maintained
	10. Lack of Training in Hazardous Material Handling
	11. Hazardous Material Storage (lockable/isolated)
	12. Warning Signs Not Provided Where Hazardous Materials are Stored
	13. Hazardous Material Disposal Ordinance
X	14. Other (Stray Animals)

CC: LIST

Original to: Ervin L. Moore, R.S., MPH
Director, DES, AANHS

Draft Copies to: Tununak City Administrator

Agnes Hooper, Bernadette Agimuk- Health Aides

Dave Shoultz, Field Engineer, EH & EB, Bethel

Village File, OEH, Bethel

Final Copies to: Darlene Wright, YKHC, Program Manager, Tribal and Program Support Services

Tununak City Administrator
Andrew J. Chikoyak
Tununak Alaska, 99681

Agnes Hooper, Bernadette Agimuk
C/O Health Clinic
Tununak, Alaska, 99681

Victor Kanrilak, SR.
General Delivery
Tununak, Ak 99681

Nova Blazej
Environmental Planner
AVCP
P.O. Box 219
Bethel, AK 99559

for household water barrels:

HOW TO KEEP HOUSEHOLD WATER BARRELS CLEAN

Problem:
Water buckets and barrels get dirty and need to be cleaned periodically just as do kitchen plates and cups. If not cleaned bacteria will begin to grow on the bottom and sides of the container. Eventually the inside of the barrel will become spotted or covered with slimy bacterial growth. Once bacteria are growing in the water the barrel acts like a "pond" in your house. This indoor pond you have created is a great place for algae, aquatic plants and insect larvae to live in your drinking water! Since a house is kept warm these organisms can grow faster in your water barrel than in a tundra pond. When this situation is allowed to occur germs are easily spread to anyone who drinks that water.

Solution:
To avoid breeding germs in your water barrel, it should be cleaned out each time it is emptied. A good way to clean the barrel is to take a bowl of water and add a 1/2 teaspoon of chlorine bleach. Then soak a clean cloth in the bowl. Next, wipe and scrub the container with the cloth. Lastly, rinse the barrel with about a half gallon of water. Then it is ready to be refilled.

Supplies Needed:
- teaspoon
- bowl
- chlorine bleach (regular)
- clean cloth
- about a 1/2 gallon of water

related t ire prevention:

FIRE EXTINGUISHER "QUICK CHECK"

A periodic check (monthly) inspection of extinguishers should include a "QUICK CHECK" of at least the following items:

1. Is the extinguisher in a designated place (hanging on the wall)?
2. Is the extinguisher visible and unobstructed?
3. Are the operating instructions legible and facing outward?
4. Are the seals and tamper indicators present and unbroken?
5. Is the extinguisher full (check by weighing or hefting)?
6. Is the canister without damage (dented, cracked, corroded or leaking)?
7. Is the extinguisher charged to the right amount (not undercharged or overcharged)?

If the answer to all of the above questions is **YES** than a tag should be attached to the extinguisher, then signed and dated. A "QUICK CHECK" such as this should be preformed monthly to be sure the extinguisher is ready for emergency use.

FOR ADDITIONAL INFORMATION OR TRAINING CONTACT THE OFFICE OF ENVIRONMENTAL HEALTH (OEH) AT 543-4117.

DRAFT

MEMORANDUM OF AGREEMENT
BETWEEN
THE INDIAN HEALTH SERVICE
AND
THE CITY OF TUNUNAK, ALASKA
AND
THE LOWER KUSKOKWIM REGIONAL EDUCATIONAL ATTENDANCE AREA SCHOOL DISTRICT
AND
THE BUREAU OF INDIAN AFFAIRS

PROJECT NO. AN-79-216
PUBLIC LAW 86-121

MEMORANDUM OF AGREEMENT
BETWEEN
THE INDIAN HEALTH SERVICE
AND
THE CITY OF TUNUNAK, ALASKA
AND
THE LOWER KUSKOKWIM REGIONAL EDUCATIONAL ATTENDANCE AREA SCHOOL DISTRICT
AND
THE BUREAU OF INDIAN AFFAIRS

PROJECT NO. AN-79-216
PUBLIC LAW 86-121

THIS AGREEMENT is made between the United States Government, acting through the Indian Health Service, part of the U.S. Public Health Service, hereinafter referred to as the IHS, under and pursuant to the provisions of Public Law 86-121 (OMB 13.229); the City of Tununak, Alaska, acting through the City Council, hereinafter referred to as the City; the Lower Kuskokwim Regional Educational Attendance Area School District, hereinafter referred to as the LKSD; and the Bureau of Indian Affairs, hereinafter referred to as the BIA.

WHEREAS, the City desires to obtain a satisfactory water supply and waste disposal facilities for the Native residents of Tununak, and

WHEREAS, the City, acting through the City Council, by a project proposal dated May 7, 1968, requested assistance from the IHS, under Public Law 86-121, to develop sanitation facilities for the Native residents of Tununak, and

WHEREAS, the LKSD desires to obtain a satisfactory water supply and waste disposal facilities for the new high school in Tununak, and

WHEREAS, the BIA desires to obtain satisfactory waste disposal facilities for the BIA grade school in Tununak, and

WHEREAS, the IHS desires to assist in the construction and installation of water supply and waste disposal facilities for the Native residents of Tununak, Alaska.

NOW THEREFORE, in order to carry out the project as set forth in the attached project summary entitled "Sanitation Facilities Construction, City of Tununak, Alaska", the parties mutually agree:

CITY CONTRIBUTIONS AND OBLIGATIONS:

1. That the City will provide, without cost to the IHS, a representative to coordinate Native participation under this agreement including: active promotion of attendance of Native participants at meetings; obtaining consent of each participating Native family on forms furnished by the IHS; and actively promoting attendance of Native members in the fulfillment of labor responsibilities assumed by the City under this agreement.

2. That the City hereby grants permission for the IHS or its representatives to enter upon or across City land and to carry out the project outlined in the project summary and provided for in this agreement. Further, the City agrees to waive all claims for damages that may arise because of such entry upon City land, except those which may be recognized under the Federal Tort Claims Act.

3. That the City hereby grants permission for the IHS staff archaeologist to conduct an archaeological survey to inventory and delineate significant historic, archaeological, or cultural values which may be impacted by sanitation facilities construction. The IHS requires this permission in order to comply with the Historic Preservation Act of 1966 and Presidential Executive Order 11593. (The survey is a surface survey with limited subsurface testing along proposed water and sewer mains, building locations, material sites or storage yards. The purpose of the survey is to avoid impacting, if possible, all historic values in the community. Any artifacts recovered during the survey will be stored and protected by the United States Government until proper storage and housing facilities are available in the community and after Native lands have been conveyed to the appropriate Native corporations. Upon the community's request, the State Director's Office, Bureau of Land Management, will return such artifacts to the community after the land has been transferred and proper storage facilities are available within the community.)

4. That the City will obtain and provide to the IHS all easements and/or rights-of-way on or over public or private land within the community as in the judgement of the project engineer may be necessary to install and operate the facilities provided for under this agreement. Further, the City waives all claims for compensation and damage for these easements and/or rights-of-ways, except those which may be recognized under the Federal Tort Claims Act.

5. That the City will provide, with no rental charge to the IHS, any construction equipment that the City has available at the time of construction and that could be used on this project.

6. That the City will contribute without charge to the IHS or its representatives sand, gravel, and shot rock, in the quality and amounts determined necessary by the project engineer, that may be available from areas controlled by the City. Sufficient gravel and rock will be provided for backfill, pipe bedding, and other such uses in constructing required facilities.

7. That the City will provide at no cost to the IHS or its representatives adequate field office facilities for the project supervisor. This building must be acceptable to the project engineer. In addition, the City will provide, at no cost to the IHS or its representatives, adequate facilities for the safe storage of project materials. These facilities must include an area approximately 12 by 16 feet (minimum size) which will protect materials from pilferage and weather and an outside area approximately 150 by 150 feet (minimum size) with sufficient room for the larger, more weather resistant materials. The office and storage facilities must be available for the duration of the construction period.

8. That the City, at the start of construction, will encourage the pumphouse operator and assistant operator to be a part of the work force during construction so they will know how the facilities are constructed. For the hours that they work on the project, they will be paid at the

specified labor rate from project funds. As portions of the project are put into operation, they will be paid by City funds for the hours that they work on the operation and maintenance of those portions which have been transferred. Upon completion of the entire project, they will become fully employed by the City as system operators. They will be paid at the rate to be determined by the City Council from City funds. These individuals will receive further training by the IHS to operate and maintain the facilities for the benefit of the City.

9. That the cost of labor shall be determined from the prevailing Davis-Bacon wage rates. IHS will provide an amount equal to 75 percent of this cost. The actual amount paid to the employees will be determined by the City Council. The City will contribute, without cost to the IHS, 25 percent of the cost of labor (based on current Davis-Bacon wage rates) necessary to provide the City with water, sewage, and solid waste facilities as described in the project summary and further specified in the final plans and specifications. Any wages or cost of fringe benefits over the amount provided by IHS must come from City funds or in-kind contributions by the City.

10. That the City will deposit all funds received for labor payments on this project in a separate bank account labeled "Labor Account" and insured by the Federal Deposit Insurance Corporation. Use of these funds is solely for the purpose of paying for labor or previously agreed upon materials or equipment required to construct the sanitation facilities. The City will obtain approval from the IHS prior to making any payments or purchases.

11. That the City shall provide the administration to perform the necessary bookkeeping and payroll management for the City labor force on this project.

12. That the City shall perform the following functions:

a. Complete payroll records;

b. Withhold Federal and State income taxes and transfer the withheld funds to appropriate governmental agencies by required deadlines;

c. Pay for Workman's Compensation and liability insurance premiums from the Labor Account to cover project employees while actually employed by the City on this project by required deadlines;

d. Pay the employer's contribution for unemployment compensation and/or Social Security (FICA) deductions from the Labor Account if the City is already committed to these programs or if the City Council elects to enroll in these programs. Further, the City shall deduct from each employee's paycheck the employee contribution for the Social Security program if the City is, or decides to participate, in this program. The City shall deposit these employer and employee contributions to the appropriate governmental agencies by required deadlines;

e. Issue paychecks to employees every two weeks; and

f. Furnish copies of payroll, time sheets, or receipts substantiating expenditures from the Labor Account fund to the project engineer at his request. The Labor Account will be subject at any time to an audit by the project engineer and/or certified auditing agency. Funds not utilized for labor or approved purchases of materials and equipment will be returned to the IHS upon request of the project engineer.

13. That the City will be responsible for maintenance of the septic tank/drainfield system which will require pumping and sludge disposal once a year (at the minimum). The City will enter into an agreement with the LKSD and BIA pertaining to sharing costs incurred for the septic tank/drainfield maintenance.

IHS CONTRIBUTIONS AND OBLIGATIONS:

14. That the IHS will contribute, without charge to the City, all materials, supplies, equipment and technical supervision required for the installation of adequate sanitation facilities as provided for in the project summary.

15. That the IHS will contribute to the City a cash contribution equal to not more than 75 percent of the cost of all labor, exclusive of project supervisors' salaries, required for construction of proposed facilities. The cost of labor, of which this contribution is a part thereof, shall include cost of direct wages paid to employees as well as employer's contributions to any Social Security, Workman's Compensation, or liability insurance payments. The total amount of the IHS contributions shall not exceed $30,000. The amount of this contribution is based on the estimated man-hours required times the wage scales set forth by the Davis-Bacon hourly rates for the trades involved. The actual hourly wage rate shall be determined by the City Council. Time sheets of employees shall be kept by the IHS supervisor and submitted to the City bi-weekly. The City shall furnish copies of all payroll records for project employees to the IHS and a copy of the monthly bank statement will be sent to the project engineer. Funds not utilized for labor or previously agreed upon materials or equipment will be returned to IHS upon request by the project engineer.

16. That the IHS will pay for all operation, maintenance, and repair costs for City-owned construction equipment provided under Section 5 of this agreement while such equipment is actually being utilized on this construction project. The equipment will be returned to the City in a condition equal to or better than its condition when first utilized by IHS, excepting normal wear

and tear. The project engineer and a representative of the City shall sign and date statements on the condition of such equipment before and after its use by IHS.

17. That the IHS will provide, without charge to the City, an operator's manual and instruction on the proper utilization, maintenance, operation, and protection of the facilities provided for herein.

18. That the IHS will aid in the drafting of an agreement between the City LKSD and BIA concerning the sharing of costs incurred for septic tank/drainfield maintenance.

LKSD CONTRIBUTIONS AND OBLIGATIONS:

19. That the LKSD will provide, without charge to the IHS, a representative to work with the project engineer and/or supervisor to coordinate the LKSD participation under this agreement.

20. That the LKSD hereby grants permission for the IHS and its representatives to enter upon or cross over lands owned or controlled by the LKSD for the purpose of carrying out the project outlined in the project summary and provided for in this agreement, and further agrees to waive all claims for damages that may arise because of such entry upon LKSD land, except those which may be recognized under the Federal Tort Claims Act.

21. That the LKSD will contribute $22,000 as its share of the project costs required to provide water service from the pumphouse/washeteria to the new proposed school and to install a septic tank/drainfield system for the school's

wastewater. A total of $10,000 of the contribution will cover the cost to purchase and install additional pumps and plumbing required to pressurize the school's circulating water line running from the pumphouse to the proposed school building. A total of $12,000 of the contribution will cover the cost of installing the septic tank/drainfield system. The contribution shall be made directly to the IHS with a check marked "Contribution to Sanitation Facilities Construction, Project AN-79-216, Tununak, Alaska", upon written request by the project engineer.

22. That the LKSD will pay the City a monthly service charge to be established and agreed upon by the LKSD and City for water services. This charge will be renegotiated annually between the LKSD and the City and will include the cost (such as electricity, replacement costs, operation and maintenance costs, etc.) to operate and maintain the pressure pumps and appurtenances servicing the school. Further, the LKSD shall enter into an agreement with the City and BIA pertaining to sharing costs incurred for the septic tank/drainfield maintenance.

BIA CONTRIBUTIONS AND OBLIGATIONS:

23. That the BIA will provide the IHS will all easements and/or rights-of-way on or over BIA property within the City as in the judgement of the project engineer may be necessary to install and operate the septic tank/drainfield system provided under this agreement. Further, the BIA waives all claims for compensation and damage for these easements and/or rights-of-way except those which may be recognized under the Federal Tort Claims Act.

24. That the BIA will reimburse the IHS for those materials used in the construction of the BIA sewer line at the completion of the project. Further, the BIA shall deliver said materials to the IHS upon written notice by the project engineer.

25. That the BIA shall enter into an agreement will the LKSD and the City pertaining to sharing costs incurred for the septic tank/drainfield system maintenance.

TRANSFER OF FACILITIES:

26. That in consideration of the contributions made and the responsibilities undertaken herein by the City, upon completion of the project, the IHS will transfer to the City without a monetary consideration, all right, title, and interest which IHS may have in all community facilities and appurtenances constructed up to the lot line of each house, including all materials, supplies, and equipment provided for and/or incorporated in such facilities.

27. That the City hereby agrees to accept the transfer of such facilities and to protect such facilities as the property of the City, to keep the facilities in an effective operating condition.

28. That in consideration of the responsibilities undertaken by the BIA, upon completion of the project, the IHS will transfer to the BIA in accordance with this agreement and without a monetary consideration, all of the right, title, and interest the IHS may have in sanitation facilities and appurtenances constructed within property under control of the BIA.

HEALTH ORDINANCES:

29. That the City, upon completion of the project, will continue to establish and collect service charges from users to pay for operation and maintenance of sanitation facilities. Service charges will be sufficient to cover costs of operator's wages, electricity, fuel, chemicals, repair parts, and replacement equipment for the facilities installed.

30. That the City agrees to continue to enact and enforce appropriate ordinances and regulations necessary to govern the use of and to protect the community water supply and waste disposal system.

PROJECT SCHEDULE AND SUPERVISION:

31. That it is important that the installation of the water supply and waste disposal facilities provided for herein be completed as soon as is practicable in accordance with the schedule of the IHS project engineer.

32. That all of the foregoing work will be performed under and in accordance with the technical direction of the IHS project engineer.

IN WITNESS WHEREOF, the parties have subscribed their names.

FOR THE CITY OF TUNUNAK, ALASKA

9-26-79
Date

Mayor, City of Tununak, having been duly authorized by the City Council to enter into this agreement on behalf of the City of Tununak as evidenced by the Resolution made by the City Council of Tununak, Alaska

FOR THE ~~Lower~~ Lower KUSKOKWIM REGIONAL EDUCATIONAL ATTENDANCE AREA SCHOOL DISTRICT

10/11/79
Date

Superintendent
~~Lower Yukon~~ Lower Kuskokwim Regional Educational Attendance Area School District

FOR THE BUREAU OF INDIAN AFFAIRS

2/5/80
Date

~~Contract Specialist~~
Bureau of Indian Affairs
Juneau Area Office

RECOMMENDED APPROVAL

9/28/79
Date

Joe Franklin, Acting Chief
Area General Services Branch

FOR THE INDIAN HEALTH SERVICE

9/28/79
Date

G. H. Ivey, Director
Alaska Area Native Health Service
Public Health Service, Department of Health, Education, and Welfare

WHEREAS, the domestic water service and waste disposal facilities and their appurtenances, materials, supplies, and equipment provided for and incorporated therein pursuant to the aforesaid agreement are the property of tne IHS, and

WHEREAS, the parties desire to provide for and assure the proper and efficient maintenance and continued operation of the sanitation facilities, and

WHEREAS, under Section 7(a)(4) of Public Law 86-121, the IHS is authorized to transfer the completed facilities with or without a monetary consideration, and under such terms and conditions as in its judgement are appropriate, considering the contributions made and the maintenance responsibility undertaken, and the special health needs of the Native people.

NOW THEREFORE, in accordance with the terms of the aforesaid agreement, and pursuant to Section 7(a)(4) of Public Law 86-121:

1. The IHS hereby transfers, assigns, and conveys to the City, without a monetary consideration and under the terms and conditions set forth in the agreement, all of the right, title, and interest of the IHS in all community facilities constructed. Community facilities include, but are not limited to, the following:

    a. New intake structure;

    b. 900 feet of 4-inch insulated transmission line;

c. Pumphouse renovations; and

d. Two 6,000 gallon septic tanks with 460 LF of sewer main and 932 LF of leachfield.

2. The following items of equipment are transferred to the City in order to operate and maintain said sanitation facilities:

a. One each - Vehicle, All Terrain, Honda ATC 90, S/N 1729072, Voucher No. 79-03-0057, CN.41;

b. One each - Chain saw, Homelite Model DM50, S/N 690800020, Voucher No. 80-02-0025, CN.3; and

c. One each - Air compressor, Quincy Model 150315, S/N X215-106164, Voucher No. 79-08-0014, CN.17.

3. The City hereby accepts such transfer of facilities listed in Paragraphs 1 and 2 under the terms and conditions set forth in the aforesaid agreement and agrees to operate, maintain, and repair such community facilities as the property of the City and to keep the facilities in an effective operating condition.

4. The IHS hereby transfers, assigns, and conveys to the BIA, without further monetary consideration, all of the right, title, and interest the IHS may have in sanitation facilities and appurtenances constructed within property under control of the BIA.

5. The BIA accepts such transfer of facilities listed in Paragraph 4 under the terms and conditions set forth in the aforesaid agreement and agrees to

operate, maintain, and repair such BIA facilities as the property of the BIA and to keep the facilities in an effective operating condition.

6. The City agrees to continue to enact and enforce appropriate ordinances and regulations to protect the community water and sewage systems, and agrees to collect appropriate service charges from recipients of said facilities. The City further agrees to use revenues received from service charges for electricity, operators wages, equipment repairs, chemicals, fuel and those items necessary to operate and maintain said facilities properly.

IN WITNESS WHEREOF, the parties have subscribed their names.

FOR THE CITY OF TUNUNAK, ALASKA

10-4-80
Date

Mayor, City of Tununak, Alaska, having been duly authorized by the City Council to enter into this agreement on behalf of the City of Tununak as evidenced by the resolution made by the City Council of Tununak, Alaska

FOR THE LOWER KUSKOKWIM REGIONAL EDUCATIONAL ATTENDANCE AREA SCHOOL DISTRICT

21 Oct 80
Date

Superintendent
Lower Kuskokwim Regional Educational Attendance Area School District

FOR THE BUREAU OF INDIAN AFFAIRS

November 18, 1980
Date

Contracting Officer
Bureau of Indian Affairs

RECOMMENDED APPROVAL

11/25/80
Date

Richard D. Frost, Chief
Area General Services Branch

FOR THE INDIAN HEALTH SERVICE

11/26/80
Date

G. H. Ivey, Director
Alaska Area Native Health Service
Public Health Service, Department of Health and Human Services

APPENDIX I: PROCUREMENT STANDARDS, STATE OF ALASKA MANAGED PROJECT, CWA INDIAN SET-ASIDE CONSTRUCTION PROGRAM

United States
Environmental Protection
Agency

Region 10
1200 Sixth Avenue
Seattle WA 98101

Alaska
Idaho
Oregon
Washington

EPA

SEP 12 1991

Reply To
Attn Of: WD-085

MEMORANDUM

SUBJECT: Procurement Standards, State of Alaska Managed Projects
CWA Indian Set-Aside Construction Program

FROM: Roger K. Mochnick, Chief
Municipal Facilities Branch

TO: The Record

This office is currently reviewing a policies and procedures manual drafted by Alaska's Village Safe Water (VSW) program, for its use as an intended EPA grantee for Indian Set-Aside Projects in the Alaska native villages of Chefornak and Tununak. (VSW is a part of the state's Department of Environmental Conservation.) The manual is also intended to serve other native villages that may be approved for set-aside projects with State of Alaska participation, should additional appropriations be made.

Presently nine other ISA projects in Alaska are also underway under interagency grants to the Indian Health Service, a part of the U.S. Public Health Service. These projects are constructed under IHS policies and procedures, and are in conformance with EPA requirements.

After a thorough review of the procurement section of the manual and the pertinent EPA regulations, our analysis indicates VSW's procurement standards for the set-aside projects meet or exceed those referenced in 40 CFR 31. In fact, only the provisions of 40 CFR 31.36(a) apply for the following reasons:

1. The "subgrant" to the village by VSW does not constitute a grant as defined by §31.3: "Grantee means the government to which a grant is awarded and which is accountable for the use of the grant funds provided." According to the manual and confirming discussions with Keith Kelton and Lori Telfer of VSW, the state's "grant offer" to the village stipulates that a VSW engineer will represent the village in all technical matters related to the ISA project, and is the sole person to approve invoices and timesheets for payment. The state "grant offer" also requires an accounting firm, hired by VSW, to make all disbursements on behalf of the village.

Basically the village does not control the grant funds and is not accountable to the state for expenditures, and is therefore not a true "subgrantee." The state retains these

authorities, and therefore is the sole grantee under our regulation.

According to our regional counsel, the true relationship that exists between the state and the villages during the course of these projects is in the nature of a trust where control of the project funds actually rests with the state for the benefit of the villages. Upon completion of a project, title to the facilities then passes from the state to the villages, completing the trust.

2. A model set-aside project is underway in the village of Huslia using the current VSW procurement procedures. To date the project is very successful, and the procedures used in this project are appropriate for villages and meet the intent of 40 CFR Part 31.

3. This approach is consistent with Section 113 of the Clean Water Act, which clearly recognizes the need for unique approaches and flexible procedures for Alaska's unique arctic and remote conditions. These conditions are further compounded by minimal governmental infrastructure and a lack of necessary specific personnel in these villages, requiring that the actual grant work be done by others (VSW and IHS for example) on behalf of the villages.

4. It should be noted that under 40 CFR 31.36(a), the state is still required to comply with other federal statutes and executive orders, such as those in 31.36 (i) which are included in the VSW procedures as a condition of the grant awards.

In summary, EPA has determined that applying only the requirements of 40 CFR 31.36 (a) are sufficient to proceed with approval of the VSW manual.

cc: Chris Powers, MAB/OWEC (WH-546)

STATE OF ALASKA

DEPT. OF ENVIRONMENTAL CONSERVATION

WALTER J. HICKEL, GOVERNOR

WESTERN DISTRICT OFFICE
800 E. DIMOND BLVD., SUITE 3-470
ANCHORAGE, ALASKA 99515

349-7755

March 5, 1993

RECEIVED
MAR - 9 1993
PCA

Mr. Arvind Phukan
Phukan consulting Engineers & Associates, Inc.
203 West 15th Ave, Suite 104
Anchorage, AK 99501

SUBJECT: Sanitation Feasibility Study And Environmental Review For Tununak

Dear Mr. Phukan:

We have reviewed the proposed subject study and have the following comments.

PHASE I

1. The proposed sewer line improvements will require low pressure testing in accordance to Department referenced standards (18 AAC 72.950). Also, testing should include evaluating manhole integrity against infiltration and exfiltration, and structural integrity.

2. Approval of the sludge disposal area will require the submission of a solid waste disposal permit application.

3. Reconstruction of the drainfield will require assessment of loading criteria, soil conditions, water table elevations, and adequate separation to any potable drinking water supplies.

4. Plans for the outside solids tank need to be submitted.

5. Since you propose to use the bladder storage toilets in public buildings, has there been consideration of potentially higher loading ?

6. Plans for the solids haul trailer need to be submitted.

7. For construction plan approval of Phase I work, please submit complete set of plans and specifications on the project.

PHASE II

1. The drainfield performance will need to be evaluated. An adequacy test needs to be performed to determine if any deterioration has occurred since construction which may reduce the field effectiveness. The testing should also include water table monitoring to ensure an adequate 4 ft. separation exist to the bottom of the bed.

2. The well proposed for the disposal shed will need to be classified as non-potable. The Department would preferably like to see the well put in under guidelines as a public water system. Our reasoning for this is based on your report which indicated problems obtaining water in the village. If other sources become unavailable, there is a good chance water from this facility may be used for drinking.

3. In review of your proposed disposal shed design, we found potential problems with the disposal pipe structure. The current design with the pipe sticking out above the floor may allow uncontrolled leakage through out the building floor. A better design and what is used in most dump stations for recreational vehicles, a small shallow sloped spit is used with the collection pipe placed on the bottom. If spillage occurs outside the collection pipe, the waste is contained within the shallow pit and the operator simply washes the pit flushing everything down the collection pipe.

If you have any questions, please contact our Western District Office in Anchorage at 349-7755.

Sincerely,

Michael P. Lewis, P.E.
District Engineer

MPL:pf

cc: Bethel Field Office
Jim Patterson, VSW

July 11, 1992 2:PM To ____

Special Meeting with Elders of Tununak
from Elders Council of Tununak.

Elders Council, D. Keegan, Frank Flynn, V. Kamkilak Sr. T. Hooper
J. Pitka.

Elders. J. Angaiak, A. Menegak, S. Kamkilak M. Jamie, J. Flynn, M. Angaiak
D. Lincoln

Subject, Village Safe water, Letter to Jame L. Peterson, and letter from
Jame L. Peterson.

Nick. first last spring the Jame L Peterson Come
here Tununak Concerned of water & sewage
And we Elder says that of the Sovereign ~~Em~~
Emments is not changed we will stay at one
position.

And we did send the safe water papers to Hank
Ostuski to let him read. and make answer.

we did received letter from Jame L. Peterson saying
that he do except the 125,000. and after we
read we send copy of letter from Jame Peterson
to Hank. and I dick Lincoln Call Hank Concerned
of Safe water Project, ~~took~~ Hank says that the
Sovereign will not be last. But to go ahead and
sign the Contract to go ahead ~~and~~ that the Safe water
Can be, but Hank says that we have a Court-
that the our Court will be working if these people
are lying

in the letter of James L. Peterson, Hank understood if those people denied on the promise by Erased of our sovereign immunities, we will put them in Court using the James L. Petersons letter at the Court.

If we signed the Safe water we will proceed and Mr. Peterson will start work on the Tununak safe water, and money of $125,000 for start up in TWK

the Elders are taking the Hanks advise to the Safe water project here in Tununak,

June. we have been helped by Hank every sence we are in Tribal Elders here in Tununak, I think But Hank should be clear to us Concerned of Safe water project.

Dick. Read the Tununak Elders Council letter to James L. Peterson on date July 1, 1992 and read the letter from James L. Peterson Dated July 7, 1992 Concerned of Safe Water Project.

Dick Explain how the money was working from the federal to the Soverign Village.

the grant offer is signed on date July 11, 1992 by Elders Council of Tununak

Council Meeting

for Feasibility Study By Phukan Consulting Engineer
Att. By Steven Miller

Oct 27, 1992

Present. D. Keegan ~ Phillip James - absent - Present @ 2pm
F. Flynn ~
H. Oscar ~
T. Hooper ~
J. Pitka ~

Steven Miller are here to Turnund To present the Resolution for extention of money for water & sewer services for turnund and also to segned the Contract. Time P.M.

Miller Introduces of the Resolution, for water from the Musk ox River to Village of TOK. Turn in the Resolution by Nov. 1, 1994 for feasabilty study

The Resolution and the paper work for the Juneau, and the Cost estemate that if we are let Mr. Miller to let him on these paper for money from Juneau Mr. Miller wanted or could if we all agree the estemate Cost of from Musk ox 497,500.00 to Relocate the Pump Station.

We talked about under ground Existing water pipe that goes from unhooked PHS to the existing water pump under ground.

Miller say no more study but to make water gain as possible, But in future, is question mark.

all papers would go to H. Lincoln @ 1st - a questionaire from House to up housing -

Ann-Machine Rentals - a 50.00 for use of Sno-go - 10.00 to 12.00 per hour.

- Council Recommend 12.00 per hour.
- Steve Miller
Be back on NOV. & 6-9 will be here for APPOX. 10 days.

Jim Patterson will be send in the check what George & Dick has used for a day Rental and subsistence food allowances.

meeting adjorned 4pm.

Phukan - Engineers - 12-17-92 1pm

Elders Council - O.U. P.J., H.L. James P.

Elders - Dick L. Jack Angyak, Stanley K. Joseph Oscar. Victor Kanrilak, Mike Angyak, [illegible]

S.U. When we had the meeting few days ago concern of the Sewer plan - They'd like to meet w/you all elders that you know more about our environment - They'd like to meet w/you. that we will find some conclusion -

D.L. We'd like to know about your position what -

Phukan Introduced to elders and, the [illegible] Peterson, and Steve [illegible].

1st Only the 23th Unit housing -
~~Aricl~~ ariel (aerial pipe) what you have already selected at first place -

Below ground Sewer System -
1st need to look @ each manhole - to see if the pipes are straight - when he examine the pipes - he discovered that the pipes weren't straight - if it isn't straight -

manhole - places could go down and look - But in most places that it couldn't see.
he could look in + line - 2 looks good, 2 weren't look good.
The rest of the pipes he doesn't know

The ~~F~~ 2 pipes he examine didnt look good -

1 treatment Center -
t/s Other things arent good is -
uses alot $ to ~~do~~ the cleaning
- the pipe - didnt had (T) line welded under ground that would connect to the houses - it has to dig under ground to hook-up the Sewer line -

MJ it isnt good to have the underground - it would Be Better ~~would Be~~ to have the pipe above ground

M.A. Before we wanted on the above ground, But those workers has worked underground.
That we didnt agree underground -

- ~~about the [illegible]~~ -
!.A about the pipe - That

?.M. Pump station not feasable to what Steven miller thinks the station would then be alot of work for Victor Kanrilak Sr. The gravity system would be then alot of problem to maintain. -

Sewage system from High school to ~~the~~ PHS and then to drain field. ~~It~~ The sewer is all going up and down. -
Enough on this existing system - Question? anyone.

?.P. Question if the buried system will be used to connect the buried system, do the above ground system

tell what they're going to do. - Their here to find out what are the community members think and what we want.

Sewage haul system: of the 60 homes only 3 peoples wanted sewage haul system instead of piped system. — Septic tank system to 3 or 4 houses and then pump the septic tank every 2 or 3 year and pump to sewage disposal site.

System is Mekenzie by Canadian - The system has holding tank and the water is pumped to the flush toilet to each house. This system is a pressure haul system. - This system has low wate consumtion. — This syste has already or is being used and the faults are already known and the advantage of this system is when one ~~proble~~ have problem that will be one problem - with the piped system when theres a cloz the whole syste stops. while pressure system will be only one pzoblm.
Price estimate is $5,000.00 per house. or more.
The only problem is the haul system, by truck and where to dispose of the waste.
Storage tank connected to the flush toilet.

Up above ground systems —
Faber 117,365

All the expenses are on the paper phase - feasability Study.

863,000 - to Ree.
to work @ 50,000.
- Connie to Ree 10,000 -

total 924,000. - it could be used to complete the project. That would be exactly - the amount

today Gov. Hickel - and those workers - they set some - Calculations - that is ready for the project.

Steve - Ready grant Request - (do you see any problem anything on that)

didnt done anything about the Sovereignty Unity -
Jim | Steve - day to day Cost -

Jim - Technical overcast -

Jack would like to ask - about the drill to the Underground Steve Permafrost - to see the Premafrost - wether would it be good to display -
- to design the above ground System

D.L. - The Resolution - you have the Sovereign Unimity. When the State of ak - they always put the the Sover Unimity to said grant -

- to Think about this - do we gonna help the Community about the Health and well-being?

James - we are instructed about the Baird what the State has put into us.

Jane-P. even Through - We have got RDA -

Matthew-

George-

Jane - Today - a Way I understood - not only The Village What we have on hand - NOT only The Sovereignity Immunity -

We can not waive the Sovereignity Immunity. We have that Strength - if we

Only - we have

- Other Side d'd like to find out about the Waiver -

D.L. RDA - Resolution - Only Refering it. Even Brink - They have gotten grant for The transportation -

IS RDA Resolution - is for The Sewer / Equipment to use and Complete the project.

George - Kasiglidi - Conference - he has Said - about The money - That is nothing to be Scared -

Steve - The Resolution is for if you don't use This right

pb - you could Be Prosecuted.

But if you use The money right = my name would Be in The Resolution -

Steve - On Pg 15 -

Didi to Translate about The Firms who would Manage The

4

PL ~~[illegible]~~
doesn't you'd be getting the Equipment - What Manufactu
in some trucks - Some Equip - Could cause injuries
Especially Hydraulic Systems - It could easily
you could find the right truck - with the Manu
instructions - -

above Ground Sewer System - !

to try out the Sewer System to rather you like or not - This is to try throw the thing out.

Our office could be utilize - The Community hall would be suitable place to try out the Sewer.

Meeting adjourned @ 5:40pm

18 Dec 92

Councils.
George Usugan
Phillip M. Kusayak
Phillip James.
~~Harry Lincoln~~.

Elders Joseph Oscar
Mathias Jones.
Dick Lincoln
James Ritke
Mike Pigaiak
Harry Lincoln

1. GU. Explain extention of meeting
SB. discuss of the sanitation drafts.
* The permits needed for the plan for the reason of funds to be approved by the Juneau. the legislature may not above the plan.
The draft will be used if the elders were approve.
D.L. Explain ~~the~~ and discuss the caution of bad selected location.
M.A. Choose the location and suggest that the East side of the pond would be a good spot.
SB. stated that the disposal site would require 200 FT by 300 FT for 20 YR.
JO choose the depression on the south side of the dump yo
SB asked for agreement of the owned land and Elders approve. (TRC - land)
M.A. I've thinked since yesterday what the presentations were all about - it has to be examine it first before it become existing -
Steam - it would be a good idea - need to have the understanding and agreement - when we do the Engeneering this summer - when it becomes.
Hand Stystem - it would be hauled every 3 wells @ approx

A. Need the Corporation Board to discuss the matter to install the Equip.

J.P. That hauling System would also need to be dumped elsewhere - @ Winter the road would be covered w/snow. And that would be the problem.

Steve - it would be reasonable - quite a few people agreed to try out the haul System to improvement on the Sanitation Systems Water & Sewer would be the appropriate on the long term.

D.L. What if all the people wanted to have the Toilet -?

Steve - we only - owned get - the Sewer Money

D.L. I have asked him - not just the housing Area - and what if the Whole Village Want - these lower Village have 80 houses - it would use 5,000 ov for each house -

how would we get to the road -

On the Main Village - it could be changed - the housing area could only be established on the Sewer System. - F

Feasability to be done before February 1st.

adjourned @ 1110 AM.

C.C. Thank yo for coming

1-18-93

1:15pm -

Elders Present: Guest: Steve Miller Elders:

George W, P. Jones, Herman P, Tommy H. Harry L Mathias J. Stanley K. Victor. Kamilak

Andrew Chikoyak - James P, Frank F. John Walter Sr, Paul L, Leo Kamilak

Steve - 65% feasibility Study done - Review the sanitation Results, if you don't like them - You ~~the~~ could make the change. don't want to leave talk - unless all the questions answered & everyone understand the Report.

- The decision could be changed, if No.
- feasibility Study contains - to include the village Profile. May skip this -

- The introduction or the Report -
- Sanitation Study Been Studied for many years - but it hasn't gone any thing done.
- described the Honey bucket at Washington - They don't know the Honey-bucket - also mentioned The H.B. Bunkers -
- told them How we have gotten our water -
- There were no way to fight the fire in the Community.

* - Steve gave all the opinion what was important in Talk.

1) to get rid of the Honey bucket and worked for the Better way.
2) and get rid of the H.B. Bunkers.
3) Need a way to get rid of the Slutz in a better way.

Final - Talk - needs water System, improved So the Sanitation could be used

That was the introduction to the Report - is there anything that were suppose to mentioned could be include?

(1) Questions -

How are we gonna dispose and get rid of the Bunkers

Steve - Village Safe Water - introductory

Chap. 3. The planning -

Chapt. I Summary and Introduction

Chpt. III Description and Recommendation

Talked about the Hazards like wave - flood - weather - and anything to do w/ Hazard -
- Some time when Hyg. tide and w/ wind the village Sometimes washes across the main village.
- talked about the Earth quake - do you ever have the earth quake? not exactly - Mentioned the little wave in or about 1800's
- Health Hazards - Fire Hazards -
in 70's - Barry mentioned about couple houses where on fire and lose the family - if we had

Talked about,

- were included also the Jobs that were done in 1990's
- Subsistence hunting - trapping,
- Public facilities in Tak.
- Post office - air strip, post office, and board walks.
- Who is Responsible for the Board walks - ?
- after the Community City was dissolve the elders become -
- Armory and the school -
- Question - I Believe there is a Composite - toilet
- head start and Clinic -
- Water, telephone System, fuel Storage facility
Does the Elders Council have the fuel Storage -
Only the Washateria have 10,000 gal capacity fuel tank -
- Community Center, and the Safety Building, dump, water System laundry units, water and disposal Waste, Burners; Incomplete 23 units System, Boat Storage, Fish drying rack - Grass basket area, herring -
- mathias - the subsistence gathering

A.C.:-

James- would the IRA Resolution Be Shown to the Elders- after the Resolution Beened done.

Steve- get to gether w/ IRA and have the Resolution agreement-
The Juneau, ~~needs IRA~~ needs meets that IRA-

State demographer-
1990 Census- 1993- 2003 ± 2013 20yr planning
in 93- 321,

- Most populations would occur would add into the new- housing area-

N.C. Restoration Act: how we could take the land-

- access to the- air service, Cargo-
Question about the Barge Services-
How does the Barge Services Come into TNK on delivery:
Thats the End of Chapter III.

Steve- Chapter IV - Capital Projects-
ISW wants to know what project-
- Waste water projects 600,000
- 470,000 for the water improvement
- 100,000 for the dump truck & Equipment Repair.

- News from Juneau - TNK did not get the water from muck ox creek.
- notice decision has made yet for the Dump & Repair fund.

Schedule for the waste water project -
Comple 2/93
Start of plan 3/4/93 would Be done
Permit to Be done 4/5/93.
[illegible] 93

All Be Shipped in June or Aug 93.
project to start. June to Sept 93.

Contract - need to Be done By Feb. 1, 93. until March
Jim P. needs time to finish The feasibility & The State
Could Review. ~~The should be~~

Any Comment on that.
Brought the Extension of Feasibility -

~~Water~~ Construction Repair & Purchase -
need the Dump truck for haul the ground + ~~Dump~~ The Honey

Crawler dozer - Have need to Repair of The Equipment.

~~Chap II~~ Chap V
Existing Fascility -
① Incomplete Sewer & Septic System.
A) School - PHS, Bunkers -
and whatever Incomplete The On The Facility, Shown,
- talked about them in detailed.
- ground water leaks into the sewer system.
- described incomplete Septic System that are under ground.
that The water leaks in at Spring.
- PHS - Where The water & Sewer pipes goes to PHS from school.
how it Could Be - fixed the pipe line and how it could be
Changed. and how PHS. internal could be fixed
- Honey Bucket Bunkers - How they leak and kids play.
- Only Building in Town has with PHS School and teacher housing
- and every body else haul water and use honey bucket.
- the Armory is the only -
Water System - well - and PHS water tower
Sewer line that never finished.
with line to School to the village.

- Operation + Maintenance
  Victor State Certifications - But it has been expired and had problem finding some parts for repair.
- difficult to fill in the tanks @ winter times - cause the heat trace is broken - and freezes the water pipes and having problem on ~~money~~ not having enough money.
- Question
  School Charges on Charges on Sewer & Water -
- Get new contracts - to have the school charges on Both Sewer and Water.
- during survey - The Community need better Services on the water and Sewer System -
- Replacing the drain field won't cost too much -
- LKSD is willing to participate.
- The project is only for the Housing : not putting too much pressure on the drainage -

1. Need - have the extention on the near hole - Raise them up about 2-3ft - and level them w/ the other holes and Seal them so the water won't get in.
2. French on the - ground -

Charcoal filter - so the vent won't smells to much.
Honey bucket Burners - get Rid of the Burners @ the Housing area first. Cause the main Village Burners drains downwards

Water System -
- Well should Be relocate from Musk-ox Creek
  new above line should Be rebuild @ PHS.
  underground 2 inch - water line from - well to PHS should Be removed.
- pepline @ PHS should Be Changed and make it more Simple.

500
4
6000 -

- Should be made for the pumps to be the same - instead of reading in separate.
- ~~We should go ahead and repair~~

Question

Chlorination - does it wash out when Chlorination - Should be watched - so it doesn't repeat like in HPB.

- Also says need another storage should be added have to decide what size should be pumped @ the village wise it should be like 500 gallons per minute for 2 hours - it would be like 60,000 gallon for 2 hrs.

Your tank capacity is 50,000 gal. if it is full @ all times, the tank won't always be enough.

- Boiler - They need to be replaced.
- above school water sewer needs to be no problem.
- underground water & loop - needs to be tested to make sure it doesn't have hole.
- PHS. piping to tie on that line. if we can't get funding water system - tying in to BIA well.
- to be careful not to use too much water cause the salt water could be intrusion on the tank.
- he has summerize what it has to be said

Future Needs all the homes, store, churches except - school, PHS. and store needs water sewer.

- PHS system needs to be repaired or maintenance
- Summerize water system, need new well, new filtering
- need to provide water to 33 unit subdivision
- " have water for the fire fighting.
- final slugs disposal

- TNK never Been provided with the proper sanitation Slug disposal
- Could that be fed the area on the dump - would be the Best place to dump the Sludge and good for dump site.
The Village Should Buy a truck for dump the Sludge to disposal that is 4 wheel drive truck, 500 gal.

- Buy a truck - one last thing to maintain - w/ trailer or w/ trailer combine in 1 truck
Jim Patterson - Suggest

The trailer Should have a Pump and some other Thing like Water -
it would Be alot Better than nothing -

(Con't.) from Jan 18, 1993

Jan. 19, 1993

15
7
22 #

~~Con't to Jan~~

Con't to Jan 20, 1993

Subj. water/Sewage

Elders Council	Guest:	Elders
D. Usugan, P. Kusauyak	Steve Myller	Gene Flynn
H Oscar	Harry Finch	M. James
T. Hooper.	Admin: Andrew Chikoyak	D. Lincoln
F Flynn		W. Kanrilak
		L Kanrilak

SEE ~~Project~~ Phukan Book Pg. (43)

Call to order:

Elders meeting resumes. "Sanitation Chapter IV

(1) D.L. explained the extention letter to have ~~them~~ the elder's council sign extended to 8 Mar 93.

~~The letter needs to be signed at~~

G.W. The meeting now resumes. S.M. states that the plan is broken into 3 plans consists related matters to the project. Discussed were the equipment and cost of the project.

S.M: All mages will include all nessary cost covered. when estimating the cost he used high cost of project.

Con't. Jan. 20, 1993

Elders Council	Guest	Elders
D. Usugan	Steven Miller	Mathias James
H. Oscar	Andrew Chikoyak	Dick Lincoln
F. Flynn	Harry Finch	Victor Kanrilak
		Stanley Kanrilak

Meeting starts at 1:24 pm

it will cost for 23 housing system

Pipil sewer ... cont est 9,100 ... Al

Haul system & piped system we all have heard.
Haul system - has money available to cover all the cost as with the piped system the money is not all that available.
A. Chikoyak stated to have the community hear and understand about the system that the elders and elders council have had made meeting for 3 days on the 65% report.
It is also stated that if we unite with IRA, TRC and the whole community to make alot of noise to Juneau on this piped system to get it funded
- D. Tucker ~~did~~ stated that V.S.W. will sent 2 or 3 people to Mekoryak to take a look at the Haul system and see how they work.
- L. Miller stated that after he goes back and comes ~~back~~ back with the final report or draft with
- Jim Patterson - This final report will be final only when the Elders and Elders council approves it with the exception of having looked at the Haul system in Mekoryak.
- Permits all projects will have to have permits from federal, EBA and Fish and wild life service and all ~~those~~ those apply to get the permits.
L. Miller stated that he has talked with A. Angaiak of land ownership

Tununak Traditional Elders Council

March 2, 1993 Feasibility Study Final Draft Reports

Report - James Patterson, Steven Miller, Harry Lincoln

Time 7:PM

Elders	ABSENT:	Elders Council
1. Jens Flynn	Frank Flynn	George Waugan
2. Nadine Jones	Philip Kasayak	Herman Oscar
3. Mike Angaiak	~~James Pitka~~	Phillip Jones
4. Jack Angaiak		James Pitka
5. Victor Kamkoff Sr.		
6. Joseph Oscar Sr.		
7. Stanley Kamkoff		
8. Dick Lincoln		
9. John Wacker Sr.		

George: We are starting the meeting now - 7:25pm - We are about to have meeting about the report - They have send in the report to discuss about the Report, This morning I have called each and told (The girl) told me that those two people are here - G.U. given a meeting to Jim.

Jim -

Steve - did you mentioned about the ready Grant -

G.U. we have Recd the BOA letter - See Feb. 19, 93 from BOA: denial of the Heavy Equipment - Dump Truck - Jim has something about to say about this -

Jim - We have to include in the red tape more paper work - we may Buy the Equipment - But the Oil Lease to BIA Smaller -

D.L. to translate the letter and answer each question in 1993. They have prepared for the funding - But we haven't been granted - if we have to prepare last year we should have accomplish to recieve the Grant.

Steve - This doesn't mean the project can go ahead. we already don't have enough money to go ahead.

D. L. we are going as much as we could, but they won't listen I'm not really surprized about this, But there is alot of

Dick - Translating /interpreting English

TM - George has told me to go into PHS. They also didn't haven't had enough money - There were some other villages to.
- it was in writing. dated ~~February~~ 2 93. to mrs coolidge.
Dave - now we are giving you a bad news, But we are ~~are~~ going - to ~~discuss~~ discuss how were.

Recommending 475,000$ to spend in 2 phase
1/2 phase 1 - 4 haul unit - to tryout in one year

Other thing to use in 1st phase - fix the loader, fix the haule or Buy the used one. to complete this project

Suggesting fix up PHS So it won't freeze up to use in the coming year.

Phase 1st Build a Sludge disposal unit and haul the Sludge

Reason - we don't want to Recommend to many unit, But give tununak to try out. rather they don't like it. So the money won't used

3 - Phase 1 make PHS a disposal place. So you could dump the anaq to PHS.
We'd also Buy the Equipment to dump the anaq

2nd Phase - Sugge Spend Rest of the money to others houses if they like the unit

The left over could be used to 10 houses.
- phase 2 to put in two home unit - have a heated Building to wash down the unit.

We only could put in only 5 unit homes to wash down
- any questions?
- Before 2nd phase start could we ~~Stan~~ ask for another grant Linn martin Linn has successfully Received 200,000 - he has counted each house - names of each house and last 5 years of home improvements and send it to PHS. he ~~made~~ Send into PHS ~~on the~~ where each house are located on the map. They have been approved for improvements

D.L. home improvements; health improvements - That could help us to Rec.

Steve - I have also Received information from the legislatores -

D.C. that nurse firm -

Steve - it may be go

Sen. Adams - Thank him to try to help us w/ The grant. and also ask him what other Things we could do.

Thats not Beginning to ask for it, cause it is (oil) That God put it there -

Jim - EPA -

Sharping our pencil - There may not Be any funding to take This alternative on These places. we may be loose the funding also EPA.

D.L. EPA - under it we have a $ What They have, if we don't use the plan - we could lose The $

Ever we have that $ we could still try and do our Best.
to Recieve another

propose Reasonable on those phase - would it Be
Resonable to the council

A- About those $ have it used the way it have to and
they would see how it is like and they will
Consider more fact about this

T- We only could see how it is after we have seen and
use it first

- Build a desposal sight - easy, warm and easy
to despose the unit - you away

how would council feel about the unit to Build
- if a

to my understanding these people are respecting.
14 units will only Be used on those homes.
- find out what went wrong on the RDA grant.

Tim - Question purchase ATV - to haul ?
Rent ATV have - and have

Ed - Cost - would Be Operating cost $60.00 per family of 4.

Steve - Harry & Victor Seen the hauling -

~~[illegible]~~

#475,000 to use in Tunnunak -

Jerry - What the Sanitation used in Nelson Island - it is used whole world to study and have improvement.

D.L. They have told you about the phases

I -

Equipment - purchase - would roughly use 100,000 ~~oo~~

Operating Cost 30,000 ~~oo~~

Pots - to fix - 25,000 ~~oo~~

Area disposal w/unit.

Vehicle - ATV w/haul - Ski & wheels - w/Pump -

Other 4 to use in TNK - 1 would cost 6,000 ~~oo~~

4 = 24,000 ~~oo~~ - feasibility.

total - 364,000 ~~oo~~

343,000 - overall Construction to Completion

for all 4 -

Phase II - 20,000 - Start -

4 other 30,000

Work - Oper. 6,000

98,000 ~~oo~~

34,000 ~~oo~~ Remain to get the grant -

need to use 132,000 ~~oo~~ - for Completion of 4

10 would -

have the Public know about the Resolution -

Public meeting on the 10th ~~wed~~ March after Sunday

Meeting adjorned @ 9:20pm - Chuck James

✓ = present
X = absent

- Public Meeting -

March 10, 1993 7:30 pm

Subject: 90% Feasibility Study Completion

Council	Guest	Elders
✓ 1) George Usugan	✓ Steven Miller	✓ Mathias Jansoa
✓ 2) Frank Flynn	Harry Lunt	✓ Victor Kamrilea Sr.
✓ 3) Phillip James		✓ Nick Angasak Sr.
(4) Herman Oscar - Army - GI		✓ Jack Angasak
✓ 5) Tommy Hooper		✓ Henry Albert
✓ 6) James Pitka		✓ Stanley Kamrilea
✓ 7) Phillip Kusayak		✓ Jens Flynn
✓ 8) Andrew Ckilcoyak - TTEC Admin		✓ Joseph Oman
		✓ Simon Billy

Roll call: Call to order by George Usugan - TTEC President
Invocation By: Nick Angasak
Roll call: Nick Angasak Sr.
7:30pm - Open Prayer.
all council present except Herman Oscar army.

1. Village Safe water - 90% Study done
2. Petition toward the Project

we are about to have a meeting & person who came in this morning / Steve miller ; we have invited him to answer some of your questions about the results of the village survey & explanation of the agenda is included with A.) phase 1 & 2 phase.

all this -
Why did we even start with this plan.
we have Requested from RDA grant for dump truck and Repair equipment

*

to Repair all these Equipment -

it says - see date from [illegible] Letter [illegible] of the RDA grant - last [illegible] - Call it Writ [illegible]

to Jerry Mcdonugh - [illegible] money, we could do the [illegible]

[illegible] [illegible] to [illegible]

A. Phase 1 - See agenda date march 10, 1993. 7pm - Public meeting. [illegible] used when the [illegible] were [illegible]. What [illegible]

total of phase 1 totaling to $343,000.00 [illegible]

total of phase 2 or alternate phase II $132,000.00

all phase 1 & 2 totaling $475,000.00 [illegible] That money [illegible]

all these phases are all up to you to choose. [illegible]

They have the same sewer @ Mekoryuk, we have the film @ the elder office where you could use them @ home.

These two phase - what have I said - I'd rather prefer the top 1st phases. I'd rather see phase 1 cause it could be fixed to repair the equipment and for the new 7 [illegible] dump truck - ...

you would as Public have to know either to take the phase 1 & 2.

it will be said to explain -

[illegible] But all could [illegible]

Harry - I understand - Both phase 1 & 2 be brought to you that would be worked in 1993. These 4 sewer would be put in to see if you'd like it or not, if you don't like the phase 1, it will be changed and if you like it, it will be worked in 1994.

Nathan - are these pipes - would be put in cause it would be to expensive - [illegible] only got the sewer?

H-C. yes after the study, the money wasn't available to get into theses phases.

[illegible] it would [illegible]

to work on these projects.

Today when it was city, we have $75,000.00 Street lite 24,900, total $99,000.00 not used.

if you want to use the money, we could do the work and have the appropriate money to complete

H.A. about those pipe they were used when the city used - those pipes that were freezed. What ~~~~ Mark said. One person has stopped [illegible]

That Sen. Adams aide said that money could Be used to Sell Residence.

H.L. if that money didn't used all, maybe we could use that money to finish the project.

we could use the money if you all agree to use.

we could set the meeting together w/ them, we could get the money back.

~~Advice~~

Petka - What is it going into. [illegible]

H.L. it was the city's money, But we all could use the $ if we could agree together

P. ~~the~~ to take the city for awhile.

H.L & G.H. NO - we don't need to take the city in order to take the money. I said if you'd like it

H.L. if that house has a sewer.

W. are only the housing area have only get the sewers?

H.L. Cause those Honey Bucket overflow the Bunkers

Steve - you all have done a really good job for maybe ...
you pay more.

G.U. These picture of The Bowl. it like @ armory. But it is different
to use them.

George Show the diagram of The Condition See diagram.
record of ...

as we all know what Johnson has That all water sewer when one breaks down, the whole house would Be involved. But this sewer has Been easily fix all of you.

Victor to explain the trip from Mekoryuk Sewer.
... would 5

40 days They'd pay The Rent. ... Completion of Sam...

- Victor asked - a person at Mekoryuk - have you had any problem w/ your sewer system, Well, This is my first time That I never have any problem! Maybe in The future Recently I haven't had any problem.

- You could get water & dump if you want, but you will have to Be trained to install how to put The pipe Fitting.

The only Thing That could Be used outside is The heat trace -

The only you could operate is like 40 gallon. if all up to you. its all up to you to put it in. 2 would Be placed in, we are - are: ...

do you have any Questions?

Steve - have you told Them, That The trace could Be under the house? Victor you want me to tell Them. Steve Yes maybe better to let Them know whats going on

G.U. Thank you - These two has said, They have seen Them so That why They told you about.

they have only Paid $24.00, the many you get less money you use. and when there is less you pay more,

Mekoryak has only paid less —

the System would be efficient to use less $

we want to know from you, it would be better for you to say. we want to know from you.

S.U. Now we come to the Resolution — when we Posted the Resolution in Public it Says see Resolution:

a way I have understood it, we council would S we have given them Permission to Completing of Sewer System.

~~You~~ You could Vote to say yes or no.

+ If yes are more it would be passed, if no would be no — it wouldn't pass.

+ You are all ~~Bosses~~ Bosses —

*

*

Joseph — we all don't mind

Council member agrees —

Frank & Geo & Phelly James signed

Resolution Signed 93-01.

APPENDIX L: LIST OF REFERENCES

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