

Bethel Water and Sewer Facilities Master Plan Update

Final Submittal
April, 2005



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Acronyms and Abbreviations

A	Amp
ac	Acre
ADEC	Alaska Department of Environmental Conservation
ADOT&PF	Alaska Department of Transportation and Public Facilities
ADF&G	Alaska Department of Fish and Game
AEIDC	Arctic Environmental Information and Data Center
AMBBA	Alaska Municipal Bond Bank Authority
ANCSA	Alaska Native Claims Settlement Act
ANICA	Alaska Native Industries Cooperative Association
ANTHC	Alaska Native Tribal Health Consortium
ASHA	Alaska State Housing Authority
ATTAC	Alaska Training/Technical Assistance Center
AVCP	Association of Village Council Presidents
bgs	Belowground Surface
BHWTP	Bethel Heights Water Treatment Plant
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BNC	Bethel Native Corporation
BOD	Biochemical Oxygen Demand
BUC	Bethel Utilities Corporation
°C	degree Celsius
Ca(OCL) ₂	Calcium Hypochlorite
CCWTP	City Center Water treatment Plant
CDBG	Community Development Block Grants
CEDS	Community Economic Development Strategy
cf	Cubic Feet
CGP	Comprehensive Grant Program
CIAP	Comprehensive Improvement Assistance Program
City	City of Bethel
CMP	Corrugated metal pipe.
CO ₂	Carbon Dioxide
COE	U.S. Army Corps of Engineers

Acronyms and Abbreviations (continued)

CRW	CRW Engineering Group, LLC
CSWTP	City Subdivision Water Treatment Plant
CWA-ISA	Clean Water Act - Indian Set Aside
DBP	Disinfection By Product
°F	degree Fahrenheit
Fe	Iron
DCED	Department of Community and Economic Development
DCRA	Department of Community and Regional Affairs
DNR	Department of Natural Resources
DPW	Department of Public Works
EDA	Economic Development Association
EPA	U.S. Environmental Protection Agency
FAA	Federal Aviation Administration
ft	Feet
ft ²	Square Feet
FY	Fiscal Year
GPM	Gallons Per Minute
HDPE	High Density Polyethylene
HP	Horsepower
HRSA	Health Resource Service Agency
HUD	U.S. Department of Housing and Urban Development
HWM	High Water Mark
I&I	Infiltration and Inflow
HIS	Indian Health Service
in	inches
IRA	Indian Reorganization Act
KCC	Kuskokwim Community College
KMnO ₄	Potassium Permanganate
lb	Pound
LKSD	Lower Kuskokwim School District
m	meters
MBR	Membrane Bioreactor Treatment
MBTU/H	Million BTU per Hour

Acronyms and Abbreviations (continued)

MCL	Maximum Contaminant Level
mgd	Million Gallons per Day
mg/L	Milligrams per Liter
Mi	Mile
ml	Milliliter
MLSS	Mixed Liquor Suspended Solids
Mn	Manganese
MSWLF	Municipal Solid Waste Landfill
NaCl	Sodium Chloride (Salt)
NaOCl	Sodium Hypochlorite
NOFA	Notice of Funding Availability
NPDES	National Pollutant Discharge Elimination System
NSF	National Sanitation Foundation
OMB	Office of Management and Budget
ONAP	Office of Native American Programs
ONC	Orutsararmiut Native Council
O&M	Operations and Maintenance
PATC	Philips Alcoholic Treatment Center
PCE	Power Cost Equalization
pH	A measure of the acidity or alkalinity of a solution
PHS	Public Health Service
ppm	Parts per Million
psi	Pounds per Square Inch
psf	Pounds per Square Foot
PSIG	Pounds per Square Inch Gauge
PVC	Poly Vinyl Chloride
QFC	Quick Food Center
RAPIDS	Rural Alaska Project Identification and Delivery System
RASC	Rural Alaska Sanitation Coalition
RECDA	Rural Economic and Community Development Administration
RMW	Remote Maintenance Worker
RUBA	Rural Utilities Business Advisory Program
s	Second

Acronyms and Abbreviations (continued)

SBR	Sequencing Batch Reactor
SDS	Sanitation Deficiency System
SDWA	Safe Drinking Water Act
Sec	Second
SEDS	Specific Social and Economic Development Strategies
SFY	State Fiscal Year
SHPO	Stat Historic Preservation Office
SRT	Solids Retention Time
Study	Kasayuli Subdivision Water and Sewer Feasibility Study
TDH	Total Dynamic Head (feet)
THM	Trihalomethanes
TSS	Total Suspended Solids
UAF	University of Alaska, Fairbanks
USDA	United Stated Department of Agriculture
UV	Ultraviolet
V	Volt
VSW	Village Safe Water
WBWTP	West Bethel Water Treatment Plant
WTP	Water Treatment Plant
YE	Yuut Elitnaviat (People's Learning Center)
YKHC	Yukon-Kuskokwim Health Corporation

1. Executive Summary

1.1. Introduction

The purpose of this document is to update the City of Bethel's water and sewer master plan. The previous Master Plan established the community's long-term goal to convert the existing truck-haul water and sewer system to a piped system. This goal remains unchanged; therefore, this document will not reevaluate truck-haul operations versus piped operations. However, segments of the community are satisfied with the truck-haul system and/or a piped system may not be feasible in all areas. Therefore, this document should be dynamic to allow flexibility in making future decisions at the local level (neighborhood, subdivision, etc.). The primary need to revise the current Bethel Water and Sewer Facilities Master Plan Update (Master Plan) includes:

- Provide design information (preliminary design, hydraulic modeling, and estimated project costs) so that proposed project phasing and associated project costs can be better forecasted.
- Identify short-term improvements that will reduce the operations and maintenance costs of the truck-haul water distribution and truck-haul wastewater collection systems.
- Revisit the planning of proposed facility improvements to meet the best needs of the City's water and sewers systems.
- Reassess project priorities to meet the short-term and long-term needs of the community.

1.2. Objectives and Means

The City of Bethel Public Works Committee developed the following objectives to the City's water and sewer master plan:

- Maintain or improve the hygiene of individuals.
- Maintain or improve community health.
- Control costs, individually and to the community.
- Make costs and services more equitable over all users.
- Continue to meet or exceed federal water treatment standards
- Exceed federal water treatment standards if deemed necessary to protect the environment.
- Implement water conservation measures.

The City of Bethel Public Works Committee developed the following means to achieve the above listed objectives:

- Construct and operate watering points as sites remote from existing water treatment facilities to shorten truck haul distances.
- Modify existing sewer mains to create evacuation truck-haul entry points with suitable infrastructure to shorten truck-haul distances. Incorporate same into design of new sewer force main construction.
- Evaluate wastewater treatment options for best cost, best methodology, and implement.
- Correct issues inherent with existing piped systems. For example; poor ASHA water quality, instances of raw sewage backing up into homes, excessive maintenance, etc.).
- Projects which do not contribute to future piped infrastructure will be given full consideration if they are consistent with the communities' aforementioned objectives.

1.3. Evaluation of Previous Master Plan's Strategy

The *City of Bethel Water and Sewer Facilities Master Plan Update (Dames & Moore / 1996)* recommended water and sewer improvement strategy included construction of a water treatment facility within a service area (subdivision) immediately followed by construction of a piped water distribution and sewer collection system within this service area. The Phase 1 Improvements identified in the 1996 master plan included approximately \$29 million worth of infrastructure:

- Upgrade the Bethel Heights Water Treatment Facility. This project was completed in 1999.
- A new water treatment facility as City Subdivision (the City Subdivision Water Treatment Facility). This project was completed in 2000.
- A new piped water distribution and sewer collection system within City Subdivision. These improvements were completed in three project phases (A, B, & C). Phase A was completed in 2003, Phase B was completed in 2004. Phase C is anticipated to be completed in 2005.

The following improvements were added to the Phase 1 improvements due to deficiencies discovered during design:

- Decommission the City Center Water Treatment Plant, and replace the piped water and sewer system within City Center. This system would be connected to the piped water and sewer system at City Subdivision. These improvements were included in the Phase A project discussed above, which was completed in 2003.
- Upgrade the backbone sewer force main that crosses Ridgcrest Drive between 6th and 7th Avenue. These improvements are included in the Phase C project discussed above. Phase C is anticipated to be completed in 2005.

The Phase 1 Improvements began in 1997 and will be completed in 2005. The project completion schedule was constrained by funding limitations (generally \$3.3 million per year). Project funds were accumulated ("stacked") until there were enough funds to complete a specific project.

Through completion of the Phase 1 Improvements the City recognized that the water and sewer development strategy recommended in the 1996 master plan was having a detrimental impact on the cost of operating the existing water and sewer truck-haul systems. The cost of operating a truck-haul water distribution and sewer collection system is directly proportional to the length of the haul. However, the City's truck-haul rate structure is not based on the length of the haul; rather it is based on the number of haul trips and gallons served. It is assumed that the costs related to the haul distances are balanced out between short haul distance and long haul distance consumers. However, the water and sewer development strategy recommended in the 1996 master plan systematically would eliminate the short distance truck-haul consumers leaving the more expensive long truck-haul distance consumers.

The water and sewer development strategy recommended in this water and sewer master plan, recommends that backbone water and sewer facilities be extended to each service area (subdivision) prior to construction of the piped water and sewer services. The short-term goal of this strategy would serve to shorten water and sewer truck-haul distances. Ultimately, these improvements would serve the City's long-term goal of providing piped water and sewer services to the entire community.

1.4. Recommended Strategy

A recommended strategy to upgrade the City of Bethel's water and wastewater facilities was developed to meet both the short-term goal (reduce the operation and maintenance costs of the truck-haul water distribution and wastewater collection system), and long-term goal (provide a piped water delivery and wastewater collection system). The strategy, which is graphically depicted on **Drawing 5** and **Drawing 6**, includes the following improvements in order of precedence:

1. Upgrade the existing wastewater lift stations and associated force mains to meet current and future wastewater collection demands. The Main Lift Station and a short segment of the downstream force main as well as the force main through City Subdivision were upgraded in 2003/2004.
2. Upgrade the existing Bethel Heights (ASHA/AVCP Housing) piped water distribution system and sewer collection system.
3. Construct a new biomechanical wastewater treatment facility and decommission the existing wastewater lagoons.
4. Construct a new water treatment facility to serve the Bethel Airport infrastructure and development to the west.
5. Extend the wastewater force mains to the subdivisions or service areas. Include a lift station to accommodate wastewater truck-haul discharge.

6. Construct booster pump stations with water storage tanks at the subdivisions or service areas. A water main will be included from one of the three water treatment facilities. Include a water fill station to accommodate water truck-haul operations.
7. Construct piped water distribution system (which will be served from the above referenced booster pump stations) and piped wastewater collection system (which will discharge to the above reference lift station) at each subdivision or service area.

The improvements described under items 1, and 3 through 6 are considered “backbone” water and wastewater facilities. They provided water treatment and piped water distribution, as well as piped wastewater collection and wastewater treatment for each subdivision or service area. These improvements will initially support the existing water and wastewater truck-haul systems. The operations and maintenance cost of the truck-haul systems will be significantly reduced because of the shorter travel times these improvements afford. The “backbone” improvements are considered essential to the City’s water and sewer infrastructure.

The improvements described under item 2 include upgrading an existing piped water distribution and sewer collection system. Piped water improvements include correcting pipe corrosion that is causing pipe degradation and poor water quality; upgrade the distribution pumps, the high-demand pump, and the distribution system controls; and replace pitot-orifice service connections that are experiencing significant corrosion. Piped sewer improvements includes providing automatic stand-by power to all three lift stations; place sewer pipes in culverts at all road crossings; divert gravity sewer main along Ridgecrest Drive away from the force main and to the ASHA Lift Station; and correct excessive pile movement that adversely impact the grade of the gravity mains. These improvements are considered essential to maintaining the City’s existing infrastructure.

The improvements described under item 7 include piped water distribution and piped wastewater collection to each residential or commercial service. These improvements are not considered essential, but are recommended.

An evaluation was completed that estimated operations and maintenance as well as capital recovery costs for four of water and sewer system improvement scenarios: 1) Existing truck haul water and sewer systems; 2) Future truck haul water and sewer system for long-haul operations [based on the 1996 master plan strategy]; 3) Future truck haul water and sewer systems after “backbone” improvements are constructed; and 4) Future piped water and sewer systems (all improvements are constructed). A summary of the results of this evaluation are summarized in **Table 1-1** (refer to **Appendix N** for a detailed evaluation).

TABLE 1-1

Estimated monthly O&M and capital recovery costs per service for four scenarios of water and sewer system development at Bethel (interest rate of 3% per annum, and 30 year recovery period)

Alternatives Truck-Haul Scenario	Monthly O&M Costs	Monthly Capital Costs	Total Monthly Rate
Existing Water and Sewer Truck-Haul	\$285	\$55	\$340
Future Water and Sewer Truck-Haul [Based on 1996 Master Plan Update Strategy]	\$377	\$66	\$443
Future Water and Sewer Truck-Haul [Based on 2005 Master Plan Update Strategy]	\$229	\$79	\$308
Future Piped Water and Sewer System	\$188	\$26	\$214

This evaluation shows that there is a significant impact to the cost to provide water and sewer truck haul service based on the water and sewer improvement strategy recommended in the 1996 master plan (the estimated rates would have to be increased from \$340/mo. to \$443/mo.) Consumer water and sewer rates would not be reduced to \$214/ mo. until they were connected to the piped water and sewer improvements.

This evaluation further shows that there is a progressive reduction of estimated water and sewer rates based on the recommended strategy in this master plan. The estimated water and sewer truck haul rates would be reduced from \$340/mo. to \$308/mo. once the backbone improvements are extended to a service area. Ultimately, the rates would be reduced to \$214/mo. once the customers have connected to the piped water and sewer systems.

1.5. Project Prioritization and Capital Cost Estimates

A summary of the project prioritization and estimated capital costs for the recommended water and sewer improvements in Bethel are presented in Table 1-1 (located at the end of this section). Detailed cost estimates for each project are included in **Appendix M**. Capital costs for each project were generated based on actual costs from recently completed water and sewer project in Bethel and or other Alaskan Communities similar in size to Bethel (FY2002 to 2004). Each estimate includes a 15% construction contingency as well as 3% for administration (Bethel/VSW), 5% for project management, 8% for design engineering, and 12% for construction management. All costs are in 2005 dollars. Also included in **Appendix M** is a project schedule for the first \$30 million dollars in capital improvements as required by VSW. Additionally, man-hour estimates were developed for the VSWSFY 2006 construction projects to assist in developing force account staffing needs.

A business plan was prepared for this document and is included under **Appendix O**. The business plan was based on the assumption that all improvements, referenced on Table 1-2 have been constructed (assumes entire community is on the piped system).

Table 1-2
Project Priorities and Capital Cost Estimates

PRIORITY	CODE (a)	ITEM NO.	DESCRIPTION	PRESENT COST (b)	CUMULATIVE COST (b)	VSW-SFY FUNDING	NO. YEARS	CUMULATIVE FUNDING (c)
1	S	1	QFC No. II Lift Station and Forcemain Upgr	\$4,153,984	\$4,153,984	2006	1	\$10,000,000
2	S	2	Main Forcemain Upgrade (Ridgcrest to Lag	\$1,202,624	\$5,356,608	2006	1	\$10,000,000
3	W	1	Bethel Heights Piped Water and Sewer Up.	\$2,248,000	\$7,604,608	2006	1	\$10,000,000
4	S	3	Wastewater Treatment Facility	\$18,944,000	\$26,548,608	2006/08	3	\$30,000,000
5	W	2	Small West Water Treatment Plant	\$3,315,680	\$29,864,288	2008	3	\$30,000,000
6	S	4	FAA Lift Station Upgrades	\$1,192,320	\$31,056,608	2008/09	4	\$40,000,000
7	S	5	Garage / Shop Facility	\$4,416,000	\$35,472,608	2009	4	\$40,000,000
8	S	6	Kasayuli Subdivision Lift Station and Force	\$3,687,360	\$39,159,968	2009	4	\$40,000,000
9	W	3	Kasayuli Subd. Water Station	\$5,275,648	\$44,435,616	2009/10	5	\$50,000,000
10	S	7	Ptarmigan Lift Station and Forcemain	\$4,631,648	\$49,067,264	2010	5	\$50,000,000
11	W	4	Tundra Ridge Subd. Water Station	\$4,114,608	\$53,181,872	2010/11	6	\$60,000,000
12	W	5	Nunvak Subd. Water Station	\$5,191,008	\$58,372,880	2011	6	\$60,000,000
13	S	8	Larson Subdivision Lift Station and Forcem	\$3,388,544	\$61,761,424	2011/12	7	\$70,000,000
14	W	6	Larson Subd. Water Station	\$4,046,528	\$65,807,952	2012	7	\$70,000,000
15	S	9	Harbor Area Lift Station and Forcemain	\$3,303,168	\$69,111,120	2012	7	\$70,000,000
16	W	7	Kilbuck Water Station	\$3,699,406	\$72,810,526	2012/13	8	\$80,000,000
17	W	8	Mission Lake Water Station	\$4,298,240	\$77,108,766	2013	8	\$80,000,000
18	W	9	Hospital Area Water Storage	\$4,879,680	\$81,988,446	2013/14	9	\$90,000,000
19	W	10	Enlarge West Water Treatment Plant	\$2,208,000	\$84,196,446	2014	9	\$90,000,000
20	P	1	Kilbuck North (Avenues)	\$9,965,469	\$94,161,915	2014/15	10	\$100,000,000
21	P	2	Kilbuck South (Avenues)	\$5,371,938	\$99,533,853	2016	10	\$100,000,000
22	P	3	Mission Lake Area West	\$5,902,734	\$105,436,587	2016/17	11	\$110,000,000
23	P	4	Mission Lake Area East	\$5,902,734	\$111,339,321	2016/17	12	\$120,000,000
24	P	5	Harbor Area West	\$7,076,094	\$118,415,415	2017	12	\$120,000,000
25	P	6	Harbor Area East	\$7,076,094	\$125,491,509	2017/18	13	\$130,000,000
26	P	7	Nunivak Subdivision West	\$4,246,375	\$129,737,884	2018	13	\$130,000,000
27	P	8	Nunivak Subdivision East	\$7,035,844	\$136,773,728	2019	14	\$140,000,000
28	P	9	Blueberry Subdivision Southeast	\$6,136,328	\$142,910,056	2019/20	15	\$150,000,000
29	P	10	Blueberry Subdivision Southwest	\$6,136,328	\$149,046,384	2020	15	\$150,000,000
30	P	11	Blueberry Subdivision Northwest	\$5,419,734	\$154,466,118	2020/21	16	\$160,000,000
31	P	12	Blueberry Subdivision Northeast	\$5,419,734	\$159,885,853	2021	16	\$160,000,000
32	P	13	Tundra Ridge Subdivision South	\$8,362,297	\$168,248,149	2021/22	17	\$170,000,000
33	P	14	Tundra Ridge Subdivision North	\$8,362,297	\$176,610,446	2022/23	18	\$180,000,000
34	P	15	Uluq Subdivision	\$7,789,813	\$184,400,259	2023/24	19	\$190,000,000
35	P	16	Larson Subdivision	\$6,500,375	\$190,900,634	2024/25	20	\$200,000,000
36	P	17	Airport Facilities	\$5,081,563	\$195,982,196	2025	20	\$200,000,000
37	P	18	Kasayuli Subdivision East	\$8,154,938	\$204,137,134	2025/26	21	\$210,000,000
38	P	19	Kasayuli Subdivision West	\$8,154,938	\$212,292,071	2026/27	22	\$220,000,000
39	P	20	H-Marker Lake Area	\$2,034,063	\$214,326,134	2027	22	\$220,000,000
40	P	21	Raven Subdivision West	\$6,093,563	\$220,419,696	2027/28	23	\$230,000,000
41	P	22	Raven Subdivision East	\$5,322,344	\$225,742,040	2028	23	\$230,000,000
42	S	10	Haroldsen Subdivision Lift Station and Forc	\$2,620,160	\$228,362,200	2028	23	\$230,000,000
43	W	11	Haroldsen Estates Water Station	\$3,554,880	\$231,917,080	2028/29	24	\$240,000,000
44	P	23	Haroldsen Estates	\$6,014,500	\$237,931,580	2029	24	\$240,000,000

Notes:

- (a) S = Backbone Sewer Improvements; W = Backbone Water Improvements; P = Piped Water & Sewer Improvements
- (b) Capital costs in 2005 dollars (present worth) +/- 15%
- (c) Funding based on fixed rate of \$10,000,000 per year

2. Introduction

2.1. Objectives and Means

The City of Bethel Public Works Committee developed the following objectives to the City's water and sewer master plan:

- Maintain or improve the hygiene of individuals.
- Maintain or improve community health.
- Control costs, individually and to the community.
- Make costs and services more equitable over all users.
- Continue to meet or exceed federal water treatment standards
- Exceed federal water treatment standards if deemed necessary to protect the environment.
- Implement water conservation measures.

The City of Bethel Public Works Committee developed the following means to achieve the above listed objectives:

- Construct and operate watering point as sites remote from existing water treatment facilities to shorten truck haul distances.
- Modify existing sewer mains to create evacuation truck-haul entry points with suitable infrastructure to shorten truck-haul distances. Incorporate same into design of new sewer force main construction.
- Evaluate wastewater treatment options for best cost, best methodology, and implement.
- Correct issues inherent with existing piped systems. For example; poor ASHA water quality, instances of raw sewage backing up into homes, excessive maintenance, etc.)
- Projects which do not contribute to future piped infrastructure will be given full consideration if they are consistent with the communities' afore mentioned goals.

2.2. Document Development

Improvements to the City of Bethel's (City) water and sewer system have been primarily funded through the Village Safe Water (VSW) program, and the Indian Health Service (IHS) Housing program. In order to utilize these funding sources, the proposed improvements must conform to a sanitation facilities master plan or a supplemental feasibility study that is

approved by the City Council. The current documents that direct the City's development of water and sewer improvements include:

1. Bethel Water and Sewer Facilities Master Plan Update (1996/Dames & Moore).
2. City of Bethel Solid Waste and Sewage Lagoon Facilities Master Plan Update (2002/CH2M Hill).
3. Kasayuli Subdivision Water and Sewer Feasibility Study, (2004/CRW).

The City is interested in delineating strategies for the development of the community's water and sewer systems. To accomplish this goal, the City has contracted with CRW Engineering Group, LLC (CRW) to work with the City, the Bethel community, and VSW to update the first of these documents. The primary need to revise the current Bethel Water and Sewer Facilities Master Plan Update includes:

- Provide design information (preliminary design, hydraulic modeling, and estimated project costs) so that proposed project phasing and associated project costs can be better forecasted.
- Identify short-term improvements that will reduce the operations and maintenance costs of the truck-haul water distribution and truck-haul wastewater collection systems.
- Revisit the planning of proposed facility improvements to meet the best needs of the City's water and sewers systems.
- Reassess project priorities to meet the short-term and long-term needs of the community.

The previous Master Plan established the community's long-term goal to convert the existing truck-haul water and sewer system to a piped system. This goal remains unchanged; therefore, this document will not reevaluate truck-haul operations versus piped operations. However, segments of the community are satisfied with the truck-haul system and/or believe a piped system may not be feasible in all areas. Therefore, this document should be dynamic enough to allow flexibility in making future decisions at the local level (neighborhood, subdivision, etc.).

2.3. Master Plan Supplement Objectives

A supplemental objective to updating the Master Plan will be to include a summary of the recommendations and conclusions from the other two planning/study documents (items 2 and 3 above) to create a single reference document that outlines the entire goals and objective for the City's water and sewer system.

3. Community Profile

3.1. Community History

Bethel was first established by Yupik Eskimos who called the village "Mumtrekhlogamute," meaning "Smokehouse People," named for the nearby fish smokehouse. The purchase of Alaska by the United States in 1867 had little effect on the region. The Moravian Church took over the Russian Orthodox Church's role in the area. The Moravian Mission in Bethel was completed in 1885 by missionaries Henry Hartmann and W.H. Weinland. The missionaries subsequently changed the village name to Bethel.

At the time of the Alaska purchase, fur trading in the area was light; however, Russian fur traders were eventually replaced by American traders. There were 41 people in Bethel during the 1880 U.S. Census. At that time, it was an Alaska Commercial Company Trading Post. The community was moved to its present location due to erosion at the prior site. A post office was opened in 1905. Before long, Bethel was serving as a trading, transportation and distribution center for the region, which attracted Natives from surrounding villages. The trading post in Bethel, run by Alaska Commercial Company, did not become robust until 1907.

Around 1907, W.R. Buckman, an early mineral prospector, created the first reliable and available maps of the upper reaches of the Kuskokwim River and in the Holitna Basin, spurning interest in the area. Irregular trade was established in 1907 between Seattle and Bethel. The Kuskokwim River became a major trade artery to the Interior and profits for the Alaska Commercial Company increased significantly.

By 1911, the gold boom was declining and by 1930, the thirty-plus gold operations had scaled down significantly. In 1933, the Roosevelt administration raised the price of gold, which lead to a flurry of activity in the gold operations. The coming of World War II, however, caused war-time shortages and increased operation and maintenance costs. By the late 1950s, gold mining was nearly abandoned in the Kuskokwim River Delta area.

The City of Bethel was incorporated in 1957. Since then many federal and state agencies have maintained regional offices there.

3.2. Physical Description

3.2.1. Location and Access

Bethel is located at the mouth of the Kuskokwim River, 40 miles inland from the Bering Sea. It lies in the Yukon Delta National Wildlife Refuge, 400 air miles west of Anchorage. It lies at approximately 60.79° North Latitude and -161.75° West Longitude. (Sec. 09, T008N, R071W, Seward Meridian.) Bethel is located in the Bethel Recording District.

The State-owned Bethel Airport is the regional transportation center, and is served by two major passenger airlines, two cargo carriers, and numerous air taxi services. The airport ranks third in the state for total number of flights. It offers a 6,398' asphalt runway and 1,850'

gravel crosswind runway. Two float plane bases are nearby at Hangar Lake and H-Marker Lake.

The Port of Bethel is the northern-most medium-draft port in the United States. A small boat harbor, dry land storage, and up to 5,000 feet of transient moorage on the seawall is available. River travel is the primary means of local transportation in the summer, and it becomes a 150-mile ice road to surrounding villages in the winter. A barge service based in Bethel provides goods to the Kuskokwim villages. There are 25 miles of local roads. Winter trails are marked to Napaskiak (1.1 mi.) and Akiachak (19 mi.)

3.2.2. Climate & Weather

The average precipitation is 16 inches/year. The average snowfall is 50 inches. The temperature in the summer ranges from 42 to 62°F and in the winter from -2 to 19°F. Based on data from 1949 to 2000, there is a 10 percent probability that fall freeze will occur before September 2 and a 50 percent probability that it will occur before September 16. There is a 50 percent probability that spring thaw will occur after May 25 and a 10 percent probability that it will occur after June 9 (Western Regional Climatic Center, 2001).

3.2.3. Geology & Soil

Bethel is situated on a modern floodplain. The geology in this area is made up of unconsolidated floodplain alluvium and silt deposits (Selkregg, 1974). Mud, silt, sand, and organic matter comprise the floodplain alluvium. Silt, sandy silt, and some organic matter make up the silt deposits.

The soil is characterized as poorly drained, medium loam, medium erosion potential, with a peat surface layer. The surface layer consists of poorly drained, non arable fibrous peat. Disturbance of the peat surface mat by removal, tearing, or compression can result in melting and subsidence of the frozen soil, sometimes irreversibly. If the underlying mineral soil is exposed, erosion can occur.

Underlying the delta in the area of Bethel is a shallow permafrost table. The permafrost ranges from moderately thin to thick. The maximum depth to base on the delta is 600 feet. The temperature of the permafrost ranges from 23 to 30°F, but may be higher. Locally, permafrost is absent around large bodies of water (Selkregg, 1974).

3.2.4. Wildlife, Vegetation & Wetlands

Bethel is located in moist tundra. Vegetation in this area is characterized by a wide variety of low-growing shrubs, herbs, grasses, and sedges rooted in a continuous mat of mosses and lichens. Cotton grass is common in depressions and poorly drained areas. Dwarf shrubs including crowberry, birch, willow, and blueberry are found on slightly raised areas (Selkregg, 1974).

Fish living in the freshwater surrounding Bethel include arctic char, lake trout, dolly varden, rainbow trout, arctic grayling, northern pike, sculpin, whitefish, burbot, stickleback, and blackfish.

Birds in the area consist of an abundance of geese and 15 species of ducks. Other bird species present include arctic tern, black brant, old-squaw, swan, pintail, teal, falcon, eider, scoter, merganser, dipper, semipalmated plover, sandpiper, phalarope, loon, and grebe.

Larger wildlife are generally not present on the Yukon-Kuskokwim Delta. Smaller mammals which are common to the area include red and Arctic fox, land otter, mink, marten, short-tailed weasel, lynx, beaver, muskrat, and snowshoe and Arctic hare (Selkregg, 1974).

3.2.5. Endangered Species & Critical Habitats

According to Ellen W. Lance, with the Endangered Species Program of the U.S. Fish and Wildlife Service, there are no federally listed endangered species or critical habitats in the area.

3.2.6. Surface Hydrology

The principal feature of the surface hydrology in Bethel is the Kuskokwim River. The drainage area of the Kuskokwim River is 50,000 sq. miles (Selkregg, 1974). The Kuskokwim River flows out of the Kuskokwim Mountains for a distance of 540 miles to the Bering Sea. The river is free flowing from May to October. Tidal backwaters from the Bering Sea influence the river but saltwater does not penetrate as far upriver as Bethel. The range of velocity in the river is 0.8 to 2.2 feet/second (Dorava and Hogan, 1995).

In addition to the Kuskokwim River, Bethel is surrounded by ponds, small lakes, sloughs, and marshes. The marshes occur in old river beds, suggesting previous flow patterns of the Kuskokwim River.

3.2.7. Groundwater

Groundwater is the main drinking water source for the City. Groundwater is abundant and is located in the deep subpermafrost silt, sand, and pebble deposits west of the Kuskokwim River in a confined aquifer and in permafrost-free areas along the east side of the river. The subpermafrost groundwater probably flows toward the southwest, similar to the flow of the Kuskokwim River (Dorava and Hogan, 1995).

Shallow groundwater exists under the thaw bulbs of surrounding water bodies and the Kuskokwim River. Shallow groundwater probably flows in the direction of the topographic gradients (Dorava and Hogan, 1995).

3.2.8. Flooding, Erosion & Seismic Hazards

Bethel experiences some flooding annually by the Kuskokwim River (US. Army, 1993). Ice jam and subsequent stream overflow is the major cause for flooding. In May 1985, the flood depth was between 3 and 4 feet, resulting in the flooding of several homes. In 1988, the flood depth was approximately 5 feet and 600 homes were reported as flooded.

In the 1960s, river bank erosion necessitated moving the fuel tanks and rebuilding the dock. The U.S. Army Corps of Engineers helped the City to construct a 3,000-foot-long bulkhead

to prevent erosion. By 1971, however, the bulkhead had been undermined by scour and was no longer effective.

In the 1970s, the City used junked cars to shore up the banks. The Alaska Department of Environmental Conservation (ADEC) put an end to this practice due to possible contamination of the river. In 1982 and 1984, sheet pile walls were built to help prevent erosion along the banks. This has aided some in slowing down the process of erosion (Dorava and Hogan, 1995).

3.3. Identification of Major Stakeholders

The entire community is a stakeholder regarding existing and proposed water and wastewater facilities; however, major stakeholders can be identified as landowners that are located adjacent to major facility improvements (such as existing and new water treatment facilities, water storage tanks, water booster stations, wastewater lift stations / dump stations, wastewater treatment lagoons, wastewater treatment plant). **Drawing 3 – Land Status Map** identifies major land owners in Bethel. Identification of major stakeholders that will be impacted by the proposed improvements will be developed during detailed design of the proposed improvements.

3.4. Governmental Structures

Bethel is a second-class city and has a council-manager form of government. The City Council is made up of seven residents who are elected at large. A Mayor and Vice Mayor are selected from and by the City Council. The Mayor serves as the ceremonial head of the city and the presiding officer at all council meetings. A City Manager is appointed by the Mayor and City Council to run the daily business of the City and to oversee all sections of the government. Three of the council members are elected in even numbered years and four are elected in odd numbered years. City elections take place in October of each year.

An organizational chart of the current Public Administration structure for the City of Bethel is provided in Figure 3-1.

The Department of Public Works (DPW) operates and maintains the City's sanitation systems. DPW is directed by the Public Works Director under the direction of the City Manager.

The Finance Director is responsible for directing the financial operational, audit procedures, and accounting practices relating to sanitation operations, billing, accounts receivable, and payables.

The overall utility management by the City is efficient and effective in ensuring that adequate services are provided to residents. The City employs a structured administrative process in which the responsibilities and duties of each position are clearly defined.

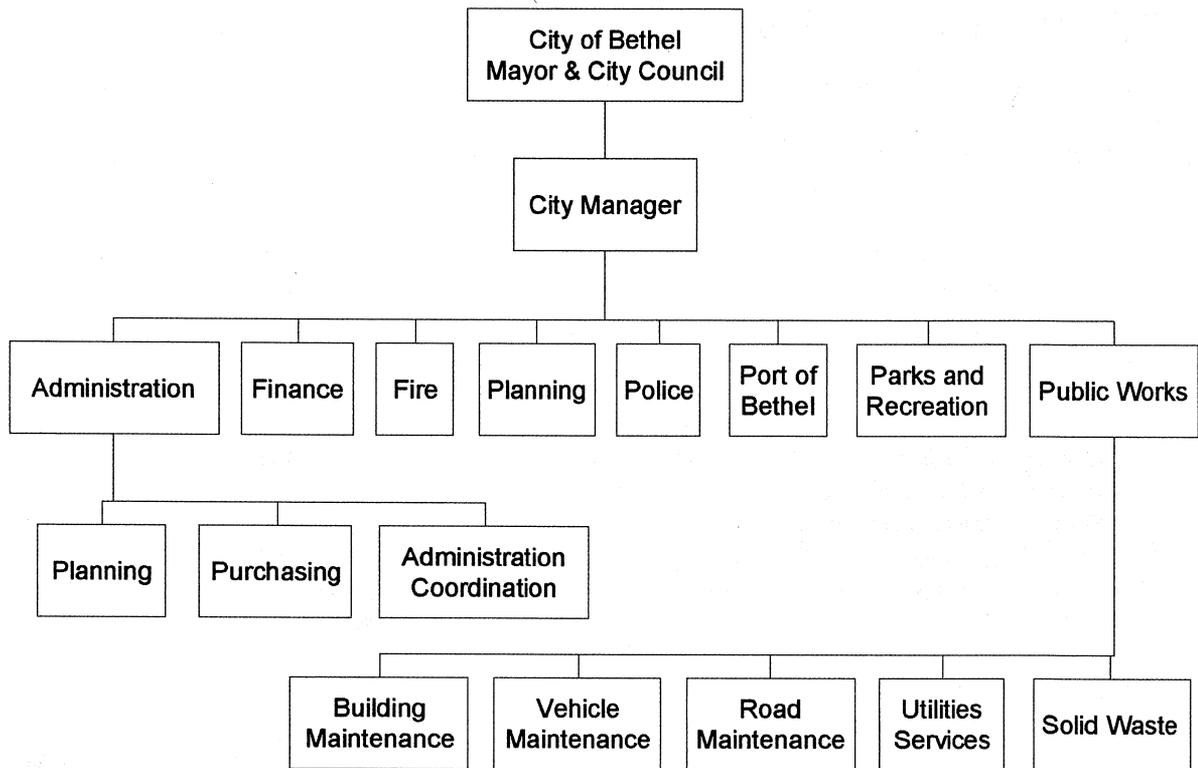


FIGURE 3-1
City of Bethel Governmental Structure

3.5. Demographics

The U.S. Census Bureau, Census 2000 indicates there are 5,471 people that make Bethel their home. Table 3-1 list the percentage of ethnic groups within the total population. The median age for residents of Bethel is 29, base on census data for 2000 (DCED, 2001).

TABLE 3-1
City of Bethel Demographic Summary

Race	Percent of Total Population
Alaska Native or American Indian	62
White	27
Asian	3
Black or African American	<1
Native Hawaiian or Other Pacific Islander	<1
Other Race	<1
Two or More Races	7

Source: U.S. Department of Commerce, U.S. Census Bureau, Census 2000

3.6. Economy & Financial Profile

Bethel is the regional center for the 56 villages on the Kuskokwim Delta. Businesses in Bethel provide transportation, medical care, and other services to the outlying villages. Barged food, fuel, construction supplies, and miscellaneous goods are distributed throughout the region by boat and plane.

The most stable sources of wage employment in Bethel are government services, transportation, and construction. Government jobs make up 50 percent of the employment. A table identifying the top ten employers in Bethel for the year 2002 is included on the following page (CEDs, 2003).

Service industries and government provided the most job growth for Bethel. Health care, led by the Yukon Kuskokwim Health Corporation (YKHC), has the greatest area of job growth in the service sector, while local government realized additional job growth. In fact, Federal and State employment actually decreased over the last 10 years. Employment in education grew significantly due to reductions in class size and increased enrollment. Public administration also increased due to expanded activities among tribal groups like AVCP, AVCP Housing and the Orutsarmiut Native Corporation (ONC).

TABLE 3-2
Top Ten Employers in Bethel (2002)

EMPLOYER	EMPLOYEES
Lower Kuskokwim School District	1,142
Yukon Kuskokwim Health Corporation	1,110
Association of Village Council Presidents (AVCP)	306
AVCP Housing Authority	134
Non-School Personnel	122
City of Bethel	113
Coastal Villages Seafoods Inc	113
Bethel Community Services Inc	112
Alaska Commercial Company	97
Alaska Dept. of Health & Social Services	86

Also important to Bethel's employment diversification is the steady growth in private sector jobs particularly in transportation and service jobs which provide services both to Bethel residents and to residents of the Bethel and Wade Hampton census districts.

Commercial fishing is an important source of income; according to the DCED Alaska Community Database, 205 residents hold commercial fishing permits, primarily for salmon and herring roe net fisheries. In addition, native arts and crafts are a growing trade. Poor fish returns since 1997 have significantly affected the community.

The basic subsistence economy is derived from fishing, hunting, and gathering. The smaller communities in the Bethel Census are very dependent on wild food harvests. According to Alaska Department of Fish and Game (ADF&G) surveys, residents of the City of Bethel show less dependence on wild food because a cash economy predominates in Bethel.

According to the Bureau of Economic Analysis (2000), income from all sources into the Bethel census area is \$305.6 million. Personal income in the City of Bethel is estimated to comprise over half the regional income. The City of Bethel, however, has the second lowest poverty rate in the Bethel census area. Fifty-nine percent of Bethel area income is from net earnings from payroll jobs and self-employment. The City also receives local revenue from taxes, licensing and permitting, service charges, and local enterprises. Outside revenue comes from federal operating budget, state revenue sharing, state safe communities budget, state fish tax sharing, and other state revenues.

The 2000 U.S. Census estimates a per capita income of \$20,267 for the community. The median household income is estimated at \$57,321 and approximately 11.2 percent of people in the community are below the poverty level. These numbers are based on a sample, and are subject to sampling variability. The percent of all households sampled in the City of Bethel was 24.1%.

3.7. Public Facilities, Services & Housing

Some of the public facilities in the City of Bethel include the hospital, youth center, senior center, library, cultural center, city hall, pool, schools, and churches. Industrial services include the Bethel Municipal Airport, fuel tank farm, Bethel Utilities Company power plant, dock, port and warehouses, water treatment plants, sewage collection facility, sewage waste disposal site, and fish processing facilities. Bethel also has a fire department, police department, and an ambulance service.

Bethel has 6 schools with 87 teachers to serve 1,328 students. These schools are under the jurisdiction of the Lower Kuskokwim School District.

Roads throughout the City are well maintained and snow-removal is performed when necessary. Roads have required some amount of repair to fix damage caused by the heavy loads transported by the water and sewer trucks. Within the corporate boundary of Bethel, there are 25 miles of roads and state highway.

As of 2000 there were 1,990 homes in Bethel, 1,741 of which were occupied. 749 homes were privately owned and 992 homes were renter occupied. Most of the homes were detached single family dwellings. Housing continues to run in short supply. As Bethel has grown, there has also been a shift in demand towards more single and two bedroom units and less higher-density apartment buildings. Based on the population projections in the 1997 Bethel Comprehensive Plan, a requirement of nearly 1,200 additional dwelling units was estimated. Assuming an average residential density of four units per developed acre, and accounting for physical constraints to land development, the plan predicted the phased development or redevelopment of approximately 400 acres would be needed for residential over the next 20 years.

Existing and planned house locations as well as an inventory of present facilities in the community are depicted in **Drawing 2**. A more detailed discussion of present facilities and future improvements is included in the next section of the report.

3.8. Power Supply & Fuel Storage Facilities

Power is supplied by the privately owned Bethel Utilities Corporation. Electrical power is derived from diesel fuel and has a 12,600 kilowatt capacity. The City power plant is located west of the YKHC Regional Hospital. The utility utilizes power cost equalization (PCS) and subsequently charges 21.4 cents/kilowatt-hour for power.

There are three bulk fuel tanks owned by separate entities. Bethel Utilities Corporation is the owner of a 51,000-gallon tank.

3.9. Transportation Facilities

Bethel has two dominate transportation facilities; the Bethel Airport and the Pot of Bethel. Bethel is the hub for air and barge cargo for other communities in the area.

According to the DCED Alaska Community Database, the state-owned airport is served by two major passenger airlines, two cargo carriers, and numerous air taxi services. The airport ranks third in the State for the total number of flights. The asphalt runway is 6,398 feet long and the gravel crosswind runway is 1,850 feet long. The airport recently underwent a \$7 million renovation and expansion. Two float plane bases are located nearby at Hangar Lake and H Marker Lake.

The port of Bethel holds the record as the northern-most medium-draft port in the U.S. Seafaring barges from Anchorage and Seattle can dock at the deep sea port during ice free months, generally from May to November. River barge service based in Bethel provides goods to villages along the Kuskokwim River.

Within the corporate boundary of Bethel, there are 25 miles of roads and state highway.

3.10. Land Use, Ownership & Status

Land use in Bethel has been strongly influenced by physical factors, land ownership, the availability of land for development, and historical development patterns. Physical limitations to development include the presence of permafrost, surface drainage problems, wind direction, and the proximity of the Kuskokwim River and subsequent erosion and flooding. A mixed land use pattern has been traditionally acceptable to the community. There is a Bethel "downtown" or core commercial area; although over the last 10 years there has been pressure to locate commercial uses along the major roadways.

3.10.1. Land Owners

A land status map has been included in **Drawing 3**. Additional land maps and information have been included in **Appendix E**.

3.10.2. Federal

Under the 1971 federal Alaska Native Claims Settlement Act (16 USC B 1601 et seq.), commonly referred to as "ANCSA", 161,280 acres were conveyed to the Bethel Native Corporation (BNC) by the federal government. A search of the joint Bureau of Land Management (BLM) and State of Alaska Department of Natural Resources (DNR) land records database yielded numerous federal information pertaining to the City. There are 41 federal records available on the database representing various areas in the City of Bethel, all of these have been included in **Appendix E** and are readily available on the BLM/DNR website should they be required. There are 4 federally owned lots along the easternmost portion of Fourth Avenue, these lots are presently unoccupied.

The Bureau of Indian Affairs (BIA) also has a 27-acre land allotment for their Bethel Administration site. This allotment is located directly west of the Bethel Municipal Airport.

3.10.3. State

The DNR has some land records pertaining to the City of Bethel. Eight Status Plats of the area as well as a historical index are available from the online database. Twelve State Surveys also exist.

The State of Alaska owns land used for the airport which includes the 6,398-foot asphalt runway, 1,850-foot gravel crosswind runway, and related housing and structures. The State also owns and maintains the highway and numerous roads running through the City.

3.10.4. Region Corporation Land

Calista Corporation's land entitlement is approximately 6.5 million acres in Southwestern Alaska, in the Yukon-Kuskokwim River Delta and the Kuskokwim Mountains physiographic regions. The region's 56 villages comprised the bulk of the region's native land selections, based on the great importance of the land to their subsistence economies, both in terms of the resources themselves and in preserving access to those resources. Nearly 5 million acres of the total entitlement is now conveyed to Calista and villages served by the corporation.

In addition, Calista Corporation holds regional subsurface estate selections in areas of high mineral potential. The corporation is eligible to make further selections to fulfill its entitlement. Calista continues to explore, evaluate its conveyances and future selections and market its mineral lands. A map showing the boundaries of land owned by the regional corporation is included in **Appendix E** and depicted on **Drawing 3**.

In 2001, a long awaited land exchange with the federal government was finalized. Through that exchange, some of Calista's subsurface estate and surface land parcels became part of the Yukon Delta National Wildlife Refuge. Subsistence hunting and fishing rights, as well as wildlife habitat and conservation values were preserved in the exchange.

No surface estates under the ANCSA 12(b) Land Entitlement have been conveyed to the village corporations by the Calista Corporation. However the local village corporation owns predominantly all surface estate encompassed by the City of Bethel through the ANCSA 12(a) entitlement conveyed by the federal government.

3.10.5. Village Corporation Land

The Bethel Native Corporation (BNC) is the sixth largest Alaskan Native Village Corporation acting as a for-profit corporation organized under Alaska Law and the pursuant to the ANCSA land entitlement. The corporation engages in many diverse business interests to maintain and improve profitability.

The BNC owns all surface estates in the local region ANCSA Section 14(c) allotments. The corporation has retained approximately 161,280 acres of land within that recently conveyed to the City in accordance with the ANCSA 14(c) (3) Land Entitlement. The corporation is presently working with the United States Fish & Wildlife Department as well as the BLM to resolve the under-selection of ANCSA acreage for BNC. This undertaking is called the ANILCA Section 1410 process and involves the neighboring BNC villages as well as Calista Corporation. The BNC Land Committee met in July to finalize the deficiency selections and will continue to work towards obtaining the full ANCSA land entitlement for BNC.

The City of Bethel's Corporate Boundary is shown on **Drawing 1**.

3.10.6. Tribal

There are no tribal owned lands in the City of Bethel.

3.10.7. Native Allotments

There are several native allotments within the City of Bethel. There are approximately 80 allotments throughout the area potentially impacted by the water and sewer improvement scenarios presented in subsequent sections.

3.10.8. Homesteads

There are no homesteads in the project area.

3.10.9. Other Owners

Land use in Bethel consists of residential, commercial, public institution, and public open space.

Residential land use includes homes, duplexes, apartments, and mobile homes. Respondents to the house survey conducted had been living in Bethel anywhere from 2 to 62 years, 80 percent having lived in Bethel over 20 years; 84 percent of these respondents owned their homes.

Commercial land use includes businesses that supply goods and services but are not involved in manufacturing. Industrial land use areas include the airport, docks, warehouses, fish processing plants, fuel tank farm, Bethel Utilities power plant, water treatment plants, solid waste landfill site, and sewage lagoon. These areas are defined as industrial because of either restricted public access, the presence of heavy equipment, or potential physical hazards.

3.10.10. Traditional Use Areas

Bethel has no formally identified areas for traditional use through activities such as berry picking and plant gathering taking place within the City limits at the present time.

The Orutsararmiut Native Council (ONC), the federally recognized Tribal Governing body for the community, is concerned with the long-term detrimental effects the proposed above-ground water and sewer pipes will have on tradition use trails utilized by Bethel residents if plans for their accommodation are not incorporated through all phases of development. The trails being referred to are primarily snow machine trails used by residents to travel to tradition winter subsistence hunting and fishing areas outside the City boundaries, as well as routine travel associated with regional commerce, social and economic infrastructure between Bethel and surrounding villages. An additional concern of some residents is how above ground water and sewer pipes might tend to restrict the movement of pedestrians about the city. The ONC considers it important that crossings over above ground pipes, at key location, be incorporated into any current or future design and construction to maintain snow-machine access to the City Center in the long-term as ongoing development occurs.

4. Forecasting Augmentation

4.1. Population Projections

Shown below are the historical records for the City of Bethel as provided by the State of Alaska Department of Community and Economic Development (DCED).

TABLE 4-1
POPULATION RECORDS

YEAR	POPULATION	YEAR	POPULATION
2004	5,830	1960	1,258
2000	5,471	1950	651
1990	4,674	1940	376
1980	3,576	1930	278
1970	2,416	1920	221

The projected population for the City of Bethel is 8,133 for the design year 2024. Data used for determining the population projection included the 1990 and 2000 U.S. Census Data and input from the Alaska State Demographer. A linear regression analysis was performed on the existing data to determine the population trend. The average population growth was estimated to be 1.6 percent/year.

4.2. Potential Growth Areas

The City is currently experiencing a rapid growth in population; as a result private development for residential use is presently being developed north (near the Tundra Ridge Subdivision), northeast (Haroldsen Estates), southwest (Kasayuli Subdivision), and along the Chief Eddie Hoffman Highway (Blueberry Field Subdivision). Development in these areas will be included in the planning of water and sewer services for the entire community.

Bethel's 2000 Census housing count was 1,990. The total number of occupied housing in 2000 was 1,741. Seasonal homes excluded, occupied homes accounted for 90.3 percent of the total. The number of people living in households, as opposed to living in group quarters, was 5,230. This represents 95.6 percent of the total population in 2000. The average housing density was 3.65 people/household in 2000. Projecting this density to 2024, 95.6 percent of the population will be living in housing units, and the number of housing units will total 2,290.

The subdivisions mentioned above are depicted in the Community Facility Inventory Map on **Drawing 2**.

5. Future Projects

5.1. Summary

A summary of recently completed and proposed capital improvement projects for the City of Bethel is presented in **Appendix F**. The data in the table is as listed in the Alaska Department of Community and Economic Development's (DCED) Rural Alaska Project Identification and Delivery System (RAPIDS).

5.2. Housing

Future development is anticipated to be concentrated within the following proposed subdivisions:

Raven Subdivision – A preliminary plat has been proposed for the Raven Subdivision by the BNC as depicted on **Drawing 2**. The proposed development is located north of the Kasayuli Subdivision

Lyman Hoffman Tract – The tract is located on the north, east, and south side of Larson Subdivision. While there is no preliminary plat available for this development, it is anticipated that the lots will be approximately 10,000 to 15,000 square feet.

Development in these areas will be included in the planning of water and sewer services for the entire community.

5.3. Facilities

5.3.1. Community

Apart from plans for a new police station and the new school facilities discussed below, there are no immediate plans for any community facilities in the City.

5.3.2. Schools

The Lower Kuskokwim School District (LKSD) is the second largest employer in the City of Bethel. With increasing regionalization, LKSD employment in the City is expected to increase. The University of Alaska Fairbanks (UAF) Kuskokwim campus also provides employment in Bethel as well as educational opportunities important in the development of an economic strategy.

One planned project is the Yuut Elitnaviat People's Learning Center (YE Center), created through a partnership between the City of Bethel, YKHC, Lower Kuskokwim School District, the Association of Village Council Presidents, Coastal Villages Regional Fund, and the UAF Kuskokwim Campus. This partnership intends to provide a vocational training center that focuses on guiding students (grades 8-14) into career paths in construction, health, education, and childhood development.

Bill Ferguson, LKSD superintendent, indicated that there were no major projects planned other than the YE. Discussion about a new elementary school for the community was ongoing but nothing substantive has been decided.

5.3.3. Health and Mental Health Facilities

Yukon-Kuskokwim Health Corporation (YKHC) operates most of the health-oriented facilities in Bethel. YKHC operates a Community Health Services Building which is Bethel's only 3-story structure and serves as YKHC's corporate headquarters, in addition to a home for optical, dental, and behavioral health services. YKHC also operates the Yukon-Kuskokwim Delta Regional Hospital, a 50-bed general acute care medical facility. The single-story 100,000 square foot steel frame structure is fully accredited by the Joint Commission on Accreditation of Healthcare Organizations. Services located in the hospital include an adult medical-surgical ward, a pediatric ward, an obstetric ward, as well as outpatient family medicine clinics, an emergency room, pharmacy, lab, X-ray, and specialty clinics.

YKHC has recently completed the State of Alaska's first Inhalant Treatment Center, a 16-bed residential treatment facility serving youth ages 10 through 17 who abuse volatile substances. The 11,440 square foot building is highly energy efficient, and is located in the Kasayuli Subdivision.

YKHC also provides employee housing at the Kasayuli Subdivision. Emily Kooch, YKHC Facilities and Planning Department, indicated that YKHC has limited improvements planned in the coming years apart from the addition of 8 duplexes this year and 10 duplexes next year to the Kasayuli Subdivision. Duplexes in the Kasayuli Subdivision typically consist of 2 apartments, each having 3 bedrooms, a living area, dining area, kitchen, laundry room, arctic entry, utility room, and garage for each side. Each duplex cost approximately \$500,000 dollars to build with funding received from the Health Resource Service Agency (HRSA).

5.3.4. Commercial Facilities

According to John Malone, Planning Director for the City, there are no imminent commercial facilities planned for the City.

5.4. Transportation

5.4.1. Roads

Bethel's role as a regional transportation hub dictates the need for quick and efficient transport of goods and merchandise. This includes a well developed road system; maintenance of a winter trail system to provide ground access (by snow-machine or four-wheeler); and efficient access to the port, boat harbor and local seaplane lake bases for commerce activities to and from surrounding villages. By ensuring that these needs are taken into consideration and accommodated as future development (such as aboveground water and sewer lines) occur, goods and merchandise can continue to be readily transported to surrounding villages by air, water or lands as the prevailing seasonal conditions dictate. Additionally, roads are considered critical to opening up area for new

development, especially closer to town, while winter trails maintain traditional access to subsistence hunting and fishing areas in the surrounding region, along with the previously mentioned economic aspects.

Allan Kemplan, the ADOT&PF regional planning director for the City of Bethel, provided some information regarding ADOT&PF projects being planned in the area. Projects identified for the City of Bethel include the paving of Ptarmigan Street, improvements along Hangar Lake Road, Oscar Way, Tundra Street (1st Street to end), Main Street (between 1st and 3rd Street), Ridgecrest Drive (between the E. Hoffman Hwy and Ptarmigan Street), and BIA Road. ADOT&PF is also planning major improvements to Chief Eddie Hoffman Highway, the design and right-of-way acquisition of which is scheduled for 2005 with construction planned for 2006.

5.4.2. Airports

The airport is critical to the Bethel and regional economy. Accordingly, continued maintenance of existing airport facilities as well as expansion of airport capacity will be important. The ADOT&PF Bethel Airport Master Plan indicates that aviation-related transportation industries are the fastest growing industries in the City and add value to the local economy. There may be a need to explore the creation of an Airport Industrial Park for outdoor storage, warehousing, transfer facilities, and light industry. Projects proposed for the Bethel Airport are included in **Appendix F**.

5.4.3. Ports

Two marine transportation facilities serve Bethel: the Port of Bethel and the small boat harbor. The City owns and operates the port facilities. The Kuskokwim River is not navigable by ocean-going barges up-river of Bethel. Port facilities include warehousing, beach staging for barges, cold storage facilities, stevedoring, and crane services. Additionally, Brown's Slough, located adjacent to the cargo dock, east of Oscar Way and Bridge Avenue, is used by regional residents for mooring boats.

Bethel's port serves more passengers and communities and delivers more goods than any other mainland port in Western Alaska. Though much of the fuel and cargo are consumed locally, many Kuskokwim River villages rely on commodities shipped through Bethel.

Bethel also maintains a small boat harbor that consists of five floating docks, a turning channel, and a passageway to the Kuskokwim River. Moorages used for inter-village travel, recreation, and subsistence fishing are provided. The harbor has the capacity for 400 small boats and serves an average 300 boats per day.

5.5. Power & Fuel Storage

Bethel Utilities Corporation (BUC) indicated that they had no immediate plans for future development of power generation and distribution. However, Lenny Welch, BUC superintendent, did indicate that Calista Regional Corporation was presently involved in planning a new power plant to serve the City.

A new tank farm, being built on property owned by Bethel Native Corporation (BNC), is progressing as planned towards a 2003 completion date. The facility will be capable of storing about five million gallons of bulk petroleum products including jet fuel, aviation gasoline, heating oil and regular unleaded gasoline. The complex, being built by Anchorage-based Rockford Corporation, will support commercial, aviation, government and individual consumers in Bethel and outlying villages in the Yukon-Kuskokwim region. The facility will support year-round fuel sales and delivery activities within the community of Bethel and will also serve seasonal fuel and general cargo barge delivery services to outlying villages.

6. Existing Community Sanitation Facilities

6.1. Administration

6.1.1. Financial Status

Budgetary accounting for the City is conducted by the use of a General Fund which finances the general government, public safety, public works, and community services. Capital improvements in these areas are currently financed by the use of the Fund Balance. Some activities within the City are budgeted and accounted for through the use of enterprise funds. Enterprise funds are designed to provide services and recover the costs of the services by charging users fees.

Appendix G includes the Bethel City Council's Adopted Utility Enterprise Budget for the fiscal year 2004-2005, which indicates O&M cost estimates for all components of the water and sewer utility for the City. The Water, Sewer and Sanitation Enterprise Fund has generally operate at a loss from year to year. Water and sewer rates were increased in 2001 and 2004 to offset these losses.

The City of Bethel currently bills 1,522 customers for water and sewer services (1,192 hauled and 330 piped). Costs of water plus O&M and administration costs are used to compute user fees. Inflation, profit and replacing equipment are not usually considered. Fees are dependent on tank size and frequency of service. Utility rates are included in **Appendix D**

In the future, revenue required to support the proposed improvements may be obtained by using a variety of sources including commercial, residential and other facility user fees and community-generated revenues such as a sales tax. Revenue generated from within the community will fund the annual O&M costs to operate the system.

6.2. History of Sanitation Improvements

Pre-1938 - All residents were responsible for providing their own water.

1938 to 1959 - Albert Schmidt initiated the first water delivery system in Bethel. Water was distributed from the Kuskokwim River using a tank truck, wood stave holding tank, and small pump.

1959 - Art Nicholson brought the first commercial drilling rig to Bethel, and drilled water wells for Kilbuck Elementary School and the National Guard Armory.

1960 - Mr. Nicholson drilled the first water well within the City to serve residential customers (located within the old fire station, next to the Kuskokwim Inn). The water was treated for removal of iron and manganese, chlorinated, and distributed via water truck.

1962- - Mr. Schmidt went out of business primarily due to the better quality of Mr. Nicholson's water.

Pre-1969 - No organized wastewater collection or disposal was available. All residents were responsible for disposing of their own honeybuckets in a manner which they deemed appropriate.

1969 - The U.S. Public Health Service drilled a water well for the Bethel Heights area. This well has since become the main water source for residential customers within the City (Bethel Heights Well).

1969 - The original City sewage lagoon was constructed and the City began the first honeybucket collection program in Bethel. The City purchased their first honeybucket collection truck and developed a wastewater rate structure.

1970 - Bethel Heights Water Treatment Building was constructed along with a piped water delivery system for the Bethel Heights community.

1970 - Roy Longbotham and Galen Dirksen bring a second well drilling business to Bethel. Privately owned water wells become commonplace for most institutional and large commercial facilities.

1970 - The Bethel Heights Lift Station and Bethel Heights piped wastewater collection system were constructed.

1971 - The City purchases a water delivery truck and begins water delivery service using water from the Bethel Heights Well.

1972 - The City purchases Mr. Nicholson's water well and delivery service.

1975 - Bethel Heights piped water delivery system freezes in-place due to city-wide power loss from electrical plant fire.

1976 - The Main Lift Station, City Subdivision Lift Station, and the cross-town wastewater trunk line, which ran from the old PHS Hospital to the Main Lift Station by way of the City Subdivision Lift Station, were all constructed.

1977 - Replacement piped water delivery system constructed for the Bethel Heights community.

1979- The City Center well was drilled.

1979 - The City began a wastewater holding tank evacuation program and purchased wastewater evacuation trucks. The City also purchased a second honeybucket collection truck.

1979 - The Kilbuck Lift Station and wastewater line extension were constructed.

1980 - The City Center Water Treatment Building was constructed along with a piped system to the City Center.

1980 - The City Laundromat was constructed, and a circulating distribution loop was connected to the Bethel Heights Water Treatment Plant.

1980 - The City Center wastewater collection pipe system was constructed.

1980 - The City Laundromat was constructed and connected to the Bethel Heights Lift Station to provide piped wastewater service.

1981 - The City sewage lagoon and the Main Lift Station were expanded to provide for growing population needs.

1982 - The Bethel Heights Lift Station pumping system was replaced.

1982 - 6" PVC wastewater lines from the Main Lift Station to the City Subdivision Lift Station were replaced with 8" steel lines.

1985 - The QFC #2/Trailer Court Lift Station was constructed to provide piped service for the Trailer Court and an evacuation truck discharge point for Blueberry Subdivision and Nunvak Estates.

1986 - The AVCP Housing Authority/Ptarmigan Subdivision water project was completed, extending service northwest from the Bethel Heights water utility lines.

1986 - The AVCP Housing Authority/Ptarmigan Subdivision wastewater project was completed, extending the Bethel Heights Lift Station service area.

1992 - The Bethel Heights Water Treatment Plant boilers and truck fill points were upgraded.

1993 - The Bethel Heights Western Addition No. 1/Tundra North piped water expansion project was completed extending Bethel Heights piped water service.

1993 - The existing sewage lagoon was expanded to meet growing population demands.

1993 - Bethel Heights Western Addition No. 1/Tundra North piped wastewater expansion project was completed extending the Bethel Heights Lift Station service area.

1995 - All water pipes in the Bethel Heights Subdivision were restored to original grade at road crossings.

1995 - All wastewater pipes in the Bethel Heights Subdivision were restored to original grade at road crossings.

1995 - Modifications to the 1993 sewage lagoon expansion were completed.

1995 - The FAA sewage lagoon, located between the State Highway and the Bethel Municipal Airport runway, was decommissioned.

1995 - Kilbuck Lift Station and Main Lift Station pumps and control systems were upgraded.

1995 - The City Subdivision Lift Station was by-passed with a wastewater pressure main. This lift station was subsequently demolished in 2000.

1999 - Water treatment upgrades made to the Bethel Heights Water Treatment Plant.

2000 - City Subdivision Water Treatment Plant construction was completed.

2002 to 2005 - A new piped water delivery and sewer collection system for the City Subdivision and the City's Governmental Office Complex was constructed.

2002 – City of Bethel Solid Waste and Sewage Lagoon Facilities Master Plan Update produced by CH2M Hill.

2004 - Water and Sewer Feasibility Study for Kasayuli Subdivision produced by CRW Engineering Group, LLC.

2004 - The Main lift station was reconstructed and relocated south further to the south of the existing facility.

The City's existing water and sewer infrastructure is depicted on **Figure 6-1** and is described in the following sections.

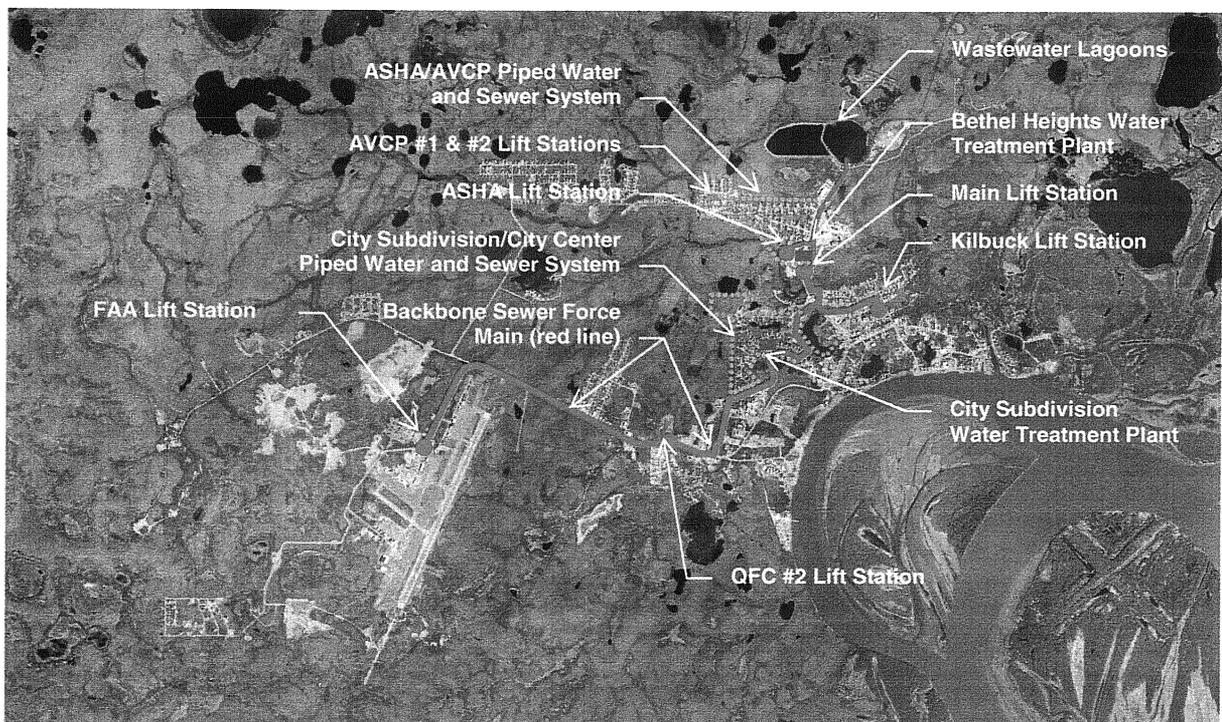


FIGURE 6-1
City of Bethel's Existing Water and Sewer Facilities

6.3. Water Treatment Systems

6.3.1. Water Facilities

The City of Bethel currently bills 1,516 customers for water and sewer services (1,261 hauled and 255 piped) and operates two water treatment facilities. The Bethel Heights Water Treatment Plant (BHWTP) produces potable water for the Bethel Heights Subdivision piped system, high school, and has capacity to support the City's truck-haul operations. The City Subdivision Water Treatment Plant (CSWTP) currently provides water for the City's water truck-haul operations, the City's governmental offices, and piped services to 180

properties within City Subdivision. The City Center Water Treatment Plant (CCWTP), constructed to support the City's governmental offices, was decommissioned and replaced by the City Subdivision piped water and sewer system became operable.

In 1996, the City of Bethel, in conjunction with the ADEC, Village Safe Water (VSW) Program, completed an update to the City's water and sewer master plan that recommended the existing truck-haul water delivery and sewer collection system be replaced with a piped water and sewer system.

6.3.2. Supply

The following includes a summary of pertinent data for the existing wells used for public and private water supply in Bethel.

BHWTP - The wellhead is located inside the BHWTP building and was drilled in 1969. The well was drilled to a depth of 420 feet belowground surface (BGS) and installed with 8-inch diameter steel casing. A Grundfos 385-S400-4 6-inch diameter 40 HP submersible pump is currently installed at 214 BGS and produces approximately 400 gallons per minute (GPM). The total yearly production from the well in 1995 was approximately 52.4 million gallons. The maximum capacity of the BHWTP well is unknown due to a limited number of aquifer tests. A secondary well having a 10-inch diameter casing and identical pump was constructed outside of the plant in 1998. The pump was set at 211.5 feet BGS.

CSWTP – The wellhead is located inside the CSWTP building. The well, comprised of a 10-inch diameter steel casing, was drilled to a depth of approximately 500 feet. Within the casing, a Grundfos 385-S400-4 6-inch diameter 40 HP submersible turbine pump was installed at about 210 BGS and supplies water at about 400 GPM. The City Subdivision WTP was intended to have an exterior back-up well but no water was found at the drill rig's maximum depth so the well was eventually filled with sand, plugged with grout, capped, and abandoned.

Private Wells – Numerous residential complexes and commercial facilities utilize private wells as a source of water. Water from individual privately owned, wells is generally not treated prior to use.

6.3.3. Treatment & Storage

This section provides a summary of the water treatment and storage facilities used by the City. Locations of these existing facilities are identified on **Drawing 2**.

BHWTP - The BHWTP provides piped water, to the Bethel Heights piped water system, LKSD High School and Elementary School, LKSD regional offices, and the City Laundromat. The BHWTP also has the capacity to provide water for truck delivery to residential customers.

The original BHWTP was constructed in 1969 by the U.S. Public Health Service. Water treatment primarily targeted the removal of iron and manganese and provided disinfection. Raw water was initially mixed with potassium permanganate before being filtered and disinfected with chlorine. After disinfection, the treated water was then fluoridated. The plant's treatment capacity could vary between 256 and 640 GPM, depending on desired iron

removal efficiency, and contained two pressure filters, with one backwash pump. A 20-foot by 16-foot portion of the WTP building was built in two stories, with the second story serving as living quarters for the plant operator.

The performance of the water treatment process was largely regarded as being substandard, and upgrades to the facility were made in 1999. Improvements to the water treatment system included the addition of two detention tanks upstream of the filters, a heat exchanger on the raw water line, new chemical feed equipment, and new pumps and filters. The plant now has three filters, two backwash pumps, and operates at a constant 400 GPM capacity. Other improvements included addition of automated valve operators and water quality monitors, increasing the size of piping, and the removal of the existing 60,000-gallon and 40,000-gallon storage tanks to make room for the proposed equipment. These storage tanks were replaced by a 428,000-gallon nominal capacity tank located outside the plant building.

The current water treatment process contains the basic steps previously used in the existing treatment system as well as the following enhancements:

- Preheat the raw water to increase chemical reaction rates.
- Inject potassium permanganate (KMnO_4) into the raw water to oxidize iron.
- Provide additional contact time to improve the effectiveness of chemical treatment.
- Inject a polymer to improve the coagulation of iron into filterable particles and the removal of organic material that, when combined with chlorine, leads to production of disinfection by-products (DBPs).
- Lower the application rate to the greensand filtration process to less than 2.5 gallons per minute per square foot (GPM/sq ft) of filter media surface area.
- Post-chlorinate and fluoridate the filtered water prior to discharging to the water storage tank.
- Increase the backwash pump size such that the unit backwash flow rate can be increased to improve filter cleaning.
- Provide additional water storage volume.
- Provide automated backwash and well pump controls.

The CCWTP treatment system provided iron and manganese removal via two Calgon greensand filters. Treated water was stored in a tank located adjacent to what is now the State court house. The CCWTP was recently decommissioned when the City Subdivision water and sewer systems bypassed the plant to serve the City Center complex. These facilities now received treated water from CSWTP.

CSWTP – Treatment facilities for the CSWTP are similar to those of the BHWTP, except that the CSWTP water storage tank has a larger nominal capacity, at about 505,000 gallons and only one well is used as a water source.

6.3.4. Distribution

The following discussion describes the different piped and haul systems presently being utilized throughout the City for water distribution.

ASHA/AVCP Housing (Bethel Heights Subdivision) - Two circulating loops, called Loops A and B, provide water serve to the Bethel Heights, Tundra North, and Ptarmigan residential subdivisions. The water lines are pile-supported, and feature insulated arctic pipe construction with 6-inch diameter Schedule 40 steel carrier pipes. Each loop is served by duplex 20 HP, 250 GPM circulation pumps. The galvanized coating on the interior of the pipe has worn off, causing surficial corrosion that appears to be adversely impacting water quality. Corrosion is also occurring at pitorifice service connections, causing significant leaking. Additionally, the distribution pumps, high demand pumps, boilers and controls need to be upgraded, based on an evaluation performed by the City. A corrosion study will be completed during the summer of 2005 to identify needed upgrades.

LKSD School and City Laundromat - Potable water is provided from the BHWTP. The City Laundromat and the LKSD school and regional offices are served by two separate circulating water systems. Both water lines are pile-supported, insulated arctic pipelines. The City Laundromat pipe has a 2½ -inch diameter copper supply line and 1-inch diameter copper return line, and the LKSD school has a 6-inch diameter steel supply line and 3-inch diameter return line.

City Subdivision – Water lines served by the City Subdivision WTP consist of water mains and service lines. The water mains are aboveground 6-inch diameter HDPE pipe, featuring insulated arctic pipe construction. Certain sections of the water main have a 1½-inch diameter HDPE circulating glycol line located below the 6-inch diameter water line, which are used for heating the circulating water line. Each lot is served by water main via a service line, which stub off the main lines through a service box. Both water and sewer service lines are usually contained in one arctic pipe. The water service has a 1-inch diameter HDPE supply and return line, which are also contained in a carrier pipe. The water from the service line runs through a water service box that feeds the house or is circulated back into the water main. Leveling sleepers (4x12 pressure-treated timbers) provide the primary support for the aboveground water mains. The timbers are typically secured to the ground with a “Duckbill” anchor. The arctic pipe is secured by a steel strap that wraps around the CMP and attaches to the leveling sleeper.

BHWTP and CSWTP Truck Fill Facilities - Two exterior water truck filling stations with 3 HP pumps are located at the BHWTP and one exterior water truck filling station with 5 HP pumps is located at the CSWTP. With the City's water truck fleet, these truck fill facilities provide water distribution for most consumers in Bethel.

A fleet of water trucks are employed to distribute water. Trucks and equipment specifications are designed by the City. Trucks used by the City are typically Ford Sterling LT8500's with an estimated design life of 5 to 10 years. Truck components include a 3,500 to 4,000 gallon capacity tank, chassis, motor, cab, heavy duty suspension, pumps, hoses, valves, and monitoring equipment.

The trucks consume 80 gallons of diesel fuel a week and are noted by the City as having poor fuel efficiency. The City is researching the availability and cost of new diesel fuel with low sulfur to reduce fuel costs in truck operation. Truck tanks are insulated and other

components are adequately protected versus freezing. Trucks are stored in a 250 by 300-foot heated, metal clad storage building located on the outskirts of town. Typical maintenance consists of checking belts, oil, grease, and the like. A small inventory of truck parts, hand tools, pneumatics and computer diagnostics are on hand for truck service and repair. Typical spare parts on hand are switches, power steering pumps, hydraulic pumps, tires, hoses, hose reels, water pumps, hydraulic motors, air filters, oil filters, and lights.

Typical residential water storage tanks are 500 to 1,500 gallons in size. Tanks are ordinarily accessible from the exterior, or outside confined in a utility area and insulated with fiberglass and/or urethane foam. Buried tanks are equipped with heat traces to thaw frozen components. Tanks are built on post and beam or piling with 1½-inch diameter camlock fittings for water and 3-inch diameter fittings for sewer. Tanks sizes vary and are normally built to suit the conditions present at individual homes thereby complicating the City's hauling efficiency. City employees do not enter facilities to provide water and sewer service to residents. Water is pumped into the storage tank until it reaches the overflow.

The City has 25 miles of roads and it takes six days to serve all customers. Service operates on a scheduled system, usually once per week. Approximately ten minutes are spent servicing one residence or facility. Service efficiency does not vary from winter to summer. The City reports that the truck-haul system is closely approaching the point of becoming inadequate to serve community needs. Fifty people are employed by the system with various levels of training depending on position.

6.4. Wastewater Treatment & Disposal System

6.4.1. Collection Facilities

The City operates a central "backbone" pressurized sewage collection system (force main) that extends from the Bethel Municipal Airport, through the business district, and discharges to a facultative lagoon located north of the City. The piped system serves commercial, institutional, and some residential facilities located near the sewer force main. Remaining customers are served via a sewage truck-haul system. The *Solid Waste and Sewage Lagoon Facilities Design Study/Master Plan Update (CH2M Hill, 2002)* recommended that the existing sewage lagoon be replaced with a biomechanical sewage treatment plant.

Wastewater in Bethel is collected and delivered to the sewage lagoon by the following methods:

- Piped sewage is pumped from several pump stations to the Main Lift Station, then via pipeline to the lagoon.
- Wastewater is pumped into trucks from individual collection tanks at commercial or residential customer locations.
- Honeybuckets of waste are left at the lagoon by individuals for disposal by the City staff.

The City's piped sewer collection system consists of a force main trunk served by pressurized laterals. Sewer flows collect at the Main lift station and are then pumped into the sewage lagoon. Aside from the Main Lift Station, the other lift stations in the system are:

Kilbuck lift station, FAA lift station, Quick Food Center (QFC) No. 2 lift station, and Alaska State Housing Authority (ASHA or "Bethel Heights") lift station. Other significant sources of flow entering the collection system include: Lower Kuskokwim School District (LKSD), BHWTP backwash, CSWTP backwash, City Center complex, Bethel Hospital, FAA service extension, and the local laundromat. Wastewater flow characteristics in Bethel's aboveground piping differ from that of a buried collection system because it contains no infiltration or inflow (I&I).

Following is a discussion of the different components utilized by the City for sewer collection.

Central "Backbone" Sewer Trunk Line - The central sewer trunk line connects the FAA Lift Station and QFC #2 to the Main Lift Station and terminates at the City sewage lagoon. The Kilbuck Lift Station sewer collection main ties into the backbone sewer trunk line south of the Main Lift Stations. The Pacifica Hotel, hospital housing, Building 800, Adult and Juvenile Correctional Facilities, the Hospital and town houses, Bethel Utilities Company, and the U.S. Fish and Wildlife buildings all tie into the backbone sewer trunk line between QFC #2 and City Subdivision. The trunk line is a pressure pipe that generally runs aboveground, with belowground road crossings. Along Ridgecrest Drive the trunk line are located under the boardwalk. The trunk line features arctic pipe construction with Schedule 40 steel carrier pipes variable in size, ranging from 4 to 10-inch diameters.

ASHA/AVCP Housing (Bethel Heights) Sewer Collection System - The ASHA sewer collection main connects the ASHA Lift Station to the central "backbone" sewer trunk line on the north side of the BHWTP. Upstream of the ASHA Lift Station, the sewer collection main collects gravity sewer flow from the Bethel Heights and Martina Oscar Subdivisions. Two lift stations are located in the AVCP Housing Complex (Martina Oscar Subdivision) and collect gravity sewer flow, pumping it to the ASHA Lift Station. The sewer collector line is a pile-mounted, insulated 8-inch diameter, Schedule 40 steel pipe. The sewer service lines are pile-mounted insulated 4-inch diameter, Schedule 40 steel pipe.

Kilbuck Sewer Collection Main - The Kilbuck sewer collection main collects pressurized sewer flow from the AC Store, Bethel Native Corp. offices, Tundra Women's Coalition, and the Tundra Center. This line originates from the Kilbuck Lift Station which collects sewer from the National Guard Armory and Kilbuck Elementary. The Kilbuck sewer collection main ties into the backbone sewer trunk line near the intersection of Ridgecrest Drive and 6th Avenue. The Kilbuck sewer collection main runs aboveground, with belowground road crossings. The sewer collection main is an insulated 4 inch diameter, Schedule 40 steel pipe.

City Subdivision Sewer Collection Mains - The City Subdivision sewer collection main collects sewer flow from the residential development within City Subdivision and the City Center complex; which includes City office, new PATC, old PATC, Cultural Center, KCC, KYUK radio/television studios, Veterans of Foreign Wars post home, Fire Department, Courthouse and Bethel Trading Company. Each City Center facility that is served by the piped sewer system has its own package lift station. All buildings have the same system with the exception of the new PATC. Both types of package lift stations utilize duplex 2 HP submersible grinder pumps and control systems. The main line for sewer is operated by an aboveground force main, ranging from 2 inches to 10 inches in diameter. The force main is constructed of HDPE and is urethane foam-insulated, having a CMP jacket for protection. Similar to the water main, certain sections of the force main also have a 1½-inch diameter HDPE circulating glycol line. Service lines stub off the main lines through a service box.

Both water and sewer are contained in one arctic pipe. The sewer service is a 1¼-inch diameter HDPE line and is contained in a carrier pipe. The sewage from each lot is emptied to a grinder pump that pumps out to the force main through the sewer service line. Leveling sleepers (4x12 pressure-treated timbers) are the primary support for the aboveground water mains. The timbers are typically secured to the ground with a "Duckbill" anchor. The arctic pipe is held in place by a steel strap that wraps around the CMP and attaches to timber leveling sleeper.

FAA Lift Station – The FAA Lift Station is located on the Chief Eddie Hoffman Highway at the entrance to the FAA housing complex. This lift station collects sewer from the FAA housing complex. One wet well is comprised of approximately 3,300 gallons and features duplex 3 HP submersible grinder pumps, control systems and wet well panel mounted heater. The influent collector line is an insulated 8" gravity line. The discharge truck line is an insulated 4-inch diameter, Schedule 40 steel pipe. Based on the Sewer CAD modeling effort the FAA Lift Station discharges approximately 54 GPM at 50 feet TDH at peak flow. At peak flow the lift station currently has approximately 30 GPM of additional capacity.

QFC #2 Lift Station - The QFC #2 Lift Station is located opposite the Chief Eddie Hoffman Highway from Quick Food Center #2. This lift station collects sewer from the Bethel Trailer Court, Bethel Prematernal Home, and Bethel Community Serves pipe systems, as well as evacuation truck discharge from Blueberry Subdivision, Nunvak Estates, and all airport facilities. It is connected to the upstream FAA lift station by the FAA force main constructed in 1996. One wet well is comprised of approximately 5,350 gallons and features duplex 10 HP submersible grinder pumps, control systems and a wet well panel mounted heater. The influent collector line is an insulated 3-inch diameter, Schedule 40 steel pipe. The discharge trunk line is an insulated 6-inch diameter, Schedule 40 steel pipe. Based on the Sewer CAD modeling effort the QFC #2 Lift Station discharges approximately 210 GPM at 62 feet TDH at peak flow. The lift station is at capacity, to keep the lift station wet well from flooding the truck-haul operator must visually monitor discharge into the lift station wet well to ensure that flooding does not occur.

Kilbuck Lift Station - The Kilbuck Lift Station is located northeast of the Kilbuck Elementary School maintenance shop. Sewer from Kilbuck Elementary School and the National Guard Armory flows into the lift station. The Alaska Commercial Store, Bethel Native Corporation office building, Tundra Women's Coalition on 6th Avenue, and some residences are connected to the sewer collection main between the Kilbuck Lift Station and the central sewer trunk line. One wet well is comprised of approximately 3,350 gallons and features duplex 3 HP submersible grinder pumps, control systems, and a wet well panel mounted heater. The influent service line is an insulated 4-inch diameter, Schedule 40 steel pipe. The discharge collector line is an insulated 4-inch diameter, Schedule 40 steel pipe. Based on the Sewer CAD modeling effort the Kilbuck Lift Station discharges approximately 103 GPM at 31 feet TDH at peak flow. At peak flow the lift station currently has approximately 65 GPM of additional capacity.

ASHA (Bethel Heights) Lift Station - The Bethel Heights Lift Station is located immediately west of the ANICA general store and collects gravity flow from ASHA/AVCP Housing Complex (Bethel Heights and Martina Oscar Subdivision). One wet well, approximately 6,000 gallons, duplex 5 HP submersible grinder pumps and control systems, and a wet well panel mounted heater make up the lift station. The influent and discharge collector lines are insulated 8-inch diameter, Schedule 40 steel pipe. The lift station is capable of a discharge of 100 GPM at a total head of 35 feet (CH2M Hill, 1995). The lift station is operating at

capacity. Standby power is provided by the Bethel Heights Water Treatment Plant; however, the standby power must be manually started.

AVCP #1 and #2 Lift Stations - The AVCP #1 and #2 Lift Stations are located within the Martina Oscar Subdivision and collect gravity sewer flows from the homes in this subdivision and pump the sewage flows to the ASHA Lift Station. The AVCP #1 Lift Station is 100 A, 120/208 V, 3 Phase. The AVCP #2 Lift Station is 100 A, 120/240 V, 1 Phase. The lift stations are operating satisfactorily; however, they both lack standby power. Standby power improvements are proposed in 2005.

Main Lift Station - In 2004, a "new" Main Lift Station was constructed south of the BHWTP and the City Laundromat, replacing the existing Main lift station located next to the water treatment plant. All piped wastewater in Bethel flows through this lift station, from either the central sewer trunk line, Bethel Heights Lift Station, laundromat, or LKSD School. The new lift station includes variable speed pumps with a total capacity of 1,940 GPM. Space has been provided for a future third pump, which could increase the capacity to 2,130 GPM. It is estimated that this lift station has sufficient capacity throughout the 20 year design life of the facility. The influent trunk line is an insulated 8-inch diameter, Schedule 40 steel pipe. The discharge trunk line is an insulated 10 inch, HDPE pipe.

6.4.2. Treatment & Disposal

Primary treatment is provided through the City sewage lagoon located north of the DPW building, adjacent to the solid waste site.

The existing lagoon consists of two non-aerated cells. The original lagoon configuration included only one cell of approximately 30 acres. In 1993, a second cell was added to the west side of the lagoon, along with baffle curtains to address short-circuiting concerns. Baffle curtains in the lagoon cells increase detention time by preventing short circuiting of sewer flow. The existing baffles rise and fall with the water level of the lagoon. During lagoon drawdown, the baffles sag and sometimes stick or freeze in a sagged position. When the water level rises, it can rise above the level of the baffles and flow over the baffles, creating short circuiting in the lagoon. Short circuiting reduces the treatment time for removing BOD and TSS from the pumped effluent.

Wastewater flow into the lagoon is not metered on a continual basis. However, there are pump run time records for two submersible pumps that operated in the former Main lift station that can be used to estimate average daily wastewater flows, when nominal pump performance characteristics are assumed. Because truck-haul records for sewage are not available, water haul records have been used to roughly estimate the volume of wastewater hauled daily to the lagoon.

The existing sewage lagoon is designed for 455,000 GPD influent flow. The lagoon is designed for 9-month retention time, or approximately 124.5 million gallons influent storage.

The lagoon is pumped twice each year. It is initially pumped after seasonal thermal turnover, in June or July, to reduce the amount of erosion of the lagoon cell walls caused by wave action and static head. The lagoon is also pumped in the fall-September or October-to discharge the waste. Each pumping period lasts approximately 20 to 30 days. The annual volume of sewage pumped from the lagoon is more than 200 million gallons. In 2000, the amount pumped from the lagoon totaled approximately 250 million gallons. The total annual

influent volume is 93 million gallons. The excess volume being pumped from the lagoon is attributed to precipitation and groundwater seepage. Seepage into the lagoon, while supported by pump records, may not be visually obvious because the seepage rate through the underlying silty sand surrounding the lagoon is fairly slow. Groundwater seepage into the lagoon is assumed to be significant. It is believed to be caused by a hydraulic gradient of the groundwater table surrounding the lagoon, and forcing water into the lagoon.

7. Community Need for Upgrades

7.1. Health & Safety Concerns

The primary health and safety impacts of the project would include the potential for improved sanitation conditions, and the reduced chance for a human disease event.

Although the current water supply and level of water treatment produces high quality potable water, the current means of water distribution may not be the most effective in preventing water contamination. The current sewer collection system, the storage of sewer at residences for prolonged periods of time and possible instances of spillage during pumping by haul operators may also heighten the risk of disease spreading throughout the community. Though a truck system is regarded more adequate than a honey bucket or small-haul system from a sanitation standpoint, a piped system is considered the most sanitary in terms of distributing clean water to residents and minimizing human contact with sewage.

Truck-haul systems also present inherent safety risks like potential truck accidents and operating mistakes like spills. Fatalities have been experienced in truck-haul served communities when trucks have accidentally collided with pedestrians due to icy roads or operator negligence. Haul trucks are often weigh over 3,000 pounds when operating and consequently have decreased mobility in extreme arctic conditions. A piped system would remove this type of safety risk although some injuries have also been experienced when snowmobiles and vehicles have collided with aboveground arctic pipes.

The purpose of this study is to provide the beneficial sanitation alternatives that address existing concerns to health and safety that may be attributable to the current condition of facilities.

The adequacy of the current sewage treatment and disposal system also requires evaluation of potential expansion to account for future development of residences and facilities. In this regard a fully piped sewer system would better limit the potential for exposure to human wastes.

7.2. Environmental Concerns

Environmental concerns related to the existing system would be those associated with truck exhaust and noise. Currently the City experiences continuous operation of large water and sewer haul trucks during the day, and consequently related noise and smoke due to these vehicles causes a disturbance to residents. Similarly, aboveground piped systems have been a source of criticism by some residents in terms of being unsightly and a hindrance at times to pedestrians. Neither system poses a significant threat to the environment but both should be evaluated in regards to potential impacts during construction and operation.

7.3. System Growth Capacity

Currently the primary method to distribute water and collect sewer is through the truck haul system. The ultimate goal of the City is to convert this system to a piped water distribution and sewer collection system. The proposed improvements must include a phased approach that reduces the current truck haul costs by providing remote truck-fill water stations and sewer dump station that would be ultimately used to serve the piped water and sewer system. The following paragraphs discuss the system growth capacity of existing water and sewer systems.

7.3.1. Water Treatment Systems

The water treatment capacity of the existing BHWTP is 400 GPM with a water storage capacity of 428,000 gallons. The plant is currently operating at approximately 56 GPM average daily flow to serve the existing piped system. There is ample treatment capacity at the BHWTP to serve additional expansion; however, the water storage tank capacity is limited to the existing piped system (Bethel Heights piped water system, LKSD High School and Elementary School, LKSD regional offices, and the City Laundromat).

The water treatment capacity of the existing CSWTP is 400 GPM with a water storage capacity of 505,000 gallons. The plant is currently operating at approximately 69 GPM average daily flow to serve the existing piped system and truck-haul operations. There is ample treatment capacity at the CSWTP to serve additional expansion; however, the water storage tank capacity is limited to the existing piped system (City Subdivision and City Center).

Further expansion of the water distribution system from the BHWTP and the CSWTP would require additional water storage to account for fluctuations in flow and to accommodate fire flow. Based on the water distribution modeling effort completed for this report the BHWTP and the CSWTP could support a piped water distribution system to serve development east of Ridgecrest Drive (Mission Lake area, the "Avenue" area, Harbor areas, and the development around the new YKHC offices) as well as development around the Hospital. However; additional water storage tanks, booster pumps, circulation pumps, and water heating systems would be needed to serve these areas.

7.3.2. Water Distribution Systems

The existing water distribution systems have been designed to support local development only. Expansion of these systems is limited. The primary constraint to expanding the existing piped distribution system is the capacity of the existing water storage tanks to support peak water demands and fire protection needs. There is no property available at the BHWTP to install another water storage tank; therefore another water storage tank would have to be installed remotely. The City had indicated an interest to purchase the lot west of the CSWTP to expand the CSWTP to install a water storage tank to support expansion to the south (around the Hospital).

7.3.3. Wastewater Treatment Systems

The existing unlined treatment lagoon meets current NPDES requirements only because of the high volume of dilution water caused by the seepage of groundwater into the lagoon. The current lagoon is not large enough to treat current BOD loading. A generally accepted guideline for sizing a lagoon in subarctic environments, based on BOD loading, is 10 lb / ac-day. The current loading on the system is about 12 lb / ac-day and is expected to reach 17 lb / ac-day by year 2021. A new biomechanical wastewater treatment facility is proposed.

7.3.4. Wastewater Collection Systems

FAA Lift Station and Force Main – The FAA Lift Station currently discharges approximately 54 GPM at 50 feet TDH at peak flow, which allows for an additional capacity of approximately 30 GPM. This flow rate is substantially less than the required capacity of 400 GPM to support truck-haul operations. Increasing the capacity of this system is controlled by the diameter of the force main and not the pumps. Therefore, in order to increase the capacity of this system the force main must be increased from 4-inch diameter to 6 and 8-inch diameter pipe. Once this is completed the existing pumps can be replaced with higher capacity pumps.

QFC #2 Lift Station and Force Main – The QFC #2 Lift Station discharges approximately 210 GPM at 62 feet TDH at peak flow, which includes flows from the FAA lift station/force main and an existing truck dump station. The City currently discharges sewage from truck-haul operations up to 400 GPM at average daily flow. When peak wastewater flows are occurring, the City must gradually meter in truck discharge and wait for the pumps to convey the volume accumulated in the wet well before continuing with further truck discharge. Additionally, significant wastewater flows enter the force main system downstream, including the Hospital and backwash from the CSWTP. The QFC #2 lift station and force main is currently operating at capacity. Therefore, in order to increase the capacity of this system the force main must be increased from 6 to 8-inch diameter and 10-inch diameter pipe. Once this is completed the existing pumps can be replaced with higher capacity pumps.

Kilbuck Lift Station and Force Main – The Kilbuck Lift Station discharges approximately 103 GPM at 31 feet TDH at peak flow. At peak flow the lift station currently has approximately 65 GPM of additional capacity. This flow rate is substantially less than the required capacity of 400 GPM needed to support truck-haul operations. Increasing the capacity of this system is controlled by the diameter of the force main and not the pumps. Therefore, in order to increase the capacity of this system the force main must be increased from 4-inch diameter to minimum 6 and 8-inch diameter pipe. Once this is completed the pumps can be changed to higher capacity pumps.

The ASHA and AVCP #1 & #2 Lift Stations – The ASHA Lift Station and the AVCP #1 & #2 Lift Stations are currently operating at its design capacity but additional capacity is not anticipated to be needed. However, the lift stations and associated force mains were constructed in the 1970's and 1980's. At some point this system will need to be replaced/upgraded. The system will be evaluated in 2005 to determine needed upgrades of the systems.

Main Lift Station and Force Main – In 2004, a new Main Lift Station was constructed south of the BHWTP and the City Laundromat. It is estimated that this lift station has sufficient capacity throughout the 20 year design life of the facility.

8. Design Criteria & Analysis Update

8.1. Drinking Water System Design Criteria

The design criteria values used in the preparation of this study are listed below. Consideration and confirmation as to the applicability of these criteria should be made during the design of all future improvements.

Design Period:	20 Years beyond design year
Design Population (Year 2024)	
City of Bethel (2.5% growth rate):	9,400 people (Year 2024)
Water Consumption:	
Piped Water and Gravity Sewer:	65 gallons/capita/day (GCPD)
Haul Water and Sewer:	26 GCPD
Fire Flow:	500 GPM.
Residual Pressure:	20 PSIG (minimum).
Hydrant Spacing:	500 feet (maximum).
Water Storage:	
Reserve Volume:	3-day supply of Average Daily Demand (ADD).
Fire Supply:	2-hour duration at 500 GPM (minimum).
Equalization Volume:	Max Daily Demand (MDD) less 8 hours of well pump output.
Disinfection:	1 Log inactivation.
Water Treatment:	Treatment objectives shall be in accordance with applicable, current ADEC drinking water regulations, some of which are summarized below for Year 2004:
Total Iron (Fe):	< 0.300 mg/L.
Total Manganese (Mn):	< 0.050 mg/L.
Total Arsenic (As):	< 0.010 mg/L.
Total Trihalomethanes (TTHM):	< 0.080 mg/L (Stage 1 D/DBP Rule).
Five Haloacetic Acids (HAA5):	< 0.060 mg/L (Stage 1 D/DBP Rule).
True Color:	< 15 color units.
Tastes and Odors	not objectionable.
Disinfection Residuals:	per ADEC.
Distributed Volume-to-Total Filtered Volume Efficiency:	> 95%.

Chemical Feed:

Comply with State drinking water regulations as amended by community-specific ADEC stipulations for disinfection residual, fluoride residual and others.

Provide multiple feed points for operational flexibility.

Anti-siphons and flow switches required for fluoride chemical feed pump, with a standby automatic shut-off control in event of flow switch failure.

Heat water prior to chemical injection as needed and as previously indicated by pilot testing to sufficiently accelerate chemical reactions and avoid or minimize other adverse effects like DBP formation, CO₂ bubble formation and excessive energy consumption.

Provide 20 to 40 minutes detention time for chemical reactions prior to direct filtration, unless pilot testing previously indicates that a shorter or longer period is required for optimum treatment.

Employ only chemicals that are certified by National Sanitation Foundation (NSF) for safe use in drinking water.

Pressure Filters for Direct Filtration Application:

Provide minimum of two filters.

Provide multi-layer media configuration optimized to remove iron, manganese, arsenic and organics to comply with applicable State drinking water regulations.

Conduct a pilot study to demonstrate and verify optimum media configuration and chemical feed dosing regime.

Avoid use of proprietary filtration media products.

Unit filter rate ranging between 1.0 and 2.0 GPM/ft² of media surface.

Provide air scour system to prevent formation of mud balls and media caking and improve backwash cleaning.

Size filters based on maximum day demand (MDD).

Provide a backwash pump flow rate up to 15 GPM/ft² of media surface to fluidize and expand media bed by 40 to 50 percent of original volume, taking into account temperature and viscosity of backwash water.

Pressure Pumps - Design based on peak hourly demand (PHD) with step-up pressure and hydropneumatic system to efficiently accommodate fluctuations in water distribution demand.

Water Heating System - Maintain temperature of return water from distribution system @ 45 to 55° F.

Water Storage Tank:

Bolted or welded steel tank with vertical side shells.

Minimum 5 inches of insulation on exposed tank surfaces.

Tank inlet and outlet shall be located to minimize short-circuiting.

Tank inlet shall provide pinch valve diffusers at pipe end to improve circulation of stored water.

Backwash Surge Tank (base working volume on maximum backwash rate x maximum duration rate x number of filters x 1.25 [for freeboard and non-draining volumes]):

Maximum filter backwash rate: 15 GPM/FT²

Duration of maximum rate backwash: up to 15 minutes or time needed to pass 3 times the side shell volume of the filter in water through the media.

Welded steel tank with vertical side shells.

Exterior: minimum 5 inches of insulation on exposed tank surfaces.

Interior: insulation not required; however, condensation ring is required.

Circulation Systems:

- Size systems to meet peak hourly demands.
- Locate circulation pumps on return ends of loops.

Plant Process Pipe (for potable water applications):

< 3-inch diameter: Schedule 80 PVC or Schedule 40 stainless steel.

> 3-inch diameter: Schedule 10 stainless steel or coated, epoxy-lined Schedule 40 steel.

Size piping based on velocities not to exceed 6 ft/sec, except in case where degree of floc shearing would otherwise be detrimental to filtration process, wherein velocities shall not exceed 2 ft/sec.

Emergency Standby Generator - Required as back up for power outages.

General - Provide floor-mounted, powered, alternating backup for major equipment components.

Tankage and pipeline interior materials and linings – Complying with NSF 61, as applicable for tanks and for pipelines, including fittings and instruments.

Water Treatment Process Facilities Design:

Comply with current edition of Recommended Standards for Water Works (i.e. "Ten States' Standards") as minimum guidelines, and with applicable State drinking water and water quality regulations.

Provide due consideration of recommendations and suggestions made by City and State O&M personnel, including YKHC and VSW remote maintenance worker staff.

Water Distribution (for local systems):

Water Demand Peaking Factors:

Maximum Day Demand (MDD): $PHD \div 1.75$

Peak Hour Demand (PHD): $125 + (1.2 \times (N-50))$, where N is the number of dwellings served (per ADEC design criteria for small systems).

Minimum Pressure: 20 PSIG

Maximum Pressure:	100 PSIG
Minimum Pipe Diameter:	6 inches.
Circulation loops: - Provide minimum 2 ft/sec. flow rate for water distribution loop circulation.	
Mean Annual Temperature:	29.1° F.
Mean Minimum Temperature:	0° F.
99% Design Temperature:	-46° F.
Mean Annual Precipitation:	16 inches.
Mean Annual Snowfall:	55 inches.
Design Thawing Index:	3,200 °F –days.
Design Freezing Index:	4,400 °F –days.
Design Wind Speed (3 sec gust):	120 miles per hour.
Seismic Load:	Per current edition of International Building Code.
Ground Snow Load:	40 PSF.
Active Layer Depth:	2 to 7 feet.
Presence of Permafrost:	Generally continuous.

8.2. Wastewater Design Criteria

Future wastewater flows are summarized in this section, which is referenced from the *City of Bethel Solid Waste and Sewage Lagoon Facilities Design Study/Master Plan Update (2002/CH2M Hill)*. Refer to this document for a detailed analysis of the wastewater design criteria and approved recommendations.

Future wastewater flows are based on projected populations for both truck-hauled and piped wastewater. Capital improvements projects that increase the number of people on piped sewer are also accounted for in the wastewater projections. Peaking factors multiplied by the average annual flow are used to determine the volumes of flow that pumps and treatment equipment will have to handle in the future. Waste characteristics such as BOD and TSS are also calculated.

8.2.1. Piped System Flows

Table 8-1 summarizes the waste loading and flow projection to the Years 2021 for the piped system.

TABLE 8-1

City of Bethel Piped Collection System Wastewater Loads for Year 2000 and Projected for Year 2021

Piped Wastewater	Unit	2000	2021/2024
Flow			
Average Annual	GPD	168,421	252,499
Summer Peak Week	GPD	207,160	252,499
Winter Peak Week	GPD	185,265	277,750
Per Capita Flow Average Annual	GPCPD	54	54
BOD			
Average Annual	lb/d	356	534
Summer Peak Week	lb/d	440	660
Winter Peak Week	lb/d	390	590
Concentration	mg/L	254	254
Loading Per Capita	ppcd	0.15	0.15
TSS			
Average Annual	lb/d	439	657
Summer Peak Week	lb/d	540	810
Winter Peak Week	lb/d	480	725
Concentration	mg/L	312	312
Loading Per Capita	ppcd	0.19	0.19

8.2.2. Truck Haul System Flows

Table 8-2 summarizes the waste loading and flow projection to the Years 2021 for the piped system.

TABLE 8-2

City of Bethel Truck-Hauled System Wastewater Loads for Year 2000 and Projected for Year 2021

Hauled Wastewater	Unit	2000	2021/2024
Flow			
Average Annual	GPD	86,082	94,786
Per Capita Flow Average Annual	GPCPD	26	26
BOD			
Average Annual	lb/d	449	495
Concentration	mg/L	626	626
Loading Per Capita	ppcd	0.14	0.14
TSS			
Average Annual	lb/d	547	602
Concentration	mg/L	762	462
Loading Per Capita	ppcd	0.17	0.7

8.2.3. Total Influent Wastewater Projections

The year 2000 estimated wastewater loading is 255,000 GPD, or 93 million gallons / year. The anticipated year 2021 wastewater loading is 350,000 GPD, or 128 million gallons / year. This estimate takes into account population growth and an increase in flow from capital improvement projects. It also takes into account the increase in frequency in backwashing the filters at the water treatment plants, assumes the hospital wastewater flow remain constant. **Table 8-3** summarizes the waste loading and flow projection to the Years 2021 for the piped system. Additional wastewater design criteria are presented below:

Wastewater Collection:

Gravity Sewer Main:

Manhole Spacing:	300-foot maximum.
Pipe Size:	8-inch diameter minimum.
Minimum Slope:	0.4 %.

Force Main:

Minimum Pipe Diameter:	2-inches.
Flow Velocity:	3 to 6 feet per second.

TABLE 8-3

City of Bethel Total Wastewater Loads for Year 2000 and Projected for Year 2021

Parameter	Unit	2000	2021/2024
Total Bethel Population		5,560 ^a	7,419
Piped Sewage Customers		2,215	3,774
Hauled Sewage Customers		3,345	3,646
Average Wastewater Flow	GPD	255,000	350,000
BOD			
Loading	lb/d	810	1,100
Concentration ^b	mg/L	380	355
TSS			
Loading	lb/d	990	1,300
Concentration ^b	mg/L	465	435

^a The 2000 U.S. Census data actually reflects 1999 population data for Bethel. The population in 2021 is computed-based on a 1.6 percent annual growth rate.

^b The biochemical oxygen demand (BOD) and total suspended solids (TSS) coming into the sewage lagoon were measured from June 14, 2001, to June 29, 2001.

9. Previous Master Plan Evaluation of Water and Wastewater Facility Improvements

9.1. Introduction

As previously discussed, the *City of Bethel Water and Sewer Facilities Master Plan Update (Dames & Moore / 1996)* established the community's long-term goal to convert the existing truck-haul water and sewer system to a piped system. This goal remains unchanged; therefore, this document will not reevaluate truck-haul versus piped water and wastewater systems.

Additionally, the City's wastewater treatment and disposal options were previously evaluated and documented in the *City of Bethel Solid Waste and Sewage Lagoon Facilities Master Plan Update (2002/CH2M Hill)*. The findings of this document remain unchanged; therefore, this document will not reevaluate wastewater treatment and disposal options.

This section provides a summary of the findings of the above referenced documents as well as additional study information related to water and wastewater facility improvements in Bethel.

9.2. Water Source, Treatment and Storage

The water sources at the BHWTP and CSWTP are water wells (each with a capacity of 400 GPM) that tap into a permafrost-confined aquifer located over 400 feet below ground surface (BGS). A groundwater source is anticipated for future systems because of the following advantages relative to using a surface water source:

- Groundwater has relatively constant water properties (i.e., temperature and water quality), generally allowing for uniformly-applied treatment processes.
- Groundwater treatment regulations are generally simpler than that for surface water sources, thereby allowing less-sophisticated treatment technologies.
- Water source is protected from surface water influence and contamination by a 400 to 500-foot thick layer of permafrost.
- Groundwater is plentiful in the Bethel area, contained within a large pressurized aquifer that causes the static water level to rise close to the ground surface, which greatly mitigates pumping power needed to convey water through the treatment process to storage.

Groundwater characteristics are relatively uniform throughout the Bethel area. Based on typical groundwater data, water treatment would need to address the following water quality issues:

Moderately high iron concentrations (2 to 9 mg/L). Iron is regulated as a secondary contaminant (i.e. not known to be toxic if consumed) and is readily removed by using

oxidation and filtration. Iron contributes to the brown color of water, which causes stains in clothing, hair and plumbing fixtures. Iron also feeds iron bacteria that can grow within distribution systems when disinfectant levels are lacking.

Moderately high manganese concentrations (0.05 to 3 mg/L). The presence of manganese is nearly always associated with presence of iron. Manganese is also listed by the State as a secondary contaminant, and like iron contributes to water color and consequent staining. Manganese is generally more difficult to remove by oxidation than is iron, but is readily removed using greensand media in a properly operated filtration process.

Moderately high arsenic concentrations (0.02 to 0.03 mg/L). A recent reduction in regulatory levels places arsenic levels normally encountered in Bethel's groundwater above the allowable maximum. Arsenic levels had previously fallen well below the previous maximum level. Fortunately, arsenic can be readily removed by adsorption to oxidized iron, which is removed by filtration.

Disinfection by-product (DBP) formation from moderately high organic concentrations (no test results for TOC, DOC or UVA254). New regulations require maximum concentration limits on various DBPs, like trihalomethanes (THMs) and haloacetic acids (HAAs). These compounds form when various disinfectants, most commonly chlorine, combines with organic molecules present in the groundwater. THMs and HAAs are suspected carcinogens when consumed in high concentrations for long periods of time and therefore any consumer's chronic exposure to them causes regulatory concern.

Slightly high true color from organic concentrations (10 to 20 color units). Color levels are regulated as a secondary contaminant because the presence of any discernable color in potable water might cause some consumers, particularly those who live in remote communities, to obtain better-looking water from non-potable sources. Hence color, like odor, is a palatability issue. Dissolved organics contribute color to Bethel's water in minor degree, and is ordinarily removed by using coagulation or adsorption processes.

With exception to DBPs, the processes at both BHWTP and CSWTP target and successfully treat groundwater for the above issues. At the time of writing this master plan, the City recently completed two pilot testing studies aimed at meeting current regulations related to DBP levels using the *direct filtration* (coagulation, flocculation and filtration) processes currently employed at both treatment plants. In these studies, summarized in *Bethel Disinfection By-Product (DBP) Bench Test Report (NTL Alaska, Inc./Aug 2004 and March 2005)*, the City targeted the reduction of organic precursors prior to chlorination by testing the efficacy of various polymers as coagulant aids. In full scale testing of three of the more promising polymers, organic material removals improved, resulting in lower DBP levels. However, usage of only one polymer resulted in DBP levels that complied with current regulations. In addition, the solids loading on filters were observed to increase, thereby reducing filtering durations between backwashings. During implementation of the polymer showing the best removal of organics, filter durations were shortened by turbidity breakthrough, and not with the differential pressure mechanism ordinarily experienced in the current treatment process. Using this polymer will somewhat change the manner in which the plant currently operates by requiring more frequent filter backwashing, based on increasing filter effluent turbidity levels.

With the processes at both plants currently able to produce water of high quality using simple, industry-tested technology, the Department of Public Works (DPW) has expressed a

commitment to using this approach in new water treatment plants (WTPs). As DPW continues to work with engineers in exploring ways to optimize and enhance the existing process, either to improve water quality and treatment efficiency or to meet new regulations, such enhancements would also be incorporated in newer plants as they are constructed. Standardization among treatment plants would continue to be a priority.

Accordingly, DPW anticipates that new WTP configurations would be progressively improved versions of that implemented at BHWTP and CSWTP. In this manner, the City could benefit from operator familiarity among the various WTPs. All operators employed by the City could readily stand in for each other during personnel absences, thereby maintaining a high level of operational reliability. Centralized inventories of consumables, parts and equipment could more efficiently serve all WTPs, as well. In contrast, providing radically different WTP configurations would require specialized expertise and equipment that could not benefit well from personnel and material interchangeability. DPW has expressed a desire in gradually implementing newer, potentially more effective treatment technologies in a prudent manner that all WTPs would incorporate, rather than operate WTPs configured to dramatically different technologies. Operating fewer, larger regional WTPs would facilitate like-kind improvements made to all of the City's water producing facilities. In this regard, a new WTP might not employ a process configuration significantly different from that currently used at BHWTP and CSWTP. However, the City's continuing pursuit to successfully treat DBPs at BHWTP and CSWTP will bear out the practicality of this objective.

In recent pilot testing, it was made apparent that while the current direction filtration process was able to comply with the Stage 1 Disinfectants/Disinfection By-Products (D/DBP) Rule, backwashing frequencies would also increase (as expected)—from about once per 20 to 30 hours of filtering (depending on type and dosage of oxidant used) to about once every 10 to 12 hours. In addition, the cost of chemicals would increase because the best performing polymer is relatively expensive. Nevertheless, for the near future, the pilot testing results represent a solution to meeting the Stage 1 D/DBP Rule.

As the community population continues to increase, the City may consider implementing potentially more-efficient and more-effective technologies as they continue to develop. *Conventional filtration* might be explored as a way to prolong filter runs by separating most of the coagulated solids in chemically-treated water prior to filtering. Although backwashing and chemical costs might not relatively decrease using this method, significant improvements in plant effluent DBP levels might be achieved. *Nanofiltration* might also be reviewed as well, as costs of replacing filter membranes becomes more economical for smaller remote communities. In any case, a cost-benefit analysis should be performed to compare the relative life cycle costs of the various technologies available in the future.

When made effective, the upcoming Stage 2 D/DBP Rule will require that DBP testing be based on *Locational* Running Annual Average (LRAA), rather than a simple running annual average (RAA) of an aggregate of monitoring locations within a community currently used in the Stage 1 Rule. In the LRAA method, annual averages are measured relative to individual monitoring sites throughout a community's distribution system previously deemed critical under an Initial Distribution System Evaluation (IDSE). If conditions in such remote locations happen to generate higher levels of DBPs than that resulting from Stage 1 monitoring, then the water treatment process will need to be adjusted such that the monitoring site conditions comply with the D/DBP Rule. In this manner, the Stage 2 Rule has the potential to effectively become a more stringent regulation. As of writing this master plan, only

communities having populations larger than 10,000 people will be required to comply with the Stage 2 Rule. The U.S. Environmental Protection Agency (EPA) has not yet determined if or when smaller communities will need to follow suit.

Water storage facilities would be needed throughout the community in order to provide the following primary functions:

- maintain a sufficient supply of potable water for public consumption when treatment processes are suspended on a routine or emergency basis;
- maintain a sufficient supply of water for fire fighting and distribution system maintenance purposes;
- equalize large water demand fluctuations during the course of a day or season;
- provide sufficient disinfection contact time.

Water storage tanks, when elevated, are also used to maintain static pressure within the distribution system. This function would not necessarily be used at Bethel, as the distribution system would likely be a circulating type pressurized by pumps.

Large community storage tanks in northern regions are typically constructed of wood, metal, or concrete and can be located either inside or outside of a WTP building. The use of wood for storage tanks has only been used in a few locations and represents some of the first water tanks installed in the north. Wood storage tanks commonly leak and are subject to bacterial growth on the interior of the tank. Concrete tanks require a cost effective supply of high quality aggregate and cement mix, as well as firm foundations to support the weight. Due to their high cost of construction and often the lack of suitable aggregate or poor foundation conditions, concrete tanks are not very common in rural Alaska. Steel tanks, either bolted or welded, are generally the preferred alternative. Bolted tanks can be quickly erected and in small sizes are usually less expensive than welded tanks, but have a greater potential for leaks. Tanks must be supported on foundations that take into consideration the added weight of the water and the possible thermal impacts caused by constructing a warm tank over frozen ground. Tanks constructed outside of buildings are typically insulated to prevent water freezing and consequent damage to the tank.

No other specific options are discussed for water storage, as it is assumed that adequate conventional storage will be needed regardless of the water distribution system alternative selected. Typically, the storage tank should provide a sufficient volume of water to meet the aforementioned functions relative to the population size of service area. The size of storage tank might be initially limited by funding, but on a regional scale would ultimately be similar in scale to that used at CSWTP, a welded-steel type, approximately 60 feet in diameter, 24 feet high, with a 505,000 gallon nominal capacity.

The CSWTP tank is insulated with a 5-inch thickness of extruded polystyrene, and installed on a gravel foundation pad with thermal tubes to keep the underlying soils frozen. Stored water is heated by circulating water through a heat exchanger located inside the WTP building. Once initially heated by the treatment process, the water inside an insulated storage tank requires relatively little additional energy to maintain a certain temperature due to its heat capacity.

9.3. Water Distribution

Relative to truck haul systems, piped systems offer the following primary advantages:

- Water is less prone to becoming contaminated. Sanitation conditions significantly improve when handling and inter-vessel transfer is minimized.
- O&M costs are generally lower. Labor effort and equipment deterioration is significantly reduced when water conveyance is provided by pumps and pipelines directly from the WTP to customers.

Primary disadvantages of piped systems are as follows:

- Capital costs of piped systems are generally much higher than that for truck haul systems. Recent experience has shown that it takes several years of funding accumulation to pay for the design and construction of piped systems. Consequently, utility development is very slow.
- Piped systems are more prone to freezing, being exposed to cold weather for extended time periods. In arctic and sub-arctic environments, heating is needed to prevent freezing.

The previous master plan document evaluated truck-haul verses piped water delivery and sewer collections methods; which concluded that piped systems were generally preferable for Bethel. Therefore; no evaluations will be made in this study to explore water distribution and wastewater collection by means other than piped systems. However, it is anticipated that some portions of the community will remain on the truck-haul system because of technical constraints and/or because it is the desire of the community.

Piped water distribution networks can either be conventional pressure “on-demand” systems or circulating systems:

- **Conventional Pressure Systems:** consist of a pipeline filled with water that is at-rest under static pressure. Water flows only when a pressure differential is created along the pipeline, such as by opening a valve or operating household water fixtures. In general, the cumulative consumption of water within a community keeps water flowing to some degree, although such flow is very low during periods of minor usage, like late nights and early mornings. Conventional pressure systems are generally used in warmer climates or where direct burial can prevent static water from freezing in the pipelines. Due to the presence of permafrost and cold winter air temperatures, a conventional static pressure system, aboveground or belowground, would be prone to freezing and is not considered appropriate for use in Bethel.
- **Circulating Water Systems:** are generally considered the most reliable piped distribution system for preventing freezing in cold region applications. Circulating systems consist of a looped, insulated water main that operates under continuous pressure, in which heated water is circulated. Circulation is typically provided by pumps located at the return end of the loop. The pumps replace the energy lost by friction when water flows through the pipe loop. Continuous circulation at sufficient velocity, in conjunction with heat added between the return and supply ends of the

loop, keeps water from freezing. One disadvantage in using circulating systems is that the entire system often must be shut down for repairs or maintenance.

Water service lines to facilities are circulated for the same reason as the water main. This objective can be accomplished with the use of a small circulating pump and “pitorifices,” scoop-like pipe fittings that protrude into a water main and divert water into and out of the service loop. Being passive devices, pitorifices will provide variable rates of circulation depending on flow rates in the main. Insufficient velocity in the main will tend to cause insufficient velocity in the service loop, which can lead to freezing. Accordingly, circulation pumps are installed to provide continuous circulation to and from a facility, at velocity rates that discourage freezing. In extremely cold climates, service lines are often installed with heat trace as an extra measure of safety. The heat trace is used as a contingency in case the water line freezes and needs thawing. Similar to facilities served by piped water in City Subdivision, circulation pumps, pitorifices and heat trace would be likely used at new facilities.

9.4. Sewer Collection

Similar to water distribution systems, the City intends to use piped systems to collect wastewater and convey it to the treatment facility. Until the City can fund and construct a piped collection system that would serve all subdivisions, the truck-haul system would continue to be employed as a primary means of transporting wastewater, gradually being phased out as piped construction progresses.

Generally the City could provide one of three types of piped systems for waste water collection: gravity, pressure or vacuum. Each type of system is briefly described below.

Gravity Systems: Gravity sewer systems are most commonly used and offer the lowest O&M costs among the aforementioned types. Wastewater water flow is provided by gravity—consequently, no power is needed for fluid transport. However, use of gravity sewers is limited by topography. Generally, a sufficient elevation gradient of the ground surface is needed to avoid excessive sewer burial depths. In addition, a sufficient pipeline gradient is needed to regularly produce wastewater flows high enough to convey deposited solids. Flat topographies do not facilitate long sewer runs. Lift stations are commonly used in larger gravity collection systems, but generate additional O&M costs. Gravity systems can be placed aboveground, but in variable terrain, require structural supports to maintain pipeline slopes. Piles are ordinarily used as supports in poor soils to withstand local frost heaving. Therefore, gravity systems have limited use in Bethel

Pressure Systems: Pressure systems can circumvent grading difficulties imposed by highly variable or flat topography. Pressure-systems are so-called because wastewater flow is provided by pumps located in central and individual lift stations, which pressurize the particular pipe lengths conveying the discharge. Generally, local areas of frost heaving do not adversely affect pressure system operation. Although capital costs for aboveground pressure systems are generally lower than that for conventional gravity systems, O&M costs are generally higher because of the requirement for pumps.

Vacuum Systems: Vacuum systems are similar to pressure systems in that the transportation of wastewater is accomplished by mechanically creating a pressure differential along the length of sewer pipelines. Whereas a pressure system produces this

differential using positive pressure, a vacuum system does the same using negative pressure. Vacuum systems tend to be more limited by topography variation than do pressure systems, because the pressure differential is ordinarily much smaller than that for pressure systems. The vacuum method requires that the entire development served be configured for vacuum conveyance. In aboveground applications, capital costs for a vacuum system are typically less than that for a buried gravity system, but more than a pressure system. O&M costs of early vacuum systems were typically greater than other piped collection systems. However, recent upgrades and improvements to vacuum technology have reportedly lowered O&M costs to be more comparable.

Lacking the topography needed for a gravity system, and using aboveground piped systems, the City currently operates pressure systems at the Bethel Heights and City subdivisions, and in the central force main that collects all piped wastewater flows for discharge into the lagoon. Given the variable terrain throughout Bethel and the distance to transport collected wastewater to treatment facilities, gravity or vacuum piped systems are not feasible options to serve the community. Further, using a piped system similar to that already employed, the City would take advantage of incremental costs from being able to expand from a regionally-sized facility, rather than implementing a new type of system currently lacking any existing infrastructure and supporting facilities.

9.5. Evaluation of Aboveground vs. Belowground Piped Water and Sewer System

In 1997, the City of Bethel and VSW evaluated aboveground versus belowground piped water and sewer system for City Subdivision. The results of this effort is documented in a technical memorandum entitled, *Bethel Water and Sewer Project—Buried Pipe Alternative Analysis (CH2M Hill / 1998)*. The study concluded that a belowground system was technically feasible, but that an aboveground system was more economical to construct, operate, maintain and replace at the end of its useful life. In general, the presence of warm permafrost, heaving conditions and poor structural soil would require special, relatively expensive belowground construction to help the pipe foundation function sufficiently. Aboveground systems are typically preferred for arctic environments due to lower capital costs, ease of construction, and access for maintenance, repair, and additions. They do, however, have aesthetic issues and greater potential for damage relative to buried systems. Being exposed to colder temperatures in winter, aboveground systems typically require more freeze protection than belowground systems.

Depending on soil conditions, aboveground piping systems can be supported in a number of ways including steel piling, trestle structures and wood sills. Steel piles generally provide the most reliable support when designed to resist soil movements, and are used when maintaining pipeline grade is critical. However, elevating pipelines tends to constrict vehicle and pedestrian movements. Use of wood sills tends to minimize this impact, but is more subject to soil movements. Consequently, wood sills are used for pipelines that function more or less independently of varying grades, like pressure systems and force mains. Trestle supports are surface-founded structures, generally constructed of pressure-treated wood, and used to elevate pipelines above wet areas, where sill supported pipelines would otherwise sink. A combination of the three support systems would be used in Bethel.

9.6. Wastewater Treatment & Disposal Options

As previously discussed, the City's wastewater treatment & disposal options were previously evaluated and are fully documented in the *City of Bethel Solid Waste and Sewage Lagoon Facilities Design Study / Master Plan Update (CH2M Hill/2002)*. This section provides a summary of the finding of this effort.

9.6.1. Oxidation Ditch

The oxidation ditch process is an extended aeration activated sludge process that uses an aeration basin configuration similar to a race track. Benefits include combined wastewater treatment and sludge stabilization, simple and reliable operation, and less maintenance than full conventional systems. Disadvantages are less efficient aeration equipment than diffuser technology and correspondingly higher electrical costs for producing the oxygen necessary to reduce waste loads. Additionally, the system requires two identical systems to provide redundancy, which would impact the building size, again making this system less desirable for the City.

9.6.2. Sequencing Batch Reactor

The sequencing batch reactor (SBR) is a relatively new technology that has been developed to use a "batch" mode rather than continuous flow treatment. One basin is used for both the aeration and sedimentation phases; thus mixing, aeration, and settling are intermittent. The advantages of SBR treatment are the elimination of separate secondary clarifiers, sludge return (RAS) pumps, and large settling area. They eliminate short circuiting problems and are relatively simple to operate. The major disadvantage is the size and number of the reactor tanks, which require a large building envelope.

9.6.3. Lined and Aerated Lagoon

The aerated lagoon alternative is developed here to explore the options for reusing the existing facultative lagoon. The existing facultative lagoon requires new baffles and a liner to eliminate the infiltration of groundwater. Once lined, the lagoon has sufficient volume to provide partial wastewater treatment. Additional treatment for BOD reduction can be provided with the addition of 20-20 horsepower surface aerators. The second half of existing Cell 2 can be used as a settling pond to settle out solids. A primary clarifier may be necessary upstream of the lagoon to reduce influent BOD and solids loading to the lagoon. **Figure 9-1** is a layout of the lined aerated lagoon alternative.

The advantage of an aerated lagoon alternative is that it utilizes the existing lagoon. The disadvantage is the cost of importing suitable material required to line the lagoon and the power cost to operate the surface aerators, making this option impractical. **Table 9-1** summarizes the costs for this alternative.

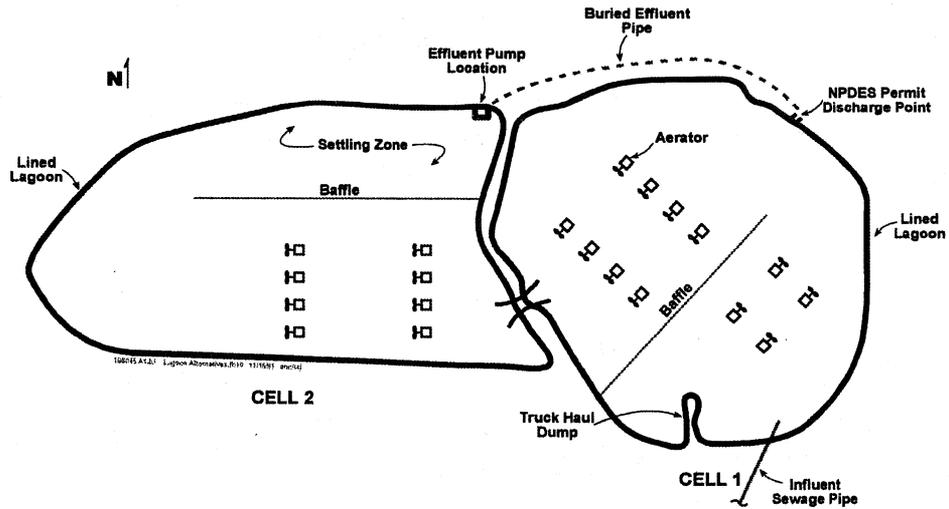


FIGURE 9-1
Lined Aerated Lagoon

TABLE 9-1
Lined and Aerated Lagoon Costs

Summary of Present Worth Costs	Project Costs ^a	Annual O&M Costs ^b	Present Worth Costs (20-Year Period)
Lined and Aerated Lagoon	\$57,300,000	\$686,000	\$67,000,000

^aAn order-of-magnitude project cost estimate is +50 percent/ -30 percent. These costs include engineering and administration cost estimates in 2002 dollars.

^bOperation & Maintenance (O&M) costs averages dredging every 5 years.

9.6.4. Conventional Treatment (Activated Sludge)

Conventional treatment consists of primary treatment, secondary treatment, and solids handling. Primary treatment alone for this application is inadequate in treating BOD to meet permit requirements. **Figure 9-2** illustrates a conventional treatment schematic.

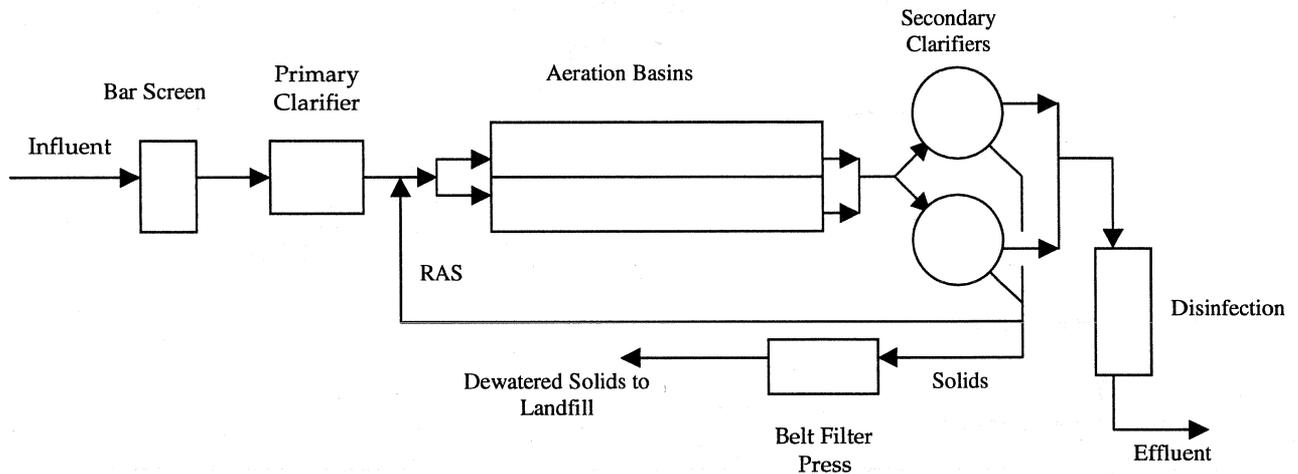


FIGURE 9-2
Conventional Treatment (Activated Sludge) System Schematic

Primary treatment significantly reduces solids from the waste stream. Secondary treatment optimizes the function of the bacterial population already present in the wastewater, further reducing the amount of BOD and solids present in the liquid waste stream. Solids handling thickens the solids that have been separated from the liquid waste stream in the primary and secondary treatment systems. The blended solids are dewatered to a suitable dryness for landfill disposal.

An equalization tank, not shown in **Figure 9-2**, is included in the process flow stream to dampen hydraulic peaks in the plant, and thus reduces the size of the treatment equipment. The tank would be located outside and insulated. The solids handling equipment includes a sludge blend tank, a belt filter press, pumps, and chemical equipment to enhance dewatering. Equipment, aeration basins, and clarifiers are located indoors to reduce maintenance during the winter. Large outdoor aeration basins and clarifiers would not be appropriate for Bethel because the cold temperatures would make maintaining heat in the aeration basins and clarifiers cost prohibitive.

The advantages of a conventional activated sludge treatment system is the automated processes, which minimize operator time. Also, the equipment can be located inside a structure, thus reducing operator and maintenance costs because of extreme weather.

The disadvantages of a conventional treatment system is the operator training required. Also, the aeration basins and clarifier are larger than more efficient treatment systems such as the membrane bioreactor, contributing to higher building and heating costs.

Table 9-2 summarizes the costs for conventional activated sludge treatment.

TABLE 9-2
Conventional Treatment System Costs

Summary of Present Worth Costs	Project Costs ^a	Annual O&M Costs	Present Worth Costs (20-Year Period)
Conventional Treatment System	\$13,800,000	\$502,000	\$19,300,000

^aAn order-of-magnitude project cost estimate is +50 percent/ -30 percent. These costs include engineering and administration cost estimates in 2002 dollars.

9.6.5. Membrane Bioreactor Treatment (Activated Sludge/MBR Treatment)

Membrane bioreactor systems (MBRs) are suspended growth activated sludge treatment systems that rely upon membrane equipment for liquids/solids separation (no secondary clarifiers) prior to effluent discharge. MBRs are still considered an emerging wastewater treatment technology in the United States. They are known for their ease of operation and good effluent quality. MBR's have been operated successfully around the globe at small treatment plants similar to Bethel's.

Figure 9-3 is a schematic diagram of the MBR system. Flow equalization, not shown, would be included to dampen the impact of diurnal peak flows and reduce the number of membranes that would otherwise be required.

One advantage of MBR systems is the extremely long solids retention times (SRTs), in the order of 30 to 70 days. A long SRT creates a stable system that is less likely to experience operational upsets and significantly reduces solids (sludge) compared to that of conventional treatment systems.

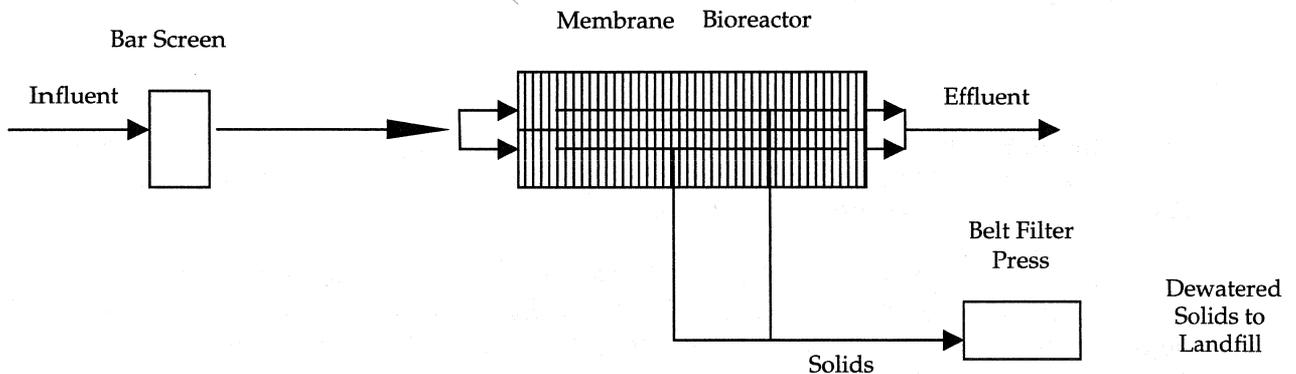


FIGURE 9-3
Membrane Bioreactor Treatment System Schematic

Another advantage of MBR systems is the high mixed liquor suspended solids (MLSS) concentrations. High MLSS allows for a smaller bioreactor volume compared to conventional treatment, reducing building cost and future heating costs. Also, MBR systems eliminate the need for secondary clarifiers, thus eliminating most of the conventional treatment process complexity.

One disadvantage of the MBR is the use of low efficiency coarse-bubble aeration, required to control membrane fouling. In addition, filter units must be replaced every 7 to 8 years and operator training is necessary. Also, there are no installed MBR systems in Alaska to establish system performance under Alaskan conditions.

Table 9-3 summarizes the costs for this alternative.

TABLE 9-3
Membrane Bioreactor Treatment System Costs

Summary of Present Worth Costs	Project Costs ^a	Annual O&M Costs ^b	Present Worth Costs (20-Year Period)
Membrane Bioreactor System	\$9,100,000	\$435,000	\$16,400,000

^aAn order-of-magnitude project cost estimate is +50 percent/ -30 percent. These costs include engineering and administration cost estimates in 2002 dollars.

^bNote that the Filter Elements must be replaced every 7 to 8 years at a cost of \$480,000 each period.

9.6.6. Disinfection Alternatives

The existing permit for the City's sewage lagoon requires monitoring of fecal coliforms. Currently, there is no disinfection facility at the lagoon.

The Alaska Department of Environmental Conservation (ADEC) may require disinfection in the future. Several alternative disinfection systems are discussed below.

UV Disinfection

Ultraviolet (UV) disinfection is a physical process in which the water is passed through a zone of UV light. The germicidal light penetrates the outer structure of the cell, alters the DNA molecule, and causes the cell to die.

The major advantage is the elimination of hazardous chemicals. Also, there are no potentially toxic by-products or residuals, and medium-pressure arc tubes are unaffected by fluid temperature. Also, UV can be used effectively with and MBR conventional treatment system.

The disadvantage is that more frequent analysis of treated water may be required to prove the performance of the system.

Chlorine Disinfection

Chlorine can be purchased as a liquid, gas, or can be generated on-site using brine and electricity. The Typical range of chlorine demand for moderately fresh sewage is 10 to 12 mg/L.

Chlorine Gas

Six 1-ton chlorine gas cylinders would be required for the City. Because of the substantial regulatory requirements, chlorine gas was not considered as a disinfection option.

Delivered Sodium Hypochlorite

Sodium hypochlorite can be barged in 55-gallon drums. However, long-term storage of sodium hypochlorite is not recommended because it deteriorates in 2 to 3 months. For this reason, sodium hypochlorite was not considered as a disinfection option.

Calcium Hypochlorite

Calcium hypochlorite is used currently at both water treatment plants as a disinfectant. It comes in granular and tablet form. The tablet form of calcium hypochlorite was considered as a disinfection alternative with a tablet chlorine-feed system.

The advantages of calcium hypochlorite is that the chemical can be flown in via air cargo from a supplier in Anchorage. Also, the system is easy to operate and operators are familiar with it.

The disadvantage is that the chemical comes in plastic pails, which require disposal.

Onsite Chlorine Generation

The onsite chlorine generation process results in the production of dilute sodium hypochlorite (NaOCl). The only imported product for the process is salt. Food-grade solar salt is mixed with water to create a saturated brine solution (30 percent).

The advantages are that only salt, water and electricity are required to produce sodium hypochlorite. Also, the disinfection system provides the effectiveness of chlorine without the danger of storing or handling hazardous materials. In addition, sodium hypochlorite generated on-site is less than 1 percent chlorine solution and thus does not degrade like commercial sodium hypochlorite. The total operating cost is less than conventional chlorination methods. And on-site generation of sodium hypochlorite allows the operator to produce only what is needed and when it is needed.

The disadvantage is that solution strength of on-site generated NaOCl is only 0.8 percent, as compared to the 12 to 15 percent of conventional purchased hypochlorite, which can result in the need for increased storage tank size.

Project costs for these disinfection alternatives are summarized in **Table 9-4**.

TABLE 9-4
Disinfection Alternative Costs

Summary of Present Worth Costs	Project Costs^a	Annual O&M Costs	Present Worth Costs (20-Year Period)
UV Disinfection	\$610,000	\$22,000	\$920,000
Calcium Hypochlorite	\$60,000	\$73,000	\$1,100,000
On-site Sodium Hypochlorite Generation	\$310,000	\$41,000	\$890,000

^aAn order-of-magnitude project cost estimate is +50 percent/-30 percent. These costs include engineering and administration cost estimates in 2002 dollars.

10. Evaluation of Water and Wastewater Facility Improvements

10.1. Introduction

As discussed in Section 9, the previous water master plan documents established the following water and sewer improvement goals for the City of Bethel:

- Provide water treatment facilities similar to water source, treatment and storage facilities at the existing Bethel Heights Water Treatment Plant (BHWTP).
- Replace the existing water truck-haul delivery system with a piped water distribution system.
- Replace the existing wastewater truck-haul collection system with a piped wastewater collection system.
- Replace the existing facultative wastewater treatment lagoon with a biomechanical wastewater treatment plant.

These goals remain unchanged; therefore, this document will not reevaluate these water and sewer alternatives. The purpose of this section is to evaluate short-term improvements that will reduce the operations and maintenance cost of the existing truck-haul water distribution and truck-haul wastewater collection systems while still meeting the long-term goal of serving the community with piped water and sewer.

10.2. Water Source, Treatment and Storage Options

The *City of Bethel Water and Sewer Facilities Master Plan Update (Dames & Moore / 1996)* established a development plan that included the construction of a new water treatment plant with a piped water distribution system for each service area. Twelve service areas were defined for the City (refer to **Figure J-1**), but two service areas were shown with no development. Hence, ten water treatment plants were proposed. Phase 1 of the development plan included upgrading the existing BHWTP and construction of a new water treatment plant to be located within City Subdivision (called "City Subdivision Water Treatment Plant" or CSWTP). A piped water distribution system was also proposed for City Subdivision (identified as Service Area 1A on **Figure J-1**). During design of these improvements, the City realized that the water treatment process was more complex than originally anticipated, thereby significantly increasing projected capital and operations costs. The production capacities of the BHWTP and the CSWTP were established at 400 GPM, to allow for future expansion of their served areas. As the realization of increased costs became more concrete among City officials and engineers, it was decided that these plants would provide treated water source to additional service areas, thereby reducing the overall number of water treatment plants needed to serve the City. The water modeling analysis prepared for this document (refer to **Appendix K**) indicates that only three large water treatment plants are required to meet the capacity needs of the City. A third future water treatment plant is proposed to be located near the Bethel Airport to serve west Bethel.

The estimated capital costs, O&M costs and equivalent annual life cycle cost for each option is included in this evaluation. The design life of the improvements for all options is 20 years and the design life factor, using an interest rate of 4%, is 0.0736. All costs are in 2005 dollars.

Two options were considered. Estimated capital cost and operations & maintenance costs are included under **Appendix I**. The primary components of each option are described below.

Option 1 – Construct a small water treatment plant at each of the 10 Service Areas referenced in the original master plan update:

Primary Components: Construct a well as water source, water treatment plant and water storage tank sized for the capacity needs of a piped water distribution system for each service area. The layout as proposed in the original master plan is depicted on **Figures J-1, K-1, and K-2**. The water treatment capacity as well as the required size of the water storage tanks for each service area is shown on **Drawing 5**. Each water treatment plant would be similar to the BHWTP and the CSWTP. The WTP building structure would feature “pre-engineered” construction, which is comprised of regularly spaced steel moment frame bents enclosed by pre-insulated metal panels. A concrete slab-on-grade foundation is assumed, founded on insulated soil kept frozen by thermal siphons. The water storage tank would be welded steel with pre-insulated outer panels. The water storage tank would be supported by frozen soil using thermal siphons as well.

Estimated Capital Cost: \$42,876,000

Estimated Annual O&M Costs: \$5,336,000

Equivalent Annual Life Cycle Cost = $(\$42,876,000 \times 0.0736) + \$5,336,000 = \mathbf{\$8,492,000}$

Advantages:

- Slightly lower estimated capital cost.
- Would reduce truck-haul costs by reducing travel distance between service area and existing truck fill point. Could serve truck-haul operation to other services areas.

Disadvantages:

- Significantly higher estimate O&M cost.
- Significantly higher equivalent annual life cycle cost.
- Increases complexity of water system including the number of needed certified water treatment plant operators.

Option 2 – Construct three large region water treatment plants with water mains and booster pump stations to serve each of the 12 service areas:

Primary Components: Construct three large water treatment facilities including a water source well and water treatment plant sized for the capacity needs of several service areas.

Each service area would include a booster pump station and water storage tanks sized for the specific needs of the services area as shown on **Drawing 5**. Each water treatment plant would be similar in configuration as described under Option 1.

Estimated Capital Cost: \$44,167,000

Estimated Annual O&M Costs: \$3,001,000

Equivalent Annual Life Cycle Cost = ($\$44,167,000 \times 0.0736$) + $\$3,001,000 = \mathbf{\$6,252,000}$

Advantages:

- Significantly lower estimate O&M cost.
- Significantly lower equivalent annual life cycle cost.
- Would reduce truck-haul costs by reducing travel distance between service area and existing truck fill point. Would serve truck-haul operation to other services areas.

Disadvantages:

- Slightly higher estimate capital cost.
- Would require above grade pipes be constructed between the water treatment plants and the booster pump stations located at each service area.

10.3. Water Distribution Options

As previously discussed the *City of Bethel Water and Sewer Facilities Master Plan Update (Dames & Moore / 1996)* established the community's goal to convert the existing truck-haul water distribution system with a piped system. This goal remains unchanged; therefore, this document did not reevaluate truck-haul verses piped delivery systems. The recommended strategy presented in the 1996 master plan included construction of a water treatment facility within a service area (subdivision) immediately followed by construction of a piped water distribution and sewer collection system within this service area. The Phase 1 Improvements identified in the 1996 master plan included approximately \$29 million worth of infrastructure:

- Upgrade the Bethel Heights Water Treatment Facility. This project was completed in 1999.
- A new water treatment facility as City Subdivision (the City Subdivision Water Treatment Facility). This project was completed in 2000.
- A new piped water distribution and sewer collection system within City Subdivision. These improvements were completed in three project phases (A, B, & C). Phase A was completed in 2003, Phase B was completed in 2004. Phase C is anticipated to be completed in 2005.

The following improvements were added to the Phase 1 improvements due to deficiencies discovered during design:

- Decommission the City Center Water Treatment Plant, and replace the piped water and sewer system within City Center. This system would be connected to the piped water and sewer system at City Subdivision. These improvements were included in the Phase A project discussed above, which was completed in 2003.
- Upgrade the backbone sewer force main that crosses Ridgecrest Drive between 6th and 7th Avenue. These improvements are included in the Phase C project discussed above. Phase C is anticipated to be completed in 2005.

The Phase 1 Improvements began in 1997 and will be completed in 2005. The project completion schedule was constrained by funding limitations (generally \$3.3 million per year). Project funds were accumulated (“stacked”) until there were enough funds to complete a specific project.

Through completion of the Phase 1 Improvements the City recognized that the water and sewer development strategy recommended in the 1996 master plan was having a detrimental impact on the cost of operating the existing water and sewer truck-haul systems. The cost of operating a truck-haul water distribution and sewer collection system is directly proportional to the length of the haul. However, the City’s truck-haul rate structure is not based on the length of the haul; rather it is based on the number of haul trips and gallons served. It is assumed that the costs related to the haul distances are balanced out between short haul distance and long haul distance consumers. However, the water and sewer development strategy recommended in the 1996 master plan systematically would eliminate the short distance truck-haul consumers leaving the more expensive long truck-haul distance consumers.

The water and sewer development strategy recommended in this water and sewer master plan, recommends that backbone water and sewer facilities be extended to each service area (subdivision) prior to construction of the piped water and sewer services. The short-term goal of this strategy would serve to shorten water and sewer truck-haul distances. Ultimately, these improvements would serve the City’s long-term goal of providing piped water and sewer services to the entire community.

An evaluation was completed that estimated operations and maintenance as well as capital recovery costs for four of water and sewer system improvement scenarios: 1) Existing truck haul water and sewer systems; 2) Future truck haul water and sewer system for long-haul operations [based on the 1996 master plan strategy]; 3) Future truck haul water and sewer systems after “backbone” improvements are constructed; and 4) Future piped water and sewer systems (all improvements are constructed). A summary of the results of this evaluation are summarized in **Table 10-1** (refer to **Appendix N** for a detailed evaluation).

TABLE 10-1

Estimated monthly O&M and capital recovery costs per service for four scenarios of water and sewer system development at Bethel (interest rate of 3% per annum, and 30 year recovery period)

Alternatives Truck-Haul Scenario	Monthly O&M Costs	Monthly Capital Costs	Total Monthly Rate
Existing Water and Sewer Truck-Haul	\$285	\$55	\$340
Future Water and Sewer Truck-Haul [Based on 1996 Master Plan Update Strategy]	\$377	\$66	\$443
Future Water and Sewer Truck-Haul [Based on 2005 Master Plan Update Strategy]	\$229	\$79	\$308
Future Piped Water and Sewer System	\$188	\$26	\$214

This evaluation shows that there is a significant impact to the cost to provide water and sewer truck haul service based on the water and sewer improvement strategy recommended in the 1996 master plan (the estimated rates would have to be increased from \$340/mo. to \$443/mo.) Consumer water and sewer rates would not be reduced to \$214/ mo. until they were connected to the piped water and sewer improvements.

This evaluation shows that there is a progressive reduction of estimated water and sewer rates based on the recommended strategy in this master plan. The estimated water and sewer truck haul rates would be reduced from \$340/mo. to \$308/mo. once the backbone improvements are extended to a service area. Ultimately, the rates would be reduced to \$214/mo. once the customers have connected to the piped water and sewer systems.

Preliminary design/hydraulic modeling (refer to **Appendix K**), estimated capital costs (refer to **Appendix M**), and estimate O&M costs (refer to **Appendix N**) were prepared for the water distribution strategy recommended in this master plan.

10.4. Wastewater Collection Options

As previously discussed the *City of Bethel Water and Sewer Facilities Master Plan Update (Dames & Moore / 1996)* established the community's goal to convert the existing truck-haul wastewater collection system with a piped system. This goal remains unchanged; therefore, this document did not reevaluate truck-haul versus piped delivery systems. Refer to the previous section for the evaluation of impacts various water and sewer development strategies have on water and sewer truck-haul rates.

Preliminary design/hydraulic modeling (refer to **Appendix L**), estimated capital costs (refer to **Appendix M**), and estimate O&M costs (refer to **Appendix N**) were prepared for the sewer collection strategy recommended in this master plan.

10.5. Wastewater Treatment and Disposal Options

As previously discussed, the City's wastewater treatment & disposal options were previously evaluated and are fully documented in the *City of Bethel Solid Waste and Sewage Lagoon Facilities Design Study / Master Plan Update (CH2M Hill/2002)*. This document recommends that the City of Bethel replace the facultative wastewater lagoon with the biomechanical wastewater treatment plant (refer to Section 12.5 of this report).

This section evaluates the option of providing a biomechanical wastewater treatment plant within each service area (Option 1) versus providing one large biomechanical wastewater treatment plant with lift stations and force mains (Option 2) to collect wastewater flows from each service area. The evaluation was based on the Service Area 5A (Kasayuli Subdivision) because of the extensive information available on this service area. Additionally, it is considered a "worst case" scenario because it will have the longest force main. Generally, the equivalent annual life cycle cost for Option 1 will remain relatively the same for each service area; however, the equivalent annual life cycle cost for Option 2 will be lower for other service areas (since the force main lengths will be shorter).

The estimated capital costs, O&M costs and equivalent annual life cycle cost for each option is included in this evaluation. The design life of the improvements for all options is 20 years and the design life factor, using an interest rate of 4%, is 0.0736. All costs are in 2004 dollars.

Two options were considered. Estimated capital cost and operations & maintenance costs are included under **Appendix J**. The primary components of each option are described below.

Option 1 – Construct a small wastewater treatment plant at each of the 10 Service Areas referenced in the original master plan update:

Primary Components: Construct a wastewater treatment plant, disinfection facilities, discharge point for the capacity needs of a piped wastewater distribution system for each service area. Each wastewater treatment plant would be similar to the wastewater treatment plant described under Section 9.6, but on a much smaller scale.

Estimated Capital Cost: \$3,770,000

Estimated Annual O&M Costs: \$77,000

Equivalent Annual Life Cycle Cost = $(\$3,770,000 \times 0.0736) + \$77,000 = \mathbf{\$354,000}$

Advantages:

- Would eliminate the aboveground force main pipes.
- Would reduce truck-haul costs by reducing travel distance between service area and existing truck fill point. Could serve truck-haul operation to other services areas.

Disadvantages:

- Higher estimated capital costs

- Significantly higher estimate O&M cost.
- Significantly higher equivalent annual life cycle cost.
- Increases complexity of wastewater system including the number of needed certified water treatment plant operators.
- Multiple discharge points would have to be addressed with the community and regulator agencies (not included in this evaluation).

Option 2 – Construct one large region wastewater treatment plant with lift stations and force mains to serve each of the 12 service areas:

Primary Components: Construct one large wastewater treatment facility including a wastewater treatment plant, disinfection facility, discharge point sized for the capacity needs of all the service areas. Each service area would include a lift station and associated force main sized for the specific needs of the services area as shown on **Drawing 6**. The wastewater treatment plant would be the same as described under Section 12.5.

Estimated Capital Cost: \$3,123,000

Estimated Annual O&M Costs: \$12,000

Equivalent Annual Life Cycle Cost = $(\$3,123,000 \times 0.0736) + 12,000 = \mathbf{\$242,000}$

Advantages:

- Lower estimated capital costs
- Significantly lower estimate O&M cost.
- Significantly lower equivalent annual life cycle cost.
- Would reduce truck-haul costs by reducing travel distance between service area and existing truck fill point. Would serve truck-haul operation to other services areas.

Disadvantages:

- Would require aboveground force main pipes be constructed between the lift stations and the wastewater treatment plants.

11. Public Involvement Process

11.1. Methods to Gain Community Input & Direction

Public meetings, a house survey, and workshops with the Bethel Public Works Committee and the Bethel Finance Committee were the primary methods used to communicate with the community to gain input from local residents on expectations regarding water and sewer facilities. In the process of preparing this study, CRW conducted several site visits to the community. Minutes and trip reports from the site visits are included in **Appendix B**.

A house survey was mailed to all users on the water and sewer system of the City. The survey was used to gain further insight into the present water and sewer system as well as obtain feedback from residents on the prospect of new facilities. The survey results may be found in **Appendix B**.

Regular input was also received from various members of the City staff, the Bethel Public Works Committee, and the Bethel Finance Committee during the completion of the study. The City of Bethel, Department of Public Works was very helpful in providing information particular to the existing system and also assisted in relaying feedback from present users of the system. The Consultant worked closely with the Bethel Public Works Committee and the Bethel Finance Committee in identifying and evaluating alternatives; as well as developing the project priorities for the proposed improvements. Both committees presented a resolution to the City of Bethel Council recommending the project priorities for the first \$30 million worth of projects (6 projects).

11.2. Identification of Community Goals & Objectives

11.2.1. Site Visits & Community Meetings

A site visit and community meeting was held on August 24, 2004 in Bethel to present the findings of the 35% document. Eight residents attended the meeting, three of them provided comments. Generally, individuals would like to see piped water and sewer in the community; however, they would prefer it to be below grade.

A presentation was made to the City of Bethel Public Works Committee on October 19, 2004 to present the findings of the 35% document. Additionally, follow-up meetings (via site visits or teleconference) were held with the Bethel Public Works Committee on November 16, 2004, December 21, 2004, March 1, 2005, and March 15, 2005 to discuss project recommendations and prioritizations. Project meeting were also held with the Bethel Finance Committee on January 27, 2005 and March 24, 2005 to discuss project recommendations and prioritizations. Trip reports and meeting summaries are included in **Appendix B**.

A site visit and two public meetings were held on March 29 and April 5, 2005 in Bethel to present the findings of the 65% document and present the proposed strategy for water and sewer development in Bethel as well as the recommended project priorities that were to be presented in the 95% complete document. Additionally, Village Safe Water made a

presentation on management options available to the City of Bethel. A complete copy of the PowerPoint presentation is included in **Appendix B**.

A presentation of the 95% complete submittal of the *Bethel Water and Sewer Facilities Master Plan Update* was made to the Bethel City Council on April 12, 2005. The City of Bethel Council approved the document, by resolution, on April 26, 2005. A copy of the resolution is included in **Appendix A**.

11.2.2. Community Survey & Results

Residents currently on the City's water and sewer system were sent a survey questionnaire with the purpose of acquiring feedback on the current system as well as comments on proposed improvements. The survey was sent out along with the newsletters announcing the public meetings and project progress.

There were 324 responses received from the community survey. The following list summarizes pertinent information received from the surveys:

- Respondents have been living in Bethel anywhere from 2 to 62 years, 80 percent have lived in Bethel over 20 years. Eighty-four percent of respondents are planning to live in Bethel for the next 5 years.
- All respondents live in houses, 84 percent own their own homes.
- All homes have plumbing and fixtures to varying degrees.
- Nine percent of respondents have piped water and sewer, rating the service between "fair" and "very good". Respondents report to pay between \$101 and \$150 per month for the service.
- Other respondents who receive service from the truck-haul system rate service between "Fair" and "Very Good" with one or two rating the system as "Poor". All respondents receive service on a scheduled basis. There is a large variation in tank size, consumption, fees, and frequency of service among these respondents.

A more complete tabulated summary of data and comments received is included in **Appendix B**.

11.2.3. Formal Public Comments

One formal letter was received providing comments to the 95% complete submittal of the *Bethel Water and Sewer Facilities Master Plan Update*. The letter was provided by the Orutsarmiut Native Council (ONC) and dated April 28, 2005. The comments were included in the final document. A copy of the letter is included in **Appendix B**.

12. Recommended Water & Wastewater Facility Upgrades

12.1. Introduction

A recommended strategy to upgrade the City of Bethel's water and wastewater facilities was developed to meet both the short-term goal (reduce the operation and maintenance costs of the truck-haul water distribution and wastewater collection system), and long-term goal (provided a piped water delivery and wastewater collection system). The strategy, which is graphically depicted on **Drawing 5** and **Drawing 6**, includes the following improvements in order of precedence:

1. Upgrade the existing backbone wastewater lift stations and associated force mains to meet current and future wastewater collection demands. The Main Lift Station and a short segment of the downstream force main as well as the force main through City Subdivision were upgraded in 2003/2004.
2. Upgrade the existing Bethel Heights (ASHA/AVCP Housing) piped water distribution system and sewer collection system
3. Construct a new biomechanical wastewater treatment facility and decommission the existing wastewater lagoons.
4. Construct a new water treatment facility to serve the Bethel Airport infrastructure and development to the west.
5. Extend the backbone wastewater force mains to the subdivisions or service areas. Include a lift station to accommodate wastewater truck-haul discharge.
6. Construct booster pump stations with water storage tanks at the subdivisions or service areas. A backbone water main will be included from one of the three water treatment facilities. Include a water fill station to accommodate water truck-haul operations.
7. Construct piped water distribution system (which will be served from the above referenced booster pump stations) and piped wastewater collection system (which will discharge to the above reference lift station) at each subdivision or service area.

The improvements described under items 1, and 3 through 6 are considered "backbone" water and wastewater facilities. They provided water treatment and piped water distribution, as well as piped sewer collection and wastewater treatment for each subdivision or service area. These improvements will initially support the existing water and wastewater truck-haul systems. The operations and maintenance cost of the truck-haul systems will be significantly reduced because of the shorter travel times these improvements afford. The "backbone" improvements are considered essential to the City's water and sewer infrastructure. The backbone sewer improvements are depicted on **Figure 12-1** and the backbone water improvements are depicted on **Figure 12-2**. Both figures are located on the following page.

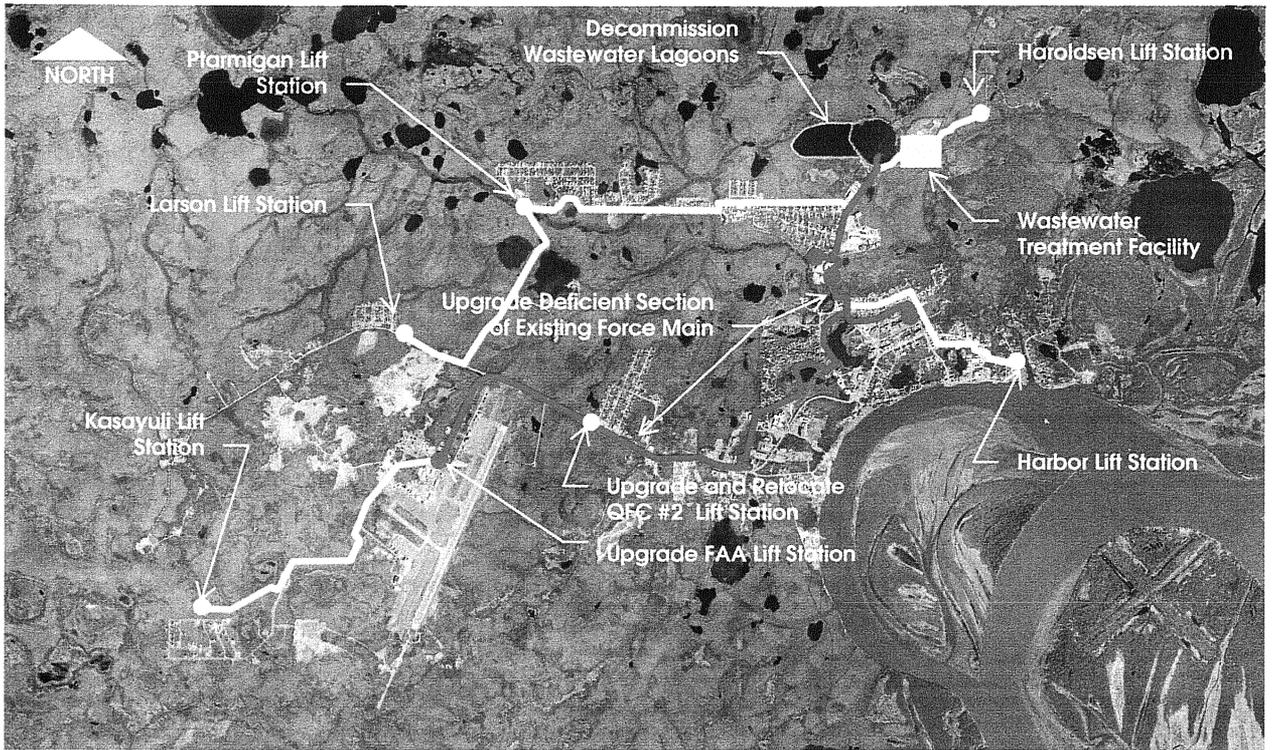


FIGURE 12-1
Proposed Backbone Sewer Improvements

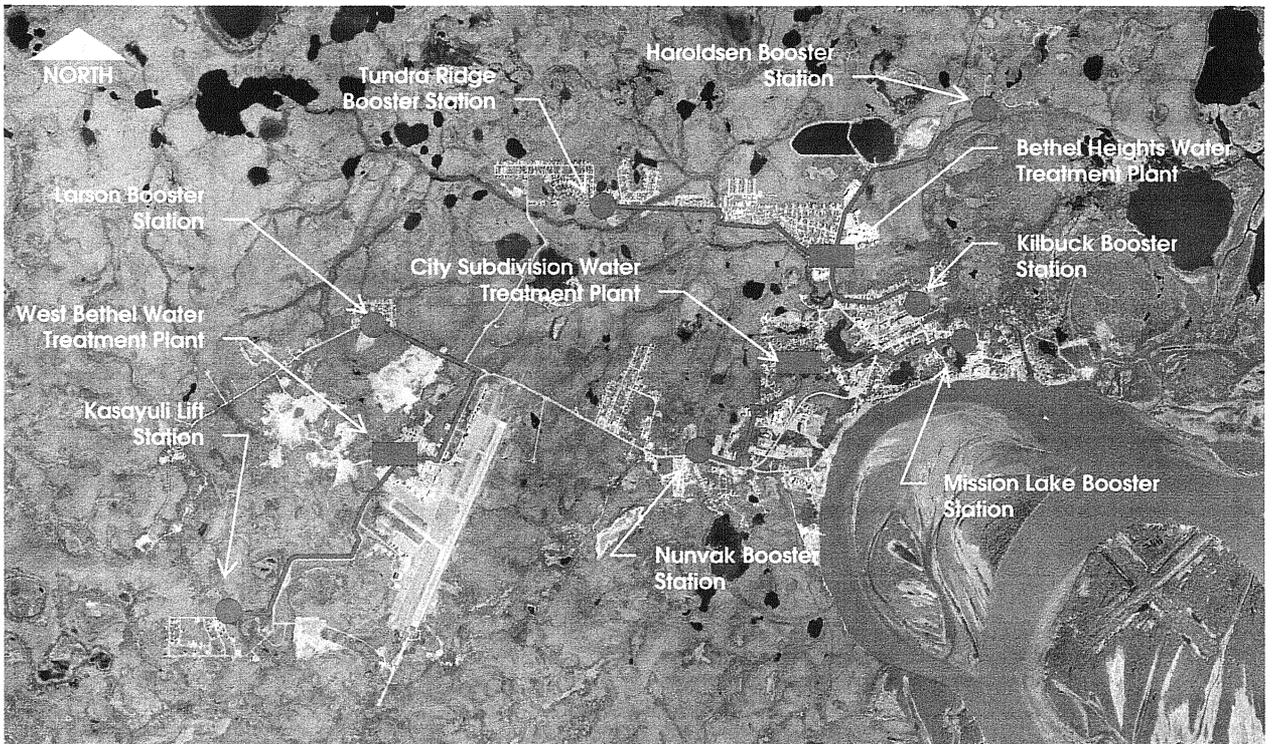


FIGURE 12-2
Proposed Backbone Water Improvements

The improvements described under item 2 include upgrading an existing piped water distribution and sewer collection system. Piped water improvements include correcting pipe corrosion that is causing pipe degradation and poor water quality; upgrade the distribution pumps, the high-demand pump, and the distribution system controls; and replace pitot-orifice service connections that are experiencing significant corrosion. Piped sewer improvements includes providing automatic stand-by power to all three lift stations; place sewer pipes in culverts at all road crossings; divert gravity sewer main along Ridgecrest Drive away from the force main and to the ASHA Lift Station; and correct excessive pile movement that adversely impact the grade of the gravity mains. These improvements are considered essential to maintaining the City's existing infrastructure.

The improvements described under item 7 include piped water distribution and piped wastewater collection to each residential or commercial service. These improvements are not considered essential, but are recommended. These improvements are depicted on **Drawing 5** and **Drawing 6**.

The recommended upgrades are more particularly described in the following paragraphs.

12.2. Recommended Water Source, Treatment & Storage Option

Based on the water modeling effort completed with this report, one additional water treatment facility will be needed to serve development west of the airport (Larson Subdivision, Kasayuli Subdivision, Bethel Airport development, and the proposed Raven and Hoffman subdivision developments). For the purpose of this report, this water treatment facility is called the "West Bethel Water Treatment Plant" (WBWTP). The existing water treatment facilities, BHWTP and CSWTP, have adequate capacity to serve the remaining needs of the community.

The WBWTP will be located on City owned property located near the Bethel Airport as depicted on **Drawing 5**. The WBWTP will have a capacity of 99 GPM and will initially include an 80,000 gallon water storage tank and truck fill facilities. This initial configuration will significantly reduce water truck-haul operations in west Bethel. Ultimately pressure pumps and circulation pumps can be added to the facility to distribute water via a piped water distribution system to Larson Subdivision, Kasayuli Subdivision, Bethel Airport development, and the proposed Raven and Hoffman subdivision developments.

A booster pump station will be constructed at each subdivision or service area. Initially each booster pump station will include a water service pipe (from one of the three water treatment facilities), a water storage tank, and a truck-haul water fill station. Later, when a piped water distribution and wastewater collection system is funded, the booster pump station will house the pressure pumps, circulation pumps, high demand pumps, heat trace, controls and other ancillary improvements.

12.3. Recommended Water Distribution Option

The current truck-haul water distribution systems will remain in place until all "backbone" water and sewer improvements have been constructed. Once the "backbone" improvements have been completed the piped water distribution system can be constructed within each subdivision or service area to replace truck-haul service.

12.4. Recommended Wastewater Collection Option

The current truck-haul sewer collection systems will remain in place until all “backbone” water and sewer improvements have been constructed. Once the “backbone” improvements have been completed the piped sewer collection system can be constructed within each subdivision or service area to replace truck-haul service.

12.5. Recommended Wastewater Treatment & Disposal Option

The following are recommended changes to the City’s future wastewater treatment and disposal system:

- A pilot plant study was conducted in 2004 to consider the treatability and feasibility of using a membrane bioreactor and/or primary treatment system to treat the wastewater (CH2M HILL, 2004). The study looked at the ease or difficulty of operation, the impacts of the cold (5 degrees C) wastewater on the treatment capacity, and the solids dewatering capability of the sludge produced. The results of the study indicate that the MBR system can reliably function as the core biological treatment process for the Bethel wastewater treatment plant (WWTP). By itself, the process can meet anticipated ADEC-permitting requirements. The combination of a MBR system and UV disinfection will provide adequate removal and inactivation of microorganisms and viruses.
- It is now time to initiate grant funding requests for a new WWTP to replace the existing lagoon system.
- Locate the new WWTP near the existing lagoon to utilize the existing discharge location, reduce the amount of effluent piping modifications, and facilitate landfill solids disposal.

Figure 12-3 shows the location of the new wastewater treatment facility. **Table 12-1** lists the capital, operation and maintenance, and 20-year present worth costs of the wastewater treatment and conveyance alternatives. The order-of-magnitude level capital costs in **Table 12-1** include construction, engineering, and city administration costs in 2002 dollars.

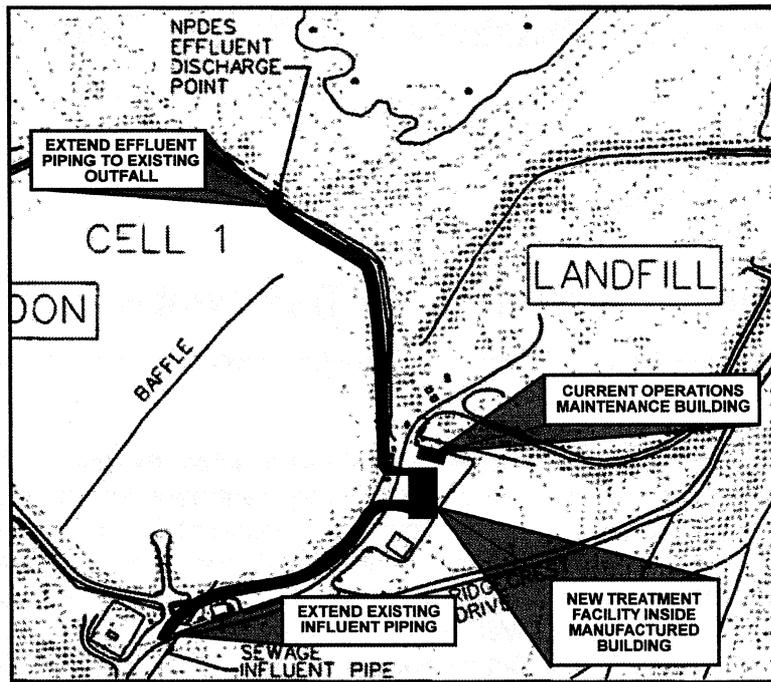


FIGURE 12-3
Recommended New Wastewater Treatment Plant Facilities

TABLE 12-1
City of Bethel Wastewater Treatment and Conveyance Alternatives

Alternatives	Capital Costs ^a	Annual O&M Costs (see notes)	Present Worth Costs for 20-Year Period
Wastewater Treatment Alternatives			
MBR Treatment (Pretreatment, MBR, Solids Handling, and Building ^b)	\$9,100,000	\$435,000 ^c	\$16,400,000
Wastewater Disinfection Alternatives			
UV Disinfection	\$610,000	\$22,000	\$920,000

Notes:

^a An order-of-magnitude project cost estimate is +50 percent/-30 percent. These are "Project Costs," which include construction, engineering, and City administration cost estimates in 2002 dollars.

^b The building costs that are included provide for a pre-manufactured building on a slab on grade that will also provide space for the solid waste equipment and office.

^c Kenai WWTP is a similar size and pays power and gas of \$200,000 /year at \$0.09/kwh versus \$.14/kwh in Bethel (or \$308,000 at Bethel costs)

12.6. Transportation Impacts

With planning and incorporation of proactive measures to address issues raised in maintaining access for traditional trails, the recommended improvements are not anticipated to negatively impact existing transportation facilities. In fact, construction of the “backbone” water and wastewater improvements will improve vehicle traffic concerns, since truck-haul travel distances will be significantly reduced.

Additionally, rather than being created or viewed as an obstruction, with adequate planning, utility easements for aboveground piped water and sewer lines could serve the dual benefit and purpose of accommodating long-term protection for winter access corridors to the City Center. Pedestrian boardwalks also have high potential to be “piggy-backed” in the same way, not only for the basic aspects of foot traffic; but also as bike or jogging trails for health, recreational, and other practical purposes. Another beneficial factor would be the reduction of safety concerns directly associated with pedestrian, and bike traffic along the road shoulders (exemplified in the current boardwalk between the community college and hospital constructed in 1985 on top of the waste heat line; and the boardwalk along Ridgecrest Drive between 6th Avenue and ASHA Subdivision).

12.7. Management & Operations Impacts

The City of Bethel will need to hire a certified water treatment plant operator and a wastewater treatment plant operator respectively once the West Bethel Water Treatment Plant and the Wastewater Treatment Facility are constructed. Otherwise, in the short-term, it is anticipated that the proposed improvements will have little impact on current management and operations. In the long-term, once the piped systems replace the truck-haul system, positions will need to be retrained and/or lost.

13. Preliminary Cost Estimates for Upgrades

13.1. Capital Cost Estimates & Construction Phases

A summary of the project prioritization and estimated capital costs for the recommended water and sewer improvement phases are presented in **Table 13-1** (located at the end of this section). Detailed cost estimates for each project phase are included in **Appendix M**. Capital costs for each project phase were generated based on actual costs from the recently completed City Subdivision Water and Sewer Improvements (SFY2002 to 2004). Each estimate includes a 15% construction contingency as well as 28% for program management, administration (City of Bethel and VSW), design engineering, and construction management. All costs are in 2005 dollars.

13.2. Capital Cost per House Served

The estimated capital cost per house served to construct the “backbone” improvements is \$41,645.

The estimated capital cost per house served to construct all improvements is \$109,646.

13.3. Operating Cash Flow

Estimated operating cash flow requirements were prepared for three points in time during development of the recommended water and wastewater improvement program. Detailed operations and maintenance cost estimates are included in **Appendix N** and are summarized in the following paragraphs. All costs are in 2005 dollars and include a) operations and maintenance costs (labor, electric, fuel, materials, supplies, etc.); b) repair and replacement costs (replacement of major equipment such as trucks, pumps, air handling units, boilers, etc.); and c) annual reserve account (5% of O&M for unanticipated costs). These costs do not include capital recovery of the initial VSW grant funded improvements that are anticipated to last beyond the 30 year evaluation period (pipe lines, water treatment facilities, wastewater treatment facilities, booster pump stations, water storage tanks, lift stations, etc.).

1. Existing truck-haul and limited piped water delivery and wastewater collection system. The total annual estimated operating cash flow needed to operate the existing truck-haul and limited piped water and sewer system in Bethel is \$6,438,000. This equates to an estimated monthly cost per service of \$340.
2. Truck-haul and existing piped water delivery and wastewater collection after the “backbone” water and sewer improvements have been constructed. The total annual estimated operating cash flow needed to operate the truck-haul and existing piped water and sewer system in Bethel after the “backbone” water and sewer improvements are constructed is \$8,010,000. This equates to an estimated monthly cost per service of \$308 (note there is an increase in population and the number of services from scenario 1).

3. Piped water delivery and wastewater collection after all improvements have been constructed (assumes entire community is on the piped system). The total annual estimated operating cash flow needed to operate the piped water delivery and wastewater collection system after all improvements are constructed is \$3,926,000. This equates to an estimated monthly cost per service of \$151. However, it should be noted that each service will incur additional electrical charges to operate the water and glycol circulation pumps, which are estimated to be \$63. Therefore, the total cost to each service for comparison purposes is $\$151 + \$63 = \$214$ per month.

This evaluation shows there is a reduction in the overall cost of providing water and sewer services to the community as development of the recommended options proceeds.

13.4. Project Priority Schedule and Funding for First \$30 Million Worth of Improvements

13.4.1. Anticipated Funding

The City of Bethel is currently completing the Phase 1 Improvements that were recommended under the *City of Bethel Water and Sewer Facilities Master Plan Update (D&M/ 1996)*. The final Phase 1 Improvement project is anticipated to be completed during the Summer/Fall 2005 using the VSW SFY 2005 Capital Improvement Grant. It is anticipated that there will be approximately \$1 million remaining from these funds that were originally anticipated to be used to start the design of the Phase 2 Improvements that were recommended in the 1996 master plan. However, the City of Bethel has requested that VSW reprogram these funds to start the design of the improvements recommended in this document. In May 2005 VSW approved this request.

Prior to the VSW SFY 2006 Capital Improvement Grant request funding was typically limited to approximately \$3.0 million per year. However, beginning with the VSW SFY 2006 Capital Improvement Grant allowable funding requests were increased to \$10 million per year. This increase was justified because Bethel is considered a "regional hub community". It is anticipated that the VSW SFY 2006 Capital Improvement Grant for the City of Bethel will be approved in the amount of \$9.075 million by July 2005. It is anticipated that these funds will be available September 2005.

In the past, the City of Bethel's grant application request through the Alaska Native Tribal Health Consortium's Sanitation Deficiency System (SDS) have been unsuccessful because the proposed improvements based on the 1996 master plan did not score well. However, it is anticipated that upgrading the backbone water and sewer systems proposed in this master plan document will score well. The City of Bethel, with the assistance of the Yukon-Kuskokwim Health Corporation applied for \$2.0 million (maximum allowable) grant request under the SDS program for upgrades to the QFC #2 Lift Station. Approval of this grant request is pending. If approved the funds should become available by January 2006.

For the purpose of this document grant funding was estimated at \$10 million per year using a blend of VSW and SDS grants.

13.4.2. \$30 Million Project Priority, Fund Requirement, and Schedule

Village Safe Water placed the following constraints on the City of Bethel for the capital improvement grants:

- The VSW SFY 2006 Capital Improvement Grant (\$9.075 million) will be appropriate July 2005 and must be substantially spent by July 2006 before receiving any VSW SFY 2007 Capital Improvement Grant.
- Subsequent grant offers must be spent similarly before receiving future funds.
- The City will not be allowed to “stack up” money for future work as previously allowed.

These constraints place a significant burden on the City of Bethel complete the work as efficiently and quickly as possible. Therefore, VSW requested that the City of Bethel prepare a detailed project schedule showing funding needs for the first \$30 million worth of projects (SFY 2006 / 2007 / 2008). Refer to **Appendix M** for the schedule. Noting the need to complete the work as quickly as possible, the City has requested that VSW approve reprogramming of the \$1.0 million remaining in the VSW SFY 2005 Capital Improvement Grant to start the design of the proposed improvements recommended in this report by July 1, 2005. The first \$30 million of proposed improvements are depicted in **Figure 13-1**.

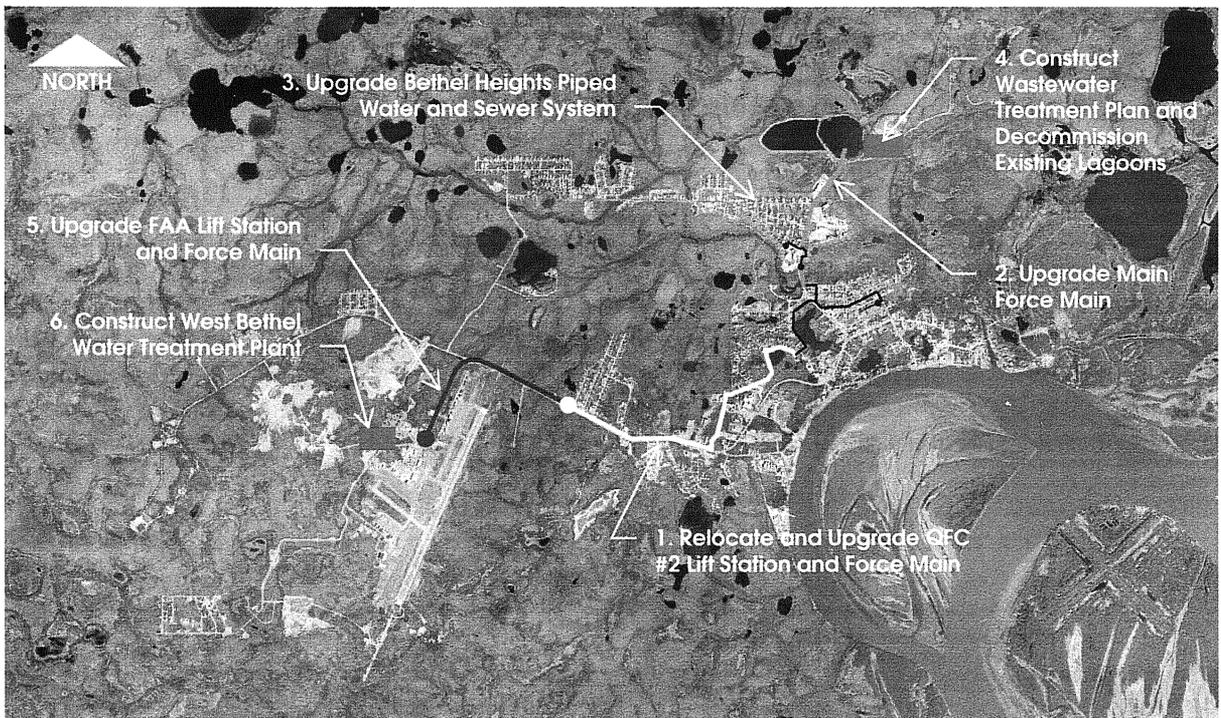


FIGURE 13-1

Priority Map of First \$30 million Worth of Recommended Improvements.

13.5. Bethel Water and Sewer Business Plan

A business plan was prepared for this document and is included under **Appendix O**. The business plan was based on the assumption that the piped water delivery and wastewater collection systems after all improvements have been constructed (assumes entire community is on the piped system).

Table 13-1
Project Priorities and Capital Cost Estimates

PRIORITY	CODE (a)	ITEM NO.	DESCRIPTION	PRESENT COST (b)	CUMULATIVE COST (b)	VSW-SFY FUNDING	NO. YEARS	CUMULATIVE FUNDING (c)
1	S	1	QFC No. II Lift Station and Forcemain Upgr	\$4,153,984	\$4,153,984	2006	1	\$10,000,000
2	S	2	Main Forcemain Upgrade (Ridgcrest to Lag	\$1,202,624	\$5,356,608	2006	1	\$10,000,000
3	W	1	Bethel Heights Piped Water and Sewer Up	\$2,248,000	\$7,604,608	2006	1	\$10,000,000
4	S	3	Wastewater Treatment Facility	\$18,944,000	\$26,548,608	2006/08	3	\$30,000,000
5	W	2	Small West Water Treatment Plant	\$3,315,680	\$29,864,288	2008	3	\$30,000,000
6	S	4	FAA Lift Station Upgrades	\$1,192,320	\$31,056,608	2008/09	4	\$40,000,000
7	S	5	Garage / Shop Facility	\$4,416,000	\$35,472,608	2009	4	\$40,000,000
8	S	6	Kasayuli Subdivision Lift Station and Force	\$3,687,360	\$39,159,968	2009	4	\$40,000,000
9	W	3	Kasayuli Subd. Water Station	\$5,275,648	\$44,435,616	2009/10	5	\$50,000,000
10	S	7	Ptarmigan Lift Station and Forcemain	\$4,631,648	\$49,067,264	2010	5	\$50,000,000
11	W	4	Tundra Ridge Subd. Water Station	\$4,114,608	\$53,181,872	2010/11	6	\$60,000,000
12	W	5	Nunvak Subd. Water Station	\$5,191,008	\$58,372,880	2011	6	\$60,000,000
13	S	8	Larson Subdivision Lift Station and Forcem	\$3,388,544	\$61,761,424	2011/12	7	\$70,000,000
14	W	6	Larson Subd. Water Station	\$4,046,528	\$65,807,952	2012	7	\$70,000,000
15	S	9	Harbor Area Lift Station and Forcemain	\$3,303,168	\$69,111,120	2012	7	\$70,000,000
16	W	7	Kilbuck Water Station	\$3,699,406	\$72,810,526	2012/13	8	\$80,000,000
17	W	8	Mission Lake Water Station	\$4,298,240	\$77,108,766	2013	8	\$80,000,000
18	W	9	Hospital Area Water Storage	\$4,879,680	\$81,988,446	2013/14	9	\$90,000,000
19	W	10	Enlarge West Water Treatment Plant	\$2,208,000	\$84,196,446	2014	9	\$90,000,000
20	P	1	Kilbuck North (Avenues)	\$9,965,469	\$94,161,915	2014/15	10	\$100,000,000
21	P	2	Kilbuck South (Avenues)	\$5,371,938	\$99,533,853	2016	10	\$100,000,000
22	P	3	Mission Lake Area West	\$5,902,734	\$105,436,587	2016/17	11	\$110,000,000
23	P	4	Mission Lake Area East	\$5,902,734	\$111,339,321	2016/17	12	\$120,000,000
24	P	5	Harbor Area West	\$7,076,094	\$118,415,415	2017	12	\$120,000,000
25	P	6	Harbor Area East	\$7,076,094	\$125,491,509	2017/18	13	\$130,000,000
26	P	7	Nunivak Subdivision West	\$4,246,375	\$129,737,884	2018	13	\$130,000,000
27	P	8	Nunivak Subdivision East	\$7,035,844	\$136,773,728	2019	14	\$140,000,000
28	P	9	Blueberry Subdivision Southeast	\$6,136,328	\$142,910,056	2019/20	15	\$150,000,000
29	P	10	Blueberry Subdivision Southwest	\$6,136,328	\$149,046,384	2020	15	\$150,000,000
30	P	11	Blueberry Subdivision Northwest	\$5,419,734	\$154,466,118	2020/21	16	\$160,000,000
31	P	12	Blueberry Subdivision Northeast	\$5,419,734	\$159,885,853	2021	16	\$160,000,000
32	P	13	Tundra Ridge Subdivision South	\$8,362,297	\$168,248,149	2021/22	17	\$170,000,000
33	P	14	Tundra Ridge Subdivision North	\$8,362,297	\$176,610,446	2022/23	18	\$180,000,000
34	P	15	Uluq Subdivision	\$7,789,813	\$184,400,259	2023/24	19	\$190,000,000
35	P	16	Larson Subdivision	\$6,500,375	\$190,900,634	2024/25	20	\$200,000,000
36	P	17	Airport Facilities	\$5,081,563	\$195,982,196	2025	20	\$200,000,000
37	P	18	Kasayuli Subdivision East	\$8,154,938	\$204,137,134	2025/26	21	\$210,000,000
38	P	19	Kasayuli Subdivision West	\$8,154,938	\$212,292,071	2026/27	22	\$220,000,000
39	P	20	H-Marker Lake Area	\$2,034,063	\$214,326,134	2027	22	\$220,000,000
40	P	21	Raven Subdivision West	\$6,093,563	\$220,419,696	2027/28	23	\$230,000,000
41	P	22	Raven Subdivision East	\$5,322,344	\$225,742,040	2028	23	\$230,000,000
42	S	10	Haroldsen Subdivision Lift Station and Forc	\$2,620,160	\$228,362,200	2028	23	\$230,000,000
43	W	11	Haroldsen Estates Water Station	\$3,554,880	\$231,917,080	2028/29	24	\$240,000,000
44	P	23	Haroldsen Estates	\$6,014,500	\$237,931,580	2029	24	\$240,000,000

Notes:

- (a) S = Backbone Sewer Improvements; W = Backbone Water Improvements; P = Piped Water & Sewer Improvements
- (b) Capital costs in 2005 dollars (present worth) +/- 15%
- (c) Funding based on fixed rate of \$10,000,000 per year

14. Funding Options

14.1. Funding Status

The State of Alaska, through the Village Safe Water program, has appropriated \$9,075,000 (SFY 2006) to fund water and sewer improvement for the City of Bethel. These funds will be used to fund the project priority as depicted on Table 13-1 (project priority 1, 2, 3 and a portion of 4).

14.2. Funding

Various grants and loans are available to cover costs associated with planning, design, and construction of water and sanitation projects from state, federal, and tribal agencies. Support is also available for technical training and technical assistance. The following is an alphabetical listing of grants and loans, their description, and contacts for more information. The provided web sites are very informative and may answer many questions regarding the various programs.

14.2.1. Grants

Alaska Science and Technology Foundation Grants

The Alaska Science and Technology Foundation manages this grant for the study and planning of innovative projects, including sewer and water treatment projects. Research must demonstrate that the project is technologically feasible and will result in direct and significant benefits to the state of Alaska.

Contact:

Alaska Science and Technology Foundation
4500 Diplomacy Drive, Suite 515
Anchorage, AK 99508-5918
Phone: (907) 272-4333 Fax: (907) 274-6228
E-mail: info@astf.org

Alaska Solid Waste Management Demonstration Grants

The Rural Alaska Sanitation Coalition (RASC) provides grants in an amount ranging from \$2,000 to \$10,000 to Alaska Native Tribes for community-approved solid waste projects. To be eligible, the Tribe must show a need and document community support and commitment to the project. Projects range from necessary activities to close an existing site to developing a new solid waste management plan. Innovative projects that may be modeled by other communities are encouraged.

Contact:

Elizabeth LeBlanc, RASC/Solid Waste Management Program Manager
Rural Alaska Sanitation Coalition
Alaska Native Health Board
4201 Tudor Centre Drive, Suite 105
Anchorage, AK 99508
Phone: (907) 562-6006 Fax: (907) 563-2001
E-mail: eleblanc@anhb.org
<http://www.anhb.org/sub/rasc/solidwaste.html>

Alaska-Specific Social and Economic Development Strategies (SEDS) Projects

The Administration for Native Americans Department of Health and Human Services provides grants to Native Tribes and rural communities with the goal to improve tribal governance capabilities and improve social and economic development. Grants may be used to plan for the development or improvement of water systems and sewer systems. They may also be used for the development of management, protection, and assessment plans of land and natural resources, including environmental impact studies. Funding is available up to \$100,000 for individual projects and \$150,000 for regional nonprofit and tribal consortia projects.

Contact:

Christopher Beach, Program Specialist
Department of Health and Human Services
Administration for Children and Families
Administration for Native Americans
370 L'Enfant Promenade SW
Mail Stop HHH 348-F
Washington, DC 20447
Phone: (202) 690-5793 Fax: (202) 690-7441
E-mail: cbeach@acf.dhhs.gov
<http://www.acf.dhhs.gov/programs/ana/seds99.txt>
<http://www.acf.dhhs.gov/programs/ana/index.html>

Clean Water Act Indian-Set Aside (CWA-ISA) Grant Program

The U.S. Environmental Protection Agency (EPA) makes this grant program available to Tribes and Alaska Native communities where 50 percent of the population is Native. Funds are used to plan, design, and construct community-approved wastewater facilities, including sewage lagoons, ocean outfalls, community washeterias, and sewer system rehabilitation. The EPA uses the IHS SDS for scoring applications and prioritizing the funding of projects.

Contact:

Geoff Keeler
EPA Region 10
1200 Sixth Ave. M/S OW-136
Seattle, WA 98101
Phone: (206) 553-1089 Fax: (206) 553-0165
E-mail: keeler.geoff@epa.gov

<http://www.epa.gov/owm/indian.htm>
<http://www.epa.gov/owm/finan.htm>
<http://www.ihs.gov>
<http://www.ihs.gov/FacilitiesServices/AreaOffices/Alaska/AK.asp>

Community Block Grant Program (CDBG)

This grant program is managed by the HUD and DCED to provide financial assistance in areas that address health and safety needs. The grant offers financial resources to communities for public facility planning, design, and construction. Specific project activities may include water and sewer facilities construction, landfill construction, acquisition of property, relocation and demolition, and rehabilitation of structures. Municipal governments (except Anchorage) are eligible for this program. In addition, 51 percent of the persons who benefit from a funded project must be of low-to-moderate income. The CDBG applications are distributed to eligible municipalities in September or October. Applications must be submitted around December or January (details in application) and awards are made the following spring.

Contact:

Jo Cooper, Block Grant Administrator
Department of Community and Regional Affairs
209 Forty Mile Avenue
Fairbanks, AK 99701-3301
Phone: (907) 452-4468 Fax: (907) 451-7251
E-mail: jo_cooper@dced.state.ak.us
<http://www.comregaf.state.ak.mradcdbg.html>
<http://www.hud.gov/progdesc/cdbg-st.html>

Community Development Block Grant Program for Indian Tribes and Alaska Native Villages

The HUD Office of Native American Programs (ONAP) offers grants (maximum \$500,000 per applicant) to Tribes or Alaska Native villages for planning and construction of community facilities, including sanitation infrastructure. The Indian Tribe or Alaska Native village applicant must show that 51 percent of the persons who benefit from a funded project must be of low-to-moderate income to be eligible for this program. In the HUD application, the applicant must describe the community need and how the proposed project will address that need. Timing for the program varies with the year.

Contact:

Marlin Knight, Administrator
Anchorage Office of Native American Programs
University Plaza Building
946 East 36th Ave. Suite 401
Anchorage, AK 99508-4399
Phone: (907) 271-4603 Fax: (907) 271-3667
E-mail: donna_hartley@hud.gov
<http://www.hud.gov>
<http://www.codetalk.fed.us>

Denali Commission

The Denali Commission is an innovative federal-state partnership established by Congress in 1998. The Denali Commission operates in conjunction with the office of the Alaska Lieutenant Governor to provide critical utilities, infrastructure, and economic support throughout Alaska in remote areas. The Denali Commission has been accepting proposals from villages for the construction of washeteria, clinics, and other facilities.

Contact:

Al Ewing, Chief of Staff
Denali Commission
510 L Street, Suite 410
Anchorage, AK 99501
Phone: toll free (888) 480-4321 or (907) 271-1414 Fax: (907) 271-1415
E-mail: ewing@denali.gov
<http://www.denali.gov>

Drinking Water Infrastructure Grant Tribal Set-Aside Program

The EPA provides funds under this grant program to federally recognized Tribes for projects that address serious public health risks. The goal of the program is to promote public health and compliance with the Safe Drinking Water Act. For non-federally recognized tribes, the IHS may accept projects on the Tribe's behalf. The EPA uses the IHS SDS for scoring applications and prioritizing the funding of projects.

Contact:

Dennis J. Wagner, P.E.
US EPA, Alaska Operations Office
222 W. 7th Ave. #19, Room 537
Anchorage, AK 99513
Phone: (907) 271-3651 Fax: (907) 271-3424
E-mail: wagner.dennisx@epamail.epa.gov
<http://www.epa.gov/OGWDW/tribes.html>
<http://www.epa.gov/safewater/tribal/tribsrf.htm>

Environmental Justice Small Grants Programs

The EPA provides funding to Native Tribes and nonprofit community organizations to address environmental justice issues. Grants may be used to develop, expand, or implement safe drinking water or solid waste public health programs. Funding is available in the range of \$15,000 to \$20,000.

Contact:

Office of Civil Rights and Environmental Justice
Grant Project Manager
US EPA Region 10
1200 Sixth Ave. M/S CEJ-163
Seattle, WA 98101
Phone: (206) 553-8580 Fax: (206) 553-8338

E-mail: platta.victoria@epa.gov
<http://www.epa.gov/oeca/oej/grants.html>

Indian Environmental General Assistance Program

The EPA American Indian Environmental Office provides funding and training under this program for Tribes and Tribal nonprofit groups to plan and develop environmental protection programs. Such programs may include, but are not limited to, the planning of sewer collection and treatment facilities.

Contact:

Jean Gamache, Alaska Native Coordinator
US EPA Alaska Operations Office
222 W. 7th Ave. #19
Anchorage, AK 99513
Phone: (907) 271-6558 Fax: (907) 271-3424
E-mail: gamache.jean@epamail.epa.gov
<http://www.epa.gov/Indian>

Indian Health Service Facilities Construction Program

The Department of Health and Human Services IHS manages this grant program to provide financial assistance to Tribes or Alaska Native villages for improving their environment. The fund may be used for construction, engineering services, and construction management services for drinking water, sewer, and solid waste projects. The funding is limited to projects occurring in remote locations with a minimum of five new or "like new" homes (having an approximate 20-year life span) with electricity and thermostatic controlled heat.

Contact:

Bill Griffith, P.E., Director
Division of Sanitation Facilities
3925 Tudor Centre Dr.
Anchorage, AK 99508
Phone: (907) 729-3538 Fax: (907) 271-4734
E-mail: bgriffith@anthc.org
<http://www.ihs.gov>
<http://www.ihs.gov/FacilitiesServices/AreaOffices/Alaska/AK.asp>

Municipal Matching Grants: Water, Sewerage, and Solid Waste Grant Program

ADEC provides partial grants and engineering assistance to incorporated municipalities for planning, design, and construction projects in the area of water, sewer, and solid waste. ADEC mails a survey to eligible communities, which they must fill out to illustrate needed facility improvements. The Office of Management and Budget (OMB) reviews the surveys and the Governor chooses suitable projects and requests funding from the State Legislature.

Contact:

Dan Garner, Program Manager
Department of Environmental Conservation
Division of Facility Construction and Operation
Municipal Grants and Loans Unit
410 Willoughby Avenue
Juneau, AK 99801
Phone: (907) 465-5144 Fax: (907) 465-5177
E-mail: dan_garner@envircon.state.ak.us
http://www.state.ak.us/dec/dfco/dec_dfco.htm#Operations
http://www.state.ak.us/local/akpages/ENV.CONSERV/dfco/mgr_form.htm

Public Works and Development Facilities Program

The U.S. Department of Economic Development Administration (EDA) funds this grant program to assist communities experiencing economic distress and whose economic growth is lagging behind the rest of the country. The program provides financial assistance to communities for water and wastewater treatment systems, access roads to industrial parks or sites, port improvements, and tourism projects with the goal of creating permanent jobs in the private sector. Grants from \$200,000 to \$2,000,000 are awarded to Tribal governments, cities, municipalities, boroughs, and public or private nonprofit organizations.

Contact:

Bernhard E. Richert, Jr.
Economic Development Representative
550 W. 7th Avenue Suite 1700
Anchorage, AK 99501
Phone: (907)271-2272 Fax:(907)271-2273/2274
E-mail: brichert@doc.gov
<http://www.doc.gov/eda>
<http://www.eda.gov>

USDA Water and Waste Disposal Grants

The USDA Rural Development manages this grant program to rural communities with a population of 10,000 or less, with priority given to populations less than 5,500, municipalities, boroughs, Alaska native villages, and nonprofit corporations. The aim of the program is to bring the cost of water and waste disposal down to an affordable level for rural community users by providing assistance to construct, repair, modify, expand, or otherwise improve water supply, water distribution, waste collection, waste treatment, storm drainage, and solid waste disposal systems. Funding is also available for legal and engineering fees associated with the development of such systems.

Contact:

John LaVarnway
800 W. Evergreen, Suite 201
Palmer, AK 99645
Phone: (907) 761-7705 Fax: (907) 761-7783
E-mail: jlavarnw@rdmail.rural.usda.gov

<http://www.usda.gov/rus/water/programs.htm#PROGRAMS>

Village Safe Water Program

The ADEC Division of Facility Construction and Operation, EPA, and U.S. Department of Agriculture (USDA) Rural Development Program work together to provide grants to rural communities: first class cities with a population equal to or less than 600, second class cities, and unincorporated communities of 25 to 600 people living within a 2-mile radius (including Indian Reorganization Act governments). The grant program provides financial and technical assistance to upgrade community-approved water, sewer, and solid waste facilities to improve public health and compliance with environmental laws. The application questionnaire is due by October 1 of each year to ADEC.

Contact:

Bill Griffith, Manager VSW
Department of Environmental Conservation
Division of Facility Construction and Operation
Village Safe Water
410 Willoughby Avenue, suite 303
Juneau, AK 99801
Phone: (907) 269-7516 Fax: (907) 269-7509
E-mail: mike_burns@envircon.state.ak.us
<http://www.state.ak.us/dec/home.htm#Operations>
http://www.state.ak.us/dec/dfco/dec_dfco.htm#Operations
http://www.state.ak.us/dec/dfco/fco_vsw.htm

Water Quality Cooperative Agreements

The EPA manages this program, which funds innovative projects that address requirements for combined sewer outflows, sludge, and pretreatment. Project grants are awarded in amounts ranging from \$25,000 to \$500,000 and matching funding is encouraged. Eligible applicants include Tribes, nonprofit institutions, state water pollution control agencies, and local public agencies.

Contact:

Bill Gissel, State Revolving Fund Coordinator
P.O. Box 20370
Juneau, AK 99802-0370
Phone: (907) 586-7620 Fax: (907) 586-7015
E-mail: gissel.bill@epa.gov
<http://www.epa.gov/OWOW/watershed/wacademy/fundppc.html>
<http://www.epa.gov/OWM/finan.htm>

14.2.2. Loans

Alaska Clean Water Fund

The EPA and ADEC manage this low-interest loan program offered to municipalities. The loans are available for planning, design, and construction of wastewater treatment facilities,

construction and rehabilitation of sewer collection systems, studying nonpoint source pollution, managing estuaries, protecting groundwater, and implementing control measures for combined sewers. Eligible communities can receive a questionnaire in February, which is due by mid-March.

Contact:

Terriann Lowell
Alaska Department of Environmental Conservation
Division of Facilities Construction and Operation
410 Willoughby Ave. Suite 303
Juneau, AK 99801-1795
Phone: (907) 465-5146 Fax: (907) 465-5177
E-mail: Tlowell@evircon.state.ak.us
http://www.state.ak.us/dec/dfco/dec_dfco.htm

Alaska Drinking Water Fund

The EPA and ADEC manage this low-interest loan program to help finance the planning and design of drinking water projects and upgrades. Eligible applicants include municipalities (incorporated political subdivisions) and publicly owned community water systems. Eligible applicants can receive a questionnaire in February, which is due by mid-March.

Contact:

Terriann Lowell
Alaska Department of Environmental Conservation
Division of Facilities Construction and Operation
410 Willoughby Ave. Suite 303
Juneau, AK 99801-1795
Phone: (907) 465-5146 Fax: (907) 465-5177
E-mail: Tlowell@evircon.state.ak.us
http://www.state.ak.us/dec/dfco/dec_dfco.htm

Alaska Municipal Bond Bank Authority (AMBBA)

The State of Alaska Department of Revenue provides loans to Alaskan municipalities for financing any capital projects.

Contact:

Deven Mitchell, Executive Director
Alaska Municipal Bond Bank Authority
P.O. Box 110405
Juneau, AK 99811-0405
Phone: (907) 465-2388 Fax: (907) 465-2902
E-mail: ambba@revenue.state.ak.us
<http://www.revenue.state.ak.us/treasury/ambba/ambba.htm>

Municipal Loan Program

The ADEC provides low-interest loans and engineering assistance to public and qualifying privately owned utility systems for drinking water and wastewater projects. The loan may be used to assist in securing or matching federal grant funds. Program participants receive an assigned engineer to assist with the project planning, budgeting, design, construction, and regulatory issues.

Contact:

Dan Garner, Program Manager
Department of Environmental Conservation
Division of Facility Construction and Operation
Municipal Grants and Loans Unit
410 Willoughby Avenue
Juneau, AK 99801
Phone: (907) 465-5144 Fax: (907) 465-5177
E-mail: dan_garner@envircon.state.ak.us
http://www.state.ak.us/dec/dfco/dec_dfco.htm#Operations
http://www.state.ak.us/local/akpages/ENV.CONSERV/dfco/mgr_form.htm

USDA Water and Waste Disposal Loans

The USDA Rural Development provides this loan program to rural communities that are unable to obtain loans at reasonable rates and terms from conventional lenders. The rural communities must have a population of 10,000 or less, with priority given to populations less than 5,500, municipalities, boroughs, Alaska Native villages, and nonprofit corporations. The loan offers assistance to construct, repair, modify, expand, or otherwise improve water supply, water distribution, waste collection, waste treatment, storm drainage, and solid waste disposal systems. Funding is also available for legal and engineering fees associated with the development of such systems.

Contact:

John LaVarnway
800 W. Evergreen, Suite 201
Palmer, AK 99645
Phone: (907) 761-7705 Fax: (907) 761-7783
E-mail: jlavarnw@rdmail.rural.usda.gov
<http://www.usda.gov/rus/water/programs.htm#PROGRAMS>

14.2.3. Training and Technical Assistance

The following is a list of programs that provide funding for training and technical assistance to communities.

Alaska Training/Technical Assistance Center (ATTAC)

The EPA manages this training and technical assistance program with the aim to enhance the technical abilities of operators of small public water and wastewater systems. Training and technical assistance is free to the community. For those applying for continuing education units, a nominal processing fee is assessed based on the number of credits.

Contact:

Lee Michalsky, Program Director
Environmental Technology Program
University of Alaska Southeast/Sitka
1332 Seward Ave.
Sitka, AK 99835
Phone: toll free (888) 750-3823 or (907) 747-7755 Fax: (907) 747-7753
E-mail: lee.michalsky@uas.alaska.edu
<http://www.water-alaska.org>

Denali Commission

The Denali Commission is an innovative federal-state partnership established by Congress in 1998. The Denali Commission operates in conjunction with the office of the Alaska Lieutenant Governor to provide critical utilities, infrastructure, and economic support throughout Alaska in remote areas. It is charged to lower the cost of living and raise the standard of living in Alaska by delivering federal services in the most cost-effective manner possible.

Contact:

Al Ewing, Chief of Staff
Denali Commission
510 L Street, Suite 410
Anchorage, AK 99501
Phone: toll free (888) 480-4321 or (907) 271-1414 Fax: (907) 271-1415
E-mail: ewing@denali.gov
<http://www.denali.gov>

Operator Training and Certification Program

The ADEC offers onsite technical assistance and training, correspondence courses, and classroom technical training to certify and advance community water and wastewater operators. The ADEC provides resources, including a library of training videos, textbooks, and reference materials. Through this program, the ADEC is also able to collect the concerns of operators and direct them to the Governor's Water/Wastewater Works Advisory Board.

Contact:

Ken Smith, Certification Officer
Department of Environmental Conservation
410 Willoughby Ave., Suite 303
Juneau, AK 99801-1795
Phone: (907) 465-5140 Fax: (907) 465-5177
E-mail: ksmith@envircon.state.ak.us
http://www.state.ak.us/dec/dfco/dec_dfco.htm#Operations

Remote Maintenance Worker (RMW)

The ADEC Division of Facility and Construction and Operation-Operations Assistance Unit and the EPA offer this program to aid operators of sanitation systems in remote parts of rural Alaska. Assistance includes reviewing plans for new or upgraded facilities, developing cold weather preparedness plans, implementing preventive maintenance plans, and providing onsite help with emergency repairs.

Contact:

Kerry Lindley, Program Manager
Department of Environmental Conservation
Division of Facility Construction and Operation
Remote Maintenance Worker Program
410 Willoughby Ave., Suite 303
Juneau, AK 99801-1795
Phone: (907) 465-5143 Fax: (907) 465-5177
E-mail: klindley@envircon.state.ak.us
http://www.state.ak.us/dec/dfco/dec_dfco.htm#Operations

Rural Utilities Business Advisory Program

The Rural Utilities Business Advisory (RUBA) Program provides onsite managerial training for city managers to improve the management of water and wastewater facilities. Through the RUBA Program, management assistance and financial training related to water and wastewater utilities is provided to cities and villages. Regional workshops on financial record keeping, utility management, and utility planning are offered to many communities in addition to the onsite visits by RUBA staff.

Contact:

Michael Black , Program Manager
Division of Community and Business Development
Department of Community and Economic Development
550 West 7th Avenue, Suite 1640
Anchorage, AK 99501
Phone: (907) 269-4537 FAX: (907) 269-4563
e-mail: Michael_Black@dced.state.ak.us
<http://www.dced.state.ak.us/mra/Mradruba.htm>

Wastewater Assistance Program

The ADEC Division of Facility Construction and Operation Assistance Unit and the EPA work together to provide training to operate and maintain wastewater facilities to extend the average facility life and protect public health. Program participants also receive onsite wastewater system evaluation, research on optimal equipment and necessary parts, and help with discharge permits and laboratory testing. Assistance is available for communities with a wastewater treatment plant larger than 5 million gallons per day (mgd) and a willing plant operator.

Contact:

Van Madding, 104 Assistance Provider
Department of Environmental Conservation
410 Willoughby Ave., Suite 303
Juneau, AK 99801-1795
Phone:(907)465-5142 Fax:(907)465-5177
E-mail: vmadding@envircon.state.ak.us
<http://www.state.ak.us/dec>

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16. Definitions

Active Layer - The layer of soil that freezes and thaws annually as seasons change (also called seasonal frost).

Aeration - A treatment process bringing air and water into close contact in order to remove or modify constituents in water.

Aerobic - A condition in which "free" or dissolved oxygen is present in the aquatic environment .

Aquifer - A porous, water-bearing geologic formation.

Backwash - The reversal of flow through a filter in order to clean the filter by removal of material trapped within the water system.

Bacteria - Living organisms, microscopic in size, which consist of a single cell. Most bacteria utilize organic matter for their food and produce waste products as the result of their life processes.

Breakup - The melting time at which a) ice on rivers breaks and starts moving with the current, b) lakes can no longer be crossed on foot, and c) previously frozen mud is soft, and most of the snow is gone.

Carcinogen - Any substance that produces cancer.

Celsius - Relating to the metric thermometer scale with the boiling point at 100 degrees and the freezing point at 0 degrees.

Cold Climate - Those regions where the design of water and sanitation facilities must consider the thermal design.

Coliform Bacteria - The coliform group of bacteria is a bacterial indicator of contamination. This group has as one of its primary habitats the intestinal tract of human beings. Coliforms may also be found in the intestinal tract of warm-blooded animals, and in plants, soil, air and the aquatic environment.

Colloidal - Any substance in a certain state of fine division in which the particles range in diameter from about 1.0 to 0.005 micron.

Color - Primarily, organic colloidal particles in water.

Confined Aquifer - An aquifer that is surrounded by formations of less permeable or impermeable material.

Contact Time - The amount of time that a disinfectant or chemical additive, measured as a free residual, is in contact with the water.

Continuous Permafrost - An area underlain by frozen ground with no thawed areas except under large lakes and rivers that never freeze solid .

Degree Days - Quantity expressed as the product of "degrees variation from a base" and "time in days". Example: If the temperature averages 40°F for 10 days, there is an accumulation of 80 degree-days of "thaw". (Base for freezing and thawing degree-days is 32°F, and base for heating degree-days usually is 65°F.)

Demand-Use - Reference to the "demand" put onto the system to meet the need of customers.

Discontinuous Permafrost - An area underlain mostly by frozen ground but containing small areas of unfrozen ground.

Disinfection - The process used to control pathogenic organisms.

Facultative Lagoon - A lagoon that treats wastes through a combination of aerobic and anaerobic processes.

Fahrenheit - Relating to an English thermometer scale with the boiling point at 212 degrees and the freezing point at 32 degrees.

Fill Points - In a truck-haul system, this is the location where a water truck fills its water tanks; it also refers to the point on individual houses where water is delivered.

Filtration - The process of passing liquid through a filtering medium (which may consist of granular material such as sand, magnetite, or diatomaceous earth, finely woven cloth, unglazed porcelain, or specially prepared paper) to remove suspended colloidal matter.

Freeze-up - The transition time when moisture at the ground surface freezes, forming a hardened surface.

Freezing Index - The integrated number of degree-days colder than the freezing point in a winter session.

Frost-heaving - The expansion of soil due to the growth within it of an extensive ice lens, which causes the displacement of the soil surface.

Frost-jacking - When soil, bonded to an object, moves upward through frost-heaving and carries the object with it; upon thawing, the object does not return to its original elevation.

Frost-susceptible soil - A soil that retains and permits migration of large amounts of water, encouraging the growth of ice lenses during freezing, from which frost-heaving develops; also defined as a soil passing more than 3 percent through a No.200 sieve.

Greensand - Naturally occurring silicates of sodium and aluminum that respond as a natural ion exchange medium. Commonly used as the primary filter medium in a potassium permanganate, greensand, iron and manganese removal process.

Greywater - Wastewater from kitchen sinks, showers, and laundry, excluding human toilet wastes.

Groundwater - Subsurface water occupying a saturated geological formation from which wells and springs are fed.

Hardness - A characteristic of water, caused primarily by calcium and magnesium ions. Hardness causes deposits and scale to form on pipes and fixtures.

Head - The measure of the pressure of water expressed as height of water in feet - 1 psi = 2.31 feet of head.

Heating index - The integrated number of degree-days colder than some base figure (usually 65°F.) during a heating season.

Honeybuckets - A plastic or steel bucket that fits into a bucket toilet.

Hypochlorite - Compounds containing chlorine that are used for disinfection. They are available as liquids or solids, in barrels, drums and cans.

Milligrams per Liter - A unit of the concentration of a constituent in water. It is 0.001g of the constituent in 1,000 ml of water. Mg/L has replaced the ppm (parts per million) in reporting results in water.

Non-Frost-Susceptible Soil - A soil that does not retain water, thereby not encouraging the growth of ice wedges.

Package Treatment - A treatment system available as Plant prefabricated "packaged" units.

Peak Demand - The maximum momentary flow required of a water treatment plant, pumping station or distribution system. This demand is usually the maximum average flow in one hour or less.

Permafrost Soil - Bedrock, or other material that has remained below 32 °F for two or more years.

Potable Water - Water suitable for drinking. (Physically, biologically, chemically, and radiologically safe water.)

Precipitate (noun) - A solid substance that can be dissolved but is separated from solution as a result of a chemical reaction or change in conditions, such as pH or temperature.

Pressure - The force exerted on a unit area. Pressure = Weight X height. In water, it is usually measured in psi (pounds per square inch). One foot of water exerts a pressure of 0.433 pounds per square inch.

Raw Water - Water that has not been treated and is to be used, after treatment, for drinking water.

Reservoir - A tank used to hold water.

Residual - What is remaining in the water after a set period of time.

Seasonal Frost Areas - Areas where ground is frozen by low seasonal temperatures and remains frozen only through the winter; in permafrost this refers to the active layer.

Sequestering Agent - A chemical compound or polymer that chemically ties up (sequesters) other compounds or ions so that they cannot be involved in chemical reactions.

Sludge - A semi-liquid substance consisting of settled sewage solids combined with varying amounts of water and dissolved materials.

Subpermafrost Layer - The layer below the permafrost; which may contain some permafrost islands.

Suprapermafrost Layer - The layer between the ground surface and the permafrost table; this layer contains the active layer, year-round thawed areas (taliks) and temporarily frozen areas (pereletoks).

Surface Water - Water on the earth's surface as distinguished from water underground (groundwater).

Thaw bulb - A thawed section in the permafrost due to the warming effect of a house, river, lake, etc.

Thawing Index - The yearly sum of the differences between 32°F and the daily mean temperature of the days with means above 32°F.

Thermal Insulation - Insulation to resist the transmission of heat.

Total Solids - The solids in water, sewage, or other liquids; it includes the suspended solids (largely removable by a filter) and filterable solids (those which pass through the filter).

Tundra - Term applied to the treeless areas in the arctic and subarctic; consists of mosses, lichens, and small brush.

Utilidor - An above- or belowground conduit (not necessarily insulated) that acts as an enclosed corridor for a network of pipes and cables that supply community services to individual homes and businesses.

Water Table - The average depth or elevation of the groundwater over a selected area. The upper surface of the zone of saturation, except where that surface is formed by an impermeable body.

Water-wasting - The continuous running of water through taps to maintain a flow in the mains, service lines, and sewers to prevent freezing of the pipes.

Watering Point - A central point for users to obtain potable water for domestic purposes.

Wetlands - General term to name any poorly drained tract, whatever its vegetation.

Zeolite - Natural or man-made minerals that will collect from a solution of certain ions (NaCl or KMnO₄) and either exchange these ions (as in the case of water softening) or use these ions to oxidize a substance (as in the case of iron or manganese removal).

Drawings

Drawing 1 - Location Map

Drawing 2 - Community Facility Inventory

Land Status Map

Drawing 4 - Topography Map of Bethel

Drawing 5 - Proposed Water Distribution System

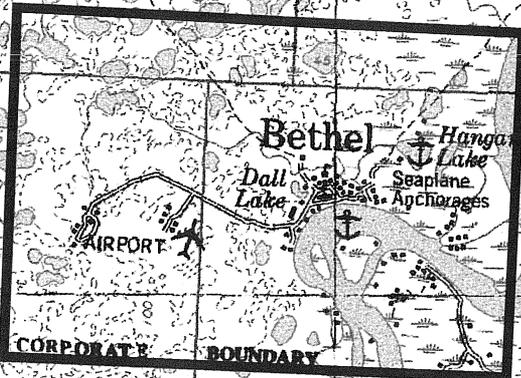
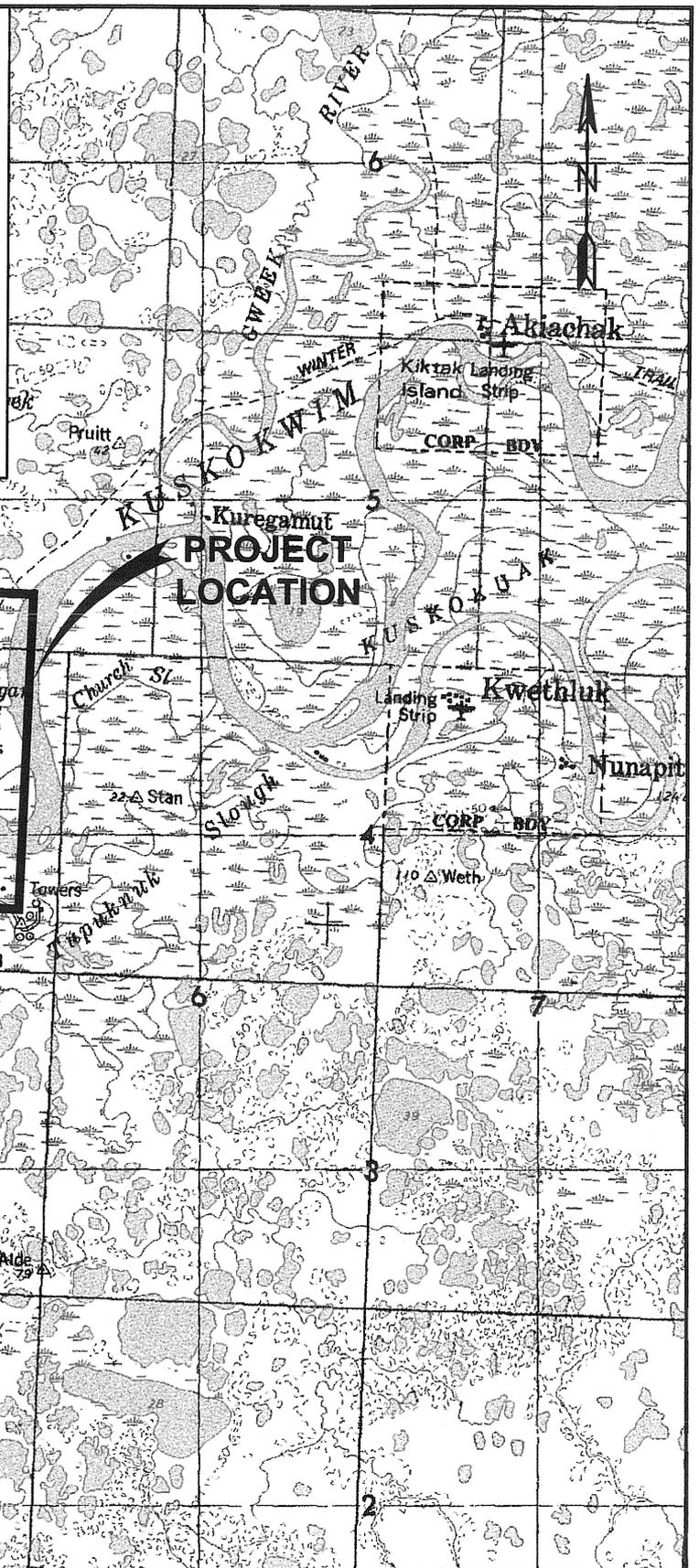
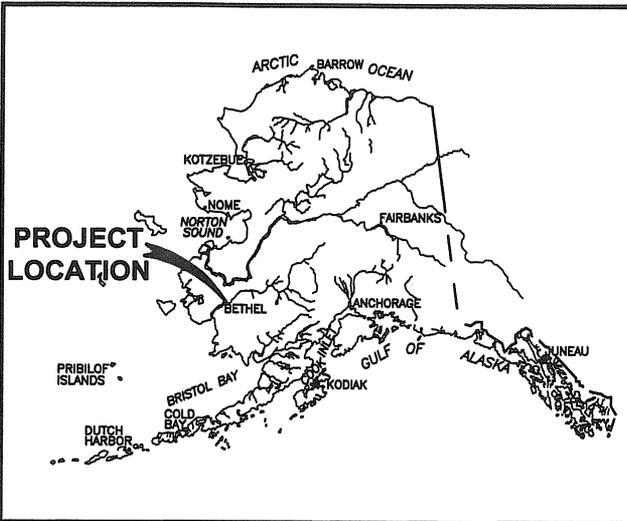
Drawing 6 - Proposed Sewer Collection System

The following figures were included in the previous Master Plan Update and are included for information:

Figure J-1 – Service Area Base Map (D&M/1996)

Figure K-1 – Piped Water Distribution System (D&M/1996)

Figure K-2 – Piped Sewer Collection System (D&M/1996)



FILE NAME: Communit_Map.dwg



VILLAGE SAFE WATER



Project:

CITY OF BETHEL
WATER & SEWER FACILITY
MASTER PLAN UPDATE
LOCATION MAP

Project No: 9641.02

Drawn By: MMHN

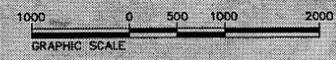
Scale: NONE

Date: JAN 2005

Figure: 1

COMMUNITY FACILITY INVENTORY

- | | |
|---|--|
| 1. YKHC WELL | 17. KILBUCK ELEMENTARY SCHOOL |
| 2. WHITE ALICE SITE | 18. PORT OF BETHEL |
| 3. BIA ADMINISTRATION SITE | 19. BOAT HARBOR |
| 4. FAA SUBDIVISION | 20. BETHEL REGIONAL HIGH SCHOOL |
| 5. BETHEL MUNICIPAL AIRPORT | 21. BETHEL HEIGHTS WATER TREATMENT PLANT |
| 6. LARSEN SUBDIVISION | 22. PUBLIC WORKS FACILITY |
| 7. BLUEBERRY FIELD SUBDIVISION | 23. LANDFILL |
| 8. POST OFFICE | 24. SEWAGE LAGOONS |
| 9. POWER PLANT | 25. TURNKEY SUBDIVISION (BETHEL HEIGHTS) |
| 10. YUKON-KUSKOKWIM DELTA REGIONAL HOSPITAL | 26. MARTINA OSCAR SUBDIVISION |
| 11. BULK-FUEL FACILITIES | 27. UIVUQ SUBDIVISION |
| 12. CITY CENTER SUBDIVISION | 28. TUNDRA RIDGE SUBDIVISION |
| 13. CITY SUBDIVISION | 29. H-MARKER SUBDIVISION |
| 14. CITY SUBDIVISION WATER TREATMENT PLANT | 30. HERALDSON SUBDIVISION |
| 15. CITY CENTER WATER TREATMENT PLANT
(NO LONGER IN OPERATION) | 31. KASAYULI SUBDIVISION |
| 16. MISSION LAKE SUBDIVISION | 32. RAVEN SUBDIVISION |
| | 33. NUNVAK SUBDIVISION |



File: CommunityMap.dwg

VILLAGE SAFE WATER

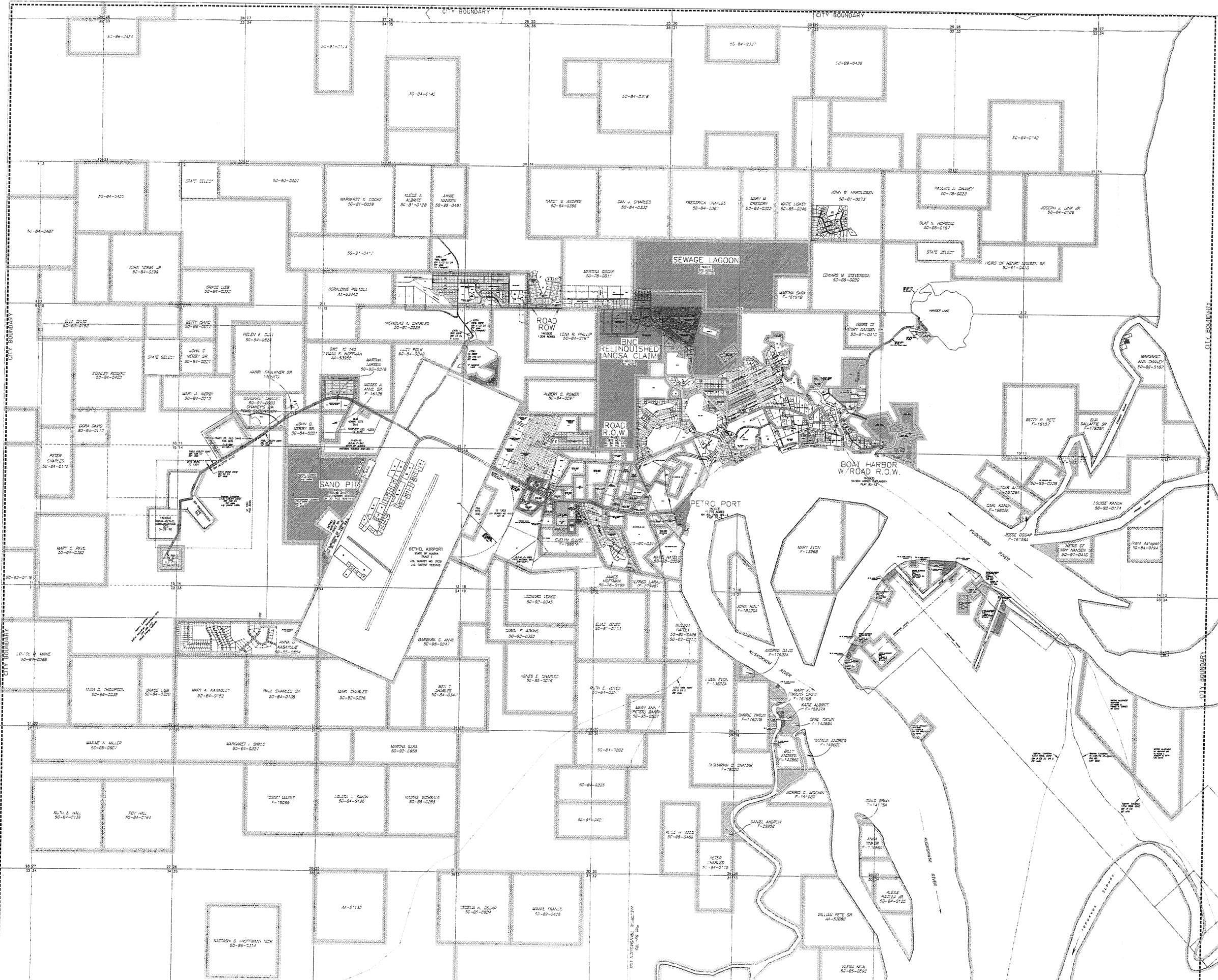


CRW
ENGINEERING GROUP, LLC
3900 ARCTIC BLVD., SUITE 203
ANCHORAGE, ALASKA 99503
PHONE: (907) 581-2272
FAX: (907) 581-2273

CITY OF BETHEL
WATER & SEWER FACILITY
MASTER PLAN UPDATE
COMMUNITY FACILITY INVENTORY

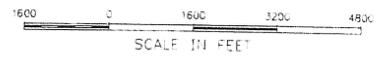
REVISION	BY	DATE

Project No. 9641.02
Date APR 2005
Designed MMHIN
Drawn MMHIN
Approved



- LEGEND**
- ANCSA 14(c)(1) & 14(c)(2)
 - ANCSA 14(c)(3)—LANDS RECOVERED OR IN RECOVERY PROCESS FROM BNC TO THE CITY OF BETHEL
 - BETHEL NATIVE CORPORATION
 - CITY OF BETHEL
 - FEDERAL LAND
 - PRIVATE INHOLDINGS
 - STATE OF ALASKA

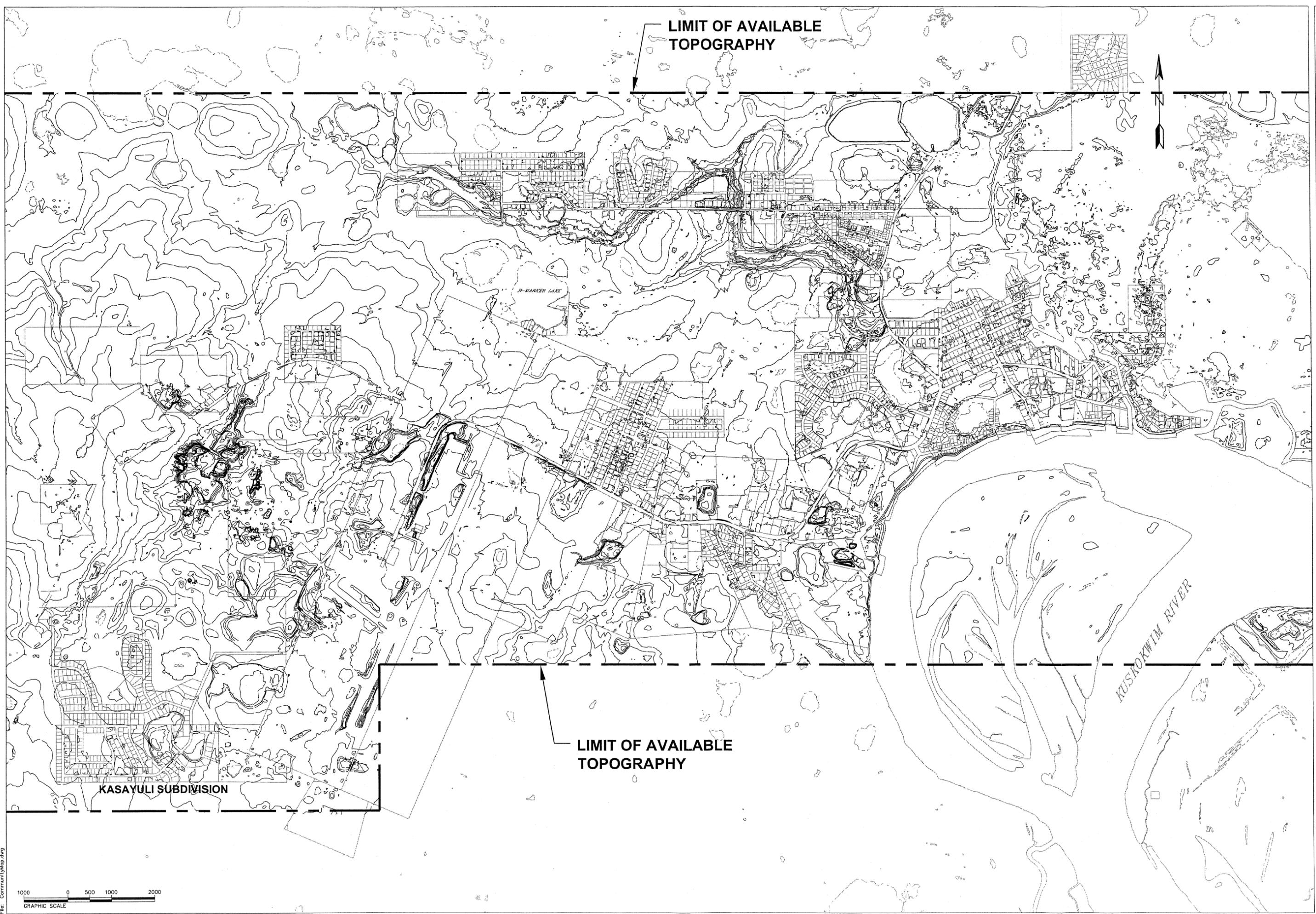
MAP CREATED BY BETHEL NATIVE CORPORATION FOR THE CITY OF BETHEL COMPREHENSION PLAN—1997.



MAP OF
**LAND STATUS WITHIN
 THE CITY OF BETHEL**

BETHEL RECORDING DISTRICT

PREPARED BY
McCLINTOCK LAND ASSOCIATES, INC.
 11840 BUSINESS BOULEVARD, SUITE 205
 EAGLE RIVER, ALASKA 99577
 (907) 694-4499



LIMIT OF AVAILABLE TOPOGRAPHY

LIMIT OF AVAILABLE TOPOGRAPHY

KASAYULI SUBDIVISION

KUSKOKWIM RIVER

VILLAGE SAFE WATER



CRW
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3800 ARCTIC BLVD, SUITE 203
ANCHORAGE, ALASKA 99503
PHONE: (907) 562-3252
FAX: (907) 561-2273

CITY OF BETHEL
WATER & SEWER FACILITY
MASTER PLAN UPDATE

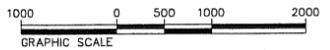
TOPOGRAPHY

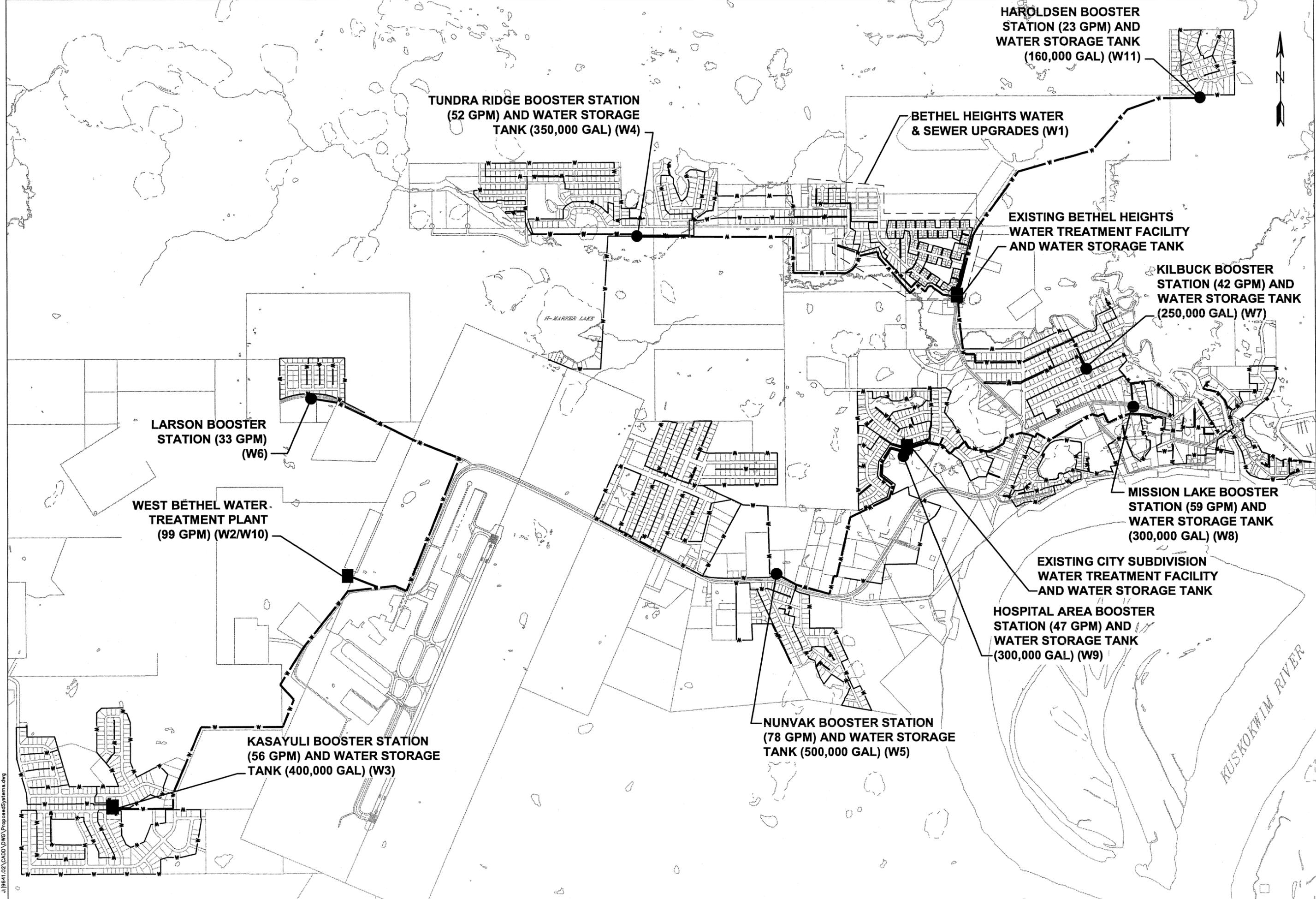
REVISION	BY	DATE

Project No. 9641.02
Date AUG 2004
Designed
Drawn MMHN
Approved

Sheet No. 4

File: CommunityMap.dwg





HAROLDSEN BOOSTER STATION (23 GPM) AND WATER STORAGE TANK (160,000 GAL) (W11)

TUNDRA RIDGE BOOSTER STATION (52 GPM) AND WATER STORAGE TANK (350,000 GAL) (W4)

BETHEL HEIGHTS WATER & SEWER UPGRADES (W1)

EXISTING BETHEL HEIGHTS WATER TREATMENT FACILITY AND WATER STORAGE TANK

KILBUCK BOOSTER STATION (42 GPM) AND WATER STORAGE TANK (250,000 GAL) (W7)

LARSON BOOSTER STATION (33 GPM) (W6)

WEST BETHEL WATER TREATMENT PLANT (99 GPM) (W2/W10)

MISSION LAKE BOOSTER STATION (59 GPM) AND WATER STORAGE TANK (300,000 GAL) (W8)

EXISTING CITY SUBDIVISION WATER TREATMENT FACILITY AND WATER STORAGE TANK

HOSPITAL AREA BOOSTER STATION (47 GPM) AND WATER STORAGE TANK (300,000 GAL) (W9)

NUNVAK BOOSTER STATION (78 GPM) AND WATER STORAGE TANK (500,000 GAL) (W5)

KASAYULI BOOSTER STATION (56 GPM) AND WATER STORAGE TANK (400,000 GAL) (W3)

VILLAGE SAFE WATER



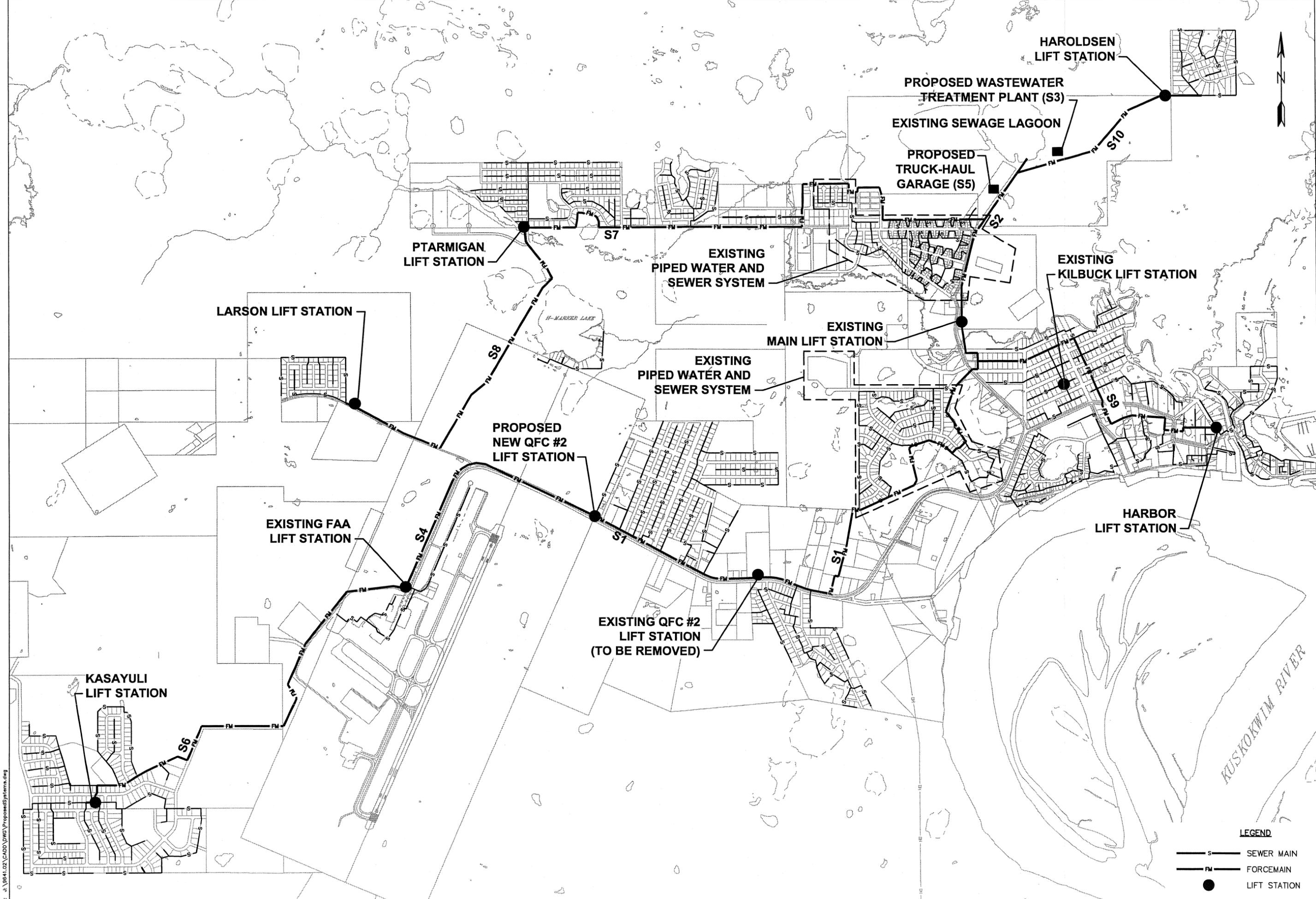
CRW
ENGINEERING GROUP LLC
3800 PACIFIC BLVD. SUITE 100
ANCHORAGE, AK 99503
PHONE: (807) 252-2322
FAX: (807) 251-2273

CITY OF BETHEL
WATER & SEWER FACILITY
MASTER PLAN UPDATE
PROPOSED WATER DISTRIBUTION SYSTEM

REVISION	BY	DATE

Project No. 9641.02
Date APR 2005
Designed
Drawn RLM
Approved

File: j:\9641.02\CADD\DWG\ProposedSystems.dwg



LEGEND

-  SEWER MAIN
-  FORCEMAIN
-  LIFT STATION



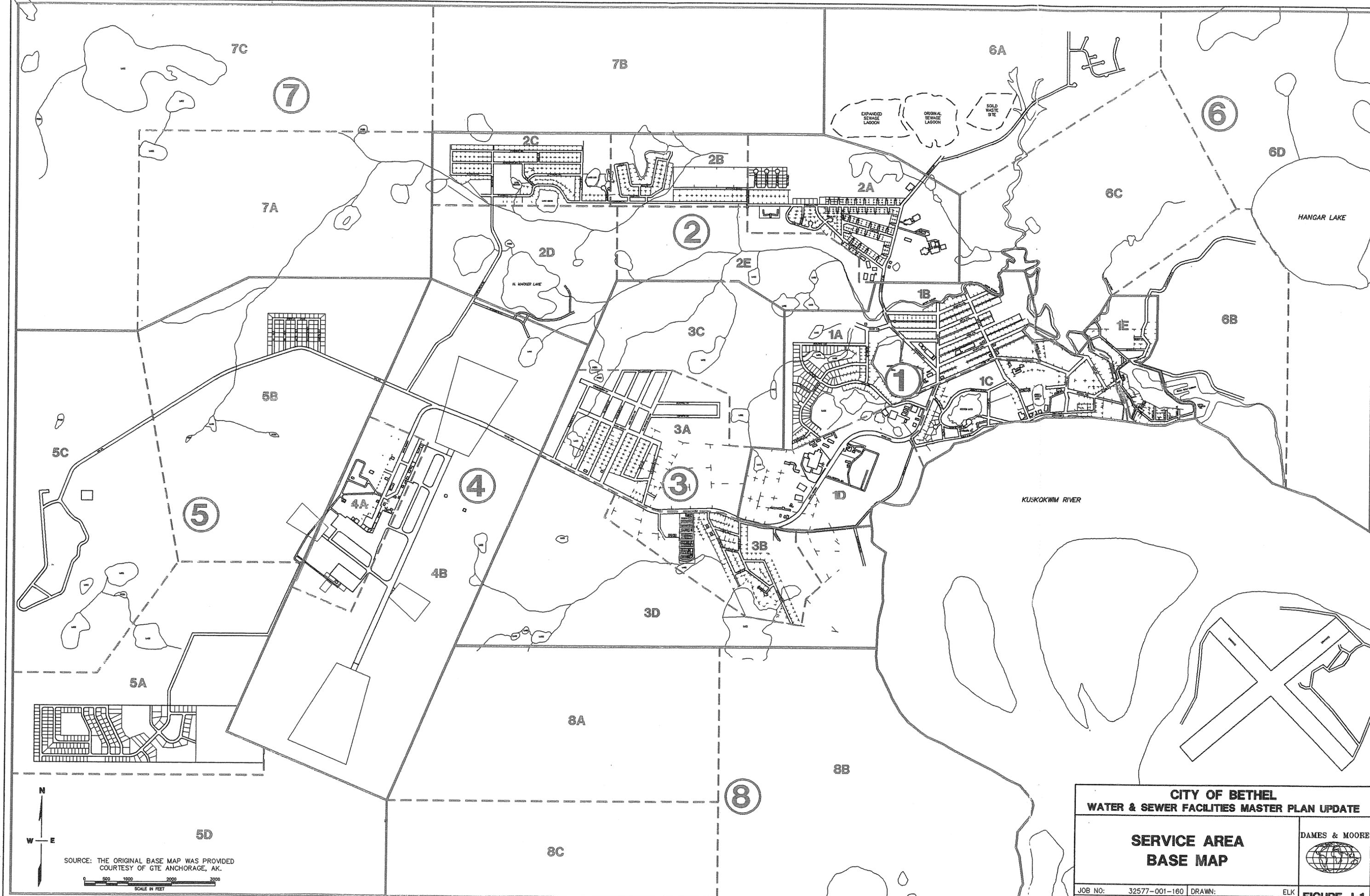
CRW
ENGINEERING GROUP, LLC
 3900 ARCTIC BLVD., SUITE 203
 ANCHORAGE, ALASKA 99503
 PHONE: (907) 562-2522
 FAX: (907) 561-2273

CITY OF BETHEL
 WATER & SEWER FACILITY
 MASTER PLAN UPDATE
 PROPOSED SEWER COLLECTION SYSTEM

REVISION	BY	DATE

Project No.	9641.02
Date	APR 2005
Designed	
Drawn	RLM
Approved	

File: j:\9641.02\CADD\DWG\ProposedSystems.dwg



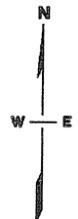
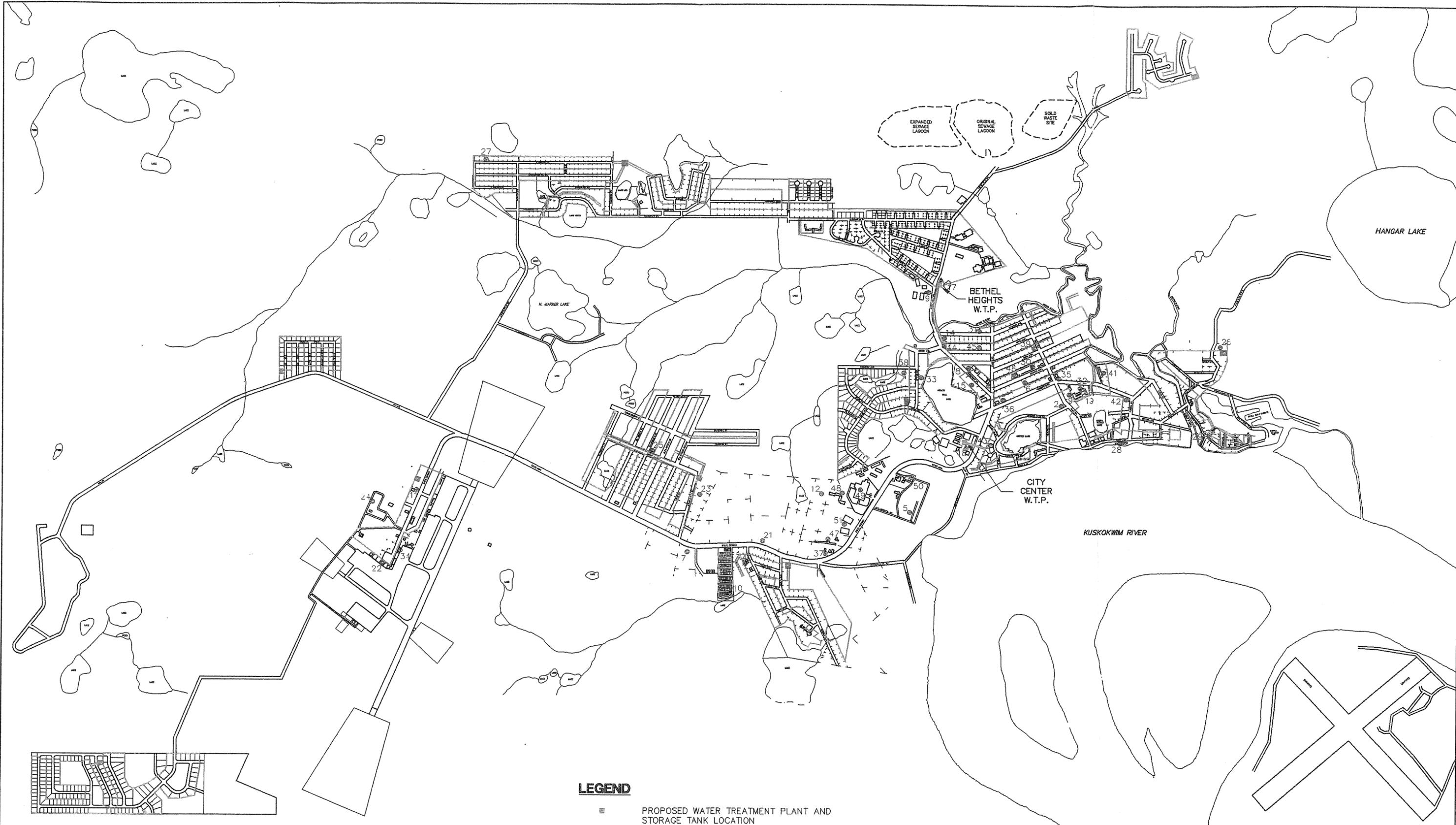
**CITY OF BETHEL
WATER & SEWER FACILITIES MASTER PLAN UPDATE**

SERVICE AREA BASE MAP		
<small>JOB NO: 32577-001-160 DRAWN: ELK DATE: 5 JUNE 1996 FILE: SVC-AREA.DWG</small>		

FIGURE J-1

SOURCE: THE ORIGINAL BASE MAP WAS PROVIDED
COURTESY OF GTE ANCHORAGE, AK.





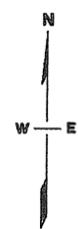
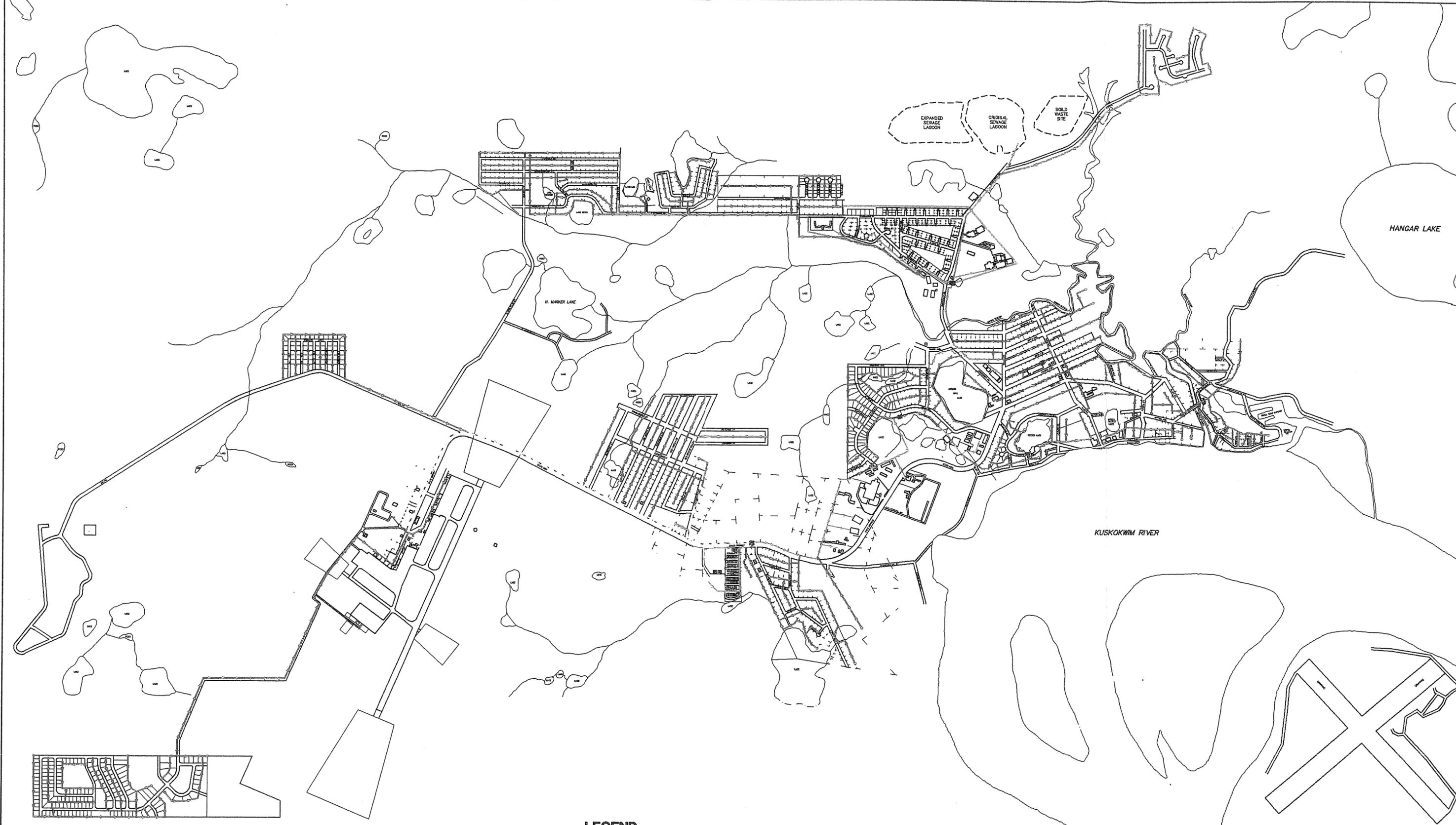
0 500 1000 2000 3000
SCALE IN FEET

SOURCE: THE ORIGINAL BASE MAP WAS PROVIDED COURTESY OF GTE ANCHORAGE, AK.

LEGEND

-  PROPOSED WATER TREATMENT PLANT AND STORAGE TANK LOCATION
-  PROPOSED WATER LINE
-  EXISTING WATER TREATMENT PLANT AND STORAGE TANK LOCATION
-  AREA OF EXISTING PIPED WATER SERVICE PROVIDED BY THE CITY OF BETHEL
-  EXISTING PRIVATE WATER WELL (SEE TABLE 2 FOR OWNER, LOCATION, CLASS, AND STATUS)
-  EXISTING CITY OWNED WATER WELL (SEE TABLE 2 FOR LOCATION, CLASS, AND STATUS)

CITY OF BETHEL			
WATER & SEWER FACILITIES MASTER PLAN UPDATE			
PIPED WATER DISTRIBUTION SYSTEM			
JOB NO:	32577-001-160	DRAWN:	ELK
DATE:	5 JUNE 1996	FILE:	WATER.DWG
			FIGURE K-1



0 500 1000 2000 3000
SCALE IN FEET

SOURCE: THE ORIGINAL BASE MAP WAS PROVIDED COURTESY OF GTE ANCHORAGE, AK.

LEGEND

- PROPOSED SEWER LINE
- - - FAA SEWER LINE (1996 CONSTRUCTION)
- EXISTING SEWER LINE
- EXISTING LIFT STATION
- AREA OF EXISTING PIPED SEWER SERVICES PROVIDED BY THE CITY OF BETHEL

**CITY OF BETHEL
WATER & SEWER FACILITIES MASTER PLAN UPDATE**

**PIPED SEWER
COLLECTION SYSTEM**



JOB NO: 32577-001-160 DRAWN: ELK
DATE: 5 JUNE 1996 FILE: SEWER.DWG

FIGURE K-2

Appendix A

Community Resolution Accepting Master Plan Update

Introduced by: Bob Herron, City
Manager
Date: April 26, 2005
Action: Passed
Vote: 7-0

CITY OF BETHEL, ALASKA

Resolution #05-15

A RESOLUTION BY THE BETHEL CITY COUNCIL TO ACCEPT THE BETHEL WATER AND SEWER FACILITIES MASTER PLAN UPDATE, APRIL 2005.

WHEREAS, the Bethel City Council, is the governing body of the City of Bethel, Alaska, hereinafter called the City; and

WHEREAS, the Bethel City Council desires to apply for grant funds to provide adequate water and sewer facilities for the City from the State of Alaska, Department of Environmental Conservation, Village Safe Water Capital Improvement Program; as well as the Alaska Native Tribal Health Consortium, Department of Environmental Health and Engineering, Sanitation Deficiency System; and

WHEREAS, a water and sewer facilities master plan prepared for the City, approved by the governing body of the City, is required to apply for said grant funds; and

WHEREAS, the City has contracted with CRW Engineering Group, LLC to assist the City in preparing the Bethel Water and Sewer Facilities Master Plan Update, April 2005, which was presented to the Bethel City Council on April 12, 2005; and

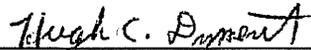
WHEREAS, the Bethel Water and Sewer Facilities Master Plan Update, April 2005, outlines a water and sewer improvement development plan that is recommended by the City of Bethel Public Works Committee and the Finance Committee; therefore be it

NOW, THEREFORE, BE IT RESOLVED THAT the Bethel City Council hereby approves and accepts the Bethel Water and Sewer Facilities Master Plan Update, April 2005 as presented by CRW Engineering Group, LLC; be it further

NOW, THEREFORE, BE IT FURTHER RESOLVED THAT the Bethel City Council makes the water and sewer development strategy, for the first \$30 million dollars of proposed projects, as presented in the Bethel Water and Sewer Facilities Master Plan Update, April 2005 the highest priority.

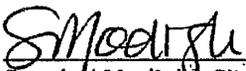
Introduced by: Bob Herron, City
Manager
Date: April 26, 2005
Action: Passed
Vote: 7-0

PASSED AND APPROVED THIS 26th DAY OF APRIL 2005, BY A UNANMIOUS VOTE.



Hugh Dymont, Mayor

ATTEST:



Sandra Modigh, City Clerk

Appendix B

Community Survey Results

Public Comments

March 29, 2005 Presentation

Trip/Meeting Reports

Community Survey Results

City of Bethel
Water & Sewer Facilities Master Plan Update

COMMUNITY WATER AND SEWER QUESTIONNAIRE

July 2004

The City of Bethel, with the assistance of CRW Engineering Group, LLC, are updating the City's water and sewer Master Plan. The purpose of this effort is to address changes in the community and identify necessary changes to future water and sewer improvements. The information collected from this survey will be used to identify current sanitation conditions in the community and the need for future improvements. It is in your benefit to voice your opinion on how Bethel should proceed with water and sewer upgrades. Please take the time to carefully answer each question. Please return the completed survey in the self addressed stamped envelope or turn in the completed questionnaire at the meeting discussed below.

To initiate this upgrade, the City of Bethel has scheduled a public workshop meeting to encourage comments from the entire community. Please plan to attend a **Project Workshop Meeting on August 24, 2004 from 12:00 pm until 5:00 pm** in the **City of Bethel Council Chamber**. The meeting will be an open-house format. Several project staff personnel will be available to take your comments and answer any questions you may have.

Your input is important to the planning process. Thank you for your time.

1. In which "general" area of Bethel do you live?
 Blueberry Subdivision
 Nunvak-Trailer Court area
 Tundra Ridge-Uivug Subdivision area
 Ptarmigan-Tundra North area
 Blueberry Subdivision
 Bethel Heights (ASHA)
 City Subdivision
 "Downtown" Bethel (1st-3rd Avenues, Mission Lake, area)
 "Downtown" Bethel (4th-7th Avenues, Alligator Acres, area)
 East of Brown Slough (small-boat harbor area)
 Larson Subdivision
 Kasayuli Subdivision
 Other (state, federal housing, etc.) _____
2. How long have you lived in Bethel? _____ Years
3. Do you plan to live in Bethel five years from now? Yes No Don't Know
4. Do you live in a trailer, house, duplex, triplex, apartment, or other? _____
5. Do you own the home in which you live? Yes No
6. How many people live in your home? _____

7. Check all fixtures/appliances that you have

- | | |
|---|---|
| <input type="checkbox"/> Kitchen sink | <input type="checkbox"/> Washing machine |
| <input type="checkbox"/> Garbage Disposal | <input type="checkbox"/> Toilet |
| <input type="checkbox"/> Dishwasher | <input type="checkbox"/> Hot water heater |
| <input type="checkbox"/> Tub/Shower | <input type="checkbox"/> Other _____ |
| <input type="checkbox"/> Bathroom sink | |

8. How do you get you water?

- _____ Piped water
_____ Truck delivery (describe your water system and delivery system below)
_____ Private well
_____ Other (explain) _____

Storage tank capacity: _____ gallons

Service connection location: Inside Outside

Is water delivered on a regular scheduled basis, or do you call when service is required?

- Regular scheduled basis
 Call when service is required

How often is water delivered to your home? _____

9. On average, how much water does your household use per week?

- | | |
|---|---|
| <input type="checkbox"/> Less than 50 gallons | <input type="checkbox"/> 301 to 500 gallons |
| <input type="checkbox"/> 51 to 100 gallons | <input type="checkbox"/> 501 to 1,000 gallons |
| <input type="checkbox"/> 101 to 200 gallons | <input type="checkbox"/> Greater than 1,000 gallons |
| <input type="checkbox"/> 201 to 300 gallons | <input type="checkbox"/> Un-metered piped water |

10. How would you rate the quality of water service provided by the City?

- Poor Fair Good Very good Service not provided

What improvements would you like to see? What problems with the water service would you like to mention? _____

11. How do you dispose of your wastewater?

- _____ Piped sewer
_____ Truck haul (describe your holding tank and schedule for pickup below)
_____ Pit privy
_____ Other (explain) _____

Holding tank capacity: _____ gallons

Service connection location: Inside Outside

Is wastewater picked up on a regular scheduled basis, or do you call when

service is required?

- Regular scheduled basis Call when service is required

How often is wastewater picked up to your home? _____

12. On average, how much wastewater does your household generate each week?

- | | |
|---|---|
| <input type="checkbox"/> Less than 50 gallons | <input type="checkbox"/> 301 to 500 gallons |
| <input type="checkbox"/> 51 to 100 gallons | <input type="checkbox"/> 501 to 1,000 gallons |
| <input type="checkbox"/> 101 to 200 gallons | <input type="checkbox"/> Greater than 1,000 gallons |
| <input type="checkbox"/> 201 to 300 gallons | <input type="checkbox"/> Un-metered piped water |

13. How would you rate the quality of wastewater service provided by the City?

- Poor Fair Good Very good Service not provided

Any problems with the water service you would like to mention? What improvements would you like to see? _____

14. Are you aware of the City Ordinance that prohibits the discharge of grey water (wastewater excluding toilet waste) to the ground surface?

- Yes No

15. How much do you currently pay for water services?

- | | |
|---|--|
| <input type="checkbox"/> Less than \$50/month | <input type="checkbox"/> \$201 to \$250/month |
| <input type="checkbox"/> \$51 to \$100/month | <input type="checkbox"/> \$251 to \$300/month |
| <input type="checkbox"/> \$101 to \$150/month | <input type="checkbox"/> \$301 to \$350/month |
| <input type="checkbox"/> \$151 to \$200/month | <input type="checkbox"/> More than \$350/month |

How much do you currently pay for sewer services?

- | | |
|---|--|
| <input type="checkbox"/> Less than \$50/month | <input type="checkbox"/> 201 to \$250/month |
| <input type="checkbox"/> \$51 to \$100/month | <input type="checkbox"/> \$251 to \$300/month |
| <input type="checkbox"/> \$101 to \$150/month | <input type="checkbox"/> \$301 to \$350/month |
| <input type="checkbox"/> \$151 to \$200/month | <input type="checkbox"/> More than \$350/month |

16. Do you understand how the current water and sewer rates were established?

- Yes No

17. Do you feel that the current water and sewer rates are fair? (Please explain)

18. The City plans to replace the current truck haul water and sewer system with an above grade piped water and sewer system. Do you agree with this approach? (Please explain?) _____

19. The construction of new facilities to expand the current water and sewer systems and improve water quality will result in additional costs that may need to be passed on to the consumer. Should this become necessary would you be able and willing to pay a monthly fee for water and sewer service? Yes No

If yes, what would you consider as a fair price for this service? _____ /month.

What, if any, concerns do you have about future water & sewer system improvements?

21. Would you be willing to provide utility easements across your property for construction, operation and maintenance of water and sewer improvements?

22. Please list any other comments you would like to make.

THANK YOU FOR YOUR TIME AND INPUT

CITY OF BETHEL
COMMUNITY WATER AND SEWER QUESTIONNAIRE: SUMMARY OF COMMENTS

Survey Number	What improvements would you like to see? What problems with the water service would you like to mention?	Any problems with the waste water service you would like to mention? What improvements would you like to see?	Are you aware of the City Ordinance that prohibits the discharge of grey water (wastewater excluding toilet waste) to the ground surface?	Do you understand how the current water and sewer rates were established?	Do you feel that the current water and sewer rates are fair?	The City plans to replace the current truck haul water and sewer system with an above grade piped system. Do you agree with this approach?	The construction of new facilities to expand the current system may result in additional cost to the consumer. Would you be able and willing to pay a monthly fee for this service? How much would you be willing to pay?	Concerns about future W & S improvements.	Would you be willing to provide utility easements across your property for construction, operation, and maintenance of water and sewer improvements?	Other Comments
24	I would like to see all water measure, metered. We would like to know if we got water. We get a note if we don't get water but we don't get a note if we do. We wonder sometimes.	None.	Yes.	No.	No. The people in the city sub have big increases in their electric bill due to the new system. Some people pay for water as they use it. Other people have "unlimited" or unmeasured water. Not equitable.	No. The aboveground system looks terrible and impedes use of property. The new kind appears to cause a high customer electric bill. This did not occur in the Bethel Heights or hospital housing. Those customers do not have increased electric bills.	No	It appears that the new system is not energy efficient. This should be very important because the incomes of the population of Bethel. Bethel is the most expensive place to live in Alaska, energy wise.	Of course if we have to, but we don't like it.	29 years ago in my college environmental biology class my professor told us of 4 types of water management. 1) dumping raw sewage into rivers 2) treating the sewage with bacteria and other microorganisms to make the material inert then putting it into streams. 3) one I cannot recall 4) Turn the waste into fertilizer and sell it. In the process the heat given off from the process is used. Which management mode do we use?
25			Yes.	No.	Costs seem high.	Costs first please.	Yes, \$100/month	Probable cost.	Yes.	If it costs more, not interested.
26	Sometimes chlorine is so strong it stings our eyes everywhere in the house. It's not consistent.		Yes.	No.	I wish it was metered to reflect actual usage. I also don't like that we can no longer have temporary stops while away from home. High chance of spillage when filling a full tank, waste of time (yours), money (mine), and I have old water when coming back!	I have strong reservations! 1) Appearance - makes Bethel look like an oil refinery. 2) No confidence in durability - ability to withstand major cold spells and function over the long haul. Seems "thrown together". 3) Expense - major electrical expense of poorly installed heat tape, grinding pumps. 4) Encourage water waste - sewer lagoon won't handle it.	Yes. This is hard to say; depends on what we get for it.	I have great concerns about our sewer lagoon. Piped water will increase load. We need a sewer treatment plant but how can we afford it?	If it's done with sensitivity to appearance and effect on property usage. I don't want to live in a box i.e. housing.	Look at sewer treatment: We're increasing load tremendously. Don't make "improvements" while sacrificing after things that are important.
27	None, except the workers that piped the water line/ sewer line did not complete the pipe work. Metal is gapped open and not secured with anything.		Yes.	Yes.	Very fair except w/ problems this winter when the water line kept freezing up. Electricity bill doubled, or more. That we weren't happy about. 5 - 6 trip work for the city.		No.	Freeze ups on lines and if the city isn't willing to come to help w/ the problem. It's difficult to find people who know how to fix freezing lines.	Yes, it's already been done.	Go back and read #19 & #10. I hope you will plan on having complete and thorough inspections that CRW did on each property line before freeze up.
28	Piped water.		Yes.	Yes.	No, water should be metered and everyone pay the same per gallon.	No, they should be part below grade.	No, the fee is already overly high.	Put them below grade.	Only if below grade.	
29	The billing portion of all city charges are not itemized. There are often errors in their billing.		Yes.	No.	Unknown.	I will still need water trucked to the boats, unless there is water service at the city dock, petro port, and seawall.	Already pay monthly.		Yukon Fuel owns the property.	The current system obviously requires upgrade. Any upgrade that would benefit the local community would also benefit YBL. Access to water at the docks 24 hrs a day would be a great help. The shore side facilities are currently adequate. We pay for garbage removal, which works well. The current charges for water & delivery are \$0.16 per gallon. I don't know how much higher the local populace will tolerate.
30	Less silt in delivered water. Less scale in delivered water.		No.	No.	No basis to determine. I can guess/know how I would do it.	No, above grade pipes are UGLY, & COSTS WILL INCREASE, & water quality and reliability will decrease.	No.	Costs too much. Sometimes it will not work and water will not be available.	Absolutely NOT.	Don't do it. I would rather pay more to improve and maintain <u>existing hauled water system</u> . E.g., more haul trucks, better water filtration, garage/improvements for haul trucks. I would pay up to \$100 a month <u>more</u> for this.
31		City does not let you know schedule dates. With no notice tanks freeze and can not be pumped.	Yes.	Yes - by council.	Too damned high.	It is going to be too damned expensive for low income and retired people.	No.	Getting more and more expensive. Seems like you are trying to run off all us old time residents who can not afford to pay.	No.	We were better off in Bethel before outsiders started in and want to change everything.

CITY OF BETHEL
COMMUNITY WATER AND SEWER QUESTIONNAIRE: SUMMARY OF COMMENTS

Survey Number	What improvements would you like to see? What problems with the water service would you like to mention?	Any problems with the waste water service you would like to mention? What improvements would you like to see?	Are you aware of the City Ordinance that prohibits the discharge of grey water (wastewater excluding toilet waste) to the ground surface?	Do you understand how the current water and sewer rates were established?	Do you feel that the current water and sewer rates are fair?	The City plans to replace the current truck haul water and sewer system with an above grade piped system. Do you agree with this approach?	The construction of new facilities to expand the current system may result in additional cost to the consumer. Would you be able and willing to pay a monthly fee for this service? How much would you be willing to pay?	Concerns about future W & S improvements.	Would you be willing to provide utility easements across your property for construction, operation, and maintenance of water and sewer improvements?	Other Comments
32	Water & sewer people do not get the budget they need to keep a steady work force to do needed maintenance & repair & to purchase new equipment.	See water comments.	Yes.	No.	Too high.	No.	No.	Water quality will not improve - those currently on piped water have lousy quality - can't even wash clothes without getting iron in clothes. Cost per dwelling totally out of line. Too high.	No.	Original cost per housing unit in excess of cost of house in many cases; city will not be able to provide needed maintenance over the years. Water quality will decline AND those above ground pipes are totally ugly - unsightly.
33	Running water & sewer.	Continues running water & sewer. I hope.	Yes.	No.	Not too fair.	If this system is cheaper than we're having now, I agree.	Yes, \$100/month	Don't know.	Yes.	Don't know.
34			Yes.	No.	No, I get charged for 900 gallons but usually use less.	NO - My observation is that it cost more, 3 or 4 units are on one bill (I may conserve water while my neighbor uses much more - then the bill is avg'd between us - not fair), electricity costs rises, pump runs all winter, I have to pay for line or pump rprs., equipment to run unit takes up room in my home, I just spent almost \$1,000 upgrading my current system for winter operation, impedes on property.	No.	The city puts the cart before the horse.	No.	I would like a report on how the present utility system (newly installed in city sub) is working, costs to owner, satisfaction report from those residents.
35			Yes.	No.	Yes - they were ridiculously higher when we first started getting piped water - we can live with the set rate.	Yes - it is so much more healthy.	No.		No.	
36	Trucks honking in the morning expecting people to run out and move their vehicles instead of pulling their hose.	Same as other.	Yes.	Yes.	Yes.	No, it doesn't look good. But I do understand the benefits.	Yes - ?	Cost. Appearance.	No.	
37			Yes.	Yes.	No. YKHC, FAA, Trailer Court, Fish & Game, BNC, ONC should be paying their fair share instead of passing all the increases to the people.	No. Sewer lagoon only so big. On truck haul you only have what you have in your tank.	No.	If the current billing system is not revamped to equal out the payment of the people vs. government & business water sewer will be deeper in the hole.	No.	Quit stealing from the people.
38	Eliminate extra high electricity costs during winter months.		Yes.	No.	Probably fair.	Yes.	No. Not more than I already pay.	Everything is on top of the ground spoiling the environment.	Already done.	
39			Yes.	No.	A little too high, but I'm not complaining.	Yes.	Depends. Don't know.	Higher water bills	Yes.	To me (and the truth) the people will just do what they want no matter what we say.
40	Would prefer piped water.	Piped sewer.	Yes.	No.	Too high.	Yes.	Yes, \$50/month	Why is it in certain areas of town water/sewer prices are so high? In some areas water is very brown, makes our white clothes colored.	Need to ask Fix-It Rentals - Krieders.	
41			Yes.	No.	Don't know, unsure what regular rate is.	Yes, don't have to worry about running out of water or sewer tank overflow.	Yes, \$50/month	\$\$\$\$\$\$\$\$\$\$\$\$	Not my property.	
42			Yes.	Yes.	Yes, I work for the city and it's discounted.	Yes, much more convenient.	Yes - ?	There are still households in Bethel without water & sewer hookup. This is very unsanitary!	Yes, if reasonable.	
43	Unlimited water for the whole town.		No.	No.	Too expensive.	Yes.	Yes, \$100/month		Yes.	

CITY OF BETHEL
COMMUNITY WATER AND SEWER QUESTIONNAIRE: SUMMARY OF COMMENTS

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44			Yes.		No I feel we pay too much.	I will agree if it brings the price down.	Yes, \$100/month.	If the cost gets too high and the electrical bill keeps going up. We wouldn't be able to pay for our house or other utilities in the house.	As long as it doesn't go through my front land.	With hooking up to the water sewer system the cost should go down because there should be any or too much water once on them also we wouldn't have to pay for delivery as I pay \$180 a month now and almost not more for elec. To keep my water heated that makes it \$400.00 a month just on utilities alone.
45	Satisfied with the services. Problem?: every time when I'm a little late with the service payment (I always pay on time but Post Office delivery is erratic) I receive threatening letters that our service will be stopped.	Satisfied with service. Problem? Once again, when I'm a little late with service payment - see #10.	Yes.	No.	No. They are too high.	Not in the area where I live.	No.	The continuing expansion of customers base without financial input from the subdivisions who cause the city to incur greater financial expense to provide basic services.	No. Our lot is too small.	
46			No.	No.	No.	Yes.	Yes, \$150/month.	COST	Yes.	
47	Too expensive, taste bad.	Lower price.		No.	Too expensive.	If it is cheaper and better quality.	Yes, \$150/month	The price will go up and the water will get worse.	Maybe.	
48	Clean clear water. Rust water - rust dishes - can't drink the water - taste like hell and makes our clothes look like a baby pee on them. Water sucks in Ptarmigan-Tundra.	The toilet is rust color.	Yes.	No.	They're not fair cause we're getting rust water to wash up - wash clothes - wash dishes - your water sucks!	NO COMMIT	No.		Yes.	
49	Pay by the gallon, Pick "Nozzle" UP DO NOT DRAG it through all the "crap - etc" on the ground!!!	Need written info for driver for each residence as to how it needs to be evac'd. i.e. extra long tank lines need to be vac'd dry to prevent spills, keep "suction pumps" repaired -- too much filthy smoke -- health hazard! Constant oil and coolant leaks -- they do <u>add up</u> to a large spill!	Yes.	No.	No, do not get <u>FULL</u> gallons. At the rate now, pay by the gallon. Why is Swg. rated by tank size that is larger (by code + 150 gal.?) and you can't put any more in it than your water tank holds -- <u>not at all fair!</u> It's larger just because the "suck-truck" may/not make it that day and extra water (if delivered) would overflow it.	No. Not for Alder St. areas -- in flood plane & not feasible.	Need far more info first to decide on this!	N/A	N/A	
50										
51	Will be happy when the piped water and sewer is on line soon.	Can't wait for city - sub to be on line soon.	Yes.	Yes.	Being a city employee, we have a set rate which I think is fair.	Yes, I'm going to like it. No more ware & tare on my driveway.	Yes, same as now.	Make sure it does not freeze up in winter or the pipes do not break from ground shifting.	Yes.	None.
52	Better regular communication about what's going on with the system.		Yes.	Yes.	No.	Yes.	Yes, \$100/month		Yes.	We were told there would be a decrease in charges with piped H2O.
53			Yes.	No.	Certainly are high - however, understand the city has only limited areas to collect revenue.	Direct burial or below grade utilities is preferred.	Yes, \$130/month	Considering construction costs are not born by the city, piped water & sewer is a <u>savings</u> to the city vs. hauled water/sewer.	Possibly.	
54	Not charge \$100+ to come back & fill it if ice problem etc. Charge \$25 - small amt. Delivery man does not always follow hand written instructions clearly posted - e.g. fill water barrels to the top.	Be friendly when making deliveries; interact with homeowners/renters.	No.	No.	No. Piped people pay less. No choice who gets hooked up first. Not a fair system. Weed a per gallon charge to be same for all residents.	Yes. Cheaper & readily available supply of water. I wish city could bury the pipes.	Yes, already do. \$60/month	The number of housing units is increasing faster than the city's ability to hook units up to piped water/sewer. Cost is only going up, not down.	Yes, can I pay extra to have pipes go underground, which would improve my real estate value?	We need to hook people up to piped water/sewer faster with large enough pipes to handle jobs. Repair and reinsulate existing pipes so they function properly and look nice. Rip out old pipes not in use - don't leave them there as a hazard.

CITY OF BETHEL
COMMUNITY WATER AND SEWER QUESTIONNAIRE: SUMMARY OF COMMENTS

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55			Yes.	No.	Fair for now.	If it doesn't cost too much more than what we pay now.	No.	How much more it will cost us is a concern for older fixed income retirees.	No, not unless we know where and it doesn't spoil our property.	
56	Leave it the way it is.	No problems.	Yes.	No.	OK.	I agree.	Yes, \$100/month.	No concerns.	No.	No comm.
57	Better water quality.	None.	Yes.	No.	No, I have a friend that's getting 1,000 gallons once a week and only paying \$170 a month. I'm paying \$260 a month for 800 gallons once a week.	Yes, it would be less of a hassle.	No, no more than what we're paying.		Yes.	The prices for water and sewer are so high. How would struggling families pay for higher rates for sewer & water & then get fined for not being able to afford these services? By using honey buckets and dumping them where ever.
58			No.	No.	Very expensive - I guess they are fair.	I don't know - the piped water I've seen looks yellow, like someone peed in it.	Yes, \$150/month		Yes.	
59			Yes.	No.						
60			Yes.	No.	Getting a senior discount, yes.	No - know people on piped water. Their water is unusable for cooking or drinking. Haul own water for cooking/drinking.	No.	Water may be unusable for cooking/drinking.	Yes, with reservations. See #22	Who would be financially responsible for major repairs to pipes? If there is a sewage discharge or spill on my land, who will be responsible for cleaning it?
61			Yes.	No.	Yes.	No, too many exposed pipes cutting off access to peoples property.	No.		No.	Live on BIA hill and will probably not see piped water & sewer for a long time.
62	You cannot drink the water, it turns every thing brown, ruins fixtures.		Yes.	No.	Yes, if the water was drinkable, about the only thing we do with it is toilet, shower, and wash clothes. You cannot cook with it.		Improve - Yes.		I already do.	I don't really know how much I pay for water services because the city is raising the rates by 50%.
63			Yes.	No.	Don't know.	No.	Yes, \$50/month	Clean water.	Don't know.	
64	Unfortunately & probably unavoidable - driveway destruction due to large tires on trucks.	Same as w/ water.	Yes. Common knowledge.	No. Never asked about it.	Don't have anything to compare to. Seem high.	Would help w/ delivery & destruction to driveways from big wheels on trucks. If it could keep quality of water good (i.e. no rust, etc.). Have to <u>guarantee</u> against freeze-ups!	Yes. Whatever the water costs to produce (less all manpower needed for deliveries). Nothing more than what I pay now though. Shouldn't be a "forever" charge though.	Maintenance of pipes & quality of water.	No - they've taken too much already! Work w/ what you have.	Thanks for asking before implementing.
65			Yes.	No.	We just have piped sewage.	Yes, piped service will cost less in the long run. The city needs to clear up their accounting system so they can tell us what it costs to make water then deliver it to each significant area of Bethel. Perform maintenance on the trucks etc.	Yes. 1-2 cents per gallon	Total cost amount consistent for the entire town.	Yes.	I would like to see a piped water system to the jail facility. I would most likely be a wash cost wise but I would not have to baby-sit the treatment system on a daily basis. The city needs to determine what it costs to make water at the plant. The city needs to determine what it costs to deliver and pipe deliver that water to the customer. Perform the same analysis for sewage services then choose accordingly and adjust to be fair to all customers. JKohl
66	Metered water on trucks. Pay for what you use. Think it is ridiculous to pay for water when were on vacation. I shouldn't cost more to have it delivered.		No.	No.		No. UGLY. Makes Bethel look ugly and obviously doesn't work very well considering city subs problems. More expensive, more problems and freezing pipes. Increased electricity bills.	Yes. \$10/month		NO	Maybe figure out how to improve city subs problems before doing water throughout Bethel. Why not underground pipes like barrow?

CITY OF BETHEL
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67	Occasional missed delivery- overall service is satisfactory	None.	Yes.	No.	As fair as can be expected. The smaller the tanks the higher the cost because deliveries are more frequent.	Its necessary to save money and inevitable. Truck haul is simpler for the homeowner. I agree with this approach as long as its well designed and works consistently in our environment.	Yes. \$50-\$100/month. Or metered system based on actual water usage.	Lack of adequate funding to complete construction and pay for maintenance/operations.	Yes- If I am paid for the easement.	Improve communication & information dissemination between the homeowners.
68			Yes.	No.	Both rates are too high.	Yes.	No.	Consumer Cost	Yes	Give elders more of a break on their total bill.
69			Yes.	No.		No because it will increase bills. Truck haul is better, and it will help keep rust away.	No.	No.	No comment.	Done like pipe water it will build up more rust. Truck haul is better.
70	We have had to buy lots of water filters and bottled water. The water is rusty and smells bad, the clothes get ruined, yellow even colors get ruined.		Yes.	No.	No- Because we can drink the water and the clothes get ruined when dishes get rusty. We have to buy bottled water for drinking and cooking and pitcher filters.	It might be good if the water wasn't bad.	Yes. \$80/month.	If they get us good water and we don't have to spend extra money for pitcher and tap filters and bottled water for drinking, washing and cooking..	Yes.	We need good water for the price we pay. We get sick when we try to drink the water from tap- we run out of money before the end of the month to buy water from the store.
71	I'd like to first see metered water delivery and then metered piped water.		Yes.	Yes.	No. Hauled water is subsidizing piped systems. Housing development further from town center aren't paying real costs. Piped customers are getting unlimited water at cheap rates and hauled customers are paying for water they don't use.	Yes- but first meters on trucks and water districts.	Yes. \$300/month	The original design that had electrical trace on the new pipes was a disaster.	Yes.	The city council has been handling this difficult situation admirably. We must go to a metered system and water districts!
72	Sometimes the water delivery is brown but most of the time good water delivery.	I'm very satisfied with this service. They do come back later whenever the tank is broken. It happened once, I mean the tank froze up.	Yes.	Yes.	Yes! I have do dissatisfaction with services at present. Just hate it at winter time. Its only my worry not to have frozen tank.	Yes. That really a tall order there's so many houses to cover. But if its done it would be wonderful.	Yes. Not sure/month.	I'm concerned about the cost. Every time we have an improvement with a them it costs land that is not covered by state revenues we suffer. Now more than ever since the state money oil monies not acquiring lots in order to provide adequate amount of money to maintain the whole state revenues in cities.		Everywhere in USA our money/economy seems to be heading to depression/inflation into deficit in fact; more deficit outlook in improvements in near future is impossible to do.
73			Yes.	No.	Don't know.	So long as I do not have high electric bills as is occurring in city sub where there is now piped water.	It depends	Increased costs	unsure.	
74	I would like to see the city back away from the idea that all of Bethel is going to be on piped water and sewer some day. It would be nice if someone woke up a and realized that the roads are the main delivery vehicle for water and sewage disposal. This whole master plan idea is so far-fetched!!!! I cant believe anybody buys into it.	I hope you guys working on the city sub water and sewer pipes let us know the costs per house for putting that system in place. Its shameful how money were spent putting a system in place where the majority of the people did not want it and the cost per household is extremely high. Let's hear some numbers on cost per house come out of this survey.		No. They're a mystery to me.	What an absurd statement to make. If you're on piped water you can wash cars, water gardens, dust control etc,etc,etc. For like \$120 a month I get my measly 500 gal a week for 180 a month. Does that found fair you know we all feel out of the same through and we should be treated fairly.	The way this town is built in a sprawling fashion its unreasonable to expect that the hundreds of millions of dollars that it would take for piped services is going to be available. When uncle Ted moves on funding levels are going to be nowhere near their current levels.	No. We pay plenty now for the amount we receive.	My biggest concern is that all moneys are going to go for piped services. Why are there not wells located in strategic areas around town to cut down on how far trucks have to go. Build sewer lines with dump station from the far-flung regions of town.	Spend some money on gravel and realize that roads are the main delivery vehicle.	

CITY OF BETHEL
COMMUNITY WATER AND SEWER QUESTIONNAIRE: SUMMARY OF COMMENTS

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75			Yes.		Water & sewer rates are too high! My husband & I earn good wages but still feel the pinch. I feel sorry for those less fortunate.	No - I think all the pipes are ugly.	No.		No.	
76		Our service is fine. I'm glad we don't have pipes.	Yes.	Yes.	Unsure-	Not really- ugly. Unclear how reliable, uncertain water quality my overload sewage lagoon, prone to leaks, and spiritually confinement.	yes. I will pay what service costs. I don't want to pay for someone's pipe dreams.		only under contested eminent domain.	I'm glad I moved out of city sub.
77		Costs are too high.	Yes.	Yes.	No- haul and pay. Sub started about more than piped.	Yes- fair pricing.	Yes, 120/month.		No	The water service needs to be privatized.
78			Yes.	No.		yes	No.	Yes I already did that years ago in fact so a sewer pip to go in gravity form across the street.	City sub houses are booked up with denied access to their own hear table and circulation pump snitches. That is substandard. Homeowners and rental tenants can understand how to use those.	
79			Yes.	No.	Do not change them they are fair.	No- we are in a flood plain area	Yes, 51/month		cant do that	
80			Yes.	No.	Fair, I get service twice a month and it's ok.		Yes 72/month		No lot is too small and it is a restricted native allotment	
81	Water quality.		Yes.	No.	Yes.	Yes	we pay a monthly fee now - \$130		Already have	No discounts for city employees
82	Cleaner water, rust and scale particles.		No.	No.	Yes, I believe they are for what it costs to run water and sewer service. Plus wages for the city employees.	Yes I do agree. The city should have done this years ago when this subdivision was in the planning.	Yes 200/month	Why would the city go with an electric heating system for piped water. And not a hear loop system and has the city looked at other heating alternatives for piped water?	Yes	None
83	A little more pure.		No.	Yes.	HELL NO!!! I never been to a city when water is so damn expensive!!! Its one of the main reasons why I plan to leave Bethel!	Yes! No person should ever have to worry about running out of water.	yes \$30/month	Quality of pipe! Cheap pipes mean future rust!		
84	Better quality of water.		Yes.	No.	No water should be metered if we are gone for several days less water is used and still pay for a full fill up.	Yes with better quality of water	no	City should have done improvements many years ago.	Only if city is agreed to a monetary easement fee.	City has poor water quality.
85	New plastic pipes brown rusty film left on everything from sinks toilets and clothes.	Suction is too much during the winter hours. Sucking cold air into vent freezing it up then sucking all out drain water out to get air which starts it to stink in house.	Yes.	No.	Yes and No. Rates are fine but water sucks.	yes	Already do.	what about burying the pipes?	already have them	Just the color and taste of the water it's great if you want to color your clothes rust.
86			Yes.	No.	No. Rates billed should be based on metered water charges.	yes	Yes, 300/month	Costs will be so high it would be better to go back to honey buckets	Yes	Truck haul rates should be based on actual water/sewer usage.
87	The cost is too high!!		No.	No.	No they are extremely high in comparison to the rest of the USA.	Yes if it decreases to cost.	No.	If the cost is going to be even greater than it is now, what exactly are the benefits?	Not if its going to look like the underground of a city. Id rather have trucked service.	Its 2004, There's got to be a more affordable what to provide water/sewer services.
88			Yes.	Yes.	No too expensive.	yes if its is cheaper	No.		yes	Design systems so that it would be cheaper.
89		There have been times they haven't emptied the tank and it has overflowed. Yuck.	No.	No.	No the quality of the water is poor for the price we pay.	yes.	Yes. ?/month	Will the pipes free in the winter?	Sure	

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90			Yes.	No.	Water/sewer rates continue to rest b/c the city needs more ways to generate revenues.	Don't want it, have talked to many others in town who hate it and not only does it cost them for water and sewer, their electric bill has sky rocketed to boot.	No		No They need to find a way to run the same ground pipes or something so as not to clog the yard with pipes.	
91			Yes.	No.	Yes based on communications from city council.	yes but hope that the water will remain as clean/cleaner as it is with the truck haul system.	Yes, 220/month.		Depends upon specifics of the proposal.	Don't at all mind the haul system.
92			Yes.	No.	Yes.	No, change of broken pips frozen pipes, destroy landscape. Discharge of grey water if pipes break freeze etc.	No		NO	
93	More filtration before delivery.		Yes.	No.		I need to study future rates and the feasibility as they come out.				
94			Yes.	NO.		Yes	yes. 150/month			
95			No.	No.			No.			
96	I want an unlimited water line.		Yes.	No.	NO!!	Yes. I'd love to have piped water.	Yes, \$300/month		yes	
97	Expense- frozen pipes are very inconvenient.	Expenses.	Yes.	No.		need more information		Expense, purity , will the pipes freeze or break? Management?		I think that it's important for residents to have as much information as possible about proposed changes. I'd certainly appreciate it.
98	Water to be clear.			No.	No and they are going up again.		yes			If we could have clean water so out things weren't so stained
99	Quality of water is poor instead of the sewer tank being emptied.	The sewer tank was not emptied and caused an overflow.	Yes.	No.	No- those that have piped water use much more water tank we who have it delivered but they pay much less.	Yes- but I fear that the quality of the water would be much worse than it is now. At least now out water has time to settle before my whites get put in the wash.	No.	I already pay too much for very little.	Yes	
100	My white and bright clothing are all yellow from the washing.	Clearer water, there's too much chlorine.	No.	No.	No- too high for bad water. My clothes are all discolored.	yes- perhaps if the water were cleaner.	yes. \$75/month.		No.	The bills are too high for bad water. I dispose my own trash and I am billed for it.
101			Yes.	No.	For right now they are . I hope the rates wont go up too high.	No.	No.			
102	They do a pretty good job of delivering water on time, on schedule.		No.	No.	It hasn't gone into effect yet but I hear prices are supposed to go up (by 30%) beginning in Sept. That isn't the best news and I'm not sure where those #'s came from.	Yes I agree. Hauling water and sewer is a headache. I'm sure and I agree as long as it's not expensive (more expensive) and the water quality is as clean as possible.	Yes. \$100/month. For Pure clean water		I think so.	
103		Because they drag the hose on the ground they make a mess and water is all around my yard.	Yes.	Yes.	No b/c I don't use up my water. Don't use 1000 gallons.	Yes	yes, \$100/month.	freezing pipes	as long as they don't mess up too much.	I love my trees and I've worked hard and the city has busted them up twice and never did anything about it.
104			Yes.	No.	Yes.	Sure.	Yes	no room for pipes.	if necessary and able-	
105			Yes.	No.	They're not equitable in that pipe users pay less, but truck service costs the city more, I don't know.	yes	Yes.		I don't think we have a choice.	
106	Lower charges, timely deliveries, improve billing system.		Yes.	No.	No. Much too high. Hard to keep payments especially when we need to call for extra service when out of water.	Yes, this will lower costs tremendously.	yes- \$175/month.	Will these block off trails/ roads used on daily basis? Winter trails?	yes and No. depends on location.	
107			Yes.	Yes.		Yes	yes. \$300/month		Yes	

CITY OF BETHEL
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108	Freeze on winter.		Yes.	Yes.		Yes	yes. \$400/month		yes	
109			Yes.	Yes.			Yes. \$300/month		Yes	
110	Another option: delivery 3 times a month or every 10 days.		Yes.	Yes.	No. Prices go up- wages stay the same.	Yes. It keeps rates down.	Yes, \$120/month.	Can be an eyesore	yes	
111			Yes.	No.		yes	yes		Yes	
112							yes \$100/month			
113										
114	Deliver on scheduled days each month.	Pickup done on scheduled days.	No.	Yes.	Somewhat fair. They are changing with additions of new customers to water/ sewer lines.	yes- but it needs to be subsidized to be affordable to all.	Yes. Less than \$100/month	will delivery price be affordable?		
115		Ask the driver to knock on our door if there is a problem out there.	No.	No.	Yes .	Yes	Yes \$100/month	Blocking the by-paths	Yes!	City of Bethel does excellent work compared to other poor villages who do not have roads.
116		Rusty water.	Yes.	No.		Yes sewer trucks stink.	Yes, \$100/month		If they pay or reduce the price of service too me.	
117			Yes.	Yes.		Yes- But it may be cost prohibitive.	Yes, within reason. \$150/month.		Yes.	
118			Yes.	No.	No/ don't make enough money.	yes, \$50/month				
119			Yes.	No.			Yes. \$80/month		Yes	
120			Yes.	Yes, Stupidity.	NO!	Yes.	NO.			
121			Yes.	Yes.	No- \$150.00 for one 600 gallon water is robbery.	Yes.	Yes. \$75/month	COST, COST, COST	Yes	
122	Clean pipe line.		Yes.	No.	No.	Yes. \$100/month		Yes.		
123								We pay for water that is unsafe to drink, cant wash our whites because it changes the color.	Work on the quality of water we pay for the color of my water is brown.	
124			Yes.	No.	No, Everyone in the city should pay the same per gallon.	Please put them below ground.	only if justified.		Possibly. I prefer them below ground.	
125	Price Lower.		Yes.	No.	No too high.	yes	yes, \$300/month		Yes.	How would it be determined who gets water and sewer first. Or what kind of schedule and could it be buried.
126			Yes.	No.	Yes.	very much	yes, \$150/month	I lease land where my trailer is.	Hurry up and put the pipe system in!	
127			Yes.	No.	I should pay for what I use.	I like, except for the ugly pipes.	yes, \$5/month	ugly pipes	no	
128			Yes.	Yes.	No- Too expensive for the service provided.	yes.	yes, \$150/month		yes	
129			Yes.	Yes.	Yes.	No	No	NO PIPED SYSTEM!!	No	
130	Cleaner, I do not drink or cook with the water.		No.	No.	No. Too high.	yes. Seems easier for all involved.	No.	Water & Sewer costs are too high. Water needs to be better quality.	no	
131	A piped system for all residents.	Service has been more reliable the last few years before that we had short fills of water and were often skipped for sewage evacuation. We were then treated badly when requesting service.	Yes.	No.	No, those who live on the outskirts of town should pay more because of the additional cost to provide service. Those who receive a better service (piped) should pay more for the better level.	Yes.	Not if we already are going to have increases in the next few months.	Cost, cost, cost. Certain areas of town such as Kasayuli seem to be a priority while other parts are not considered important.	yes, within reason.	A fairer billing system which reflects the cost is necessary. Also the time to pay bills is not reasonable, last month I had 8 days between getting the bill and my payment being late.
132	Too rusty most of the time- need new pipes or something to fix the rust problem. Whites are tan from this problem.		Yes.	No.	No- with high costs its frustrating but understandable.	It would be great to change the existing pipes- who knows how much rust is in those pipes.	No.	They need to control the rust problem in Ptarmigan Housing pipes- some days it just gushes out brown water.	If they pay for it.	Like I've been saying - rust problem needs to be fixed.

CITY OF BETHEL
COMMUNITY WATER AND SEWER QUESTIONNAIRE: SUMMARY OF COMMENTS

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133			Yes.	No.	Yes.	Only if I can get a price break as a usage factor.	Yes, \$50/month	If I have to maintain a lift station for water then it would add additional cost to me. I am a senior citizen.	Utility easements now exist with only sewer lines.	
134			Yes.	No.	I am unsure of fairness but they are very expensive.	yes if it doesn't take too much electricity to run it, which may be a greater cost to me.	yes. ?/month	Improvements might be made but the cost of it will be too much for consumers to absorb	possibly, depending on how much is needed	
135	Do not pipe the avenues or old town . Either pipe blueberry or Qugyak-Tundra Ridge next. They are set up better and the houses are north the investment . Put the pipes underground. Remote Tank fill locations- for remote subs.	Remote lift stations for dumping- Airport, Tundra Ridge, Larsons, Kasuyli, etc.	Yes.	Yes.	Hauled customers should not have to pay so much more than piped . Meter the pipes. Do not meter the haul. They are limited on the usage, If they are metered, you'll have trucks running all over town unnecessarily delivering to houses already full.	No, the pipes can be buried in a utility door as in other arctic communities. The cost of piping might not be worth it.	yes, \$200/month	Pipe the newer subs first, the houses are laid out better. It is easier to haul water to the older parts of town. Closer to fill and dump smaller tanks. Pipe Blueberry.	yes.	Work on a better design than the above ground pipes all over the city sub.
136	Water is very dark (brown) in color afraid to buy white clothing any more. Baby gets a rash when washed with city water.		Yes.	No.		Yes because people with tanks pay too much.	Yes. \$50/month	I hope to be able to buy white clothes in the future.	I already have utility pipes all around my house.	
137			Yes.	No.		The government is very good at starting programs that fail when turned over to the public to support.	Yes, \$100/month	I think the cost is prohibitive.	Yes, providing I don't have to go over the lines.	I do not think the water & sewer act passed by congress was well thought out for this country.
138	If they could try and take the iron out of the water because when I wash my whites they turn out yellow. Also, it dry out your skin.		Yes.	Yes.	I think the price we pay for pipe water & sewer is a bit high.	Agree.	Yes, \$90/month	Get the iron out of the water because it harsh on your skin.	Yes.	You have to try and improve the iron in the water. It also taste funny.
139	Change the old pipes so we don't get rusted water or install filter system.		Yes.	No.	No comment.	Yes, above ground seems to be the most reliable.	Yes, already paying \$120/month	Interested to see how the city sub area fine - then we can comment.	Yes, if it ensures in-ground water.	
140			Yes.	No.	No. My water is brown. This causes me to buy harsh cleaning products for my sinks, washer, dish washer, toilet, clothing, etc. It's pretty gross.	Yes, when we had to pay for our water sewer the price was CRAZY. I hope you plan on replacing the pipes to our home. Most people believe the housing water is so brown because of the age of the pipes.	Able - Yes, \$109/month. Willing - No.	I really would like to see an improvement in the quality of the water already pay for. I would be willing to pay for higher bills if our water was "worth drinking & bathing in". Until then I will have a BIG problem with paying higher amounts for bad water.	We already do. If you needed more easements then no.	Thanks for taking the time for our survey.
141			Yes.	No.	I think the cost of water & sewer here is <u>very</u> high compared to other parts of the country.	It makes sense if it can be shown to reduce operating costs for the city and consumers in the long term - 10 years.	*Hello, we are currently paying a monthly fee for water and sewer service. Duh!*		I understand that there currently are easements for this purpose on my property.	
142	It's too early for me to say. I only completed construction of my house in March. After I have lived in the house for one winter I will know better.		No.	No.	I don't know enough about them to know if they are fair or not.	Yes.	No. Bethel is too expensive already.	That I will be responsible financially for maintaining the system in working order.	This has already been done.	
143	Notification of holiday schedule. It is irritating when they come earlier than regularly scheduled and we do not get full use of our water supply.	Driving across our lawn when we have a cleared 16 foot gravel driveway for their access!	Yes.	No.	Yes.	No, I think that the above ground system is an eye sore and would lessen the value of our property and home.	No.	The project would drag on and on and be nothing but an eye sore for many years.	If it was professionally done yes. However, I have yet to see much professional work by any of the city maintenance or construction crews!	

CITY OF BETHEL
COMMUNITY WATER AND SEWER QUESTIONNAIRE: SUMMARY OF COMMENTS

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144	No comment.		Yes.	Yes.	Me & my wife have fixed income and we are both 70 years old. Some things should be done for Elders that have fixed income. Do not raise water & sewer price for Elders.	I prefer water delivered. Water is not rusty when delivered. I do not want water hooked up to city pipe. Sewer truck is fine.	No.	Like I said, me & my wife have fixed income. We can not pay higher water & sewer cost.	NO	I'm happy with water delivery and sewer pick up. I'm not happy about city hook up water. It is too rusty.
145	I think it's fine.		Yes.	No.	Yes.	No, trucked water works fine. I had the same system in Fairbanks. Piped water and the electricity needed to keep it from freezing it too expensive! Please stay with delivered water.	We already do.	1) Design, consider ALL costs. 2) Focus on good water & sewage, less on piped delivery.	NO	Again, this is Alaska. Use methods that work here but keep costs down. Delivery works.
146	Cheaper.		Yes.	No.	Wish they were lower.	Yes, won't run out of water.	Yes, \$200/month. Maybe lower would be better.	None.	Yes.	Costs make it hard to live here.
147	Water that clearer and smell less. We have 2 filters which help and a Brita filter.		No.	No.		Yes.	Yes, \$50/month	With pipes water you don't need trucks or drivers - thus it should cost less in the long haul.	Yes.	Is it 1958 or what - why does Barrow, Kotezbue, and Nome have a water system and Bethel does not?
148	Rusty water.		No.	No.	Sometimes I wonder why I'm paying for running water when we don't even use it for cooking or drinking because I don't feel that it's good for our health.	I'll be happy when my tub, toilet, both basins, and my white clothes wouldn't be badly discolored and stained with rust.	Yes, no opinion.	I would like to see clean, clear, and free of any kind of stain, & healthy water.	This section is up to those with property.	Please, Please - I want RUST FREE water.
149	Sometimes miss our house.	Appointed time of day, especially in the winter.	Yes.	Yes.	NO! The recent increase may force those households that already cannot afford the cost of living to revert back to using honey buckets.	Not entirely - see # 22.	Able, yes, the same each month. But there are plenty that will not be able.	The above ground pipe system is an eyesore, as well as very inconvenient to snow-go travel. I think it's also potentially dangerous to off road vehicles & kids climbing on it.	No, but there's no other choice in subdivision that does not give sub-surface rights.	Why not several wells instead of one? Bethel is much too spread out. I don't think it will work. Wells at, for example, Tundra Ridge, City Sub, Blueberry, Kasuyli, Larson, & Vivik would probably be less costly and look much more attractive than the current plan. I don't think I've heard of any research done on that alternative.
150			Yes.	No.	Yes.	We are totally against pipes system in Alligator Acres. Present piped system inefficient & poorly designed. It encourages people to use too much water.	No.	Our sewage pond is too full now and people living on the slough are tired of the 2X yearly outflow.	No! I will leave town before those ugly pipes cross my lawn!	POOR DESIGN JOB!
151	None, keep up the good work.	None, keep up the good work.	Yes.	No.	I feel they are fair, I just wish I had larger water & sewer tanks.	Yes, please expedite the project.	Yes, \$200/month.	The above ground pipes will be a burden for my snowmobile access to my house. They will also be an eyesore. It almost seems like being forced in. I would rather have truck delivery than above ground pipes.	No, I don't have room to spare.	No comments.
152	Further demineralize the water.	N/A	Yes.	No.	Those of us getting our water hauled pay too much for, or rather compared to those receiving piped unlimited, water.	Agree whenever it's decided to get the job done.	No, not for a while since those getting unlimited water don't pay as much per month.	We still have to rely on getting our water hauled while continuing to pay an outrageous amount of money for water.	No. At this point we have put a lot of money into improving our piece of property. I'm sure that there is another way to have us hooked up to w & s without having to tear up our property.	Placing the w & s pipes above ground is really a sight for sore eyes! Please take time to study the possibility of burying the pipes. How have other cities/villages dealt w/ broken pipes? We need to upgrade our town while at the same time make it look attractive enough for those of us living here!

CITY OF BETHEL
COMMUNITY WATER AND SEWER QUESTIONNAIRE: SUMMARY OF COMMENTS

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153	Drivers work holidays and provide great service!	Drivers work holidays and provide great service!	Yes.	Yes.	Yes.	Yes, I understand the phases may take up to 20 years to put in place due to funding limitations. Some percentage should be maintained.	Yes, \$50/month.	Funding is limited for improvements and residents have hard time paying for them.	Yes.	Thank you Utilities Service Dept. for wonderful water, sewage, & garbage disposal at dumpsters. Quiano caqneq City of Bethel!
154	Fill water tank full each time.		No.	No.	Yes.	Yes, very much so. It is more convenient, more sanitary due to less manual handling.	Yes, don't know.	Any improvement to current water & sewer hauling is positive.	Yes.	
155			Yes.	Yes.	I think the system has worked well. I.e. pipes customers have a lower rate and hauled customers obviously pay more.	I'm not familiar w/ this!	Not sure.	I don't wish to pay any more for my weekly service.	I'm not sure!	I am not familiar w/ this plan. The only issue I'm aware of is the rate increase happening soon. Please inform us as to what this expansion of services will be as I am not informed!
156	During winter it is poor because even though your service wasn't in they say fill it up and use our water must be leaking or running too much and double charge our water even though they never fill it.	If the workers were being honest so we won't have to get billed for nothing. Some of us are having hard time so it hurts when they double charge our service even though they never did it.	Yes.	Yes.	Yes, only when they don't double charge the service.	Yes, it would be better if we had new piped so there won't be problems going one place to other for water service and sewer.	Yes, \$100/month.	Bethel should pup pipe water system and sewer and maybe a monthly charge so we won't have a problem running out of water specially to huge size of a family.	Yes, as long as I won't have to deal with truck drivers who lie on the job even they never fill our tanks.	The workers should be honest and do their jobs right.
157	More attention to overflow pipes when filling.		Yes.	No.		No!!! Discussions w/ friends and family on piped water systems indicate extreme disappointment not only is cost but quality of water. High iron content in the housing and trailer court areas result in high cost of water filters, purchase of bottled water, and build up in household appliances.	I pay a monthly fee now. \$100/month.	Increasing costs of living in rural Alaska is running people out of the region.	No!	I have problems with new systems developed and put in place, and residents later finding out that they will be <u>forced</u> to make increasing higher payments for city services. Those with truck haul at least have the option of decreasing their service schedule. For a professional organization operating out of Anchorage, I feel that this survey could have been more user friendly and respondents would be more willing to take their time and reply if provided with a self addressed returned stamped envelope. What are the costs/benefits of the truck haul system compared to expanded or newly developed systems that are subject to hidden costs and increases to the customer w/o guarantees of getting a quality or improved services? Why isn't water and sewer metered like fuel?
158	Brown water & rust particles coming out of faucet. Have to buy drinking water. Just raised price of water that we don't use.		Yes.	No.	No, we are paying for water that we hardly use.	As long as they use PVC pipes so they don't get the same problems as we do.	No.	We need potable water coming out of our piped services.	Yes.	
159	Better regularity re: time of day for delivery & evacuation. (One day we got H2O at 8am, another day we got it in the afternoon. Same with sewer)	See water comments re: regularity.	I am now!	No.	Yes.	Yes.	Yes, \$50/month additional.	Freezing, leaks, contamination, shutting off water during absence, changes to my home to accommodate new system at whose expense?	Limited, but yes.	
160	New to our area. Still getting used to piped water and sewer.		Yes.	No.		They could probably save a lot more not delivering the water.	Yes, \$100/month	If more people were in the system. The amount should decrease.	Already done that.	
161			No.	No.	The current rates for our water & sewer are fair for us.	I am living at Kasayuli sub and I think it will be better to have a piped water & sewer system.	yes, \$100/month	If they ever make it happen	no.	

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162	Lots of arsenic in water (29 parts/b) other heavy metals - when we use evaporator to distill water for drinking it's hard to remove residue.	Find better water source.	Yes.	No.	Yes.	NO- It will cost much more - water of very poor quality - above ground piping ruins usable land, looks ugly.	?. \$50/month	High cost- usage greatly reduced very poor water quality- waste treatment inadequate.	Not if I can avoid it.	good luck.
163			Yes.	No.	Yes given the product and labor for the truck drivers I feel the rates are fair.	yes Hopefully it will eliminate freeze in the winter and for myself personally the chances of running out of water less likely.	yes. \$80-100/month	Cost! I've heard the rates will double and I'm a little concerned. Also I've heard we will be charged extra for electricity as well. Though the new system may be more convenient, if the rates do double it will be difficult for a lot of people.	No	
164			Yes.	Yes.	Yes they are.	I believe it would be great	No.	I don't know of any where that people pay certain amounts of dollars for piped water and sewer.	yes	
165			Yes.	No.	I think they are fair right now and should rise.	I would agree.	Yes. \$8/month	That they not interfere with snowmobile/ 4 wheeler access to and from city. The plans should be thought out carefully and improvements are made to work effectively and plans be made if water/ sewer interruptions occur to deal with them in a efficient, timely manner.	Would water quality deteriorate or improve?	
166	Nowhere else but Bethel is water almost \$300 a month. That is the reason we are looking at moving! Utilities too high!		No.	No.	No! Why are villages rates cheaper and their pipes are underground? It would be cheaper to go back to the Honey Bucket!	No! How are villages able to bury their pipes? This isn't a 3rd world town. Or is it? Why are utilities so expensive? It's about time 118 city employees pay their share! Including the City Manager! It would give the city almost 2,000 more per year.	No.	Everyone I've talked to plan on moving within 2 - 5 years due to the high cost of everything. Is the city using the money made from water & sewer to pay for their own costs?	Yes, if the quality improves!	It's about time the city and council upgrades to the 21st Century. How about upgrading from a 2nd class city to a 1st class so property taxes can be imposed? Or are all City Council members swayed by the Business community?
167	Pump water, since we have no complaints.	Again, pump system - since no complain.	Yes.	No.	It's expensive. It might be for delivery water/picking up sewer fair for them. Pretty expensive compare to anywhere in states.	Yes - piped water upgrades everything.		Improve pipes for winter's weather & children playing - repavement.	Yes, if needed to. It depends on where they are with their project. As long as it's all property levels. I suppose that would be fine.	All for pipe systems.
168	No improvements needed. Nothing to mention at this time.	No.	No.	No, need someone to define current rates.		I will need translator to explain the grade piped water & sewer system to me before I answer this approach.	Don't know.	N/A	N/A	
169	Very high iron content. Buy too many water filters. Price of water too high for such poor water.		Yes.	No.	No. Poor quality water.	Yes.	No. \$75/month.	None.	N/A	N/A
170	Cleaner w/ no rust.		Yes.	No.	For lower income people.	No, cost will go up higher.	No. \$160/month		No.	
171	Will not accept piped water.	No problems.	Yes.			No - ugly, more expensive, and let me repeat - UGLY!	No.		No.	
172	Replace the can over the evacuation pipe to the sewage tank so the sewage doesn't freeze!!	See previous section.	Yes.	No.	No, I see no reason why it should cost so much for a truck to drive less than a mile to bring water to my house.	Only if it costs less.	No.		No.	
173			Yes.	No.						

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174	Don't overflow - is my worst nightmare.	Please dump all!	No.	No.	No, too high.	Yes! Unlimited!?!	Yes, \$130/month.	Cleaner, fresher, less chlorine.	Maybe.	
175			Yes.	No.	No, you should pay for what you use.		Yes, \$25/month.	Contractors over budget. Cost of freeze up protection. Many people won't be able to afford water & sewer.	You'll do it anyway, why even ask me?	Sabotage.
176	Be careful not to overflow.	Good job.	No.	No.	Ok.	No, don't feel it would be cost effective.	No.		Ask landlord.	Charges need to be based on actual usage.
177			Yes.	No.	Yes, but expensive.	Yes, if water quality is good.	Yes, \$20/month.		Yes.	
178	Metered delivery.		Yes.	No.	They are too high - we do not use the amount we are charged for. I keep paying for the water I don't use - over & over.	No - too unsightly.	Yes, \$100/month.	The cost to prevent freeze ups charged to consumers (City Sub) - electricity.	No - unless I am consulted first.	Meter the water trucks.
179	Water deliver not to drop the hose on the ground. Sewer man needs to be more careful not to drop the hose on the ground.	Water deliver not to drop the hose on the ground. Sewer man needs to be more careful not to drop the hose on the ground.	Yes.	No.	The rates as is are good for now. Do not change the rate.	If it's feasible in our location - without changing the rates.	Yes, \$179/month.	Construction planning will need to be planned to prevent any liabilities to the land owners.	Yes, should construction impact the land owner this should be a cost considered.	Proper planning, excellent labor work should prevent any problems. Maintenance - proper planning to hire highly skilled maintenance crew. A crew with accurate certifications to accurately fulfill the responsibilities and duties. MANDATE the Echo Apartment's Bob, the rental unit owner, to comply with the regulatory requirements. Every day he leaks gray water from his rental units to our private property. Mandate that his rental units need to have running water/flush toilets holding tank for gray water. He should not be an exception. Bob Graham is the rental owner for his 7 or 8 units.
180	Rusty water. Location of well and sewage lagoon. High prices - Bethel should be <u>all</u> piped.		No.	No.	No - piped water shouldn't be so much because there is no need for service handlers.	YES - YES - YES	Yes, \$150/month		Yes.	Get the city to cut some of the office workers budgets - not raise the people water rates.
181	Should be more on time.	Twice they pump into the house.	Yes.	No.	Getting too high.	Well, I can't say anything about this. All I know is piped water & sewer system will increase the cost. Shut off and reconnection may be higher.	Yes, \$175/month if I can afford it.	Improvements usually make problems for low income family who doesn't get aide from welfare.	When a person say no, he is told we'll put you const.	
182			Yes.	Yes.	Yes.	Only in some areas.	Yes, \$150/month.	The cost.	Yes.	
183	I would like to see it stay as it is. I do not like above ground pipes all over Bethel.	I would like to see it stay the same.	Yes.		For health issues the city should subsidize rates for low-income families.	No, I think it's a horrible idea, there are too many what if's; example broken pipes, frozen pipes.	No.	Environmental issues were created with Phase I, the increased costs for electricity in the winter.	No - too much damage to the tundra.	Please let the public know about the outcome of this survey.
184	Don't forget the sewer pickup. In the past 5 years it has been missed at least 7 times.		Yes.	No.	Yes, as long as they are not increased.	Yes, I want water as need.	Yes, \$300/month.	The system is silt and how it will be maintained and who is responsible.	Yes.	Thank you for the services. We look forward to the possibility of having piped water/sewer in the future.
185			Yes,	No.	No, too high.	If it will lower my bill for water & sewer. I am worried that with the additional electrical needs my total bill will increase.	Yes, \$100/month total cost: water, sewer, plus additional electrical.		Yes.	
186			No.	No.		Not necessarily. Will it be more expensive?	Yes, \$50/month.	Cost.	No.	
187			Yes.	No.	Not really, too expensive.	No, invasive to area, destruction of tundra, extremely unsightly.	Yes, \$?.	Not to be so destructive to property. Water/Sewer trucks have destroyed my culvert.	YES!	

CITY OF BETHEL
COMMUNITY WATER AND SEWER QUESTIONNAIRE: SUMMARY OF COMMENTS

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188	Water is always rusty & not drinkable - sinks, tubs, & any water containers used constantly get very rusty.	Not enough suction on toilet.	Yes.	No.	No, especially because quality of the piped water is really poor nowadays. Very rusty & undrinkable and laundry always has to be done at the Laundromat which costs more now than ever!	Yes.		We already do! This calls for improved quality water to housing homes in Ptarmigan. The only means possible would be to totally change all our old pipes first if meters or increase in our monthly rate is going to keep going up.	Change or replace all housing water pipes before increasing the monthly rate again. With poor water quality coming from piped water it is unfair to increase the monthly rate. This is something that is always not considered & overlooked when it come to meetings. We are the ones to see what the problem really is with quality of water because they don't live in housing area as we do!	
189	Honk horn if vehicles block entry vs. driving off. This takes a few seconds and alerts people vs. driving off as soon as driver sees blocked driveway.	Same response as Q. 10	Yes.	No.	NO - Rates should reflect usage, not delivery patterns.	Yes, however, all rates need to reflect amount of water used, not the cost of delivery service. This seems the fairest plan.	Yes, a scale that is based on usage.	Concern: People will be overcharged because the system is poorly managed vs. well thought out. Bethel has a history of poor planning, short sightedness, and knee jerking reactions to fiscal problems. Propose water/sewer rate increases of such disproportionate amounts are a perfect example of a city council scrambling to find quick fixes to complicated issues & problems.	Yes.	Thanks for providing this survey. I would like to see the data published once it's compiled.
190	Metered as I don't use all of my water yet I pay a set fee.		Yes.	No.	No - too much admin costs that pays other city services.	Yes - but you need a design similar to the ASHA Bethel Heights Loop because the home owner will have high power bills.	No.	You don't care what it would cost the consumer. A necessity we need.	Maybe, if it is reasonable.	
191			Yes.	No.	I pay for water I never use on top water I had used.	It will take lots of ideas to do east slough.		Can the State or Fed Gov't take part? I can't see the elderly on fixed income, those on less than minimum wage, or people who are having a hard time absorb extra.	If the cost is less on water & sewer.	
192			Yes.	No.	No. Should be averaged with piped water.	Yes.	Yes, \$10/month.		Yes.	
193	I use a metal water container which builds up rust and other sediments that color & pollute the water I receive.	I want a piped water & sewer system.	No.	No.	I'm charged a regular rate every month regardless of whether I needed/used up the water in the container or not. That's not fair.	Yes, the standing water collects pollution while a running system in health beneficial.	Yes, \$50/month.	Freezing pipes; maintenance.	I do not own any property.	The amount charged to customers should be fair and equal to ALL users; every user should be charged.
194			Yes.	Yes.	Yes.	Yes.	No.		No.	
195	Paying extra when we have to run the water when otherwise it would freeze. Paying for water to go down the drain.		Yes.	No.	?	?	Yes, already paying \$130/month.	Maintenance - city.	Already piped.	Fix this - fix the roads - improve the health of the city.

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196	Piped water.	If frozen sewer, have landlord take responsibility for extra payment to remove wastewater when thawed.	Yes.	No.	Yes, but expensive. But I hear that employees only pay one rate - no matter how many deliveries they receive. They should pay more than the base employee price if they receive extra deliveries.	Yes, it would be fine but sort of unsightly but a good change none the less.	Yes, but I'm already paying \$130/month.	Unsightly but we can work something out.	I don't own the property but yes, I'd do it if I had the property.	Thanks for trying to improve the city water/sewer situation.
197	I have to order 1,000 gallons, but only use about 600 - 700 gallons. Would like water usage metered for better equality by users.		Yes.	No.	No - should be charged for usage throughout city. Piped water users use way more water than I do but pay less.	Yes.	Yes, \$200/month.		Yes.	
198	Need water & sewer pipes here in Larson Sub. - running water.	No problem.	Yes.	No.	The rates are fair.	Very much in favor. I will be very happy.	Yes, \$50/month.	None.	Yes.	
199	Cost.	Cost.	Yes.	No.	Cost seem to be escalating.	Yes, should help the city contain costs.	Yes, ?/month.	Fair pricing for <u>all</u> customers.		
200		No heat tapes.	Yes.	No	Yes	Yes	No			
201	Waiting for piped system rates are too high. Metered delivery.	Yes	No	No- too high for level of service.	Yes - more efficient when installed, should be cheaper.	No.		Yes.		
202	improve water quality - everything		Yes	No	No... too many city employees over paid customers should get services increased.	If we don't get increase for service.	Yes. \$75/month	Not to increase payments to customers.		
203	the water is discolored - rusty and undrinkable.		Yes.	Yes	The service rates are fair now. Since we can't drink it and the discoloration of all white clothing is stained- tub, toilet and clothes water are rusted.		Yes. \$117/month	The flushing on ASHA housing does not get any better. I still have to scrub rust every 2 days and it costs me money to get supplies for rust removal.		UPGRADE ASHA WATER SYSTEM!!! This is an ongoing problem.
204		emergency delivery needs to be handled with courtesy and guidelines.	No	No	NO - too high!	Yes	Yes. ?/month	cost of living in Bethel is already formidable. CLEAN WATER A MUST!	it would depend.	
205	More filtration needed. Cant wash whites with it without staining them. Not fit to drink.	Proper filtration.	Yes	Yes	The rates should be lower to encourage hook up to piped service.	Yes.	No. \$80/month.	The quality is not being improved but the rates are going up, this is not right.	No, existing above ground pipe is restricting full utilization of my small property.	Cut more time to improve the filtration.
206		Drivers never care about overflow.	Yes	Yes	Too much.	Yes, very much.	Yes, \$20/month		Yes	
207			Yes.	No.	No, it is not fair for the retired people. We have fixed income, not like the working people. Everyone should pay - including the City of Bethel employees.	We'll be long gone dead before this happens - so good luck.	No.	The city managers have more money to spend for stuff that is not needed.	No comment.	
208	No more water/sewer trucks.	No more water/sewer trucks.	Yes.	No.	No, too high.	Yes, if it is less costly per month.	No.	Rate increases.	No.	
209	The service is fine. The quality of the water provided is not acceptable. Appliances, clothes, sheets, & towels are all stained. What do you think this is doing to our bodies?	Clean water.	Yes.		Not as long as the utility enterprise fund is the cash cow for the city.	Give the homeowners a choice. We were happier with our water/sewer tanks. After delivery we let the water settle before using it and cleaned the tank annually. By doing this, the water in our house was much cleaner.	No, no increases until the water is clean.	Village Safe Water & their engineers don't care a bit what the residents want - they're just going to shove it down our throats.	We did not give the city permission for the easement and it made no difference. They took 10' off the back of the property & drove steel pilings next to our wooden house support pilings. This loosened our house pilings & they now jack.	See attached sheet.

CITY OF BETHEL
COMMUNITY WATER AND SEWER QUESTIONNAIRE: SUMMARY OF COMMENTS

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210	City employees should be paying for their water, city truck damages our road, and the city refuses to fix the road.	City employees should pay for their water!!	Yes.	No.	NO - City employees should <u>not</u> get free water!!	No - I think a below ground system needs to be devised because of the impediment of snowmobiles & 4 wheelers that above grade cause.	Yes, ?/month.	That it will be implemented in the fashion that special interest groups will dictate and will not be what the general population wants.	No.	
211	We would like a receipt that shows a meter reading of water received.	See H2O info.	Yes.	No.		No - <u>UGLY</u>	No.	\$ \$ \$ \$ passed on to consumers.	NO	
212		Yes.		Yes.	We should be able to get piped water	We wait for good water.	Yes, \$100/month.		?	We should get to use nice clean water. Don't take germ water & bacteria.
213		Yes, private tap water.	Yes.	Yes.	We need better water. Not the germ water.	Yes, we need good water system. I don't want to die.	Yes, \$100/month.	We should be able to get sewer & water system for all the residents of Bethel.	?	We don't want to die. All the people of Bethel need some piped water please.
214	Piped water/sewer systems.	No comment. (I think trucks are unsanitary.)	Yes.	No.	No. Too expensive.	Definitely! It would be so convenient w/ unlimited water!!	Yes, \$150/month.	No comment.	No comment.	No comment.
215			Yes.	No.	No - there are weeks when I don't use much water therefore we pay for water we don't receive because our tank isn't empty on fill day.	Yes - the trucks are heavy & wear the road down - especially during the muddy season!	No. We are paying for service already.	Seems like there are two sources. One having lots of iron in water, another that's considerably cleaner.	Yes, as long as it doesn't rip up the yard and become a hazard.	The cost of living in Bethel has increased incredibly & piped water should be lower than truck and road maintenance could be lower.
216			Yes.	No.	Yes.	Yes - would be better if in utilidar or buried.	Yes, \$150/month.	Too slow in being implemented.	Yes.	
217			Yes.	No.						
218	None.		Yes.	No.		Yes, if it was not on a wood foundation. Explain how system works if we are able to fix it. Hook up right.	Yes, \$150/month.	The current construction in City Sub is stupid. Wood foundation will not last. The whole set up looks second rate.	Already have.	Living in City Sub I feel like a lab rat. It's as if the engineering/contractor said "not my house, just hook this up and get out before they realize we screwed them".
219			Yes.	Yes.	No.	Yes.	Yes, ?/month.		Yes.	None.
220	Put meters in. Too much chlorine, can smell and taste when get water, then it goes away in a day or two.		Yes.	No.	No - want meter.	I do not. Looks ugly. Too many pipes and will cost more in the end. Why grinder pumps? Should be lift pump. Who can afford to fix grinder pumps? Too many problems. Know of new building in town that has two grinder pumps and they have had nothing but problems for two years.	No.	Never made the one in City Sub big enough to even cover additional area like Post Office, Public health.	NO	VERY POOR ENGINEERING!!!
221						No.	\$50/month		I got well on my plan.	NO.
222	Rust removal. The water is horribly brown. Change pipes a little at a time.		Yes.	No.	No, water extremely rusty - can't even drink it. We have to buy water or collect rain water for cooking & drinking. All my whites are brown.	Not if the city raises our bill. Get funds from state for upgrades if the city is going to do the upgrades.	No.	Rust removal.	No.	People can't afford the raise. Let the people who are going to benefit from it have the increase in pay and not the ones who aren't.
223	Improve quality of water. Varies greatly throughout the year - odor, flavor, clarity.	See question 10.	Yes.	No.	No, piped water rates increased to cover high truck delivery costs.	Must be cost effective & not raise current system rates.	\$0/month.	Must be cost effective!!	NO	All "improvements" must be cost effective, approved by the customers who will receive the improvements and paid for by those same customers. Not those customers who will not be affected by them. I have no business approving changes to someone water/sewer and should not pay for someone else's water/sewer.

CITY OF BETHEL
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224	Expensive.		Yes.	No.	I guess so.	Do NOT like above ground pipes, ugly, confining, will freeze, high maintenance.	Yes, \$150/month		Yes.	The workmen have our phone # but never call before they come. They just knock, knock, knock, & wake me up. Give us a call pleas, Thanks!
225		The truck came full so it didn't take all of my tank contents, the driver forgets to come back and empty the tank.	Yes	Yes	No.	Yes, more efficient, less costly..	Yes, less than \$100/month.	See letter attached.	No, I would be willing to provide a connection point from my system to the city system at the property line.	See attached pages.
226			Yes	No.	Yes, it fits my budget at this time.	No- wont work in flood plain area and will cut off access to traditional trails.	No.	It is adequate the way it is now.	NO!!!!	The next project on the list should be for people with low income and live in subsistence lifestyles, like the whole area across the bridge to East Ave and the area of Hanger Lake Road.
227	We want clear water, no brown or rusty water. My mom got sick from that rusty water and after a shower or bath our skin is itchy and dry.	We want to see clear water in the toilet and faucet. All of our dishes are getting stained because of your water.	Yes	Yes	NO we don't think it is fair to pay that much money to the city if it is rusty and brown. All of our white clothes and socks are all stained from 3 years of washing them. It should be lowered down to \$50.00 or less.	I don't think that is good because I think we will pay more. Why not change the pipes and get new ones and we can pay you even it will have to be expensive.	No. \$50/month.			
228	Slightly more scheduled to include morning or afternoon delivery.		Yes	Yes	No. We have a discount for being city employees. Without that discount we would pay much more.	Yes.	Yes	What it be a one time payment? Based on current tank size? Percentage of current payment? How long? Based on subdivision?	Yes	There is definitely a problem with current services. No answer would please everyone, and I'm not even sure what the best choice is. Piped water will be great we just don't want to pay the initial set up fees.
229			Yes	Yes	Yes. The drive all the way out to H-marker is greatly appreciated.	I'm not sure. I'd have to be told more about it. If it would cost more money, I'd say the cost of living in Bethel is high enough.	No.	The cost, because Bethel is already very expensive!	P	Please keep prices low, you'll have many pleased customers
230	water discolors clothes		Yes	No	Pretty high, but probably fair.	I agree- seems like the safest and healthiest system.	Unsure.	I can't afford to pay more than I do already.	No.	
231			Yes	Yes	No. Need to add gauges to truck so you only pay for the water used.	No. 1) They are ugly 2) Home owners are stuck with high electric bills for pumps that run 100% of the time. 3) Pipes freeze in the winter if not run all of the time.	Only if the costs/benefits were well explained.	Only in the back of the house.	Communication is very important!	
232			Yes	No.	Yes, for city employees I don't know about the others.	Yes	Yes. \$200/month	Pipes above the ground everywhere is ugly. The sewage lagoon needs to be upgraded, it stinks and I sure don't know the discharging into our river.	Yes, if it doesn't obstruct.	I think it would be a long time before Tundra Ridge gets on a piped system.
233	Because they did it once a week		-	No	Compared to having Hauled water & sewer before, the amount we have to pay per month is less than but our electricity doubled- the main problem.					
234	metered service- pay for what we use.		No	No	NO!! Flat fee isn't right. Hurry and use it or pay for not and be careful or run out of water.	Yes- more cost effective for the city and customers.	No.	No way should it cost more - it anything water and sewer rates should drop considerably.	Yes	Pipes should be underground!!!
235			Yes	No	Yes	No- Not at current approach as construction and technology used is outdated and not cost effective to the consumer.	Yes. \$90/month	Technology and construction/ engineering techniques.	Yes	

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236	Metered water.		Yes	No	No they are high.	No. The system is very ugly! It will ruin how my land is used.	No.	Poor engineering has cost way too much to the customers in electric bills!		
237	The new system is tragically flawed.		Yes	No	No, those rates do not reflect the need of the people.	No, running pipes around town but the answer to what happens in 20 years with these pipes?	No.	Yes. Cannot justify the pipes cost and wasted time and money by the lowest paid bidders.	No, this has already destroyed my pad.	
238	The quality of the water need to be improved. It stinks.		Yes	No.	No, They are too high. The city is using the water/sewer system monies to support most of the rest of the city. The water/sewer system should be operated by private enterprises.	Not if the current city sub plan is implemented city wide. The system needs to be a circulating 2 pipe loop similar in design to the Nome system which has worked well for over 35 years.	Yes. \$75/month	If having piped water & sewer means astronomical electrical bills to keep a poorly designed facility system running during the winter I would consent.	Only as long as the water sewer lines remain within the standard 10' building set back from the property lines.	
239	Taste of the water is bad. Even though the hoses are long, some drivers will not deliver if a car is in the driveway.	pickup should be whenever, holidays.	Yes	No	No costs way too much for water. One penny per gallon.	Yes. Do I have a choice? \$250/month counting electrical increase.	electrical cost.	No.		
240		Since the new well/pumping station for water was put in city sub, the water quality has greatly improved. We don't have to filter our water for drinking anymore.	Yes	No.	No- extremely high. Actual use needs to be metered. A household should pay for the water they use, not by a standard rate.	No. when public meetings were held years ago we said to put the money into central wells and pumping stations in the different housing areas, don't do piped water and sewer.	Why should we be paying increased rates for piped water and sewer when we didn't want it in the first place? One of the intentions of having piped water and sewer was supposed to be lower costs. Only a city wide per gallon used fee, regardless of housing order. Meter actual water used- the only equitable approach.	No, more piped water and sewer- its been a financial and engineering fiasco. Put in central wells and pumping stations. Build another lagoon. Put windmills around the lagoon for aeration of sewer water.	Already have.	The solution of running water all the time to keep the new piped system from freezing is crazy- were already out sizing our sewer lagoon.
241	Cost reduction for services	Cost reduction for services	yes	No	No, too costly. Hear the prices are expected to rise again	That would be nice but I hear the city plans on charging by the gallon.	No.	Water by the gallon	Yes, if it were to lower costs.	
242			Yes	No	For new ok- but if they are raised would be too expensive.	yes if they keep up watching water does get rusty - or taste of metal.	Yes \$80/month	raising cost too high	No really/ never did like the looks of the pipes on the property.	
243	The utilities Forman des not know his job. Further more he angers every customer he has contact with.		No the system is not efficient	Yes & No piped water is the most effective but the above ground is a joke below ground is doable in bethel.	Yes. \$100-150/month	The above ground is unsightly prone to damage and creates fenced in areas, pine drops property value.	Dig trench, line it, fill it with gravel. My property is already bisected by pipes.			
244	How about a 10 day schedule that would cut back 1 delivery per month times a lot of customers who would probably sign up for a 10 day schedule.	I would like the water on a 10 day schedule.	yes	No	Do- not when piped water and sewer get to use as much as they want and when its cold out they are told to run the water. The piped people should be paying their fair share too.	No- because sewer dumps in areas of town make more sense them pipes every where- same with water have water sources in areas of town the trucks can work on. Better is a trucked water and sewer town- you need to make it more efficient. By cutting down travel time and working in areas of town.	HELL NO.	Again- Areas of town whit sewer dumps and areas of town with water sources. No more piped water and sewer to every home.	No.	It makes sense for the cost saving to have some dumps & water for the trucks to work in.
245	I would like to see improvement in the water quality. I would like a more accurate charge for exact water usage.		Yes.	Yes.	No - The less water I receive the more I pay (relatively). The me water I receive the less I pay.	Yes - However the system is obstructive and wastes valuable land on my property and surrounding trails and portages.	Yes, \$60/month.	Lines freezing. Sewer spillage. Unjust water costs= water/sewer drainage to my home.	I guess I already have.	I would like to cover some of the pipes that my property and the easements.
246			Yes.	No.			Yes, \$100/month.	I can't afford more than \$100/month. I retire I wont be able to afford that.	Not sure.	Water should not be so expensive
247			Yes.	Yes.	Fair.	Agree.	undecided.			

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248	Equalize prices on tank water and sewer. I pay much more than people on the city water system. I get less and pay more.			No.	No. People on tank water pay more than people on the city sewer and water system.	Yes.	Yes.		Yes.	The faster you get the entire town on the system the faster you can get rid of the trucks and the associated costs. Plus fire fighting coverage will improve.
249	Piped water and sewer, trucked water and sewer costs too much. Our trucks running 6 days a week year around tear out roads up.	Truck sewer costs too much. Piped sewer.	Yes.		Trucked water and sewer are too high for everybody in general. Pipe water and sewer would be cheaper to operate and wouldn't have the trucks tearing up the roads.	Yes. It would be cheaper to operate and maintain and it would take the trucks off the roads.	Yes. \$100/month.	How long it takes to get piped water & sewer.	Yes.	It would be cheaper for the public and the city of Bethel if we could be on piped water and sewer. There reasons are too many to list.
250	Pipes sewer and water		Yes.	No.	Without a state study, I have no way to respond.	Yes- But present contracts are too slow, costly and have perpetual problems before going on line why cant city utility stuff also install some of these less complex lines?	No.	Rate study	Yes	More pipes quicker and less costly- install main heads ahead of house communications.
251	Improve taste of water, maybe flush water delivery trucks once a month.		Yes	Yes	Okay to certain extent, Raise rates on something else sometime.	I like the idea, but I know rates will go up. Expansion joint, sewer valves thaw out connects, PRV's.	Yes. \$25-55/month.	Water quality is hare to maintain in large piped systems. Especially flood areas.	Maybe for now	
252	Sewer lift stations in key zones of city to reduce wear on trucks and make it more efficient to operate- reduce above ground pipes in city.		Yes	No	No! Does hauled water subsidize piped water?	NO! NO! NO!	No! I already do!	Those Nasty pipes! Bad Pipes! Not in my neighborhood!!	NO!!	
253			Yes	No.	Yes	Yes, then we would be charged by usage not by delivery.	Yes, \$200/month		Yes	
254	Cleaner water. Piped water and sewer. Cheaper water or pre rated according to area of town lived in- charge extra for travel time.		No.	No.	No- Trucked time should be a factor in rates- how long does it take for the truck to travel from water plant to delivery place.	Yes- as long as it is a better design than city sub and does not triple electric bills.	Yes. \$100/month.	Problems in a city sub- increased electric bills- come up with a better design housing don't have that problem.	Yes	
255		Sewer tank frozen last year.	Yes	Yes	Yes	Unsure.	No. \$200/month.	Pipes carry germs/ rust people dump junk into pipes not thinking about others.	No	I like my service now. I might have to move await if prices get too high.
256			No.	No.	Seems high... maybe because of a lack of understanding of how the rates were established.	Yes!	Yes, can't comment since unfamiliar w/ work & costs.	That the pipes are placed on stable foundations so breakage or blockage does not affect pipes due to tundra shifting.	Yes, as long as it goes around or behind the property so parking will not be hindered.	Assembly of God Church.
257			No.	No.	Seems high... maybe because of a lack of understanding of how the rates were established.	Yes!	Yes, can't comment since unfamiliar w/ work & costs.	That the pipes are placed on stable foundations so breakage or blockage does not affect pipes due to tundra shifting.	Yes, as long as it goes around or behind the property so parking will not be hindered.	Pastor at Assembly of God Church.
258	Too expensive.	Too expensive.	Yes.	No.	No, too expensive.	Why can't the system be underground where there is enough top soil for the pipes to be buried?	No.	The cost and construction for this.	No.	I do not want above ground water/sewer pipes in my front yard or back yard dividing my lawn. The system should be put underground.
259			Yes.	Yes.	No, I think people with unlimited water should be metered & also trucked water. Sometimes we use less than we pay for.	Yes.	Depends on how much.	If it will increase our light bill by very much, I could afford it. I don't think using heat tapes is good idea. Find out how to keep water from freezing.	Yes.	
260			No.	No.	Too high priced.	Yes, more sanitary.	Yes, comparable to Anchorage.	Not available soon enough.	Yes.	

CITY OF BETHEL
COMMUNITY WATER AND SEWER QUESTIONNAIRE: SUMMARY OF COMMENTS

Survey Number	What improvements would you like to see? What problems with the water service would you like to mention?	Any problems with the waste water service you would like to mention? What improvements would you like to see?	Are you aware of the City Ordinance that prohibits the discharge of grey water (wastewater excluding toilet waste) to the ground surface?	Do you understand how the current water and sewer rates were established?	Do you feel that the current water and sewer rates are fair?	The City plans to replace the current truck haul water and sewer system with an above grade piped system. Do you agree with this approach?	The construction of new facilities to expand the current system may result in additional cost to the consumer. Would you be able and willing to pay a monthly fee for this service? How much would you be willing to pay?	Concerns about future W & S improvements.	Would you be willing to provide utility easements across your property for construction, operation, and maintenance of water and sewer improvements?	Other Comments
261	The city must filter the water that is being supplied to houses (piped water) because it is so filthy and smells bad. We can't drink it & water is \$3/gallon and everything we was turns brown.	We need better quality water to prevent destroying our clothes and things we wash with piped water. It needs better filtration before supplying it to houses connected to city water.	No.	No.	It is not fair to charge us more and the city is not doing anything to improve the water quality being supplied to houses connected to piped water. The water is so filthy, it looks like river water.	Yes, as long as you will not charge us more than what you are charging us now.	No.	The will is too close to sewer lagoon and we could smell sewer smell from the pipe water supplied to housing. The well should be higher and away from sewer lagoon because it is possible that we are using water from sewer.	N/A - We are connected to city water.	Filter water before supplying it to houses connected to city water (piped).
262	The city must provide a better quality water which is potable because water is very expensive & the water quality that one gets is so brown that it destroys our clothes when we wash them and everything that we wash dishes, etc.		Yes.	No.	No, because the water quality is so bad that is ruins almost everything that one washes in it and we cannot even drink it. It is not fair that you would provide better quality of water when delivered & we get the poor quality of water & it even smell like sewer.	As long as you will not charge us more than what you are charging us now.				
263	They are great. We get service every Monday, 1st thing. It's wonderful. And in the winter, our road gets plowed before delivery like clock work. You're doing a great job! :)	The only problem is the odor! I'm not sure you can do anything about that!	Yes.	Yes.	No comment.	It's ugly! Yuk! We love our truck drivers! Give me a well, not a pipe!	No.	One of the wonderful things about living in this region of Alaska is the "untouched beauty" of the Tundra. Above ground piping = ugly! Yuk! Sight pollution!	NO!	The City of Bethel has been doing a great job providing us w/ water & sewer service. Rather than spending \$ on pipes...put it towards clean trucks, continue to improve the roads they must drive on & keep them employed!
264			Yes.	No.	No, too spendy.	Would be great to have piped water & not be limited, but it would depend on the price also.	No.	Already pay too much.	Yes.	
265	No problems.		No.	No.	Too costly.	Yes.	Yes, \$150/month.		Not a property owner.	
266			Yes.	No.	No, water/sewer consumption should be metered so that we only pay for actual consumption.	No, the above ground pipes are ugly. I would rather keep the hauled system and have it metered.	No. Please elaborate on what the additional costs would be and how much!	Costs to the consumer and the ugliness of the pipes.	Probably not.	
267	No problems with trucked water/sewer.	No probs.	Yes.	No.	Not sure.	No - already tons of probs in City Sub - i.e. froze pipes, ridiculous electric rates.		Like it as is.	NO!!	
268	Drinkable water. Water that will not stain and shrink clothes, non greasy dishes, clean hair.		Yes.	Yes, whatever the market will bear.	No, the city is making it's money on the backs of poor people in housing.	The concept yes. The design, no.				
269	Metering.		Yes.	No.	No.	No.	No.		Depends on size, quantity, etc.	
270			Yes.	No.	No choice in the matter.	We are scheduled to be online when this phase of the development is completed.	No choice. ?/month.		Yes.	
271	A meter in my facility to check readings.			Yes.	The cost of doing laundry is very high and I have no choice but to raise the rates again!!	Won't affect me.	Have no choice in the cost increases.	Again, the cost of doing laundry in Bethel is very high and cost increases must be passed on to the customers.	Already do.	It is becoming a very expensive community to live in. We won't retire in Bethel.
272	Meters on the trucks so we only pay for what we use.	My house was flooded when they overfilled the water tank.	Yes.	No, I don't think anybody knows because it is not a fair system.		No, I don't want those pipes above ground in my yard.	Yes.	Too many problems with the City Sub project. Out of control costs when the system is on line.	No.	
273	Closer monitoring of overflow for ice clogs.		Yes.	Yes.	Yes.	Yes!	Yes, no idea/month.		Yes.	
274			Yes.	No.	Yes.	Yes, but I understand it will cost an arm and a leg.		Water condition.	Yes.	
275	Lower the price.		Yes.	No.	Yes.	I am already on piped system.				

CITY OF BETHEL
COMMUNITY WATER AND SEWER QUESTIONNAIRE: SUMMARY OF COMMENTS

Survey Number	What improvements would you like to see? What problems with the water service would you like to mention?	Any problems with the waste water service you would like to mention? What improvements would you like to see?	Are you aware of the City Ordinance that prohibits the discharge of grey water (wastewater excluding toilet waste) to the ground surface?	Do you understand how the current water and sewer rates were established?	Do you feel that the current water and sewer rates are fair?	The City plans to replace the current truck haul water and sewer system with an above grade piped system. Do you agree with this approach?	The construction of new facilities to expand the current system may result in additional cost to the consumer. Would you be able and willing to pay a monthly fee for this service? How much would you be willing to pay?	Concerns about future W & S improvements.	Would you be willing to provide utility easements across your property for construction, operation, and maintenance of water and sewer improvements?	Other Comments
276			Yes.	No.	No, too expensive for elders income.	Yes, piped water and sewer system.	No.	No.	No.	None.
277			Yes.	No.		Yes.		Don't know.	Yes.	
278		Service is good, but would like unlimited water.	Yes.	No.	I feel they are too high.	Yes, would like unlimited water.	Yes, \$150/month.	Maintenance of above ground water & sewer.	Depends on the amount. Would like to see if any grants are available for construction, operation, and maintenance.	
279	They have made a few mistakes over they years, like only filling the water tank half full.	The occasionally miss our house and we end up with raw sewage over flowing under the house.	Yes.	Yes.	I understand that the cost of a truck haul system is very high, but our rates are outrageously high and prohibit some people from living in Bethel.	This may work in some parts of town, but in Alligator Acres with unstable ground and spring flooding, it is not an option. There could be <u>serious</u> environmental concerns and potential health hazards.	Yes, \$200/month.	As more people get on piped service consumption will go up. The current lagoon, "Honey Bucket Lake", is inadequate already.	No. Piped service in Alligator Acres will not work.	
280			Yes.	No.	No, rates should be based on occupancy/size of home. I should pay <u>much</u> . No dishwasher/tub & only 1 person in house.	Yes.	No, I had to pay for my piped water hookup - not like the City Sub folks.		I already did!	
281			Yes.	No.	\$3000.00 a year down the drain.	? Will it cost less per month?	I am paying \$3000 a year for water & sewer. If you can get this down to \$1000 a year that would be nice.			
282			Yes.	No.		Yes.	Yes.		No.	
283	I do not want to pay the same amount each month as I do not empty my water tank. I should have to pay only for the amt. of water I use/amt. of fill up - not for the whole tank every week!		Yes.	No.	NO! I should pay only for the amount of water I use - not for a full tank every week if it's not empty.	No if it is a lot more expensive.	No.	The current system works for me and I would not want to pay a lot more for piped water.	Depends on location, amount of traffic, etc. Nothing invasive.	I have heard from people in City Sub that their electric bill has gone up \$100's of dollars per month due to the new piped water system. I am not in favor of putting a new system into T.R. if it increases our costs by hundreds. I don't use that much water so it's not worth it to me.
284	No complaints.	Expensive.	Yes.	Yes.	Yes.	Yes.	?	Unsure at this time.	yes - provided you stay away from the driveway.	
285	Poor installation of piped water system in my neighborhood. Poor communication between city and homeowners.		Yes.	No.	Yes.	No. Housing water is notorious for bad quality. The new City Sub installation is ill conceived and poorly executed. The city cannot afford the long term maintenance of the pipes or their foundations, nor do we have the treatment facilities for waste that "unlimited" water access demands.	No.	Poor engineering and worse installation, plus no clear statement about long term maintenance make the approval of future installations very suspect.	Absolutely not.	Resolve the problems with the current installations in housing and City Sub before you saddle the community with more long term problems.
286	No problems have been experienced. Delivery service has been great. Suggest you drop the fee for suspension of delivery service when people are away for some periods of time.	No problems - service is great. Would like to have fee for temporary suspension of service deferred.	Yes.	No.	No, there is no clear basis for how the rates were established or how they are changed. The process is too arbitrary.	No, because the above ground pipes will lower property value - unless they are buried.	No.	Decreased water quality - the truck delivery provides high quality water - the piped system does not.	These above ground pipes would not be improvements. They would be eye sores and would lower property values.	If you must put in pipes, buys them underground.

CITY OF BETHEL
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287	Lower prices.	Lower prices.	Yes.	No.	Too expensive.	Yes, and water use should be metered.	Yes, \$50/month.	That it won't freeze.	Yes.	The plumbers and electricians should work more closely with individual households regarding pipe and pump placements. I am worried that once in place (the pipes) and we want to remodel, we will have a hard time doing modifications.
288	The water taste is terrible often. They put in the "new" system a couple of years ago.		Yes.	No.	No - piped water users pay far less & should not be supplemented by the fed/state govt. They should have close to the same rate as those who don't have water at their doors.	I do yes! But Tundra Ridge will never get it in my lifetime. It is far healthier for the citizens of Bethel to have piped water.	Yes, \$100/month. I do now!	Connection fees?	Yes.	It's amazing that Kasayuli is being talked about water/sewer pipes when Tundra Ridge should be before them. Very poor planning on the part of the City of Bethel to allow these subdivisions being so far from city services.
289	Incentive for larger tank.		Yes.	No.	No - not related to distance, frequency, & piped water is unlimited w/ no plan for recapitalization of the system into the rates.	Only if the cost to maintain and replace is figured and it is not so obtrusive.	Yes, \$250/month.	We have not reserved. It is too ugly for words.	NO	
290	Water has high particulates. Clogs Brita filter every couple of weeks.		Yes.	No.		Yes.	Yes, whatever it takes.	Reliability of above ground system.	Yes.	
291	It is not a problem w/ the service per se; a year ago October we replaced our water tank w/ a new aluminum tank. It wasn't long before our 2 water filters started to clog. We think the problem must be w/ the cleanliness of the haul trucks.		Yes.	Yes.	No, I agree with others believe we should all be paying equally for the system as a whole, at least when it comes to the cost of water &, to a certain extent, delivery.	Yes, although the infrastructure is more expensive then buying new trucks every couple of years, when the system is in place for a while I believe the overall cost will be cheaper, even if we do actually set aside monies to fund depreciation. Not to mention piped services are the most sanitary method.	Yes, would depend on what data analysis showed was needed.	Only concern is the length of time and available funding to see improvements made any time soon.	Reluctantly, but yes - I realize it is in my best interest. Some homeowners invest a lot of time into the landscaping and maintenance of yards and trees. It is too bad the pipes have to be so visible and take away from the aesthetics of the yards.	
292	I would like to have an outside spigot.		Yes.	No.	I don't know if they are fair. For piped water it should be metered so that I pay for what I use! That's the most fair way and it helps promote conservation of limited resources.	Yes.	Yes, don't know.	That it be a safe system as well as clean & healthy for humans & pets.	I don't own property.	
293			Yes.	No.	Too expensive!!	No.	No.			
294			Yes.	Yes.	Yes.	No! Lagoons cannot handle current wastewater, i.e. infiltration & other dyke problems main lift station needs power back-up first. Back up problems can occur. Main lift station has unstable foundation.	Yes.	If dyke breaks & wastewater in lagoons runs into river, Bethel will be fined. Who will pay for this?	No.	Adding more wastewater to the system by providing "unlimited" piped fresh water is crazy until current wastewater problems are solved. Bethel's wastewater system is an ecological & financial disaster waiting to happen! But you already know this. The city residents and business need to know because they will have to pay for it. Shame on those who understand but do nothing.
295	Sewer pumping smell.	Sewer pumping smell.	Yes.	No.	N/A	Do something about the rust in pipe and harsh water. But other than that, cool.	Depends on cost effectiveness, at least 1/3 less than current.	Harsh water resulting in frequent faucet changes.	Possibly.	Thank you for your continuing efforts. Bethel Family Clinic - Head of Maintenance.
296	I don't like spending more on water than I do on gas every month.	Bad odor on day's of removal.	Yes.	No.	NO, TOO MUCH.	YES.	No.		NO	UGLY PIPES

CITY OF BETHEL
COMMUNITY WATER AND SEWER QUESTIONNAIRE: SUMMARY OF COMMENTS

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297	Consistent service time on date of service. More reliable service. I have to constantly check my sewer. We were not pumped on a scheduled day so we had an overflow. Still trying to get the city to come out and fix the problem. Also, water delivery no shut off in timely manner so we have a lake (or ice rink) under our house - causes major settling which requires frequent leveling.	See above.	Yes.	No.	No. I understand the need to pay for the system but for me to pay a set amount and for those w/ piped water to pay less and use as much as they want is not fair. We all need the same price or have piped water/sewer.	Yes.	Yes, \$200/month.	How soon?	Yes.	
298	I have trouble sometimes wit not netting water & not knowing about it. My tank is fully enclosed so if I see the truck tracks I assume I got water. They always need to leave a note if they do not fill.	I have a sewer truck take out a corner of fence & the driver lied & said that he did not do it. The city manager came and fixed it and apologized.	Yes.	No.	Yes, just went up 9% this month though.	No, it should not be above ground, looks ugly. What does Nome do? I do not remember seeing pipes there and they have good water.	Yes, \$125/month.	How will it impact my fence - people already try to climb it, now they will have a step stool. Kids in my neighborhood will probably break the pipes. They play on and in everything and damage things.	NO! Should be under ground. Will have to pay to make it go through fence. The lots are small enough as is, do not have room for above ground.	
299			Yes.	Yes.	Yes & no - city is doing everything it can. The price is too high (especially when compared to Anchorage rates) and the state should subsidize costs.	Sure - if quality & supply can be maintained. City Sub has been a joke - condolences to those who live there.	Yes, \$250/month.	Assure snow machine & pedestrian right of ways. Hire installers who know what they are doing.	In back.	
300	New pipe line. Water we're using now tends to settle. Rusted my dishes and appliance equipment.		Yes.	No.	No, it's not fair to cook rusty water.	Yes, clothing and equipment ruined from rusted water.	Yes, \$50/month.		Yes.	
301	I would like to see all housing on piped water.	Same as #10.	Yes.	Yes.	Little bit too high.	Yes.	Yes, \$100-150/month.	I'm concerned about the quality of water.	Yes.	None.
302			Yes.	No.	No. I believe they are too high. Some people do not make that kind of money.	If you can get pipes on this side of the slough I would be amazed.	No.	Freezing & broken pipes under or around the bridge, leaking into the slough & river, costs being way too high.	Yes, if guaranteed that the pipes will not break and spill into our river & slough.	Question, how will the pipes affect the boaters on leaving & returning?
303	Ask me in another year.							That it will eat up a lot of my fixed income.	For a fee or in kind to my satisfaction.	
304	Water should be metered per gallon.		Yes.	No.	No.	Only if the water is clean & treated.	Yes, \$40/month.		Only is properly planned.	
305			Yes.	Yes.	Yes.		Yes.		Not sure.	
306	Try not to make mess on ground from septic tank after empty out. Please don't drag the hose to due to septic tank.		No.		NO	Yes, at least the hoses aren't dragged around - much cleaner.	Yes.		Yes.	
307	Piped water & sewer. The outdoor water pipes freeze at times.	Maintenance of new piped services should be done by all households using that station. This is important & should be shown how to maintain whatever needs to be done - otherwise one person will be doing all the work. Insist all have to care for the service!	Yes.		We do not use our full tank of water and still pay for a full tank same with sewer. The planned meters will be better control.	Sounds good!	Not too much now! No ideal	The pipes should not take up too much space. We need to maneuver on the yard too. We have 4 boats and several vehicles to park and switch places.	Have to.	We are going to get fenced in with the pipes. We've never had any fencing to contend with so it's going to be hard for all.

CITY OF BETHEL
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308			Yes.	Yes.	No, Those that are lucky enough to live in piped neighborhoods get the lower utility bills and therefore are able to capitalize on a grant/subsidy that doesn't impact the whole city, just a few.	Yes. This is a cheaper system to operate, and is built with grant money.	Yes. \$200/month.		Yes.	
309			No.	No.	Yes.	Yes, if this will benefit the residents of Bethel.	No.			
310	They do a great job and always good natured. If we have problems with ice or delivery the city and deliverers always listen and help solve the problem.	None- Always helpful and help with ice problems in winter.	Yes.	No.	If need to be raised fine, but we are ardent conservers of water - most meters would make it fair. Pay for what you use.	No. Who will pay for it down the road and unforeseen costs of paying for electricity to keep it thawed in the winter- eventually it will get more costly. Trucks seem old fashioned, but when the money dries up, it may be the most practical way.	No. Only if meters are in place- I don't want to pay for another's selfish waste.	Meters on water- pay what you use and pay for how much you heat.	I don't we have a choice but it is very ugly . I don't want it in our Hoffman Sub.	Meters should have been put on every house- at one time they were only \$10.00 Now the city says they are very expensive. People will continue to waste water if they are not held accountable for it. All of us, rich or poor need to conserve.
311	Rusted pipes are ruining drinking and washing clothing.	Change all housing pipe lines. They are all rusted pipes.	Yes.	No.	No! How can you cook and eat rusty water. It's not fair to even make any payments.	Yes, you guys need to be fair and look to the matter. Change all pipe lines.	No.	Change all your pipe lines	Yes as long as you get rid of old pipe lines.	We would be glad to see clean water with clean water running!
312	Not very sanitary - I see the delivery boys at times drag the nozzle through dirty puddles of water and dirt.		Yes.	Yes.	Too much.	Yes.	Yes. \$125/month.	only for our properties.		
313		No.	Yes.	No.	No.	No, disaster in city sub and wait till it starts to age- put it underground or not at all. Too much damage above ground and too ugly.	No.		Absolutely not.	Don't believe anyone who says you cant put the system underground.
314	No comment.	None at this time.	Yes.	No.	Yes, because schedules are met.	I do not understand this question.	Yes, \$1.50/month.	Piped water.	N/A	N/A
315	Be more careful when backing city trucks into driveways so they don't hit things and back over lawns.	Maybe some more common sense. Ex, last winter they left a notice my sewer was frozen up when in fact it wasn't. The driver just turned the pipe around so it was sucking off the bottom of the tank.	Yes.	No.	No, I'll bet Bethel has somewhere near the highest rates in the country.	Yes.	No.	Why can't they be buried? Someday someone's going to hit one of them and you'll have a big mess.	They already have.	The city talks about how much this costs all the time, then why have it?
316	Pipe system.	Pipe.	Yes.	Yes.	Yes.	Excellent.	Yes, \$150/month. (As an employee I pay \$50 per month.)	My concern is that council will not take the appropriate steps to increase revenue. Sooner or later Village Safe Water will realize that Bethel citizens are not going to pay their part to improve water & sewer projects.	N/A	
317	Continue to improve clarity & reduce iron. Keep up fluoridation.		Yes.	No.	Yes.	Yes, where practical.	Yes, ?/month.		Already have.	
318	None, except less expense or no increase.	As mentioned for delivery services.	No.	No.	I guess.	No - the above ground pipes are ugly and it's going to be expensive.	No.	No more expense.	No.	If it ain't broke, don't fix it.
319			Yes.	No.	Unknown.	Yes, piped system will be better than sewer tank.	No.		No.	
320	Running water.	None.		Yes.	Yes.	Yes.	Yes.	It will take years to have water & sewer system improvements.	Yes.	

Public Comments

BETHEL WATER AND SEWER FACILITIES MASTER PLAN UPDATE

SIGN IN SHEET - (Please Print)

24-Aug-04

NAME	PROPERTY ROAD ADDRESS	MAILING ADDRESS	PHONE	E-MAIL
Greg Rozycki	449 NAPAUKIAK DR.	bx. 513	2903	N/A
ANNA CHOE	320 TUNORA ST	PO. BOX 634	3292	
Pony Choi	454 Fernington	1080	3204	
Jeff Sanders	432 NAPAUKIAK	Box 927	2379	
Tim Glickoff	217 BLACKBERRY	BOX 1362	4463	
Larin Badbury	192 Alex Hwy	P.O. Box 1208	3266	lovin192@ bni.com-ak@shn.com
Jan Grover	519	Box 3431	7720	
Marian Kellum	175 Blackberry St.	Box 2463	2393	

City of Bethel Water and Sewer Facilities Master Plan Update

35% Complete Public Open House Meeting

Name

Lorin L. Bradbury

Property Address

197 Alex Hatley

Mailing Address

P.O. Box 1748

Phone

543-3266

E-mail

lorin192@unicon-ak.com

What are your top 3 priorities associated with this project?

1. Below-grade pipes for all future water systems
2. Develop local improvement districts to fund systems
- 3.

General Comments.....

Return to:

Mike Rabe, P.E.
CRW Engineering Group, LLC
3940 Arctic Blvd, Suite 300
Anchorage, AK 99503

Tel 562-3252
Fax 561-2273
mrabe@crweng.com

City of Bethel Water and Sewer Facilities Master Plan Update

35% Complete Public Open House Meeting

Name United Presbyterian Church
Property Address 451 Bridgecrest
Mailing Address P.O. Box 1749
Phone 543-3246
E-mail joon192@united-ak.net

What are your top 3 priorities associated with this project?

1. All future water systems be on grade.
2. Develop local improvement districts to fund constructions
- 3.

General Comments.....

Return to:

Mike Rabe, P.E.
CRW Engineering Group, LLC
3940 Arctic Blvd, Suite 300
Anchorage, AK 99503

Tel 562-3252
Fax 561-2273
mrabe@crweng.com

City of Bethel Water and Sewer Facilities Master Plan Update

35% Complete Public Open House Meeting

Name JEFF SANDERS
Property Address 432 NAPAKIAR City Sub
Mailing Address Box 527 BETHEL
Phone (907) 543 2379
E-mail _____

What are your top 3 priorities associated with this project?

1. Concurr w/ priority, of creating watering points / sewer access to trucks
2. Conservation needs to be part of Village Safe water Fund Stream - Prioritize
3. Better analysis of real costs + trade offs needs to be incorporated in planning:

General Comments.....
ie: 1) costing competing treatment + delivery systems
2) Accounting structure that creates rate structure needs to be made accurate + transparent.

Return to:

Mike Rabe, P.E.
CRW Engineering Group, LLC
3940 Arctic Blvd, Suite 300
Anchorage, AK 99503

Tel 562-3252
Fax 561-2273
mrabe@crweng.com

State of Alaska

Department of Corrections

**Yukon-Kuskokwim Correctional Center**

25 March 05

City of Bethel
P.O. Box 3401
Bethel, Alaska 99559-3401

RE: FORCE SEWER MAIN

Dear Mr. Herron:

The Yukon Kuskokwim Correctional Center is tied into the force sewer main that runs from the QFC II to the new lift station by the ASHA Pump house. The facility has been connected since it was constructed.

During the past three year period the YKCC facility has experienced a slow down in the discharge pumping rate from our sewage lift station and two sump pits into the sewer main. We made the assumption that the existing sewage pumps we have were worn from use over the past fifteen years of use. We replaced one pump and did not see an improvement in the discharge rate. The sewage lift station has overflowed twice in the past year.

The two sump pits collect roof run off and the backwash discharge from our water treatment system. These pits have overflowed at least twice in 2003 and 2004, and three times in 2005.

We have monitored the discharge rate of our lift stations periodically during the day, and it varies depending on the time of the day.

We have been discussing this issue with Mr. Rabe of CRW Engineering, and our pump supplier. The conclusion we have come to, is the hydraulic loading of the existing force main is the issue.

We appreciate the efforts being made to expedite the replacement of the forced sewer main by the City of Bethel, their engineering firm, and other concerned entities.

Sincerely,

A handwritten signature in black ink, appearing to be "Rob Dahl", written over a horizontal line.

Rob. Dahl, Acting Superintendent

PACIFIC RIM INTERNATIONAL SERVICES INC.

**PO Box 1208
Bethel, AK 99559**

**Phone: (907) 543-4305;
Fax: (907) 543-4216
pacific3@msn.com**

March 24, 2005

Wayne Ogle
Public Works Director
City of Bethel
Bethel, AK 99559

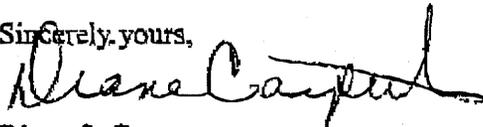
Dear Mr. Ogle:

I am writing in regard to badly needed improvements in the Bethel sewer line that is located on the highway near the airport. My guest house is connected to this line. The line and lift station are already inadequate for existing users, and projected growth is very heavy in this area. At peak times during the day there are already backups when this line cannot discharge into the main. It will not be long before major public sanitation problems occur.

Please support the need for upgrading this facility.

Thank you.

Sincerely yours,



Diane S. Carpenter
President



Fax

City of Bethel
Director, Public Works Department
907-543-3110
Fax: 907-543-3366

TO: Ms. Diane S. Carpenter

FROM: Wayne H. Ogle

SUBJECT: PACIFIC RIM INTERNATIONAL SVCS INC.; YOUR FAX DATED 24
MARCH 2005 REGARDING SEWER PROBLEMS

FAX NUMBER: 907-543-3403

DATE: 24 MARCH 2005

Dear Ms. Carpenter,

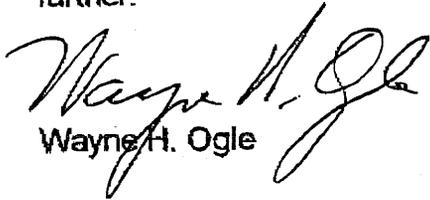
Thank you for fax of this date which points out the problems you are having with the piped sewer system.

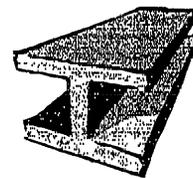
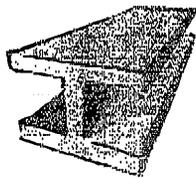
The Public Works Department is aware of the sewage back-up problems you have described. This is due to a higher demand than the current lines can handle. We are working with our customers who are experiencing these problems on a case by case basis. I will have Ben Kirk, Utilities Maintenance Foreman contact you and discuss what can be done about your problem.

We are also taking steps to address over-capacity in these sewer lines in the long term. The City of Bethel is now considering the *Bethel Water & Sewer Facilities Master Plan Update*. All water and sewer projects in the Master Plan will be funded by State of Alaska Village Safe Water (with possibly some other funding sources). In this Master Plan, the current top ranked project (among 44 others) is constructing a larger Lift Station to replace the present one at QFC II. Also, part of this project will be upgrading the "Forcemain" or main pipeline which your property is tied into. This project would, in the long term, resolve the over capacity problems you are experiencing.

The Master Plan is undergoing the final approval process which will ultimately result in the Bethel City Council adopting the Plan. Part of this approval process is holding public meetings where the public can learn what the Master Plan is all about and also have a chance to be heard about possible concerns. As a person who is decidedly affected by this Master Plan, I would urge you to attend this public hearing and provide input. We are all listening intently to the needs of the community in considering the priorities of the Master Plan. The meetings will be held at 6:00PM at the Log Cabin on Tuesday, 29 May and, for your convenience, again on Tuesday, 5 April at the same time and place. We are advertising this meeting in all the local media in an attempt to gain as much public interest as possible. I hope to see you there.

Please let me know if you have any questions or would like to discuss this further.


Wayne H. Ogle



Bethel Drilling & Welding
&

*Bethel Trailer Court
P.O. Box 189/Trailer Ct. #26
Bethel, Alaska 99559-0189
907-543-2026
907-543-5348 Fax*

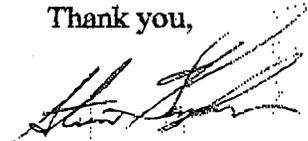
March 22, 2005

City of Bethel
P.O. Box
Bethel, Alaska 99559

To Whom it May Concern:

I wanted to inform you of us having some trouble with the line to the liftstation that is located across the street from the Bethel Trailer Court. We have in the last 3 years had it back up and also at times it runs slow. When this happens we have to inform DEC and then have an evac truck come and pump the ditch out. I think this is do to the size and if it were possible to made the lines bigger we would not have this problem. The Bethel Trailer Court is on the same line with the Bethel Permaternal Home also. I have heard that the City is in the process of upgrading and moving the liftstation. My concern is when they do this will I have to upgrade our equipment? Also if you could let me know what side of the road the new liftstation will on and could you let me know where we will connect into. The pumps we are currently using are BJM1500C, 150 GPM at 40 head FT. If I can help you in anyway please contact me.

Thank you,


Steve Hayden
Manager
Bethel Drilling & Welding



RECEIVED

MAY 02 2005

April 28, 2005

CRW Engineering Group, LLC
Attn. Mike Rabe
3490 Arctic Blvd., Suite 300
Anchorage, Alaska 99503

CRW Engineering Group, LLC
Project # _____
File in Folder _____
CC to Folder _____

Re: Bethel Water/Sewer Master Plan Update – ONC N.R. Dept. Comments

Dear Mr. Rabe:

Per our conversation at the Bethel City Council meeting last Tuesday at which the 95% Plan was approved, following are fleshed-out comments and suggested language reflecting those we presented verbally at that meeting and the April 6, 2005 public hearing at the log cabin. If you feel that the points raised would be more appropriate or carry more weight in pages or paragraphs other than (or in addition to) those I've identified, feel free to copy/cut/paste/edit; so long as the essence and integrity of what's contained is kept intact and substantively incorporated in the final version.

Page 17, 3.10.10. Traditional Use Areas

Bethel has no formally identified areas for traditional use though activities such as berry picking and plant gathering continue to take place within the City limits at the present time.

Personnel with the Orutsararmiut Native Council (ONC), the federally recognized Tribal Governing Body for the community, are concerned with the long-term detrimental effects the proposed improvements would have on traditional use trails utilized by Bethel residents if plans for their accommodation are not incorporated through all phases of development. The trails being referred to are primarily snow machine trails used by residents to travel to traditional winter subsistence hunting and fishing areas outside the City boundaries, as well as routine travel associated with regional commerce, social and economic infrastructure between Bethel and surrounding villages. An additional concern of some residents is how aboveground water and sewer lines might tend to restrict the movement of pedestrians about the city. The ONC considers it important that crossings over pipes at key locations be incorporated into any current or future design and construction to maintain snow-machine access to the City Center in the long-term as ongoing development occurs.

**Page 20, 5.4. Transportation 5.4.1.
Roads and Trails**

Bethel's role as a regional transportation hub dictates the need for quick and efficient transport of goods and merchandise within town, and maintenance of a winter trail system to provide ground access (by snowmachine or four-wheeler), efficient access to the port, boat harbor and local seaplane lake bases, for commerce activities to and from surrounding villages is essential. By ensuring that these needs are taken into consideration and accommodated as future developments (such as aboveground water and sewer lines) occur, goods can continue to be readily transported to surrounding villages by air, water or land as the prevailing seasonal conditions dictate. Additionally, roads are considered critical to opening up areas for new development, especially closer to town, while winter trails maintain traditional access to subsistence hunting and fishing areas in the surrounding region, along with the previously mentioned economic aspects.

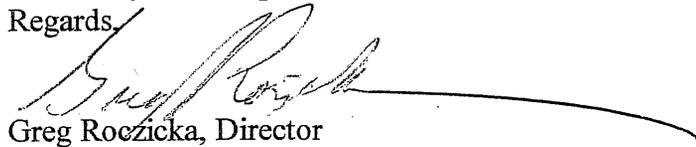
Page 72, 12.6. Transportation Impacts

With planning and incorporation of proactive measures to address issues raised in maintaining access for traditional winter or foot trails, the recommended improvements are not anticipated to negatively impact existing transportation facilities. In fact, construction of the "backbone" water and wastewater improvements will improve traffic concerns, since truck-haul travel distances will be significantly reduced.

Additionally, rather than being created or viewed as an obstruction, with adequate planning, utility easements for aboveground piped water/sewer lines could serve the dual benefit and purpose of accommodating long-term protection for winter access corridors to the City Center. Pedestrian boardwalks also have high potential to be "piggy-backed" in the same way, not only for the basic aspects of foot traffic, but as bike or jogging trails for health, recreational and other practical purposes (high & rising cost of gas these days). Another beneficial factor would be the reduction of safety concerns directly associated with pedestrian, children and bike traffic along the road shoulders. (Exemplified in the current boardwalk between the community college and hospital constructed at minimal cost by the City in 1985 on top of the waste heat line; and along Ridgecrest between 6th Avenue and ASHA subdivision.) Snowmachine crossings and boardwalks should also result in reduced costs to pipes overall in the long term by preventing damage and subsequent repairs or maintenance.

Thank you for your time and consideration in this matter. Please don't hesitate to contact me for any further questions or additional information.

Regards,



Greg Roetzicka, Director
N.R. Dept.

Cc: COB Mayor Hugh Dymont, John Sargent

March 29, 2005 Presentation

BETHEL WATER AND SEWER FACILITIES MASTER PLAN UPDATE

SIGN IN SHEET - (Please Print)

29-Mar-05

NAME	PROPERTY ROAD ADDRESS	MAILING ADDRESS	PHONE	E-MAIL
Yolanda Jorgensen	116 Osage	P.O. Box 1347-919	543-2577	tweetybird-196779@earthlink.net
Bo Olson	305 Panmigan	Box 982	543-190	okonoos@unicom.com
Dave Wastham	9236 Cordova Ridge 1900 State Highway	Box 90	543-2772	dave_wastham@alaska.com
Dan Leinberger	PO Box 2888	PO Box 2888	543-3733	Esti.mowham@aol.com
Andrew McGowan	Box 2082	451 Ptarmigan St	543-5147	amcgowan@unicom-alaska.com
Luanh B. Budberg	192 Birch Hill Butterfield	P.O. Box 1748	3266	192192@unicom-alaska.com
WAYNE OOUR	253 AKIAR CITY SUB	P.O. Box 3189	3837	woste@cityofbethel.net
R. P. M.	1420 Hoffman Sub	P.O. Box 1986	1575	SISSAWIL@UNION-ALASKA.COM
JEFF SANDERS	432 NARAKIAR	# 527	2379	JEFFCO2004@YAHOO.COM
Hugh Dymont	Box 995	223 Alex Hately	3351	hugh_dymont@ksd.com
BOB GRAHAM	370 Kinshah	Box 808	2007	
Robert Strahan	325 First Ave	P.O. Box 590	1376	rstrahan@cityofbethel.net



City of Bethel



**Water and Sewer Facilities Master Plan Update
Public Meeting
March 29, 2005**

Why Have a Water & Sewer Facilities Master Plan ?

- State and Federal funding agencies require a City approved water and sewer master plan
- Ensures the community is getting the most cost effective systems
- Allows the community to provide input into future improvements
- Allows the City to better plan operations and maintenance needs

Current Water and Sewer Master Plan (1996)

- Recommended 10 water treatment facilities be constructed throughout the community
- Recommended continued use of the existing sewer backbone lift stations/force mains and the sewer treatment lagoons
- Recommended the truck-haul water distribution and sewer collection system be replaced with a piped system
 - Aboveground circulating piped water system with heat added at distribution point
 - Aboveground piped pressure sewer system with glycol/electric heat trace

Current Water and Sewer Master Plan (1996)

- A project priority list was prepared that generally provided piped service to the most densely populated areas first
- Project sequence included constructing a water treatment facility within a service area immediately followed by constructing the piped water and sewer system within this service area
- Phase 1 Improvements were initiated in 1997

Current Water and Sewer Master Plan (1996)

- Phase 1 included approximately \$29 million of improvements
 - Upgrade the existing Bethel Heights Water Treatment Facility
 - A new water treatment facility at City Subdivision
 - A new piped water distribution and sewer collection system within City Subdivision
- The following improvements were added to Phase 1 due to deficiencies discovered during design
 - Decommission the City Center WTF, and replace the piped water and sewer system within City Center
 - Upgrade the sewer force main backbone that crosses Ridgcrest Drive
- The Phase 1 improvements began in 1997 and will be completed in 2005
 - Project schedule was limited by funding constraints (approximately \$3.3 million per year)

What Did We Learn From Phase 1?

- The cost of the water treatment facilities were significantly higher than anticipated
- Much of the existing sewer backbone facilities are deficient and must be upgraded
- The Bethel Heights piped water and sewer system are deficient and must be upgraded
- Estimated project costs were outdated which made it difficult to estimate funding needs
- The proposed water and sewer development plan did not address the increased costs to the existing truck-haul operations
- Therefore; the 1996 Water and Sewer Facilities Master Plan needs to be updated

Bethel Water and Sewer Facilities Master Plan Update

- Anticipated Schedule
 - 35% Submittal – August 2004
 - 65% Submittal – January 2005
 - 95% Submittal – April 2005
 - Final Document – May 2005
- Community Involvement
 - Public Meetings
 - Bethel Finance Committee
 - Bethel Public Works Committee
 - Bethel City Council

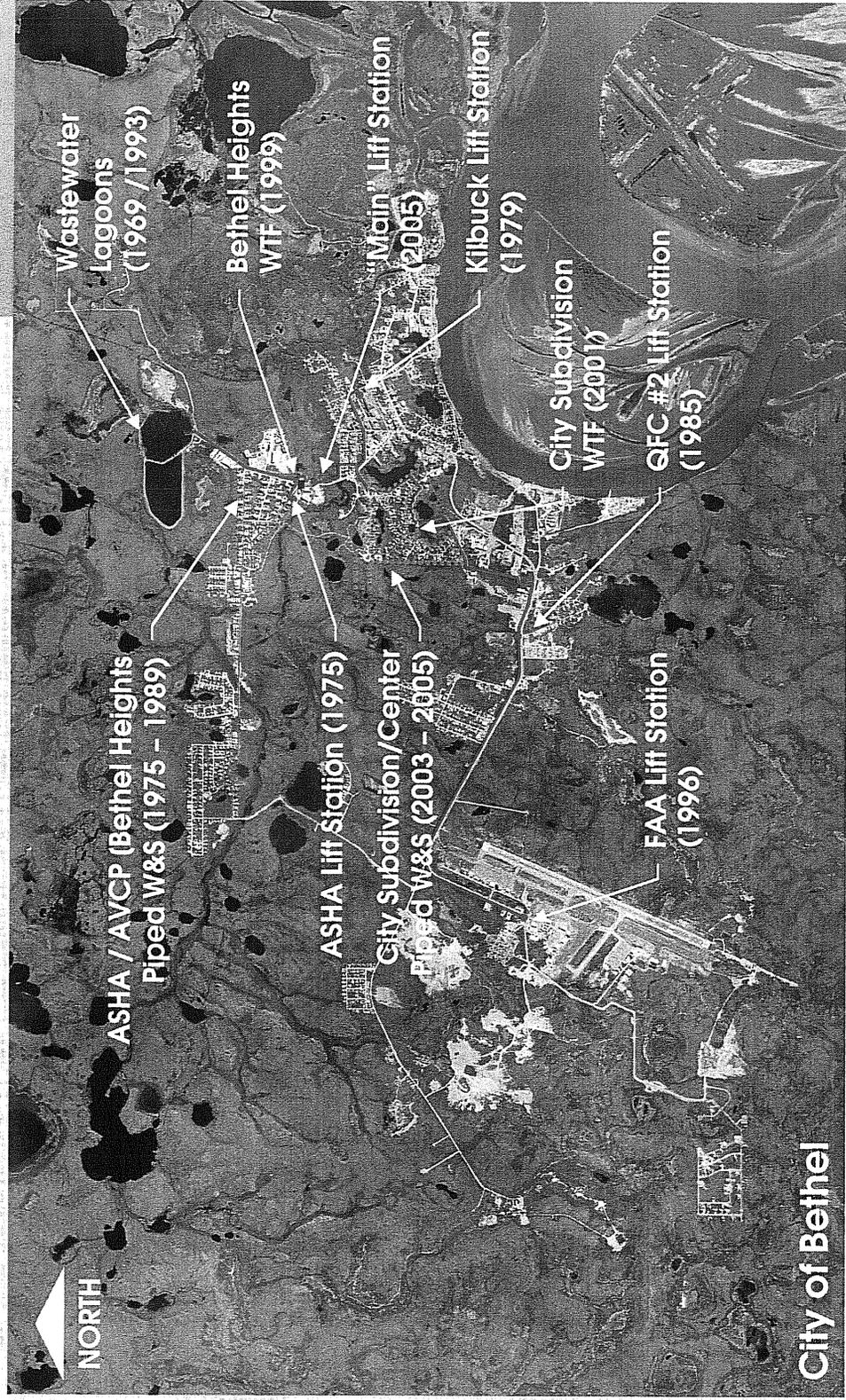
Master Plan Update Approach

- Computer model piped improvements to size proposed facilities and establish better costs
- Identify short-term improvements that reduce the truck-haul costs
- Identify long-term improvements to meet the community's goal of providing piped water and sewer services
- Reassess project priorities to meet the short-term and long-term goals of the community
- Provide a project schedule with funding needs for the first approximately \$30 million of proposed improvements

Existing Water & Sewer Facilities

- Sewer Collection/Treatment/Backbone System
 - Seven lift stations with aboveground force main
 - Sewer truck-haul vehicles
 - Facultative Wastewater Treatment Lagoons
- Water Treatment/Distribution Backbone System
 - Two water treatment facilities
 - Water truck-haul vehicles
- ASHA/AVCP (Bethel Heights) Piped Water and Sewer System
- City Subdivision/City Center Piped Water and Sewer System

Existing Water & Sewer Systems



Condition Assessment

■ Sewer Collection Backbone System

- Main Lift Station was reconstructed in 2004 and is operating satisfactorily
- QFC # 2 Lift Station is undersized and must be relocated to accommodate the National Guard Armory development
- Most of the sewer force main from QFC # 2 Lift Station to Lagoon is undersized causing pressures to exceed design
- FAA Lift Station is operating satisfactory; however, it is undersized to handle future flows
- FAA Force Main is undersized to handle future flows and the pipe lining is delaminating causing plugging
- Wastewater Treatment Lagoons are ineffective due to groundwater infiltration
- Killbuck Lift Station / Force Main is operating satisfactorily; however, it is nearing the design life of the facility

Condition Assessment

- Water Supply Backbone Systems
 - Bethel Heights Water Treatment Facility (BHWTF) was reconstructed in 1999 and is operating satisfactorily
 - City Subdivision Water Treatment Facility (CSWTF) was constructed in 2001 and is operating satisfactorily
 - City Center Water Treatment Facility was decommissioned in 2001
 - The BHWTF and CSWTF have adequate capacity to meet the future water demands of the community except for development west of the airport

Condition Assessment

- ASHA/AVCP (Bethel Heights) Piped Water & Sewer System
 - The existing sewer lift stations need automatic standby power
 - A section of sewer gravity main needs to be redirected from the force main to the ASHA Lift Station
 - All sewer road crossings need to be placed in conduit crossings to eliminate settlement
 - Piling needs to be secured to eliminate movement of the gravity sewer lines
 - The water distribution lines are experiencing corrosion and need to be upgraded
 - Water service connections are leaking and need to be upgraded
 - Water distribution pumps, high demand pump, boilers, and all controls need to be upgraded

Condition Assessment

- City Subdivision/City Center Piped Water and Sewer System
 - Phase A was completed in 2003
 - Phase B was completed in 2004
 - Phase C will be completed in 2005
 - Ridgcrest Drive Sewer Crossing will be completed in 2005
- These systems are new and are operating satisfactorily

System Operational Costs

Estimated Monthly Water and Sewer Cost per Service(*)

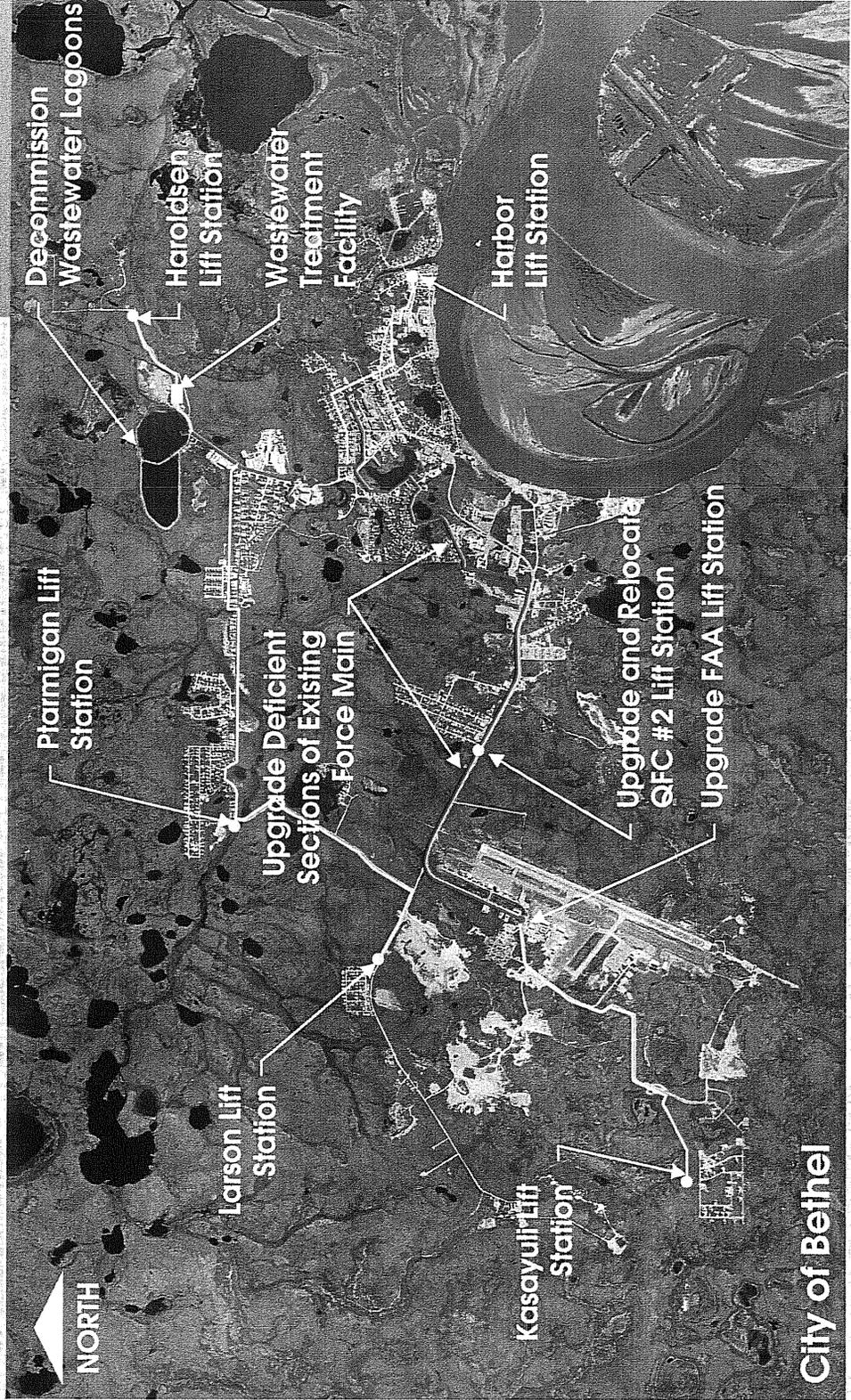
- Existing Truck-Haul W&S..... \$340/Mo.
- Future Truck-Haul W&S (1996 Plan)..... \$452/Mo.
- Future Truck-Haul W&S (2005 Plan)..... \$308/Mo.
- Future Piped W&S..... \$214/Mo.

(*) Includes O&M costs and replacement of equipment with design life less than 10 years

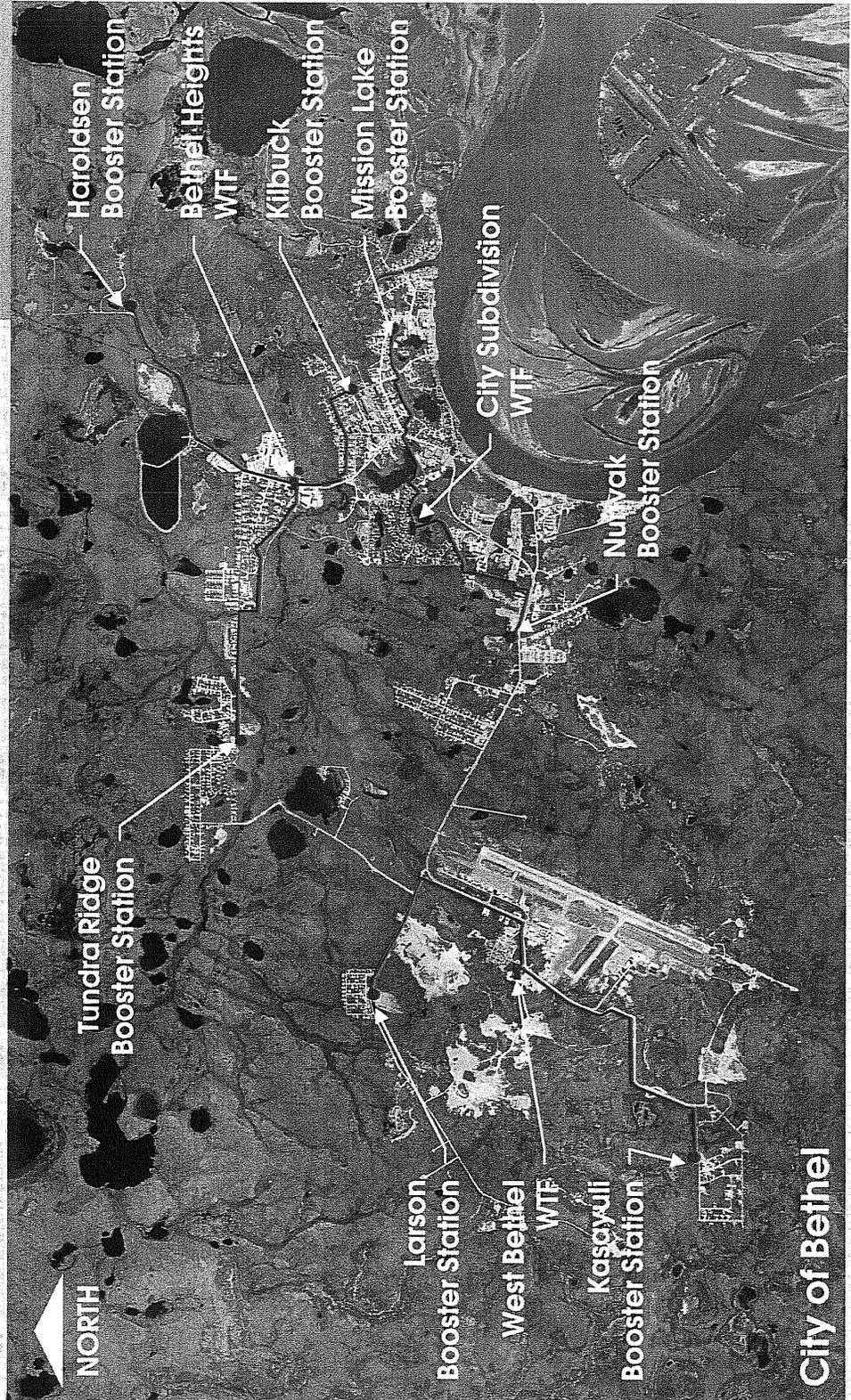
Recommended Strategy

1. Upgrade the backbone sewer lift stations/force mains to correct deficiencies and meet future flow demands
2. Upgrade the Bethel Heights piped water distribution and sewer collection system to correct deficiencies
3. Construct a new mechanical wastewater treatment plant and decommission existing wastewater lagoons
4. Construct a new water treatment facility in west Bethel to serve the Bethel Airport and development to the west
5. Extend the backbone sewer force main to un-served subdivisions to initially serve truck-haul operations
6. Construct water booster pump stations with water storage to un-served subdivisions to initially serve truck-haul operations
7. Construct piped water distribution and sewer collection systems at all the subdivisions

Recommended Backbone Sewer Strategy



Recommended Backbone Water Strategy



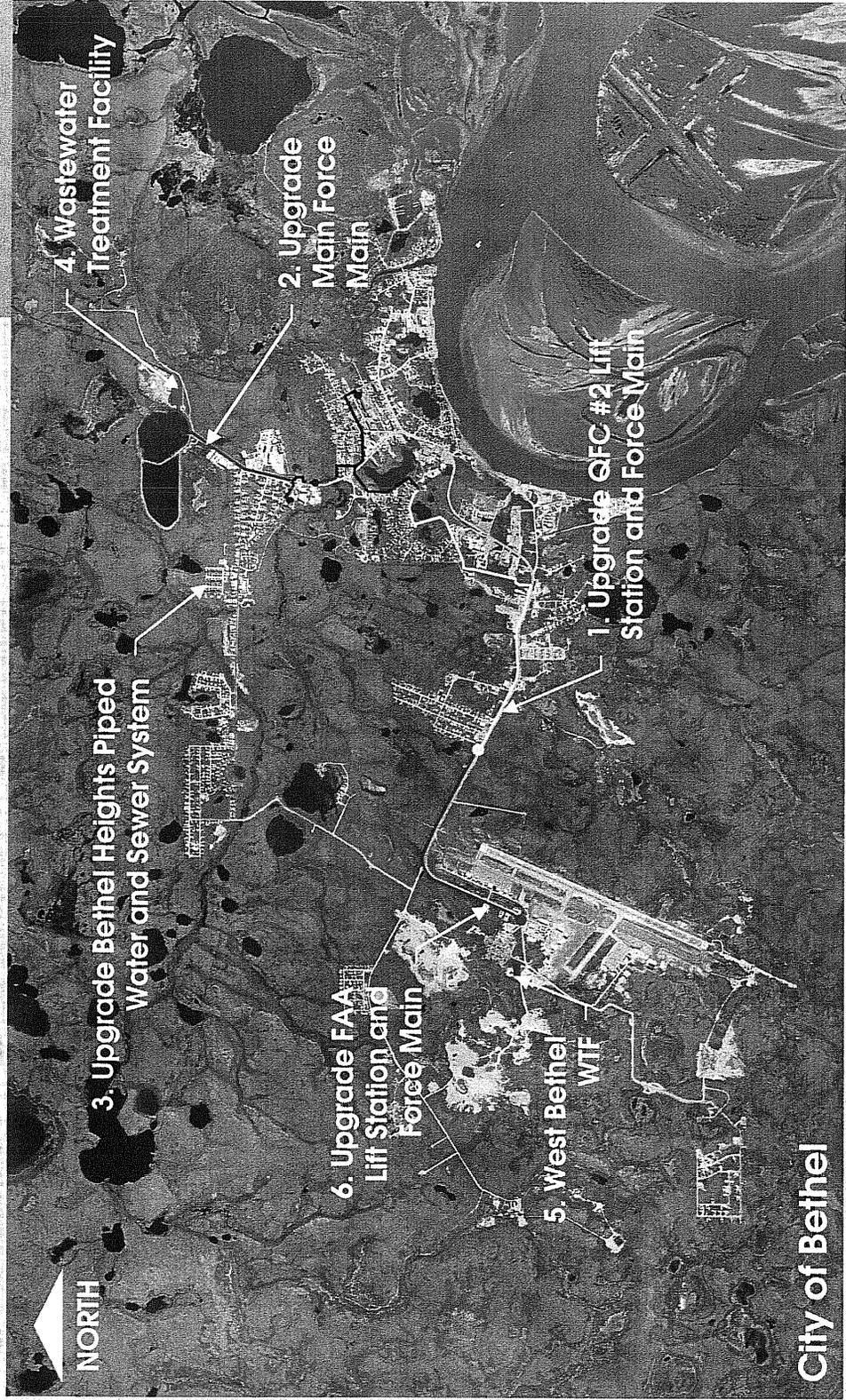
Anticipated Project Funding

- Approximately \$1.0 million available from existing Village Safe Water SFY 2005 Capital Improvement Grants
- Approximately \$30 million anticipated over the next three years (SFY2006/07/08)
 - \$7.5 to \$9 million per year from Village Safe Water's Capital Improvements Grant
 - \$1 to \$2 million per year from Alaska Native Tribal Health Consortium's Sanitation Deficiency System Grant

Three Year Project Priority

1. QFC #2 Lift Station and Force Main Upgrade.....	\$4.2 Million
2. Main Force Main Upgrade.....	\$1.2 Million
3. Bethel Heights Water and Sewer System Upgrades.....	\$2.2 Million
4. Wastewater Treatment Facility.....	\$18.9 Million
5. West Bethel Water Treatment Facility.....	\$3.3 Million
6. FAA Lift Station and Force Main Upgrade.....	\$1.2 Million
Total.....	\$31.0 Million

Three Year Project Priority



Funding Constraints

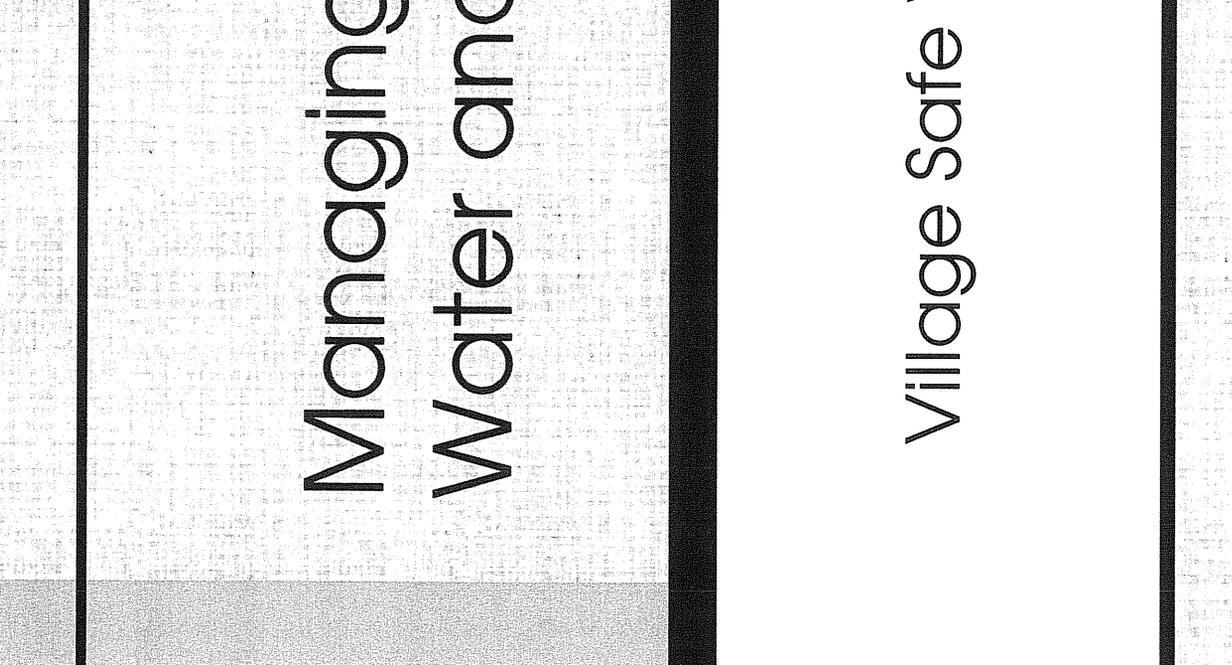
- The SFY VSW 2006 grant (\$9.075 million) is available July 2005 and must be substantially spent by July 2006 before receiving the SFY 2007 grant
- Subsequent grants must be spent similarly before applying for future funds
- The City cannot “stack up” money for future work
- Refer to hard copy schedule for first three years of projects

Where Do We Go From Here?

- March 15, 2005 - Bethel Public Works Committee approved project prioritization for 95% complete document
- March 24, 2005 - Bethel Finance Committee approved project prioritization for 95% complete document
- March 29 & April 4/5, 2005 - Public Meetings
- April 12, 2005 - The 95% complete Water and Sewer Facilities Master Plan Update presented to the City Council for approval by Resolution (available April 6, 2005)
- May 2005 - Final Water and Sewer Facilities Master Plan Update completed
- June 2005 - Start the design of the first \$10 million worth of priority projects
- July 2005 - City of Bethel to apply for SFY 2007 Village Safe Water Capital Improvement Grant (Master Plan Update must be completed)



Managing Bethel's Water and Sewer Projects



Village Safe Water Program

VSW Management Methods

Traditional VSW Management

- The City hires an Engineering Consulting Firm to manage, administer, and design the project
- This consulting firm must be familiar with VSW and State administrative, design, and construction regulation, policies and procedures
- Generally suited to fast paced projects or large/special projects

Alternative Management

- The City assigns employees to manage and administer the project
- These employees must be familiar with VSW and State administrative, design, and construction regulation, policies and procedures
- Generally suited to small special projects or reoccurring projects

Traditional VSW Management

ADVANTAGES

- The Consultant, not the City, is responsible for compliance to VSW and State of Alaska regulation, policies and procedures
- The Consultant is liable for any mistakes that may occur
- The Consultant is responsible for project schedule
- Consultant will manage construction through competitive bid contracting or force account method
- The City does not have to worry about seasonal staffing issues

DISADVANTAGES

- The City has less project control
- The project may cost more since the Consultant must make a profit
- The City may lose job opportunity to local residents that are qualified

Alternative Management

ADVANTAGES

- Potential to hire local residents for the management team
- More City control over project schedule, design, materials & construction
- City may be able to save money on project management services since the community doesn't need to make a profit
- The Community may take a greater level of pride in the projects

DISADVANTAGES

- The City is responsible for compliance to regulations, policies and procedures
- The City must demonstrate the capability to do the work without technical or administrative support from VSW
- The City takes on all the project management financial risk
- If the City opts to force account construction
 - The City is liable for any problems or mistakes that occur
 - The City is responsible for all quality control
 - The City must provide a good training program to ensure workers are skilled
 - Difficult to find qualified personnel that are willing to work seasonal

What Has Bethel Been Doing?

- VSW provides management oversight and is not staffed to provide Project Management services
- Bethel has been using the Traditional VSW Management method
 - Large and special projects have been competitively bid to licensed Contractors
 - Smaller projects have been constructed through force accounting which were managed by the consultant
- These projects have undergone several State of Alaska audits without problems
- Project contracts and invoicing have been reviewed and approved jointly by the City and VSW
 - Engineering fees for the Phase 1 improvements have averaged approximately 16.6%; below the industry standard of 20%
 - Overall project quality and costs are in accordance accepted industry standards

VSW Management Expectations

- VSW proposes that the City of Bethel solicit and hire a Project Management consultant to manage Bethel's water & sewer capital program
 - VSW does not have the resources to manage \$10 million per year in capital improvements
 - Consultants have a proven record to complete project on schedule
 - Consultants have a proven record to complete the work in accordance with regulation, policies and procedures
 - Consultants have a proven record of passing a State of Alaska audit
 - Consultants have a proven record of managing force account projects

VSW Management Expectations

- Alternative Management Method
 - The City needs to show how they can meet the project schedule
 - The City must provide administrative and management methods to show they can complete the work in accordance with regulations, policies and procedures
 - The City must identify a project management team that has proven record for managing consultants, contractors, and force account projects
 - The risk of not meeting the project schedule may impact future funding

Trip/Meeting Reports

Telephone Record

From



Michael Rabe, P.E.
CRW Engineering Group, LLC
3940 Arctic Boulevard
Anchorage, AK 99503

Phone: (907) 562-3252 Fax: (907) 561-2273 E-mail: mrabe@crweng.com

Attention **Mike Rabe P.E.**

Company CRW Engineering Group

To 3940 Arctic Blvd., Suite 300
Anchorage AK 99503

Tel. No. **562-3252**

CRW No964102

Date: 12/22/2004

Project: City of Bethel
Bethel Water & Sewer Master Plan

Subject: Telephone Conference

Telephone Conference - Bethel Public Works Committee.

6:30 to 8:30 PM

1. The Public Works Committee does not believe that the City of 'Bethel can support the infrastructure for the entire piped system even though the capital improvements are funded by VSW Grants. The City is currently building a capital reserve based on the grant funds so that there is funds available to replace the infrastructure in the future. Unfortunately, this reserve is raising utility rates above what is affordable. They asked what other VSW funded communities are doing. I explained that VSW only requires that a community show that the can pay for O&M costs and a capital reserve to fund equipment that is anticipated to breakdown during the design life (for example, pumps, boilers, controls, etc.). However, VSW does not require a capital reserve to replace the entire infrastructure. It is assumed that grants will be available and or other methods to fund replacement will be available (low interest loans, grants, and bonds).

2. The Public Works Committee does not want the Master Plan Update state the the City is ultimately going to a piped system. They want the opportunity to remain using truck-haul if that makes sense of the subdivision or community. However, they agree to the construction of the Backbone Improvements.

3. The Public Works Committee will recommend to the Planning Department that minimum water and sewer tank sizes be established (1000 gal. and 1500 gal respectively). They asked if VSW would participate in changing out old tanks with new tanks. Based on my conversation with Jim Patterson I said that I didn't think so.

4. The Public Works Committee believes that remote reading water meters should be installed on both piped and truck-haul services. They wanted to know if VSW would participate in retrofitting existing homes. Based on my conversation with Jim Patterson I said that I didn't think so.

Telephone Record

From



Michael Rabe, P.E.
CRW Engineering Group, LLC
3940 Arctic Boulevard
Anchorage, AK 99503

Phone: (907) 562-3252 Fax: (907) 561-2273 E-mail: mrabe@crweng.com

Attention **Robert Strahan**

Company City of Bethel

To P.O Box 388
Bethel AK 99559

Tel. No. **534-1376**

CRW No964102

Date: 11/23/2004

Project: City of Bethel
Bethel Water & Sewer Master Plan

Subject: Telephone Conference

Telephone Conference - Bethel Public Works Committee/Finance Committee Meeting.

6:30 to 8:30 PM

The Water Wagon, a water truck-haul company out of Fairbanks, AK., visited Bethel and provided recommendations to the City's water haul system. Generally, they concluded that the City was providing good service and need just needed to raise rates. The water wagon provides water service only. They charge \$60 for minimum 750 gallons, plus \$0.07/gallon thereafter. They also have 2000 customers. Other recommendations included:

1. The City could look into installing meters that could be read from the truck drive to help automate the billing system.
2. Install minimum 1000 gal water tank and 1500 gal sewer tank to reduce the number of required trips.
3. The City needs to raise rates at least 30%.

We discussed the City's rate vs. Water Wagon rates - I estimate that the City consumes approximately 75 million gallons per years with a water and sewer budget of \$5.5 million per year. This equates to \$0.07 per gallon for water and sewer services. Water wagon charges \$0.07 per gallon just for water.

The committees want to know if they could use VSW funds to install new larger tanks to existing homes and fund tanks for new homes. I told them that the water and sewer master plan would have to recommend truck-haul operations as the preferred alternative, rather than the current piped alternative, in order to use VSW funds to modify existing homes. I did not believe VSW funds could be used to install water and sewer tanks on future homes (an ordinance would need to be passed by the Council requiring minimum tanks sizes).

We discussed using remote meters to automate billings. It was my opinion that installing remote reading meter would not reduce costs of billings. It was my opinion that the meters are installed a method force consumers to conserve water - this is not a problem in Bethel at this time. It is my opinion that the City needs to reduce truck haul cost by reducing the distance trucks need to travel - I explained that this is the basis of the current master plan update, 35% complete document.

We discussed the current master plan document philosophy - The overall goal is to first construct \$80 million of "backbone" facilities (including truck fill stations and sewer dump station at each of the 10 service areas). These improvements would initially be used to reduce truck haul operational costs by reducing the distance the trucks need to travel. Ultimately, these improvements could be used to expand piped service (estimated at \$170 million).

The committee wanted to know what options there were to speed up the process of funding these improvements (at the current funding level of \$3 million/year through VSW the project would take 26 years just to complete the "backbone" improvements. I indicated that a loan though EPA would be the best option. Rate are about 2.5% over 30 years. They wanted to know if VSW funds could be used to pay off a loan. I told them that I did not think that would be

approved, but I would check with VSW.

I explained that it was my understanding that the City was proposing to fund a new wastewater treatment plan using EPA loan and that they were waiting for the completion of an Engineering Report from CH2M Hill. No one seemed to know what that status of the report and loan application. I said that I would look into this issue.

The committees asked me to write a memo summarizing the evaluation of construction a small WWTF within the service areas rather than constructing a lift station with associated force main.

TRIP REPORT



CRW Engineering Group, LLC
3900 Arctic Blvd. Suite 203
Anchorage, AK 99503
(907) 562-3252 FAX 561-2273

DATE: February 27 through March 2, 2005

PROJECT: City of Bethel
Bethel Water and Sewer Facilities Master Plan Update

LOCATION: Bethel, Alaska

REPORTER: Mike Rabe, PE, Project Manager, CRW Engineering Group, LLC

PURPOSE: Meet with City Staff and Bethel Public Works Committee to discuss Project Prioritization for the 95% Submittal

Tour Bethel Water and Sewer Facilities with City and VSW

Attend Special City Council Meeting

CONTACTS:

Bob Herron	Manager, City of Bethel
Wayne Ogle	Public Works Director, City of Bethel
Ben Kirk	Utilities Manager, City of Bethel
Tim Oosterman	WTP Operator, City of Bethel
Billy Stuart	WTP Operator, City of Bethel
Laurie Walters Public Works Committee	Assistant Finance Director, City of Bethel (See Below)
Laurie Walters	Assistant Finance Director, City of Bethel
Jim Patterson	Village Safe Water (VSW)
Bill Griffith	VSW
Greg McGee	VSW
Kent Knapp	DEC/RMW

ACTIVITIES:

February 27, 2005 (Sunday):

I arrived in Bethel at 10:00 PM on Alaska Airlines Flight 45. I picked up the company pickup truck and went to the quarters and to bed.

February 28, 2005 (Monday)

- 8:00 to 9:30 AM – Bob Herron, Wayne Ogle and I met to discuss the status of prioritization of the projects identified in the 65% Master Plan Update. Additionally, we discussed the VSW site

visit and associated tour of Bethel's water and sewer facilities and the VSW presentation to the City Council.

- 9:30 AM to 12:00 PM – Wayne and I went to the Public Works Office to review, update and printout various information for the Public Work Committee Meeting. Information included project cost estimates, a project prioritization list, and a schedule for the project funded under the VSW SFY2006 Grant.
- 12:00 to 2:30 PM – Meeting with the Public Works Committee, member of the community, and Public Works Staff (Jeff Sanders, Chair, Oly Olsen, Karl Power, Frank Neitz, Vicky Malone, Dan Leinberger, Eric Middlebrock, Andy McGowan, Paul O'Brian, David Tranthum, Wayne Ogle, Sandra Mosley, Ben Kirk, Chuck Willert). Project prioritization was further developed. Karl Powers requested that the schedule be revised as discussed for the Council Meeting scheduled for the evening of March 1, 2005.
- 2:30 to 4:30 PM – Met with Wayne Ogle and Ben Kirk to discuss upgrades needed to the Bethel Heights Water Distribution and Sewer Collection System.
- 4:30 to 6:00 PM – Dinner
- 6:00 to 11:00 PM – I went to the quarters and updated the information requested by the Public Works Committee.

March 1, 2005 (Tuesday)

- 8:00 to 11:00 AM – Met Jim Patterson, Wayne Ogle and Bob Herron at City Hall. After a short discussion about VSW representatives' schedule; Jim Wayne and I proceeded to the City Subdivision Water Treatment Facility where we met Ben Kirk and Tim Oosterman, WTP Operator, for a tour of the plant. Jim Patterson, Wayne Ogle, Ben Kirk and I continued with a tour of the rest of the City's water and sewer facilities including the Bethel Heights Water Treatment Plant (where we met with Billy Stuart, WTP Operator), the Bethel Heights water distribution and sewer collection system, the new Main Lift Station, the QFC #2 Lift Station, the FAA Lift Station, and the FAA WTP (which is owned and operated by FAA). The City personnel noted the following problems and concerns:
 1. CSWTF – Three valves stick about one time per year.
 2. CSWTF – Glycol alarm is not operating. CRW has ordered the part and will repair once the Force Account work restarts this spring.
 3. CSWTF – Capacity concerns on the boilers.
 4. BHWTF – The City identified several concerns with the distribution portion of the plant including electric, controls, pumping, pipe corrosion, standby power, etc. Additionally, within the distribution system leaks abound (joints and service connections); and the gravity sewer main is settling at road crossings.
 5. BHWTF – Need to get the DBP modifications being tested at CSWTF at BHWTF.
 6. QFC#2 Lift Station – This lift station is under capacity and must be relocated to accommodate the National Guard Armory development.
 7. Backbone Force Main – The existing force main between FAA Lift Station and the City Subdivision; and between 7th Avenue to the Lagoon is steel grooved joint pipe that is under capacity. Additionally, the liner of the force main between FAA Lift Station and the QFC #2 Lift Station is coming off the inside pipe wall and plugging the piped causing extensive maintenance.
- 11:00 AM to 12:30 PM – Jim Patterson, Wayne Ogle and I went to lunch. After lunch we dropped Jim Patterson off at the Long House Inn.
- 12:30 PM to 2:30 PM – I went to CRW's project office and check my email and voice mail messages.

- 2:30 to 4:30 PM – Worked on estimating project costs for the Bethel Heights water distribution and sewer collection system upgrades.
- 4:30 to 6:30 PM – Went to the quarters and ate dinner and relaxed.
- 6:30 to 9:00 PM – Attended the City of Bethel Special Council Meeting where Bill Griffith made a presentation regarding the VSW Grant Program and answered questions.
- 9:00 to 9:00 PM – Answered questions and provided information to several Council Members and City representatives.
- Went to the quarters for the day.

March 2, 2005 (Wednesday)

- 8:00 to 9:00 AM – Met with Laurie Walters regarding the RD Grant Checklist she was preparing. She indicated that she would Goldstreak it to me by the end of the week. She asked that I get a hold of Joan Travostino, Preston Gates and Ellis to discuss the legal and easement acquisition documentation needed.
- 9:00 to 11:30 AM – Went to CRW's project office and check my email and voice mail messages as well as continued to work on updating the Master Plan Update 95% document submittal.
- 11:30 AM to 12:30 PM – Lunch
- 12:30 to 2:00 PM – Met with Wayne Ogle at the Public Works Office to summarize the events of the past few days. Karl Powers, Bill Griffith, Greg McGee and Kent Knapp also stopped by and visited.
- 2:00 to 2:30 PM – Wayne and I met with David Horesh, a City Subdivision Phase B property owner (410 Napakiak Drive) who claims his pad is eroding due to the project. This is an ongoing complaint that Bob Herron was handling. However; with Bob resignation, Mr. Horesh was concerned his concerns would not be addressed this summer. We agreed that we would all meet again this spring to investigate Mr. Horesh's concerns.
- I then went to the quarters, packed and proceeded to the airport where I took Alaska Airlines Flight 44 back to Anchorage. The flight arrived in Anchorage at 5:30 PM.

END REPORT

VILLAGE SAFE WATER TRIP REPORT

DATE: March 1-2, 2005

REPORTER: Jim Patterson *J.P. 3/18/05*

LOCATION: Bethel, AK

PROJECT NO: 16724, 25, 27 & 28.

PURPOSE: Interim inspection of the main lift station replacement being completed by a general contractor and an interim inspection of 'force account' construction work being completed on Phase C within City Subdivision of Bethel, Alaska. Also, review unmet needs associated with all sanitation facilities for possible inclusion in a final draft of the on-going Bethel Water and Sewer Facilities Master Plan Update. Accompany Facilities Program Director to a special City Council meeting to present the HUB funding concept and process.

ACCOMPANIED: Bill Griffith, Facilities Program Manager, Division of Water, ADEC Anchorage

CONTACTS: Bethel City Council (list included as an attachment)
Bob Herron, Manager, City of Bethel
Wayne Ogle, Public Works Director, City of Bethel
Ben Kirk, Utilities Foreman, City of Bethel
Mike Rabe, Project Manager, CRW Engineering Group, Inc., Anchorage
Tim Oostermann, City Subdivision Water Treatment Operator, City of Bethel
William Stuart, Bethel Heights Water Treatment Operator, City of Bethel.

MAJOR ACCOMPLISHMENTS (FINDINGS):

- Completed inspection and/or review of the following sanitation facilities:
 - City Subdivision water treatment plant,
 - Bethel Heights water treatment plant,
 - Ptarmigan Heights water and sewer system,
 - Alaska Village Council of Presidents (AVCP) subdivision's two lift stations,
 - Alaska State Housing Authority (ASHA) subdivision's lift station,
 - Newly operational Main sewage lift station,
 - Quick Foods Center (QFC) II lift station,
 - Federal Aviation Administration (FAA) water treatment plant,
 - City Subdivision water and sewer system, specifically, Phase C including a glycol heat make-up facility, and
 - Sewage Lagoon.

We attempted to list all unmet needs of the City's sanitation facilities so as to address in the completion of the Final Draft Bethel Water and Sewer Facilities Master Plan Update; either designate as maintenance items or capital project worthy improvements based upon a criteria recommended to the City's Public Works Committee. The City Council will ultimately prioritize the unmet needs through a public review process over the next few months.

- Attended a special Bethel City Council meeting accompanying the Facilities Program Manager in a presentation of the VSW program, and an introduction to the HUB set-aside process by answering several questions pertaining to existing project scoping of grants signed by the City Council and the Division Director.

FOLLOW-UP:

- Recommend that the City Public Works Department forward a compiled list of unmet needs (enclosed in the body of this report and from other sources such as representatives of the Facilities section, who visited facilities upon my return to Anchorage on March 2) to be reviewed at a Public Works Committee meeting to be held on March 15th.
- Suggest that the City prioritize these sanitation facilities unmet needs through a public review process utilizing a final draft of the on-going Water and Sewer Master Plan Update development with the PW committee, the Finance committee, the public (i.e., hearing) and finally, the Bethel City Council. Cost out the first \$30 million dollars in capital project improvements.
- If the City is prepared to re-program granted funds away from Area 1B (the "Avenues") to accelerate administration and design of HUB priority unmet needs, then assist Facilities management in requesting an Amendment to the existing executed Grant #16728 to do so through the Division Director and City Council.
- Pending the above re-programming of Granted #16728 funds, facilitate preparation of a request for proposal(s). Requests for Statements of Qualifications and RFPs to solicit project management firms and/or design/construction management firms can be solicited to offer services to plan, design and administer the upcoming prospective \$9.075 million dollars in Capital Projects Improvements starting in 2006.
- Follow-up with the construction administration firms (i.e., CRW and CH2M-Hill) on what is being done to help the City staff remedy the Public Works Department's compiled list as prioritized by the Public Works committee as being maintenance related instead of major improvements. Some of the items are contract related work as in the main lift station (i.e., adjustment of the environmental and electrical controls) or assessing water work maintenance items within the water treatment plants (i.e., City Subdivision WTP is reportedly experiencing actuated valve malfunctioning at the rate of one per year). Have Master Plan update answer. Are these items maintenance related or are they due for capital project improvements?
- Review Mike Pollen's soon to be released Water Testing report updating the City of Bethel on the latest polymer aides to filtration and Potassium Permanganate treatment strategies piloted in Bethel's City Subdivision water treatment plant. Reportedly these strategies to reduce the potential of THHM-DBBP contaminants in treated water were successful.

ACTIVITIES:

Awoke by 4:20 a.m. on Tuesday, March 1, 2005, washed up and packed gear before heading to the Anchorage International Airport by 4:45 a.m.

Arrived at Ted Stevens International Airport via U.S. Post Office by 5:10 a.m. Departed Anchorage in a Boeing 727 twin jet aircraft by 6:10 a.m. to arrive in Bethel by 7:19 a.m. on Tuesday, March 1, 2005.

Met Public Works Director Wayne Ogle to drive to the City of Bethel's office by 7:40 a.m. after retrieving overnight bag from luggage area.

Met with City Manager Bob Herron, Wayne Ogle and Senior Engineer Mike Rabe, concerning construction in 2005. There is a desire by the community to see construction of new water and sewer works this coming summer 2005. To aide VSW in overseeing the management of the contracts in this accelerated design/construction effort of the City's top water and sewer priorities, consideration is being given by certain council members to have a prospective City Engineer help manage. The HUB Capital Project's Improvements process may bring \$9.075 million dollars in the first year. While some funding is available from last year's grant offer signed by the City of Bethel (approximately \$1.1 million) that would be spent on the Phase 1B "Avenues" project, it may be better to reprogram part of these funds to address the acceleration to receive the \$9.075 million dollars by fall 2005. But not only the urgency but a direction in improvements needs to be addressed through a public review process. To accomplish this review process of selecting the final top projects for the City, Bob Herron proposed the following meetings' schedule:

- March 15th – Public Works Committee reviews Draft 95% Water & Sewer Master Plan Update.
- March 24th – Finance Committee reviews recommended 95% Water & Sewer Master Plan Update.
- March 29th – Public Hearing on 95% recommended Water & Sewer Master Plan Update.
- April 12th – Council consideration of the 95% Water & Sewer Master Plan Update with comments from public/agencies.
- April 26th – Council approves 100% Water & Sewer Master Plan Update and pass City Resolution endorsing plan in anticipation of upcoming SFY VSW CIP 2007 application process starting in May 2005.

Again, with the direction of the City to accomplish the top four (4) projects prioritized by the public review process, the "Avenues" funds may be reprogrammed to "administration/design" of these projects from the current Grant (see copy attached) to ready for SFY CIP 2006 funds approaching \$9.075 million in Fall 2005 for "construction."

We left the City Manager's office to inspect existing water and sewer facilities in Bethel. The following is a list of unmet needs observed at the facilities over the course of several hours:

A. City Subdivision Water Treatment Plant:

1. We noted draft results from Mike Pollen's latest polymer testing appear to be positive. The report is being prepared to evaluate the lowering of potential Trihalomethane contaminants in the treated water using various potable chemical agents.
2. Implementation of the addition of polymer agents in conjunction with potassium permanganate to oxidize raw water containing iron and manganese may lower filter run from 30+ hours to 15+ hours between backwashes.

B. Bethel Heights Water Treatment Plant:

1. Replace 30+ year old piping distribution headworks to the main water loops, including

circulation pumps that are no longer available.

2. Replace/upgrade boilers and heat loops.
3. Replace all piping and valves not replaced during the late 1990's upgrades to filtration treatment upgrades.
4. Water well (old inside one) needs new submersible pump.
5. A few actuation electrical/mechanical solenoid valves appear to be acting up.
6. Upgrade/replace electrical panels for the water distribution systems.
7. Overall electrical trouble shooting of the Bethel Heights WTP is required.

C. Ptmarigan Heights:

1. Arctic pipe crossings of gravel roads are surfacing, so need to be adjusted to grade due to shifting seasonally because (water and) sewer deliveries are being affected by change in grades. Paving is understood to be coming.
2. Hydrostatic testing of arctic pipes (water) due to suspect out filtration systems require work.

D. AVCP-RHA Subdivision:

1. Two (2) lift stations require standby power supply for times of power outages.
2. Address need for existing retrofitted sewage backflow preventers that prevent sewage from backing up into homes due to power outage.

E. ASHA Lift Station:

1. Current manual standby power for sewage lift stations needs to be automated for startup during power outages.

F. Main Sewage Lift Station (New):

1. Environment controls need adjusting by general contractor (i.e. MKB Constructors).
2. Electrical ground fault problem needs trouble shooting.
3. Question about class of fitting to be explosion proof needs to be addressed.

G. Quick Foods Center II Lift Station:

1. Needs relocation away from National Guard Property (from S.E. corner) westward towards airport.
2. QFCII lift station needs to be enlarged (wet well) to receive tank trucked wastewater received from Western Bethel. Current trucks must throttle back discharge so as not to overflow lift station. Not able to upsize force main due to probable piped sewers in future; larger diameter sewer forcemain would result in lesser velocity for the piped flows which drops out detrimental solids.
3. Model for a relocated new QFCII lift station will likely be configured after the Main lift station (new) with its peristotal pump configured system.

H. Federal Aviation Administration (FAA) Water Treatment Plant:

1. Consider upgrading FAA's WTP from 12 gallon per minute with 90,000 gallon water tank.
2. Extend a waterline (circulating) to a watering point truck haul off FAA property but on City property to service Kasuyali and other Western Bethel subdivisions.

Finally, we took a look at a portion of the recently completed (but not active Phase "C" subdivision works. Particularly noted was the boiler makeup to two (2) glycol loops located in the Youth Center's building aiding in maintaining heat to the water distribution systems.

We went to lunch by 11:45 a.m. and made a few calls to Anchorage; one to acquire confirmation code for return flight tomorrow. Also, caught up on notes from this morning's field inspection/review.

Returned by 1:45 p.m. to the Public Work's office to meet up with Wayne Ogle and Mike Rabe to discuss funding (current) availability:

1. RD/USDA RAVG 1998 Final Disbursement:
 - a. Legal fees and easement/rights of way acquisition costs associated with City Subdivision/Ridgecrest,
 - b. Corrosion Study of Bethel Heights Water Distribution System, possibly inhibiting the rusting deposition from the 30+ year old above ground arctic steel carrier distribution water system piping.
 - c. Standby power upgrades to ASHA lift station (automate startup during power outages) and for AVCP-RHA's lift stations (with two standby automatic standby generators).
2. Grant Offer #16727 (see attached) with approximately \$3 million scheduled for completion of:
 - a. City Subdivision Phase "C" Water and Water Mains (approx. \$500,000),
 - b. Ridgecrest Force Main, Sewer (approx. \$870,000), and
 - c. Relocation of gravity sewers associated and impacted upon startup of new main sewage lift station (approx. \$500,000) leaving about \$3.2 million less \$1.9 million (above) or \$1.1 million scheduled in SFYCIP 2006 questionnaire for the beginning of the "Avenues" in the Dames & Moore old Master Plan.

However, discussions from a Public Work's Committee meeting on Monday, February 28, 2005 indicated that there may be interest in advancing the start of the next \$9.075 million CIP anticipated in fall 2005 by completing the design and administrative tasks for:

1. QFC No. II sewage lift station and force main relocation,
2. Main sewer force main replacement, Ridgecrest to existing lagoon.
3. Improvements to the 30-year+ old Bethel Heights piped water and sewer system (some of which is noted above).

These core infrastructure improvements are considered in the draft 95% Master Plan Update and will be reviewed by the Council and public in the weeks ahead.

By 3:15 p.m. we arrived at the Bethel Airport to pick up Bill Griffith, Facilities Program manager. However, due to a mislocation of a cargo igloo, Bill was not able to pick up overnight bag for about 45 minutes.

By 4:30 p.m., we met with Bob Herron in the City Manager's office to review highlights of possible

initiatives that may be discussed at tonight's Special Council Meeting. Just a few:

- An initiative to reprogram funds for initiating the "Avenues" water and sewer's design engineering/administration could be moved to the recent Public Work's prioritized top projects to accelerate in anticipation of \$9.075 million to be received in Fall 2005 (VSW's CIP SFY 2006 funds).
- Council should approve Water & Sewer Master Plan update by April 26, 2005 Council Meeting with Resolution for anticipated next CIP Application due out early Spring 2005.
- There is the possibility of the City of Bethel receiving \$29 million over the next 16 months time for sanitation facilities improvements. Project management enhancements are needed.
- The success of defining the direction the City will take through public review process is contingent upon active participation of a few key people.

At 5 p.m. we took a quick drive-by tour of City Subdivision (approx. 120 homes being served with water & sewer) and the existing lagoon via Bethel Heights.

By 5:15 p.m., we went for dinner and then to the hotel for Bill Griffith to check in.

We returned to the City Offices to attend the Special Council Meeting in the Council Chambers by about 6:05 p.m.

The Bethel City Special Council Meeting convened about 6:30 p.m. The minutes of the meeting are available from the City Clerk which are not repeated here. But to highlight the presentation by Bill Griffith, it was about the VSW program, the Capital Project's process, and specifically about Regional HUB set-aside established last year for Bethel, AK.

Although many issues and developing approaches were discussed, this gave the Bethel City Council an opportunity to digest the intent of the Congressional Legislation.

A few questions that I addressed are noted as follows:

- How much money is there in last year's SFY 2005 CIP (as granted 9/3/04 as Water & Sewer Improvements Phase 6, #16728 see attached front page) to divert from the "Avenues" phase (service area 1B) of the grant to accelerating the HUB process? Answer: Approximately \$1.1 million in project funds are available (out of \$3.0 million dollars granted). The previously slated funds of \$1.9 million would be used to complete: (within service area 1A)
 - City Subdivision Phase "C",
 - Ridge crest force main, and
 - Main lift station gravity main relocation.
- What is the status of the "Kasayuli Subdivision Water and Sewer Feasibility Study" at the completion of the "Bethel Water and Sewer Facilities Master Plan update?" Answer: The Master Plan would super cede the Feasibility Study. (Recommendations in the Master Plan would establish newer priorities for the City of Bethel that may or may not incorporate the unmet needs listed in the Feasibility Study).

- What was the intended funding source for the Feasibility Study? Answer: The preparation of the Feasibility Study was funded by Village Safe Water (because neither the City nor YKHC had funds for planning). However, it was the intent of the study's recommended facilities to be funded by YKHC (as listed in not to exceed \$2 million dollar increments per year on page 84 of the study).

Following the Special Council Meeting, information was being sought by YKHC representative, Karl Powers, about the AFCII lift station/force main from Mike Rabe and I to share. We left the Council Chambers by 9:20 p.m.

We returned to the hotel by 9:35 p.m. to retire to bed by 10 p.m.

Awoke by 6 a.m. on Wednesday, March 2, 2005, to wash up, eat and catch a taxicab to Bethel's airport by 7 a.m.

At Bethel's airport terminal, met up with Greg Magee, VSW Manager, Kent Knapp, OAU Supervisor, Jimmy Smith, RUBA and Wayne Ogle, Public Works, City of Bethel by 7:20 a.m. to highlight:

- Bill Griffith's presentation was introductory and informative to the HUB process. Much work remains to implement concept.
- Important to focus a facilities review on the newly operational Main sewage lift station (albeit still under contract for completion this year 2005) because it appears to be a model for the highest CIP need, Quick Foods Center II's relocation/upgrade lift station/force main to serve West Bethel, Alaska.
- Also, significant that some Council Members are considering a change in project management style. It should not be assumed that the City take on this role for large special projects such as within the HUB funds. Recommend exploring logic of article provide VSW Manager and Public Works Director (see attached Public Works article "Engineering Services: Contract Versus In-House").

I left in a Boeing 737 twin engine jet by 7:45 a.m. flying to Kodiak, AK then Anchorage, AK by 10:45 a.m.; fog delayed our arrival. Upon arrival at Ted Steven's Anchorage International Airport, picked up overnight bag and went home for lunch on Wednesday, March 3, 2005.

ATTACHMENTS: As noted above.

cc: Reading File, VSW Anchorage
Bill Griffith/Greg Magee, VSW Anchorage E-mail
Kent Knapp, OAU, Anchorage E-mail
Ben Kirk/Wayne Ogle/Bob Herron, City of Bethel E-mail
Matt Dixon, ANTHC, Anchorage
~~Mike Rabe, CRW, Anchorage~~
Jim Wodrich/Tom Wolf, CH2M-Hill, Anchorage

STATE OF ALASKA

FRANK H. MURKOWSKI, GOVERNOR

DEPT. OF ENVIRONMENTAL CONSERVATION

DIVISION OF WATER

410 Willoughby Ave., Ste 303
Juneau, AK 99801-1795
PHONE: (907) 465-5180
FAX: (907) 465-5177
<http://www.state.ak.us/dec>

CERTIFIED MAIL NO. 7004 1160 0007 3656 2820

September 3, 2004

Honorable Hugh Short, Jr., Mayor
City of Bethel
P.O. Box 1388
Bethel, AK 99559

Dear Mayor Short:

Grant Offer: Water and Sewer Improvements Phase 6 (#16728)

As provided by the Village Safe Water (VSW) Act (AS 46.07), the Department of Environmental Conservation (Department) is pleased to offer the City of Bethel (Grantee) a grant of funds not to exceed \$3,000,000. Funding for this grant is comprised of \$750,000 in State dollars and \$2,250,000 in federal Environmental Protection Agency Infrastructure funds (CFDA #66.606). This grant will finance construction management and administrative services for service area 1A, and design, construction, construction management and administrative services for service area 1B water and sewer improvements.

This offer is expressly conditioned upon the terms and limitations contained herein and in 2 AAC 45.010 (copy enclosed).

GENERAL GRANT CONDITIONS

1. The Grantee designates the VSW engineer, Jim Patterson, P.E., as its representative in the design and construction management of the VSW improvements. The representative will provide advice and assistance to the Grantee on administrative and technical matters to this grant.
2. The Grantee agrees to obtain all titles and easements necessary to provide clear title or authority to construct and maintain the proposed project.
3. The Grantee shall expend grant funds and project account interest only for the purpose(s) described above.
4. Plans and specifications must be approved by the Department before proceeding with the start of construction.

Engineering Services: Contract Versus In-House

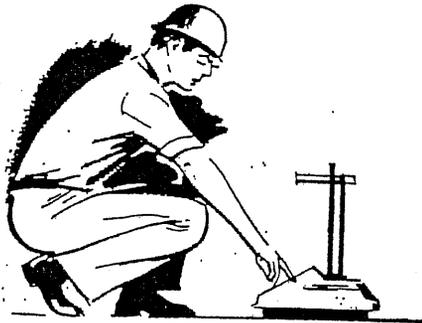
ALBERT L. CATES, P.E.
Director of Public Works,
Rosewell, New Mexico

AFTER Rosewell elected a new mayor and members to its council, they began questioning the city's need for its own engineering staff. After all, they reasoned, can't engineering services be obtained more economically by contracting with private firms?

While an excellent argument can be made for contracting for engineering services on projects requiring special expertise or large capital improvement projects, an equally excellent argument can be made for in-house staffing for normally recurring projects and small special projects.

Rosewell's engineering department consists of two registered engineers, one lab technician, one draftsman, and two inspectors. The town performs planning, design, construction management, and testing

for all city street construction and reconstruction, storm drainage, water/sewer projects of 12-in. diameter lines or less, parking lots, small buildings, etc. Large projects, such as our new wastewater treatment plant and sewer interceptors, are contracted out. Developers are required to provide for their own engineering requirements.



In 1979, the city began to gradually staff-up the engineering department to perform more capital improvement projects in-house. The prime criteria for increased staffing was that the in-house engineering must "meet or beat" the costs for "farming out" the equivalent engineering services. Since that time, an annual cost/benefit study has been prepared for review by the city council.

Cost Versus Benefits

From February 1985 to February 1986, the total cost for maintaining the engineering department was: salaries, \$143,000; benefits, \$43,000; transportation, \$12,000; supplies, \$6,500; and office and utilities, \$6,000, for a total cost of \$210,500.

For comparison, benefits to the city shown in Table 1 are based on estimated construction costs times the American Society of Consulting Engineers guidelines for providing engineering services, or charges normally paid by the City to consultants for similar projects.

The city received a total benefit worth \$305,200 for an expenditure of only \$210,500, or a saving on the cost of engineering services of 31 percent.

To achieve such a cost/benefit ratio requires careful selection and training of personnel, careful attention to schedules, adequate compensation for personnel, and avoiding the normal bureaucratic tendency for "empire building."

It is difficult for a consultant to compete on a cost basis with a well run, well staffed municipal engineering department due to the consultant's expenses for income, sales taxes, salaries, profit, business development, travel, etc. There is, however, no logical alternative to using the expertise and staff of consultants for large special projects. □□□

Table 1 — Project Benefits

Project	Contracted Engineering Cost (\$)
Sewer Interceptor — Inspection Testing	60,000
\$2,182,000 @ 2.75 percent	
Annual Maintenance Contract — Design, Inspection, Testing	20,000
\$360,000 @ 5.56 percent	
Country Club Road — Design Only	13,000
\$650,000 @ 2 percent	
Mescalero Road — Design, Inspection, Testing	28,000
\$308,000 @ 9.1 percent	
Traffic Signalization — Design, Inspection, Testing	20,000
\$227,000 @ 8.81 percent	
Garage — Design, Inspection, Testing	8,000
\$81,000 @ 9.88 percent	
Annual Overlay — Design, Inspection, Testing	39,000
\$640,000 @ 6.1 percent	
Atkinson Street Reconstruction — Design Only	20,000
\$400,000 @ 5 percent	
Country Club Road — Inspection, Testing	13,000
\$330,000 @ 3.9 percent	
6-in. Water Line — Design, Inspection, Testing	31,200
\$398,000 @ 7.84 percent	
Main Street Lighting — Design, Inspection, Testing	4,000
\$38,000 @ 10.5 percent	
Engineering Services to Other City Departments	10,000
Service to Public, City Council, Committees	8,000
Review/Selection of Engineering Consultants and Their Work	22,000
Review of Subdivision Plans, Building Permits, and Other Submittals	9,000
Total Benefit	\$305,200

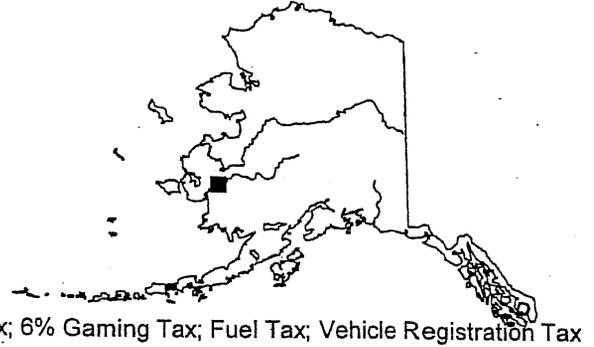
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City of Bethel

P.O. Box 1388, Bethel, AK 99559

Phone: 907-543-2047; Clerk 543-2087
 Fax: 907-543-4171; Clerk 543-5556
 E-Mail Address: bobherron@alaska.com
 Web Page Address: http://www.cityofbethel.org

Population: 5,899
 Type of Government: 2nd Class City
 Year of Incorporation: 1957
 Manager Form of Gov't: Yes
 Regular Election: 1st Tuesday in October
 Council Meets: 2nd & 4th Tuesdays
 Sales Tax: 5%
 Property Tax: None
 Special Tax: 5% Alcohol Tax; 3% Hotel/B&B Tax; 6% Gaming Tax; Fuel Tax; Vehicle Registration Tax



Mayor

✓ Hugh Dymont 2006

City Council

✓ R. Thor Williams 2006
 ✓ Hugh Dymont, Mayor 2006
 ✓ Yolanda Jorgensen 2005
 ✓ Dan Leinberger 2006
 ✓ Stanley Rodgers, Vice Mayor 2005
 ✓ David Trantham, Jr. 2007
 ✓ Andrew McGowen 2007

Advisory School Board

Martha Perry 2006
 Jane Allen 2006
 Greg McIntyre 2007
 Tamy Rogers 2007
 Kathy Hanson 2006
 Sam Shield 2005
 Mary Thompson 2007

Lower Kuskokwim Schools

Planning Commission

Brian Glasheen 2005
 Pat Jennings 2007
 Joan Hamilton 2005
 John Guinn, Chair 2006
 Joy Shantz 2006
 Mark Charlie 2006

Municipal Employees

Attorney Louann Cutler
 City Clerk
 Executive Assistant Jane Neeser
 Finance Director Robert Strahan
 Fire Chief George Young
 Manager Robert Herron
 Parks & Recreation Director Janet Athanas
 Planning Director John Malone
 Police Chief Howard Morris
 Port Director Howard Elliott
 Public Works Director [Redacted]
 Senior Services Director Louise Charles

Wayne Cyle

Municipal Facilities & Utilities

Piped Water, Water Delivery, Piped Sewer, Tank Haul, Refuse Collection, Landfill, Recycling Center, Dock/Port, Police, Fire/EMS/Ambulance, Roads, Ice Roads, Teen/Youth Center, Senior Center (Adult Day Care), Senior Transportation, Library, Bingo/Gaming, Parks & Recreation, Planning, Animal Control, Business Licenses, Braund Building, Job Training, Motor Vehicle Registration (State DMV contract)

Introduced by: Council Member
Leinberger
Date: February 24, 2005
Action:
Vote:

CITY OF BETHEL, ALASKA

Resolution # 05-08

A RESOLUTION TO RESTORE THE VILLAGE SAFE WATER FUNDING.

WHEREAS, the City of Bethel has made many improvements in our water and sewer systems by utilizing Village Safe Water Funding;

WHEREAS, the City of Bethel's ability to meet Federal Clean Water Standards are contingent on Village Safe Water Funding;

WHEREAS, the City of Bethel has no other funding or revenue generating capacity for water and sewer improvements.

THEREFORE, NOW IT BE RESOLVED, that the Bethel City Council urges President Bush and the Congress to restore funding to Village Safe Water as proposed in the budget requested to the Department of Environmental Conservation.

ENACTED THIS _____ DAY OF _____ 2005 BY A _____ VOTE.

Hugh Dymont, Mayor

ATTEST:

Sandra Modigh, City Clerk

City of Bethel, Alaska

City Council Agenda

City Hall, Bethel, Alaska

Special Meeting

March 1, 2005 at 6:30P

gh Dyment
or
m Expires 2006
-3351
h_dyment@lksd.org

nley "Tundy" Rodgers
e-Mayor
m Expires 2005
-2035
dy@gci.net

vid Trantham, Jr.
ouncil Member
m Expires 2007
-2772
e_trantham@hotmail.com

Thor Williams
ouncil Member
m Expires 2006
-1575
awil@unicom-alaska.com

onda Jorgensen
ouncil Member
m Expires 2005
-2577
eetybird_1967_99@yahoo.c

n Leinberger
ouncil Member
m Expires 2006
-3-3460
imomann@aol.com

drew McGowan
ouncil Member
m Expires 2007
-3-2330
ccowan@unicom-
aska.com

o Herron
y Manager
-3-2047
pherron@alaska.com

ndra Modigh
y Clerk
-3-2087
odigh@cityofbethel.net

uann Cutler
y Attorney
lerl@prestonqates.com

I. CALL TO ORDER

II. ROLL CALL

III. PEOPLE TO BE HEARD – Fifteen minutes per person

IV. APPROVAL OF THE AGENDA

V. NEW BUSINESS

- a) Resolution #05-08: A Resolution to Restore Village Safe Water Funding.
- b) Presentation by Bill Griffith regarding the Village Safe Water Fund for the City of Bethel.

VI. COUNCIL MEMBER COMMENTS

VII. ADJOURNMENT

Posted on February 23, 2005 at City Offices, AC Co., Swanson's, Anica Store, & BNC Complex

Sandra Modigh, City Manager

(All Items noted with an asterisk (*) are considered routine and will be adopted with one motion.)

City of Bethel
Bethel Water and Sewer Master Plan Update

WATER AND SEWER IMPROVEMENTS COST SUMMARY

DESCRIPTION	TOTAL COST
BACKBONE WATER SYSTEM OPTIONS	\$43,591,096
BACKBONE SEWER SYSTEM OPTIONS	\$46,802,618
PIPED WATER AND SEWER SERVICE OPTIONS	\$153,462,498
TOTAL WATER AND SEWER IMPROVEMENTS:	\$243,856,211

DRAFT

City of Bethel
Bethel Water and Sewer Master Plan Update - 65% Submittal - Revision 01

DRAFT

**WATER AND SEWER IMPROVEMENTS
PROJECT PRIORITIZATION AND FUNDING SUMMARY**

PRIORITY	CODE	ITEM NO.	DESCRIPTION	PRESENT COST	FUTURE COST	CUMULATIVE COST	VSW-SFY FUNDING	NO. YEARS	CUMULATIVE FUNDING	
	(a)			(b)	(c)	(c)			(d)	
1	S	1	QFC No. II Lift Station and Forcemain Upgrade	\$4,218,890	\$4,345,457	\$4,345,457	2006	1	\$10,000,000	BACKBONE WATER AND SEWER IMPROVEMENTS
2	S	2	Main Forcemain Upgrade (Ridgcrest to Lagoon)	\$1,221,415	\$1,258,057	\$5,603,514	2006	1	\$10,000,000	
3	W	1	Bethel Heights Piped Water and Sewer Upgrades	\$2,283,125	\$2,351,619	\$7,955,133	2006	1	\$10,000,000	
4	S	3	Wastewater Treatment Facility	\$17,760,000	\$19,406,832	\$27,361,964	2006/08	3	\$30,000,000	
5	W	2	Small West Water Treatment Plant	\$3,367,488	\$3,790,137	\$31,152,101	2009	4	\$40,000,000	
6	S	4	FAA Lift Station Upgrades	\$1,210,950	\$1,362,935	\$32,515,036	2009	4	\$40,000,000	
7	S	5	Garage / Shop Facility	\$4,485,000	\$5,047,907	\$37,562,943	2009	4	\$40,000,000	
8	S	6	Kasayuli Subdivision Lift Station and Forcemain	\$3,744,975	\$4,341,452	\$41,904,396	2010	5	\$50,000,000	
9	W	3	Kasayuli Subd. Water Station	\$5,358,080	\$6,211,483	\$48,115,879	2010	5	\$50,000,000	
10	S	7	Ptarmigan Lift Station and Forcemain	\$4,704,018	\$5,616,843	\$53,732,722	2011	6	\$60,000,000	
11	W	4	Tundra Ridge Subd. Water Station	\$4,178,899	\$4,989,824	\$58,722,545	2011	6	\$60,000,000	
12	W	5	Nunivak Subd. Water Station	\$5,272,118	\$6,484,040	\$65,206,585	2012	7	\$70,000,000	
13	S	8	Larson Subdivision Lift Station and Forcemain	\$3,441,490	\$4,232,599	\$69,439,184	2012	7	\$70,000,000	
14	W	6	Larson Subd. Water Station	\$4,109,755	\$5,206,115	\$74,645,298	2013	8	\$80,000,000	
15	S	9	Harbor Area Lift Station and Forcemain	\$3,354,780	\$4,249,735	\$78,895,033	2013	8	\$80,000,000	
16	W	7	Kilbuck Water Station	\$3,847,383	\$5,019,962	\$83,914,995	2014	9	\$90,000,000	
17	W	8	Mission Lake Water Station	\$4,365,400	\$5,695,857	\$89,610,851	2014	9	\$90,000,000	
18	W	9	Hospital Area Water Storage	\$4,955,925	\$6,660,349	\$96,271,200	2015	10	\$100,000,000	
19	W	10	Enlarge West Water Treatment Plant	\$2,242,500	\$3,013,732	\$99,284,933	2015	10	\$100,000,000	
20	P	1	Kilbuck North (Avenues)	\$10,364,088	\$14,776,711	\$114,061,643	2015/17	12	\$120,000,000	SUBDIVISION PIPED WATER AND SEWER IMPROVEMENTS
21	P	2	Kilbuck South (Avenues)	\$5,586,815	\$8,204,426	\$122,266,070	2017/18	13	\$130,000,000	
22	P	3	Mission Lake Area West	\$6,138,844	\$9,285,552	\$131,551,622	2018/19	14	\$140,000,000	
23	P	4	Mission Lake Area East	\$6,138,844	\$9,564,119	\$141,115,740	2020	15	\$150,000,000	
24	P	5	Harbor Area West	\$7,359,138	\$11,809,255	\$152,924,995	2020/21	16	\$160,000,000	
25	P	6	Harbor Area East	\$7,359,138	\$12,163,533	\$165,088,528	2021/22	17	\$170,000,000	
26	P	7	Nunivak Subdivision West	\$4,416,230	\$7,518,336	\$172,606,864	2023	18	\$180,000,000	
27	P	8	Nunivak Subdivision East	\$7,317,278	\$12,830,890	\$185,437,755	2024	19	\$190,000,000	
28	P	9	Blueberry Subdivision Southeast	\$6,381,781	\$11,526,207	\$196,963,962	2024/25	20	\$200,000,000	
29	P	10	Blueberry Subdivision Southwest	\$6,381,781	\$11,871,993	\$208,835,955	2025/26	21	\$210,000,000	
30	P	11	Blueberry Subdivision Northwest	\$5,636,524	\$10,800,162	\$219,636,117	2026/27	22	\$220,000,000	
31	P	12	Blueberry Subdivision Northeast	\$5,636,524	\$11,457,892	\$231,094,009	2027/29	24	\$240,000,000	
32	P	13	Tundra Ridge Subdivision South	\$8,696,789	\$18,209,144	\$249,303,154	2029/30	25	\$250,000,000	
33	P	14	Tundra Ridge Subdivision North	\$8,696,789	\$19,318,081	\$268,621,235	2030/31	27	\$270,000,000	
34	P	15	Uivuuq Subdivision	\$8,101,405	\$19,091,492	\$287,712,726	2031/33	29	\$290,000,000	
35	P	16	Larson Subdivision	\$6,760,390	\$16,901,518	\$304,614,244	2033/35	31	\$310,000,000	
36	P	17	Airport Facilities	\$5,284,825	\$13,608,862	\$318,223,106	2035/36	32	\$320,000,000	
37	P	18	Kasayuli Subdivision East	\$8,481,135	\$23,864,747	\$342,087,854	2036/39	35	\$350,000,000	
38	P	19	Kasayuli Subdivision West	\$8,481,135	\$25,318,110	\$367,405,964	2039/41	37	\$370,000,000	
39	P	20	H-Marker Lake Area	\$2,115,425	\$6,504,474	\$373,910,438	2041/42	38	\$380,000,000	
40	P	21	Raven Subdivision West	\$6,337,305	\$20,672,528	\$394,582,966	2042/44	40	\$400,000,000	
41	P	22	Raven Subdivision East	\$5,535,238	\$19,155,774	\$413,738,740	2044/46	42	\$420,000,000	
42	S	10	Haroldsen Subdivision Lift Station and Forcemain	\$2,661,100	\$9,485,536	\$423,224,276	2046/47	43	\$430,000,000	
43	W	11	Haroldsen Estates Water Station	\$3,610,425	\$13,255,503	\$436,479,779	2047/48	44	\$440,000,000	
44	P	23	Haroldsen Estates	\$6,255,080	\$24,363,810	\$460,843,589	2048/50	46	\$460,000,000	

\$243,856,211

Notes:

- (a) S = Backbone Sewer Improvements; W = Backbone Water Improvements; P = Piped Water & Sewer Improvements
- (b) Capital costs in 2005 dollars (present worth)
- (c) Includes a 3% inflation factor (future worth)
- (d) Funding based on fixed rate of \$10,000,000 per year

(e)

Force Account

City of Bethel
Bethel Water and Sewer Master Plan Update

DRAFT

BACKBONE WATER SYSTEM OPTIONS

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL COST	ITEM TOTAL
1	Bethel Heights Piped Water and Sewer Upgrades					
1	Water main replacement	lf	5,000	\$75	\$375,000	
2	Water service connections	ls	1	\$250,000	\$250,000	
3	Water distribution pump & control upgrades	ls	1	\$500,000	\$500,000	
4	Sewer road crossing upgrades	ea	13	\$25,000	\$325,000	
5	Sewer main improvements	lf	5,000	\$50	\$250,000	
2	Contingency			15%	\$56,250	
	Total Estimated Construction Cost:				\$1,756,250	
3	Engineering/CA/Admin			30%	\$526,875	
	Total Estimated Project Cost:					\$2,283,125
2	Small West Water Treatment Plant					
1	Pilot Study	ls	1	\$250,000	\$250,000	
2	Water line from FWWTF	lf	2,500	\$125	\$312,500	
3	Heat trace	lf	2,500	\$20	\$50,000	
4	Water storage tank	gal	120,000	\$2	\$240,000	
5	Water treatment plant upgrades	sf	2,000	\$600	\$1,200,000	
6	Truck fill	ea	1	\$200,000	\$200,000	
7	Contingency			15%	\$337,875	
	Total Estimated Construction Cost:				\$2,590,375	
8	Engineering/CA/Admin			30%	\$777,113	
	Total Estimated Project Cost:					\$3,367,488
3	Kasayuli Subd. Water Station					
1	Water line from WBWTF	lf	9,200	\$125	\$1,150,000	
2	Heat trace	lf	9,200	\$20	\$184,000	
3	Water storage tank	gal	400,000	\$2	\$800,000	
4	Booster pump station	sf	2,500	\$500	\$1,250,000	
5	Truck fill	ea	1	\$200,000	\$200,000	
6	Contingency			15%	\$537,600	
	Total Estimated Construction Cost:				\$4,121,600	
7	Engineering/CA/Admin			30%	\$1,236,480	
	Total Estimated Project Cost:					\$5,358,080
4	Tundra Ridge Subd. Water Station					
1	Water line from FWWTF	lf	4,450	\$125	\$556,250	
2	Heat trace	lf	4,450	\$20	\$89,000	
3	Water storage tank	gal	350,000	\$2	\$700,000	
4	Booster pump station	sf	2,500	\$500	\$1,250,000	
5	Truck fill	ea	1	\$200,000	\$200,000	
6	Contingency			15%	\$419,288	
	Total Estimated Construction Cost:				\$3,214,538	
7	Engineering/CA/Admin			30%	\$964,361	
	Total Estimated Project Cost:					\$4,178,899
5	Nunivak Subd. Water Station					
1	Water line from FWWTF	lf	5,700	\$125	\$712,500	
2	Heat trace	lf	5,700	\$20	\$114,000	
3	Water storage tank	gal	500,000	\$2	\$1,000,000	
4	Booster pump station	sf	3,000	\$500	\$1,500,000	
5	Truck fill	ea	1	\$200,000	\$200,000	
6	Contingency			15%	\$528,975	
	Total Estimated Construction Cost:				\$4,055,475	
7	Engineering/CA/Admin			30%	\$1,216,643	
	Total Estimated Project Cost:					\$5,272,118

City of Bethel
Bethel Water and Sewer Master Plan Update

BACKBONE WATER SYSTEM OPTIONS

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL COST	ITEM TOTAL
6	Larson Subd. Water Station					
1	Water line from KSWTF	lf	6,200	\$125	\$775,000	
2	Heat trace	lf	6,200	\$20	\$124,000	
3	Water storage tank	gal	200,000	\$2	\$400,000	
4	Booster pump station	sf	2,500	\$500	\$1,250,000	
5	Truck fill	ea	1	\$200,000	\$200,000	
6	Contingency			15%	\$412,350	
	Total Estimated Construction Cost:				\$3,161,350	
7	Engineering/CA/Admin			30%	\$948,405	
	Total Estimated Project Cost:					\$4,109,755
7	Kilbuck Water Station					
1	Water line from BHWTF	lf	4,300	\$125	\$537,500	
2	Heat trace	lf	4,300	\$20	\$86,000	
3	Water storage tank	gal	250,000	\$2	\$500,000	
4	Booster pump station	sf	2,500	\$500	\$1,250,000	
5	Truck fill	ea	1	\$200,000	\$200,000	
6	Contingency			15%	\$386,025	
	Total Estimated Construction Cost:				\$2,959,525	
7	Engineering/CA/Admin			30%	\$887,858	
	Total Estimated Project Cost:					\$3,847,383
8	Mission Lake Water Station					
1	Water line from CSWTF	lf	6,000	\$125	\$750,000	
2	Heat trace	lf	6,000	\$20	\$120,000	
3	Water storage tank	gal	300,000	\$2	\$600,000	
4	Booster pump station	sf	2,500	\$500	\$1,250,000	
5	Truck fill	ea	1	\$200,000	\$200,000	
6	Contingency			15%	\$438,000	
	Total Estimated Construction Cost:				\$3,358,000	
7	Engineering/CA/Admin			30%	\$1,007,400	
	Total Estimated Project Cost:					\$4,365,400
9	Hospital Area Water Storage					
1	Water line from CSWTF	lf	7,000	\$125	\$875,000	
2	Heat trace	lf	7,000	\$20	\$140,000	
3	Water storage tank	gal	300,000	\$2	\$600,000	
4	Booster pump station	sf	3,000	\$500	\$1,500,000	
5	Truck fill	ea	1	\$200,000	\$200,000	
6	Contingency			15%	\$497,250	
	Total Estimated Construction Cost:				\$3,812,250	
7	Engineering/CA/Admin			30%	\$1,143,675	
	Total Estimated Project Cost:					\$4,955,925
10	Enlarge West Water Treatment Plant					
1	Water treatment facility	sf	2,500	\$600	\$1,500,000	
2	Contingency			15%	\$225,000	
	Total Estimated Construction Cost:				\$1,725,000	
3	Engineering/CA/Admin			30%	\$517,500	
	Total Estimated Project Cost:					\$2,242,500

**City of Bethel
Bethel Water and Sewer Master Plan Update**

BACKBONE WATER SYSTEM OPTIONS

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL COST	ITEM TOTAL
11	Haroldsen Estates Water Station					
1	Water line from BHWTF	lf	7,000	\$125	\$875,000	
2	Heat trace	lf	7,000	\$20	\$140,000	
3	Water storage tank	gal	100,000	\$2	\$200,000	
4	Booster pump station	sf	2,000	\$500	\$1,000,000	
5	Truck fill	ea	1	\$200,000	\$200,000	
6	Contingency			15%	\$362,250	
	Total Estimated Construction Cost:				\$2,777,250	
7	Engineering/CA/Admin			30%	\$833,175	
	Total Estimated Project Cost:					\$3,610,425
	TOTAL WATER SOURCE OPTIONS:					\$43,591,096

Summary of Quantities:

Water line / Heat trace	lf	57,350
Water storage tanks	gal	2,520,000
Booster pump station	sf	18,000
Truck fill	ea	9
Water treatment plant	sf	2,500
Water treatment plant upgrades	sf	4,500

City of Bethel
Bethel Water and Sewer Master Plan Update

BACKBONE SEWER SYSTEM OPTIONS

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	EXTENSION COST	ITEM TOTAL
1	QFC No. II Lift Station and Forcemain Upgrade					
1	Lift station	ea	1	\$1,250,000	\$1,250,000	
2	Sewer forcemain	lf	9,200	\$125	\$1,150,000	
3	Heat trace	lf	9,200	\$20	\$184,000	
4	Demolish existing forcemain	lf	9,200	\$15	\$138,000	
5	Reestablish services	ea	10	\$10,000	\$100,000	
6	Contingency			15%	\$423,300	
	Total Estimated Construction Cost:				\$3,245,300	
7	Engineering/CA/Admin			30%	\$973,590	
	Total Estimated Project Cost:					\$4,218,890
2	Main Forcemain Upgrade (Ridgcrest to Lagoon)					
1	Sewer forcemain	lf	3,700	\$175	\$647,500	
2	Heat trace	lf	3,700	\$20	\$74,000	
3	Demolish existing forcemain	lf	3,700	\$15	\$55,500	
4	Reestablish services	ea	4	\$10,000	\$40,000	
5	Contingency			15%	\$122,550	
	Total Estimated Construction Cost:				\$939,550	
6	Engineering/CA/Admin			30%	\$281,865	
	Total Estimated Project Cost:					\$1,221,415
3	Wastewater Treatment Facility					
1	Wastewater Treatment Facility	ls	1	\$12,000,000	\$12,000,000	
3	Decommission Existing Lagoons	ls	1	\$1,000,000	\$1,000,000	
2	Contingency			15%	\$1,800,000	
	Total Estimated Construction Cost:				\$14,800,000	
3	Engineering/CA/Admin			20%	\$2,960,000	
	Total Estimated Project Cost:					\$17,760,000
4	FAA Lift Station Upgrades					
1	Lift station upgrades	ls	1	\$200,000	\$200,000	
2	Upgrade pump controls	ls	1	\$50,000	\$50,000	
3	Sewer forcemain	lf	3,500	\$125	\$437,500	
4	Heat trace	lf	3,500	\$20	\$70,000	
5	Demolish existing forcemain	lf	3,500	\$15	\$52,500	
6	Contingency			15%	\$121,500	
	Total Estimated Construction Cost:				\$931,500	
7	Engineering/CA/Admin			30%	\$279,450	
	Total Estimated Project Cost:					\$1,210,950
5	Garage / Shop Facility					
1	Garage / Shop Facility	sf	10,000	\$300	\$3,000,000	
2	Contingency			15%	\$450,000	
	Total Estimated Construction Cost:				\$3,450,000	
3	Engineering/CA/Admin			30%	\$1,035,000	
	Total Estimated Project Cost:					\$4,485,000

City of Bethel
Bethel Water and Sewer Master Plan Update

BACKBONE SEWER SYSTEM OPTIONS

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	EXTENSION COST	ITEM TOTAL
6	Kasayuli Subdivision Lift Station and Forcemain					
1	Lift station	ea	1	\$1,000,000	\$1,000,000	
2	Dump station improvements	ea	1	\$200,000	\$200,000	
3	Forcemain	lf	9,000	\$125	\$1,125,000	
4	Heat trace	lf	9,000	\$20	\$180,000	
5	Contingency			15%	\$375,750	
	Total Estimated Construction Cost:				\$2,880,750	
6	Engineering/CA/Admin			30%	\$864,225	
	Total Estimated Project Cost:					\$3,744,975
7	Ptarmigan Lift Station and Forcemain					
1	Lift station	ea	1	\$1,250,000	\$1,250,000	
2	Dump station improvements	ea	1	\$200,000	\$200,000	
3	Forcemain	lf	11,700	\$125	\$1,462,500	
4	Heat trace	lf	11,700	\$20	\$234,000	
5	Contingency			15%	\$471,975	
	Total Estimated Construction Cost:				\$3,618,475	
6	Engineering/CA/Admin			30%	\$1,085,543	
	Total Estimated Project Cost:					\$4,704,018
8	Larson Subdivision Lift Station and Forcemain					
1	Lift station	ea	1	\$1,000,000	\$1,000,000	
2	Dump station improvements	ea	1	\$200,000	\$200,000	
3	Forcemain	lf	7,600	\$125	\$950,000	
4	Heat trace	lf	7,600	\$20	\$152,000	
5	Contingency			15%	\$345,300	
	Total Estimated Construction Cost:				\$2,647,300	
6	Engineering/CA/Admin			30%	\$794,190	
	Total Estimated Project Cost:					\$3,441,490
9	Harbor Area Lift Station and Forcemain					
1	Lift station	ea	1	\$1,000,000	\$1,000,000	
2	Dump station improvements	ea	1	\$200,000	\$200,000	
3	Forcemain	lf	7,200	\$125	\$900,000	
4	Heat trace	lf	7,200	\$20	\$144,000	
5	Contingency			15%	\$336,600	
	Total Estimated Construction Cost:				\$2,580,600	
6	Engineering/CA/Admin			30%	\$774,180	
	Total Estimated Project Cost:					\$3,354,780

City of Bethel
Bethel Water and Sewer Master Plan Update

BACKBONE SEWER SYSTEM OPTIONS

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	EXTENSION COST	ITEM TOTAL
10	Haroldsen Subdivision Lift Station and Forcemain					
1	Lift station	ea	1	\$1,000,000	\$1,000,000	
2	Dump station improvements	ea	1	\$200,000	\$200,000	
3	Forcemain	lf	4,000	\$125	\$500,000	
4	Heat trace	lf	4,000	\$20	\$80,000	
5	Contingency			15%	\$267,000	
	Total Estimated Construction Cost:					\$2,047,000
6	Engineering/CA/Admin			30%	\$614,100	
	Total Estimated Project Cost:					\$2,661,100
TOTAL SEWER FORCEMAIN OPTIONS:						\$46,802,618
Summary of Quantities:						
	Lift stations:	ea	7			
	Dump station improvements	ea	7			
	Forcemain / Heat trace	lf	55,900			
	Demolition of existing pipe	lf	16,400			
	Reestablish services	ea	14			

City of Bethel
Bethel Water and Sewer Master Plan Update

PIPED WATER AND SEWER SERVICE OPTIONS

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL COST	ITEM TOTAL
1	Kilbuck North (Avenues)					
1	Water main	lf	12,000	\$130	\$1,560,000	
2	Sewer main	lf	7,700	\$130	\$1,001,000	
3	Heat trace	lf	7,700	\$15	\$115,500	
4	Services	ea	133	\$32,000	\$4,256,000	
5	Contingency			15%	\$1,039,875	
	Total Estimated Construction Cost:				\$7,972,375	
6	Engineering/CA/Admin			30%	\$2,391,713	
	Total Estimated Project Cost:					\$10,364,088
2	Kilbuck South (Avenues)					
1	Water main	lf	12,000	\$130	\$1,560,000	
2	Sewer main	lf	4,200	\$130	\$546,000	
3	Heat trace	lf	4,200	\$15	\$63,000	
4	Services	ea	49	\$32,000	\$1,568,000	
5	Contingency			15%	\$560,550	
	Total Estimated Construction Cost:				\$4,297,550	
6	Engineering/CA/Admin			30%	\$1,289,265	
	Total Estimated Project Cost:					\$5,586,815
3	Mission Lake Area					
1	Water main	lf	16,000	\$130	\$2,080,000	
2	Sewer main	lf	12,500	\$130	\$1,625,000	
3	Heat trace	lf	12,500	\$15	\$187,500	
4	Services	ea	135	\$32,000	\$4,320,000	
5	Contingency			15%	\$1,231,875	
	Total Estimated Construction Cost:				\$9,444,375	
6	Engineering/CA/Admin			30%	\$2,833,313	
	Total Estimated Project Cost:					\$12,277,688
4	Harbor Area					
1	Water main	lf	21,500	\$130	\$2,795,000	
2	Sewer main	lf	16,400	\$130	\$2,132,000	
3	Heat trace	lf	16,400	\$15	\$246,000	
4	Services	ea	146	\$32,000	\$4,672,000	
5	Contingency			15%	\$1,476,750	
	Total Estimated Construction Cost:				\$11,321,750	
6	Engineering/CA/Admin			30%	\$3,396,525	
	Total Estimated Project Cost:					\$14,718,275
5	Nunivak Subdivision West					
1	Water main	lf	7,250	\$130	\$942,500	
2	Sewer main	lf	3,500	\$130	\$455,000	
3	Heat trace	lf	3,500	\$15	\$52,500	
4	Services	ea	47	\$32,000	\$1,504,000	
5	Contingency			15%	\$443,100	
	Total Estimated Construction Cost:				\$3,397,100	
6	Engineering/CA/Admin			30%	\$1,019,130	
	Total Estimated Project Cost:					\$4,416,230

City of Bethel
Bethel Water and Sewer Master Plan Update

PIPED WATER AND SEWER SERVICE OPTIONS

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL COST	ITEM TOTAL
6	Nunivak Subdivision East					
1	Water main	lf	10,600	\$130	\$1,378,000	
2	Sewer main	lf	7,700	\$130	\$1,001,000	
3	Heat trace	lf	7,700	\$15	\$115,500	
4	Services	ea	75	\$32,000	\$2,400,000	
5	Contingency			15%	\$734,175	
	Total Estimated Construction Cost:				\$5,628,675	
6	Engineering/CA/Admin			30%	\$1,688,603	
	Total Estimated Project Cost:					\$7,317,278
7	Blueberry Subdivision South					
1	Water main	lf	17,000	\$130	\$2,210,000	
2	Sewer main	lf	12,300	\$130	\$1,599,000	
3	Heat trace	lf	12,300	\$15	\$184,500	
4	Services	ea	142	\$32,000	\$4,544,000	
5	Contingency			15%	\$1,280,625	
	Total Estimated Construction Cost:				\$9,818,125	
6	Engineering/CA/Admin			30%	\$2,945,438	
	Total Estimated Project Cost:					\$12,763,563
8	Blueberry Subdivision North					
1	Water main	lf	14,000	\$130	\$1,820,000	
2	Sewer main	lf	10,100	\$130	\$1,313,000	
3	Heat trace	lf	10,100	\$15	\$151,500	
4	Services	ea	133	\$32,000	\$4,256,000	
5	Contingency			15%	\$1,131,075	
	Total Estimated Construction Cost:				\$8,671,575	
6	Engineering/CA/Admin			30%	\$2,601,473	
	Total Estimated Project Cost:					\$11,273,048
9	Tundra Ridge Subdivision					
1	Water main	lf	18,300	\$130	\$2,379,000	
2	Sewer main	lf	15,500	\$130	\$2,015,000	
3	Heat trace	lf	15,500	\$15	\$232,500	
4	Services	ea	219	\$32,000	\$7,008,000	
5	Contingency			15%	\$1,745,175	
	Total Estimated Construction Cost:				\$13,379,675	
6	Engineering/CA/Admin			30%	\$4,013,903	
	Total Estimated Project Cost:					\$17,393,578
10	Uivuuq Subdivision					
1	Water main	lf	13,000	\$130	\$1,690,000	
2	Sewer main	lf	7,400	\$130	\$962,000	
3	Heat trace	lf	7,400	\$15	\$111,000	
4	Services	ea	83	\$32,000	\$2,656,000	
5	Contingency			15%	\$812,850	
	Total Estimated Construction Cost:				\$6,231,850	
6	Engineering/CA/Admin			30%	\$1,869,555	
	Total Estimated Project Cost:					\$8,101,405

City of Bethel
Bethel Water and Sewer Master Plan Update

PIPED WATER AND SEWER SERVICE OPTIONS

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL COST	ITEM TOTAL
11	Larson Subdivision					
1	Water main	lf	8,700	\$130	\$1,131,000	
2	Sewer main	lf	8,600	\$130	\$1,118,000	
3	Heat trace	lf	8,600	\$15	\$129,000	
4	Services	ea	67	\$32,000	\$2,144,000	
5	Contingency			15%	\$678,300	
	Total Estimated Construction Cost:				\$5,200,300	
6	Engineering/CA/Admin			30%	\$1,560,090	
	Total Estimated Project Cost:					\$6,760,390
12	Airport Facilities					
1	Water main	lf	12,400	\$130	\$1,612,000	
2	Sewer main	lf	6,200	\$130	\$806,000	
3	Heat trace	lf	6,200	\$15	\$93,000	
4	Services	ea	32	\$32,000	\$1,024,000	
5	Contingency			15%	\$530,250	
	Total Estimated Construction Cost:				\$4,065,250	
6	Engineering/CA/Admin			30%	\$1,219,575	
	Total Estimated Project Cost:					\$5,284,825
13	Kasayuli Subdivision					
1	Water main	lf	16,600	\$130	\$2,158,000	
2	Sewer main	lf	16,800	\$130	\$2,184,000	
3	Heat trace	lf	16,800	\$15	\$252,000	
4	Services	ea	211	\$32,000	\$6,752,000	
5	Contingency			15%	\$1,701,900	
	Total Estimated Construction Cost:				\$13,047,900	
6	Engineering/CA/Admin			30%	\$3,914,370	
	Total Estimated Project Cost:					\$16,962,270
14	H-Marker Lake Area					
1	Water main	lf	3,600	\$130	\$468,000	
2	Sewer main	lf	3,000	\$130	\$390,000	
3	Heat trace	lf	3,000	\$15	\$45,000	
4	Services	ea	16	\$32,000	\$512,000	
5	Contingency			15%	\$212,250	
	Total Estimated Construction Cost:				\$1,627,250	
6	Engineering/CA/Admin			30%	\$488,175	
	Total Estimated Project Cost:					\$2,115,425
15	Raven Subdivision West					
1	Water main	lf	11,500	\$130	\$1,495,000	
2	Sewer main	lf	4,800	\$130	\$624,000	
3	Heat trace	lf	4,800	\$15	\$72,000	
4	Services	ea	64	\$32,000	\$2,048,000	
5	Contingency			15%	\$635,850	
	Total Estimated Construction Cost:				\$4,874,850	
6	Engineering/CA/Admin			30%	\$1,462,455	
	Total Estimated Project Cost:					\$6,337,305

City of Bethel
Bethel Water and Sewer Master Plan Update

PIPED WATER AND SEWER SERVICE OPTIONS

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL COST	ITEM TOTAL
16	Raven Subdivision East					
1	Water main	lf	9,500	\$130	\$1,235,000	
2	Sewer main	lf	5,100	\$130	\$663,000	
3	Heat trace	lf	5,100	\$15	\$76,500	
4	Services	ea	54	\$32,000	\$1,728,000	
5	Contingency			15%	\$555,375	
	Total Estimated Construction Cost:				\$4,257,875	
6	Engineering/CA/Admin			30%	\$1,277,363	
	Total Estimated Project Cost:					\$5,535,238
17	Haroldsen Estates					
1	Water main	lf	7,900	\$130	\$1,027,000	
2	Sewer main	lf	5,000	\$130	\$650,000	
3	Heat trace	lf	5,000	\$15	\$75,000	
4	Services	ea	76	\$32,000	\$2,432,000	
5	Contingency			15%	\$627,600	
	Total Estimated Construction Cost:				\$4,811,600	
6	Engineering/CA/Admin			30%	\$1,443,480	
	Total Estimated Project Cost:					\$6,255,080
TOTAL WATER SOURCE OPTIONS:						\$153,462,498
Summary of Quantities:						
	Water main	lf	211,850			
	Sewer main	lf	146,800			
	Heat trace	lf	146,800			
	Services	ea	1,857			

Telephone Record

From	 Michael Rabe, P.E. CRW Engineering Group, LLC 3940 Arctic Boulevard Anchorage, AK 99503	
Phone: (907) 562-3252	Fax: (907) 561-2273	E-mail: mrabe@crweng.com

Attention Robert Strahan
Company City of Bethel
To P.O Box 388
Bethel AK 99559
Tel. No. 534-1376

CRW No964102	Date: 3/27/0200
Project: City of Bethel	Bethel Water & Sewer Master Plan
Subject: Finance Committee Meeting	

Teleconference with Bethel Finance Committee

Date: March 24, 2005

Mike Rabe and Jim Patterson teleconferenced with the City of Bethel Finance Committee's regular meeting. 7:00 to 7:45 PM

When we called in the meeting was in progress. The Committee had just finished people to be heard and was in the process of approving the minutes from the previous meeting and approval of the meeting agenda.

First order of business was discussion of the project priorities for the City of Bethel Water and Sewer Facilities Master Plan Update - 95% Submittal (which will be presented to the City Council on April 12, 2005)

1. Wayne Ogle started by asking several questions that apparently were brought up during the people to be heard section of the meeting:

a. Wayne asked Jim Patterson if CRW fees been inline with industry standards. Jim stated yes. Industry standard for design is 8-10% of project and CRW has averaged 8%. Industry standard for construction administration is 12-15% and CRW has average 12%.

b. Wayne asked Jim Patterson if CRW's services have met or exceeded industry standard. Jim responded yes.

c. Wayne stated that he understood that VSW has performed internal audits of section of the Bethel projects that have been managed by CRW. Wayne asked Jim if these audits every showed any irregularities in CRW's performance. Jim stated that portions of the Bethel project managed by CRW have been audited every year and no irregularities have been found. Jim also stated that an internal audit was completed last week for the Phase 2 Improvements and no problems were noted.

2. The committee requested that Mike Rabe summarize the goal of today's meeting. Mike asked if the committee received that document, dated March 13, 2005, that was submitted to the Public Works Committee. This document includes the proposed "Executive Summary" for the 95% document, a "Project Prioritization Summary", a "Projects Cost Estimate" for the proposed improvements, anticipated "Man-hour Summary" for first three prioritized projects, and a detailed

"Project Schedule" showing funding levels for the first \$30 million worth of projects. The goal of the meeting was to get concurrence from the Finance Committee on the first \$30 million worth of project (6 projects).

3. Jeff Sanders, Chairman for the Bethel Public Works Committee stated that the Public Works Committee approved the first six projects listed at the March 15, 2005, Special Meeting. He indicated there was strong commitment for the first 4 projects; however, the committee wanted the City have some recourse to modify the last 2 projects if funding is less than anticipated. They did not want that potential lack of funds to slow down completion of the Wastewater Treatment Plant.

4. The committee discussed the projects. There was some concern regarding the odor of a dump station at the proposed location of the relocated QFC#2 Lift Station. Jim Patterson noted that the exact location of the new lift station could be determined during detailed design.

5. The Finance Committee agreed with the priority of the first 6 projects.

Telephone Record

From



Michael Rabe, P.E.
CRW Engineering Group, LLC
3940 Arctic Boulevard
Anchorage, AK 99503

Phone: (907) 562-3252 Fax: (907) 561-2273 E-mail: mrabe@crweng.com

Attention **Wayne Ogle**
Company City of Bethel
To Department of Public Works
P.O Box 388
Bethel AK 99559

Tel. No. **546-3110**

CRW No964102 Date: 3/15/2005
Project: City of Bethel
Bethel Water & Sewer Master Plan
Subject: Public Works Committee Meeting

Teleconference with Bethel Public Works Committee

Date: March 15, 2005

Mike Rabe and Jim Patterson teleconferenced with the City of Bethel Public Works Committee's regular meeting. 6:30 to 8:45 PM

When we called in the meeting was just getting started with the people to be heard. Mr. Tundy Rogers stated that it was important the everyone read this document carefully. He felt the document did not include enough of the recommendations from the previous master plan. For example; the previous master plan recommended a water treatment plant be located at the location of the Nicholson Well, which is now owned by the City of Bethel. Additionally, the previous master plan recommended a water treatment plant be constructed at each subdivision - this is better than putting in all these pipes.

After the people to be heard section of the meeting the addenda for this special meeting was approved. First order of business was discussion of the project priorities for the City of Bethel Water and Sewer Facilities Master Plan Update - 95% Submittal (which will be presented to the City Council on April 12, 2005)

1. The committee requested that Mike Rabe summarize the goal of today's meeting. Mike asked if the committee received that document, dated March 13, 2005. This document includes the proposed "Executive Summary" for the 95% document, a "Project Prioritization Summary", a "Projects Cost Estimate" for the proposed improvements, anticipated "Man-hour Summary" for first three prioritized projects, and a detailed "Project Schedule" showing funding levels for the first \$30 million worth of projects. The goal of the meeting was to get concurrence from the Public Works Committee on the first \$30 million worth of project (6 projects).

2. Karl Powers stated that we prepared a spreadsheet that shows how the SDS Funds could be blended with the Village Safe Water Grant Funds to ensure \$30 million is funded to the City of Bethel's Water and Sewer improvements over the next three years. Karl stated that he would assist with completing a SDS Fund Application on behalf of the City of Bethel to provide SDS funds to replace the QFC#2 Lift Station. He stated that he would work with Mike Rabe to ensure ANTHC gets the information they need. Mike Rabe agreed.

3. The Committee discussed the need to prioritize the project past the first \$10 million. Jim Patterson explained that the City of Bethel had already secured \$9.075 million that will go to funding the first \$10 million worth of improvements. The City will be applying for the next \$10 million worth of project July 2005 . This document must include a prioritization of project for this application. Additionally, VSW wants the City to commit to the first \$30 million to show that the City has a plan.

4. The Committee recommended that the Finance Committee review metered water and sewer rates for the piped system vs. truck haul rates to determine most economic rates.

5. The Committee requested that CRW move the Mission Lake area booster station to the site of the Nicholson Water Well site.

6. Public Works Committee approved the first six projects listed at the March 15, 2005. There was strong commitment for the first 4 projects; however, the committee wanted the City have some recourse to modify the last 2 projects if funding is less than anticipated. They did not want that potential lack of funds to slow down completion of the Wastewater Treatment Plant.

7. Mike Rabe stated that a Public Meeting was scheduled for March , 2005 and asked that the member of the Public Works Committee attend the meeting to show community support.

Appendix C

Community RAHSI Survey

Printed: 02/25/2004 02:22PM (AK Time)

wSTARS

Printed By: Powers Karl

SDS COMMUNITY DEFICIENCY PROFILE FOR BETHEL (AK16485)

Community BETHEL	Comm. Code AK16485	SU Code 3033 - NON-RESERVATION	Descriptive Information		
Reservation ALASKA		District 21 - Western-ANTHC Lead			
Tribe BETHEL NATIVE VILLAGE, AK		Field Office 031 - YKHC	EPA PWS ID(s) AK2270346, AK2270469, AK2271075, AK2271083, AK2271148, AK2271300	Threshold Unit Cost \$85,500	

Location Description	Home Type	Number Homes	Water I.D.L.	Sewer I.D.L.	Solid I.D.L.	Comments
BETHEL	E1 - Existing Homes	90	1	1	0	From RAHSI House Count (Submitted: 11/22/2002)
BETHEL	E1 - Existing Homes	2	1	2	0	From RAHSI House Count (Submitted: 11/22/2002)
BETHEL	E1 - Existing Homes	1	2	1	0	From RAHSI House Count (Submitted: 11/22/2002)
BETHEL	E1 - Existing Homes	428	2	2	0	From RAHSI House Count (Submitted: 11/22/2002)
BETHEL	E1 - Existing Homes	4	4	4	0	From RAHSI House Count (Submitted: 11/22/2002)
BETHEL	E2 - Non-Residential Units	44	1	1	0	From RAHSI House Count (Submitted: 11/22/2002)
BETHEL	E2 - Non-Residential Units	1	1	4	0	From RAHSI House Count (Submitted: 11/22/2002)
BETHEL	E2 - Non-Residential Units	3	2	1	0	From RAHSI House Count (Submitted: 11/22/2002)
BETHEL	E2 - Non-Residential Units	77	2	2	0	From RAHSI House Count (Submitted: 11/22/2002)
BETHEL	E3 - Non-Indian Units	12	1	1	0	From RAHSI House Count (Submitted: 11/22/2002)
BETHEL	E3 - Non-Indian Units	3	1	2	0	From RAHSI House Count (Submitted: 11/22/2002)
BETHEL	E3 - Non-Indian Units	1	2	1	0	From RAHSI House Count (Submitted: 11/22/2002)
BETHEL	E3 - Non-Indian Units	36	2	2	0	From RAHSI House Count (Submitted: 11/22/2002)
BETHEL	H1 - HUD Housing	148	1	1	0	From RAHSI House Count

						(Submitted: 11/22/2002)
BETHEL	H1 - HUD Housing	1	2	2	0	From RAHSI House Count (Submitted: 11/22/2002)
BETHEL	H5 - Other Housing	104	1	1	0	From RAHSI House Count (Submitted: 11/22/2002)
BETHEL	H5 - Other Housing	5	1	2	0	From RAHSI House Count (Submitted: 11/22/2002)
BETHEL	H5 - Other Housing	469	2	2	0	From RAHSI House Count (Submitted: 11/22/2002)
BETHEL	H5 - Other Housing	3	4	4	0	From RAHSI House Count (Submitted: 11/22/2002)

DEFICIENCY LEVELS					
	1	2	3	4	5
Water	409	1016	0	7	0
Sewer	403	1021	0	8	
Solid Waste	0	0	1432		
Homes Without Potable Water	7	Total Homes 1432			

Web-Based Sanitation Tracking & Reporting System

SDS SUMMARY (1 PAGE)

Community: BETHEL

GENERAL COMMUNITY INFORMATION

Number of Projects:	
Total Data Base:	4
Current Agency Funding Plan:	1
Total Project Cost:	
Total Data Base:	\$45,159,117
Current Agency Funding Plan:	\$2,659,485
Estimated Number of Homes Without Potable Water	800
Estimated Number of Homes at Deficiency Levels 4 and 5	0
Estimated Number of Homes at Deficiency Levels 2 through 5	773
Estimated Number of Homes at all Deficiency Levels	773
Number of Communities in Deficiency Profile	1

DEFICIENCY LEVEL INFORMATION

DEFICIENCY LEVEL	1	2	3	4	5
Homes	0	0	773	0	0
Percent Eligible Homes	0.00	0.00	100.00	0.00	0.00
Number of Projects	0	2	1	0	0
Estimated Cost:					
Total Data Base:	\$0	\$41,899,632	\$2,659,485	\$0	\$0
Curr. Funding Plan:		\$0	\$2,659,485	\$0	\$0

TYPE OF SERVICE INFORMATION

TYPE OF SERVICE	WATER	SEWER	SOLID WASTE	O & M
Homes at IDL 2 - 5	773	773	773	N/A
Percent Eligible Homes	100.00	100.00	100.00	N/A
Estimated Cost:				
Total Data Base:	\$22,279,558	\$22,279,558	\$600,000	\$0
Curr. Funding Plan:	\$1,329,742	\$1,329,742	\$0	\$0

Web-Based Sanitation Tracking & Reporting System

SDS COMMUNITY DEFICIENCY PROFILE FOR BETHEL (AK16485)

Community BETHEL	Comm. Code AK16485	SU Code 3033 - NON-RESERVATION	Descriptive Information		
Reservation ALASKA	District 21 - Western-ANTHC Lead				
Tribe BETHEL NATIVE VILLAGE, AK			Field Office 031 - YKHC	EPA PWS ID(s) None	Threshold Unit Cost \$85,500

Location Description	Home Type	Number Homes	Water I.D.L.	Sewer I.D.L.	Solid I.D.L.	Comments
BETHEL	E1 - Existing Homes	541	3	3	3	
BETHEL	H1 - HUD Housing	232	3	3	3	

DEFICIENCY LEVELS					
	1	2	3	4	5
Water	0	0	773	0	0
Sewer	0	0	773	0	
Solid Waste	0	0	773		
Homes Without Potable Water	800		Total Homes	773	

Web-Based Sanitation Tracking & Reporting System

SDS COMMUNITY DEFICIENCY PROFILE-ONE LINE LISTING

COMMUNITY NAME	COMMUNITY- STATE CODE	NO. HOMES AT EACH DEFICIENCY LEVEL					TOTAL HOMES	TOTAL HOMES	WATER COST	SEWER HOMES	SEWER COST	SOLID WASTE		OPERA MAINT
		0 OR 1	2	3	4	5						HOMES	COST	
BETHEL	AK16485	0	0	773	0	0	773	773	\$22,279,558	773	\$22,279,558	773	\$600,000	
TOTALS:		0	0	773	0	0	773	773	\$22,279,558	773	\$22,279,558	773	\$600,000	

Web-Based Sanitation Tracking & Reporting System

SDS SCORE LISTING

PROJECT NUMBER	DEF. LVL.		SDS PROJECT NAME	SCORES							TOTAL T.P. SCORE		
	I	F		TRIBE HEALTH CODE	DEF. IMPACT	FIRST LEVEL	SERVICE	CAPITAL COST	O & M CAP.	OTHER CONSD.			
AK16485-0002	3	1	BETHEL - W&S Improvements	524	0	12	0	0	0	0	0	0	12
AK16485-0001*	2	2	BETHEL - W&S Extension	524	3	6	0	-20	0	0	0	0	-11
AK16485-0003*	2	1	BETHEL - Water & Sewer	524	0	6	0	-20	0	0	0	0	-14
AK16485-0004*	0	0	BETHEL - Solid Waste	524	0	0	0	-20	0	0	0	0	-20

Web-Based Sanitation Tracking & Reporting System

SDS GROUPED LISTING (Listed by State, Reservation and Community)

NUMBER	NAME	TOTAL SCORE	COMMUNITY	DEF LEVEL INIT	DEF LEVEL FINAL	TOTAL HOMES	COST
STATE: ALASKA(2)							
RESERVATION: ALASKA							
COMMUNITY NAME: BETHEL							
AK16485-0001	BETHEL - W&S Extension	-11	BETHEL	2	2	50	\$1,899,600
AK16485-0002	BETHEL - W&S Improvements	12	BETHEL	3	1	70	\$2,659,500
AK16485-0003	BETHEL - Water & Sewer	-14	BETHEL	2	1	630	\$40,000,000
AK16485-0004	BETHEL - Solid Waste	-20	BETHEL	0	0	1400	\$600,000
TOTAL FOR COMMUNITY: BETHEL							\$45,159,100
TOTAL FOR RESERVATION: ALASKA							\$45,159,100
TOTAL FOR STATE: ALASKA(2)							\$45,159,100

Web-Based Sanitation Tracking & Reporting System

SDS ONE-LINE LISTING

Project / Project Name	Tribe	Res	District	Field Office	Priority	Init. DL	Final DL	Total Score	Homes	Total Contr.	IHS Project Cost	IHS Cumulative Cost
AK16485-0002 - BETHEL - W&S Improvements	524	227	21	031	341	3	1	12	70	0	2,659,485	2,659,485
AK16485-0001* - BETHEL - W&S Extension	524	227	21	031	458	2	2	-11	50	0	1,899,632	4,559,117
AK16485-0003* - BETHEL - Water & Sewer	524	227	21	031	460	2	1	-14	630	0	40,000,000	44,559,117
AK16485-0004* - BETHEL - Solid Waste	524	227	21	031	465	0	0	-20	1400	0	600,000	45,159,117

Web-Based Sanitation Tracking & Reporting System

SDS SOLID WASTE (Listed by Reservation and Community)

NUMBER	NAME/DESCRIPTION	TOTAL SCORE	DEF LEVEL		SOLID WASTE COST
			INIT	FINAL	
RESERVATION NAME: ALASKA					
COMMUNITY NAME: BETHEL					
AK16485-0004	BETHEL - Solid Waste	-20	0	0	\$600,000 * A \$0
	Existing: Solid Waste facility, permitted with management plan, well operated system. Needs some equipment and expansion.				* B - \$0
	Proposed: Expand solid waste site with equipment.				* C \$600,000
TOTAL FOR COMMUNITY: BETHEL					\$600,000
TOTAL FOR RESERVATION: ALASKA					\$600,000

Appendix D

City of Bethel Codes and Ordinances
Related to Water and Sewer Services:

Title 13 – Public Services

Ordinances Related to Public Water and Sewer Services

Title 13 – Public Services

Title 13

PUBLIC SERVICES

Chapters:

- 13.04 Water Service**
- 13.08 Sewer Service**
- 13.12 Solid Waste Collection and Disposal**
- 13.16 Utility Rates**
- 13.20 Cemeteries and Burials**

Chapter 13.04

WATER SERVICE

Sections:

- | | | | |
|-----------|--|-----------|---|
| 13.04.010 | Definitions. | 13.04.270 | Delinquent accounts. |
| 13.04.020 | Area of service. | 13.04.280 | Shutoff—By request. |
| 13.04.030 | Connection to proximate main required. | 13.04.290 | Shutoff—Nonpayment of charges. |
| 13.04.040 | Segregation of private water supply. | 13.04.300 | Shutoff—Improper plumbing. |
| 13.04.050 | Service continuity and quality. | 13.04.310 | Shutoff—Waste or noncompliance. |
| 13.04.060 | Ownership of facilities. | 13.04.320 | Access for inspection. |
| 13.04.070 | Classes of service. | 13.04.330 | Liability of city and customer. |
| 13.04.080 | Resale of water. | 13.04.340 | Fire hydrants. |
| 13.04.085 | Sale of metered water in bulk. | 13.04.350 | Easement and right-of-way. |
| 13.04.090 | Preference during shortage. | 13.04.360 | Experiments and innovations. |
| 13.04.100 | Application for service. | 13.04.370 | Suspension of provisions. |
| 13.04.110 | Credit establishment—Deposits. | 13.04.380 | Administration and enforcement. |
| 13.04.120 | Service changes. | 13.04.390 | Violation—Penalty. |
| 13.04.130 | Mains and connections. | | |
| 13.04.140 | Water extension. | 13.04.010 | Definitions. |
| 13.04.150 | Service connection—Charge. | | As used in this chapter: |
| 13.04.160 | Service connection—Procedure. | | A. “Applicant” means the person or persons, firm or corporation or other entity making application for water service from the department under the terms of this chapter. |
| 13.04.170 | Multiple service on one extension. | | B. “Customer” means an applicant whose application has been accepted by the department. |
| 13.04.180 | Holding tank service. | | C. “Department” means the city public works department. |
| 13.04.190 | Fire protection service. | | D. “Water connection” means that part of the water distribution system connecting the water main with the lot line of the property being furnished the water service or with the lot line of the nearest property abutting the water main if the water connection must first cross this abutting property to reach the property being served. |
| 13.04.200 | Temporary service. | | |
| 13.04.210 | Customer’s plumbing. | | |
| 13.04.220 | Control valve. | | |
| 13.04.230 | Commercial service meters. | | |
| 13.04.240 | Rates. | | |
| 13.04.250 | Notices. | | |
| 13.04.260 | Billing. | | |

13.04.020

E. "Water extension" means that part of the water distribution system extending from the water connection into the premises served.

F. "Water main" means that part of the water distribution system intended to serve more than one water connection. (Prior code § 11.04.010)

13.04.020 Area of service.

The water service area shall be such area within the city and such nearby territory as the council from time to time includes within the water service area by resolution. (Prior code § 11.04.020(1))

13.04.030 Connection to proximate main required.

Upon completion of construction of a water main in front of, alongside of, or adjacent to improved property in an area, the department shall notify the city clerk who shall publish a notice that the water service is available to serve inhabitants of that area who shall make application for service or connect to the system within one year after the date of the published notice. Should the owner of improved property fail to do so, a charge shall be made each month until connection is made. This charge shall be equal to the monthly minimum for the type of service that would be furnished were water service supplied. The charge will be levied upon and collected in the same manner as an assessment for the improved property. (Prior code § 11.04.020(2))

13.04.040 Segregation of private water supply.

When water service has been provided for improved property, all wells and springs on such property shall be completely segregated

from the city water system. (Prior code § 11.04.020(3))

13.04.050 Service continuity and quality.

A. Supply.

1. Water service shall be provided by the department, which shall exercise reasonable diligence and care to deliver a continuous and sufficient supply of water to customers in adequate pressure and to avoid, insofar as reasonably possible, any shortage or interruption in delivery.

2. The city shall not be liable for damage resulting from interruption in service or lack of service. Temporary suspension of service by the department for improvements and repairs may be necessary. Whenever possible, and when time permits, all customers affected by such suspension will be notified prior thereto by notice through news media or otherwise.

B. Quality. The department will exercise reasonable diligence to supply safe and potable water at all times. (Prior code § 11.04.030(1), (2))

13.04.060 Ownership of facilities.

All water mains, water connections, valves, fittings, hydrants and other appurtenances, except water extension lines shall be the property of the city, unless otherwise provided by the council by written contract. (Prior code § 11.04.030(3))

13.04.070 Classes of service.

The classes of service shall be residential or commercial. Residential services shall consist of all services where water is supplied for domestic purposes to a single-family dwelling unit. Commercial services shall consist of all

services where water is supplied for a commercial or business establishment, or multi-dwelling units. If water is supplied to a customer for use in both a single-family dwelling unit and a business establishment, the rate for commercial services shall apply for the combined usage. (Prior code § 11.04.030(4))

13.04.080 Resale of water.

Resale of water shall be permitted only pursuant to written contract between the council and the party proposing to sell water. (Prior code § 11.04.030(5))

13.04.085 Sale of metered water in bulk.

Sale of metered water in quantities of one hundred gallons or more per fill is permitted only pursuant to a written contract executed between the city and the party proposing to buy water in bulk. The city is authorized to enter into such contracts on behalf of the city. (Ord. 01-38 § 2)

13.04.090 Preference during shortage.

In case of a water shortage, the department may give preferences to customers as public convenience or necessity requires. Water service to customers outside the city shall at all times be subject to the prior superior rights of the customers within the city. (Prior code § 11.04.030(6))

13.04.100 Application for service.

Each applicant for water service shall sign an application form provided by the city clerk, giving the date of application, location of the premises to be served, the date applicant desires services to begin, class of service, the address for mailing bills, the size of line

required, and such other information as the department may reasonably require. By signing the application, the applicant agrees to abide by this chapter and all resolutions or regulations promulgated under this chapter and the applicant agrees to have placed in an approved location a number which conforms to the street numbering system of the city. The application is a request for service and does not require the city to furnish service. (Prior code § 11.04.040(1))

**13.04.110 Credit establishment—
Deposits.**

At the time application for service is made, the applicant shall establish credit with the finance department.

A. Establishment of Credit. A utility deposit will be required if the applicant has no previous credit history with the finance department. A deposit equal to two months' service, but not less than one hundred dollars shall be required. Credit history will be based upon an applicant's past utility payment record and a deposit will not be required if it is determined that the applicant has not been delinquent more than once in the applicant's most recent twelve-month period. Once a customer has established an acceptable credit history for twelve months the deposit shall be refunded.

B. Deposits. No service shall be furnished until the deposit is made with the finance department, and the applicant will be given a receipt for the deposit. The deposit is not a payment on account. In the event water service is discontinued, the deposit will be applied to the closing bill, and any amount in excess of the closing bill will be refunded to the applicant.

13.04.120

C. Forfeiture of Deposit. If a customer's account becomes delinquent and service is discontinued, the deposit shall be applied to the unpaid balance. Water service shall not be restored to the customer at any premise in which the customer resides within the city until all outstanding water bills due the city from the customer have been paid and the cash deposit replaced in an amount equal to the department's estimated bill for two months' service together with a thirty-five dollar service charge for the restoration of services. (Amds. 10 (part) and 12, § 1 to Ord. 85: prior code § 11.04.040(2))

13.04.120 Service changes.

A. Increased Level of Service. Existing customers in good standing may increase their level of service without an additional deposit due providing the original deposit equals two months of service. Customers who are not in good standing shall be required to pay all outstanding balances before an increased level of service will be provided.

B. Decreased Level of Service. Existing customers may decrease their level of service. A reduction in deposit will not be given.

C. Fees for Changes in Level of Service.

1. Two changes in level of service per calendar year shall be allowed to a customer in good standing at no charge. Thereafter, a fee of twenty-five dollars will be due for any additional changes made. Customers not in good standing will be required to pay twenty-five dollars for each change in level of service.

2. Per calendar year, one reconnection after a disconnection shall be given to a customer in good standing at no charge. All reconNECTIONS thereafter will be charged a fifty dollar reconnection fee. Customers not in good

standing will be required to pay fifty dollars for each reconnection after a disconnection. (Ord. 02-31 § 2: Amd. 10 (part) to Ord. 85: prior code § 11.04.040(3))

13.04.130 Mains and connections.

A. Within the city. Water mains to areas within the city not presently served with water shall be installed only upon authorization of the council.

B. Outside the city. Water mains outside the city shall be installed only at the expense of the customers served.

C. Ownership. All water mains and water connections, whether within or without the city, shall be the property of the city, and shall be installed by the department or the applicants, in accordance with plans and specifications approved by the department.

D. Location. All water mains and water connections shall be on rights-of-way, easements or public property. All easements or right-of-way permits secured for water mains and water connections shall be obtained in the name of the city. (Prior code § 11.04.050)

13.04.140 Water extension.

The water extension shall be owned, installed and maintained by the applicant for water service. (Prior code § 11.04.060(1))

13.04.150 Service connection—Charge.

At the time the applicant files for water service where service has previously existed, or if the applicant is filing for a change in service class, size or location, the applicant shall submit with his application a service connection charge which will cover the actual cost to the department of the connection, plus twenty-five percent. (Prior code § 11.04.060(2))

**13.04.160 Service connection—
Procedure.**

Regulations, orders or procedures governing the installation of water extensions shall be promulgated by the department, subject to approval of the council by resolution. All water extensions and repairs, modifications or disconnections thereof shall be made only on the terms and conditions set forth in the Uniform Plumbing Code (current edition) and such further regulations, orders or procedures as the council may approve by resolution. (Prior code § 11.04.060(3))

**13.04.170 Multiple service on one
extension.**

A. The department may, at its option, serve two or more premises or customers with one water extension connection, provided that such joint service water extension lines shall be of such a size as to provide a capacity of not less than the combined capacity of the individual water extension lines. No water extension service shall be permitted to other customers except that under written contract approved by council.

B. The owner of a single parcel of property may apply for and receive as many connections as he and his tenants may require, provided his application or applications meet the requirements of this chapter. (Prior code § 11.04.060 (4), (5))

13.04.180 Holding tank service.

Customers to whom a water main is not available may have water delivered to their properties for discharge into holding tanks, provided that the location, type of holding tank and access thereto is approved by the department. Quantity and frequency of delivery shall be determined by regulations or orders of the department and approved by the council by resolution, and the rate charged for such delivery shall be determined by the council by ordinance. (Prior code § 11.04.060(6))

13.04.190 Fire protection service.

A customer having fire protection facilities on the premises or who uses water for other purposes through the same water extension connection shall be charged at the applicable rate for that customer's class of service, regardless of such other use. (Prior code § 11.04.060(7))

13.04.200 Temporary service.

Temporary water extensions and water connections may be provided by the department for a period not to exceed six months, unless an extension is granted by the department. Costs of connection, deposits, charges for installation and removal of equipment shall be established by the department, subject to approval by the council by ordinance. (Prior code § 11.04.060(8))

13.04.210 Customer's plumbing.

The customer's plumbing, which shall include the water extension lines and all plumbing, piping, fixtures and other appurtenances carrying or intended to carry water on property owned or controlled by the customer, shall comply with the plumbing

regulations of the city. (Prior code § 11.04.060(9)(a))

13.04.220 Control valve.

Customers shall install a suitable control valve in the water extension line at a location approved by the department, the operation of which valve will control the entire water supply to the premises served. It will be a violation of this chapter for the customer to operate, cause or permit unauthorized operation of the control valve, except in the case of emergencies. (Prior code § 11.04.060(9)(b))

13.04.230 Commercial service meters.

A. Requirement. The department may require installation of a water meter at the customer's expense for any commercial service.

B. Location. Meters shall be placed in a location approved by the department.

C. Joint Use. Meters cannot be used by more than one customer except as provided by written contract with the department. (Prior code § 11.04.070)

13.04.240 Rates.

Water rates shall be determined by the council, adopted by ordinance, and shall be available in the city clerk's office for public inspection during regular business hours. (Prior code § 11.04.080)

13.04.250 Notices.

A. To Customers. Notices from the department to a customer will normally be given in writing, and either mailed to or delivered to the customer at his last known address. Where conditions warrant and

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emergencies, the department may notify the customer either by telephone or messenger.

B. From Customers. Notices from customers to the department shall be given by the customer in writing on a city utility form to the utility/finance office or to the utility services foreman of the department duly authorized to receive notices or complaints.

C. Discontinuance for Repairs. Notices from the department to a customer providing for the discontinuance of service for the purpose of repairs shall be given to a customer in writing twenty-four hours prior to such discontinuance, except in the case of emergencies. (Ord. 02-10 § 2; prior code § 11.04.090)

13.04.260 Billing.

A. All bills shall be mailed on or before the fifth day of each month.

B. Each bill entered shall be due upon receipt. If the bill is not paid by the twentieth day of the month in which mailed, the account shall be considered delinquent.

C. Customer shall have ninety days beyond the current payment due date for any corrections or adjustments. (Ord. 02-10 § 3; Ord. 93-38 § 4 (part); Amd. 10 (part) to Ord. 85; prior code § 11.04.100(1), (2))

13.04.270 Delinquent accounts.

A. The finance department shall send a notice of account delinquency to each customer when the account becomes delinquent.

B. Within fifteen days after an account becomes delinquent water will be turned off if the delinquent account is not paid in full prior thereto.

C. On the turn-off date, any agent of the department or city may turn off the water service.

D. Interest on delinquent accounts shall be paid at the rate of fifteen percent per annum. Delinquent payments, with interest, shall constitute a lien on real and personal property of the person or entity whose account is delinquent.

E. The city has the authority to collect from the delinquent customer all expenses that relate to the collection effort including: (1) cost of collection; (2) attorney's fees; (3) recorder's fees; (4) court costs. (Ord. 95-24 § 4; Amd. 10 (part) to Ord. 85; Ord. 170 (part), 1986; prior code § 11.04.100(3))

13.04.280 Shutoff—By request.

Each customer shall give the department written notice of his intention to discontinue water service at least two days prior to the date he wishes water service discontinued, and shall specify the date service is to be discontinued; otherwise, the customer will be responsible for all water supplied to the premises until the department receives notice of such discontinuance. Upon discontinuance of water service, a bill shall be rendered and such bill shall be payable immediately. In no case will the bill be less than the monthly minimum specified in the current water rate schedule for the class or classes of water service theretofore furnished. (Prior code § 11.04.110(1))

13.04.290 Shutoff—Nonpayment of charges.

If water service charges are not paid when due by any person, firm, corporation or other entity whose premises are served by water service, then the water service provided to that customer may be discontinued because of the default in the payment of the water service charges. (Prior code § 11.04.110(2))

13.04.300 Shutoff—Improper plumbing.

A. The department may refuse to furnish water and may discontinue water service to any premises without prior notice where plumbing facilities, appliances or equipment using water are dangerous, unsafe or not in conformity with the plumbing regulations of the city.

B. No physical connection between the water service system and any other water source shall be permitted, and the department may discontinue services to any persons or premises where a cross-connection exists without notice. (Prior code § 11.04.110(3))

13.04.310 Shutoff—Waste or noncompliance.

The department may discontinue service to any customer, upon five days' written notice, for any of the following reasons:

- A. Wasteful or negligent use of water;
- B. Excessive use of water resulting in inadequate service to other customers;
- C. Fraud or abuse by the customer;
- D. Unauthorized turn-on of water after discontinuance of water service by the department;
- E. Noncompliance with this chapter or any regulations, resolutions or orders issued pursuant thereto. (Prior code § 11.04.110(4))

13.04.320 Access for inspection.

Employees of the department shall have free access at all reasonable hours to any and all parts and structures of the premises in which water is or may be delivered for the purposes of inspecting connections, the conditions of the conduits and fixtures, and the manner and extent to which the water is being used. The department does not, however, assume the duty

of inspecting the water extension line or the customer's plumbing and equipment, and shall not be responsible therefor. (Prior code § 11.04.120)

13.04.330 Liability of city and customer.

The city shall not be liable for any loss or damage of any nature whatsoever caused by any defect in the water extension line or the customer's plumbing or equipment, nor shall the city be liable for loss or damage due to interruption of service or changes in pressure. The customer shall be responsible for valves on his premises being turned off when the water service is turned on. (Prior code § 11.04.130)

13.04.340 Fire hydrants.

A. Operation. No person or persons other than those designated and authorized by the department shall open any fire hydrant belonging to the city, attempt to draw water from it or in any manner damage or tamper with it.

B. Damage. Any person who damages a fire hydrant shall be responsible for its complete repair and return to service. Any person damaging the fire hydrant shall be subject to penalties provided for in this chapter.

C. Moving. Any party desiring to change the size, type or location of a fire hydrant shall bear all costs of such changes. Any changes in the size, type or location of a fire hydrant shall be approved by the department and by the city fire department of the city. (Prior code § 11.04.140)

13.04.350 Easement and right-of-way.

Each applicant and customer gives and grants to the city an easement and right-of-way

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on and across his property for the installation of water connections, water extensions and water mains and the necessary valves and equipment used in connection therewith. (Prior code § 11.04.180)

13.04.360 Experiments and innovations.

Nothing in this chapter shall be construed to prohibit the use of experimental and/or innovative processes or procedures for water service. The operation of such device, process or procedure shall have the prior approval of the public works committee of the city council. The committee shall approve all such devices, processes and procedures that are not in conflict with the health and welfare of the city. Applications for approval of such devices, processes and procedures shall be made to the public works director and appeal from a decision of the public works committee shall be to the council as a whole. (Prior code § 11.04.190)

13.04.370 Suspension of provisions.

No employee of the department is authorized to suspend or alter any of the provisions hereof without specific approval or direction of the city council, except in cases of emergency involving a danger of loss of life or property or which would place the water system operation in jeopardy. (Prior code § 11.04.170)

13.04.380 Administration and enforcement.

This chapter shall be administered and enforced by the city manager. The city council shall have the authority to establish and regulate monthly rates for water service pursuant to Chapter 48 of Title 29, Alaska

Statutes. All rates and other charges adopted by the council shall be by ordinance and available for public inspection during regular business hours at the office of the city clerk. All moneys collected for water services will be separately accounted for by the city finance director and used for such purposes and disbursed by the council as it deems appropriate. The city council may adopt such additional regulations, resolutions, orders, provisions and procedures pertaining to water service as it deems proper. (Prior code § 11.04.150)

13.04.390 Violation—Penalty.

Any person violating any of the provisions of the chapter shall, upon conviction thereof, be punished by a fine not exceeding five hundred dollars or by imprisonment in the city jail for a period not exceeding thirty days, or by both such fine and imprisonment. (Prior code § 11.04.160)

Chapter 13.08

SEWER SERVICE

Sections:

13.08.010	Definitions.
13.08.020	Service area.
13.08.025	Mandatory subscription.
13.08.030	Connection to proximate interceptor.
13.08.040	Service obligations of city.
13.08.050	Ownership of facilities.
13.08.060	Classes of service.
13.08.070	Obedience to rules and regulations.
13.08.080	Credit—Deposits— Assistance.
13.08.090	Changes in service.
13.08.100	Extension of service.
13.08.110	Interceptors and appurtenances.
13.08.120	Service lines.
13.08.130	Service connection— Charge.
13.08.140	Service connection— Installation.
13.08.150	Multiple service on one line.
13.08.160	Holding tanks and sanitary cans.
13.08.170	Temporary service.
13.08.180	Customer plumbing.
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13.08.200	Notices.
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13.08.240	Sanitary facilities nuisance declared.
13.08.241	Abatement of nuisance.
13.08.243	Violation.

13.08.245	Injunctive relief.
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13.08.260	Access for inspection.
13.08.270	Liability of city.
13.08.280	Prohibited substances.
13.08.290	Unlawful sewage disposal.
13.08.300	Individual sewer system.
13.08.310	Surface discharge.
13.08.320	Drains.
13.08.330	Illegal connection.
13.08.340	Interference.
13.08.350	Easement and right-of-way.
13.08.360	Experiments and innovations.
13.08.370	Suspension of provisions.
13.08.380	Administration and enforcement.

13.08.010 Definitions.

As used in this chapter:

A. "Applicant" means the person or persons, firm or corporation or other entity making application for sewer service from the department under the terms of this chapter.

B. "Customer" means an applicant whose application has been accepted by the department.

C. "Customer service lines" means that part of the sewer system which is situated on the customer's property or other private property over which the customer has control.

D. "Department" means the city public works department.

E. "Designee" means a person or business that has been approved by the city to collect, transport and dispose of sewage.

F. "Financial need" means a person meets the standards developed by the finance department in accordance with government

13.08.020

standards, which are reviewed and approved annually by the city council.

G. "Interceptors" means all trunk, main and lateral sewer lines of every kind which are connected to and used for the collection of sewage from the customer service lines and its delivery to the sewage treatment plant, except customer service lines.

H. "Person" means the head of the household occupying or maintaining a premises and the owner or manager of a premises.

I. "Premises" means any dwelling, office or building located within the boundaries of the city that are connected to the dedicated road system whose occupants or invitees create or accumulate sewage at least weekly. Each unit in a multi-occupied structure is considered to be a separate premises.

J. "Sanitary can" means a five gallon standard metal or plastic container used for the collection of human waste. (Ord. 94-125 § 4: prior code § 11.12.010)

13.08.020 Service area.

The sewer service area shall be such area within the city and such nearby territory as the council shall from time to time include within the sewer service area by resolution. (Prior code § 11.12.020(1))

13.08.025 Mandatory subscription.

A. Each person shall be jointly and severally responsible to subscribe for sewer service from the city and shall so subscribe for city-approved sewer service no later than October 1, 1994. The city or its designee shall regularly collect sewage from each premises by either an interceptor or by a holding tank or sanitary can collection service.

B. Each person shall be jointly and severally responsible to provide and maintain at least one sanitary can upon any premises; except that owners and occupants of premises served by a sewer interceptor or holding tank shall not be required to provide and maintain any sanitary can upon the premises. (Ord. 94-12S § 5)

13.08.030 Connection to proximate interceptor.

Wherever there is constructed within the sewer service area an interceptor for the purpose of transmitting sewage to the sewage treatment plant or lagoon, the owner or owners of the property abutting any street, alley or right-of-way along which the interceptor is constructed, must connect all improvements on such property in which any sewage or liquid waste is produced, with a customer service line and an interceptor. Upon completion of construction of such interceptor, the department shall notify the city clerk who shall publish a notice that the sewer service is available to serve inhabitants of that area who shall make application for service or connect to the sewer system within one year after the date of the published notice. Failure of the owner of the improved property to do so shall constitute a violation of this chapter. The department may, for good and sufficient reason, extend the time for completion of the connection. (Prior code § 11.12.020(2))

13.08.040 Service obligations of city.

A. Sewer service shall be provided by the department, which shall exercise reasonable diligence and care to ensure the uninterrupted operation of the system.

B. The city shall not be liable for damage resulting from interruption in service. Temporary suspension of service by the department for improvements and repairs may be necessary. Whenever possible, and when time permits, all customers affected by such suspension will be notified prior thereto by notice through news media or otherwise.

C. The city shall own or operate and maintain a facility to be used for the treatment of sewage deposited in the sewer system. (Prior code § 11.12.030(1), (2))

13.08.050 Ownership of facilities.

All interceptors, pump stations, valves, fittings, outfall pipes, aeration equipment, and related facilities and appurtenances, except customer service lines, shall be the property of the city, unless otherwise provided by the council by written contract. (Prior code § 11.12.030(3))

13.08.060 Classes of service.

The classes of service shall be residential or commercial. Residential services shall consist of all services where sewer service is supplied for domestic purposes to a single-family dwelling unit. Commercial services shall consist of all services where sewer service is supplied for a commercial or business establishment, or multi-dwelling units. If sewer service is supplied to a customer for use in both a single or a multi-dwelling unit and a commercial or business establishment, or a multi-dwelling unit, the rate for commercial services shall apply for the combined usage. (Prior code § 11.12.030 (4))

13.08.070 Obedience to rules and regulations.

Each person required to subscribe to sewer collection service shall sign a service form provided by the department, giving the date, location of the premises to be served, class of service, the address for mailing bills and such other information as the department may reasonably require. All persons required to subscribe to sewer collection services shall abide by the rules and regulations established by the city and by the requirements set forth in this chapter, including alterations and amendments which may be made from time to time. (Ord. 94-12S § 6: prior code § 11.12.040(1))

13.08.080 Credit—Deposits—Assistance.

Each person required to subscribe to sewer collection service shall establish credit with the finance department.

A. Establishment of Credit. A utility deposit will be required. A deposit equal to the estimated bill for two months' service, but not less than one hundred dollars shall be required.

B. Deposits. The deposit is not a payment on account. In the event the person making the deposit is no longer required to subscribe to sewer collection service, the deposit will be applied to the closing bill, and any amount in excess of the closing bill will be refunded to such person. The city shall pay interest of three percent on any deposit.

C. Forfeiture of Deposit. If a customer's account becomes delinquent, the deposit shall be applied to the unpaid balance and an additional deposit equal to the estimated bill for two months' service shall be paid within thirty

13.08.090

days of the date the original deposit was applied to the delinquent balance.

D. Assistance. The city shall provide assistance for sanitary can service to any subscriber proving financial need. (Ord. 94-12S § 7: Amds. 10 (part) and 12, § 2 to Ord. 85: prior code § 11.12.040(2))

13.08.090 Changes in service.

A. Increased Level of Service. Existing customers in good standing may increase their level of service without an additional deposit due providing the original deposit equals two months of service. Customers who are not in good standing shall be required to pay all outstanding balances before an increased level of service will be provided.

B. Decreased Level of Service. Existing customers may decrease their level of service. A reduction in deposit will not be given.

C. Fees for Changes in Level of Service.

1. Two changes in level of service per calendar year shall be allowed to a customer in good standing at no charge. Thereafter, a fee of twenty-five dollars will be due for any additional changes made. Customers not in good standing will be required to pay twenty-five dollars for each change in level of service.

2. Per calendar year, one reconnection after a disconnection shall be given to a customer in good standing at no charge. All reconNECTIONS thereafter will be charged a fifty dollar reconnection fee. Customers not in good standing will be required to pay fifty dollars for each reconnection after a disconnection. (Ord. 02-31 § 3: Amd. 10 (part) to Ord. 85: prior code § 11.12.040(3))

13.08.100 Extension of service.

A. Within the city. Sewer service to areas within the city not presently served with sewers shall be provided only upon authorization of the council.

B. Outside the city. Sewer service to areas outside the city shall be provided only at the expense of the customers served. (Prior code § 11.12.050(1), (2))

13.08.110 Interceptors and appurtenances.

A. Ownership. All interceptors and other appurtenances of every kind constituting and used for the sewer system, except customer service lines, shall be the property of the city, and shall be installed by the department or the applicants, in accordance with plans and specifications approved by the department.

B. Location. All interceptors and appurtenances constituting and used for the sewer system, except the customer service lines, shall be on rights-of-way, easements or public property. All easements or right-of-way permits secured for the sewer system shall be obtained in the name of the city. (Prior code § 11.12.050(3), (4))

13.08.120 Service lines.

Customer service lines shall be owned, installed and maintained by the applicant for sewer services. (Prior code § 11.12.060(1))

13.08.130 Service connection—Charge.

At the time the applicant files for sewer service where service has previously existed, or if the applicant is filing for a change in service, class, size, or location, the applicant shall submit with his application a service

connection charge which will cover the actual cost to the department of the connection, plus twenty-five percent. (Prior code § 11.12.060(2))

**13.08.140 Service connection—
Installation.**

Regulations, orders or procedures governing installation of customer service lines shall be promulgated by the department, subject to approval of the council by resolution. All customer service lines and repairs, modifications or disconnections thereof shall be made only on the terms and conditions set forth in the Uniform Plumbing Code (current edition) and such further regulations, orders, or procedures as the council may approve by resolution. (Prior code § 11.12.060(3))

13.08.150 Multiple service on one line.

A. The department may, at its option, serve two or more premises or customers with one customer service line, provided that such joint service customer service lines shall be of such a size to provide a capacity of not less than the combined capacity of individual customer

service lines. No customer service line shall be permitted to serve other customers except under written contract approved by the council.

B. The owner of a single parcel of property may apply for and receive as many customer service lines as he and his tenants may require, provided his application or applications meet the requirements of this chapter. (Prior code § 11.12.060(4), (5))

13.08.160 Holding tanks and sanitary cans.

A. All persons required to subscribe to sewer collection services but to whom a sewer is not available shall have sewage collected from their property or residence provided that the location, type of holding tank or sanitary can, and access thereto is approved by the department. Quantity and frequency of sewer services shall be determined by regulations or orders of the department and approved by the council by resolution, and the rate charged for such sewage collection services shall be determined by the council by ordinance.

B. All sewage holding tanks shall be equipped with an operating, three-inch, female camlock device. No evacuation service may be provided after October 30, 1999 to a holding tank unless it is equipped with a properly operating, compatible camlock. (Ord. 98-26 § 2; Ord. 98-18 § 2; Ord. 94-12S § 8; prior code § 11.12.060(6))

13.08.170 Temporary service.

Temporary sewer extensions and sewer connections may be provided by the department for a period not to exceed six months, unless an extension is granted by the department. Cost of connection, deposits, charges for installation and removal of

equipment shall be established by the department, subject to approval by the council by ordinance. (Prior code § 11.12.060(7))

13.08.180 Customer plumbing.

A. The customer's plumbing, which shall include the sewer extension lines and all plumbing, piping, fixtures and all other appurtenances carrying or intended to carry sewage on property owned or controlled by the customer, shall comply with the plumbing regulations of the city.

B. Customers shall install a suitable control valve on the sewer extension line at a location approved by the department, the operation of which valve will control the entire sewage supply from the premises served. It will be a violation of this chapter for the customer to operate, cause or permit unauthorized operation of the control valve, except in the case of emergencies.

C. Customers installing new sewage tanks shall install a camlock compatible with the city's plumbing regulations on the evacuation pipe of the sewage holding tanks. (Ord. 96-30 § 3; prior code § 11.12.060(8))

13.08.190 Rates.

Sewer rates shall be determined by the council, adopted by ordinance, and shall be available in the city clerk's office for public inspection during regular business hours. (Prior code § 11.12.070)

13.08.200 Notices.

A. To Customers. Notices from the department to a customer will normally be given in writing, and either mailed to or delivered to the customer at his last known address. Where conditions warrant and in

emergencies, the department may notify the customer either by telephone or messenger.

B. From Customers. Notices from customers to the department shall be given by the customer in writing on a city utility form to the utility/finance office or to the utility services foreman of the department duly authorized to receive notices or complaints.

C. Notice of Discontinuance for Repairs. Notices from the department to a customer providing for the discontinuance of service for the purpose of repairs shall be given to a customer in writing twenty-four hours prior to such discontinuance, except in the case of emergencies. (Ord. 02-10 § 4; prior code § 11.12.080)

13.08.210 Billing.

A. All bills, except the connection fee, shall be included in the bill for city water service. Customers receiving the sewer service, but who do not receive water service, shall be billed separately. All bills shall be mailed on or before the fifth day of each month.

B. Each bill entered shall be due upon receipt. If the bill is not paid by the twentieth day of the month in which mailed, the account shall be considered delinquent.

C. Customer shall have ninety (90) days beyond the current payment due date for any corrections or adjustments. (Ord. 02-10 § 4; Ord. 93-38 § 4 (part); Amd. 10 (part) to Ord. 85: prior code § 11.12.090(1), (2))

13.08.220 Delinquency.

A. The city shall send a notice of account delinquency to each customer on or after ten days after the account becomes delinquent.

B. On or before fifteen days after an account becomes delinquent, a notice of delinquency and public nuisance shall be sent

to the customer and to the owner of the premises. The notice shall state a date on or after which the premises will be declared a public nuisance if the delinquent account is not paid in full prior thereto. Such date shall not be less than five not more than fifteen days from the date of the notice. The delivery to the premises served or mailing to the address on record of the customer and of the owner shall be considered a delivery to the customer and to the owner.

C. If the delinquency has not been cured by the date stated in the notice, the city may declare the premises a public nuisance and proceed to abate said nuisance in accordance with Section 13.08.241.

D. Interest on delinquent accounts shall be paid at the rate of fifteen percent per annum. Delinquent payments, with interest, shall constitute a lien on real and personal property of the person or entity whose account is delinquent. (Ord. 95-24 § 5; Ord. 94-12S § 9: Amd. 10 (part) to Ord. 85: Ord. 170 (part), 1986; prior code § 11.12.090(3))

13.08.230 Discontinuance—Customer request.

Each person who is moving from a premise for which they were required to subscribe for sewer service shall give the department written notice of their intention to move from the premises at least two days prior to the date of their move. Said notice shall specify whether the premises will continue to be inhabited following their departure and the name of the owner of the premises. Failure to give the required notice means the person shall remain jointly and severally liable for all sewage removed from the premises until the department receives the notice required by this section. Upon receipt of the notice required by this section, a bill shall be rendered and such

bill shall be payable immediately. In no case will the bill be less than the monthly minimum specified in the current sewer rate schedule for the class or classes of sewer service theretofore furnished. (Ord. 94-12S § 10: prior code § 11.12.100(1))

13.08.240 Sanitary facilities nuisance declared.

Any building inhabited or owned by any person required to subscribe to sewage collection services for which no subscription for sewage service has been made, or for which delinquent charges for sewage services exist, or whose facilities for the disposal of sewage are not in serviceable working order, or have not been approved by either the city or the state, or whose sewage facilities consist of a sanitary can without adequate antiseptic treatment of human excrement, or whose sewage facilities are unsanitary or dangerous to health or safety shall be and is deemed and declared a common or public nuisance. (Ord. 94-12S § 11 (part))

13.08.241 Abatement of nuisance.

Any common or public nuisance as defined by Section 13.08.240 shall be abated as follows:

A. The owner of the property and an inhabitant of the building shall be given a notice to abate by the city manager, by the police chief or by any of their designees.

B. The notice shall include:

1. The address of the property and the name of the record owner;

2. A short description of the nuisance;

3. An order to abate the nuisance in a manner acceptable to the city;

4. A statement that if such abatement is not completed within forty-eight hours of service

of the notice, the city is authorized to issue a citation for a violation and impose a fine of up to one hundred dollars per day for each day abatement of the nuisance is not completed.

5. A statement that the city shall provide assistance to any subscriber proving financial need.

C. Forty-eight hours after service of the notice to abate, the city shall inspect the premises and determine whether the nuisance is still present. If, in the best judgement of the city, the owner or any inhabitant of the premises has not acted to abate the nuisance or their actions to abate have failed, the city shall issue a citation to the owner and any inhabitant of the premises. (Ord. 94-12S § 11 (part))

13.08.243 Violation.

It is unlawful for any person to continue any violation of which they have received notice beyond the period specified in such notice. Each day for which any violation continues shall be considered a separate violation. (Ord. 94-12S § 11 (part))

13.08.245 Injunctive relief.

The city may seek injunctive relief to halt a continuing violation of this chapter or to mandate compliance with this chapter or both. (Ord. 94-12S § 11 (part))

13.08.247 Penalty.

Any person who violates any provision of this chapter shall be subject to a fine of not more than one hundred dollars. (Ord. 94-12S § 11 (part))

13.08.260 Access for inspection.

Employees of the department shall have free access at all reasonable hours to any and all

parts and structures of the premises from which sewage is carried for the purpose of inspecting connections, the conditions of pipes and fixtures, and the quality and composition of the sewage. The department does not, however, assume the duty of inspecting customer service lines, plumbing and equipment, and shall not be responsible therefor. (Prior code § 11.12.110)

13.08.270 Liability of city.

The city shall not be liable for any loss or damage of any nature whatsoever caused by any defect in the customer service line or the customer's plumbing or equipment, nor shall the city be liable for loss or damage due to interruption of sewer service. (Prior code § 11.12.120)

13.08.280 Prohibited substances.

It is unlawful and a violation of this chapter for a customer or any other person to deposit or allow to be placed in the sewer system any of the following materials:

A. Petroleum, coal tar, vegetable and mineral oils and products, and their derivatives and wastes;

B. Greases, oils and sludges from service stations, garages, repair shops, machine shops, cleaning establishments or other industries or establishments;

C. Explosives or flammable liquids and gases;

D. Acids, alkalis or other corrosive liquids, gases or substances of sufficient strength to damage sewers, manholes, pumping stations or treatment plant units;

E. Substances which will form deposits or obstructions in the sewage collection system or which, when mixed with sewage, will

precipitate material and thus form deposits in the system;

F. Ashes, cinders, sand, earth, coal, rubbish, or metals of any kind;

G. Live steam, exhaust steam or water having a temperature above one hundred forty degrees Fahrenheit;

H. Ground or unground refuse, garbage or waste materials;

I. Offal from slaughterhouses and fish processing plants;

J. Dead animals. (Prior code § 11.12.130(1))

13.08.290 Unlawful sewage disposal.

It is unlawful for a person to dispose of sewage, liquid waste or human excreta from any premises by any method other than through utilization of the city sewer service or its appointed designee. (Ord. 94-12S § 12: prior code § 11.12.130(2))

13.08.300 Individual sewer system.

It is unlawful for any person to operate or maintain an individual sewage disposal system, without a state wastewater discharge permit 18 AAC 72.010. (Ord. 94-12S § 13: prior code § 11.12.130(3))

13.08.310 Surface discharge.

It is unlawful for any person to discharge sewage on the surface of the ground within the city. (Prior code § 11.12.130(4))

13.08.320 Drains.

It is unlawful for any person to connect drains from roofs, storm sewers, storm drains or drains carrying fluid from excavation sites to the sewer system. (Prior code § 11.12.130(5))

13.08.330 Illegal connection.

It is unlawful for any person to connect a customer service line to an interceptor without first making application, paying the connection fee and securing a permit therefor. (Prior code § 11.12.130(6))

13.08.340 Interference.

It is unlawful for any person to open any manhole or sewage lift stations, enter into or interfere or tamper with any sewer, manhole, sewage lift station, property at the sewage treatment plant or stabilization pond. (Prior code § 11.12.130(7))

13.08.350 Easement and right-of-way.

Each applicant and customer gives and grants to the city an easement and right-of-way on and across his property for the installation of interceptors and other appurtenances used in connection with a sewer system. (Prior code § 11.12.170)

13.08.360 Experiments and innovations.

Nothing in this chapter shall be construed to prohibit the use of experimental and/or innovative processes or procedures for waste treatment. The operation of such device, process or procedure shall have the prior approval of the public works committee of the city council. The committee shall approve all such devices, processes and procedures that are not in conflict with the health and welfare of the city. Applications for approval of such devices, processes and procedures shall be made to the public works director and any appeal from a decision of the public works committee shall be to the council as a whole. (Prior code § 11.12.180)

13.08.370 Suspension of provisions.

No employee of the department is authorized to suspend or alter any of the provisions of this chapter without specific approval or direction of the city council, except in cases of emergency involving the danger of loss of life or property, or which would place the sewer system operation in jeopardy. (Prior code § 11.12.160)

13.08.380 Administration and enforcement.

This chapter shall be administered and enforced by the city manager. The city council shall have the authority to establish and regulate monthly rates for sewer services pursuant to Chapter 48 of Title 29, Alaska Statutes. All rates and other charges adopted by the council shall be by ordinance and available for public inspection during regular business hours at the office of the city clerk. All moneys collected for sewer services will be separately accounted for by the city finance director and used for such purposes and disbursed by the council as it may deem appropriate. The city council may adopt such additional regulations, resolutions, orders, provisions and procedures pertaining to sewer service as it deems proper. (Prior code § 11.12.140)

Chapter 13.12

SOLID WASTE COLLECTION AND DISPOSAL

Sections:

- 13.12.010 Definitions.
- 13.12.020 Contracts.
- 13.12.030 Application for service.
- 13.12.040 Credit establishment—Deposits.
- 13.12.050 Changes in service.
- 13.12.060 Notices.
- 13.12.070 Billing.
- 13.12.080 Delinquency.
- 13.12.090 Discontinuance.
- 13.12.100 Collection vehicles.
- 13.12.110 Garbage wrapping or containers.
- 13.12.120 Garbage can maintenance.
- 13.12.130 Containers required.
- 13.12.140 Container racks.
- 13.12.150 Container specifications.
- 13.12.160 Bulk containers.
- 13.12.170 Frequency of emptying.
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- 13.12.190 Service provided by city.
- 13.12.200 Placement of containers for collection.
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- 13.12.250 Unlawful deposit of solid waste.
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- 13.12.280 Depositing trash on land of another.
- 13.12.290 Landfill use.
- 13.12.300 Experiments and innovations.
- 13.12.310 Violation—Misdemeanor.

13.12.010 Definitions.

Whenever, in any section of this chapter, the following terms are used, they shall have the meaning respectively ascribed to them in this section:

A. "City" means the city, acting through its city council and/or its city manager.

B. "Collection" means the operation of gathering together and transporting to the point of disposal garbage, rubbish and waste material.

C. "Contractor" means the person, persons, firm or corporation entering into a contract with the city for the collection and disposal of garbage, rubbish and waste material.

D. "Department" means the city public works department.

E. "Disposal" means the complete operation of treating and/or disposing of the accumulation of garbage, rubbish and waste material, and the product or residue arising from such treatment.

F. "Garbage" means and includes all animal and vegetable refuse from kitchens, all household waste which has been prepared from food or shall have resulted from the preparation of food, all table refuse or offal, and every accumulation of animal, vegetable, or other matter that attends the preparation, consumption, marketing, packing, canning, storage, and decay of meat, fish, fowl and vegetables, and fruit intended for human

consumption; also dead animals and the accumulation from restaurant grease traps, but not dishwasher nor wastewater.

G. "Person" means and includes individuals, firms, associations and corporations.

H. "Rubbish" means and includes tree and shrubbery trimmings, lawn renovating grass, weeds, leaves, chips, paper, pasteboard, magazines and books, rags, rubber, carpets, clothing, boots, shoes, hats, straw packing, boxes and cartons, crates, packing materials, furniture and all other kinds of combustible rubbish, trash or waste material which ordinarily accumulates in the operation of a household or business. "Rubbish" does not include manure or waste from any poultry yard or stable.

I. "Waste material" means and includes broken crockery, broken glass, ashes, cinders, shells, bottles, tin cans, metals and other similar noncombustible waste material resulting from the operation of a household or business, but does not include discarded automobile or truck bodies or other bulky or heavy objects, nor waste material resulting from any manufacturing, building or construction operation. (Prior code § 11.08.010)

13.12.020 Contracts.

A. Contract. The city and its duly authorized agents, servants and employees, or any contractor or contractors with whom the city may at any time enter into a contract therefor, and the agents, servants and employees of such contractor or contractors, while any such contract shall be in force, shall have the exclusive right or waive such right to a person to gather, collect and remove garbage, rubbish and other waste material from all

premises in the city, and no person other than those above specified shall gather, collect or remove any garbage, rubbish or waste material or convey or transport any garbage, rubbish or waste material from any premises in the city, and no person other than those above specified shall take any garbage, rubbish or waste material from any receptacle in which the same may be placed for collection or removal, or interfere with or disturb any receptacle or remove any such receptacle from any location where the same is placed by the owner thereof; provided, however, that nothing in this section prohibits the occupant of any dwelling house from himself removing or causing the removal of any garbage or rubbish accumulated on the premises occupied by him as a dwelling house and disposing of the same in a lawful manner.

B. Exclusive Rights. The city, and its duly authorized agents, servants and employees, or any contractor or contractors with whom the city may at any time enter into a contract therefor, and the agents, servants and employees of such contractor or contractors, while any such contract is in force, shall have the exclusive right to collect, remove and dispose of garbage, rubbish and other waste material from the city sanitary landfill, and no person other than those specified in this section shall collect, remove or dispose of any garbage, rubbish or waste material, or convey or transport any garbage, rubbish or waste material to the city sanitary landfill. (Prior code § 11.08.020)

13.12.030 Application for service.

Each applicant for garbage, rubbish and waste material collection service shall sign an application form provided by the city clerk, giving the date of application, location of the

premises to be served, the date applicant desires services to begin, class of service, the address for mailing bills, and such other information as the department may reasonably require. By signing the application, the applicant agrees to abide by this chapter and all resolutions or regulations promulgated under this chapter and the applicant agrees to have placed in an approved location a number which conforms to the street numbering system of the city. The application is a request for service and does not require the city to furnish service. (Prior code § 11.08.030(1))

**13.12.040 Credit establishment—
Deposits.**

At the time application for service is made, the applicant shall establish credit with the finance department.

A. Establishment of Credit. A utility deposit will be required. A deposit equal to two months' service, but not less than twenty dollars shall be required. Credit history will be based upon an applicant's past utility payment record and a deposit will not be required if it is determined that the applicant has not been delinquent more than once in the applicant's most recent twelve-month period. Once a customer has established an acceptable credit history for twelve months the deposit shall be refunded.

B. Deposits. No service shall be furnished until the deposit is made with the finance department, and the applicant will be given a receipt for the deposit. The deposit is not a payment on account. In the event garbage, rubbish and waste material collection service is discontinued, the deposit will be applied to the closing bill, and any amount in excess of the closing bill will be refunded to the applicant.

C. Forfeiture of Deposit. If a customer's account becomes delinquent and service is discontinued, the deposit shall be applied to the unpaid balance. Garbage, rubbish and waste material collection service shall not be restored to the customer at any premises in which the customer resides within the city until all outstanding water bills due the city from the customer have been paid and the cash deposit replaced in an amount equal to the department's estimated bill for two months' service together with a thirty-five dollar service charge for the restoration of services. (Amds. 11 (part) and 12, § 3 to Ord. 85: prior code § 11.08.030(2))

13.12.050 Changes in service.

A. Increased Level of Service. Existing customers in good standing may increase their level of service without an additional deposit due providing the original deposit equals two months of service. Customers who are not in good standing shall be required to pay all outstanding balances before an increased level of service will be provided.

B. Decreased Level of Service. Existing customers may decrease their level of service. A reduction in deposit will not be given.

C. Fees for Changes in Level of Service.

1. Two changes in level of service per calendar year shall be allowed to a customer in good standing at no charge. Thereafter, a fee of twenty-five dollars will be due for any additional changes made. Customers not in good standing will be required to pay twenty-five dollars for each change in level of service.

2. Per calendar year, one reconnection after a disconnection shall be given to a customer in good standing at no charge. All reconnections thereafter will be charged a fifty dollar

reconnection fee. Customers not in good standing will be required to pay fifty dollars for each reconnection after a disconnection. (Ord. 02-31 § 4; Ord. 01-09 § 8; Amd. 11 (part) to Ord. 85; prior code § 11.08.030(3))

13.12.060 Notices.

A. To Customers. Notices from the department to a customer will normally be given in writing, and either mailed to or delivered to the customer at his last known address. Where conditions warrant and in emergencies, the department may notify the customer either by telephone or messenger.

B. From Customers. Notices from customers to the department shall be given by the customer in writing on a city utility form to the utility/finance office or to the utility services foreman of the department duly

authorized to receive notices or complaints. (Ord. 02-10 § 5; prior code § 11.08.040)

13.12.070 Billing.

A. All bills shall be mailed on or before the fifth day of each month.

B. Each bill entered shall be due upon receipt. If the bill is not paid by the twentieth day of the month in which mailed, the account shall be considered delinquent.

C. Customer shall have ninety (90) days beyond current payment due date for any corrections or adjustments. (Ord. 02-10 § 6; Ord. 93-38 § 4 (part); Amd. 11 (part) to Ord. 85: prior code § 11.08.050(1), (2))

13.12.080 Delinquency.

A. The finance department shall send a notice of account delinquency to each customer when the account becomes delinquent.

B. Within fifteen days after an account becomes delinquent, garbage, rubbish and waste material collection service will be discontinued if the delinquent account is not paid in full prior thereto.

C. On the discontinuance of service date, any agent of the department or city may discontinue garbage, rubbish and waste material collection service.

D. Interest on delinquent accounts shall be paid at the rate of fifteen percent per annum. Delinquent payments, with interest, shall constitute a lien on real and personal property of the person or entity whose account is delinquent.

E. The city has the authority to collect from the delinquent customer all expenses that relate to the collection effort including: (1) cost of collection; (2) attorney's fees; (3) recorder's fees; (4) court costs. (Ord. 95-24 § 6; Amd. 11

(part) to Ord. 85: Ord. 170 (part), 1986; prior code § 11.08.050(3))

13.12.090 Discontinuance.

A. On Customer Request. Each customer shall give the department written notice of his intention to discontinue garbage, rubbish and waste material collection service at least two days prior to the date he wishes such service discontinued, and shall specify the date service is to be discontinued; otherwise, the customer will be responsible for all garbage, rubbish and waste material collection service supplied to the premises until the department shall receive notice of such discontinuance. Upon discontinuance of such service, a bill shall be rendered and such bill shall be payable immediately. In no case will the bill be less than the monthly minimum specified in the current garbage, rubbish and waste material collection rate schedule for the class or classes of garbage, rubbish and waste material collection service theretofore furnished.

B. Nonpayment of Service Charges. If garbage, rubbish and waste material collection service charges are not paid when due by any person, firm, corporation or other entity whose premises are served by such service, then such service provided to that customer may be discontinued because of the default in the payment of the garbage, rubbish and waste material collection service charges.

C. Proper Customer Facility. The department may refuse to furnish garbage, rubbish and waste material collection service and may discontinue such service to any premises without prior notice where garbage, rubbish and waste material facilities or equipment used for the disposal of garbage, rubbish and waste material by the customer are

13.12.100

dangerous, unsafe or not in conformity with the regulations of this chapter. (Prior code § 11.08.060)

13.12.100 Collection vehicles.

All vehicles used in collecting and conveying garbage in the city shall be provided with bodies which shall be kept watertight at all times and thoroughly cleansed. All vehicles used in collecting and conveying rubbish and waste material shall be provided with bodies so constructed as to prevent the loss of any contents thereof upon the streets, alleys or highways of the city. (Prior code § 11.08.070)

13.12.110 Garbage wrapping or containers.

At all locations where residence, dwelling, commercial and industrial units exist, garbage shall be drained to remove its liquid content, and, after drainage, wrapped or packaged in such a manner as will eliminate odor, and may then be placed in the rubbish and waste material containers as provided in this chapter, for removal and disposition in the same manner as rubbish and waste material. If the person or persons having charge or control of any premises where residence, dwelling, commercial and industrial units exist choose not to drain and wrap the garbage in the manner described in this section, then such person or persons shall place and keep all garbage which accumulates on such premises in an approved receptacle, each of which shall be watertight and shall have a tight-fitting cover, and suitable handles on the outside thereof for the lifting of the receptacle and its contents. Such covers shall be kept upon each of the receptacles at all times, except when the receptacle is being filled or while the receptacle is being emptied. (Prior code § 11.08.080)

13.12.120 Garbage can maintenance.

All persons shall cause all garbage receptacles on their premises to be emptied and kept cleaned and dried, and all garbage to be removed from the premises and disposed of in some lawful manner at least every two calendar weeks. (Prior code § 11.08.090)

13.12.130 Containers required.

Every person occupying or having control of any residence, dwelling, commercial or industrial unit in the city shall provide a type of container or receptacle suitable for the accumulation and collection of rubbish and waste material, the type of container or receptacle to be in conformity with the provisions of this chapter. (Prior code § 11.08.100)

13.12.140 Container racks.

Every person occupying or having charge or control of any residence, dwelling, commercial or industrial unit in the city shall provide a type of container or receptacle rack so designed as to prevent the upsetting or spillage of such containers or receptacles by wind, weather, dogs, cats and/or other animals, or accidents. (Prior code § 11.08.110)

13.12.150 Container specifications.

All containers or receptacles for the accumulation and collection of garbage, rubbish and waste material from residence, dwelling, commercial or industrial units shall conform to the following minimum specifications:

- A. Each such container or receptacle shall have a maximum capacity of forty gallons.

B. Each such container or receptacle shall have a maximum weight when filled of seventy-five pounds.

C. Each such container or receptacle shall have a maximum weight when empty of thirty pounds.

D. Each such container or receptacle shall be constructed of metal, plastic or rubber, of sufficient quality to serve as such a container or receptacle; provided, however, that no corrugated cardboard box shall be permitted to serve as such container or receptacle, except as provided in this chapter; and provided further, that no fifty-gallon or fifty-five-gallon steel petroleum drums or barrels shall be permitted, unless properly cut down and provided with tight-fitting lid and handles. (Prior code § 11.08.120(1))

13.12.160 Bulk containers.

No other type of container or receptacle shall be permitted for the accumulation and collection of rubbish and waste materials from residence, dwelling, commercial and industrial units, except certain bulk rubbish and waste material containers approved by the public works department of the city and supplied to the residence or dwelling unit by the city or contractor, as the term contractor is defined by this chapter. Such bulk rubbish and waste material containers shall be kept in a clean and sanitary condition by the person occupying or having charge or control of the residence, dwelling, commercial or industrial unit for which such bulk rubbish or waste material container is provided. Such bulk rubbish and waste material containers shall be provided with lids which shall be kept tightly closed at all times except during the process of filling or

emptying such bulk containers. (Prior code § 11.08.120(2))

13.12.170 Frequency of emptying.

All persons shall cause rubbish and waste material containers or receptacles to be emptied and all rubbish and waste material removed from said premises and disposed of in some lawful manner, such removal and disposal to be accomplished at least once each calendar week in case of rubbish, and at least once each calendar month in case of waste material, except as provided in Section 13.12.180. (Prior code § 11.08.130)

13.12.180 Removal of waste material and debris.

Every person occupying or having charge or control of any premises in the city shall, at least once in each calendar month, collect and dispose of all waste material and debris, such as discarded automobile bodies, and similar heavy or bulky objects, and all other waste not included in the meaning of waste material as defined in Section 13.12.010, which may have accumulated on his premises; provided, that building or construction waste and debris shall be removed weekly and upon completion of construction. All such waste and debris in this section defined shall be moved to such dump grounds as may be provided or designated by the city. (Prior code § 11.08.140)

13.12.190 Service provided by city.

The city shall provide for the collection and disposal of rubbish, waste material and garbage from all residence, dwelling, commercial and industrial units in the city. Such provision may be made either by letting a contract for such collection and removal, or otherwise. The

13.12.200

public works department of the city and/or the contractor shall have charge and supervision of such collection and removal, and shall prescribe established routes and days for collection and removal of rubbish, waste material and garbage from residence, dwelling, commercial and industrial units so as to conform with the provisions of any section of this chapter, and may change the same from time to time. When such routes or days of collection are established or changed, he shall give notice thereof in such manner as he deems best. (Prior code § 11.08.150(1))

13.12.200 Placement of containers for collection.

Rubbish or waste material or garbage containers or receptacles shall be placed at a point along a dedicated public right-of-way adjacent to the residence, dwelling, commercial or industrial unit, as that point is agreed upon by the public works department of the city or the contractor and the person. In no case shall rubbish, waste material or garbage containers or receptacles be placed on private property of the residence, dwelling, commercial or industrial unit for collection and removal unless the public works department of the city and/or the contractor and the person have approved such private property location as being readily accessible to the contractor for pickup and loading of the rubbish and waste material. (Prior code § 11.08.150(2))

13.12.210 Plant trimmings and cuttings.

Whenever brush or shrub trimmings, trees, logs or lawn cuttings are placed in any designated location for collection and disposal by any person owning or occupying any residence, dwelling, commercial or industrial

unit in the city, one of the following methods of placement of the material shall be utilized by such person:

A. Brush and shrub trimmings, trees or logs placed in the rubbish or waste material containers described in this chapter shall not exceed a length of three feet, and shall be securely tied and bound in bundles not to exceed one foot in diameter.

B. Brush, shrub and tree trimmings, as well as lawn clippings, may be placed in disposable corrugated cardboard containers or other type of cardboard boxes, which cardboard containers shall not be returnable. Brush, shrub and tree trimmings shall not include branches or logs when the branches or logs are more than three inches in diameter, or more than three feet in length. In no case shall brush, shrub and tree trimmings, or lawn clippings, placed in a disposable corrugated cardboard container or other type of cardboard container, exceed sixty-five pounds in weight. (Prior code § 11.08.160)

13.12.220 Ashes, dust or sweepings.

Every person occupying or having charge or control of any residence, dwelling, commercial or industrial unit in the city who has need for the disposal of ashes or other residue from combustion, or vacuum cleaner dust or sweepings, shall place the ashes or residue, or vacuum cleaner dust or sweepings, in disposable containers or receptacles and such containers or receptacles shall be tightly closed. (Prior code § 11.08.170)

13.12.230 Large boxes or containers.

Every person occupying or having charge of or control of any residence, dwelling, commercial or industrial unit in the city, who

has need for the disposal of large appliance cartons, shipping crates, or similar large boxes or containers, or small nonbulky items of furniture, shall disassemble such boxes or containers or the items of furniture prior to placement for collection and disposal, or provide by specific contract for its removal. (Prior code § 11.08.180)

13.12.240 Nonconforming receptacles.

After July 1, 1977, all rubbish and waste material receptacles and containers which do not conform to the specifications contained in this chapter shall become illegal for the collection and disposal of rubbish and waste materials from all residence, dwelling, commercial or industrial units. If, after July 1, 1977, such nonconforming containers and receptacles are placed in a position for collection and disposal, such nonconforming containers and receptacles shall be collected by the city. Every person occupying or having charge or control of any residence, dwelling, commercial or industrial unit in the city may request that such nonconforming rubbish and waste material containers or receptacles be removed by the city at no expense to the owner or occupier of the residence, dwelling, commercial or industrial unit. (Prior code § 11.08.190)

13.12.250 Unlawful deposit of solid waste.

No person shall throw, place, scatter or deposit any garbage, rubbish or waste material in or upon any public alley, street, or highway, park or other public place, in the city, except as expressly authorized in this chapter; nor throw, place, scatter or deposit any garbage or rubbish

or waste material upon or below the surface of any premises. (Prior code § 11.08.200)

13.12.260 Unlawful deposit on public ways—Hazardous or loathsome materials.

It is unlawful for any person or persons, firm or corporations to throw or deposit, or permit to be thrown or deposited, into or upon any public street, sidewalk, snowmachine trail, park or common within the city any broken glass, broken wire, rubbish, garbage, dead animals, offal or filth of any kind, or to fill or deposit or cause to be thrown or deposited in or upon any sidewalk, street or snowmachine trail within the city any broken or cracked glass, ice or other similar substances. (Prior code § 11.08.210)

13.12.270 Unlawful deposit on public ways—Debris and hulks.

A. It is unlawful for any firm, person or corporation to dump, deposit, place or leave, or cause to be dumped, deposited, placed or left any waste material, debris, rubbish, scrap iron, destroyed automobiles or automobile bodies, truck or truck bodies, similar heavy, bulky objects, or any other waste within any streets, sidewalks, snowmachine trails or alleys within the city.

B. Violation of this provision is a misdemeanor, and each day or part of a day during which such violation continues shall be a separate misdemeanor and shall be punishable as provided in this code. (Prior code § 11.08.220)

13.12.280 Depositing trash on land of another.

No person shall place or deposit on land of another any tin can, trash, refuse, rubbish, garbage, offal, nauseous substance, tree trimmings, grass cuttings, animal or vegetable matter, muck, automobiles, automobile bodies, trucks, truck bodies or any material which may become a nuisance, decayed or putrid. (Prior code § 11.08.230)

13.12.290 Landfill use.

A. After September 1, 1980, no persons shall be allowed without permit to use the city-owned sanitary landfill except upon acquiring a permit from the city. The cost of such permit shall be:

1. Residential single-use permit	\$ 10.00
2. Residential monthly use permit	20.00
3. Residential yearly use permit	240.00
4. Commercial single-use permit	30.00
5. Commercial monthly use permit	90.00
6. Commercial yearly use permit	1,080.00

B. In no event shall any person, except for the city's fire department, burn garbage, rubbish or waste material at any city-owned sanitary landfill site.

C. Residential and commercial permits issued by the city may be immediately revoked by the public works department if any person who has acquired such permit violates any section of this chapter.

D. The city council may permit free use of the city's sanitary landfill by all persons. (Prior code § 11.08.240)

13.12.300 Experiments and innovations.

Nothing in this chapter shall be construed to prohibit the use of experimental and/or innovative processes or procedures for garbage, rubbish and waste material disposal. The operation of such device, process or procedure shall have the prior approval of the public works committee of the city council. The committee shall approve all such devices, processes and procedures that are not in conflict with the health and welfare of the city. Applications for approval of such devices, processes and procedures shall be made to the public works director and any appeal from a decision of the public works committee shall be to the council as a whole. (Prior code § 11.08.250)

13.12.310 Violation—Misdemeanor.

Any person, firm or corporation violating any of the provisions of this chapter is guilty of a misdemeanor, and each such person, firm or corporation is guilty of a separate offense for each and every day or portion thereof during which any violation of any of the provisions of this chapter is committed, continued or permitted. (Prior code § 11.08.260)

Chapter 13.16

UTILITY RATES

Sections:

- 13.16.010 Solid waste collection.**
- 13.16.020 Water service.**
- 13.16.030 Sewage service.**
- 13.16.040 Holidays.**
- 13.16.050 Allowance for mechanical malfunctions.**
- 13.16.060 Adjustments for nonservice.**
- 13.16.070 Senior citizen credit.**
- 13.16.080 Nonliability for water damage.**
- 13.16.090 Contractual agreements.**

13.16.010 Solid waste collection.

For the collection, removal and disposal of residential/commercial garbage, rubbish and waste materials within the city, the following charges shall be made:

A. Residential/commercial scheduled rates:

1. Residential service:

Frequency of Service	Rate
Monthly flat rate	\$12.00 per month

2. Commercial service:

Frequency of Service	Rate
Four yard dumpster per pick up	\$30.00 per pick up
Eight yard dumpster per pick up	\$40.00 per pick up

B. Residential/commercial on-call rates:

- 1. Residential services, ten dollars and ninety cents per call;

- 2. Commercial services, forty-five dollars per call.

C. Public use of the municipal landfill:

Frequency of Service	Rate
Four cubic yards or less per day	Free
More than four cubic yards	\$5.00 per cubic yard

The landfill subject to approval by the city council, shall establish and may periodically adjust additional rates, charges, and fees for the use of the landfill, including but not limited to rates, charges, and fees for dumping oil, glycol, and oversized items. (Ord. 01-09 §9; Ord. 96-29 § 3: Modification 1 of Ord. 85 § 1, 1979: prior code § 11.16.010)

13.16.020 Water service.

For the providing of water within the city, the following charges shall be made:

- A. Residential/commercial water delivery services for outside fill with an overflow involving the following capacities, frequencies and rate charges:

13.16.020

Capacity	Frequency	Maximum Gallons Received	Price Per Gallon	Monthly Rate, Outside Fill With Overflow
Up to 100 gals.	4 times per week	1,600	4.56¢	\$ 72.96
	3 times per week	1,200	4.43¢	53.08
	2 times per week	800	4.28¢	34.30
	1 time per week	400	4.15¢	16.60
	2 times per month	200	4.01¢	8.03
	1 time per month	100	3.88¢	3.98
101 — 150 gals.	4 times per week	2,400	4.43¢	106.15
	3 times per week	1,800	4.30¢	77.23
	2 times per week	1,200	4.15¢	49.90
	1 time per week	600	4.02¢	24.16
	2 times per month	300	3.89¢	11.68
	1 time per month	150	3.76¢	5.64
151 — 200 gals.	4 times per week	3,200	4.28¢	137.16
	3 times per week	2,400	4.15¢	99.79
	2 times per week	1,600	4.03¢	64.46
	1 time per week	800	3.90¢	31.20
	2 times per month	400	3.77¢	15.08
	1 time per month	200	3.65¢	7.28
201 — 250 gals.	4 times per week	4,000	4.15¢	165.98
	3 times per week	3,000	4.02¢	120.76
	2 times per week	2,000	3.90¢	78.01
	1 time per week	1,000	3.78¢	37.76
	2 times per month	500	3.65¢	18.26
	1 time per month	250	2.53¢	8.82
251 — 300 gals.	4 times per week	4,000	4.01¢	192.91
	3 times per week	3,600	3.89¢	140.12
	2 times per week	2,400	3.77¢	90.53
	1 time per week	1,200	3.65¢	43.82
	2 times per month	600	3.53¢	21.19
	1 time per month	300	3.41¢	10.24

Capacity	Frequency	Maximum Gallons Received	Price Per Gallon	Monthly Rate, Outside Fill With Overflow
301 — 350 gals.	4 times per week	5,600	3.88¢	\$217.06
	3 times per week	4,200	3.76¢	157.91
	2 times per week	2,800	3.65¢	102.01
	1 time per week	1,400	3.53¢	49.38
	2 times per month	700	3.41¢	23.88
	1 time per month	350	3.30¢	11.53
351 — 400 gals.	4 times per week	6,400	3.74¢	239.30
	3 times per week	4,800	3.62¢	174.10
	2 times per week	3,200	3.52¢	112.48
	1 time per week	1,600	3.41¢	54.44
	2 times per month	800	3.29¢	26.33
	1 time per month	400	3.18¢	12.72
401 — 450 gals.	4 times per week	7,200	3.60¢	259.37
	3 times per week	5,400	3.49¢	188.70
	2 times per week	3,600	3.38¢	121.91
	1 time per week	1,800	3.28¢	59.00
	2 times per month	900	3.17¢	28.54
	1 time per month	450	3.06¢	13.78
451 — 500 gals.	4 times per week	8,000	3.47¢	277.25
	3 times per week	6,000	3.36¢	201.70
	2 times per week	4,000	3.25¢	130.31
	1 time per week	2,000	3.16¢	63.07
	2 times per month	1,000	3.05¢	30.49
	1 time per month	500	2.94¢	14.72
501 — 600 gals.	4 times per week	9,600	3.32¢	319.56
	3 times per week	7,200	3.23¢	232.49
	2 times per week	4,800	3.13¢	150.19
	1 time per week	2,400	3.02¢	72.70
	2 times per month	1,000	2.93¢	35.15
	1 time per month	600	2.83¢	16.98

13.16.020

Capacity	Frequency	Maximum Gallons Received	Price Per Gallon	Monthly Rate, Outside Fill With Overflow
601 — 750 gals.	4 times per week	12,000	3.24¢	\$388.51
	3 times per week	9,000	3.14¢	282.65
	2 times per week	6,000	3.05¢	182.60
	1 time per week	3,000	2.95¢	88.39
	2 times per month	1,500	2.84¢	42.73
	1 time per month	750	2.75¢	20.64
751 — 1,000 gals.	4 times per week	16,000	3.10¢	496.13
	3 times per week	12,000	3.01¢	360.94
	2 times per week	8,000	2.92¢	233.18
	1 time per week	4,000	2.82¢	112.87
	2 times per month	2,000	2.72¢	54.58
	1 time per month	1,000	2.64¢	26.35
1,001 — 1,500 gals.	4 times per week	24,000	2.96¢	711.36
	3 times per week	18,000	2.88¢	517.51
	2 times per week	12,000	2.78¢	334.34
	1 time per week	6,000	2.70¢	161.83
	2 times per month	3,000	2.60¢	78.24
	1 time per month	1,500	2.52¢	37.79
1,501 gals. and above	4 times per week	32,000	2.83¢	904.70
	3 times per week	24,000	2.75¢	658.18
	2 times per week	16,000	2.66¢	425.21
	1 time per week	8,000	2.57¢	205.82
	2 times per month	4,000	2.48¢	99.52
	1 time per month	2,000	2.48¢	48.06

B. Residential/commercial water delivery services for outside fill: Customers with inside fill shall be charged by the schedules as set by the outside fill rate, and in addition each customer shall be charged a monthly surcharge of twelve dollars per month.

C. Residential/commercial piped water rates:

	Frequency of Service	Rate
1.	Residential Service	
	Monthly flat rate (nonmetered)	\$69.00 per month
2.	Commercial Service:	
	Monthly rate (metered service)	\$13.80 per 1,000 gallons
	Monthly rate (nonmetered service)	\$69.00 per month per dwelling unit
3.	Water service picked up at the pump house:	
	Per gallon (.25 per minute-approx. twenty-five gallons)	\$0.01 per gallon for all water taken

D. Residential/commercial water delivery service (normal hours, extra call) fifty dollars per call plus \$.11 per gallon, two hundred gallon minimum.

E. Residential/commercial water delivery service (after hours, extra call) one hundred dollars per call plus \$.11 per gallon, two hundred gallon minimum. (Ord. 01-19 § 2; Ord. 01-88 § 2 (part))

13.16.030 Sewage service.

For the providing of residential/commercial sewage service within the city the following charges shall be made:

	Frequency	Monthly Rate
A.	Evacuation service;	
	Five hundred gallons or more	\$12.00 per pick up plus 0.012 per gallon of sewer tank size
B.	Piped sewer service:	
1.	Flat rate (nonmetered service):	
	Monthly rate	\$21.60 per month per dwelling unit
2.	Metered service:	
	Monthly rate	\$9.60 per 1,000 gallons

C.1. Evacuation service (off-schedule), fifty-eight dollars and eighty-six cents per call plus \$0.01 per gallon;

2. Evacuation service (normal business hours, extra call), fifty-eight dollars and eighty-six cents per call plus \$0.01 per gallon;

3. Evacuation service (after hours, extra all), one hundred seventeen dollars and seventy-two cents per call plus \$0.01 per gallon.

D. Sewage service dumped at the municipal sewage lagoon, three dollars and sixty cents per one thousand gallons. (Ord. 01-08 § 2 (part))

13.16.040 Holidays.

The monthly residential/commercial rates charges for the collection of garbage, rubbish and waste material, delivery of water and removal of sewage within the city shall not include providing such services on or during officially recognized city holidays as described in the city's personnel rules. (Modification 1 of Ord. 85 § 4(1), 1979: prior code § 11.16.040(1))

13.16.050 Allowance for mechanical malfunctions.

The monthly residential/commercial rates charged for the collection of garbage, rubbish and waste material, delivery of water and removal of sewage within the city are also established on the basis of three days per year for garbage service, three days per year for water service and three days per year for sewer service which may not be implemented because of mechanical malfunctions experienced by city-owned vehicles engaged in providing the utility services described in this section. (Modification 1 of Ord.. 85 § 4(2), 1979: prior code § 11.16.040(2))

13.16.060 Adjustments for nonservice.

Customers who do not receive residential/commercial garbage, water or sewer services four or more times a year in each of the utility service areas mentioned in this chapter, excluding officially recognized city holidays, physical or other impediments created by the customer to all residential/commercial garbage, water or sewer areas (e.g., locked doors, the presence of animals) and the three days per year per utility service area which may not be implemented because of mechanical malfunctions experienced by city-owned

vehicles engaged in providing the utility services described in this section, may request and shall be granted by the city an adjustment to their utility bills as supported by utility records maintained by the city's public works department and finance department. Such requests by a utility customer shall be made to the city's finance department within thirty days after utility bills are mailed by the city. If a utility customer makes a request for an adjustment to the utility bill after the thirty-day time period, such request will be considered invalid by the city. (Modification 1 of Ord. 85 § 4(3), 1979: prior code § 11.16.040(3))

13.16.070 Senior citizen credit.

A. Any Bethel citizen at least sixty years of age residing in their own household shall receive up to a twenty-five-dollar monthly utility credit, if they are the primary source of income, after making application for such at the city utilities office.

B. All other Bethel citizens at least sixty years of age that do not meet the conditions of subsection A of this section shall receive up to a ten-dollar monthly utility credit after making application for such to the city utilities office.

C. Each residential unit shall be limited to one credit application. (Modification 2 of Ord. 85, 1980: prior code § 11.16.080)

13.16.080 Nonliability for water damage.

The city shall not be held liable for water damage to any property where the customer has failed to install an adequate operative overflow system, or has failed to keep the overflow line from freezing. (Modification 1 of Ord. 85 § 4(4), 1979: prior code § 11.16.040(4))

13.16.090 Contractual agreements.

The city manager shall have the power and authority to enter into contractual arrangements with any person for the provision of any of the services described in this chapter at rates or terms different from those set out in this chapter, subject to the approval of the city council. (Modification 1 of Ord. 85 § 5, 1979; prior code § 11.16.050)

Ordinances Related to Public Water and Sewer Services

Introduced by: Thor Williams
Date Introduced: March 9, 2004
Public Hearing Date: March 23, 2004
Action: Passed 4-3(Rodgers, Notti, Short)
Date Enacted: July 1, 2004

CITY OF BETHEL, ALASKA

ORDINANCE #04-03

AN ORDINANCE AMENDING SECTIONS 13.12.010, 13.12.160 AND 13.12.280 OF THE BETHEL MUNICIPAL CODE REGARDING SOLID WASTE COLLECTION AND DISPOSAL BY DEFINING NON-RESIDENTIAL CUSTOMERS, REQUIRING NON-RESIDENTIAL CUSTOMERS TO USE DUMPSTERS, AND CLARIFYING THAT NON-AUTHORIZED USE OF DUMPSTERS OR OTHER GARBAGE CONTAINERS OWNED BY OTHERS IS PROHIBITED, AND AMENDING SECTION 13.16.010 TO CREATE A SEPARATE FEE FOR NON-RESIDENTIAL SOLID WASTE SERVICE CUSTOMERS AND INCREASE COMMERCIAL SERVICE RATES

WHEREAS solid waste service customers who own non-residential properties, including commercial businesses, industrial businesses, restaurants, multi-family dwellings and apartments, accumulate more garbage, rubbish and waste materials than single family residential service customers;

WHEREAS to more equitably assess costs, the City Council determines that a new rate category is appropriate for non-residential properties that are provided solid waste collection and disposal services;

WHEREAS to prevent garbage, rubbish and waste materials on non-residential properties from overflowing, the City Council determines that such customer should be required to use dumpsters;

WHEREAS to insure against use of dumpsters and other garbage containers by unauthorized users, the City Council is clarifying that Section 13.12.280 of the Bethel Municipal Code prohibit any unauthorized use of dumpsters as well as any garbage container;

WHEREAS the City Council instructs the City of Bethel or through its contractor to negotiate the purchase of dumpsters to be used by all non-residential customers, with any needed appropriation for the dumpsters to be addressed in a separate ordinance; and

WHEREAS it is expected that since the City of Bethel or its contractor will need to appropriate funds for purchase of the dumpsters for all non-residential customers, and order, receive, and dispense the dumpsters, that the required use of a dumpster will not be effective until such date.

BE IT ORDAINED by the City Council of Bethel, Alaska, that:

SECTION 1. Classification. This ordinance is of a general and permanent nature and shall become a part of the Bethel Municipal Code.

SECTION 2. Amendment. Section 13.12.010 of the Bethel Municipal Code entitled "Definitions" is amended by adding an additional definition to read as follows (new language is underlined and old language is stricken out):

13.12.010 Definitions.

Whenever, in any section of this chapter, the following terms are used, they shall have the meaning respectively ascribed to them in this section:

- A. "City" means the city, acting through its city council and/or its city manager.
- B. "Collection" means the operation of gathering together and transporting to the point of disposal garbage, rubbish and waste material.
- C. "Contractor" means the person, persons, firm or corporation entering into a contract with the city for the collection and disposal of garbage, rubbish and waste material.
- D. "Department" means the city public works department.
- E. "Disposal" means the complete operation of treating and/or disposing of the accumulation of garbage, rubbish and waste material, and the product or residue arising from such treatment.
- F. "Garbage" means and includes all animal and vegetable refuse from kitchens, all household waste which has been prepared from food or shall have resulted from the preparation of food, all table refuse or offal, and every accumulation of animal, vegetable, or other matter that attends the preparation, consumption, marketing, packing, canning, storage, and decay of meat, fish, fowl and vegetables, and fruit intended for human consumption; also dead animals and the accumulation from restaurant grease traps, but not dishwasher nor wastewater.
- G. "Non-residential customer" means any owner of property provided solid waste services that is not a single family dwelling, including industrial properties, commercial properties, restaurants, multi-family dwellings and apartments.
- H. "Person" means and includes individuals, firms, associations and corporations.

I. _____ “Rubbish” means and includes tree and shrubbery trimmings, lawn renovating grass, weeds, leaves, chips, paper, pasteboard, magazines and books, rags, rubber, carpets, clothing, boots, shoes, hats, straw packing, boxes and cartons, crates, packing materials, furniture and all other kinds of combustible rubbish, trash or waste material which ordinarily accumulates in the operation of a household or business. “Rubbish” does not include manure or waste from any poultry yard or stable.

J. _____ “Waste material” means and includes broken crockery, broken glass, ashes, cinders, shells, bottles, tin cans, metals and other similar noncombustible waste material resulting from the operation of a household or business, but does not include discarded automobile or truck bodies or other bulky or heavy objects, nor waste material resulting from any manufacturing, building or construction operation.

SECTION 3. Amendment. Section 13.12.160 of the Bethel Municipal Code entitled “Bulk containers” is amended as follows (new language is underlined and old language is stricken out):

13.12.160 Bulk containers.

A. No other type of container or receptacle shall be permitted for the accumulation and collection of rubbish and waste materials from residence, dwelling, commercial and industrial units, except certain bulk rubbish and waste material containers approved by the public works department of the city and supplied to the residence or dwelling unit by the city or contractor, as the term contractor is defined by this chapter. Such bulk rubbish and waste material containers shall be kept in a clean and sanitary condition by the person occupying or having charge or control of the residence, dwelling, commercial or industrial unit for which such bulk rubbish or waste material container is provided. Such bulk rubbish and waste material containers shall be provided with lids which shall be kept tightly closed at all times except during the process of filling or emptying such bulk containers.

B. All non-residential customers shall be required to have and use a dumpster that is supplied by the city or its contractor.

SECTION 4. Amendment. Section 13.12.280 of the Bethel Municipal Code is repealed and reenacted to read as follows (new language is underlined and old language is stricken out):

13.12.280 Depositing trash on land of another.

No person shall place or deposit any can, trash, refuse, rubbish, garbage, offal, nauseous substance, tree trimmings, grass cuttings, animal or vegetable matter, muck, automobiles, automobile bodies, trucks, truck bodies or any material which may become a nuisance, decayed or putrid:

A. On land owned by another without the owner’s permission; or

B. In any garbage container owned by another, including a bulk container or dumpster, without the owner's permission.

~~No person shall place or deposit on land of another any tin can, trash, refuse, rubbish, garbage, offal, nauseous substance, tree trimmings, grass cuttings, animal or vegetable matter, muck, automobiles, automobile bodies, trucks, truck bodies or any material which may become a nuisance, decayed or putrid.~~

SECTION 5. Amendment. Section 13.16.010 of the Bethel Municipal Code entitled "Bulk containers" is amended as follows (new language is underlined and old language is stricken out):

13.16.010 Solid waste collection.

For the collection, removal and disposal of residential/non-residential/commercial garbage, rubbish and waste materials within the city, the following charges shall be made:

A. Residential/non-residential/commercial scheduled rates:

1. Residential service:

Frequency of Service	Rate
Monthly flat rate	\$12.00 per month

2. Non-residential service

Frequency of Service	Rate
Monthly flat rate	<u>\$75.00 per month</u>

3. Commercial service:

Frequency of Service	Rate
Four yard dumpster per pick up	\$40.00 30.00 per pick up
Eight yard dumpster per pick up	<u>\$50.00</u> 40.00 per pick up

B. Residential/non-residential/commercial on-call rates:

1. Residential services, ten dollars and ninety cents per call;
2. Non-residential service, twenty-five dollars per call;
3. Commercial services, forty-five dollars per call.

C. Public use of the municipal landfill:

Frequency of Service

Rate

Four cubic yards or
less per day

Free

More than four
cubic yards

\$5.00 per cubic yard

The landfill subject to approval by the city council, shall establish and may periodically adjust additional rates, charges, and fees for the use of the landfill, including but not limited to rates, charges, and fees for dumping oil, glycol, and oversized items.

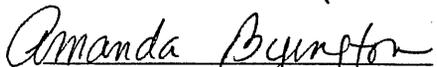
SECTION 6. Effective Date. This ordinance shall become effective immediately upon passage by the City Council, except for Sections 3 and 5. Section 3 shall become effective for non-residential customers only after the City or its contractors has purchased and provided dumpsters to non-residential customers, and therefore this section is given an effective date of July 1, 2004. Section 5 shall become effective 30 days after passage in order to give additional notice to customers of solid waste services and collection about the rate changes.

PASSED AND APPROVED THIS 23rd DAY OF March 2004, by a vote of 4 in favor and 3 opposed.



Hugh Short, Mayor

ATTEST:



Amanda Byington, City Clerk

Introduced by: Hugh Short
Date Introduced: May 25, 2004
Public Hearing Date: June 8 & 22,
July 13 & 27
Action: Passed 4-2 (No –
Trantham, Williams)
Date Enacted: September 28, 2004

CITY OF BETHEL, ALASKA

ORDINANCE #04-06

AN ORDINANCE REPEALING ORDINANCE #04-03 REGARDING AMENDMENTS TO SECTIONS 13.12.010, 13.12.160, 13.12.280, AND 13.16.010 OF THE BETHEL MUNICIPAL CODE CONCERNING SOLID WASTE COLLECTION AND DISPOSAL

BE IT ORDAINED by the City Council of Bethel, Alaska, that:

SECTION 1. Classification. Sections 2, 3, and 4 of this ordinance are of a general and permanent nature and shall become a part of the Bethel Municipal Code.

SECTION 2. Amendment. Section 13.12.010 of the Bethel Municipal Code entitled "Definitions" is hereby amended to read as follows:

13.12.010 Definitions.

Whenever, in any section of this chapter, the following terms are used, they shall have the meaning respectively ascribed to them in this section:

- A. "City" means the city, acting through its city council and/or its city manager.
- B. "Collection" means the operation of gathering together and transporting to the point of disposal garbage, rubbish and waste material.
- C. "Contractor" means the person, persons, firm or corporation entering into a contract with the city for the collection and disposal of garbage, rubbish and waste material.
- D. "Department" means the city public works department.
- E. "Disposal" means the complete operation of treating and/or disposing of the accumulation of garbage, rubbish and waste material, and the product or residue arising from such treatment.

- F. "Garbage" means and includes all animal and vegetable refuse from kitchens, all household waste which has been prepared from food or shall have resulted from the preparation of food, all table refuse or offal, and every accumulation of animal, vegetable, or other matter that attends the preparation, consumption, marketing, packing, canning, storage, and decay of meat, fish, fowl and vegetables, and fruit intended for human consumption; also dead animals and the accumulation from restaurant grease traps, but not dishwater nor wastewater.
- G. "Non-residential customer" means any owner of property, provided solid waste services that is not a three unit or less residential family dwelling, including industrial and commercial properties.
- "Person" means and includes individuals, firms, associations and corporations.
- H. "Rubbish" means and includes tree and shrubbery trimmings, lawn renovating grass, weeds, leaves, chips, paper, pasteboard, magazines and books, rags, rubber, carpets, clothing, boots, shoes, hats, straw packing, boxes and cartons, crates, packing materials, furniture and all other kinds of combustible rubbish, trash or waste material which ordinarily accumulates in the operation of a household or business. "Rubbish" does not include manure or waste from any poultry yard or stable.
- I. "Waste material" means and includes broken crockery, broken glass, ashes, cinders, shells, bottles, tin cans, metals and other similar noncombustible waste material resulting from the operation of a household or business, but does not include discarded automobile or truck bodies or other bulky or heavy objects, nor waste material resulting from any manufacturing, building or construction operation.

SECTION 3. Amendment. Section 13.12.160 of the Bethel Municipal Code entitled "Bulk containers" is hereby amended to read as follows:

13.12.160 Bulk containers.

No other type of container or receptacle shall be permitted for the accumulation and collection of rubbish and waste materials from residence, dwelling, commercial and industrial units, except certain bulk rubbish and waste material containers approved by the public works department of the city and supplied to the residence or dwelling unit by the city or contractor, as the term contractor is defined by this chapter. Such bulk rubbish and waste material containers shall be kept in a clean and sanitary condition by the person occupying or having charge or control of the residence, dwelling, commercial or industrial unit for which such bulk rubbish or waste material container is provided. Such bulk rubbish and waste material containers shall be provided with lids which shall be kept tightly closed at all times except during the process of filling or emptying such bulk containers.

SECTION 4. Amendment. Section 13.12.280 of the Bethel Municipal Code entitled "Depositing trash on land of another" is hereby amended to read as follows:

- 13.12.280 Depositing trash on land of another.
- A. On land owned by another without the owner's permission; or
 - B. In any garbage container owned by another, including a bulk container or dumpster, without the owner's permission.

No person shall place or deposit on land of another any tin can, trash, refuse, rubbish, garbage, offal, nauseous substance, tree trimmings, grass cuttings, animal or vegetable matter, muck, automobiles, automobile bodies, trucks, truck bodies or any material which may become a nuisance, decayed or putrid.

SECTION 5. Amendment. Section 13.16.010 of the Bethel Municipal Code entitled "Bulk containers" is amended as follows:

13.16.10 Solid waste collection.

For the collection, removal and disposal of residential/non-residential/commercial garbage, rubbish and waste materials within the city, the following charges shall be made:

A. Residential/non-residential/commercial scheduled rates:

1. **Residential service:**

Frequency of Service	Rate
Monthly flat rate	\$12.00 per month

2. **Non-residential service:**

Frequency of Service	Rate
Monthly flat rate	\$45.00 per month

3. **Commercial service:**

Frequency of Service	Rate
Four yard dumpster	\$40.00 per pick up
Eight yard dumpster	\$50.00 per pick up
Commercial monthly flat rate w/o dumpster	\$45.00 per month

B Residential/commercial on-call rates:

- 1. Residential services, ten dollars and ninety cents per call;
- 2. Commercial services, forty-five dollars per call.

SECTION 6. Effective Date. This ordinance shall become effective immediately upon passage by the City Council.

PASSED AND APPROVED THIS 28th DAY OF SEPTEMBER 2004, BY A VOTE OF FOUR IN FAVOR AND TWO OPPOSED.



Hugh Short, Mayor

ATTEST:



Selena Malone, City Clerk

Introduced by: City Council
Date: May 25, 2004
Public hearing date: June 22, 2004
Action: Passed
Vote: 5 – 1 (Williams)

CITY OF BETHEL, ALASKA

ORDINANCE #04-10

AN ORDINANCE INCREASING THE RATES/FEEES CHARGED FOR CITY OF BETHEL WATER AND SEWER SERVICES

WHEREAS, the City of Bethel ("City") operates water and sewer utilities to provide water and sewer in Bethel; and

WHEREAS, provision of such services to Bethel is in the best interest of the public; and

WHEREAS, the fees that the City charges for provision of water and sewer services to businesses and homes in Bethel have not been increased since April 2001; and

WHEREAS, since 1999 the City's water and sewer services have operated at a net loss every year; and

WHEREAS, the City of Bethel's present water and sewer rate structure in the Enterprise Fund does not cover all expenditure costs (including depreciation and CPI); and

WHEREAS, since Village Safe Water has recently funded by grant \$2.5 million dollars for a new pipe water and sewer system, future Village Safe Water funding could be in jeopardy if the City of Bethel does not fund the replacement of the pipe water and sewer system; and

WHEREAS, let be it resolved that the Finance Committee recommends a break-even rate structure based upon cents per gallon basis achieved by metering; and

WHEREAS, the Water and Sewer Fund Balance will accumulate monies for replacement costs;

WHEREAS, the City of Bethel's recalculation of revenue is completed on an annual basis with the implementation of the City's future Budgets and covers all or most related expenditure costs in its water and sewer rates with fairness to **all** City customers.

BE IT ORDAINED, by the City Council of Bethel, Alaska; that:

Section 1. Classification. This ordinance is permanent and general in nature and shall be placed in the Bethel Municipal Code.

Section 2. Repeal and Reenactment. Sections 13.16.020 and 13.16.030 of the Bethel Municipal Code are hereby repealed and reenacted as follows:

13.16.020 Water service.

A. Residential/commercial water delivery services for outside fill with an overflow involving the following capacities, frequencies and rate charges:

UTILITY RATE SHEET

CAPACITY	FREQUENCY	UTILITY RATE SHEET			
		WATER	SEWER		
100 Gallons	4 times per week	\$72.96	\$83.90	\$57.60	\$66.24
	3 times per week	\$53.08	\$61.04	\$43.20	\$49.68
	2 times per week	\$46.06	\$52.97	\$28.80	\$33.12
	1 times per week	\$28.60	\$32.89	\$14.40	\$16.56
	2 times per month	\$20.03	\$23.03	\$7.20	\$8.28
	1 time per month	\$15.98	\$18.38	\$3.60	\$4.14
150 Gallons	4 times per week	\$106.15	\$122.07	\$220.80	\$253.92
	3 times per week	\$77.23	\$88.81	\$165.60	\$190.44
	2 times per week	\$49.90	\$57.39	\$110.40	\$126.96
	1 time per week	\$24.16	\$27.78	\$55.20	\$63.48
	2 times per month	\$11.68	\$13.43	\$27.60	\$31.74
	1 time per month	\$5.64	\$6.49	\$13.80	\$15.87
200 Gallons	4 times per week	\$137.16	\$157.73	\$230.40	\$264.96
	3 times per week	\$99.79	\$114.76	\$172.80	\$198.72
	2 times per week	\$64.46	\$74.13	\$115.20	\$132.48
	1 time per week	\$31.20	\$35.88	\$57.60	\$66.24
	2 times per month	\$15.08	\$17.34	\$28.80	\$33.12
	1 time per month	\$7.28	\$8.37	\$14.40	\$16.56
250 Gallons	4 times per week	\$165.98	\$190.88	\$240.00	\$276.00
	3 times per week	\$120.76	\$138.87	\$180.00	\$207.00
	2 times per week	\$78.01	\$89.71	\$120.00	\$138.00
	1 time per week	\$37.76	\$43.42	\$60.00	\$69.00
	2 times per month	\$18.26	\$21.00	\$30.00	\$34.50
	1 time per month	\$8.82	\$10.14	\$15.00	\$17.25
300 Gallons	4 times per week	\$192.91	\$221.85	\$249.60	\$287.04
	3 times per week	\$140.12	\$161.14	\$187.20	\$215.28
	2 times per week	\$90.53	\$104.11	\$124.80	\$143.28
	1 time per week	\$43.82	\$50.39	\$62.40	\$71.76
	2 times per month	\$21.19	\$24.37	\$31.20	\$35.88
	1 time per month	\$10.24	\$11.78	\$15.60	\$17.94
350 Gallons	4 times per week	\$217.06	\$249.62	\$259.20	\$298.08
	3 times per week	\$157.91	\$181.60	\$194.40	\$223.56

CAPACITY	FREQUENCY				
		WATER	SEWER	WATER	SEWER
	2 times per week	\$102.01	\$117.31	\$129.60	\$149.04
	1 time per week	\$49.38	\$56.79	\$64.80	\$74.52
	2 times per month	\$23.88	\$27.46	\$32.40	\$37.26
	1 time per month	\$11.53	\$13.26	\$16.20	\$18.63
400 Gallons	4 times per week	\$239.30	\$275.20	\$268.80	\$309.12
	3 times per week	\$174.10	\$200.22	\$201.60	\$231.84
	2 times per week	\$112.48	\$129.35	\$134.40	\$154.56
	1 time per week	\$54.44	\$62.61	\$67.20	\$77.28
	2 times per month	\$26.33	\$30.28	\$33.60	\$38.64
	1 time per month	\$12.72	\$14.63	\$16.80	\$19.32
450 Gallons	4 times per week	\$259.37	\$298.28	\$278.40	\$320.16
	3 times per week	\$188.70	\$217.01	\$208.80	\$240.12
	2 times per week	\$121.91	\$140.20	\$139.20	\$160.08
	1 time per week	\$59.00	\$67.85	\$69.60	\$80.04
	2 times per month	\$28.54	\$32.82	\$34.80	\$40.02
	1 time per month	\$13.78	\$15.85	\$17.40	\$20.01
500 Gallons	4 times per week	\$277.25	\$318.84	\$288.00	\$331.20
	3 times per week	\$201.70	\$231.96	\$216.00	\$248.40
	2 times per week	\$130.31	\$149.86	\$144.00	\$165.60
	1 time per week	\$63.07	\$72.53	\$72.00	\$82.80
	2 times per month	\$30.49	\$35.06	\$36.00	\$41.40
	1 time per month	\$14.72	\$16.93	\$18.00	\$20.70
550 Gallons	4 times per week	\$319.56	\$367.49	\$297.60	\$342.24
	3 times per week	\$232.49	\$267.36	\$223.20	\$256.68
	2 times per week	\$150.19	\$172.72	\$148.80	\$171.12
	1 time per week	\$72.70	\$83.61	\$74.40	\$85.56
	2 times per month	\$35.15	\$40.42	\$37.20	\$42.78
	1 time per month	\$16.98	\$19.53	\$18.60	\$21.39
600 Gallons	4 times per week	\$319.56	\$367.49	\$307.20	\$353.28
	3 times per week	\$232.49	\$267.36	\$230.40	\$264.96
	2 times per week	\$150.19	\$172.72	\$153.60	\$176.64
	1 time per week	\$72.70	\$83.61	\$76.80	\$88.32
	2 times per month	\$35.15	\$40.42	\$38.40	\$44.16
	1 time per month	\$16.98	\$19.53	\$19.20	\$22.08
650 Gallons	4 times per week	\$388.51	\$446.79	\$316.80	\$364.32
	3 times per week	\$282.65	\$325.05	\$237.60	\$273.24

2 times per week	\$182.60	\$209.99	\$158.40	\$182.16
1 time per week	\$88.39	\$101.65	\$79.20	\$91.08
2 times per month	\$42.73	\$49.14	\$39.60	\$45.54
1 time per month	\$20.64	\$23.74	\$19.80	\$22.77

CAPACITY	FREQUENCY	WATER		SEWER	
700 Gallons	4 times per week	\$388.51	\$446.79	\$326.40	\$375.36
	3 times per week	\$282.65	\$325.05	\$144.80	\$166.52
	2 times per week	\$182.60	\$209.99	\$163.20	\$187.68
	1 time per week	\$88.39	\$101.65	\$81.60	\$93.84
	2 times per month	\$42.73	\$49.14	\$40.80	\$46.92
	1 time per month	\$20.64	\$23.74	\$20.40	\$23.46
750 Gallons	4 times per week	\$388.51	\$446.79	\$336.00	\$386.40
	3 times per week	\$282.65	\$325.05	\$252.00	\$289.80
	2 times per week	\$182.60	\$209.99	\$168.00	\$193.20
	1 time per week	\$88.39	\$101.65	\$84.00	\$96.60
	2 times per month	\$42.73	\$49.14	\$42.00	\$48.30
	1 time per month	\$20.64	\$23.74	\$21.00	\$24.15
800 Gallons	4 times per week	\$496.13	\$570.55	\$345.60	\$397.44
	3 times per week	\$360.94	\$415.08	\$259.20	\$298.08
	2 times per week	\$233.18	\$268.16	\$172.80	\$198.72
	1 time per week	\$112.87	\$129.80	\$86.40	\$99.36
	2 times per month	\$54.58	\$62.77	\$43.20	\$49.68
	1 time per month	\$26.35	\$30.30	\$21.60	\$24.84
850 Gallons	4 times per week	\$496.13	\$570.55	\$355.20	\$408.48
	3 times per week	\$360.94	\$415.08	\$266.40	\$306.36
	2 times per week	\$233.18	\$268.16	\$177.60	\$204.24
	1 time per week	\$112.87	\$129.80	\$88.80	\$102.12
	2 times per month	\$54.58	\$62.77	\$44.40	\$51.06
	1 time per month	\$26.35	\$30.30	\$22.20	\$25.53
900 Gallons	4 times per week	\$496.13	\$570.55	\$364.80	\$419.52
	3 times per week	\$360.94	\$415.08	\$273.60	\$314.64
	2 times per week	\$233.18	\$268.16	\$182.40	\$209.76
	1 time per week	\$112.87	\$129.80	\$91.20	\$104.88
	2 times per month	\$54.58	\$62.77	\$45.60	\$52.44
	1 time per month	\$26.35	\$30.30	\$22.80	\$26.22

1000 Gallons	4 times per week	\$496.13	\$570.55	\$384.00	\$441.60
	3 times per week	\$360.94	\$415.08	\$288.00	\$331.20
	2 times per week	\$233.18	\$268.16	\$192.00	\$220.80
	1 time per week	\$112.87	\$129.80	\$96.00	\$110.40
	2 times per month	\$54.58	\$62.77	\$48.00	\$55.20
	1 time per month	\$26.35	\$30.30	\$24.00	\$27.60

<u>CAPACITY</u>	<u>FREQUENCY</u>	<u>WATER</u>		<u>SEWER</u>	
1500 Gallons	4 times per week	\$904.70	\$1040.41	\$480.00	\$552.00
	3 times per week	\$658.18	\$756.91	\$360.00	\$414.00
	2 times per week	\$425.21	\$488.99	\$240.00	\$276.00
	1 time per week	\$205.82	\$236.69	\$120.00	\$138.00
	2 times per month	\$99.52	\$114.45	\$60.00	\$69.00
	1 time per month	\$48.06	\$55.27	\$30.00	\$34.50
2000 Gallons	4 times per week	\$904.70	\$1040.41	\$576.00	\$662.40
	3 times per week	\$658.18	\$756.91	\$432.00	\$496.80
	2 times per week	\$425.21	\$488.99	\$288.00	\$331.20
	1 time per week	\$205.82	\$236.69	\$144.00	\$165.60
	2 times per month	\$99.52	\$114.45	\$72.00	\$82.80
	1 time per month	\$48.06	\$55.27	\$36.00	\$41.40
2500 Gallons	4 times per week	\$904.70	\$1040.41	\$672.00	\$772.80
	3 times per week	\$658.18	\$756.91	\$504.00	\$579.60
	2 times per week	\$425.21	\$488.99	\$336.00	\$386.40
	1 time per week	\$205.82	\$236.69	\$168.00	\$193.20
	2 times per month	\$99.52	\$114.45	\$84.00	\$96.60
	1 time per month	\$48.06	\$55.27	\$42.00	\$48.30
3000 Gallons	4 times per week	\$904.70	\$1040.41	\$768.00	\$883.20
	3 times per week	\$658.18	\$756.91	\$576.00	\$662.40
	2 times per week	\$425.21	\$488.99	\$384.00	\$441.60
	1 time per week	\$205.82	\$236.69	\$192.00	\$220.80
	2 times per month	\$99.52	\$114.45	\$96.00	\$110.40
	1 time per month	\$48.06	\$55.27	\$48.00	\$55.20
3500 Gallons	4 times per week	\$904.70	\$1040.41	\$864.00	\$993.60
	3 times per week	\$658.18	\$756.91	\$648.00	\$745.20
	2 times per week	\$425.21	\$488.99	\$432.00	\$496.80

	1 time per week	\$205.82	\$236.69	\$216.00	\$248.40
	2 times per month	\$99.52	\$114.45	\$108.00	\$124.20
	1 time per month	\$48.06	\$55.27	\$54.00	\$62.10
4000 Gallons	4 times per week	\$904.70	\$1040.41	\$960.00	\$1104.00
	3 times per week	\$658.18	\$756.91	\$720.00	\$828.00
	2 times per week	\$425.21	\$488.99	\$480.00	\$552.00
	1 time per week	\$205.82	\$236.69	\$240.00	\$276.00
	2 times per month	\$99.52	\$114.45	\$120.00	\$138.00
	1 time per month	\$48.06	\$55.27	\$60.00	\$69.00

CAPACITY	FREQUENCY	WATER		SEWER	
4500 Gallons	4 times per week	\$904.70	\$1040.41	\$1,056.00	\$1214.40
	3 times per week	\$658.18	\$756.91	\$792.00	\$910.80
	2 times per week	\$425.21	\$488.99	\$528.00	\$607.20
	1 time per week	\$205.82	\$236.69	\$264.00	\$303.60
	2 times per month	\$99.52	\$114.45	\$132.00	\$151.80
	1 time per month	\$48.06	\$55.27	\$66.00	\$75.90
5000 Gallons	4 times per week	\$904.70	\$1040.41	\$1,152.00	\$1324.80
	3 times per week	\$658.18	\$756.91	\$864.00	\$993.60
	2 times per week	\$425.21	\$488.99	\$576.00	\$662.40
	1 time per week	\$205.82	\$236.69	\$288.00	\$331.20
	2 times per month	\$99.52	\$114.45	\$144.00	\$165.60
	1 time per month	\$48.06	\$55.27	\$72.00	\$82.80
5500 Gallons	4 times per week	\$904.70	\$1040.41	\$1,248.00	\$1435.20
	3 times per week	\$658.18	\$756.91	\$936.00	\$1076.40
	2 times per week	\$425.21	\$488.99	\$624.00	\$717.60
	1 time per week	\$205.82	\$236.69	\$312.00	\$358.80
	2 times per month	\$99.52	\$114.45	\$156.00	\$179.40
	1 time per month	\$48.06	\$55.27	\$78.00	\$89.70
6000 Gallons	4 times per week	\$904.70	\$1040.41	\$1,344.00	\$1545.60
	3 times per week	\$658.18	\$756.91	\$1,008.00	\$1159.20
	2 times per week	\$425.21	\$488.99	\$672.00	\$772.80
	1 time per week	\$205.82	\$236.69	\$336.00	\$386.40
	2 times per month	\$99.52	\$114.45	\$168.00	\$193.20
	1 time per month	\$48.06	\$55.27	\$84.00	\$96.90

6500 Gallons	4 times per week	\$904.70	\$1040.41	\$1,440.00	\$1656.00
	3 times per week	\$658.18	\$756.91	\$1,080.00	\$1242.00
	2 times per week	\$425.21	\$488.99	\$720.00	\$828.00
	1 time per week	\$205.82	\$236.69	\$360.00	\$414.00
	2 times per month	\$99.52	\$114.45	\$180.00	\$207.00
	1 time per month	\$48.06	\$55.27	\$90.00	\$103.50

7000 Gallons	4 times per week	\$904.70	\$1040.41	\$1,536.00	\$1766.40
	3 times per week	\$658.18	\$756.91	\$1,152.00	\$1324.80
	2 times per week	\$425.21	\$488.99	\$768.00	\$883.20
	1 time per week	\$205.82	\$236.69	\$384.00	\$441.60
	2 times per month	\$99.52	\$114.45	\$192.00	\$220.80
	1 time per month	\$48.06	\$55.27	\$96.00	\$110.40

CAPACITY	FREQUENCY	WATER		SEWER	

7500 Gallons	4 times per week	\$904.70	\$1040.41	\$1,632.00	\$1876.80
	3 times per week	\$658.18	\$756.91	\$1,224.00	\$1407.60
	2 times per week	\$425.21	\$488.99	\$816.00	\$938.40
	1 time per week	\$205.82	\$236.69	\$408.00	\$469.20
	2 times per month	\$99.52	\$114.45	\$204.00	\$234.60
	1 time per month	\$48.06	\$55.27	\$102.00	\$117.30

8000 Gallons	4 times per week	\$904.70	\$1040.41	\$1,728.00	\$1987.20
	3 times per week	\$658.18	\$756.91	\$1,296.00	\$1490.40
	2 times per week	\$425.21	\$488.99	\$864.00	\$993.60
	1 time per week	\$205.82	\$236.69	\$432.00	\$496.80
	2 times per month	\$99.52	\$114.45	\$216.00	\$248.40
	1 time per month	\$48.06	\$55.27	\$108.00	\$124.20

8500 Gallons	4 times per week	\$904.70	\$1040.41	\$1,824.00	\$2097.60
	3 times per week	\$658.18	\$756.91	\$1,368.00	\$1573.20
	2 times per week	\$425.21	\$488.99	\$912.00	\$1048.80
	1 time per week	\$205.82	\$236.69	\$456.00	\$524.40
	2 times per month	\$99.52	\$114.45	\$228.00	\$262.20
	1 time per month	\$48.06	\$55.27	\$114.00	\$131.10

9000 Gallons	4 times per week	\$904.70	\$1040.41	\$1,920.00	\$2208.00
	3 times per week	\$658.18	\$756.91	\$1,440.00	\$1656.00
	2 times per week	\$425.21	\$488.99	\$960.00	\$1104.00
	1 time per week	\$205.82	\$236.69	\$480.00	\$552.00

	2 times per month	\$99.52	\$114.45	\$240.00	\$276.00
	1 time per month	\$48.06	\$55.27	\$120.00	\$138.00
9500 Gallons	4 times per week	\$904.70	\$1040.41	\$2,016.00	\$2318.40
	3 times per week	\$658.18	\$756.91	\$1,512.00	\$1738.80
	2 times per week	\$425.21	\$488.99	\$1,008.00	\$1159.20
	1 time per week	\$205.82	\$236.69	\$504.00	\$579.60
	2 times per month	\$99.52	\$114.45	\$252.00	\$289.80
	1 time per month	\$48.06	\$55.27	\$126.00	\$144.90
10000 Gallons	4 times per week	\$904.70	\$1040.41	\$2,112.00	\$2428.80
	3 times per week	\$756.91	\$756.91	\$1,584.00	\$1821.60
	2 times per week	\$488.99	\$488.99	\$1,056.00	\$1214.40
	1 time per week	\$236.69	\$236.69	\$528.00	\$607.20
	2 times per month	\$114.45	\$114.45	\$264.00	\$303.60
	1 time per month	\$55.27	\$55.27	\$132.00	\$151.80

B. Residential/commercial water delivery services for outside fill: Customers with inside fill shall be charged by the schedules as set by the outside fill rate, and in addition each customer shall be charged a monthly surcharge of ~~twelve~~ thirteen dollars and eighty cents per month.

C. Residential/commercial piped water rates:

Frequency of Service	Rate
1. Residential Service:	
Monthly flat rate (non-metered)	\$69.00 \$86.25 per month
2. Commercial Service:	
Monthly rate (metered service)	\$13.80 \$17.25 per 1,000 gallons
Monthly rate (non-metered service)	\$69.00 \$86.25 per month per dwelling unit
3. Water service picked up at the pump house:	
Per gallon (.25 cents per minute approximately twenty-five gallons)	

D. Residential/commercial water delivery service (normal hours, extra call) ~~forty~~ **fifty-seven** dollars and **fifty** cents per call plus ~~\$.11~~ **.13** cents per gallon, two hundred gallon minimum.

E. Residential/commercial water delivery service (after hours, extra call) ~~one hundred~~ **one hundred fifteen** dollars and **fifty** cents per call plus ~~\$.11~~ **.13** cents per gallon, two hundred gallon minimum.

13.16.030 Sewage service.

For the providing of residential/commercial sewage service within the city the following charges shall be made:

Frequency of Service	Monthly Rate
A. Evacuation service	
Five hundred gallons or more	\$12.00 \$13.80 per pick up plus 0.012 0.14 cents per gallon of sewer tank size.
B. Piped sewer service:	
1. Flat rate (non-metered service):	\$21.60 \$27.00 per month per dwelling unit

2. Metered service: ~~\$9.60~~ \$12.00 per 1,000 gallons
- C. 1. Evacuation service (off-schedule), ~~forty-eight~~ **sixty-six** dollars and **seventy** cents per call plus \$0.01 per gallon.
2. Evacuation service (normal business hours, extra call), ~~forty-eight dollars and eighty-six cents~~ **sixty-seven** dollars and **sixty-nine** cents per call plus \$0.01 per gallon;
3. Evacuation service (after hours, extra call), ~~one hundred seventeen and eighty-six cents~~ one hundred **thirty-five** dollars and **fifty-four** cents per call plus \$0.01 per gallon;
- D. Sewage service dumped at the municipal sewage lagoon, ~~three dollars and sixty cents~~ **four** dollars and **fourteen** cents per one thousand gallons.

Section 3. Effective Date. This provisional ordinance shall become effective on July 1, 2004 until August 29, 2004, where upon the rates will increase to the originally proposed figures of thirty percent for hauled services and fifty percent for piped services, unless otherwise acted upon and decided by the Council during the 60 day window period.

PASSED AND ENACTED THIS 22nd DAY OF June 2004, by a vote five in favor and one opposed.

Hugh Short, Jr., Mayor



ATTEST:



Selena Malone, Acting City Clerk

Introduced by: City Manager Herron
Date: November 30, 2004
Public Hearing: January 11, 2004
Action: Adopted
Vote: 4-2 (Rodgers, Dymont)

CITY OF BETHEL, ALASKA

ORDINANCE #04-28

AN ORDINANCE AMENDING SECTION 13.16.010 OF THE BETHEL MUNICIPAL CODE TO REMOVE CHURCHES FROM A MONTHLY FLAT RATE OF \$45.00 TO A RESIDENTIAL SERVICE RATE WITH A FLAT RATE OF \$12.00

WHEREAS, Churches are not like an ordinary business for profit;

WHEREAS, the Bethel Municipal Code ("Code") in Section 13.16.010 should be fair among all residential, businesses and churches concerning services;

WHEREAS, different businesses have different revenues, expenditures and net profit; and

WHEREAS, churches receive gifts and donations (not revenue), so Chapter 13.16.010 of the Code should charge churches with the lowest charge for solid waste services so as to treat churches fairly.

BE IT ORDAINED by the City Council of Bethel, Alaska, that:

SECTION 1. Classification. This ordinance is permanent in nature and shall be incorporated into the Code.

SECTION 2. Content. Section 13.16.010 of the Code is hereby amended to read as follows (new language is underlined and deleted language is stricken out):

13.16.010 Solid Waste Collection.

For the collection, removal and disposal of residential/commercial garbage, rubbish and waste material within the city, the following charges shall be made:

A. Residential/churches/commercial schedule rates:

1. Residential and church services:

Frequency of Service	Rate
Monthly flat rate	\$12.00 per month

SECTION 3. Effective Date. This Ordinance shall take effect immediately upon approval by the City Council and is retroactive back to July 1, 2004.

ENACTED THIS 11th DAY OF JANUARY, 2005 by a vote of 4 in favor and 2 opposed.

Hugh Dymont
Hugh Dymont, Mayor

ATTEST:

S Malone
Selena Malone, City Clerk

Appendix E

Land Status Information

PARTIALLY SURVEYED TOWNSHIP 8 NORTH, RANGE 72 WEST OF THE SEWARD MERIDIAN, ALASKA

PROTRACTION DIAGRAM NO. 59-10 OFFICIALLY FILED 6/28/1959

STATUS OF PUBLIC DOMAIN
LAND AND MINERAL TITLES

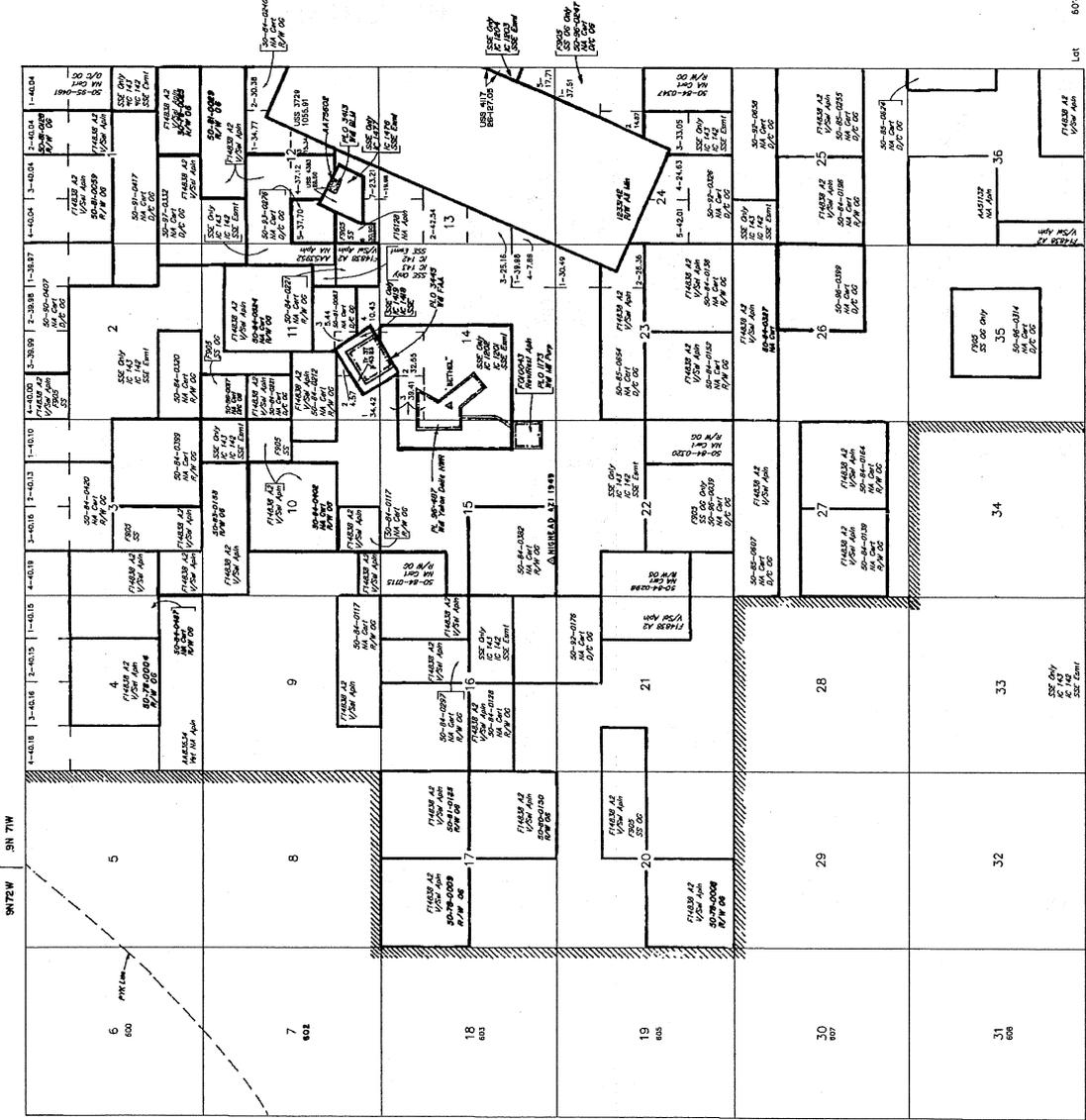
MTP

FOR ORDERS EFFECTING DISPOSAL OR USE OF UN-
DEVELOPED LANDS WITHDRAWN FOR CLASSIFICATION
MINERALS, WATER AND/OR OTHER PUBLIC PURPOSES
REFER TO INDEX OF MISCELLANEOUS DOCUMENTS.

PL 92-207 WPT 714538 LOS W/ 714639-A, 714639-A2

R.D. 5184 WPT C. MINNES. LES. Interest not conveyed

PL 92-487 WPT Yakom Dingo NWR within T.D.

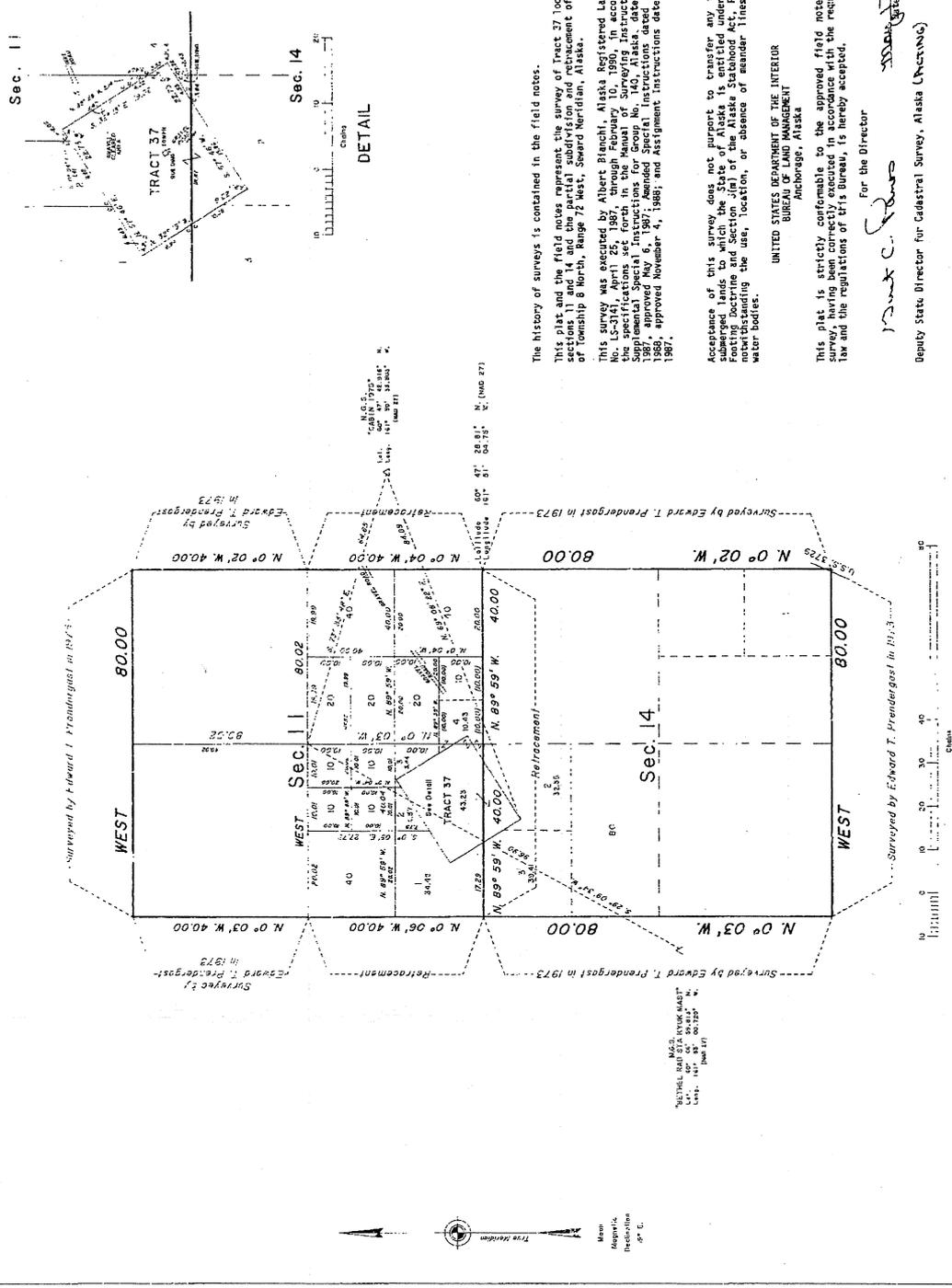


CURRENT TO	SW. Mer
5-21-2002	T B N
	R 72 W

6044300.84"N
1614918.25"W

This plan is the Bureau's Record of Title and should be used only in the event of a dispute. It does not constitute a warranty of title. The Bureau is not responsible for errors or omissions in this plan. It is the responsibility of the landowner to verify the accuracy of this plan.

TOWNSHIP 8 NORTH, RANGE 72 WEST, OF THE SEWARD MERIDIAN, ALASKA



The history of surveys is contained in the field notes. This plat and the field notes represent the survey of Tract 37 located within sections 11 and 14 and the partial subdivision and replacement of section 11 of Township 8 North, Range 72 West, Seward Meridian, Alaska.

This survey was executed by Albert Bianchi, Alaska Registered Land Surveyor No. LS-3141, April 25, 1987, through February 10, 1990, in accordance with the Alaska Statute, AS 38.05.01, and the Alaska Statute, AS 38.05.02, and Supplemental Special Instructions for Group No. 143, Alaska, dated April 22, 1987, approved May 6, 1987; Amended Special Instructions dated November 3, 1988, approved November 4, 1988; and Assignment Instructions dated April 23, 1987.

Acceptance of this survey does not purport to transfer any interest in submerged lands to which the State of Alaska is entitled under the Equal Footing Doctrine and Section 1(a) of the Alaska Statute, P.L. 86-508, without resurveying the use, location, or absence of boundary lines to depict water bodies.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Anchorage, Alaska

This plat is strictly conformable to the approved field notes, and the surveying instrument used, and is in accordance with the requirements of the Act and the regulations of this Bureau, is hereby accepted.

For the Director
M. C. [Signature]
Deputy State Director for Cadastral Survey, Alaska (L26266)

ORIGINAL

U.S. SURVEY NO. 3729, ALASKA

SITUATED
APPROXIMATELY 2 MILES WEST OF BEHESE, ALASKA
AND
THE ESTABLISHMENT OF U.S. LOCATION MONUMENT NO. 3729

APPROXIMATE GEOGRAPHIC POSITION
LATITUDE 66°46' N LONGITUDE 161°48' W

AREA: 1055.91 ACRES

SURVEYED BY
RAY HARRIS, CADASTRAL SURVEYOR
SEPTEMBER 1, 1959 TO MAY 24, 1960
UNDER SPECIAL INSTRUCTIONS

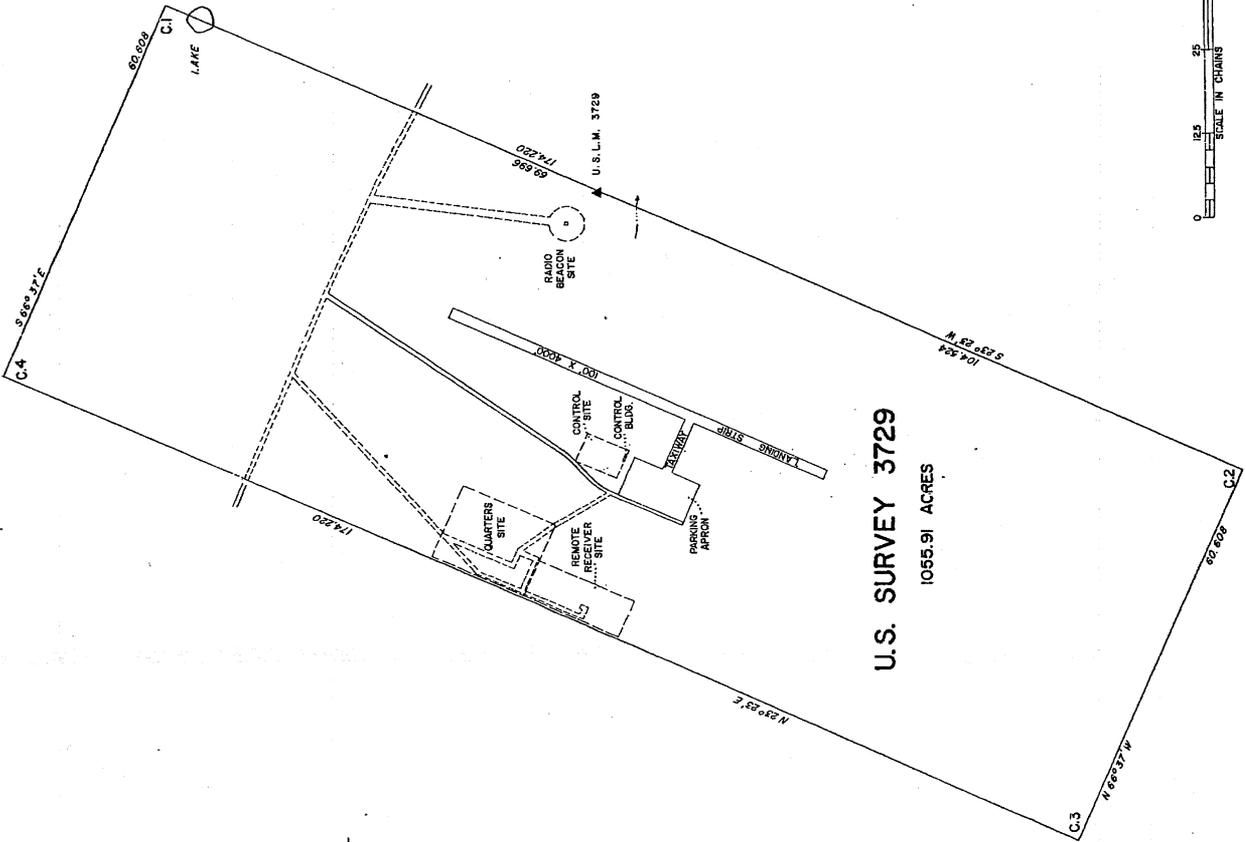
DATED AUGUST 3, 1959
AND
APPROVED AUGUST 6, 1959

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D.C. October 19, 1961

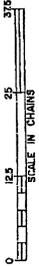
This plat is strictly conformable to the approved field notes, and the survey, which has been correctly checked in accordance with the standards of law and the regulations of this Bureau, is hereby accepted.

For the Director

E. J. Luntz
Chief, Division of Engineering



U.S. SURVEY 3729
1055.91 ACRES



U.S. SURVEY
NO. 4117, ALASKA

EMBRACING

LOTS 1 THROUGH 14

LOCATED

APPROXIMATELY ONE MILE WEST

OF BETHEL, ALASKA

ON BOTH SIDES

OF THE BETHEL-AIRPORT ROAD

APPROXIMATE GEOGRAPHIC POSITION

LATITUDE 60° 47' N., LONGITUDE 161° 47' W.

AREA: 715.00 ACRES

SURVEYED BY:

EDWARD A. TAYLOR, SUPERVISORY CADASTRAL SURVEYOR

JULY 18, 1963 TO JULY 14, 1964

Under Special Instructions

Dated July 2, 1963, and

Approved July 17, 1963.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C. May 9, 1966

This plat is strictly conformable to the approved field notes and the survey, having been correctly executed in accordance with the requirements of law and the regulations of this Bureau, is hereby accepted.

For the Director

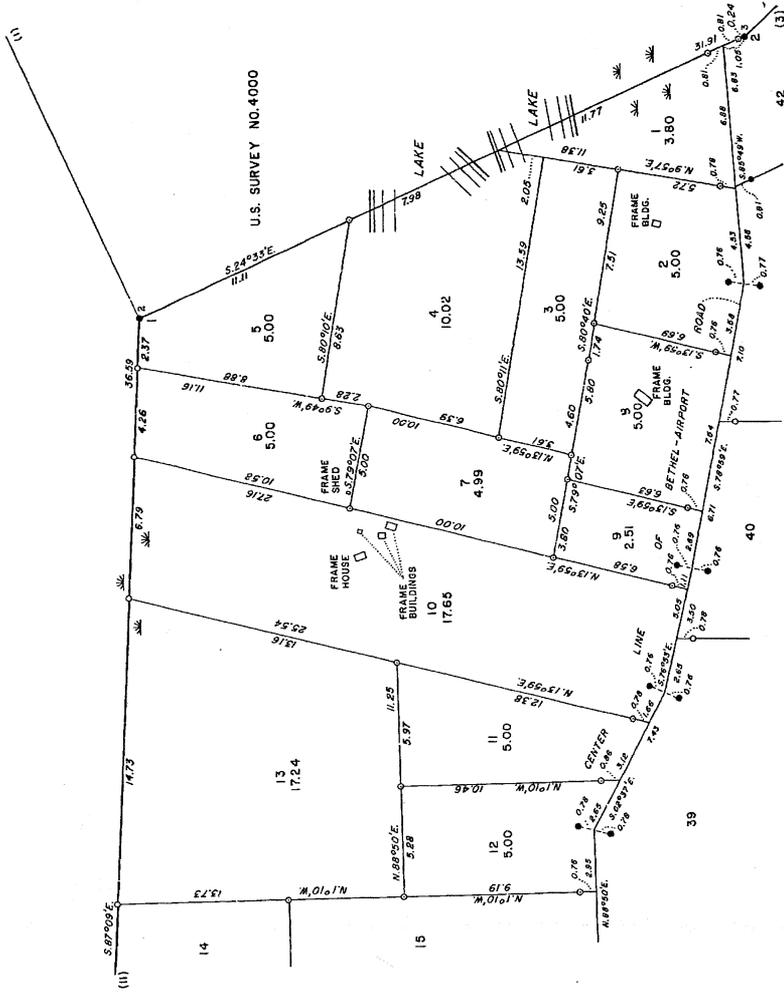
R. E. Sproun

Acting Chief, Division of Engineering

Sheet 1 of 5 sheets



Magnetic Declination
19° East



● REGULATION IRON POST

○ COPPERNIELD

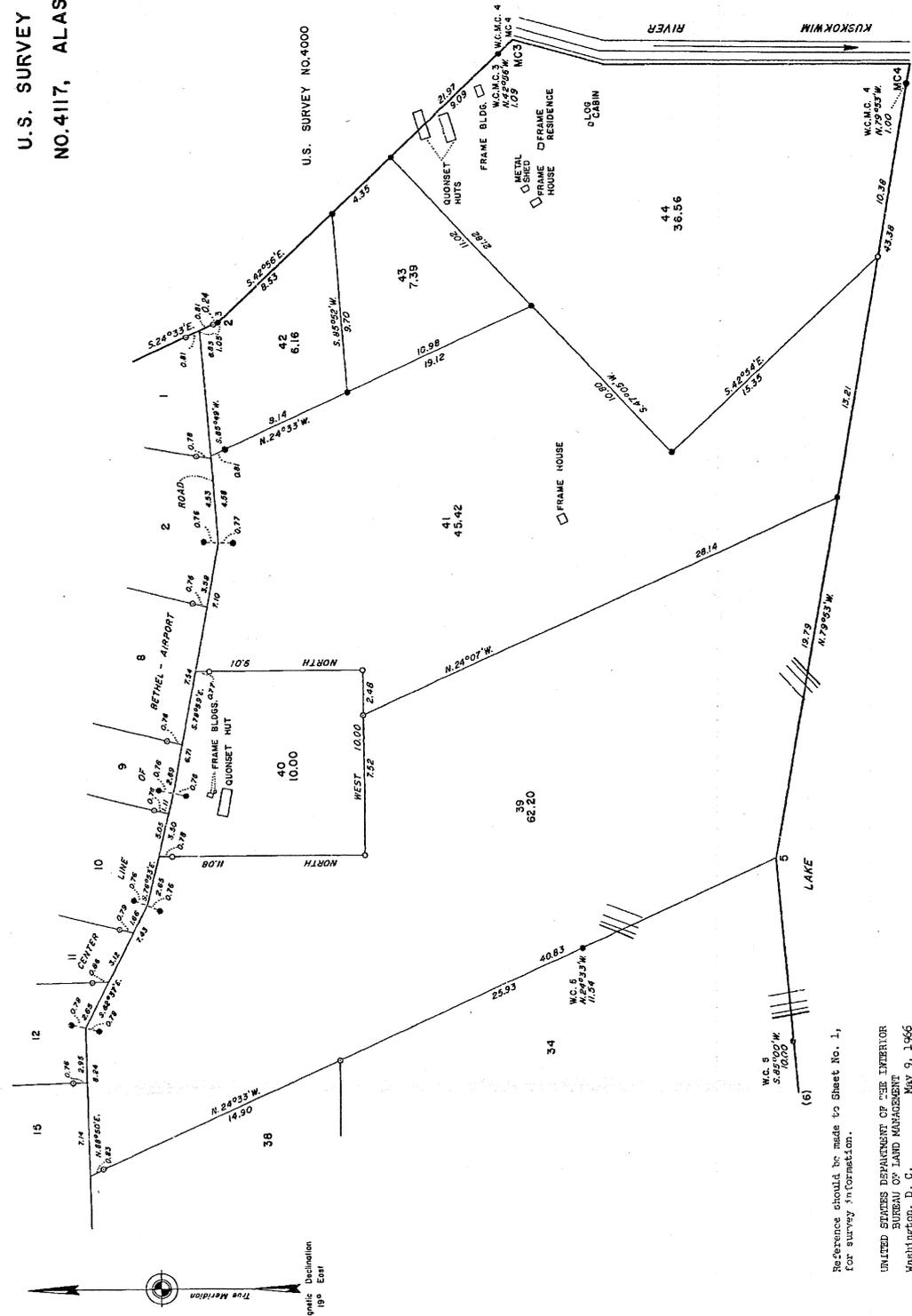
◊ IRON PIPE

4

SCALE IN CHAINS

U.S. SURVEY
NO. 4117, ALASKA

Sheet 2 of 5 sheets



- REGULATION IRON POST
- IRON PIPE
- COPPERWELD



Reference should be made to Sheet No. 1,
for survey information.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C.
May 9, 1966

This plat is strictly conformable to the approved field notes, and the survey, having been correctly executed in accordance with the requirements of law and the regulations of this Bureau, is hereby accepted.

For the Director
RE. Deann

Acting Chief, Division of Engineering

U.S. SURVEY
NO. 4117, ALASKA

References should be made to Sheet No. 1,
for survey information.

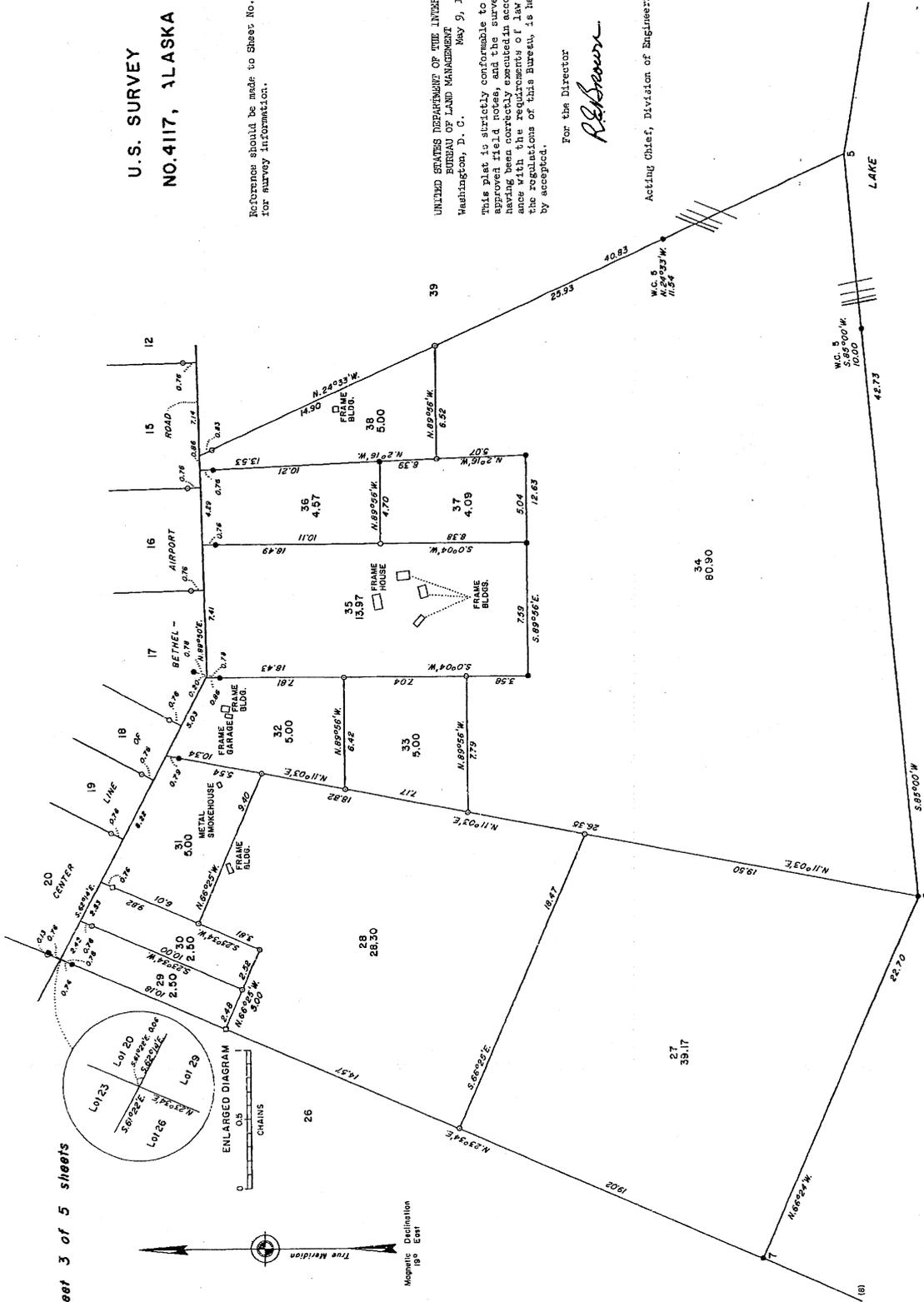
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C. May 9, 1966

This plat is strictly conformable to the
approved field notes, and the survey,
having been correctly executed in accordance
with the instructions of the Chief of the
Bureau of Land Management, is hereby
accepted.

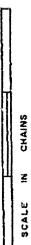
For the Director

R. B. Brown

Acting Chief, Division of Engineering



- REGULATION IRON POST
- IRON PIPE
- COPPERWELD
- ANGLE IRON

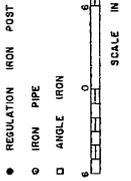
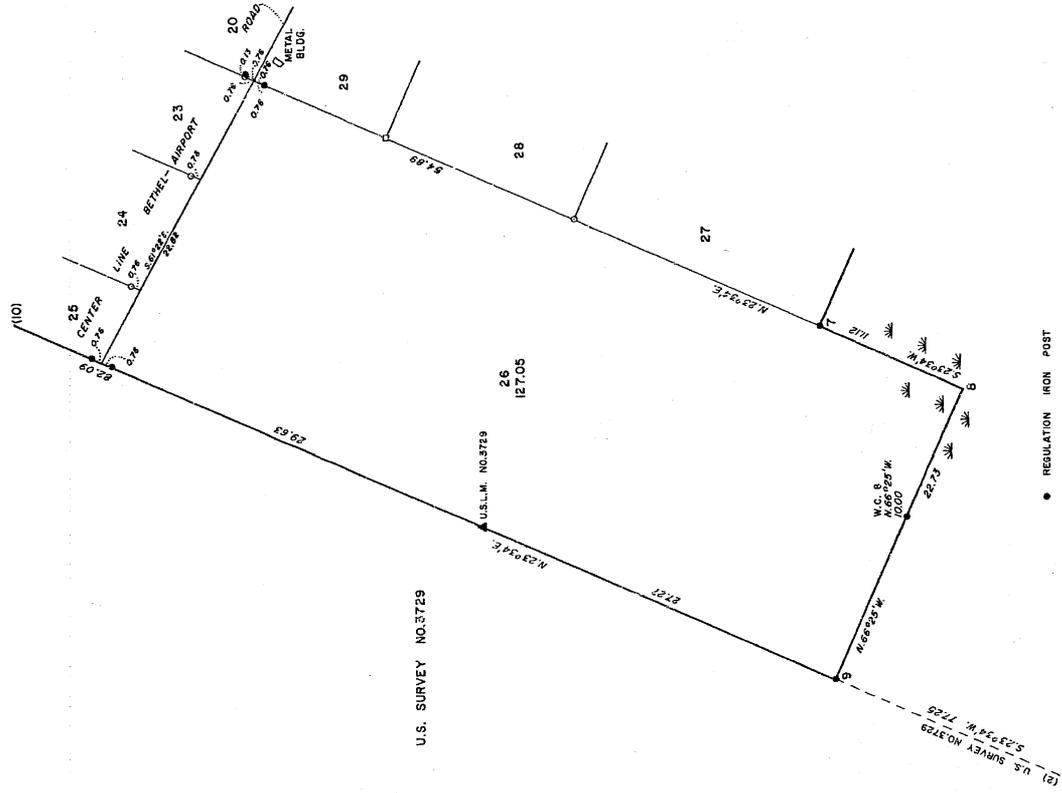


Sheet 3 of 5 sheets

U.S. SURVEY
NO. 4117, ALASKA

Reference should be made to Sheet No. 1.
for survey information.

Sheet 4 of 5 sheets



UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C.
May 2, 1966

This plan is strictly conformable to the approved field notes, and the survey, having been correctly conducted in accordance with the requirements of law and the regulations of this Bureau, is hereby accepted.

For the Director
R. L. Brown

Acting Chief, Division of Engineering

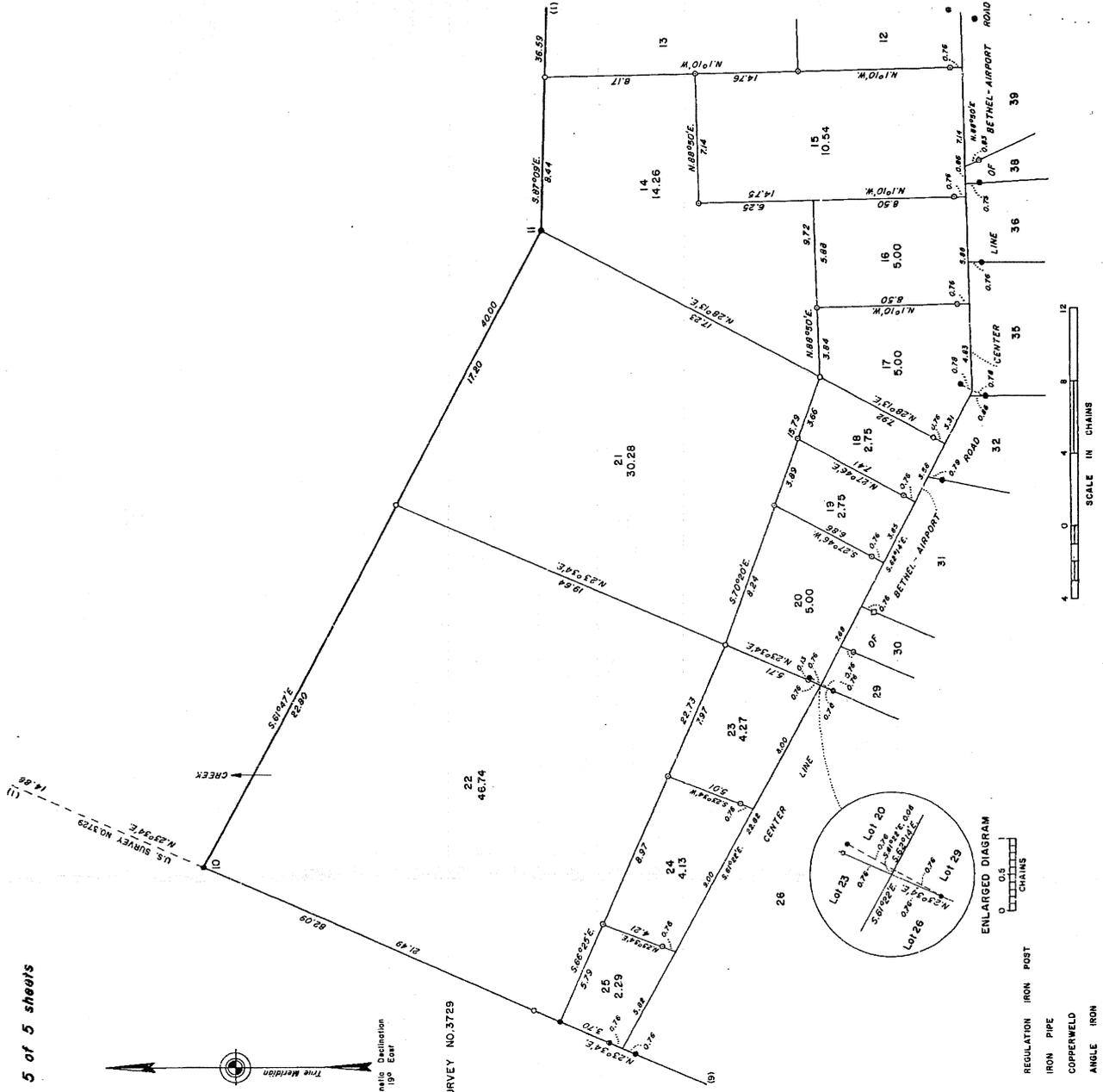
U. S. SURVEY
NO. 4117, ALASKA

Reference should be made to Sheet No. 1,
for survey information.

Sheet 5 of 5 sheets



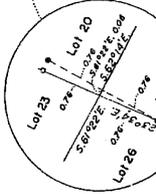
U. S. SURVEY NO. 3729



UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C.
May 9, 1966
This plat is strictly conformable to the approved field notes, and the survey, having been corrected to the requirements of law and the regulations of this Bureau, is hereby accepted.

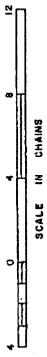
For the Director
R. L. Brown

Acting Chief, Division of Engineering



ENLARGED DIAGRAM

- REGULATION IRON POST
- IRON PIPE
- COPPERWELD
- ANGLE IRON



Officially Filed
 DATE, **DECEMBER 22, 1989**

ORIGINAL

**U.S. SURVEY
 No. 4117, ALASKA**

RETRACEMENT AND SUBDIVISION
 OF
 ORIGINAL LOT 35
 INTO LOTS 45, 46, AND 47
 SITUATED
 ON
 THE SOUTHERLY SIDE
 OF THE BETHEL AIRPORT ROAD
 APPROXIMATELY 2 MILES FROM
 THE BETHEL AIRPORT

GEOGRAPHIC POSITION

OF
 CORNER NO. 4, LOT 45
 IDENTICAL WITH CORNER NO. 1, LOT 46, 181;
 LATITUDE: 60°47'03.74" NORTH MAD 27
 LONGITUDE: 161°47'58.78" WEST

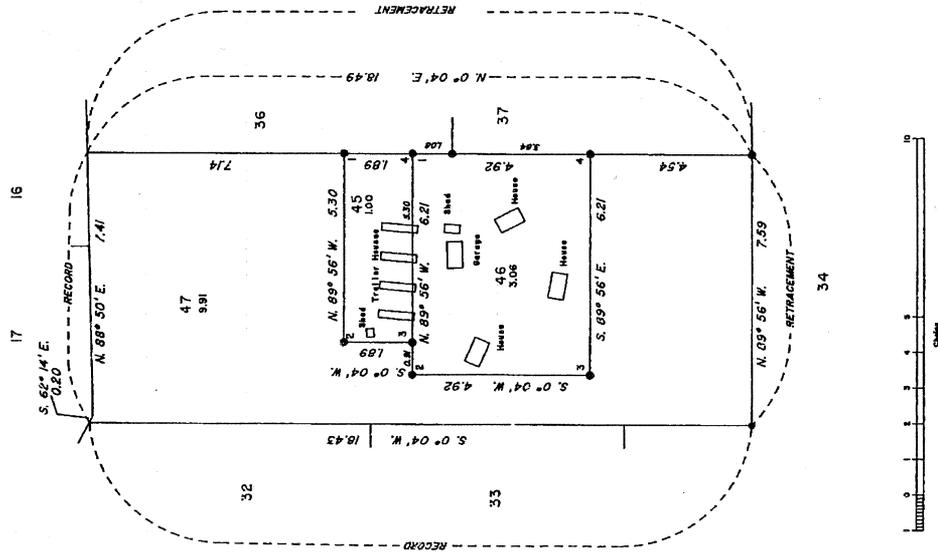
**SURVEYED
 BY**

BRUCE E. OGONOWSKI, CADASTRAL SURVEYOR
 SEPTEMBER 22 THROUGH SEPTEMBER 26, 1989
 UNDER SPECIAL INSTRUCTIONS
 FOR GROUP NO. 503, ALASKA
 DATED SEPTEMBER 14, 1989
 APPROVED SEPTEMBER 22, 1989
 SUPPLEMENTAL SPECIAL INSTRUCTIONS
 DATED SEPTEMBER 22, 1989
 APPROVED SEPTEMBER 22, 1989

UNITED STATES DEPARTMENT OF THE INTERIOR
 BUREAU OF LAND MANAGEMENT
 Anchorage, Alaska

The plat is hereby approved and approved field notes, and the survey, having been correctly established in accordance with the applicable laws and regulations of this Bureau, is hereby accepted.

For the Director
David C. Davis December 12, 1989
 (PRINTING)
 Deputy State Director for Cadastral Survey, Alaska



ORIGINAL

U. S. SURVEY
No. 4383, ALASKA

SITUATED
ON THE BETHEL AIRPORT ROAD
APPROXIMATELY FOUR MILES WEST
OF BETHEL, ALASKA

APPROXIMATE GEODETIC POSITION
AT REFERENCE MONUMENT NO. 1

LATITUDE $60^{\circ} 47' 40''$ N., LONGITUDE $161^{\circ} 50' 20''$ W.

AREA: 28.50 ACRES

SURVEYED BY:

HAROLD O. TEMME, SUPERVISORY CADASTRAL SURVEYOR
JUNE 19 TO 21, 1965

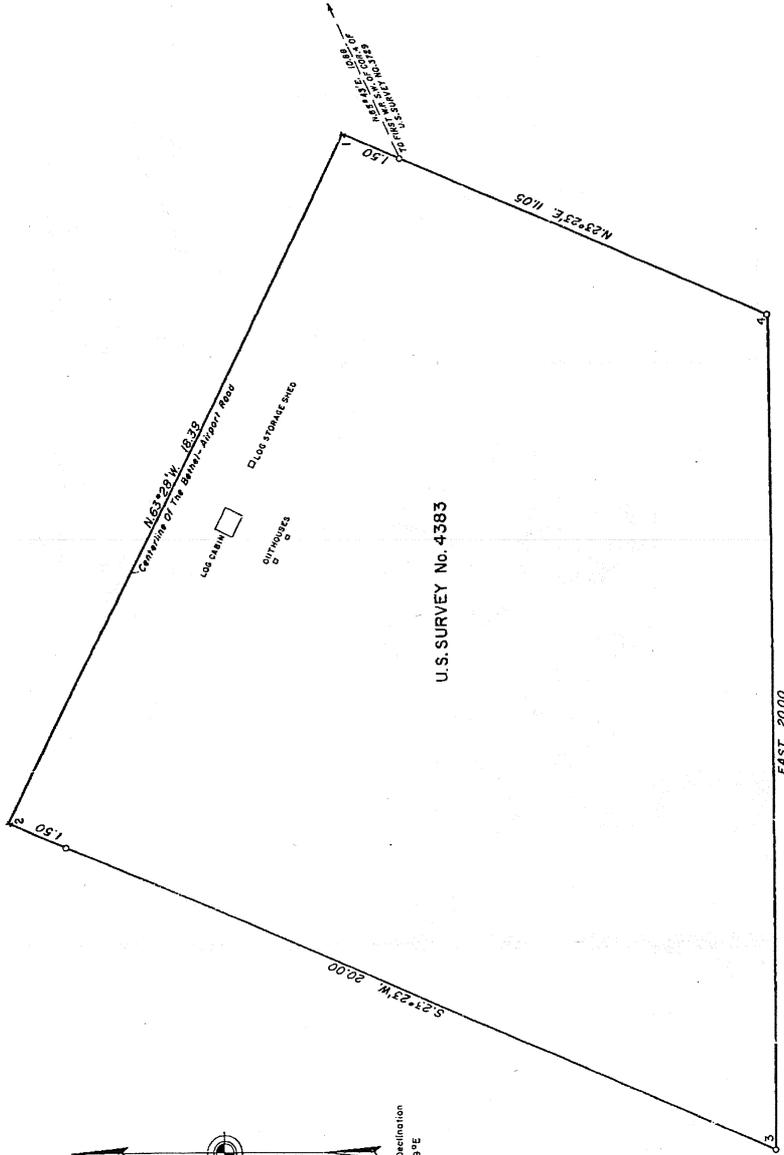
Under Special Instructions
Dated November 16, 1964, and
Approved December 31, 1964

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C. August 4, 1966

This plat is strictly conformable to the approved field notes, and in accordance with the requirements of law and the regulations of Title B. said, is hereby accepted.

For the Director

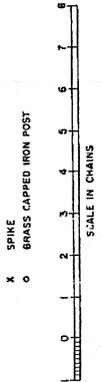
[Signature]
Chief, Division of Engineering



U.S. SURVEY No. 4383



Magnetic Declination
1962



177

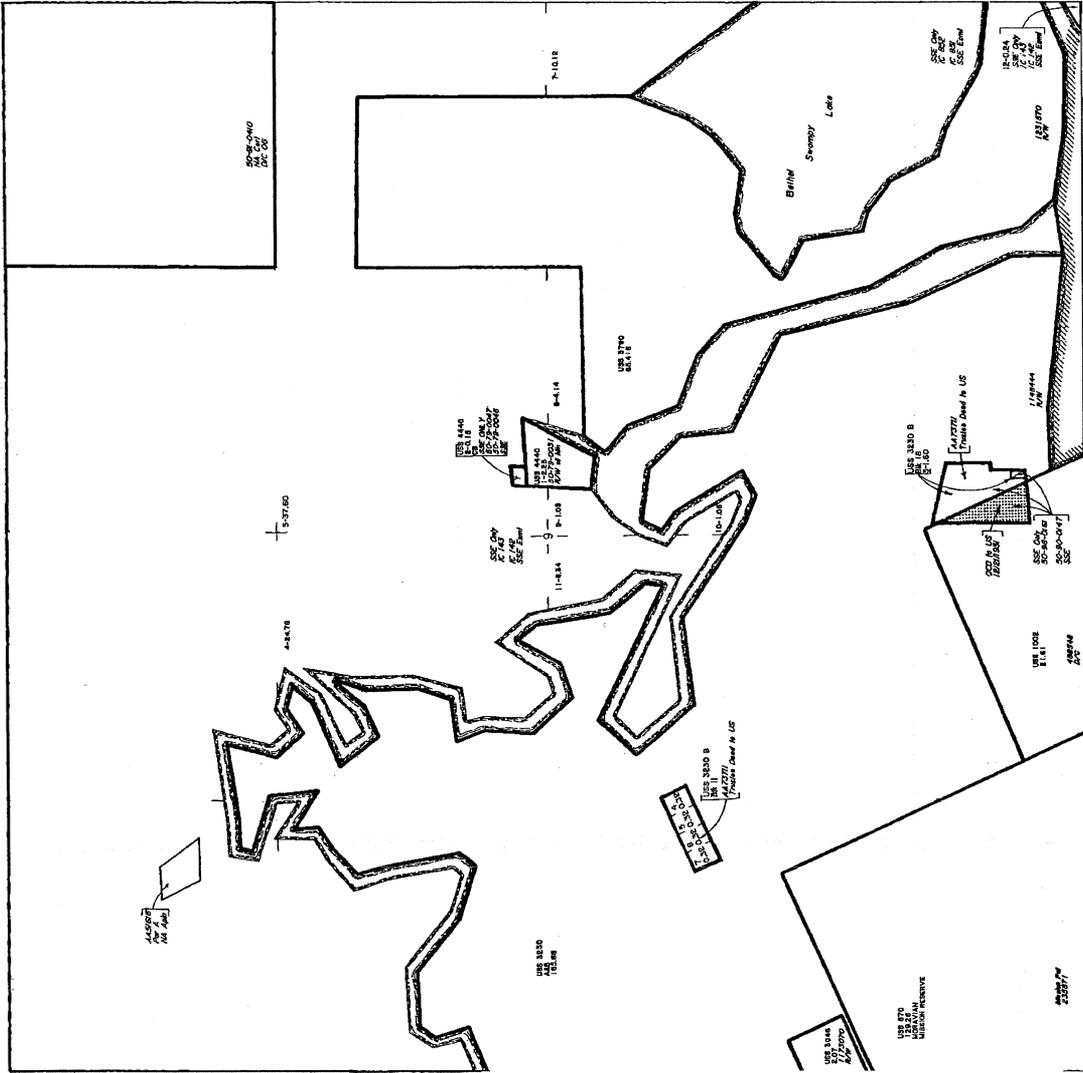
PARTIALLY SURVEYED TOWNSHIP 8 NORTH RANGE 71 WEST OF THE SEWARD MERIDIAN, ALASKA

PROTRACTION DIAGRAM NO. 59-10 OFFICIALLY FILED

STATUS OF PUBLIC DOMAIN
LAND AND MINERAL TITLES

MTP
SUPPL SEC 9

NO. 1
FOR ORDERS EFFECTING DISPOSAL OR USE OF UN-
RESERVED LAND AND MINERAL RIGHTS IN THE
MTP SUPPL SEC 9, REFER TO THE PUBLIC PURPOSES
REFER TO INDEX OF MISCELLANEOUS DOCUMENTS.
PL 92-203 AND F14838, 108 W/2 F14839-A, F14839-A2
PL 92-204 AND F14838, 108 W/2 F14839-A, F14839-A2
F14839-A2 1/2 NW 1/4
SECS 7-10 & 1052, 4449
PL 95-487 AND TOWN CHARTER WITHIN TO



NOTES:
This plan is the Surveyor's Record of Title and should be used
only when the land is being surveyed or when the Surveyor
has been authorized to do so. It is not to be used for any other
purpose. Refer to the cadastral maps for further information.

SCALE IN CHAINS
5 10 15

NO. 1
CURRENT TO AVOCS FMS
12-23-2002
Sew Mer
T 8 N
R 71 W

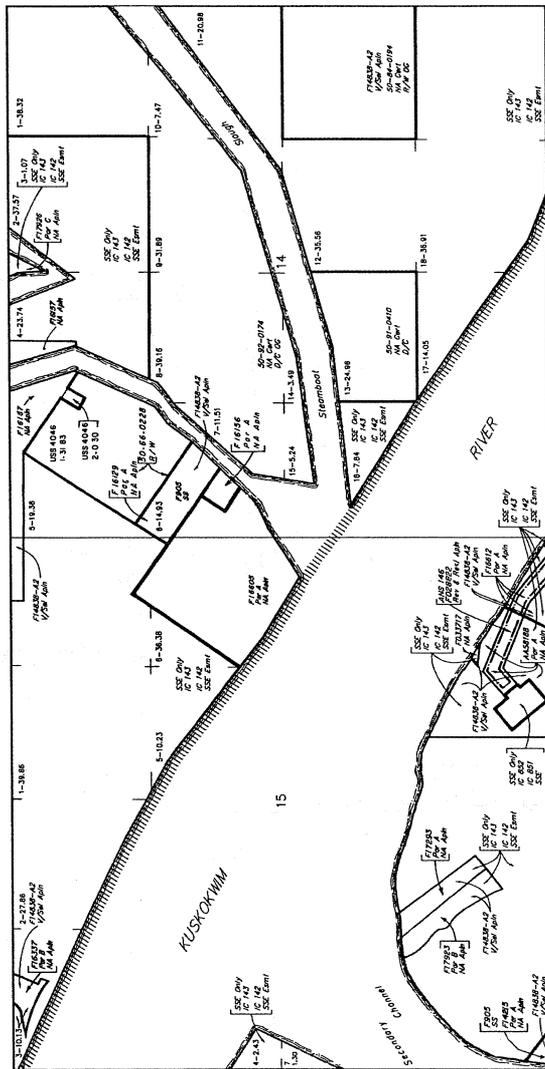
PARTIALLY SURVEYED TOWNSHIP 8 NORTH, RANGE 71 WEST OF THE SEWARD MERIDIAN, ALASKA

PROTRACTION DIAGRAM NO. 89-10 OFFICIALLY FILED 6/25/1959

STATUS OF PUBLIC DOMAIN
LAND AND MINERAL TITLES

MTP SUPPL SECS 14, 15

- NO. 3
FOR ORDERS EFFECTING CORRECTION OR USE OF UN-
SUPPORTED TITLES FOR FEDERAL, STATE, OR LOCAL
MINERALS WATER AND/OR OTHER PUBLIC PURPOSES
REFER TO INDEX OF MISCELLANEOUS DOCUMENTS
- P.L.O. 3184 Not Co affected 1887/Intervests not conveyed
- P.L. 92-203 Not F14839, L18 W1/ F14839-A, F14839-A2
- Sect 1-36
- P.L. 96-487 Not Yukon Data NHP entire ID
Cancellation of US 2639 7/27/97 does not affect
Title to Lts conveyed in 10, 142, 143, 145, 146, 147, 148, 149



NO. 3	NO. J
CURRENT TO	See Mer
12-23-2002	T B N
	R 71W

WARNING:
This plan is the Engineer's Report of Title and should be used
only for the purposes stated. It does not constitute a warranty
of title and does not protect the interests of any party herein.
Refer to the appropriate records for additional survey information.



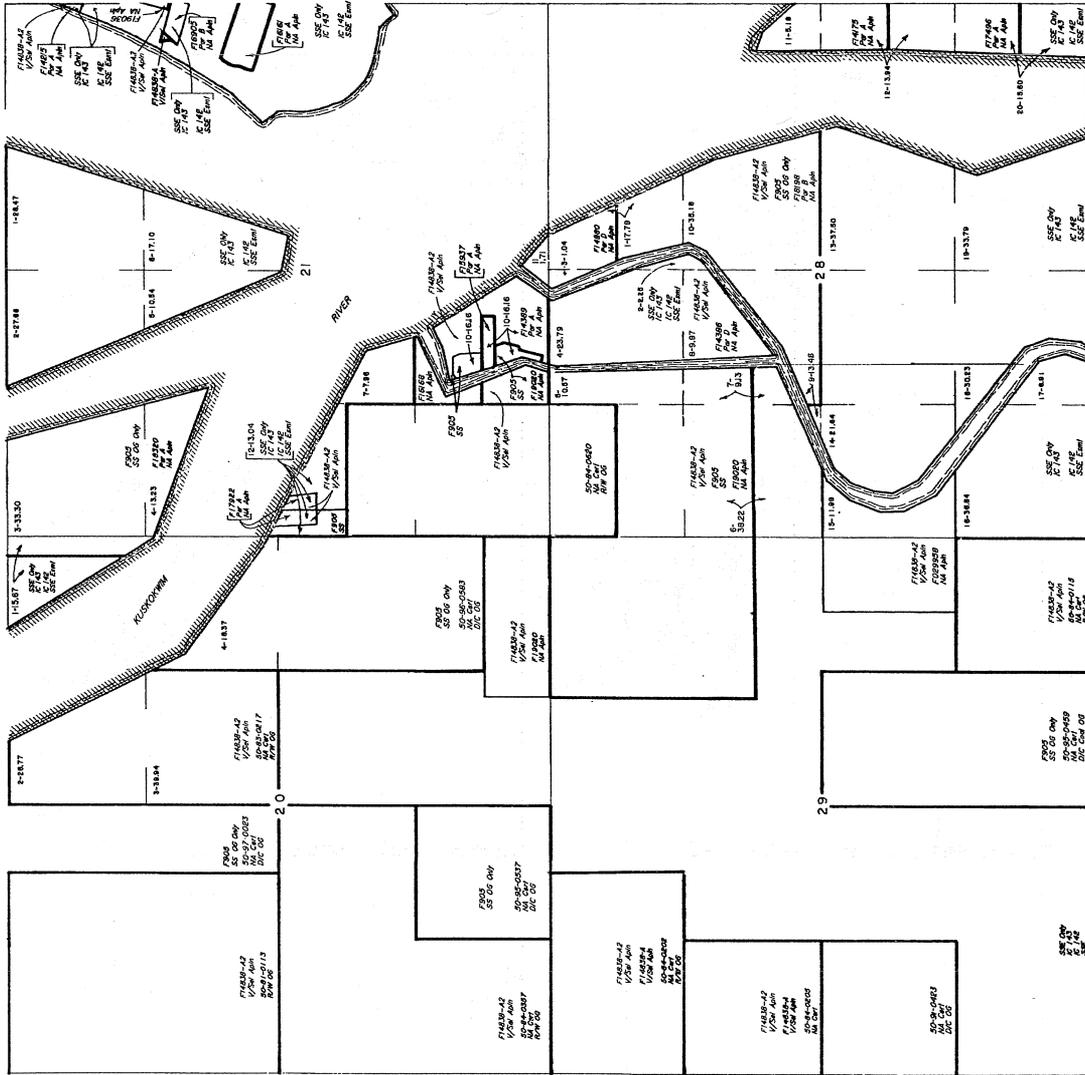
PARTIALLY SURVEYED TOWNSHIP 8 NORTH, RANGE 71WEST OF THE SEWARD MERIDIAN, ALASKA

PROTRACTION DIAGRAM NO. S9-10 OFFICIALLY FILED 6/29/1959

STATUS OF PUBLIC DOMAIN
LAND AND MINERAL TITLES

MTP SUPPL
SECS 20, 21, 28, 29

NO. 4
FOR ORDERS EFFECTING DISPOSAL OR USE OF UN-IDENTIFIED LANDS WITHDRAWN FOR CLASSIFICATION MINERALS, WATER AND/OR OTHER PUBLIC PURPOSES REFER TO INDEX OF MISCELLANEOUS DOCUMENTS.
P.L.O. STATE WELLS EFFECTS LEGISLATION NOT COMPLETED
PL 92-203 HAS 714838, LOC. W/1 714838-A, 714838-2
714838-22 1/2 SW 1/4 Sec. 20, W/1
PL 92-487 HAS 714838, LOC. W/1 714838-A, 714838-2
714838-22 1/2 SW 1/4 Sec. 20, W/1
PL 92-487 HAS 714838, LOC. W/1 714838-A, 714838-2
714838-22 1/2 SW 1/4 Sec. 20, W/1
CONSIDERATION OF USE 70539, 7271892, DOES NOT AFFECT
HOW TO USE CONSIDERED IN AC. 142, U.C. 143.



WARNING: This diagram is a reproduction of the original survey map and should be used only as a guide to the location of the land. It does not constitute a warranty for the accuracy of the information shown. The user is responsible for verifying the accuracy of the information shown. The user is also responsible for obtaining the necessary permits for the use of the land.

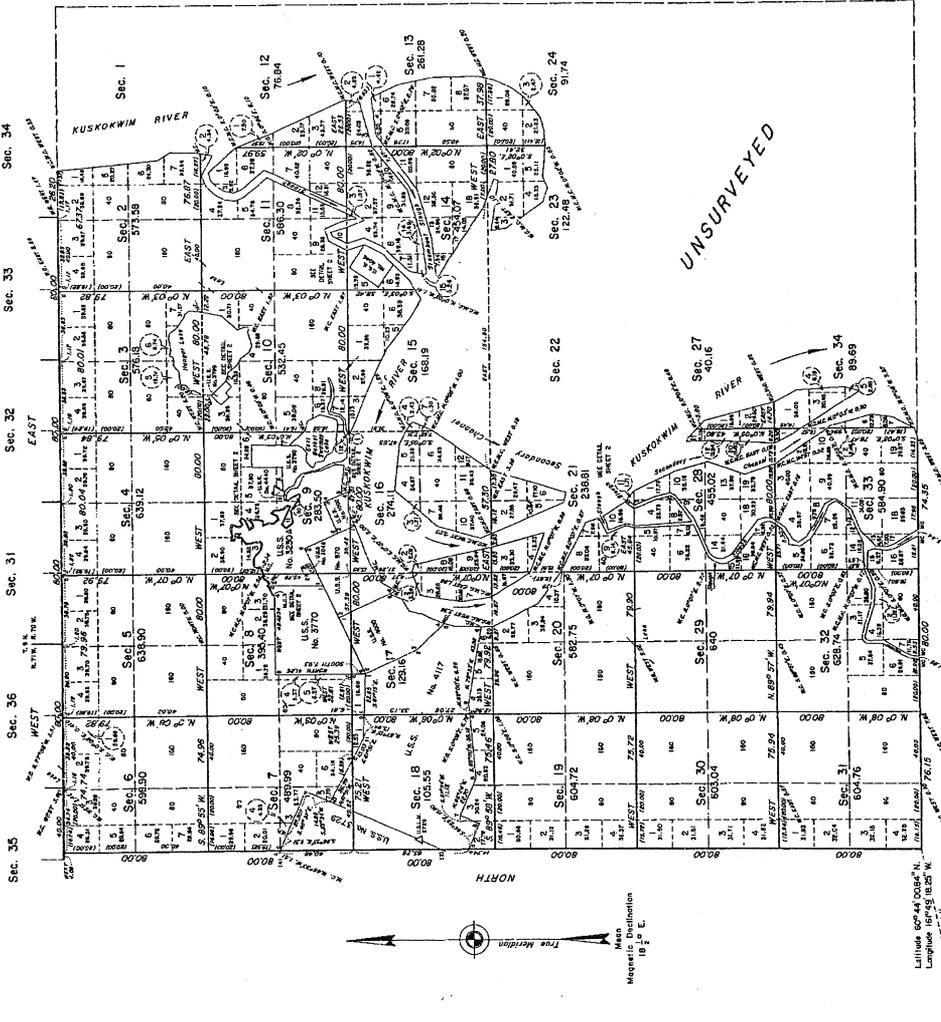
SCALE IN CHAINS
0 10 20 30 40 50 60 70 80

CURRENT TO: FWS, AICP
12-23-2002

NO. 4
S M B N
R 71 W
14

TOWNSHIP 8 NORTH, RANGE 71 WEST, OF THE SEWARD MERIDIAN, ALASKA

SECOND STANDARD PARALLEL NORTH



The Second Standard Parallel North along a portion of the north boundary and the west boundary were surveyed concurrently with the adjoining townships under this group. This plat, in two sheets, represents the survey of a portion of the south boundary and a portion of the subdivision lines of T. 8 N., R. 71 W., Seward Meridian, Alaska.

Survey conducted by Edward T. Frensdorff, Supervisory Cadastral Surveyor, June 24, 1976, under Special Instructions dated April 2, 1973, for Group No. 140, Alaska.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D.C. June 24, 1976

This plat is strictly conformable to the approved field notes, and the survey, having been correctly executed in accordance with the instructions and the regulations of this Bureau, is hereby accepted.

For the Director

[Signature]

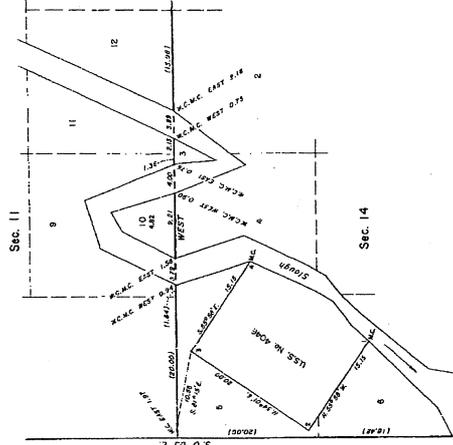
Acting Chief, Division of Cadastral Survey

SCALE IN CHAINS
Also surveyed: 12,070.33 cent.

Latitude 66° 44' 00.84" N
Longitude 157° 51' 52.27" W
MAGNETIC DECLINATION
18.2° E

Vol. 15/5 p. 1

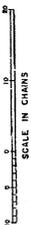
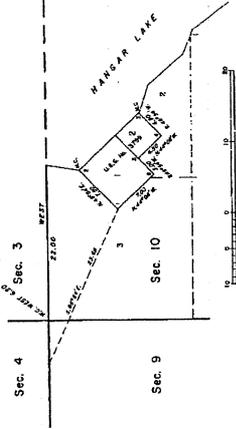
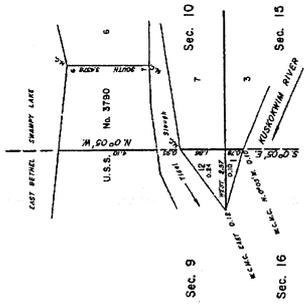
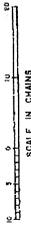
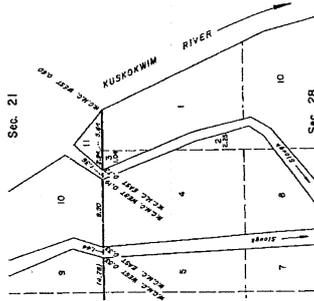
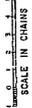
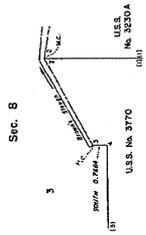
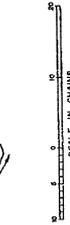
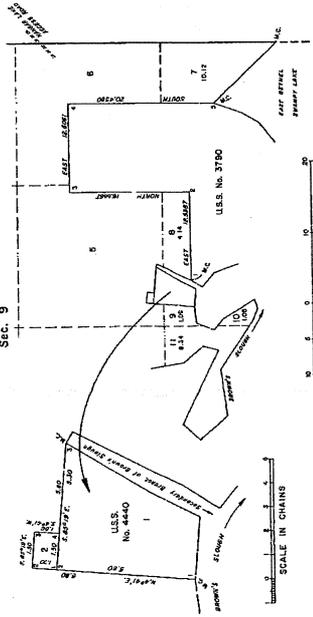
TOWNSHIP 8 NORTH, RANGE 71 WEST, OF THE SEWARD MERIDIAN, ALASKA DETAILS



Reference should be made to Sheet No. 1 for survey information.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D.C.
June 24, 1976
This plat is attested to be correct in accordance with the requirements of law and the regulations of this Bureau, and is hereby accepted.
For the Director

[Signature]
Acting Chief, Division of Geodetic Survey

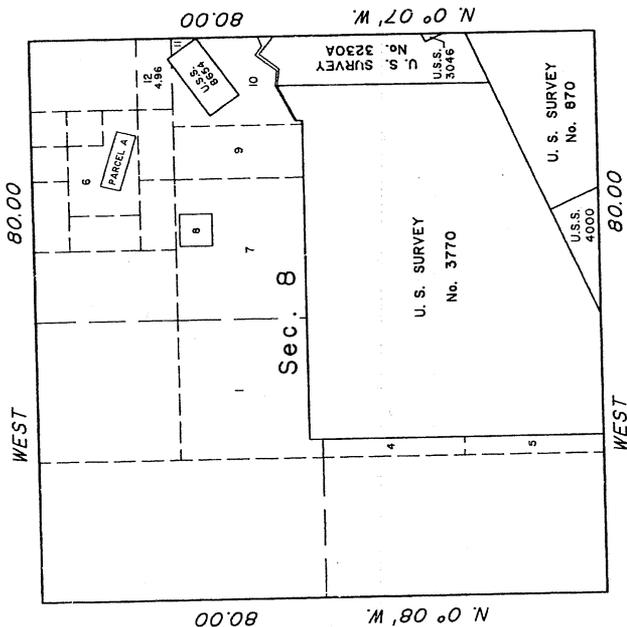


Officially Filed

DATE, JULY 17, 1995

TOWNSHIP 8 NORTH, RANGE 71 WEST, OF THE SEWARD MERIDIAN, ALASKA SUPPLEMENTAL PLAT

This supplemental plat of section 8, Township 8 North, Range 71 West, Seward Meridian, Alaska, shows an amended plat of section 8, Township 8 North, Range 71 West, Seward Meridian, Alaska, as shown on the supplemental plat of Township 8 North, Range 71 West, Seward Meridian, Alaska, accepted June 24, 1976. This supplemental plat is based upon the original survey records of Township 8 North, Range 71 West, Seward Meridian, the plat Seward Meridian, Alaska, accepted June 24, 1976; the supplemental plat of Township 8 North, Range 71 West, Seward Meridian, Alaska, accepted June 24, 1976; and this supplemental plat of Township 8 North, Range 71 West, Seward Meridian, Alaska, accepted March 30, 1995.



Acceptance of this survey does not purport to transfer any interest in submergible lands to the United States under the Act of March 3, 1879, and Section 6(m) of the Public Ranges and Section 6(m) of the Alaska Statehood Act, P.L. 85-508, notwithstanding the use, location, or absence of meander lines to depict water bodies.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Anchorage, Alaska

This supplemental plat is based upon the official records of the Bureau of Land Management and in accordance with the regulations of this Bureau, is hereby accepted.

For the Director

Debra J. Christ
12 July 1995
DJS

Deputy State Director for Cadastral Survey,
Alaska



Officially Filed

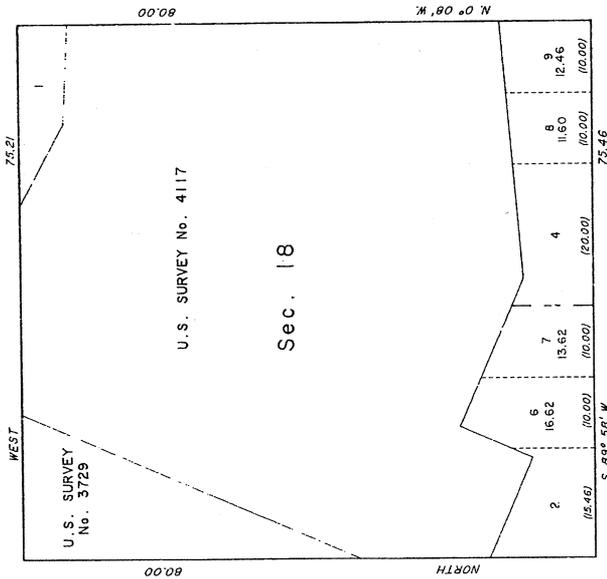
DATE AUGUST 14, 1989

ORIGINAL

TOWNSHIP 8 NORTH, RANGE 71 WEST, OF THE SEWARD MERIDIAN, ALASKA

SUPPLEMENTAL PLAT

This supplemental plat shows amended lottings in original Lots 3 and 5; creating Lots 6, 7, 8, and 9. These amended lottings are based upon the plat of Township 8 North, Range 71 West, Seward Meridian, Alaska, accepted June 24, 1976.



UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
ANCHORAGE, ALASKA

This supplemental plat is based upon the official records and, having been correctly prepared in accordance with the regulations of this Bureau, is hereby accepted.

For the Director

James T. Johnson
August 22, 1989
James T. Johnson
Alaska State Director for Cadastral Survey,
Alaska

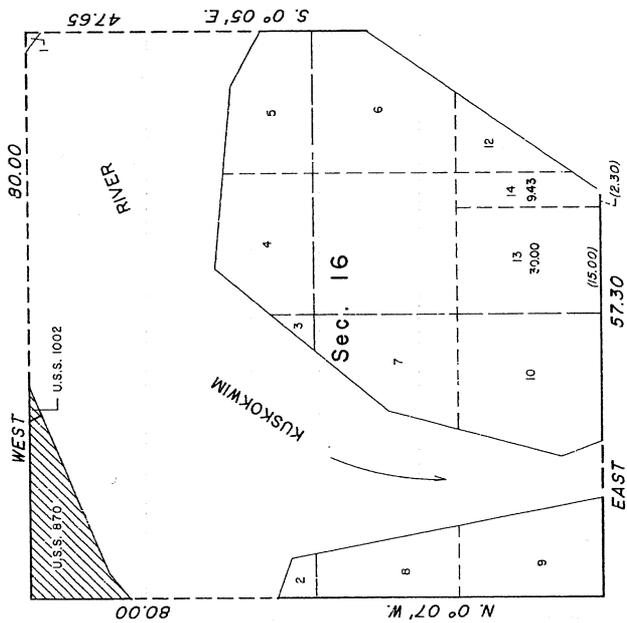
Officially Filed

DATE - MARCH 17, 1992 - - -

TOWNSHIP 8 NORTH, RANGE 71 WEST, OF THE SEWARD MERIDIAN, ALASKA

SUPPLEMENTAL PLAT

This supplemental plat of section 16 of Township 8 North, Range 71 West, Seward Meridian, Alaska, showing the subdivision of original Lot 11 into Lots 13 and 14 is based upon the plat of Township 8 North, Range 71 West, Seward Meridian, Alaska, accepted June 27, 1976.



Acceptance of this survey does not purport to include or affect the validity of any other survey or plat of land in Alaska which the State of Alaska is entitled under the Equal Footing Doctrine and Section 6(a) of the Alaska Statehood Act, P.L. 85-508, notwithstanding the fact that the same do not encroach upon the boundaries of former lines to depict water bodies.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Anchorage, Alaska

This supplemental plat is based upon the official records and has been accepted in accordance with the regulations of this Bureau, is hereby accepted.

For the Director

John W. Tompkins
Date: March 14, 1992

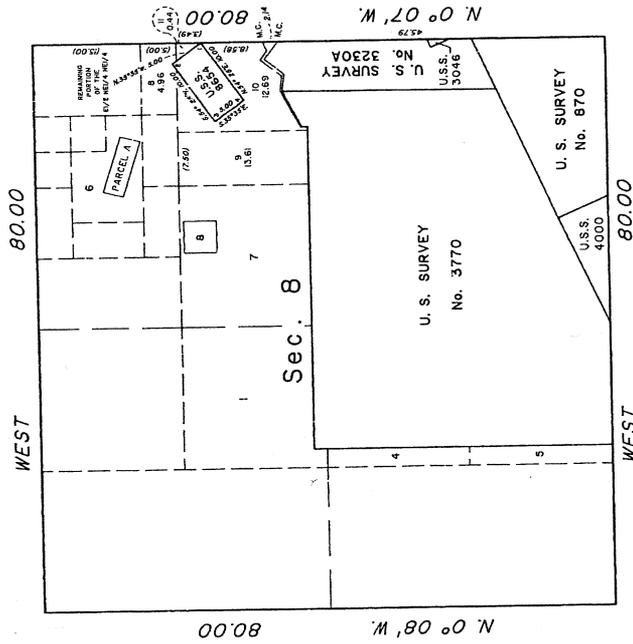
Deputy State Director for Cadastral Survey,
Alaska

Officially Filed

DATE MAY 1, 1995

TOWNSHIP 8 NORTH, RANGE 71 WEST, OF THE SEWARD MERIDIAN, ALASKA SUPPLEMENTAL PLAT

This supplemental plat of section 8, Township 8 North, Range 71 West, Seward Meridian, Alaska, is based upon the plat of section 8, Township 8 North, Range 71 West, Seward Meridian, Alaska, created by the segregation of U.S. Survey No. 8654 in the plat of section 8, Township 8 North, Range 71 West, Seward Meridian, Alaska, based upon the plat of section 8, Township 8 North, Range 71 West, Seward Meridian, Alaska, accepted April 18, 1976, and the supplemental plat of section 8, Township 8 North, Range 71 West, Seward Meridian, Alaska, accepted April 18, 1976, and the Plat of U.S. Survey No. 8654 accepted December 17, 1989.



Acceptance of this survey does not purport to transfer title in the lands to the State of Alaska. The State of Alaska is entitled under the Equal Footing Doctrine and Section 6(a) of the Alaska Statehood Act, P.L. 86-501, notwithstanding the fact that the absence of meander lines to depict water bodies.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Anchorage, Alaska

This supplemental plat is based upon the original surveying records correctly obtained in accordance with the regulations of this Bureau, and is hereby accepted.

For the Director

Max J. Vinkler
Deputy State Director for Cadastral Survey,
Alaska



PLAT

OF
U. S. SURVEY NO. 1002

OF THE
TRADING SITE

UNDER ACT OF MAY 14, 1808
As Amended by Act of March 9, 1903
OF

Joaquin, Twitchell and Fowler

SITUATE
On right bank of Kuskokwim River adjoining the
Bethel Mission on the N.E.

DISTRICT OF ALASKA

SCALE 300 CHS TO INCH
NADATION 20/45 E EAST
AREA 27.61 ACRES

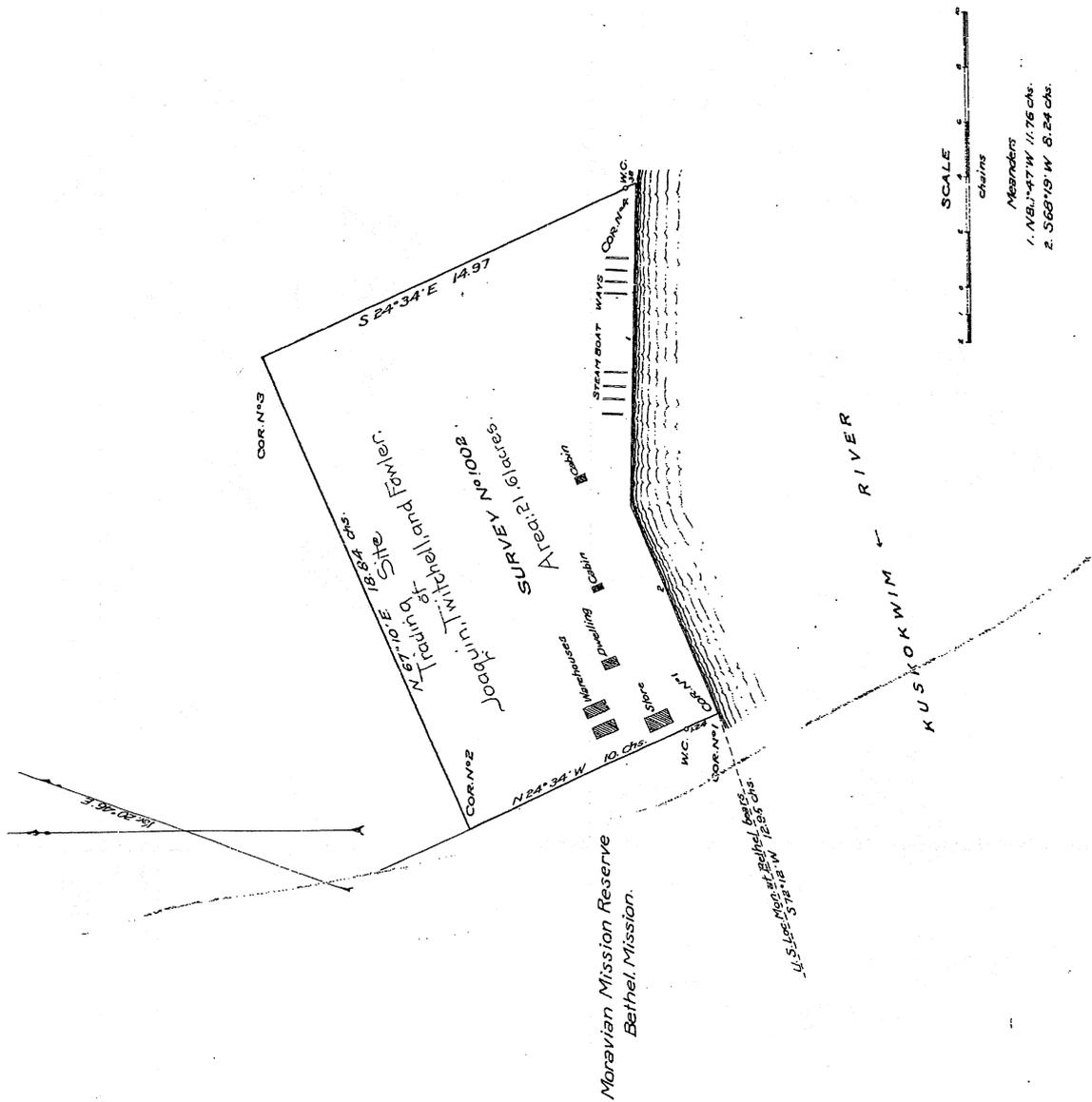
SURVEYED BY
AS
Clinbn Gurnee
U. S. DEPUTY SURVEYOR
June 19, 1908

The original field notes of the survey of the Trading Site
of Joaquin, Twitchell and Fowler, which this plat has been
made, have been examined and approved, and are on file in this office,
and I hereby certify that they furnish such an accurate description of
said claim as will, if incorporated into a patent, serve fully to identify
the premises, and that such reference to the original field notes of the
said survey is not necessary to identify the premises and for the LOCUS
hereof.

And I further certify that this is a correct plat of said claim, made
in conformity with said original field notes of the survey thereof.
And the same is hereby approved.

Surveyor General's Office.

Witness, Alaska, *April 2, 1910.*
M. G. Smith
Surveyor General of the District of Alaska



SCALE
chains

Meters
1. N 61° 47' W 11.76 Chs.
2. S 69° 19' W 8.24 Chs.

U. S. SURVEY No. 3046, ALASKA

Situated
In the Village of Bethel, Alaska,
northwest of U. S. Survey No. 870

in
Latitude $60^{\circ}47'48.82''$ N. Longitude $161^{\circ}46'06.24''$ W.
At U. S. Location Monument No. 3046

Area: 2.07 Acres

Surveyed By
John H. Short, Cadastral Engineer
September 21, 1952
Under Special Instructions Dated
September 5, 1950 and Approved
September 22, 1950

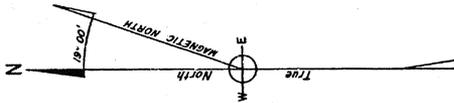
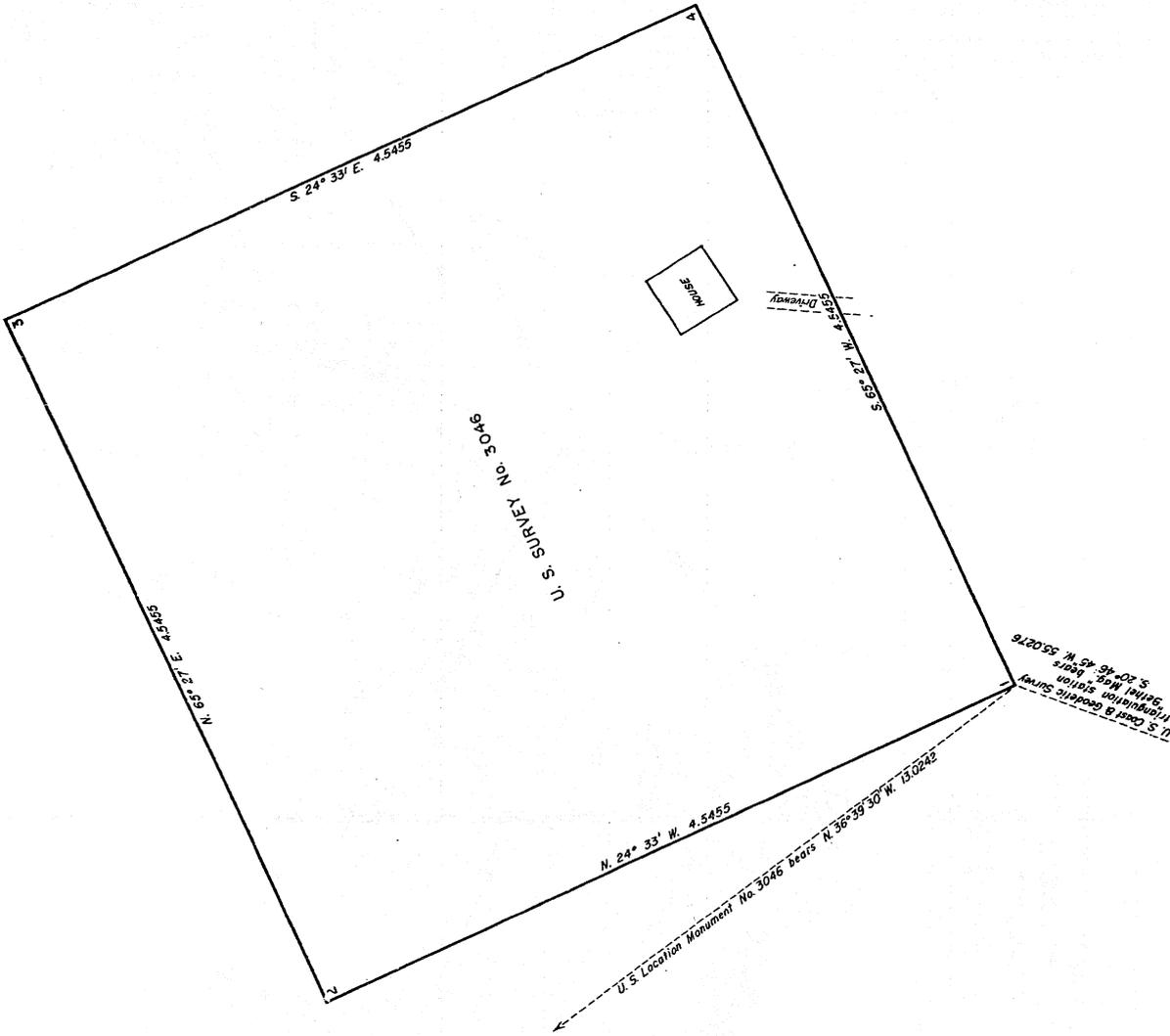
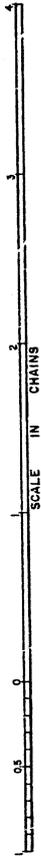
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C., July 7, 1953

This plat is strictly conformable to the approved
field notes, and the survey, having been correctly
checked, approved, and accepted, and
and the regulations of this Bureau, is hereby accepted.

For the Administrator

Donald B. Cunniff
Assistant Chief, Division of
Cadastral Engineering

DS-455
MS/200



U. S. SURVEY
No. 3230 A (Boundaries)
 AND
3230 B (Subdivision)

TOWNSITE OF BETHEL, ALASKA
 SITUATED
 ON NORTHERLY BANK OF KUSKOKWIM RIVER
 LATITUDE 60° 47' 48.92" N., LONGITUDE 161° 46' 06.24" W.,
 AT U. S. LOCATION MONUMENT No. 3046
 TOTAL AREA U. S. S. No. 3230A--167.95 ACRES
 U. S. S. No. 3046----6.07
 NET AREA----166.88

Surveyed by John M. Short, Cadastral Engineer
 under special instructions dated August
 11, 1932 and approved September 3, 1932
 U. S. DEPARTMENT OF THE INTERIOR
 BUREAU OF LAND MANAGEMENT
 Washington, D. C. January 4, 1934

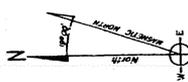
This plat is strictly conformable to the approved
 field notes and the survey having been correctly executed
 in accordance with the requirements of law and regulations
 of this bureau, is hereby accepted.
 For the Director

John M. Short
 Cadastral Engineer
 Division of Cadastral Engineering

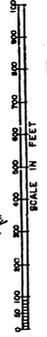
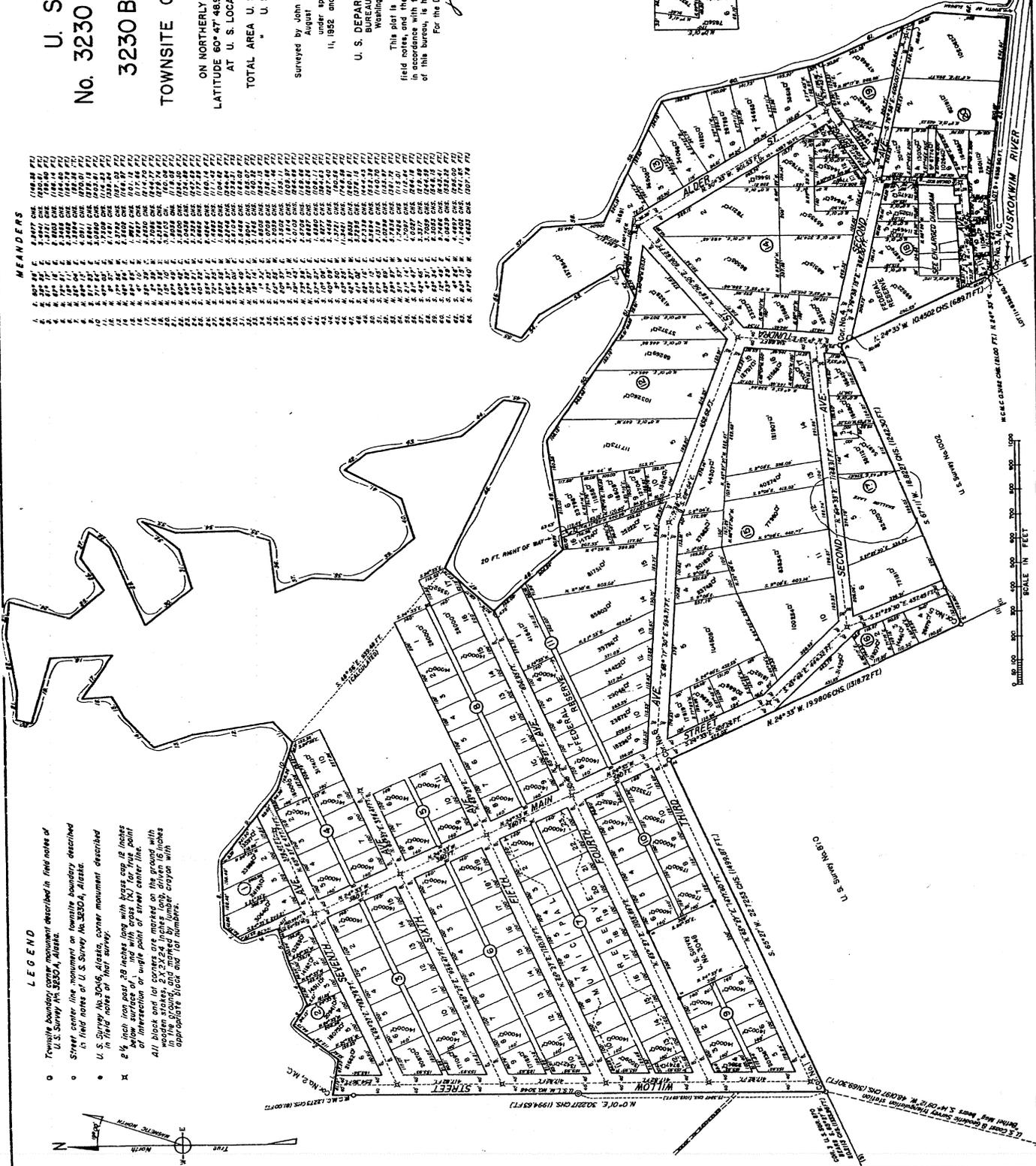
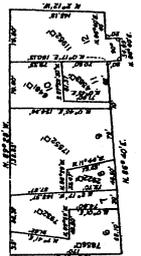
MEASUREMENTS

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9	100.00	100.00	100.00	100.00
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58	100.00	100.00	100.00	100.00
59	100.00	100.00	100.00	100.00
60	100.00	100.00	100.00	100.00
61	100.00	100.00	100.00	100.00
62	100.00	100.00	100.00	100.00
63	100.00	100.00	100.00	100.00
64	100.00	100.00	100.00	100.00

- LEGEND**
- Townsite boundary corner monument described in field notes of U. S. Survey No. 3230A, Alaska.
 - Street center line monument on townsite boundary described in field notes of U. S. Survey No. 3230A, Alaska.
 - U. S. Survey No. 3046, Alaska, corner monument described in field notes of that survey.
 - ✕ 2 1/2 inch iron post, 28 inches long with brass cap 12 inches below surface of ground, and with cross bar central line of intersection or single point marked on the ground with 2 1/2 inch brass spike 100, driven 16 inches in the ground, and marked by lumber crayon with appropriate block and nail numbers.



ENLARGED DIAGRAM
 PORTION OF BLOCK 16



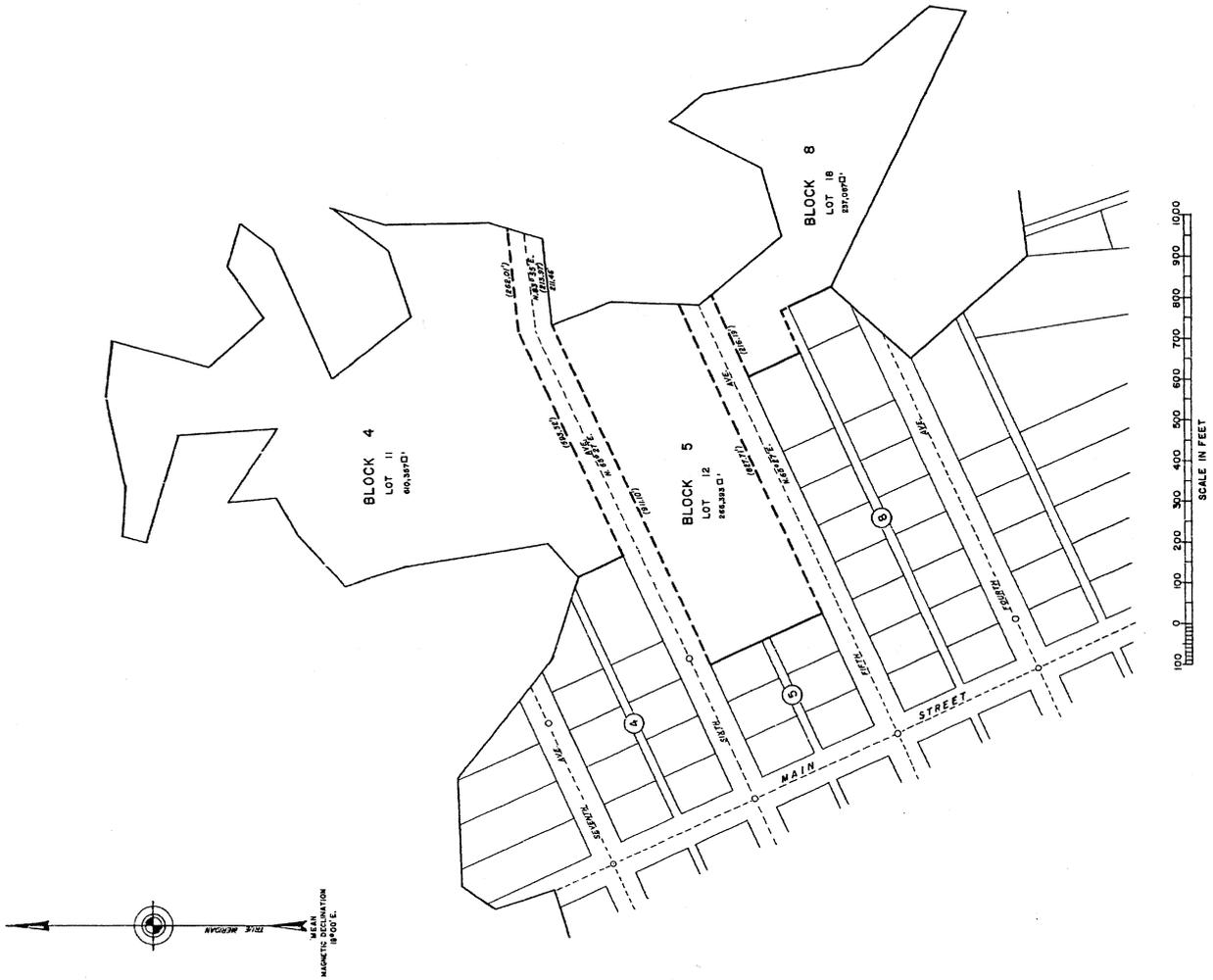
SUPPLEMENTAL PLAT
 U. S. SURVEY
 No. 3230 B, ALASKA
 TOWNSITE OF BETHEL
 Showing Additional Subdivision
 & Area in Blocks 4, 5, & 8

This supplemental plat of U. S. Survey No. 3230 B (Subdivision) shows the retracement of Blocks 4, 5, and 8 to include the unplatted portion of the Townsite of Bethel as shown on the original townsite plat with resultant lottings and areas, and is based on plat accepted January 4, 1954.

UNITED STATES DEPARTMENT OF THE INTERIOR
 BUREAU OF LAND MANAGEMENT
 Washington, D. C. May 6, 1959

This plat, showing amended lottings, is based upon the official records, and having been correctly prepared in accordance with the regulations, is hereby accepted.

For the Director
Earl S. Harrington
 Cadastral Engineering Staff Officer



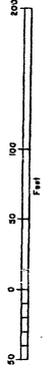
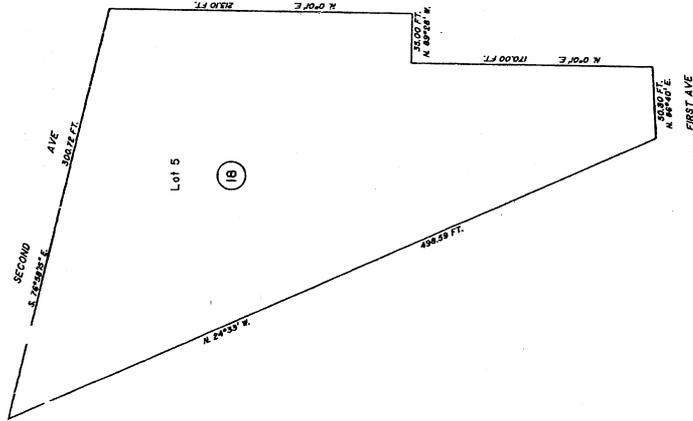
Officially Filed

ORIGINAL

DATE - FEBRUARY 5, 1990

U.S. SURVEY
No. 32308, ALASKA
SUPPLEMENTAL PLAT
TOWNSITE OF BETHEL, ALASKA

This supplemental plat of Lot 5, Block 18, U.S. Survey No. 32308, Townsite of Bethel, Alaska, shows the location FEDERAL RESERVE from Lot 5, Block 18, U.S. Survey No. 32308, U.S. Survey No. 32308, Alaska, accepted January 1, 1984.



UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Anchorage, Alaska

This supplemental plat is based upon the official survey and is hereby accepted in accordance with the regulations of this Bureau, is hereby accepted.

For the Director

J. W. Pinkston
February 2, 1990
Deputy State Director for Cadastral Survey,
Alaska

ORIGINAL

U.S. SURVEY NO. 3729, ALASKA

SITUATED
APPROXIMATELY 2 MILES WEST OF BETHEL, ALASKA
AND
THE ESTABLISHMENT OF U.S. LOCATION MONUMENT NO. 3729

APPROXIMATE GEOGRAPHIC POSITION
LATITUDE $60^{\circ}16' N$ LONGITUDE $161^{\circ}48' W$

AREA: 1055.91 ACRES

SURVEYED BY
RAY HARVEY, CADASTRAL SURVEYOR
SEPTEMBER 1, 1959 TO MAY 24, 1960
UNDER SPECIAL INSTRUCTIONS
DATED AUGUST 3, 1959

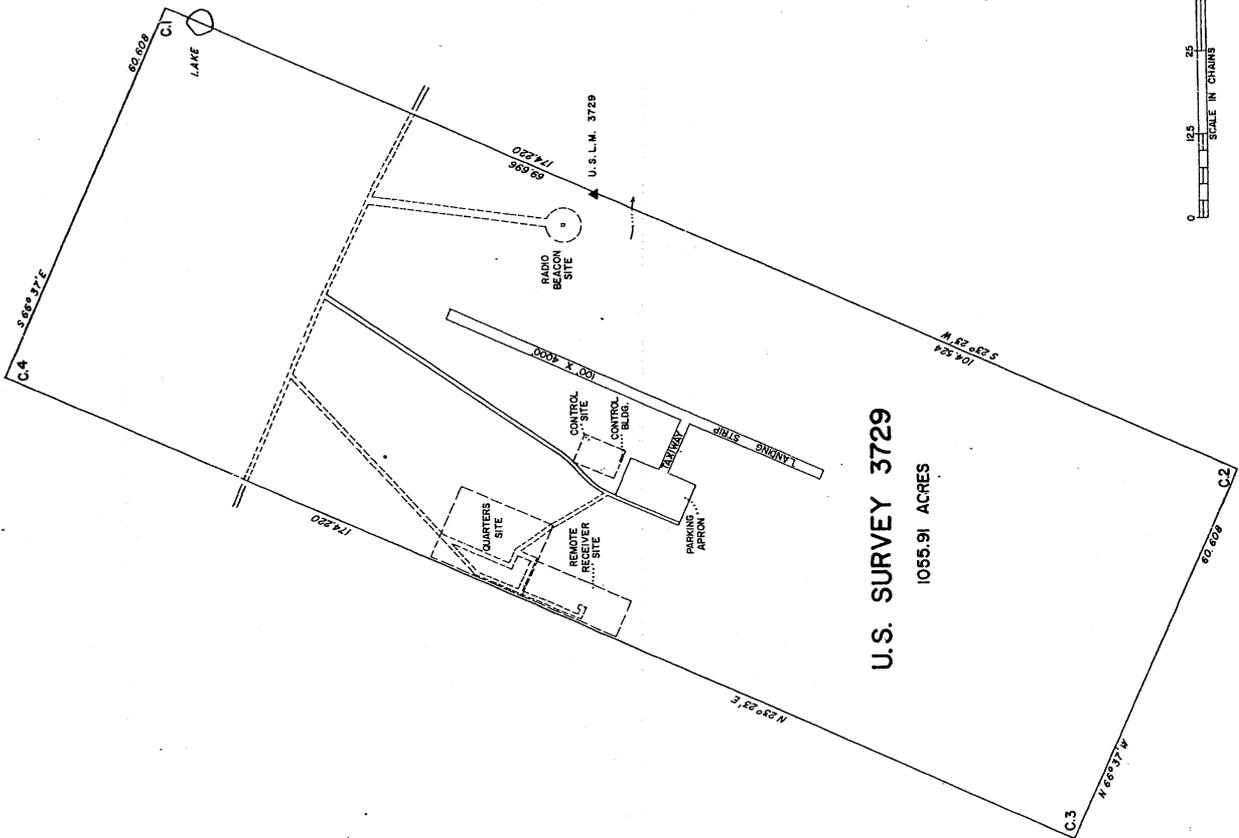
AND
APPROVED AUGUST 6, 1959

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D.C. October 19, 1961

This plat is strictly conformable to the approved field notes and other data being referred to herein and is prepared in accordance with the requirements of law and the regulations of this Bureau, is hereby accepted.

For the Director

E. J. ...
Chief, Division of Engineering



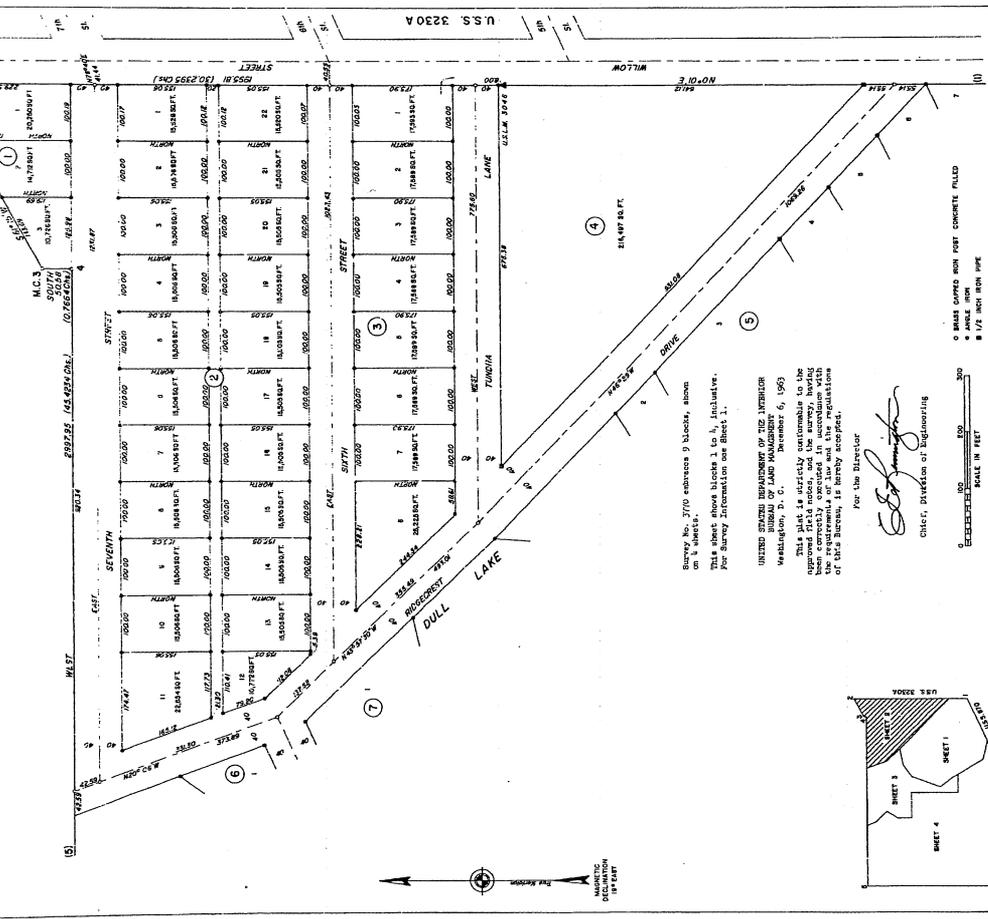
U.S. SURVEY 3729
1055.91 ACRES



ORIGINAL

Sheet 2 of 4 Sheets

U.S. SURVEY No. 3770 NORTHWEST ADDITION TO THE TOWNSITE OF BETHEL, ALASKA



Burvey No. 3770 embraces 9 blocks, shown on 4 sheets.
This plan shows blocks 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

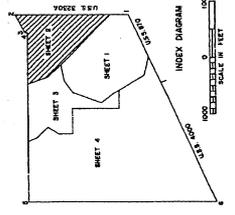
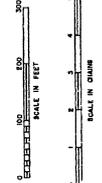
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C. December 6, 1965

This plat is strictly conformable to the requirements of law and the regulations of the Bureau, in every respect.

For the Director

[Signature]
Chief, Division of Engineering

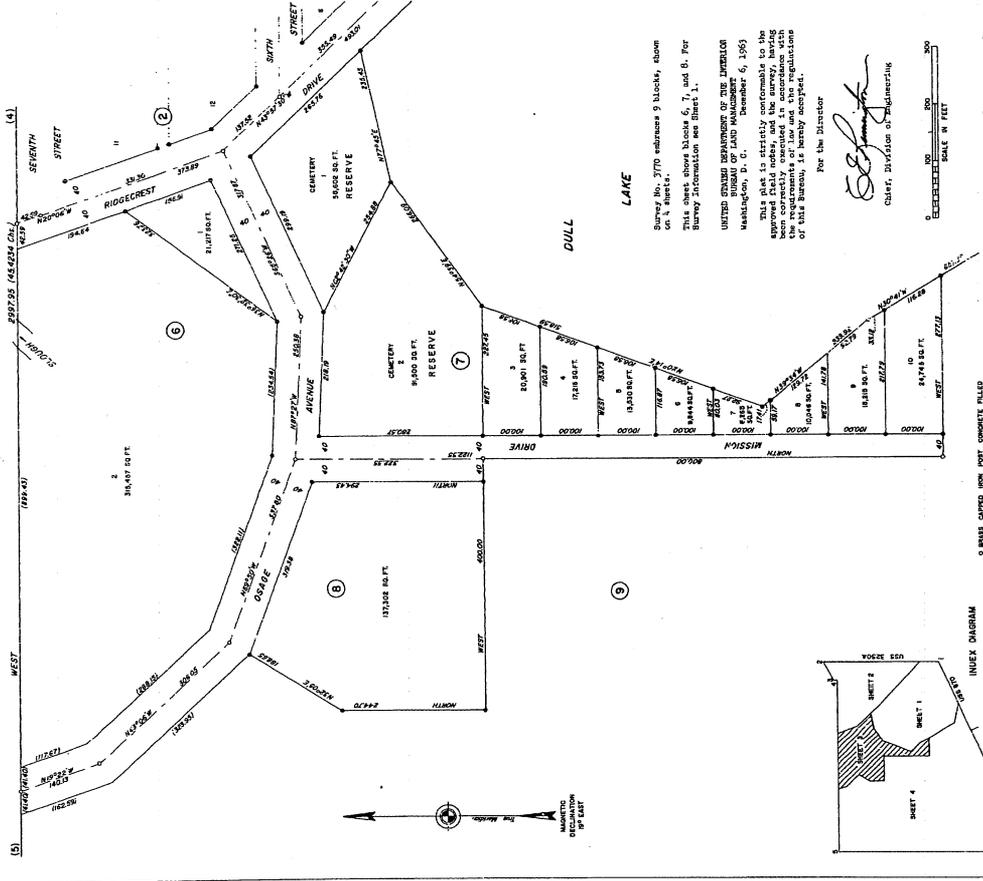
- BRICK CAPPED IRON POST CONCRETE FILLED
- 6" X 6" IRON PIPE
- 1/2" IRON PIPE



ORIGINAL

Sheet 3 of 4 Sheets

U.S. SURVEY No. 3770 NORTHWEST ADDITION TO THE TOWNSHIP OF BETHEL, ALASKA



DULL LAKE

Survey No. 3770 embraces 9 blocks, shown on 4 sheets.
This sheet includes blocks 6, 7 and 8. For
block information see Sheet 1.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C. Land Management
December 6, 1953

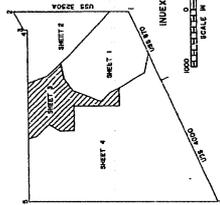
This plat is strictly conformable to the
approved field notes, and the survey having
been completed in accordance with the
best interests of the public, the regulations
of this Bureau, is hereby accepted.

For the Director

[Signature]
Chief, Division of Land Surveying



○ BRASS CAPPED IRON POST CONCRETE FILLED
● SINGLE IRON



U.S. SURVEY NO. 3790 EAST ADDITION TO THE TOWNSITE OF BETHEL, ALASKA

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D.C. September 11, 1942

This plat is strictly conformable to the approved field notes and the survey having been correctly executed in accordance with the requirements of law and the regulations of this Bureau, is hereby accepted.

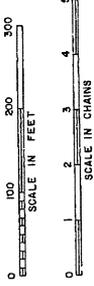
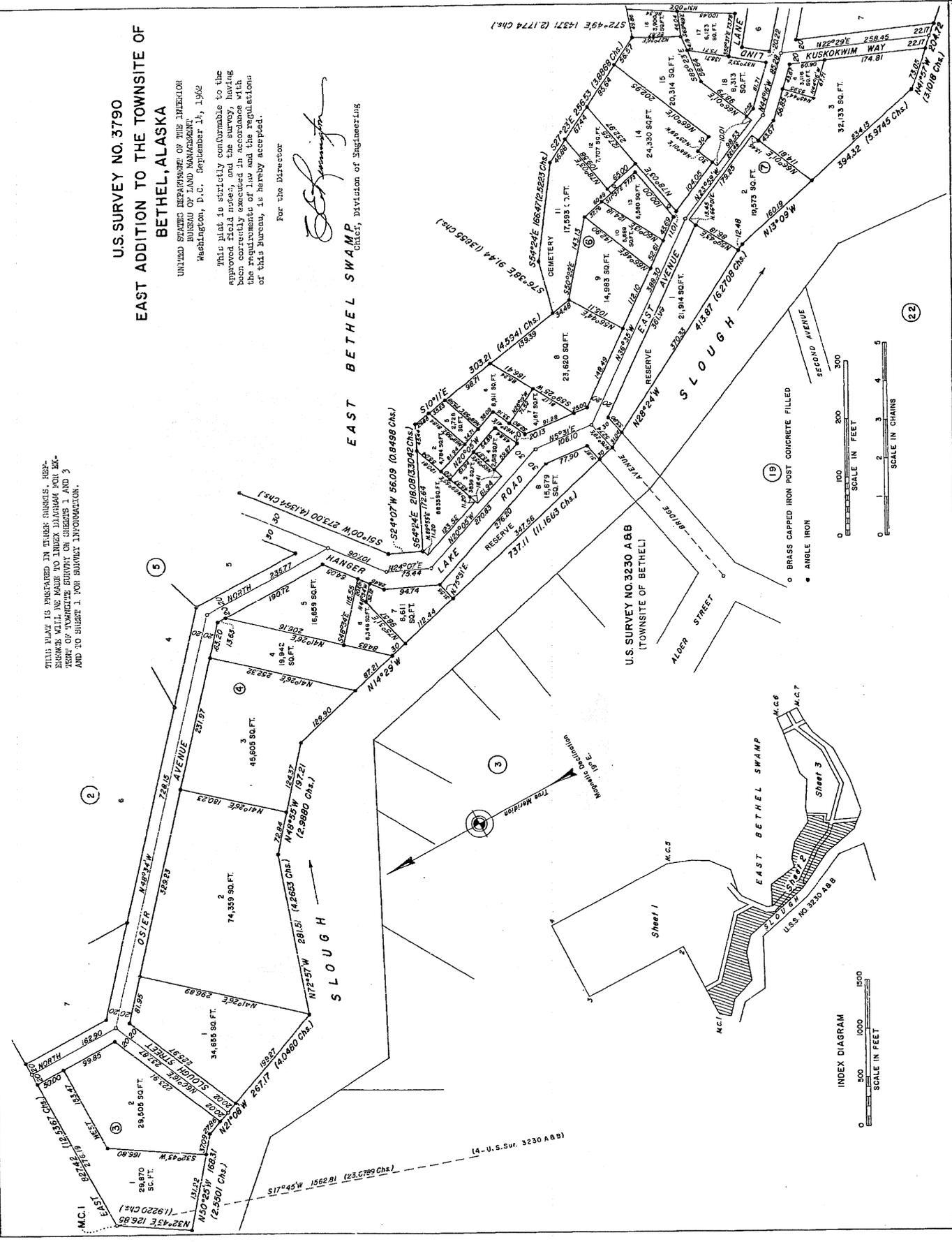
For the Director



E. S. Livingston
Chief, Division of Engineering

EAST BETHEL SWAMP

THIS PLAT IS PREPARED IN THREE SHEETS. REFERENCE WILL BE MADE TO INDEX DIAGRAM FOR EXTENT OF TOWNSITE SURVEY ON SHEETS 1 AND 3 AND TO SHEET 1 FOR SURVEY INFORMATION.



ORIGINAL

U.S. SURVEY NO. 3799, ALASKA

SITUATED
ON THE SOUTHWEST SHORE OF HANGAR LAKE
AND
APPROXIMATELY ONE MILE NORTHEAST
OF
THE TOWNSHIP OF BEVILLE, ALASKA
APPROXIMATE GEOGRAPHIC POSITION
LATITUDE $60^{\circ}17'42''$ N LONGITUDE $161^{\circ}14'02''$ W

AREA: 7.27 ACRES

SURVEYED BY
RAY HARPEL, CADASTRAL SURVEYOR
MAY 28 to 31, 1960
UNDER SPECIAL INSTRUCTIONS
DATED MAY 2, 1960

AND
APPROVED MAY 24, 1960

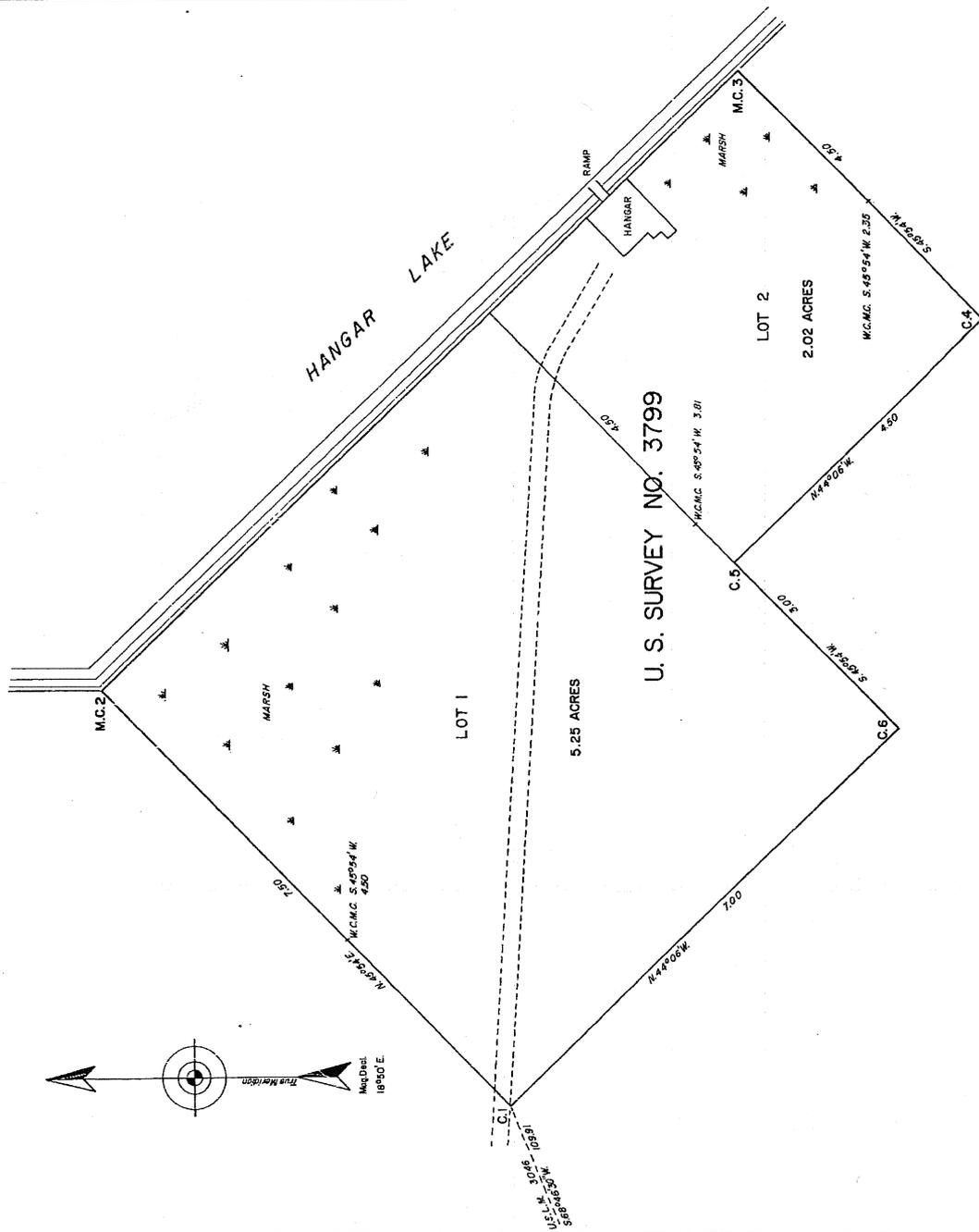
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D.C. October 16, 1961

This plat is strictly conformable to the approved field notes, and the survey, having been correctly executed in accordance with the requirements of law and the regulations of this Bureau, is hereby accepted.

For the Director

E. J. Huntington
Chief, Division of Engineering

D.S. 445 98-10



U.S. SURVEY NO. 3799

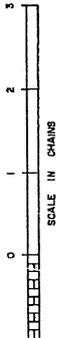
LOT 1

5.25 ACRES

LOT 2

2.02 ACRES

HANGAR LAKE



BCP

ORIGINAL

U.S. SURVEY NO. 4000, ALASKA

STIMANED
ADJACENT TO AND WEST OF
SETTEL, ALASKA
ON THE RIGHT BANK OF THE KUSKOKWIM RIVER

APPROXIMATE GEOGRAPHIC POSITION
LATITUDE 60°47' N LONGITUDE 161°46' W

AREA: 143.24 ACRES

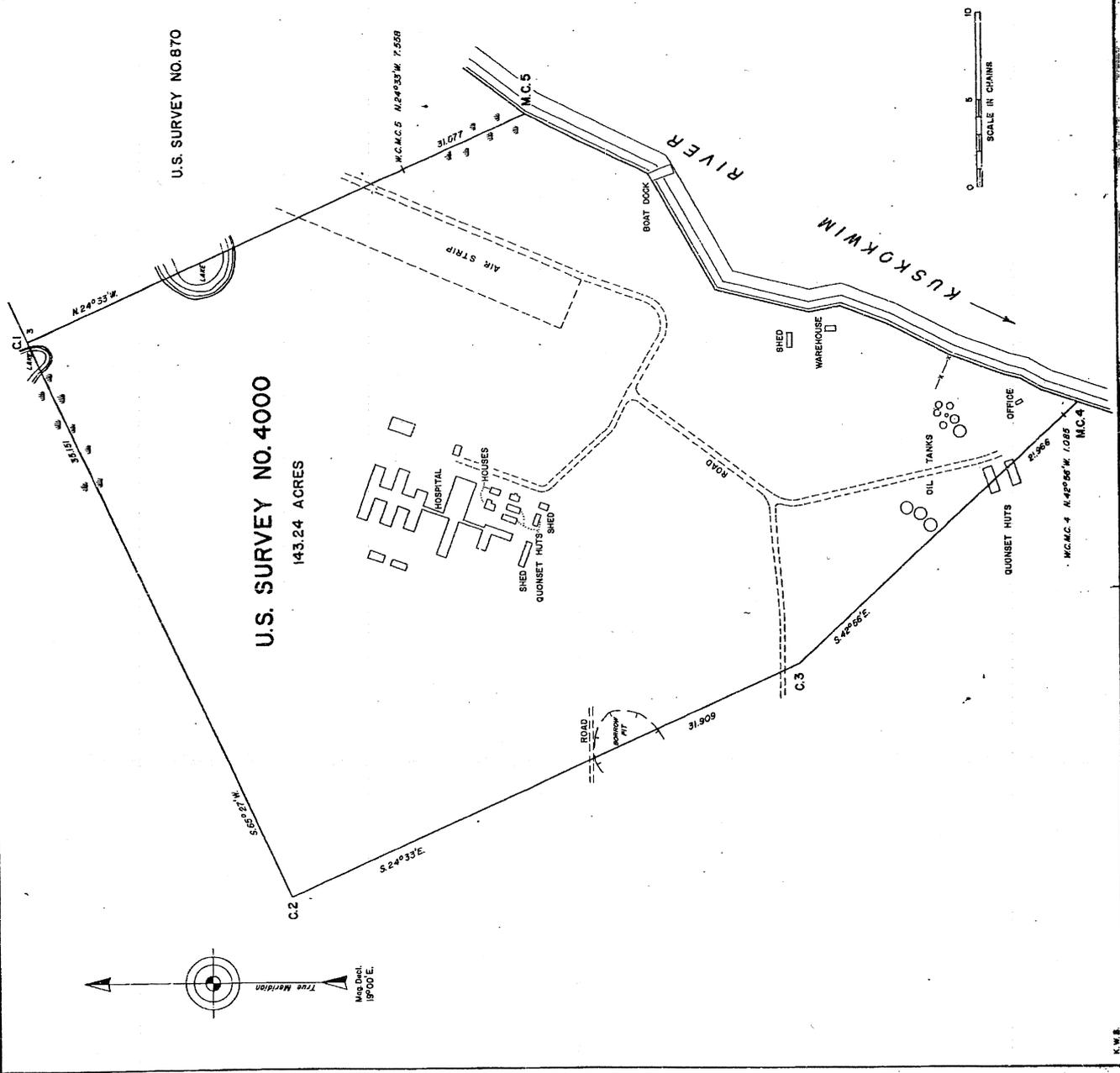
SURVEYED BY
RAY HARKIN, CHIEF SURVEYOR
MAY 25 TO 28, 1960
UNDER SPECIAL INSTRUCTIONS
DATED MAY 3, 1960
AND
APPROVED MAY 4, 1960

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D.C. October 16, 1961

This plat is strictly conformable to the approved field notes, and the survey, having been correctly executed in accordance with the requirements of law and the regulations of this Bureau, is hereby accepted.

For the Director

Edmund J. ...
Chief, Division of Engineering



K.W.B.

Officially Filed
 DATE: **DECEMBER 22, 1989**

ORIGINAL

**U.S. SURVEY
 No. 4000, ALASKA**

THE RETRACEMENT AND DEPENDENT RESURVEY
 OF THE SURVEY OF NEW MEANDERS
 AND THE SUBDIVISION OF
 U.S. SURVEY NO. 4000
 INTO LOTS 1 THROUGH 5
 SITUATED
 ON

BOTH SIDES OF THE BETHEL AIRPORT ROAD
 APPROXIMATELY 3 MILES EASTERLY OF
 THE BETHEL AIRPORT

GEOGRAPHIC POSITION

OF
 CORNER NO. 1, LOT 2
 IDENTICAL WITH CORNER NO. 6
 U.S. SURVEY NO. 3770

AND

CORNER NO. 1, U.S. SURVEY NO. 4117, IS:
 LATITUDE: 60°47'23.65" NORTH, MAG 27
 LONGITUDE: 161°47'09.18" WEST

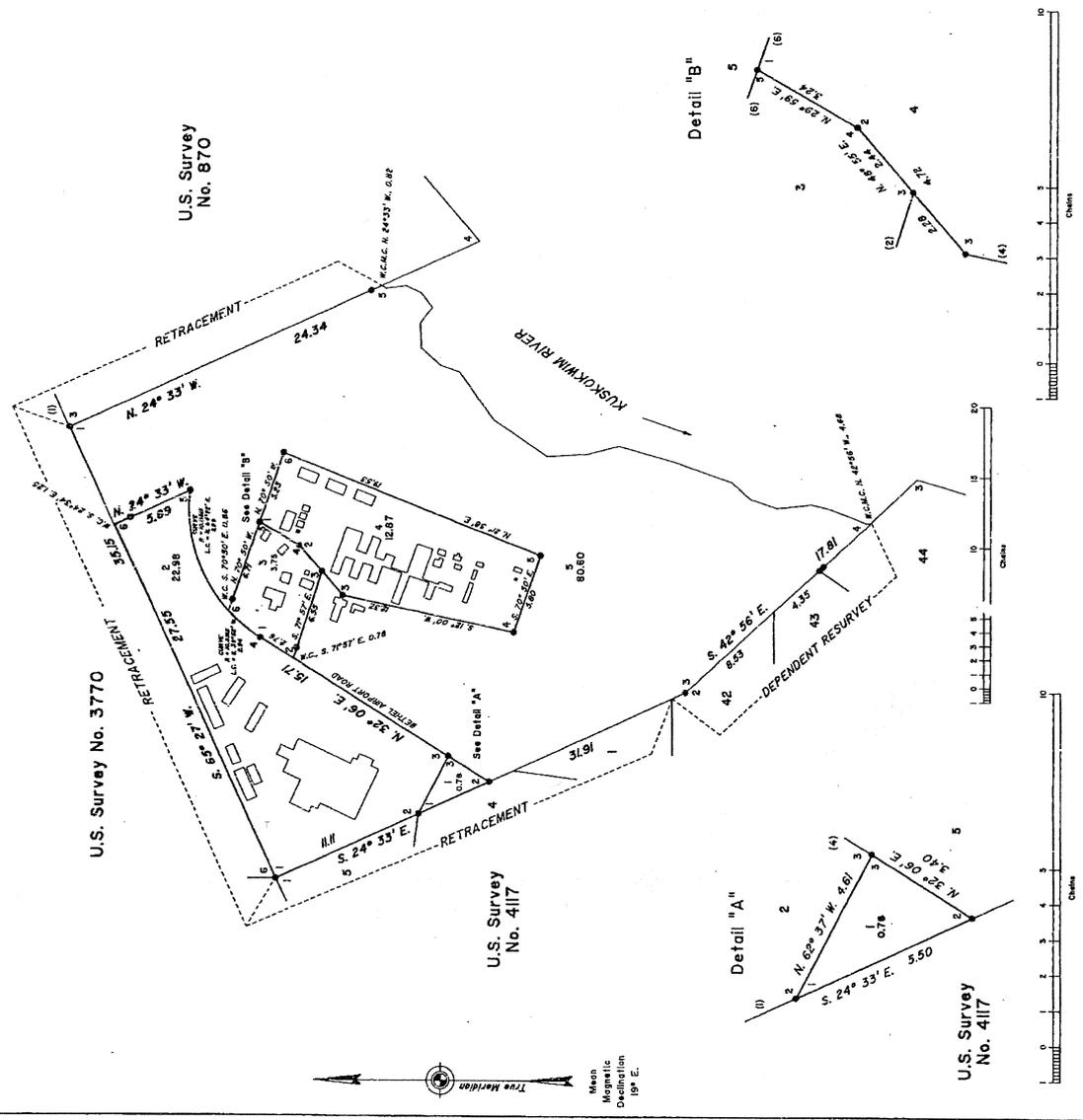
SURVEYED BY
 BRUCE E. OGONOWSKI, CADASTRAL SURVEYOR
 SEPTEMBER 22 THROUGH OCTOBER 5, 1989
 UNDER SPECIAL INSTRUCTIONS
 FOR GROUP NO. 503, ALASKA
 DATED SEPTEMBER 14, 1989
 APPROVED SEPTEMBER 22, 1989
 SUPPLEMENTAL SPECIAL INSTRUCTIONS
 DATED SEPTEMBER 22, 1989
 APPROVED SEPTEMBER 22, 1989

UNITED STATES DEPARTMENT OF THE INTERIOR
 BUREAU OF LAND MANAGEMENT
 Anchorage, Alaska

This plat is strictly conformable to the approved
 field notes, and the survey, having been
 made in accordance with the regulations and
 requirements of law and the regulations of this
 Bureau, is hereby accepted.

For the Director

Dwight C. Pomeroy
 Deputy State Director for Cadastral Survey, Alaska



ORIGINAL

U.S. SURVEY

NO. 4046, ALASKA

EMBRACING LOTS 1 AND 2

SITUATED

ON THE RIGHT BANK

OF STEAMBOAT SLOUGH

APPROXIMATELY 1 1/2 MILES EAST

OF BERTHEL, ALASKA

AT

APPROXIMATE GEOGRAPHIC POSITION

LATITUDE 60° 47' NORTH - LONGITUDE 161° 42' WEST

AREA: 32.13 ACRES

SURVEYED BY:

OSWALD P. JENSEN AND EDWARD A. TAYLOR

SUPERVISORY CADASTRAL SURVEYORS

JUNE 15, 1962 TO JUNE 9, 1964

Under Special Instructions
Dated February 12, 1962
Approved MAY 17, 1962

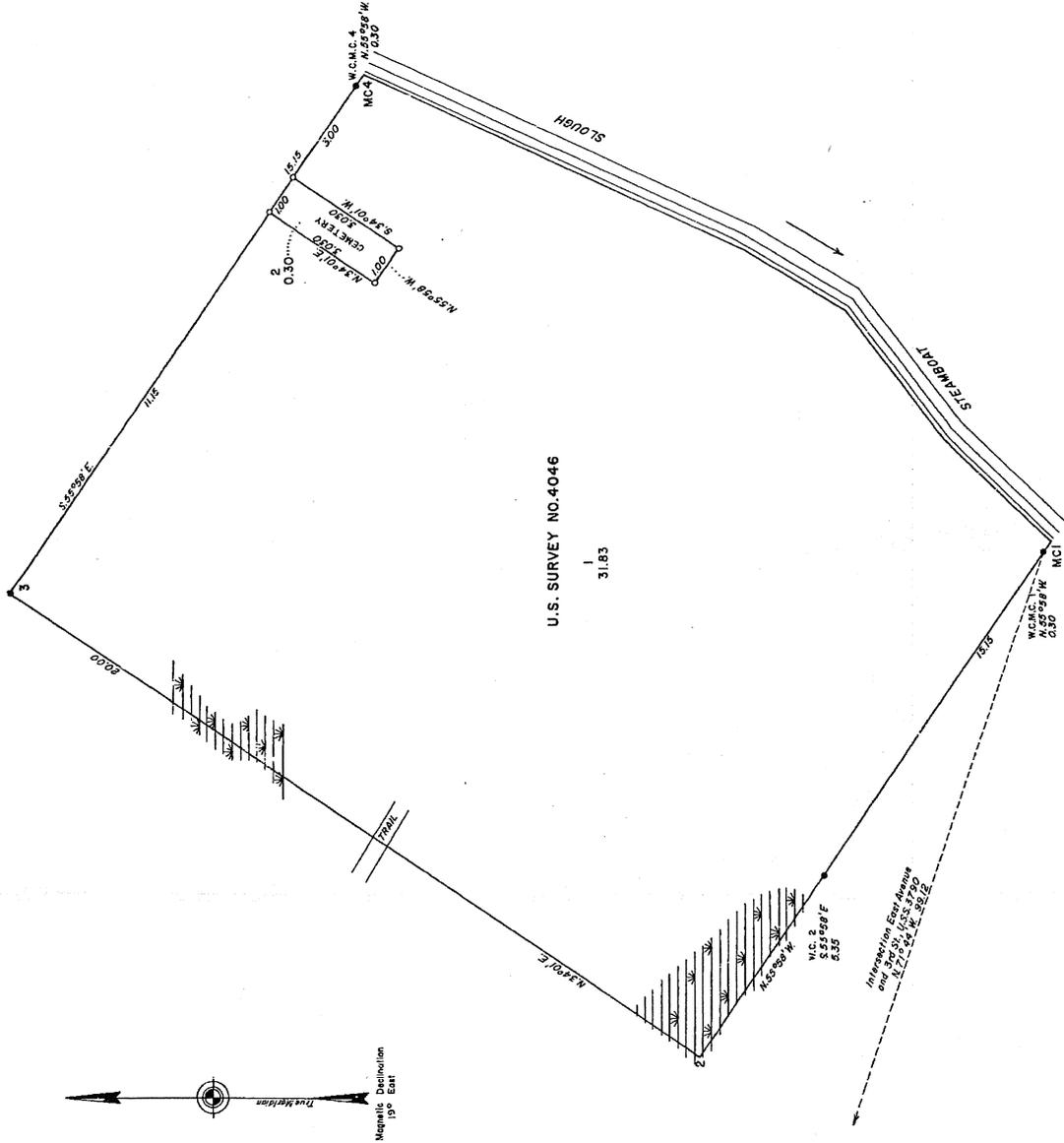
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C. March 22, 1965

This plat is strictly conformable to the approved field notes, and the survey, having been correctly executed, in accordance with the requirements of law and the regulations of this Bureau, is hereby accepted.

For the Director

Ed Spangler

Chief, Division of Engineering

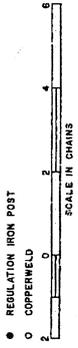


U.S. SURVEY NO. 4046

1
31.83



Magnetic Declination
19° East



B.M.S.

U.S. SURVEY
NO. 4117, ALASKA

EMBANKING
LOIS I. ROUGH 44
LOCATED

APPROXIMATELY ONE MILE WEST
OF BETHEL, ALASKA
ON BOTH SIDES
OF THE BETHEL-AIRPORT ROAD

APPROXIMATE GEOGRAPHIC POSITION
LATITUDE 60° 47' N., LONGITUDE 161° 47' W.

AREA: 745.00 ACRES

SURVEYED BY:

EDWARD A. TAYLOR, SUPERVISORY CADASTRAL SURVEYOR
JULY 18, 1963 TO JULY 14, 1964

Under Special Instructions
Dated July 21, 1963, and
Approved July 17, 1963.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C. May 9, 1966

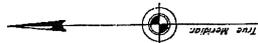
This plat is strictly conformable to the approved field notes, and the survey, having been correctly executed in accordance with the requirements of law and regulations of this Bureau, is hereby accepted.

For the Director

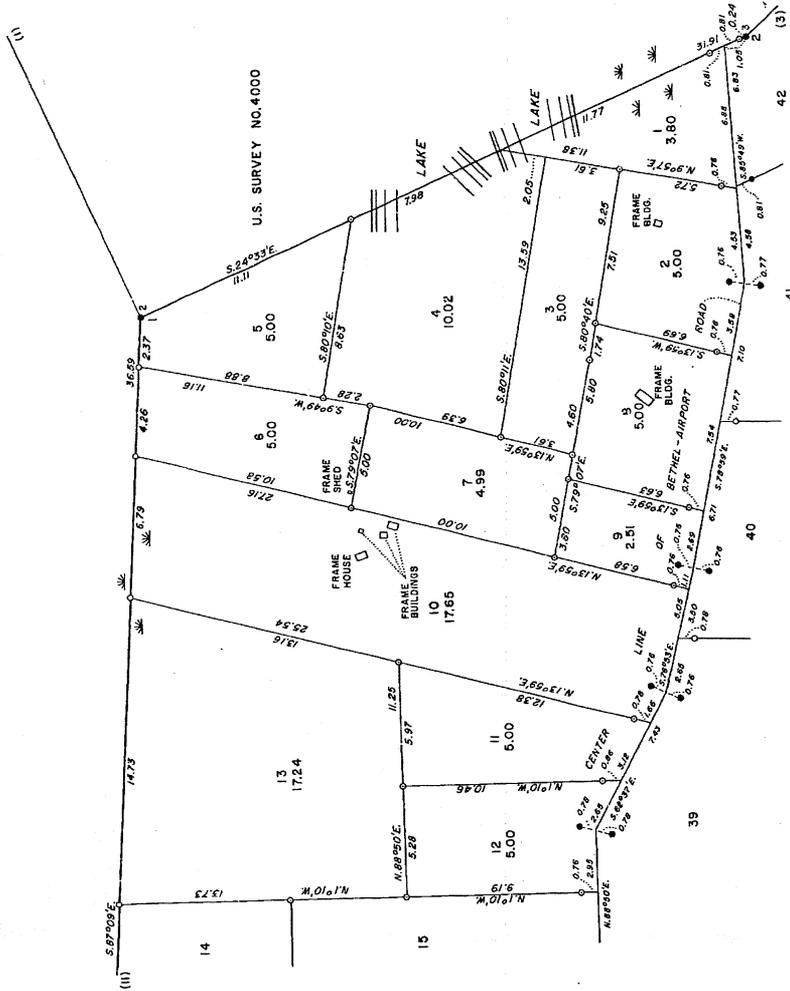
R.L. Brown

Acting Chief, Division of Engineering

Sheet 1 of 5 sheets

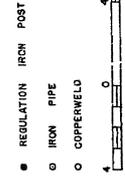
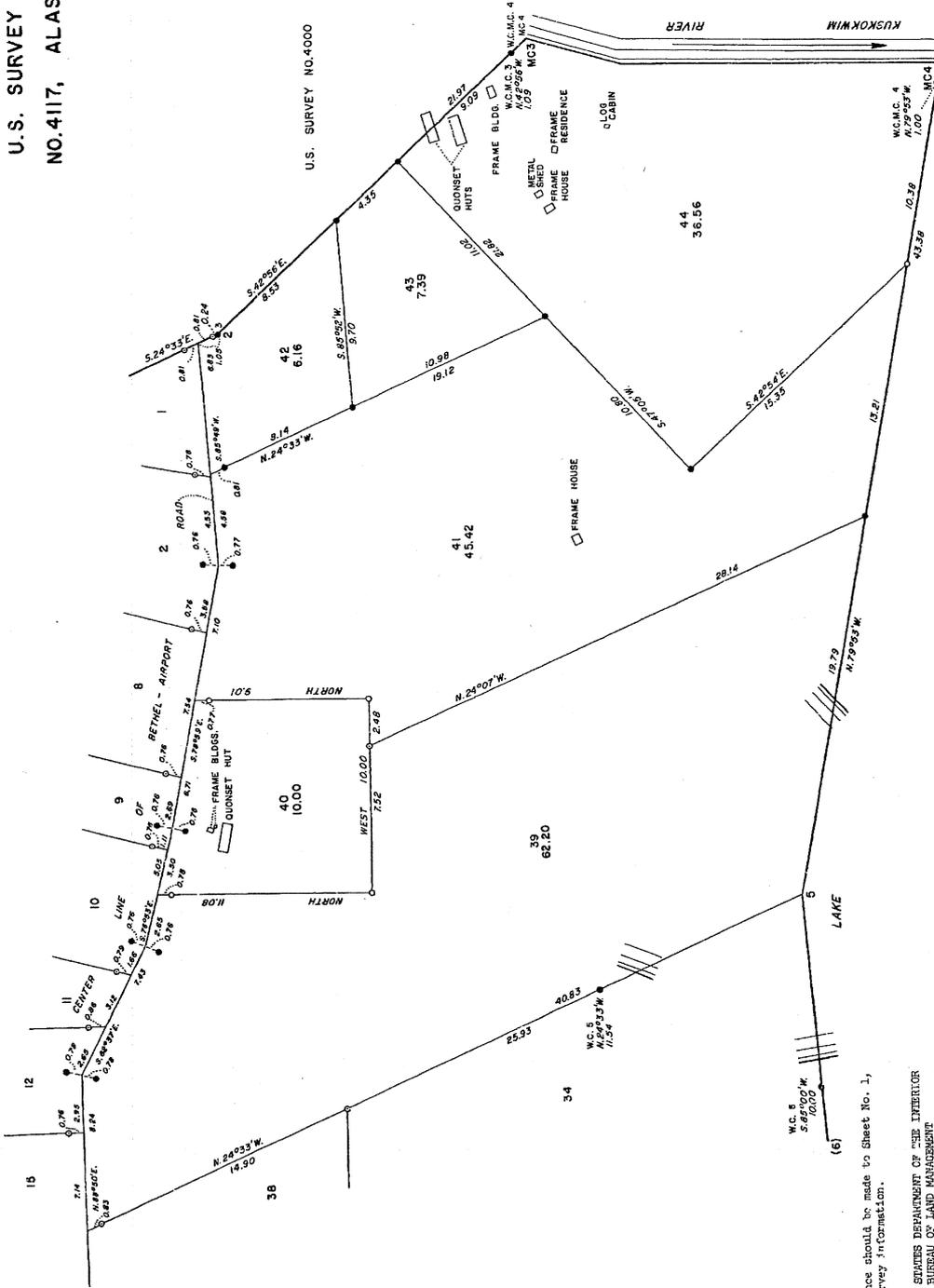


Magnetic Declination
19° East



U.S. SURVEY
NO. 4117, ALASKA

Sheet 2 of 5 sheets



Reference should be made to Sheet No. 1,
for survey information.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C.
May 9, 1966

This plat is strictly conformable to the approved field notes, and the
survey has been correctly executed in accordance with the require-
ments of law and the regulations of this Bureau, is hereby accepted.

For the Director

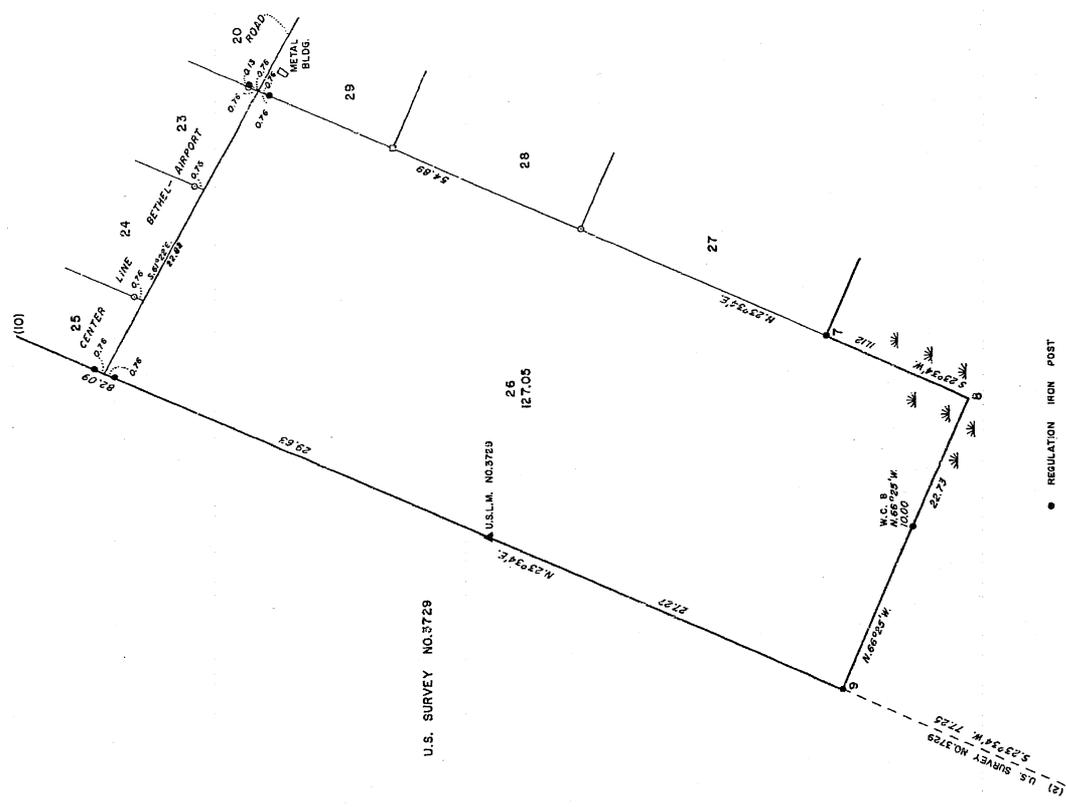
R. L. Brown

Acting Chief, Division of Engineering

Sheet 4 of 5 sheets

U.S. SURVEY
NO. 4117, ALASKA

References should be made to Sheet No. 1,
for survey information.

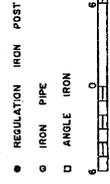


UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C. May 9, 1966

This plan is strictly conformable to the approved field notes, and the survey, having been correctly executed in accordance with the requirements of law and the regulations of this Bureau, is hereby accepted.

For the Director
R. E. Brown

Acting Chief, Division of Engineering



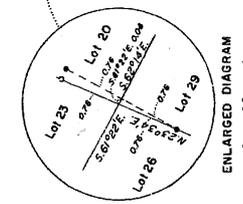
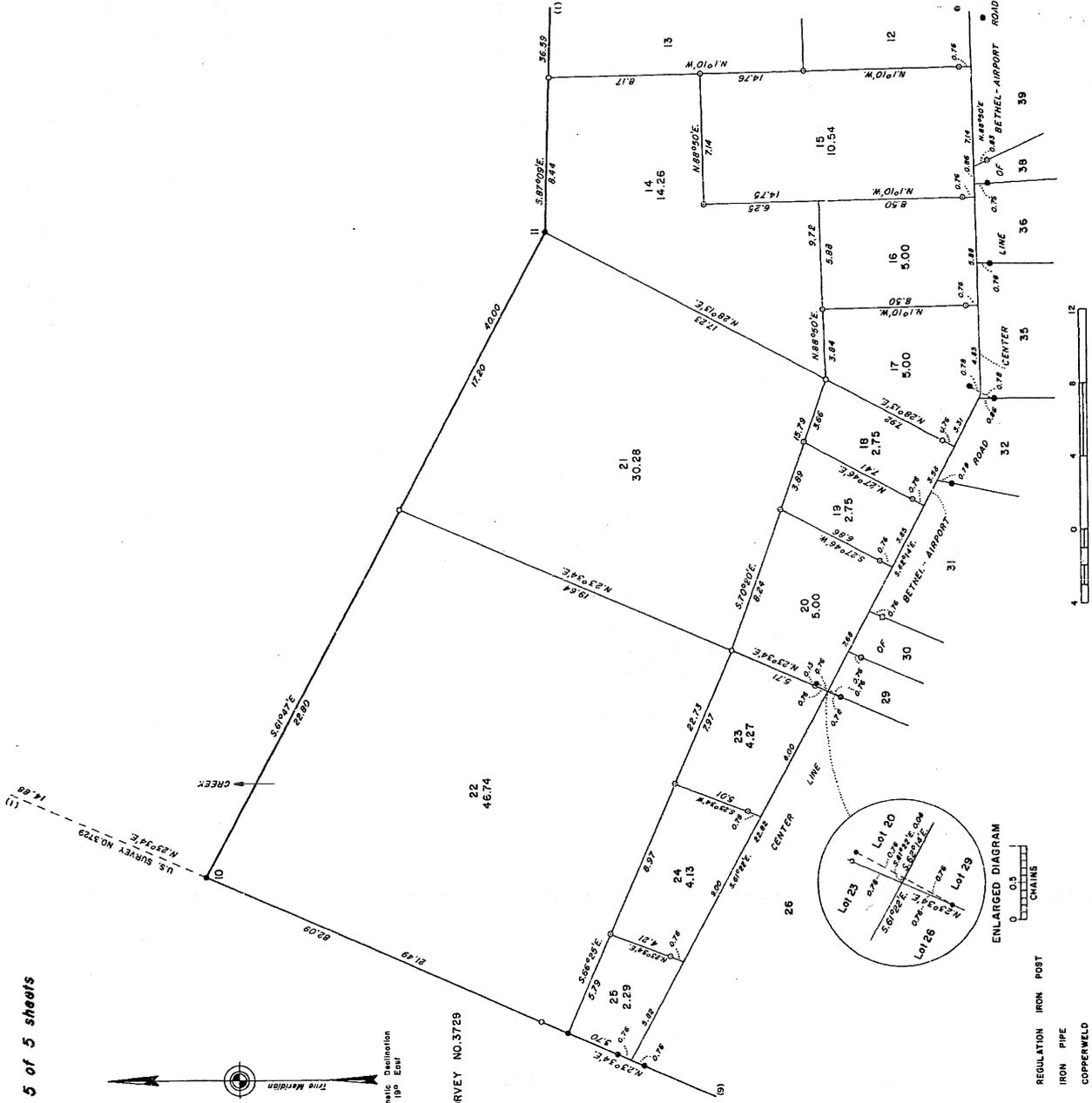
U.S. SURVEY
NO. 4117, ALASKA

Reference should be made to Sheet No. 1,
for survey information.

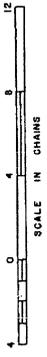
Sheet 5 of 5 sheets



U.S. SURVEY NO. 3729



- REGULATION IRON POST
- IRON PIPE
- COPPERWELD
- ANGLE IRON



UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C. May 9, 1966

This plat is strictly conformable to the approved field notes, and the survey, having been correctly executed in accordance with the requirements of law and the regulations of this Bureau, is hereby accepted.

For the Director
R. B. Brown

Acting Chief, Division of Engineering

Officially Filed
 DATE, **DECEMBER 22, 1989**

ORIGINAL

**U.S. SURVEY
 No. 4117, ALASKA**

RETRACEMENT AND SUBDIVISION
 OF
 ORIGINAL LOT 35
 INTO LOTS 46, 46, AND 47
 SITUATED
 ON
 THE SOUTHERLY SIDE
 OF THE BETHEL AIRPORT ROAD
 APPROXIMATELY 2 MILES FROM
 THE BETHEL AIRPORT

**GEOGRAPHIC POSITION
 OF**

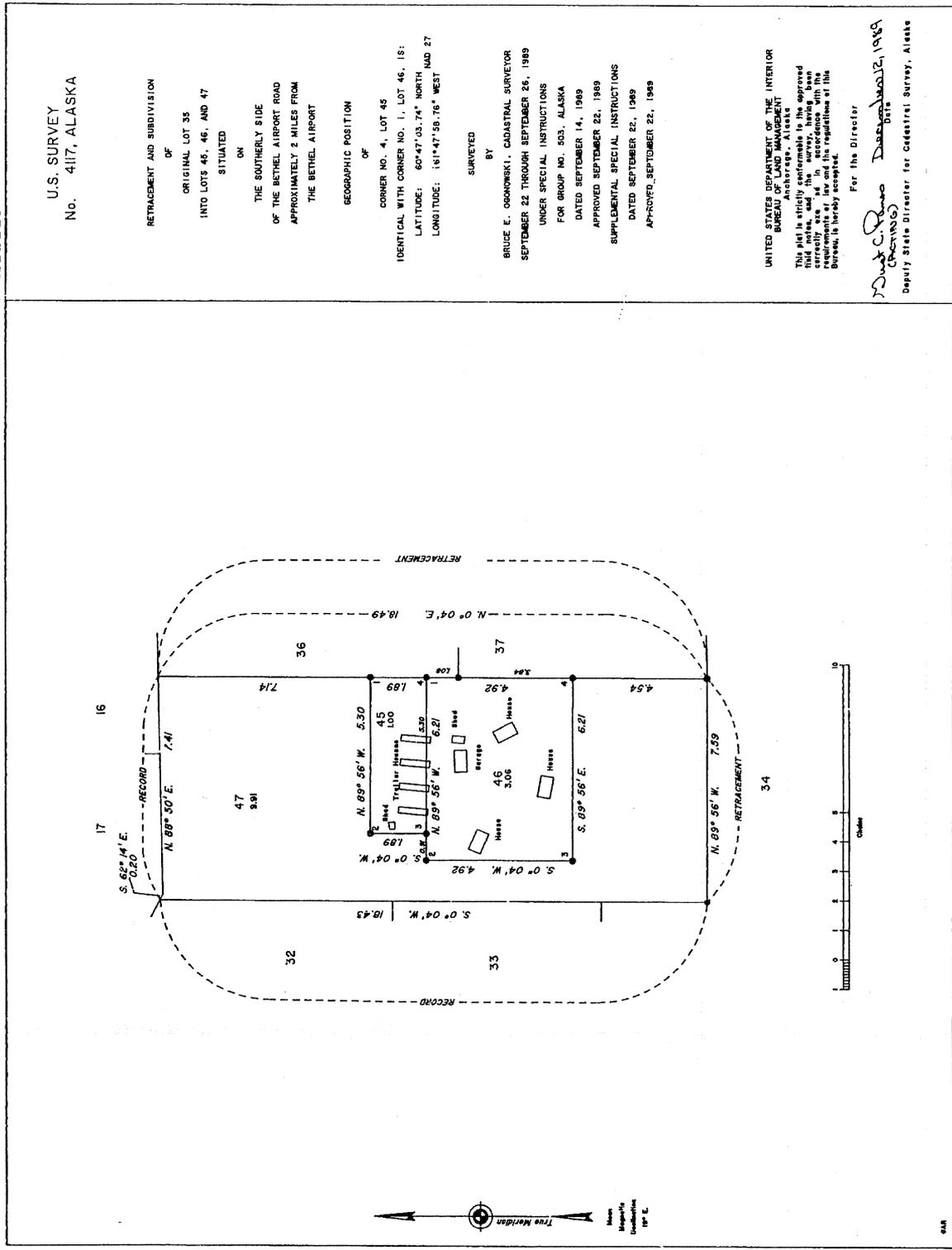
CORNER NO. 4, LOT 45
 IDENTICAL WITH CORNER NO. 1, LOT 46, IS:
 LATITUDE: 60°47'03.74" NORTH
 LONGITUDE: 161°47'56.76" WEST

**SURVEYED
 BY**

BRUCE E. OROKOWSKI, CADASTRAL SURVEYOR
 SEPTEMBER 22 THROUGH SEPTEMBER 26, 1989
 UNDER SPECIAL INSTRUCTIONS
 FOR GROUP NO. 503, ALASKA
 DATED SEPTEMBER 14, 1989
 APPROVED SEPTEMBER 22, 1989
 SUPPLEMENTAL SPECIAL INSTRUCTIONS
 DATED SEPTEMBER 22, 1989
 APPROVED SEPTEMBER 22, 1989

UNITED STATES DEPARTMENT OF THE INTERIOR
 BUREAU OF LAND MANAGEMENT
 Anchorage, Alaska
 This plat is strictly conformable to the approved
 field notes, and the survey, having been
 approved by the Bureau of Land Management,
 requirements of law and the regulations of the
 Bureau, is hereby accepted.

For the Director
[Signature]
 Date **December 22, 1989**
 Deputy State Director for Cadastral Survey, Alaska



PLAT

OF

U.S. Survey No. 807

of the:

RUSSIAN-GREEK
MISSION RESERVE

SITUATE IN THE

VILLAGE OF CHERNOVO,
DISTRICT OF ALASKA

AREA

TRACT A - 0.22 acres.
TRACT B - 3.40 "
Total Area 3.62 "
Scale: 1 inch = 200 chs.
Variation 15' 25"E.

As surveyed under Contract No. 22 dated Dec. 11, 1908

by
John A. McQuinn,
U.S. Deputy Surveyor

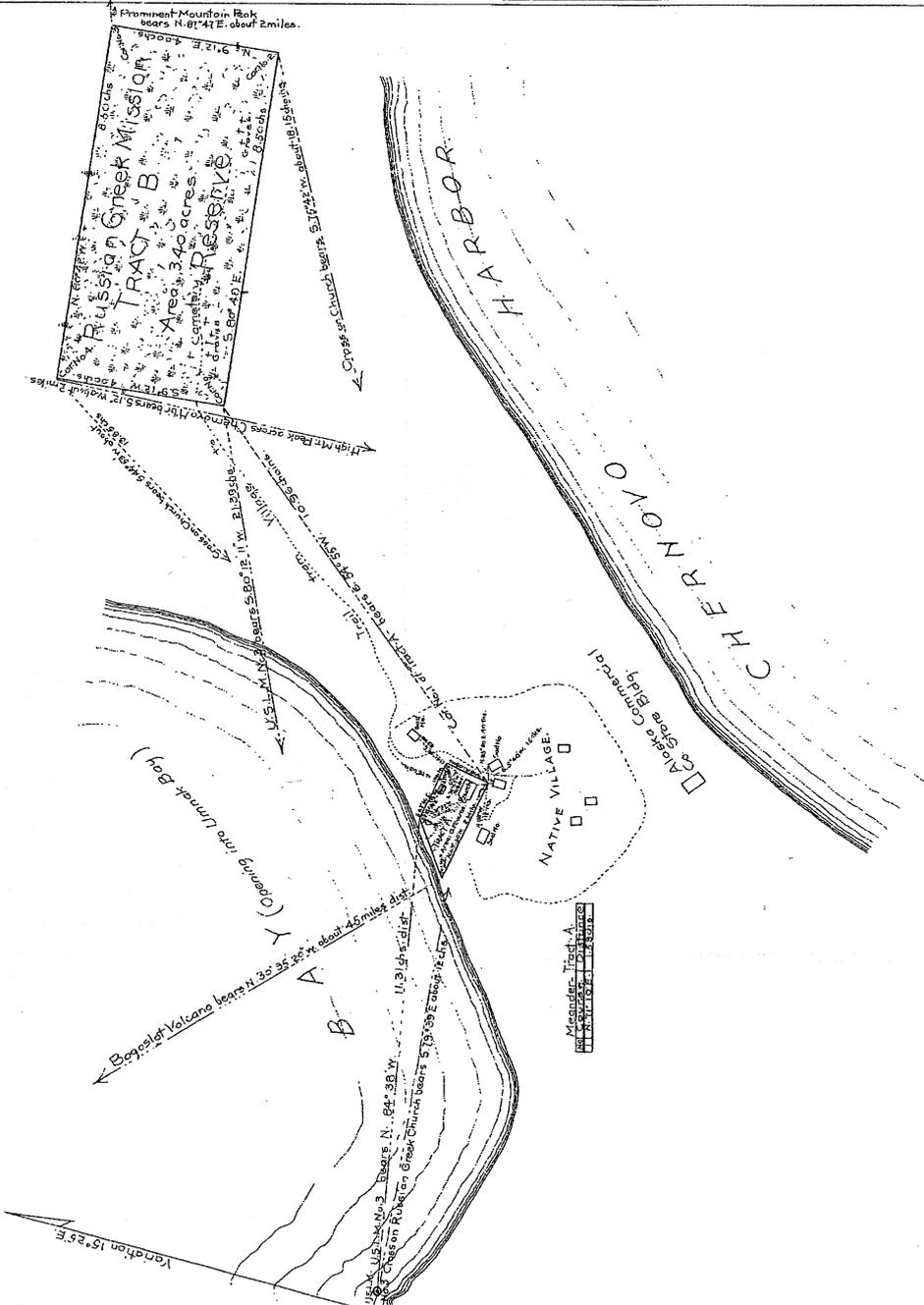
Aug. 25, 1907.

U.S. Surveyor General's Office

Juneau, Alaska, Nov. 12, 1908.

The above Plat of the Russian Greek Mission Reserves at Chernovo, Alaska, is strictly conformable to the field notes of the survey thereof on file in this office, which have been examined and approved.

Myself
U.S. Surveyor-General for
District of Alaska.



U.S. SURVEY
No. 4440, ALASKA

EMBRACING
LOTS 1 AND 2
SITUATED
AT
BETHEL, ALASKA

APPROXIMATE GEOGRAPHIC POSITION
AT

MEANDER CORNER NO. 1, LOT 1
LATITUDE 60° 47.9' NORTH, LONGITUDE 161° 45.0' WEST

AREA: 2.40 ACRES

SURVEYED BY
TOSBY G. BANKS, CADASTRAL SURVEYOR
JUNE 30 THROUGH JULY 8, 1972
UNDER SPECIAL INSTRUCTIONS

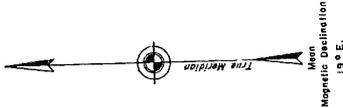
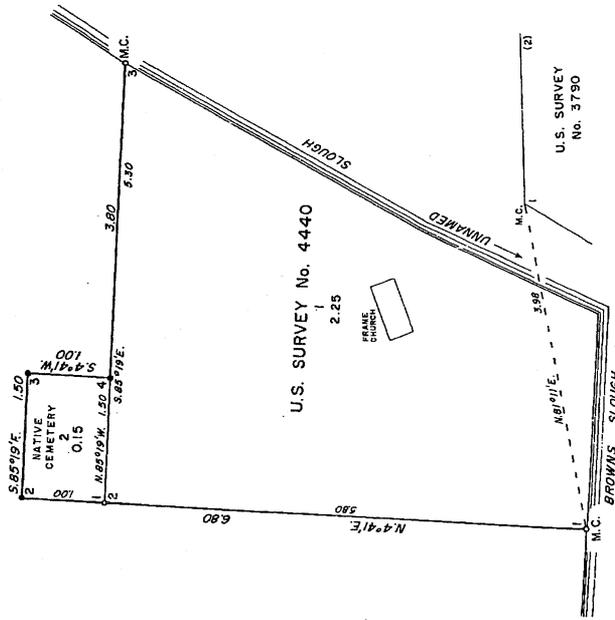
DATED
NOVEMBER 1, 1965
AND
APPROVED
NOVEMBER 23, 1965

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D.C. November 30, 1973

This plat is strictly conformable to the approved field notes, and the survey, having been correctly executed in accordance with the requirements of law and the regulations of this Bureau, is hereby accepted.

For the Director

Chief, Division of Cadastral Survey



- COPPERWELD MONUMENT
- BRASS CAPPED IRON POST

SCALE IN CHAINS

**U.S. SURVEY
No. 8654, ALASKA**

This plat contains the entire survey record.
The section boundaries, and the subdivisional lines of Township 8 North, Range 71 West, Seward Meridian, were surveyed by Edward T. Prandergast, Supervisory Cadastral Surveyor, in 1975.
This survey was executed by Bruce E. Ogonowski, Cadastral Surveyor, on the 13th day of September, 1989, in accordance with the specifications set forth in the Memo of Instructions dated August 13, 1985, approved September 13, 1985, and Assignment Instructions dated September 22, 1985.

Field assistant was:
Orin K. Frazier, Cadastral Surveyor

Area: 5.00 Acres.

The azimuth was obtained from the resection of Township 8 North, Range 71 West, Seward Meridian, and refers to the true meridian.

The geographic position of corner No. 1, identical with the witness corner to the meander Range 71 West, Seward Meridian, is:
Latitude: 60°49'06.56" North
Longitude: 161°45'32.08" West

The mean magnetic declination was obtained from U.S. Geological Survey quadrangle map BETHEL (D-8), Alaska, 1954 edition, with minor revisions in 1977.

The survey is located approximately 400 feet south of the Bethel High School, and is bounded on the east with higher ground than the center of the survey.
Access to the survey was by car from Bethel, Alaska.

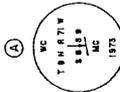
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Anchorage, Alaska

The survey represented by this plat, having been correctly executed in accordance with the requirements of the regulations of this Bureau, is hereby accepted.

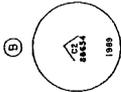
For the Director

Bruce E. Ogonowski
Date: **December 13, 1989**
Deputy State Director for Cadastral Survey, Alaska

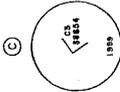
Revised on this plat, 2 1/2 in. diam. (100 ft. radius), with brass cap and 1/4 in. hole.



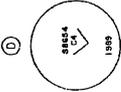
One in. diam. red 3/4 in. diam. with brass cap and 1/4 in. hole.



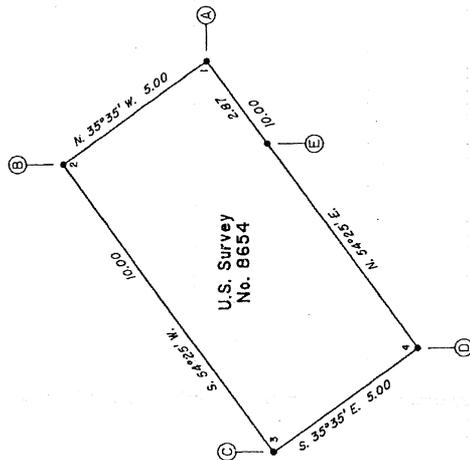
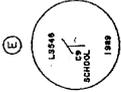
Drive in aluminum rod, 3/4 in. diam. with brass cap and 1/4 in. hole.



2 1/2 in. diam. red 1 1/2 in. diam. with brass cap and 1/4 in. hole.



Revised marker, 2 1/2 in. diam. with brass cap and 1/4 in. hole.



True Meridian
Magnetic Declination
197 E.

I, Bruce E. Ogonowski, HEREBY CERTIFY upon honor that in pursuance of Special Instructions dated August 13, 1985, I have executed the survey depicted on this plat in strict compliance with the specifications of the Memo of Instructions dated August 13, 1985, and in the specific manner described on this plat.

Bruce E. Ogonowski
Date: **December 13, 1989**
Cadastral Surveyor

PLAT

of

U.S. Survey No. 870

at the

MORAVIAN
MISSION RESERVE

Situate on right bank of Kuskokwim
River about 100 miles above its mouth
and known as

BETHEL MISSION,

DISTRICT OF ALASKA

AREA 129.26 ACRES.

Scale: 4:00 chains to 1 inch.
Variation 20° 46' East.

As surveyed under contract No. 23 dated June 25, 1907

by

CLINTON GURNEE,

U.S. Deputy Surveyor

June 17, 1908.

U.S. SURVEYOR GENERAL'S OFFICE:

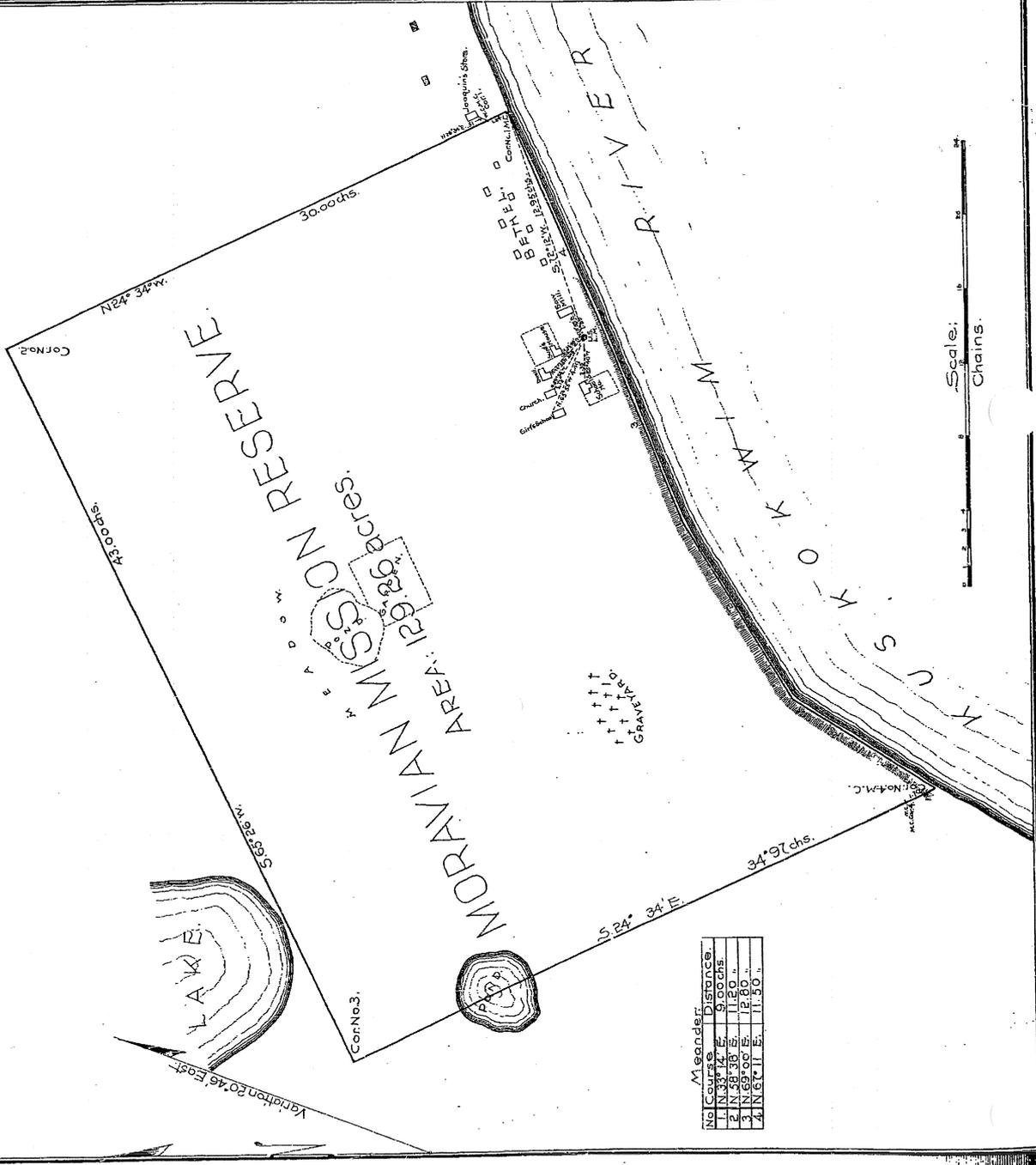
Juneau, Alaska, Nov. 2, 1909.

The map hereon delineated of the
Moravian Mission Reserve situate on
the right bank of Kuskokwim River
and known as Bethel Mission, Alas-
ka, is strictly conformable to the field
notes of the survey thereof on file in
this office, which have been exam-
ined and approved.

Myrta A. Nelson

U.S. Surveyor General for

Alaska.



**STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES**

State Maps and Historical Index

TOWNSHIP 8N RANGE 72W OF THE SEWARD MERIDIAN, ALASKA

LEGEND

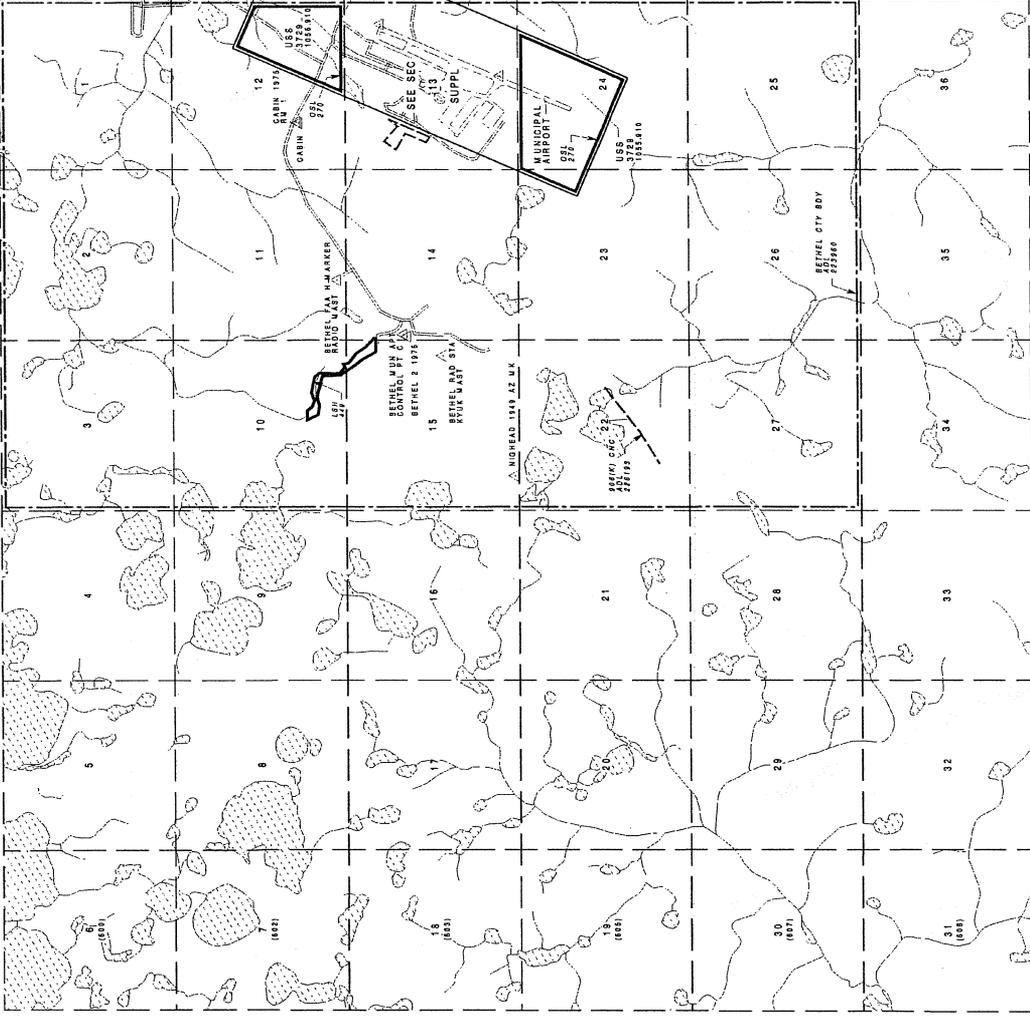
- BASE INFORMATION**
- HYDROGRAPHY
 - SURVEY LOT LINE
 - TOWNSHIP/SECTION GRID
 - 1/4 SECTION LINE
 - HIGHWAY
 - ROAD
 - TRAIL
 - RAILROAD
 - ELECTRICAL POWER LINE
 - TELEPHONE LINE
 - PIPELINE
 - AIRPORT/LANDING STRIP
 - HORIZONTAL CONTROL
 - CONTROL MONUMENT

STATUS INFORMATION

- TITLE
- BOUNDARY
- CLASSIFICATION
- DIPRMA
- MUNICIPAL
- RESTRICTION
- FEDERAL ACTION
- MENTAL HEALTH TRUST
- LIMITS OF ACTION
- NAVIGATIONAL AID
- CABIN PERMIT
- TRAPPING CABIN PERMIT
- TRAPSPASS LOCATION
- SURFACE WATER RIGHTS
- APPLICATION
- PERMIT
- CERTIFICATE
- SUB-SURFACE WATER RIGHTS
- APPLICATION
- PERMIT
- CERTIFICATE
- IN-STREAM FLOW RESERVATION
- APPLICATION
- CERTIFICATE
- DAM WEIR BARRIER
- APPLICATION
- PERMIT
- CERTIFICATE

6	5	4	3	2	1
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36

VICINITY MAP



STATUS PLAT

THE STATE OWNS ALL LAND UNDER WATERS THAT ARE NAVIGABLE. IN FACT, ARE SUBJECT TO THE SEB AND FLOW OF THE TIDES, OR ARE PERMANENT OR LITORAL TO UPLANDS OWNED BY THE STATE.

BASED ON:

COORDINATES
 CONTROL POINTS
 OF TOWNSHIP
 2500000000
 2500000000
 2500000000
 2500000000
 2500000000

PROCESSED BY:
 FROM AERIAL PHOTOGRAPHY 1952-1953
 LAND NET:
 FROM AERIAL PHOTOGRAPHY 1952-1953

OTHER ACTIONS AFFECTING USE OR DISPOSAL OF STATE LANDS:
 SEE PLAN NUMBER OR ORIGINAL SOURCE DOCUMENTS FOR
 ADDITIONAL INFORMATION.

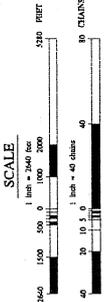
BETHEL CITY BODY
 DOCUMENT DATED 03/11/07



A PRODUCT OF THE
 STATE OF ALASKA
 DEPARTMENT OF NATURAL RESOURCES
 LAND RECORDS INFORMATION SECTION

SP 8N
 TWP 8N
 RNG 72W
 SM

ATTENTION STATUS PLAT USERS: ON THIS PLAT, ALL STATUS LINES CLOSE FOR ACTIONS THAT EXTEND INTO ADJACENT TOWNSHIPS. THIS INCLUDES STATUS LINES SUCH AS DIPRMA, MUNICIPAL, TRAIL, AND TO DETERMINE IF ACTIONS EXTENDING BEYOND THE BOUNDARIES SHOWN ON THIS PLAT, REMEMBER TITLE, CLASSIFICATION, AND RESTRICTION LINES ALWAYS CLOSE ON ALL PLATS.



GRAPHIC ILLUSTRATION ONLY. ORIGINAL RECORD. CONSULT LAND ADMINISTRATION SYSTEM (LADS) CASUALTY FOR ADDITIONAL INFORMATION.

NE 1/4 SEC 16 TOWNSHIP 8N RANGE 71W OF THE SEWARD MERIDIAN, ALASKA

LEGEND

BASE INFORMATION

- HYDROGRAPHY
- SURVEY LINE
- SURVEY LOT LINE
- TOWNSHIP/SECTION GRID
- 1/4 SECTION LINE
- HIGHWAY
- ROAD
- TRAIL
- RAILROAD
- ELECTRICAL POWER LINE
- TELEPHONE LINE
- PIPELINE
- AIRPORT/LANDING STRIP
- HORIZONTAL CONTROL
- CONTROL MONUMENT

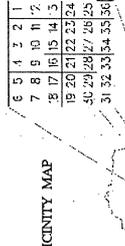
- BOUNDARY
- CLASSIFICATION
- UNUSUAL
- MUNICIPAL
- RESTRICTION
- FEDERAL ACTION
- MUNICIPAL HEALTH TRUST
- LIMITS OF ACTION
- NAVIGATIONAL AID
- CABIN PERMIT
- TRAPPING CABIN PERMIT
- TRIPSASS LOCATION

STATUS INFORMATION

- TITLE
- BOUNDARY
- CLASSIFICATION
- UNUSUAL
- MUNICIPAL
- RESTRICTION
- FEDERAL ACTION
- MUNICIPAL HEALTH TRUST
- LIMITS OF ACTION
- NAVIGATIONAL AID
- CABIN PERMIT
- TRAPPING CABIN PERMIT
- TRIPSASS LOCATION

- STORAGE WATER RIGHTS
- APPLICATION
- PERMIT
- CERTIFICATE
- SUB-SUBJECT WATER RIGHTS
- APPLICATION
- PERMIT
- CERTIFICATE
- IN-STREAM FLOW RESERVATION
- APPLICATION
- CERTIFICATE

- DAM WITH BARRIERS
- APPLICATION
- PERMIT
- CERTIFICATE



STATUS PLAT

THIS STATUS PLAT SHOWS ALL LAND UNDER WATER THAT HAS BEEN DRAINAGE-IMPROVED AND IS BEING OFFERED FOR SALE TO THE PUBLIC BY THE STATE OF ALASKA. THE STATE OWNS ALL LAND UNDER WATER THAT HAS BEEN DRAINAGE-IMPROVED AND IS BEING OFFERED FOR SALE TO THE PUBLIC BY THE STATE OF ALASKA.

BASED ON:

- COORDINATES: PLANS CASE 7
- BY: M. L. LONNER, JR. TOWNSHIP
- DATE: 10/25/2000
- BY: M. L. LONNER, JR.
- DATE: 01/24/2001
- BY: M. L. LONNER, JR.
- DATE: 03/28/2001

ADDITIONAL (CS) USA (US) AND BEZEL (CS) (US) PROVIDED BY M. L. LONNER, JR. FROM AVALA, INC. ALL RIGHTS RESERVED.

LAND ACQUISITION DIAGRAM 92-16; APPROVED 9/28/1999

DEED, SECTION 8, OFFICIALLY FILED 07/17/1995



STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
LAND RECORDS INFORMATION SECTION

NE 1/4
SEC 16
SP
TWP 8N
RNG 71W
SM

CHECKED BY: TEBL MOODY

ATTENTION STATUS PLAT USERS: ON THIS PLAT, ALL STATUS LINES CLOSE FOR ACTIONS THAT EXTEND INTO ADJACENT TOWNSHIPS. THIS INCLUDES STATUS LINES SUCH AS TOWNSHIP BOUNDARIES, TOWNSHIP AND SECTION BOUNDARIES, AND TOWNSHIP AND SECTION BOUNDARIES. TO DETERMINE IF ACTIONS EXTEND BEYOND THE BOUNDARIES SHOWN ON THIS PLAT, REFER TO THE ORIGINAL RECORDS FOR THE ACTIONS. ALWAYS CLOSE ON ALL PLATS.



GRAPHIC ILLUSTRATION ONLY
THIS STATUS PLAT IS NOT AN OFFICIAL RECORD.
CONSULT LAND ADMINISTRATION SYSTEM (LAS)
CASEFILES FOR ADDITIONAL INFORMATION.

VERSION: Archib 8.0.2.71w Job 22 06/01/14 13:57 2000

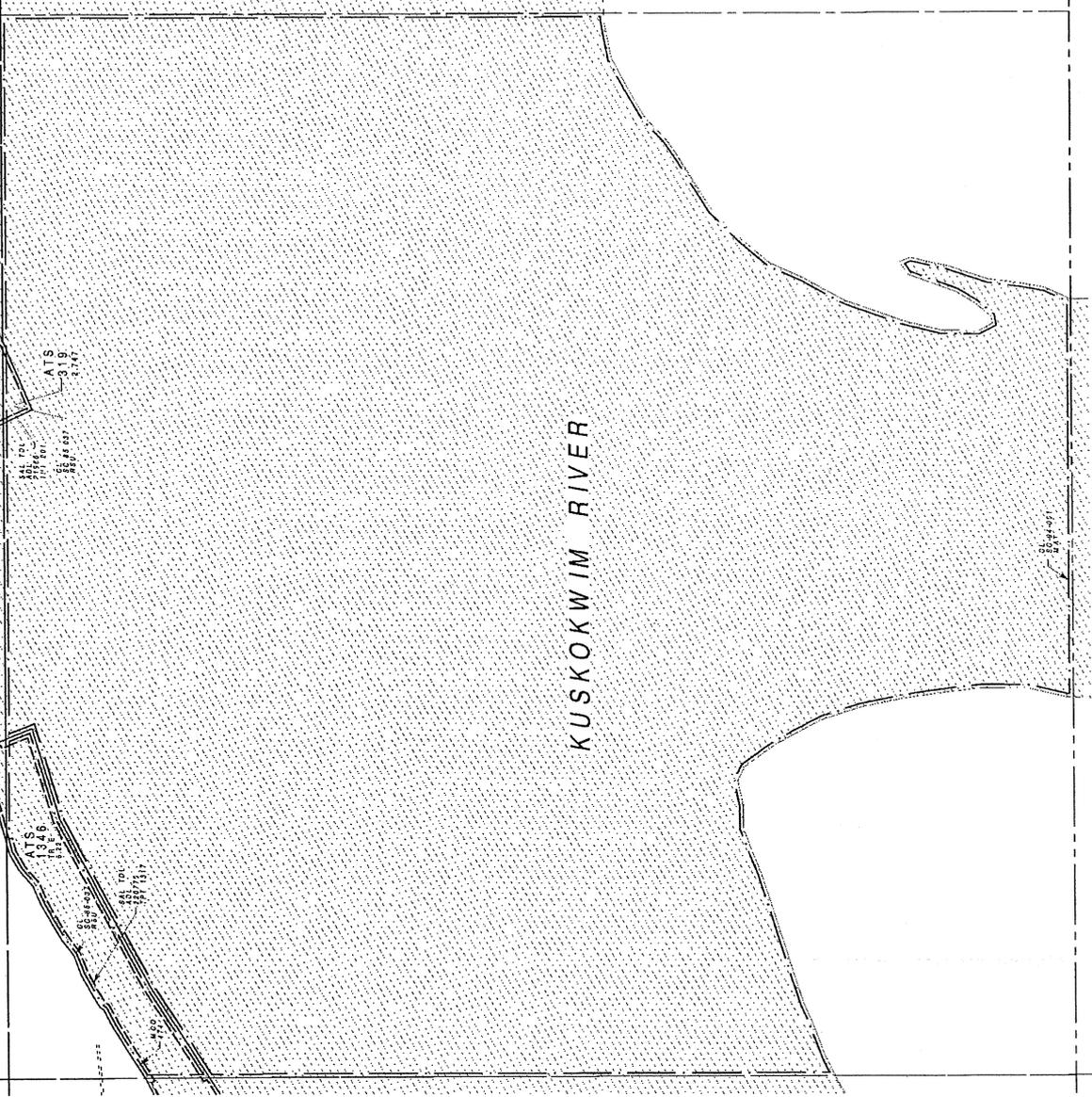
NW 1/4 SEC 16 TOWNSHIP 8N RANGE 71W OF THE SEWARD MERIDIAN, ALASKA

LEGEND

- BASE INFORMATION:**
- SURVEY LINE
 - SURVEY LOT LINE
 - TOWNSHIP/SECTION GRID
 - 1/4 SECTION LINE
 - HIGHWAY
 - ROAD
 - TRAIL
 - RAILROAD
 - ELECTRICAL POWER LINE
 - TELEPHONE LINE
 - PIPELINE
 - AIRPORT/LANDING STRIP
 - HORIZONTAL CONTROL
 - CONTROL MONUMENT
- STATUS INFORMATION**
- TITLE
 - BOUNDARY
 - CLASSIFICATION
 - DISPOSAL
 - MUNICIPAL
 - RESTRICTION
 - FEDERAL ACTION
 - NATIONAL HEALTH TRUST
 - LIMITS OF ACTION
 - NAVIGATIONAL AID
 - CABIN PERMIT
 - TRAPPING CABIN PERMIT
 - TRESPASS LOCATION
 - STORAGE WATER RIGHTS
 - APPLICATION
 - PERMIT
 - CERTIFICATE
 - SUB-SURFACE WATER RIGHTS
 - APPLICATION
 - PERMIT
 - CERTIFICATE
 - IN-STREAM FLOW RESERVATION
 - APPLICATION
 - CERTIFICATE
 - DAM, WEIR, BARRIER
 - APPLICATION
 - PERMIT
 - CERTIFICATE

VICINITY MAP

6	5	4	3	2	1
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36



STATUS PLAT

THE STATE OWNS ALL LAND UNDER WATER THAT ARE NATIONALLY-STRATEGIC OR ARE OF NATIONAL OR STATE INTEREST OR ARE OF ANY IMPORTANCE OR UTILITY TO THE STATE OWNED BY THE STATE.

BASED ON:

COORDINATES:
 UTM ZONE 18 N
 UTM EPOCH 1984
 UTM PROJECTION TRANSVERSE
 X 726300.666
 Y 726300.666
 LAT 66 04 00.041 N
 LONG 161 38 46.357 W

HYDROGRAPHIC: USN 1954, USN 1955 AND RETRIEVAL
 (ON ADVISORY BY NEM FROM AERIAL HIGH ALTITUDE PHOTOGRAPHY 1958-1965)

LAND MET:
 USN SECTION 8, OFFICIALLY FILED 02/17/1958
 USN 1958, APPROVED 02/17/1958
 USN 1959, APPROVED 02/17/1958
 USN 1960, APPROVED 02/17/1958
 USN 1961, APPROVED 02/17/1958
 USN 1962, APPROVED 02/17/1958
 USN 1963, APPROVED 02/17/1958
 USN 1964, APPROVED 02/17/1958
 USN 1965, APPROVED 02/17/1958
 USN 1966, APPROVED 02/17/1958
 USN 1967, APPROVED 02/17/1958
 USN 1968, APPROVED 02/17/1958
 USN 1969, APPROVED 02/17/1958
 USN 1970, APPROVED 02/17/1958
 USN 1971, APPROVED 02/17/1958
 USN 1972, APPROVED 02/17/1958
 USN 1973, APPROVED 02/17/1958
 USN 1974, APPROVED 02/17/1958
 USN 1975, APPROVED 02/17/1958
 USN 1976, APPROVED 02/17/1958
 USN 1977, APPROVED 02/17/1958
 USN 1978, APPROVED 02/17/1958
 USN 1979, APPROVED 02/17/1958
 USN 1980, APPROVED 02/17/1958

OTHER ACTIONS: SETTING ORIGINAL OR USN OF STATE LANDS; SETTING LAS CASERTE OR ORIGINAL SOURCE DOCUMENTS FOR ADDITIONAL INFORMATION.

NOTED: THIS PLAT IS A STATUS PLAT AND IS NOT A SURVEY PLAT. IT IS NOT TO BE USED FOR ANY PURPOSES OTHER THAN TO IDENTIFY THE BOUNDARY FOR ACTIONS WITHIN SECTION 8.

NOTE: THIS PLAT IS A STATUS PLAT AND IS NOT A SURVEY PLAT. IT IS NOT TO BE USED FOR ANY PURPOSES OTHER THAN TO IDENTIFY THE BOUNDARY FOR ACTIONS WITHIN SECTION 8.

APPROVED: STATEWIDE AERIAL PHOTOGRAPHY (ASAP) AND AERIAL PHOTOGRAPHY (AP) DATA COLLECTIONS, PROVIDED OVER TERRITORY AND STATE OF ALASKA, AND THE STATE DEPARTMENT OF LAND AND MINING DEPARTMENTAL ORDER 98-101 FOR PERMISSIBLE ACTIVITIES.

A PRODUCT OF THE
 STATE OF ALASKA
 DEPARTMENT OF NATURAL RESOURCES
 LAND RESOURCES INFORMATION SECTION

NW 1/4
 SEC 16
 SP

TWP 8N
 RNG 71W
 SM

PLAT CHECKED TO ORIGINAL, REFER TO THE USN STATUS PLAT TRACKING SYSTEM (SPTMS) FOR OTHER PENDING ACTIONS ON THIS TOWNSHIP/PLAT

CHECKED BY: TRELL MOODY

ARC Update

ATTENTION STATUS PLAT USERS: ON THIS PLAT, ALL STATUS LINES CLOSE ARE ACCURATE. STATUS LINES THAT DO NOT CLOSE, SUCH AS DISPOSAL, MUNICIPAL, TITLE CLASSIFICATION, ETC., PLEASE REFER TO ADJACENT TOWNSHIP OR LAS TO DETERMINE THE CORRECT BOUNDARY. ALWAYS CLOSE ON ALL PLATS.



GRAPHIC ILLUSTRATION ONLY. SOURCE DOCUMENTS NEARBY THE OFFICIAL RECORD. CONSULT LAND ADMINISTRATION SYSTEM (LAS) CASERTE FOR ADDITIONAL INFORMATION.

SE 1/4 SEC 17 TOWNSHIP 8N RANGE 71W OF THE SEWARD MERIDIAN, ALASKA

LEGEND

BASE INFORMATION

- HYDROGRAPHY
- SURVEY LINE
- SURVEY LOT LINE
- TOWNSHIP/SECTION GRID
- 1/4 SECTION LINE
- HIGHWAY
- ROAD
- TRAIL
- RAILROAD
- ELECTRICAL POWER LINE
- TELEPHONE LINE
- PIEGLINE
- AIRPORT/LANDING STRIP
- HORIZONTAL CONTROL
- CONTROL MONUMENT

STATUS INFORMATION

- TITLE
- BOUNDARY
- CLASSIFICATION
- DISPOSAL
- MUNICIPAL
- RESTRICTION
- FEDERAL ACTION
- MUNICIPAL TRIBAL TRUST
- LIMITS OF ACTION
- NAVIGATIONAL AID
- CABIN PERMIT
- TRAPPING CABIN PERMIT
- TRAPSPASS LOCATION
- STORAGE WATER RIGHTS
- APPLICATION
- PERMIT
- CERTIFICATE
- SUB-STORAGE WATER RIGHTS
- APPLICATION
- PERMIT
- CERTIFICATE
- IN-STREAM FLOW RESERVATION
- APPLICATION
- CERTIFICATE
- DAMAL WATER-BARRIER
- APPLICATION
- PERMIT
- CERTIFICATE

STATUS INFORMATION

- TITLE
- BOUNDARY
- CLASSIFICATION
- DISPOSAL
- MUNICIPAL
- RESTRICTION
- FEDERAL ACTION
- MUNICIPAL TRIBAL TRUST
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- PERMIT
- CERTIFICATE
- IN-STREAM FLOW RESERVATION
- APPLICATION
- CERTIFICATE
- DAMAL WATER-BARRIER
- APPLICATION
- PERMIT
- CERTIFICATE

VICINITY MAP

6	5	4	3	2	1
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36



STATUS PLAT

THIS PLAT SHOWS ALL LAND UNDER WATER THAT HAS BEEN DRAINED BY THE STATE OF ALASKA AND IS SUBJECT TO THE PROVISIONS OF THE SEWARD MERIDIAN OR AIR-IMPARIAN OR LITVINIA. THE INFORMATION IS BASED ON THE STATE OF ALASKA.

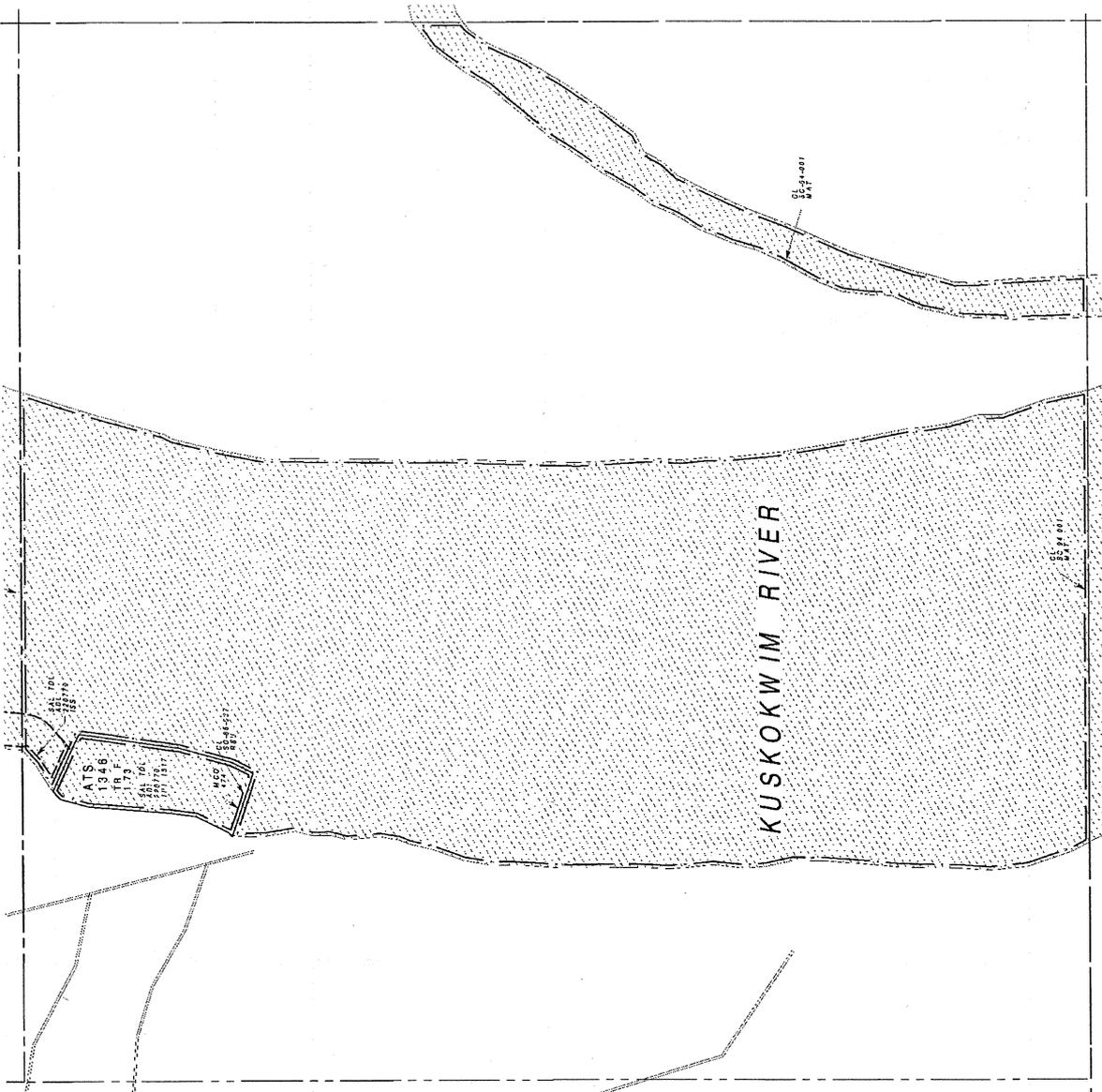
COORDINATES:
 PLANE: NAD 83
 ZONE: 7
 X: 1000000.000
 Y: 6632000.000
 LAT: 66 44 00.000 N
 LONG: 151 58 46.250 W

INDICATOR: 1000000.000
 FROM: 1000000.000
 PHOTOGRAPH: 1980-1985

LAND MET:
 SECTION 8, OFFICIALLY FILED 00/11/1985
 SECTION 9, OFFICIALLY FILED 00/11/1985
 SECTION 10, OFFICIALLY FILED 00/11/1985
 SECTION 11, OFFICIALLY FILED 00/11/1985
 SECTION 12, OFFICIALLY FILED 00/11/1985
 SECTION 13, OFFICIALLY FILED 00/11/1985
 SECTION 14, OFFICIALLY FILED 00/11/1985
 SECTION 15, OFFICIALLY FILED 00/11/1985
 SECTION 16, OFFICIALLY FILED 00/11/1985
 SECTION 17, OFFICIALLY FILED 00/11/1985
 SECTION 18, OFFICIALLY FILED 00/11/1985
 SECTION 19, OFFICIALLY FILED 00/11/1985
 SECTION 20, OFFICIALLY FILED 00/11/1985
 SECTION 21, OFFICIALLY FILED 00/11/1985
 SECTION 22, OFFICIALLY FILED 00/11/1985
 SECTION 23, OFFICIALLY FILED 00/11/1985
 SECTION 24, OFFICIALLY FILED 00/11/1985
 SECTION 25, OFFICIALLY FILED 00/11/1985
 SECTION 26, OFFICIALLY FILED 00/11/1985
 SECTION 27, OFFICIALLY FILED 00/11/1985
 SECTION 28, OFFICIALLY FILED 00/11/1985
 SECTION 29, OFFICIALLY FILED 00/11/1985
 SECTION 30, OFFICIALLY FILED 00/11/1985
 SECTION 31, OFFICIALLY FILED 00/11/1985
 SECTION 32, OFFICIALLY FILED 00/11/1985
 SECTION 33, OFFICIALLY FILED 00/11/1985
 SECTION 34, OFFICIALLY FILED 00/11/1985
 SECTION 35, OFFICIALLY FILED 00/11/1985
 SECTION 36, OFFICIALLY FILED 00/11/1985

OTHER ACTIONS AFFECTING DISPOSAL OR USE OF STATE LANDS:
 SEE TITLE LAS CASPARE OR ORIGINAL SOURCE DOCUMENTS FOR ADDITIONAL INFORMATION.

PLAT FILED BY: J. B. MOODY
 DATE: 08/14/2000



ATTENTION STATUS PLAT USERS: ON THIS PLAT, ALL STATUS INFORMATION IS BASED ON THE OFFICIAL RECORD. THIS INCLUDES STATUS LINES SUCH AS DISPOSAL, MUNICIPAL, TITLE CLASSIFICATION, ETC. PLEASE REFER TO ADJACENT TOWNSHIP OR LAND RECORDS FOR ADDITIONAL INFORMATION. ALWAYS CLOSE ON ALL PLATS.



A PRODUCT OF THE
 STATE OF ALASKA
 DEPARTMENT OF NATURAL RESOURCES
 LAND NEUTRALIZATION SECTION

SE: 1/4
 SEC 17
 SP
 TWP 8N
 RNG 71W
 SM

PLAT CURRENT TO 6/6/2000. REFER TO THE DNR STATUS PLAT TRACKING SYSTEM (ENHANCED FOR OTHER PENDING ACTIONS ON THIS TOWNSHIP PLAT)

CHECKED BY: J. B. MOODY
 AUC Update

GRAPHIC ILLUSTRATION ONLY. SOURCE DOCUMENTS BEHIND THE OFFICIAL RECORD. CONSULT LAND ADMINISTRATION SECTION (LAS) FOR ADDITIONAL INFORMATION.

SHEET 3

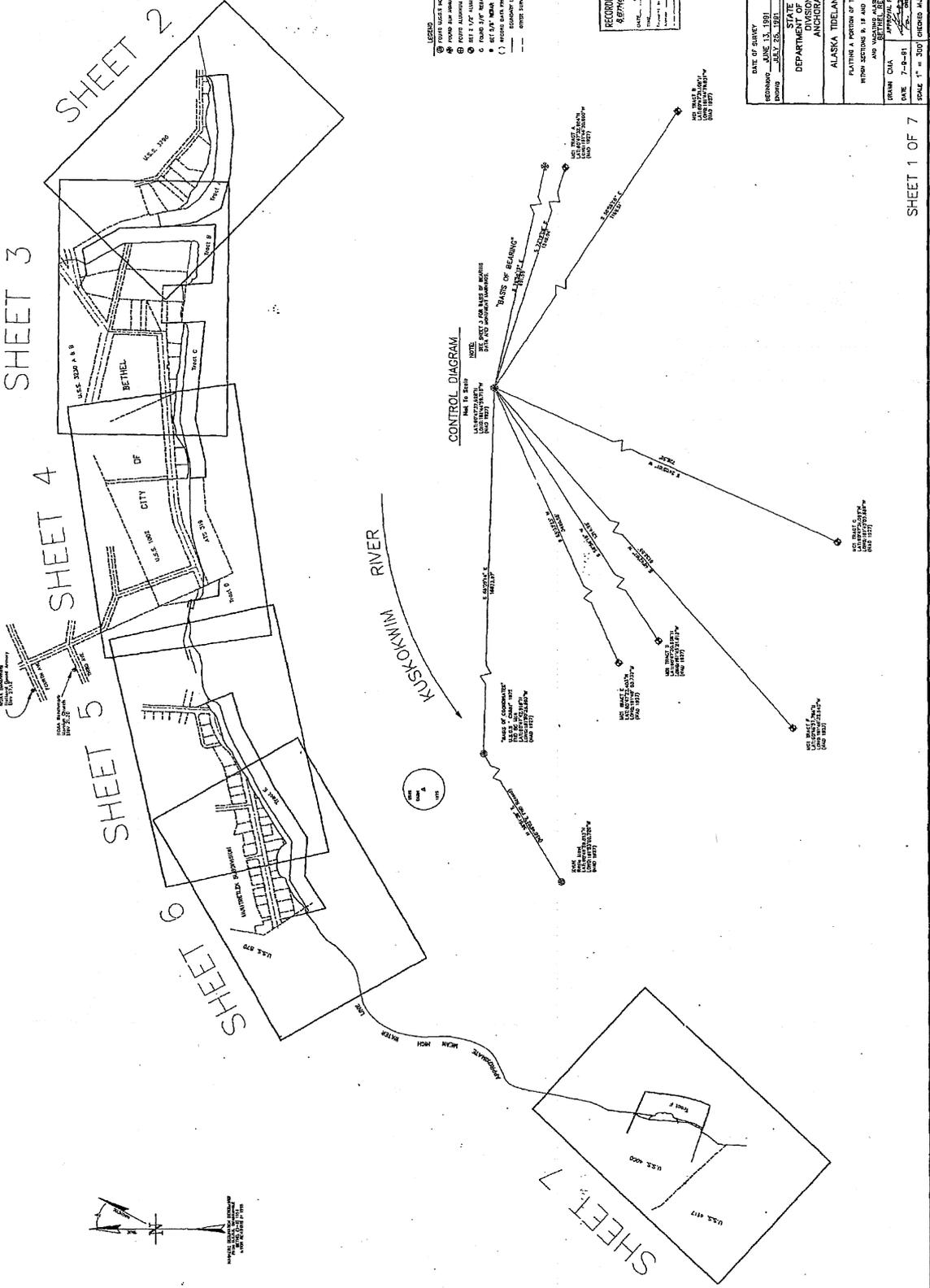
SHEET 4

SHEET 5

SHEET 6

SHEET 2

SHEET 7



- LEGEND
- ① POINT ADJUSTED
 - ② POINT ADJUSTED
 - ③ POINT ADJUSTED
 - ④ POINT ADJUSTED
 - ⑤ POINT ADJUSTED
 - ⑥ POINT ADJUSTED
 - ⑦ POINT ADJUSTED
 - ⑧ POINT ADJUSTED
 - ⑨ POINT ADJUSTED
 - ⑩ POINT ADJUSTED
 - ⑪ POINT ADJUSTED
 - ⑫ POINT ADJUSTED
 - ⑬ POINT ADJUSTED
 - ⑭ POINT ADJUSTED
 - ⑮ POINT ADJUSTED
 - ⑯ POINT ADJUSTED
 - ⑰ POINT ADJUSTED
 - ⑱ POINT ADJUSTED
 - ⑲ POINT ADJUSTED
 - ⑳ POINT ADJUSTED
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 - ㉔ POINT ADJUSTED
 - ㉕ POINT ADJUSTED
 - ㉖ POINT ADJUSTED
 - ㉗ POINT ADJUSTED
 - ㉘ POINT ADJUSTED
 - ㉙ POINT ADJUSTED
 - ㉚ POINT ADJUSTED
 - ㉛ POINT ADJUSTED
 - ㉜ POINT ADJUSTED
 - ㉝ POINT ADJUSTED
 - ㉞ POINT ADJUSTED
 - ㉟ POINT ADJUSTED
 - ㊱ POINT ADJUSTED
 - ㊲ POINT ADJUSTED
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 - ㊴ POINT ADJUSTED
 - ㊵ POINT ADJUSTED
 - ㊶ POINT ADJUSTED
 - ㊷ POINT ADJUSTED
 - ㊸ POINT ADJUSTED
 - ㊹ POINT ADJUSTED
 - ㊺ POINT ADJUSTED

92-4

RECORDED: 92-4

REPORT: 92-4

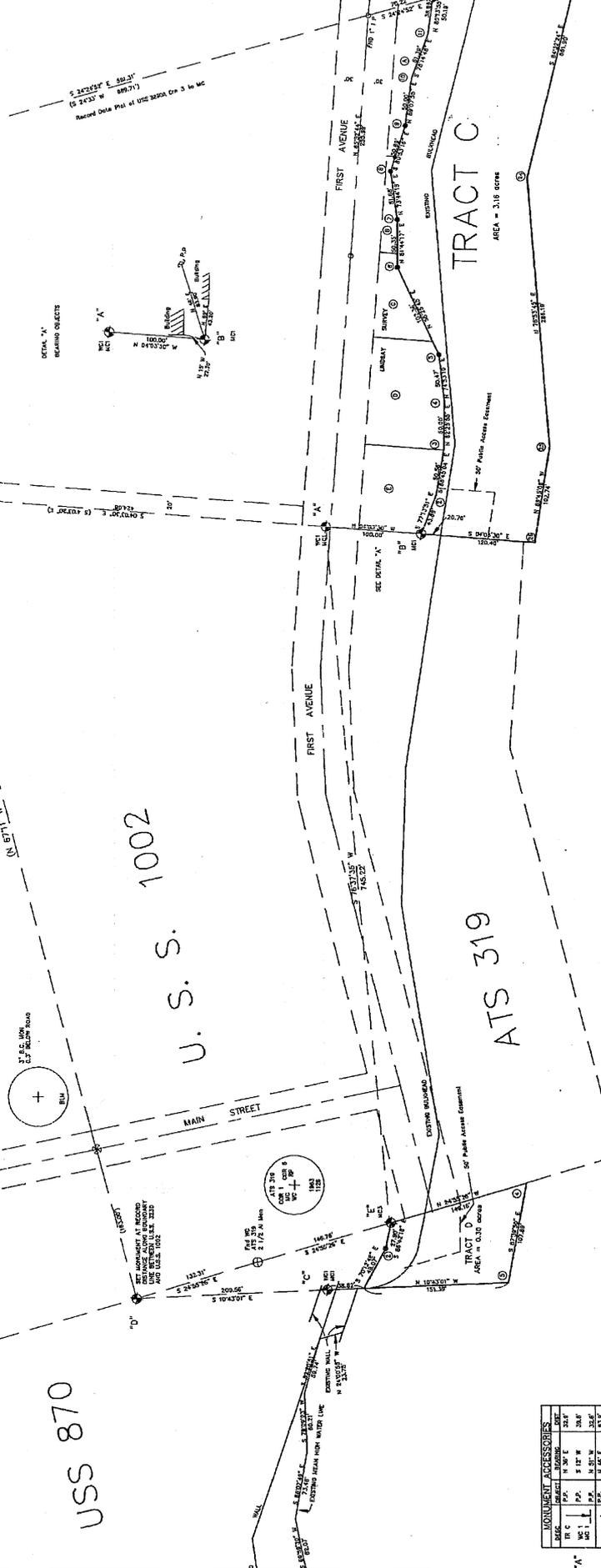
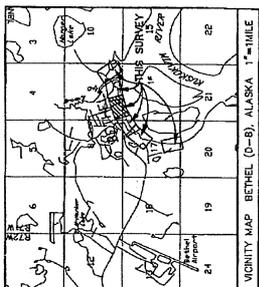
DATE: 7-2-81

BY: [Signature]

DATE OF SURVEY	JUNE 13, 1981
REVISION	NO. 1
PROJECT	ALASKA TIDELAND SURVEY NO. 1346
STATE	STATE OF ALASKA
DEPARTMENT	DEPARTMENT OF NATURAL RESOURCES
DIVISION	DIVISION OF LAND ANCHORAGE, ALASKA
ALASKA TIDELAND SURVEY NO.	1346
PLATTING A PORTION OF THE TIDE AND SUBMERGED LANDS WITHIN SECTIONS 9, 18 AND 17, T. 8 S., R. 71 N., S.4, ALASKA AND VARIOUS ALASKA TIDELAND SURVEY TRACTS	
BRANCH	CHVA
APPROVAL	[Signature]
DATE	7-8-81
SCALE	1" = 300'
RECORD	441
FILE NO.	ATS 1346

SHEET 1 OF 7

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100



DATE OF SURVEY: JUNE 13, 1991
 BEGINNING: JULY 23, 1991
 ENGINE: [Signature]

STATE OF ALASKA
 DEPARTMENT OF LAND RESOURCES
 DIVISION OF LAND ANCHORAGE, ALASKA

ALASKA TIDELAND SURVEY NO. 1348

PLACING A PORTION OF THE TIDE AND SUBMERGED LANDS WITH SECTIONS 1, 15 AND 17, T. 11 N., R. 71 W., S. 14, ALASKA AND TIDAL ALASKA TIDELAND SURVEY 185

DRAWN BY: [Signature]
 CHECKED BY: [Signature]
 DATE: 7-9-91
 SCALE: 1" = 50'

9-2-4
 RECORDED - EREB N/C
 & EREB N/C
 DATE: 7-21
 BY: [Signature]

UPLAND OWNERS:
 UMSBY SURVEY
 A/P/O: [Signature]
 10000 W. 100th St.
 ANCHORAGE, ALASKA 99504

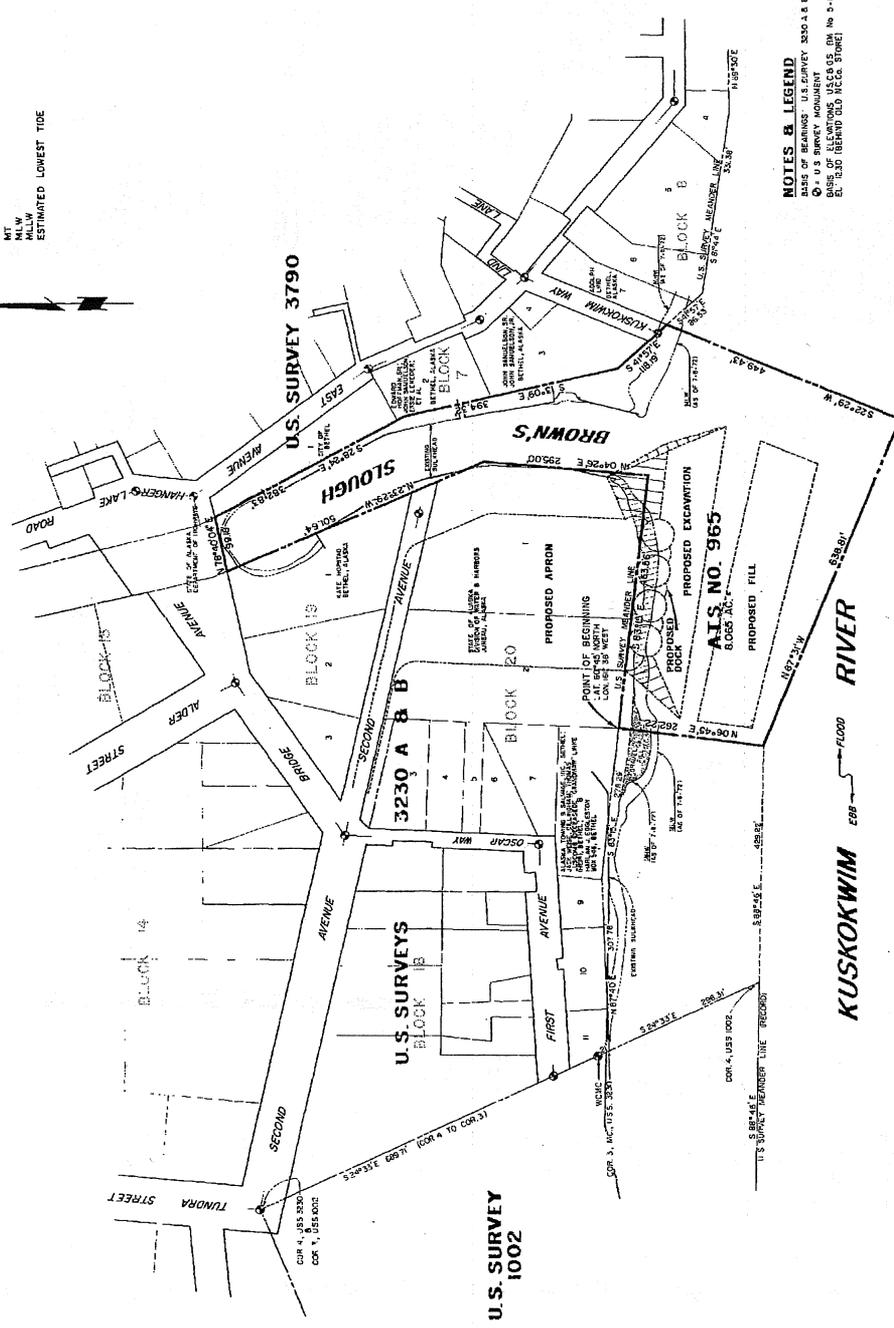
LEGEND

- FOUND ALUMINUM MONUMENT
- SET 3 1/2" ALUMINUM MONUMENT
- FOUND 5/8" REBAR
- SET 5/8" REBAR W/ 1 1/2" AL CAP
- RECORD DATA FROM U.S. SURVEYS 1002 & 970 & U.S. 319
- BOUNDARY LINE INCLUDING TIE LINE ALSO PROPERTY LINE

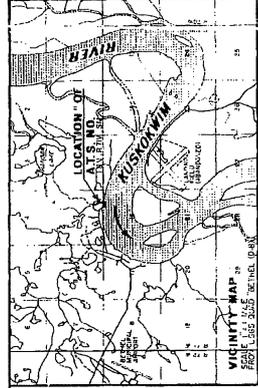
MONUMENT ACCESSORIES	
REQ.	FOUND
1" ALUMINUM MONUMENT	1
3 1/2" ALUMINUM MONUMENT	1
5/8" REBAR	1
1 1/2" AL CAP	1
1" ALUMINUM MONUMENT	1
3 1/2" ALUMINUM MONUMENT	1
5/8" REBAR	1
1 1/2" AL CAP	1
1" ALUMINUM MONUMENT	1
3 1/2" ALUMINUM MONUMENT	1
5/8" REBAR	1
1 1/2" AL CAP	1

REBAR TO THE MONUMENT TO THE ACCESSORY.

TIDE DATA
 CORP OF ENGINEERS STANDARD PROJECT FLOOD 17.5
 ESTIMATED 1971 FLOOD 7.0
 ESTIMATED HIGHEST TIDE 4.0
 MHW 2.7
 MLLW 0.6
 ESTIMATED LOWEST TIDE -3.0



NOTES & LEGEND
 BASE OF BEARINGS - U.S. SURVEY 3230 A & B.
 U.S. SURVEY MONUMENT
 BASE OF ELEVATIONS - U.S.C.G.S. BM No 5-1970
 EL. ALSO BEARING OLD (CROSS STAKE)



LEGAL DESCRIPTION

1. COMMENCE AT THE INTERSECTION OF THE CENTER LINE OF THE ALASKA TIDELANDS SURVEY NO. 965 AND THE CENTER LINE OF THE ALASKA TIDELANDS SURVEY NO. 3790, BEING THE POINT OF BEGINNING OF THE BEACHING PROJECT, AND PROCEED S89°15'00\"

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U.S. SURVEY 1002

SURVEYORS CERTIFICATE

WE, THE UNDERSIGNED SURVEYORS, HAVE BEEN DULY SWORN AND HAVE MADE A CAREFUL EXAMINATION OF THE ABOVE DESCRIBED SURVEY AND CERTIFY THAT THE SAME IS ACCURATE AND CORRECTLY REPRESENTS THE ACTUAL SURVEY MADE BY US OR UNDER OUR SUPERVISION AND CONTROL.

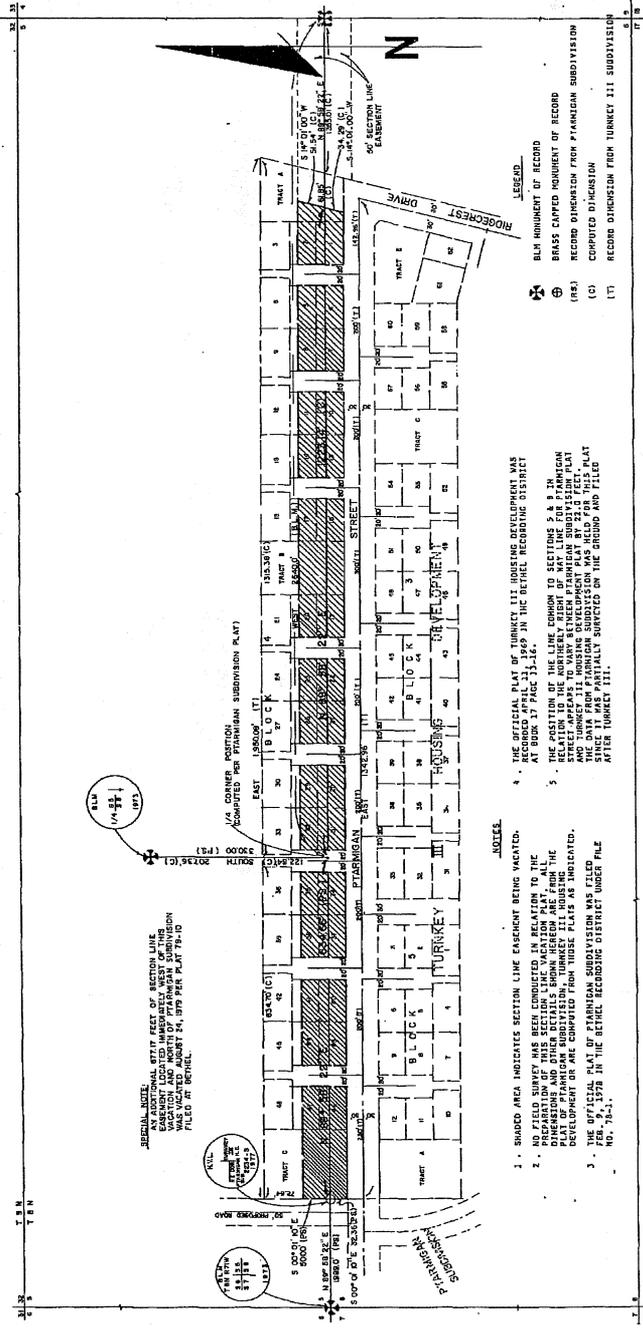
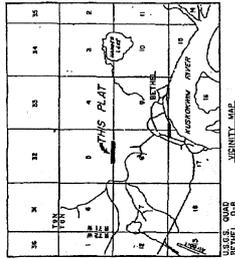
DATE: 1971, 12, 15.

ALASKA DIVISION OF LANDS
 STATE OF ALASKA
 ANCHORAGE, ALASKA

ALASKA TIDELANDS SURVEY NO. 965, T.6N, R.71W, S.M.

Drawn by: [Signature]
 Date: 12/15/71
 Approved: [Signature]
 Scale: 1" = 400'

Sheet 1 of 1 A1S 965



SPECIAL NOTE:
AN ADDITIONAL 87 1/2 FEET OF SECTION LINE VACATION AND 100 FEET OF PATRIARCHAN SUBDIVISION WAS APPLICABLE TO TRACT 54, 1879 PER PLAT 75-10

SEE PLAT 75-10 FOR SECTION LINE VACATION

SEE PLAT 75-10 FOR SECTION LINE VACATION

SEE PLAT 75-10 FOR SECTION LINE VACATION

CERTIFICATE OF OWNERSHIP
I, (NAME) HEREBY CERTIFY THAT I AM THE OWNER(S) OF THE PROPERTY SHOWN AND DESCRIBED HEREIN, AND THAT THE PROPERTY IS NOT SUBJECT TO ANY OTHER SECTION LINE VACATION OR EASEMENT PLAT, AND THAT THE PROPERTY IS NOT SUBJECT TO ANY OTHER SECTION LINE VACATION OR EASEMENT PLAT.

Signature
DATE: 4/14/80

OWNER'S ACKNOWLEDGEMENT
SUBSCRIBED AND SIGNED TO BEFORE ME THIS 14th DAY OF April 1980, BY COMMISSIONER OFFICER *James J. Hayes*

LOT 29 BURNING DATE: 7-5-80

NOTARY'S ACKNOWLEDGEMENT
SUBSCRIBED AND SIGNED TO BEFORE ME THIS 14th DAY OF April 1980, BY COMMISSIONER OFFICER *James J. Hayes*

80-15
RECORDED - FILED IN
BOOK 12-22 PAGE 20
DATE 4/14/80
OFFICE OF THE CLERK
STATE OF ALASKA



DATE OF RIVER PLAT
BOOK 12-22 PAGE 20
STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF TECHNICAL SERVICES
SECTION LINE EASEMENT VACATION PLAT
TURKEY III SUBDIVISION DEVELOPMENT
REGISTERED TO: S. B. & S. M. TRIV. S.M.A.V.
REGISTERED TO: S. B. & S. M. TRIV. S.M.A.V.
REGISTERED TO: S. B. & S. M. TRIV. S.M.A.V.

APPROVALS
THE STATE OF ALASKA, ACTING BY AND THROUGH THE COMMISSIONERS OF THE DEPARTMENT OF NATURAL RESOURCES AND THE COMMISSIONERS OF THE DEPARTMENT OF TECHNICAL SERVICES, HAS REVIEWED THE SECTION LINE EASEMENT VACATION PLAT AND HAS DETERMINED THAT THE STATE OF ALASKA VACATES AND RELEASES ALL RIGHTS AND TITLE TO THE SECTION LINE EASEMENT VACATION PLAT AND THAT THE SECTION LINE EASEMENT VACATION PLAT IS SUBJECT TO THE SECTION LINE VACATION PLAT 75-10-010 (SPECIFIC AREA DELINEATED)

APPROVED BY: *Robert J. Hayes*
DATE: 4/14/80

APPROVED BY: *James J. Hayes*
DATE: 4/14/80

APPROVALS
THE STATE OF ALASKA, ACTING BY AND THROUGH THE COMMISSIONERS OF THE DEPARTMENT OF NATURAL RESOURCES AND THE COMMISSIONERS OF THE DEPARTMENT OF TECHNICAL SERVICES, HAS REVIEWED THE SECTION LINE EASEMENT VACATION PLAT AND HAS DETERMINED THAT THE STATE OF ALASKA VACATES AND RELEASES ALL RIGHTS AND TITLE TO THE SECTION LINE EASEMENT VACATION PLAT AND THAT THE SECTION LINE EASEMENT VACATION PLAT IS SUBJECT TO THE SECTION LINE VACATION PLAT 75-10-010 (SPECIFIC AREA DELINEATED)

APPROVED BY: *Robert J. Hayes*
DATE: 4/14/80

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APPROVED BY: *Robert J. Hayes*
DATE: 4/14/80

APPROVED BY: *James J. Hayes*
DATE: 4/14/80

SECTION LINE EASEMENT VACATION PLAT

DATE OF RIVER PLAT
BOOK 12-22 PAGE 20
STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF TECHNICAL SERVICES
SECTION LINE EASEMENT VACATION PLAT
TURKEY III SUBDIVISION DEVELOPMENT
REGISTERED TO: S. B. & S. M. TRIV. S.M.A.V.
REGISTERED TO: S. B. & S. M. TRIV. S.M.A.V.
REGISTERED TO: S. B. & S. M. TRIV. S.M.A.V.

Appendix F

Department of Community and Economic Development:

Community Information Summary

Community Funding Database

Rural Alaska Project Identification and Delivery System

Municipal Contact Information

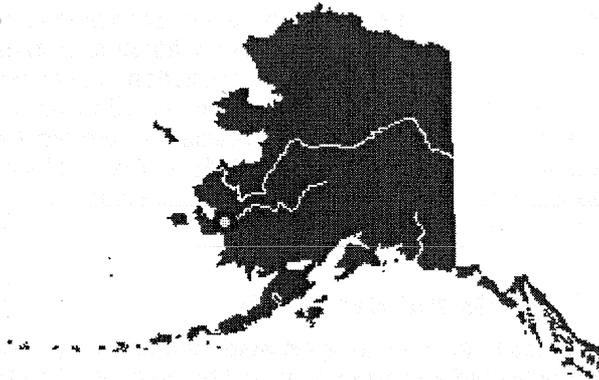
Department of Transportation & Public Facilities:

Central Regions Bid Calendar for Project in Bethel, Alaska

Community Information Summary

Alaska Community Database Community Information Summaries (CIS)

[State of Alaska](#) > [Commerce](#) > [Community Advocacy](#) > [Community Database Online](#) > [CIS](#) > [Results](#)



Bethel

(BETH-ul); a.k.a. Orutsararmuit

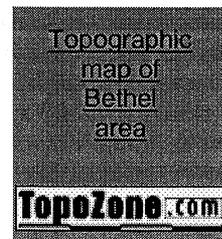
For Photos of Bethel click [here](#)

For a Map of Bethel click [here](#)

Current Population:	5,899 (2003 State Demographer est.)
Incorporation Type:	2nd Class City
Borough Located In:	Unorganized
Taxes:	Sales: 5%, Property: None, Special: 5% Alcohol Tax; 3% Hotel/B&B Tax; 6% Gaming Tax; Fuel Tax; Vehicle Registration Tax

Location and Climate

Bethel is located at the mouth of the Kuskokwim River, 40 miles inland from the Bering Sea. It lies in the Yukon Delta National Wildlife Refuge, 400 air miles west of Anchorage. It lies at approximately 60.792220° North Latitude and -161.75583° West Longitude. (Sec. 09, T008N, R071W, Seward Meridian.) Bethel is located in the Bethel Recording District. The area encompasses 43.8 sq. miles of land and 5.1 sq. miles of water. Precipitation averages 16 inches a year in this area, with snowfall of 50 inches. Summer temperatures range from 62 to 42; winter temperatures average 19 to -2.



History, Culture and Demographics

Bethel was first established by Yup'ik Eskimos who called the village "Mumtrekhlogamute," meaning "Smokehouse People," named for the nearby fish smokehouse. There were 41 people in Bethel during the 1880 U.S. Census. At that time, it was an Alaska Commercial Company

Trading Post. The Moravian Church established a mission in the area in 1884. The community was moved to its present location due to erosion at the prior site. A post office was opened in 1905. Before long, Bethel was serving as a trading, transportation and distribution center for the region, which attracted Natives from surrounding villages. The City was incorporated in 1957. Over time, federal and state agencies established regional offices in Bethel.

A federally recognized tribe is located in the community -- the Orutsararmuit Native Council. 68% of the population are Alaska Native or part Native. The region is fortunate in that rapid development did not occur before the importance of protecting the Native culture was realized. The traditional Yup'ik Eskimo practices and language remain predominant in the area. Subsistence activities and commercial fishing are major contributors to residents' livelihoods. The sale of alcohol is banned in the community, although importation or possession is allowed. During the 2000 U.S. Census, there were 1,990 total housing units, and 249 were vacant. 61 of these vacant housing units are used only seasonally. 2,459 residents were employed. The unemployment rate at that time was 8.95%, although 33.49% of all adults were not in the work force. The median household income was \$57,321, per capita income was \$20,267, and 11.18% of residents were living below the poverty level.

Facilities, Utilities, Schools and Health Care

Some residents are connected to the central piped water and sewer system. Approximately 75% of households have water delivered and sewage hauled by truck. Several facilities in Bethel have individual wells and septic tanks. For health reasons the City ruled that residents can no longer use honeybuckets. Extensions of the piped systems to the City Subdivision and Old Town are under construction. Water Treatment Plant improvements have been completed in Bethel Heights. Additional funding has been requested to connect 105 homes to the piped system. Electricity is provided by Bethel Utilities Corporation. There are 6 schools located in the community, attended by 1,328 students. Local hospitals or health clinics include Yukon-Kuskokwim Delta Regional Hospital (543-6511); Bethel Family Health Clinic (543-3773). The hospital is a qualified Acute Care facility, and the clinic is a qualified Emergency Care Center. Specialized Care: YKHC Phillips Alcohol Program (City-operated health care, lodging, rehabilitation); YKHC Outpatient Services (Calista-operated health care, information); Bethel Community Services' Malon. Bethel is classified as a large town/Regional Center, it is found in EMS Region 7A in the Yukon/Kuskokwim Region. Emergency Services have limited highway, river, floatplane and airport access. Emergency service is provided by 911 Telephone Service, volunteers and a health aide. Auxiliary health care is provided by Bethel Fire Dept. & Ambulance Service (543-2131); Yukon Kuskokwim Health Corp. Ambulance & Aeromed Int'l. Medevac (677-7501/888-283-7220).

Economy and Transportation

Bethel serves as the regional center for 56 villages in the Yukon-Kuskokwim Delta. Food, fuel, transportation, medical care, and other services for the region are provided by Bethel. 50% of the jobs in Bethel are in government positions. Commercial fishing is an important source of income; 200 residents hold commercial fishing permits, primarily for salmon and herring roe net fisheries. Subsistence activities contribute substantially to villager's diets, particularly salmon, freshwater fish, game birds and berries. Poor fish returns since 1997 have significantly affected the community.

The State-owned Bethel Airport is the regional transportation center, and is served by a number of passenger airlines, cargo carriers, and numerous air taxi services. Bethel is the third busiest airport in Alaska. It offers a 6,398' long by 150' wide asphalt runway and 1,850' long by 75' wide gravel crosswind runway, and is currently undergoing a \$7 million renovation and expansion. Two float plane bases are nearby, Hangar Lake and H Marker Lake. The Port of Bethel includes a small boat harbor, dry land storage, and up to 5,000 feet of transient moorage on the seawall.

River travel is the primary means of local transportation in the summer, and it becomes a 150-mile ice road to surrounding villages in the winter. A barge service based in Bethel provides goods to the Kuskokwim villages. There are 16 miles of graded dirt roads maintained by the City and 22 miles of paved roads maintained by the State DOT. Winter trails are marked to Napakiak (1.1 mi.) and Akiachak (19 mi.)

Organizations with Local Offices

Chamber of Commerce - Bethel Chamber of Commerce

P.O. Box 329

Bethel, AK 99559

Phone 907-543-2911

Fax 907-543-2255

E-mail bethelchamber2@alaska.com

Web <http://www.bethelchamber.org>

City - City of Bethel

P.O. Box 1388

Bethel, AK 99559

Phone 907-543-2047

Fax 907-543-4171

E-mail boherron@alaska.com

Web <http://www.cityofbethel.org>

Economic Development - Lower Kuskokwim Resource Conser. & Dev.

P.O. Box 1869

Bethel, AK 99559

Phone 907-543-7157

Electric Utility - Bethel Utilities Corporation

3380 C Street, Suite 210

Anchorage, AK 99503-3952

Phone 907-562-2500

Fax 907-562-2502

Housing Authority - AVCP Reg. Housing Authority

P.O. Box 767

Bethel, AK 99559

Phone 907-543-3121

Fax 907-543-3933

E-mail ron@avcphousing.org

Web <http://www.avcphousing.org>

Media - Tundra Drums

PO Box 868

Bethel, AK 99559

Phone 907-543-3500

Fax 907-543-3312

E-mail drums@unicorn-alaska.com

Web <http://www.alaskanewspapers.com>

Media - The Delta Discovery

P.O. Box 1028

Bethel, AK 99559

Phone 907-543-4113

Fax 907-543-4116
E-mail realnews@deltadiscovery.com
Web <http://www.deltadiscovery.com>

Other - Cenaliulriit Coastal Resource Service Area
P.O. Box 219
Bethel, AK 99559
Phone 877-827-8747
E-mail cenaliulriit@starband.net

Regional Development - Lower Kuskokwim Ec. Dev. Coun.
P.O. Box 2021
Bethel, AK 99559
Phone 907-543-5967
Fax 907-543-3130
E-mail carl_berger@ddc-alaska.org
Web <http://www.lkedc.org/>

Regional Health Corporation - Yukon-Kuskokwim Health Corp.
P.O. Box 528
Bethel, AK 99559
Phone 907-543-6020
Fax 907-543-6006
E-mail gene_peltola@ykhc.org
Web <http://www.ykhc.org/>

Regional Native Corporation - Calista Corporation
301 Calista Court, Suite A
Anchorage, AK 99518-3028
Phone 907-279-5516
Fax 907-272-5060
E-mail calista@calistacorp.com
Web <http://www.calistacorp.com/>

Regional Native Non-Profit - Assoc. of Village Council Presidents
P.O. Box 219
Bethel, AK 99559
Phone 907-543-3521
Fax 907-543-3369
E-mail Myron_Naneng@avcp.org
Web <http://www.avcp.org/>

School District - Lower Kuskokwim Schools
P.O. Box 305
Bethel, AK 99559-0305
Phone 907-543-4800
Fax 907-543-4904
E-mail bill_ferguson@lkcd.org
Web <http://www.lkcd.org>

Village Corporation - Bethel Native Corporation
P.O. Box 719
Bethel, AK 99559
Phone 907-543-2124
Fax 907-543-2897

Village Council - Orutsarmuit Native Council

P.O. Box 927
Bethel, AK 99559-0927
Phone 907-543-2608
Fax 907-543-2639
E-mail folrun@nativecouncil.org

Regional Organizations

School District - Lower Kuskokwim Schools

P.O. Box 305
Bethel, AK 99559-0305
Phone 907-543-4800
Fax 907-543-4904
E-mail bill_ferguson@lksd.org
Web <http://www.lksd.org>

Regional Native Corporation - Calista Corporation

301 Calista Court, Suite A
Anchorage, AK 99518-3028
Phone 907-279-5516
Fax 907-272-5060
E-mail calista@calistacorp.com
Web <http://www.calistacorp.com/>

Regional Native Health Corporation - Yukon-Kuskokwim Health Corp.

P.O. Box 528
Bethel, AK 99559
Phone 907-543-6020
Fax 907-543-6006
E-mail gene_peltola@ykhc.org
Web <http://www.ykhc.org/>

Regional Native Non-Profit - Assoc. of Village Council Presidents

P.O. Box 219
Bethel, AK 99559
Phone 907-543-3521
Fax 907-543-3369
E-mail Myron_Naneng@avcp.org
Web <http://www.avcp.org/>

Native Housing Authority - Orutsarmuit Native Council

P.O. Box 927
Bethel, AK 99559-0927
Phone 907-543-2608
Fax 907-543-2639
E-mail folrun@nativecouncil.org

Regional Development - Lower Kuskokwim Ec. Dev. Coun.

P.O. Box 2021
Bethel, 99559
Phone 907-543-5967
Fax 907-543-3130

E-mail carl_berger@ddc-alaska.org
Web <http://www.lkedc.org/>

Community Funding Database

Community Funding Database

State of Alaska > Commerce > Community Advocacy > Community Funding Database > Results

Bethel (2nd Class City)

Fiscal Year	Grant Type	Recipient	Project Description	Project Status	Lapse Date	Award Amount	Total Disbursed	Total Reported	Balance
1997	Legislative	Assn. Village Council Pres.	Fisheries Research Kwethluk and Lower Yukon Rivers	Closed	Not Entered	\$19,123	\$19,123	\$19,123	\$0
1995	Legislative	Assn. Village Council Pres.	Program Operations	Closed	Not Entered	\$30,000	\$0	\$0	\$0
1993	Legislative	Assn. Village Council Pres.	Emergency Runway Lights	Closed	Not Entered	\$6,000	\$6,000	\$6,000	\$0
1992	Legislative	Assn. Village Council Pres.	Portable Runway Lights	Closed	Not Entered	\$12,000	\$0	\$0	\$0
2005	ACMP	City of Bethel	05 - Required Tasks	Active In Progress	Not Entered	\$7,000	\$4,200	\$4,200	\$2,801
2005	ACMP	City of Bethel	FY05 - ACMP District Plan Amendment	Active In Progress	Not Entered	\$18,000	\$0	\$0	\$18,000
2005	Mini-Grant	City of Bethel	Development Plan for Recreation Facility	Active In Progress	Not Entered	\$30,000	\$0	\$0	\$30,000
2004	TFR	City of Bethel	Temporary Fiscal Relief Grant	Closed	Not Entered	\$151,820	\$0	\$0	\$0
2004	FDA	City of Bethel	Direct Aid to Fisheries-Impacted Communities	Closed	Not Entered	\$20,338	\$0	\$0	\$0
2004	ACMP	City of Bethel	04 - Required Tasks	Closed	2004-06-30 00:00:00.0	\$6,151	\$6,151	\$6,151	\$0
2003	Legislative	City of Bethel	Dust Control	Active In Progress	2007-06-30 00:00:00.0	\$143,500	\$28,700	\$0	\$114,800
2003	Safe	City of Bethel	Safe Communities	Closed	2004-06-30 00:00:00.0	\$133,380	\$133,380	\$0	\$0
2003	ACMP	City of Bethel	Alaska Coastal Management Plan 306 Grant	Closed	2003-06-30 00:00:00.0	\$7,100	\$7,100	\$7,100	\$0
2003	Capital Matching	City of Bethel	City Hall Renovation	Active In Progress	2007-06-30 00:00:00.0	\$110,194	\$0	\$0	\$110,194
2003	Mini-Grant	City of Bethel	Community Priorities & Economic Development Strategic Plan	Closed	Not Entered	\$29,965	\$29,965	\$29,965	\$0
2003	PILT	City of Bethel	Payment in Lieu of Taxes	Closed	Not Entered	\$360,835	\$360,835	\$0	\$0
					2004-06-				

2003	SRS	City of Bethel	State Revenue Sharing	Closed	30 00:00:00.0	\$169,456	\$169,456	\$0	\$C
2002	Capital Matching	City of Bethel	City Hall Renovation	Active In Progress	2006-06-30 00:00:00.0	\$112,101	\$84,561	\$84,561	\$27,540
2002	Fish Business	City of Bethel	Shared Fisheries Business Tax	Closed	Not Entered	\$564	\$564	\$0	\$C
2002	PILT	City of Bethel	Payment in Lieu of Taxes	Closed	Not Entered	\$337,442	\$337,442	\$0	\$C
2002	SRS	City of Bethel	State Revenue Sharing	Closed	2003-06-30 00:00:00.0	\$154,688	\$154,688	\$0	\$C
2002	CDBG	City of Bethel	Senior Center Renovation/Upgrade	Active In Progress	Not Entered	\$280,772	\$171,456	\$171,456	\$109,316
2002	ACMP	City of Bethel	Alaska Coastal Management Plan 306 Grant	Closed	Not Entered	\$7,100	\$0	\$0	\$C
2002	Safe	City of Bethel	Safe Communities	Closed	2003-06-30 00:00:00.0	\$132,359	\$132,359	\$0	\$C
2001	Capital Matching	City of Bethel	City Hall Renovation	Closed	Not Entered	\$115,182	\$115,182	\$115,182	\$C
2000	Capital Matching	City of Bethel	Braund Building Renovation	Closed	2004-06-30 00:00:00.0	\$112,740	\$112,740	\$112,740	\$C
1999	Capital Matching	City of Bethel	Braund Building Renovation	Closed	2003-06-30 00:00:00.0	\$107,358	\$107,358	\$107,358	\$C
1998	Capital Matching	City of Bethel	Braund Building Renovation	Closed	2002-06-30 00:00:00.0	\$108,061	\$108,061	\$108,061	\$C
1998	Capital Matching	City of Bethel	Community Facilities and Equipment	Closed	2002-06-30 00:00:00.0	\$50,553	\$50,553	\$50,553	\$C
1998	CDBG	City of Bethel	Owl Street Park	Closed	Not Entered	\$197,860	\$197,860	\$197,860	\$C
1997	Capital Matching	City of Bethel	Braund Building Renovation	Closed	2001-06-30 00:00:00.0	\$109,120	\$109,120	\$109,120	\$C
1997	Capital Matching	City of Bethel	Braund Building Renovation	Closed	2001-06-30 00:00:00.0	\$52,497	\$52,497	\$52,497	\$C
1996	Capital Matching	City of Bethel	Braund Building Renovation	Closed	2000-06-30 00:00:00.0	\$157,663	\$157,663	\$157,663	\$C
1995	Capital Matching	City of Bethel	Braund Building Renovation	Closed	2000-06-30 00:00:00.0	\$160,773	\$160,773	\$160,773	\$C
1994	Legislative	City of Bethel	Braund Building Renovations	Closed File is Closed	Not Entered	\$300,000	\$300,000	\$300,000	\$C
1994	Capital Matching	City of Bethel	Courthouse Roof Reconstruction	Closed	1998-06-30 00:00:00.0	\$188,680	\$136,183	\$136,183	\$C

1993	Legislative	City of Bethel	Road Construction/Gravel Stockpile	Closed File is Closed	Not Entered	\$160,000	\$160,000	\$160,000	\$0
1992	Legislative	City of Bethel	Road Improvement/Equipment Purchase	Closed File is Closed	Not Entered	\$550,000	\$550,000	\$550,000	\$0
1990	Legislative	City of Bethel	Public Safety Vehicles	Closed File is Closed	Not Entered	\$80,000	\$80,000	\$80,000	\$0
1988	Legislative	City of Bethel	Multi-purpose Bulkhead Toe Protection	Closed	Not Entered	\$400,000	\$400,000	\$400,000	\$0
1988	Legislative	City of Bethel	Boat Harbor Finger Floats	Closed File is Closed	Not Entered	\$149,949	\$149,949	\$149,949	\$0
1988	Legislative	City of Bethel	Community Improvements	Closed File is Closed	Not Entered	\$100,000	\$100,000	\$100,000	\$0
1988	Legislative	City of Bethel	Road Improvements	Closed File is Closed	Not Entered	\$100,000	\$100,000	\$100,000	\$0
1987	Legislative	City of Bethel	Water and Sewer Projects	Closed File is Closed	Not Entered	\$200,000	\$200,000	\$200,000	\$0
1987	Legislative	City of Bethel	Erosion Control	Closed File is Closed	Not Entered	\$4,000,000	\$4,000,000	\$4,000,000	\$0
1986	Legislative	City of Bethel	Philips Alcohol Treatment Center/Expansion and Improvements and Teen Center Improvements	Closed File is Closed	Not Entered	\$1,349,000	\$1,349,000	\$1,349,000	\$0
1986	Legislative	City of Bethel	Public Safety Equipment and Facilities	Closed File is Closed	Not Entered	\$50,000	\$50,000	\$50,000	\$0
1985	Legislative	City of Bethel	Bethel Prematernal Home	Closed File is Closed	Not Entered	\$21,500	\$21,500	\$21,500	\$0
1985	Legislative	City of Bethel	Training Center Fire Fighting Methods & Use of Equip.	Closed File is Closed	Not Entered	\$125,300	\$125,300	\$125,300	\$0
1985	Legislative	City of Bethel	Roads	Closed File is Closed	Not Entered	\$550,000	\$550,000	\$550,000	\$0
1985	Legislative	City of Bethel	Erosion Control	Closed File is Closed	Not Entered	\$2,200,000	\$2,200,000	\$2,200,000	\$0
1985	Legislative	City of Bethel	Erosion Control Project	Closed File is Closed	Not Entered	\$605,000	\$605,000	\$605,000	\$0
1985	Legislative	City of Bethel	Family Clinic Medical Equipment	Closed File is Closed	Not Entered	\$75,000	\$75,000	\$75,000	\$0
1984	Legislative	City of Bethel	Patch Program	Closed File is Closed	Not Entered	\$20,000	\$20,000	\$20,000	\$0
1984	Legislative	City of Bethel	Energy Consv Adts/Grnts/Pur of Emrg	Closed File is	Not	\$259,300	\$259,300	\$259,300	\$0

			Equip--Amend 85/105	Closed	Entered				
1984	Legislative	City of Bethel	Erosion Control Projects	Closed File is Closed	Not Entered	\$5,000,000	\$5,000,000	\$5,000,000	\$C
1984	Legislative	City of Bethel	Purchase Mat for Waste Heat Utilidor to Pub. Fac.	Closed File is Closed	Not Entered	\$426,000	\$426,000	\$426,000	\$C
1984	Legislative	City of Bethel	Waste Heat Utilidor	Closed File is Closed	Not Entered	\$275,000	\$275,000	\$275,000	\$C
1984	Legislative	City of Bethel	Sewer System Improvements	Closed File is Closed	Not Entered	\$200,000	\$200,000	\$200,000	\$C
1984	Legislative	City of Bethel	Sewer Line Extension	Closed File is Closed	Not Entered	\$60,000	\$60,000	\$60,000	\$C
1984	Legislative	City of Bethel	Prematernal Home	Closed File is Closed	Not Entered	\$47,500	\$47,500	\$47,500	\$C
1983	Legislative	City of Bethel	Norma Jean Center for Young Children	Closed File is Closed	Not Entered	\$31,300	\$31,300	\$31,300	\$C
1983	Legislative	City of Bethel	Mini Parks	Closed File is Closed	Not Entered	\$30,000	\$30,000	\$30,000	\$C
1983	Legislative	City of Bethel	Water and Sewer Vehicle	Closed File is Closed	Not Entered	\$428,000	\$428,000	\$428,000	\$C
1983	Legislative	City of Bethel	Airport Firetruck	Closed File is Closed	Not Entered	\$225,000	\$225,000	\$225,000	\$C
1983	Legislative	City of Bethel	Bank Stabilization Dock	Closed File is Closed	Not Entered	\$1,438,000	\$1,438,000	\$1,438,000	\$C
1983	Legislative	City of Bethel	Road Resurfacing	Closed File is Closed	Not Entered	\$500,000	\$500,000	\$500,000	\$C
1983	Legislative	City of Bethel	Bank Stabilization Project	Closed File is Closed	Not Entered	\$5,000,000	\$5,000,000	\$5,000,000	\$C
1983	Legislative	City of Bethel	Civic Center Planning	Closed File is Closed	Not Entered	\$100,000	\$100,000	\$100,000	\$C
1983	Legislative	City of Bethel	Chronically Handicapped Program	Closed File is Closed	Not Entered	\$20,000	\$20,000	\$20,000	\$C
1983	Legislative	City of Bethel	Juvenile Rec. Center	Closed File is Closed	Not Entered	\$350,000	\$350,000	\$350,000	\$C
1983	Legislative	City of Bethel	Model Clinic	Closed File is Closed	Not Entered	\$60,000	\$60,000	\$60,000	\$C
1983	Legislative	City of Bethel	Prematernal Home	Closed File is Closed	Not Entered	\$78,000	\$78,000	\$78,000	\$C

1982	Legislative	City of Bethel	Child Care Center Completion	Closed File is Closed	Not Entered	\$210,000	\$210,000	\$210,000	\$C
1982	Legislative	City of Bethel	Riverbank Erosion Control/Moorage	Closed File is Closed	Not Entered	\$5,250,000	\$5,250,000	\$5,250,000	\$C
1982	Legislative	City of Bethel	Small Boat Harbor--Phase II	Closed File is Closed	Not Entered	\$777,000	\$777,000	\$777,000	\$C
1982	Legislative	City of Bethel	Southwest Alaska Dredging	Closed File is Closed	Not Entered	\$1,000,000	\$1,000,000	\$1,000,000	\$C
1982	Legislative	City of Bethel	Pinky's Wayside Park	Closed File is Closed	Not Entered	\$17,500	\$17,500	\$17,500	\$C
1982	Legislative	City of Bethel	Women's Shelter Construction, Phase II	Closed File is Closed	Not Entered	\$900,000	\$900,000	\$900,000	\$C
1981	Legislative	City of Bethel	Recreation/Agriculture Facility	Closed File is Closed	Not Entered	\$528,000	\$528,000	\$528,000	\$C
1981	Legislative	City of Bethel	Utility Purchase Feasibility Study	Closed File is Closed	Not Entered	\$50,000	\$50,000	\$50,000	\$C
1981	Legislative	City of Bethel	Yukon/Kuskokwim Fair Building	Closed File is Closed	Not Entered	\$137,500	\$137,500	\$137,500	\$C
1981	Legislative	City of Bethel	Kuskokwim River Dredging	Closed File is Closed	Not Entered	\$1,400,000	\$1,400,000	\$1,400,000	\$C
1981	Legislative	City of Bethel	Fish Processing Industry Feasibility Study	Closed File is Closed	Not Entered	\$15,000	\$15,000	\$15,000	\$C
1981	Legislative	City of Bethel	AVCP Housing Authority--Ptarmigan Subd	Closed File is Closed	Not Entered	\$150,000	\$150,000	\$150,000	\$C
1981	Legislative	City of Bethel	AVCP Housing Authority--Akolmuit Land	Closed File is Closed	Not Entered	\$50,000	\$50,000	\$50,000	\$C
1981	Legislative	City of Bethel	Alaska Economic Reporting System	Closed File is Closed	Not Entered	\$45,000	\$45,000	\$45,000	\$C
1981	Legislative	City of Bethel	Liquor Store Tax Liability	Closed File is Closed	Not Entered	\$26,000	\$26,000	\$26,000	\$C
1981	Legislative	City of Bethel	Governor Declared Disaster--Unmet Needs	Closed File is Closed	Not Entered	\$26,000	\$26,000	\$26,000	\$C
1981	Legislative	City of Bethel	Shelter Cabins--Southwest Alaska	Closed File is Closed	Not Entered	\$75,000	\$75,000	\$75,000	\$C
1981	Legislative	City of Bethel	Sewer Line--Bethel Heights	Closed File is Closed	Not Entered	\$300,000	\$300,000	\$300,000	\$C
1981	Legislative	City of Bethel	Youth Services	Closed File is Closed	Not Entered	\$50,000	\$50,000	\$50,000	\$C

1981	Legislative	City of Bethel	Pumper Fire Truck	Closed File is Closed	Not Entered	\$125,000	\$125,000	\$125,000	\$C
1981	Legislative	City of Bethel	Senior Citizens--Cost Overrun	Closed File is Closed	Not Entered	\$400,000	\$400,000	\$400,000	\$C
1981	Legislative	City of Bethel	Prematernal Home Project	Closed File is Closed	Not Entered	\$50,800	\$50,800	\$50,800	\$C
1981	Legislative	City of Bethel	Kuskokwim Museum Halon Fire Protection	Closed File is Closed	Not Entered	\$10,000	\$10,000	\$10,000	\$C
1981	Legislative	City of Bethel	Kuskokwim Consortium Library	Closed File is Closed	Not Entered	\$39,700	\$39,700	\$39,700	\$C
1981	Legislative	City of Bethel	Pumper Tanker	Closed File is Closed	Not Entered	\$30,000	\$30,000	\$30,000	\$C
1981	Legislative	City of Bethel	Road construction and improvements	Closed File is Closed	Not Entered	\$900,000	\$900,000	\$900,000	\$C
1981	Legislative	City of Bethel	Bethel Roads	Closed File is Closed	Not Entered	\$294,000	\$294,000	\$294,000	\$C
1981	Legislative	City of Bethel	Louse Town Slough Boat Harbor	Closed File is Closed	Not Entered	\$1,514,900	\$1,514,900	\$1,514,900	\$C
1981	Legislative	City of Bethel	Dock expansion	Closed File is Closed	Not Entered	\$650,000	\$650,000	\$650,000	\$C
1981	Legislative	City of Bethel	Youth/Adult Hostel	Closed File is Closed	Not Entered	\$500,000	\$500,000	\$500,000	\$C
1981	Legislative	City of Bethel	Solid Waste Equipment	Closed File is Closed	Not Entered	\$260,000	\$260,000	\$260,000	\$C
1997	Legislative	Orutsarmuit Native Council	Fisheries Research Kuskokwim Districts W- 1 & W-2	Closed	Not Entered	\$13,659	\$13,659	\$13,659	\$C
1994	Legislative	Orutsarmuit Native Council	Office Remodel	Closed	Not Entered	\$32,000	\$30,773	\$30,773	\$C
1995	Legislative	Yukon Kuskokwim Health Corp.	Water Safety Program	Closed	Not Entered	\$29,300	\$0	\$0	\$C
1994	Legislative	Yukon Kuskokwim Health Corp.	Water Safety Program	Closed	Not Entered	\$39,300	\$0	\$0	\$C

Services Webmaster

Rural Alaska Project Identification and Delivery System

RAPIDS: Rural Alaska Project Identification and Delivery System

State of Alaska > Commerce > Community Advocacy > Community Database Online > RAPIDS > Search Results

If you have questions about specific projects, please contact the lead agency.

See the agency contacts [here](#).

For additional explanation of the columns below, please see the RAPIDS description [here](#).

Bethel

Lead Agency	Fiscal Year	Project Status	Project Description/Comments	Project Stage	Agency Cost	Total Cost	Schedule	Type/Contractor
DEC/VSW	2005	Funded	Water and Sewer Improvements, PH VI	Preliminary	\$750,000	\$3,000,000	N/A	N/A
EDA	2005	Funded	Construction of a shop facility that will be used to provide comprehensive training in the construction trades. Estimated (40-50 job trainees/year; \$2.5 million private investment)	Contract	\$1,800,000	\$2,587,397	Approved 9/22/04	Direct Grant: Yuut Elitnaurviat - People's Learning Center, Inc
DCCED	2005	Funded	Yuut Elitnaurviat. Design & Construct People's Learning Center, Phase I Legislative Grant	Construction	\$1,000,000	\$1,000,000	N/A	Yuut Elitnaurviat Inc
USDA/RD	2004	Funded	Yuut Elitnaurviat Inc. Regional Voc/Tech School RD grant \$2,000,000; Letter of Conditions issued	Preliminary	\$2,000,000	\$16,900,000	N/A	Yuut Elitnaurviat Inc.
Denali	2004	Funded	Yuut Elitnaurviat. Vocational Education/Job Training Facility (Peoples Learning Center) Develop Yuut Elitnaurviat - the "People's Learning Center". Funding - BIA \$2M; Rasmuson \$2M; SOA \$ 900,000; UA \$500,000M; Paul G. Allen Foundation \$100,000.	Contract	\$1,000,000	\$8,100,000	Start 04/01/2004 End 06/01/2005	Yuut Elitnaurviat Inc
HUD	2004	Funded	Indian Housing Block Grant - Calista Native Regional Corporation NAHASDA administration, operating & construction funds	Preliminary	\$6,082,787	\$6,082,787	N/A	Direct Grant: AVCP Regional Housing Authority
DEC/VSW	2004	Funded	Water & Sewer Improvements EPA \$2,493.7 Construction, construction management services and administrative services for Phases B and C Improvement for the City Subdivision water and sewer improvements as part of Phase I improvements.	Construction	\$831,300	\$3,325,000	2002-2005	Constructive Management Account & Contract Administrator CRW Engineering Group & CH2M Hill
HUD	2004	Funded	Indian Housing Block Grant NAHASDA administration, operating & construction funds	Preliminary	\$2,247,251	\$2,247,251	N/A	Direct Grant: Orutsaram Native Village

HUD	2004	Funded	Indian Housing Block Grant - Orutsararmuit Native Council NAHASDA administration, operating & construction funds	Preliminary	\$1,842,906	\$1,842,906	N/A	Direct Grant: Orutsararmuit Native Council
FAA	2004	Funded	Improve Runway Safety Area	Contract	\$1,399,999	\$1,493,332	Grant Agreement Date 7/26/04	Contract: AKDOT/PF
FAA	2004	Funded	Rehabilitate Runway	Contract	\$1,200,000	\$1,280,000	Grant Agreement Date 7/26/04	Contract: AKDOT/PF
COE	2004	Funded	Bethel Bank Stabilization Cost Range \$1-5M.	Preliminary	\$1,000,000	\$1,000,000	Estimated Advertisement Date - Jul-04	8(a) compet.
EED	2004	Funded	LKSD Weatherization Projects	Preliminary	\$649,338	\$649,338	N/A	N/A
DOT&PF	2004	Funded	Dock Deferred Maintenance & Transfer	Preliminary	\$600,000	\$600,000	N/A	N/A
DEC/VSW	2004	Funded	Water & Sewer Facilities Master Plan Update EPA \$180.0 Update of the water and sewer facilities master plan, a pilot plant study of sewage treatment plant alternatives and preliminary design of the water distribution and sewer collection system.	Contract	\$60,000	\$240,000	2002-2005	A/E Contract: CRW Engineering Group
USDA/RD	2004	Funded	EMS Ph IV Yukon-Kuskokwim Health Corporation RD grant \$131,000; Letter of Conditions issued	Preliminary	\$131,000	\$176,000	N/A	Yukon-Kuskokwim Health Corporation
DCCED	2004	Funded	Lower Kuskokwim Region, Community Mapping Project Mini-Grant. Denali Commission funding	Design	\$0	\$90,000	N/A	Direct Grant: Coastal Villages Region Fund
DCCED	2004	Funded	LKEDC.: Slush Bag Delivery and Installation System Fish Econ Dev.	Contract	\$15,500	\$31,000	N/A	Lower Kuskokwim Economic Development Council, Inc.
EED	2003	Funded	Bethel Region High School Deferred Maintenance Funded by State GO Bond	Design	\$10,905,286	\$11,127,843	N/A	Lower Kuskokwim
FAA	2003	Funded	Construct Runway Safety Area - Bethel Airport Improvements - Stage 1 AKDOT/PF \$333,334 Construct runway safety area and provide interim rehabilitation to runway 18/36 in locations exhibiting swales.	Contract	\$5,000,000	\$5,333,334	Anticipate Advertising In May 2004	Contract: AKDOT/PF AKSAS # 55694
EED	2003	Funded	LKSD District-Wide Asbestos Abatement Funded by State GO Bond	Construction	\$3,000,000	\$3,061,224	N/A	Lower Kuskokwim
DEC/VSW	2003	Funded	Water and Sewer Project EPA \$2,250.0 Construct water and	Construction	\$750,000	\$3,000,000	2002-	Constructive Management Account & Contract Administration

			sewer mains, hydrants, and service connections				2005	CRW Engineering Group & CH2M Hill
AEA-AEEE	2003	Funded	Bethel/Donlin Creek Mining District Power Line Study Denali Commission \$1,500,000. Legislative earmark.	Preliminary	\$0	\$1,500,000	N/A	Calista Corp
DHSS	2003	Funded	Bethel Health Center Design/Build Lease to suit tenant	Construction	\$940,000	\$940,000	7/15/2002	Contract: Tunista Inc
USDA/RD	2003	Funded	2 Water and 2 sewer Trucks RD loan \$320000, RD grant \$208400	Contract	\$528,400	\$783,112	N/A	N/A
FAA	2003	Funded	Acquire Aircraft Rescue & Fire Fighting Vehicle AkDOT/PF \$47733.	Contract	\$716,000	\$763,733	Grant Agreement Date 07/07/03	Contract: AkDOT/PF AKSAS # 56268
DEC/WSW	2003	Funded	Water and Sewer IHS Housing. Service connections for 22 homes.	Construction	\$0	\$698,980	2002-2005	Constructic Manage Account: CRW Engineering Group
HUD/ICDBG	2003	Funded	Tribal Office Rehabilitation ICDBG Program. Orutsaramiut	Preliminary	\$500,000	\$500,000	N/A	Direct Gar
USDA/RD	2003	Funded	Fire Log Recycling Project RD loan \$123,946; RD grant \$55,776; SOA \$68,170	Preliminary	\$179,722	\$468,102	N/A	N/A
DOT&PF	2003	Funded	Ptarmigan St Improvement Resurface Ptarmigan Street from Ridgecrest Drive to Tundra Ridge, a distance of about 10,000 feet. Project does not include separated pathways or illumination.	Design	\$14,400	\$160,000	Anticipate Advertising In: September 2004	Contract
DCCED	2003	Funded	City Hall Renovation Capital Matching	Construction	\$110,194	\$157,420	N/A	Direct Grant: City of Bethel
DCCED	2003	Funded	Dust Control Leg. Grant	Construction	\$143,500	\$143,500	N/A	Direct Grant: City of Bethel
DEC/WSW	2003	Funded	Kasayulie Subdivision Water & Sewer Feasibility Study EPA \$75.0 Completion of water and sewer feasibility study for Kasayuli Subdivision in preparation to conform with the City's 1996 and 2002 Master Plan Updates.	Design	\$25,000	\$100,000	2002-2004	A/E Contract: CRW Engineering Group
DCCED	2003	Funded	Community Priorities & Strategic Plan Mini-Grant. Denali Commission funding	Completed	\$0	\$29,965	N/A	Direct Gar
DHSS	2003	Funded	Bethel Family Clinic: Medical and office equipment. Capital Grant. Purchase of medical and office equipment.	Contract	\$25,000	\$29,145	09/29/02	Bethel Family Clinic
			Bethel Community Services - Receiving Grp Home Ren: All terrain vehicle for the					Bethel Community Services

DHSS	2003	Funded	subsistence program. Capital Grant. All terrain vehicle for the subsistence program.	Contract	\$18,000	\$21,958	08/14/02	Receiving Grp Home Ren
HUD	2002	Funded	Indian Housing Block Grant for communities in the Region (not yet allocated) NAHASDA administration, operating & construction funds	Completed	\$5,822,893	\$5,822,893	N/A	N/A
DEC/SW	2002	Funded	Water and Sewer Improvements EPA \$2,475.0 Construct Phase II water and sewer improvements including the main sewage lift station/force main and Phase B of the City Subdivision piped water and sewer system.	Construction	\$825,000	\$3,300,000	2002-2005	Constructive Manage Account & Contract Administrat CRW Engineerin Group & CH2M Hill
COE	2002	Funded	Erosion Protection/Riverbank Stabilization Design to be completed Jan 2002	Completed	\$2,500,000	\$2,500,000	July 2002-2004	N/A
EED	2002	Funded	LKSD Districtwide ADA Upgrade	Completed	\$0	\$2,217,859	N/A	Contract
HUD	2002	Funded	Indian Housing Block Grant - Orutsararmuit NAHASDA administration, operating & construction funds	Completed	\$1,976,565	\$1,976,565	N/A	N/A
DMVA	2002	Funded	Bethel Readiness Center Planning & Design	Preliminary	\$750,000	\$750,000	N/A	N/A
DCCED	2002	Funded	Senior Center Renovation/Upgrade CDBG	Construction	\$280,772	\$280,772	06/30/04	City of Bethel
EED	2002	Funded	Kilbuk Elementary Boiler Replacement	Completed	\$0	\$236,338	N/A	Contract
ANTHC	2002	Funded	Repair/Renovate Health Clinic Denali Commission Funding. The scope of this project includes, materials and equipment, construction, and labor. No new ground disturbance will occur under this project.	Construction	\$0	\$172,292	60% complete	Force Account
DCCED	2002	Funded	City Hall Renovation Capital Matching	Construction	\$112,278	\$160,397	N/A	Force Account: City of Bethel
ANTHC	2002	Funded	Water/Sewer Connect - 2 homes IHS \$25.0 Provide 2 BIA-HIP homes with water and sewage holding tanks	Design	\$0	\$25,000	Design by Jul 2002; Constr by Aug 2002	Force Account: Orutsararm Native Council
DHSS	2002	Funded	Bethel Health Center - Misc Repairs The entry stairs at the old DOT building need to be replaced and roof runoff water needs to be redirected away from traffic areas.	Construction	\$15,200	\$15,200	End 10/15/02	Contract: NRDOT M&O
BIA	2002	Funded	Winter Trail Marking to Napakiak (1.1 mi.) and Akiachak (19 mi.)	Design	\$6,753	\$6,753	N/A	N/A
			Indian Housing Block Grant for communities in the Region (not					Direct Grant:

HUD	2001	Funded	yet allocated) NAHASDA administration, operating & construction funds	Completed	\$7,777,370	\$7,777,370	N/A	AVCP Housing Authority
HUD	2001	Funded	Indian Housing Block Grant - Calista Native Regional Corporation NAHASDA administration, operating & construction funds	Completed	\$6,285,268	\$6,285,268	N/A	Direct Grant: Calista Native Regional Corporation
DEC/WSW	2001	Funded	Water and Sewer Facilities Improvement Ph II EPA \$2,175.0 Construct Phase II City Subdivision water and sewer for Phases 2 & 3	Construction	\$725,000	\$2,900,000	2002-2005	Constructive Management Account & Contract Administration CRW Engineering Group & CH2M Hill
HUD	2001	Funded	Indian Housing Block Grant - Orutsaramuit Native Village NAHASDA administration, operating & construction funds	Completed	\$1,971,450	\$1,971,450	N/A	Direct Grant: Orutsaramuit Native Village
AHFC	2001	Funded	Housing 4 Units Funded with Home Funds	Completed	\$0	\$777,783	N/A	N/A
AHFC	2001	Funded	Bethel Heights Cul-De-Sac Drainage Improvements Project Completed July 2002	Completed	\$400,197	\$400,197	2001-2002	Contract: Trans Alaska Exc
DEC/WSW	2001	Funded	Solid Waste & Sewage Lagoon Facility Study EPA 217.5 Update to the water and sewer master with a solid waste and sewage lagoon facilities design study.	Design	\$72,500	\$290,000	2002-2004	A/E Contract: CH2M Hill
DCCED	2001	Funded	City Hall Renovation Capital Matching	Completed	\$115,182	\$164,546	N/A	Force Account
DHSS	2001	Funded	Bethel Community Services - Renovations to Malone Assisted Living Home and Kameroff Building Capital Grant 4780	Contract	\$58,253	\$68,253	Start 6/21/01	Direct Grant: Bethel Community Services
DHSS	2001	Funded	Bethel Group Home - Roof replacement Capital Grant 4794	Construction	\$28,385	\$31,097	Start 7/2/01	Direct Grant
DHSS	2001	Funded	Bethel Community Services - Purchase of a landing craft for the cultural and subsistence program fish camp. Capital Grant 4799	Completed	\$25,000	\$25,000	Start 6/1/01, End 6/30/01	Direct Grant: Bethel Community Services
DHSS	2001	Funded	YKHC - Equipment purchase Capital Grant 4797	Contract	\$24,894	\$24,894	Start 6/15/01	Direct Grant: Yukon Kuskokwim Health Corporation
HUD	2000	Funded	Indian Housing Block Grant - Calista Native Regional Corporation NAHASDA administration, operating & construction funds	Completed	\$8,079,636	\$8,079,636	N/A	Direct Grant: AVCP Housing Authority
FAA	2000	Funded	Construct Apron AKDOT \$215,187.	Completed	\$3,227,809	\$3,442,996	N/A	Contract: AKDOT/FF

DEC/VSW	2000	Funded	Water/Wastewater Improvements Ph II EPA \$2,000.0 Construct Phase II water and sewer improvements including the main sewage lift station/force main and Phase B of the City Subdivision piped water and sewer system.	Construction	\$1,000,000	\$3,000,000	2002-2005	Constructive Management Account & Contract Administrator CRW Engineering Group & CH2M Hill
HUD	2000	Funded	Indian Housing Block Grant - Orutsaramuit Native Village NAHASDA administration, operating & construction funds	Completed	\$1,888,031	\$1,888,031	N/A	Direct Grant: AVCP Housing Authority
HUD	2000	Funded	Pre-Maternal Home Expansion EDI Program	Completed	\$1,500,000	\$1,500,000	N/A	Direct Grant
DOT&PF	2000	Funded	Airport Heavy Apron Construction	Completed	\$900,000	\$1,000,000	N/A	N/A
HUD/ICDBG	2000	Funded	Health Clinic ICDBG Program	Completed	\$495,619	\$495,619	N/A	Direct Grant: Orutsaramuit Tribal Council
DOT&PF	2000	Funded	Airport Security Fencing	Completed	\$441,000	\$490,000	N/A	N/A
FAA	2000	Funded	Acquire Security Equipment Alaska DOT/PF \$24,668	Completed	\$370,000	\$394,668	N/A	Contract: AKDOT/PF
DOT&PF	2000	Funded	Boardwalk Construction Reconstruct 3,000' of existing boardwalk between Main Street and Tundra Street on the north side of Third Avenue. Boardwalk reconstruction in Pinky's Park. 3,600' of new boardwalks from Pinky's Park to Ridgecrest Dr and to Ptarmigan St near AVCP Housing. Bid advertising in May 2001	Completed	\$22,575	\$250,000	Bid Adv Nov 2001	Contract
AHFC	2000	Funded	Bethel Heights Interior Painting Construction completed 2002	Completed	\$189,920	\$189,920	2000-2001	Contract: TNT Painting
DOT&PF	2000	Funded	Tundra Ridge Road Improvement, Ph 1 Resurface Tundra Ridge Road, a distance of about 5,500 feet. Project does not include separated pathways or illumination.	Completed	\$13,500	\$150,000	N/A	N/A
DCCED	2000	Funded	Braund Building Renovation Capital Matching	Completed	\$112,740	\$112,740	N/A	Direct Grant
DHSS	2000	Funded	Bethel Community Services - Replace fire suppression heat systems Capital Grant 4710	Construction	\$48,100	\$50,100	10/1/00	Direct Grant: The Furnace Doctor
AHFC	2000	Funded	Bethel Heights Vinyl Flooring Construction completed 2002	Completed	\$20,000	\$20,000	2000-2001	Contract: TNT Painting
DHSS	2000	Funded	Bethel Receiving Home - Maintenance and Repair Services Provide maintenance and repair for facility through FY2000	Completed	\$15,000	\$15,000	N/A	Contract: MacDonald Miller (Main Repair)
			Bethel Youth Facility - Smoke					

DHSS	2000	Funded	Detector Repair and Replacement Install new smoke detectors in detention cells	Completed	\$5,972	\$5,972	N/A	Grinnell Fire Protection Sys. Co.
Federal	2000	Funded	New Post Office	Construction	\$0	\$0	N/A	N/A
HUD	1999	Funded	Indian Housing Block Grant - Calista Native Regional Corporation NAHASDA administration, operating & construction funds	Completed	\$8,079,636	\$8,079,636	N/A	Direct Grant: AVCP Housing Authority
DEC/VSW	1999	Funded	Water and Sewer Improvements, Ph I USDA/RD \$2,300.0. Renovate Bethel Heights and City Subdivision water treatment plants	Completed	\$1,300,000	\$3,600,000	June 2002	Direct Grant/Force Account & Contract: CRW Engineering Group & CH2M Hill
HUD	1999	Funded	Indian Housing Block Grant - Orutsaramuit Native Village NAHASDA administration, operating & construction funds	Completed	\$1,888,031	\$1,888,031	N/A	Direct Grant: AVCP Housing Authority
FAA	1999	Funded	Construct Taxiway Alaska DOT/PF \$54,256 Close Date 09/25/02	Completed	\$813,818	\$868,072	N/A	Contract: AkDOT/PF
HUD	1999	Funded	Housing Improvements NAHASDA Funding	Completed	\$357,148	\$357,148	N/A	N/A
DOT&PF	1999	Funded	Chief Eddie Hoffman Hwy Separated Pathway, Ph 1 Design Construct 4.2-mile, separated pathway from airport to high school along north side of Chief Eddie Hoffman Hwy	Completed	\$23,000	\$255,000	N/A	N/A
DCCED	1999	Funded	Braund Building Renovation Capital Matching	Completed	\$107,358	\$153,369	N/A	Direct Grant
DHSS	1999	Funded	Bethel Combined Facility - Heating Improvements	Completed	\$37,000	\$37,000	N/A	N/A
HUD	1998	Funded	Indian Housing Block Grant - Calista Native Regional Corporation NAHASDA administration, operating & construction funds	Completed	\$6,896,486	\$6,896,486	N/A	Direct Grant: AVCP Housing Authority
FAA	1998	Funded	Bethel Airport: Construct Partial Parallel Twy-Ph 1	Completed	\$4,000,000	\$4,266,667	N/A	Contract: AkDOT/PF
USDA/RD	1998	Funded	Water & Sewer Facility Improvements, Ph I City Subdivision Water Treatment, Water & Sewer VSW \$1,300.0. Bethel Heights: 105 Service connections & upgrade water treatment plant; City Subd.: Piped Water & Sewer & Water Treatment Plant Construction.40% complete on construction as of July 2003.	Completed	\$1,300,000	\$2,600,000	2004	Force Account
FAA	1998	Funded	Bethel Airport: Air Taxi Apron Expansion	Completed	\$2,000,000	\$2,133,333	N/A	Contract: AkDOT/PF
DOT&PF	1998	Funded	Air Taxi Apron Expansion Includes acquiring land to the northeast for april expansion	Completed	\$125,000	\$2,000,000	N/A	Contract

HUD	1998	Funded	Indian Housing Block Grant - Orutsaramuit Native Village NAHASDA administration, operating & construction funds	Completed	\$1,933,850	\$1,933,850	N/A	Direct Grant: AVCP Housing Authority
FAA	1998	Funded	Bethel Airport: Rehabilitate Runway - Stabilization	Completed	\$1,000,000	\$1,066,667	N/A	Contract: AKDOT/PF
DOT&PF	1998	Funded	Airport Runway 18-36 Stabilization Resurface, groove and repaint	Completed	\$62,500	\$1,000,000	N/A	Contract
DCCED	1998	Funded	Braund Building Renovation/Relocation Magnuson-Stevens Act 1997 Fish Disaster Grant	Completed	\$119,316	\$477,262	N/A	Force Account & Contract for Engineering City of Bethel
DCCED	1998	Funded	Construct Owl Street Park CDBG	Completed	\$190,110	\$380,349	Aug 1999	Contract for Sand Pad Prep: Red Samm Constructive Inc.
DCCED	1998	Funded	Braund Building Renovation Capital Matching	Completed	\$108,061	\$154,373	N/A	Direct Grant
DCCED	1998	Funded	Office Building Renovation; Construct Shop - Orutsaramuit Native Council Magnuson-Stevens Act 1997 Fish Disaster Grant	Completed	\$33,527	\$134,108	N/A	Direct Grant
DCCED	1998	Funded	Community Facilities and Equipment Capital Matching	Completed	\$50,553	\$72,219	N/A	Direct Grant
AHFC	1998	Funded	Weatherize 2 Homes	Completed	\$8,400	\$8,400	N/A	N/A
DOT&PF	1997	Funded	Airport Improvements	Completed	\$0	\$3,794,894	N/A	N/A
AHFC	1997	Funded	Lulu Heron Elderly 16 Units Funded with Senior Housing Fund	Completed	\$0	\$3,147,806	N/A	N/A
DOT&PF	1997	Funded	Bethel Street Improvements, 1st Ave., Main St. and Hangar	Completed	\$156,190	\$1,402,292	N/A	Contract: Knik Constructive
DEC/WSW	1997	Funded	Water/Sewer Extension Water & Sewer Extension to 35 HUD units	Completed	\$500,000	\$1,000,000	N/A	Direct Grant/Force Account
DOT&PF	1997	Funded	Airport Lighting	Completed	\$50,000	\$500,000	N/A	N/A
HUD/ICDBG	1997	Funded	Crisis Center ICDBG Program	Completed	\$500,000	\$500,000	N/A	Direct Grant: Orutsaramuit Native Council
COE	1997	Funded	Water Navigation Improvements/Reconnaissance Kuskokwim River. Scheduled completion May 97	Completed	\$362,000	\$362,000	N/A	N/A
FAA	1997	Funded	Airport Master Plan Update	Completed	\$325,000	\$346,667	N/A	Contract: AKDOT/PF
DOT&PF	1997	Funded	Airport Master Plan Update	Completed	\$20,000	\$320,000	N/A	N/A
DCCED	1997	Funded	Braund Building Renovation Capital Matching	Completed	\$161,617	\$211,146	N/A	Direct Grant

DEC/VSW	1997	Funded	Kilbuk-School	Completed	\$42,000	\$42,000	N/A	Direct Grant/Forc Account
ANTHC	1997	Funded	Plumbing, water and sewer for 2 homes IHS funding	Completed	\$0	\$21,000	N/A	N/A
AHFC	1997	Funded	Weatherize 2 Homes	Completed	\$8,400	\$8,400	N/A	N/A
DEC/VSW	1996	Funded	City Subdivision Piped Water/Sewer Construct Phase I City Subdivision water and sewer; pending easement acquisition	Completed	\$2,100,000	\$3,500,000	N/A	Direct Grant/Forc Account
DEC/VSW	1996	Funded	Original Townsite Piped Water/Sewer Reappropriated to construct Bethel piped water and sewer, SFY-2001	Completed	\$1,200,000	\$2,000,000	N/A	Direct Grant/Forc Account
FAA	1996	Funded	Bethel Airport: Runway Lighting Rehab	Completed	\$442,500	\$472,000	N/A	Contract: AkDOT/PF
DCCED	1996	Funded	Braund Building Renovation Capital Matching	Completed	\$157,663	\$225,233	N/A	Direct Gar
DEC/VSW	1996	Funded	Water/Sewer Facility Master Plan Update water and sewer facility master plan; completed July 1996	Completed	\$100,000	\$100,000	N/A	Direct Grant/Forc Account
HUD/CGP	1996	Funded	Housing Modernization Renovate water/sewer	Completed	\$74,742	\$74,742	N/A	N/A
DCCED	1996	Funded	Museum Gift Shop Start-Up and Regional Marketing for Arts RDA	Completed	\$21,000	\$21,000	N/A	Direct Gar
COE	1996	Funded	Bulk Fuel Tank Modifications	Completed	\$0	\$0	N/A	N/A
COE	1995	Funded	Erosion Protection/Riverbank Stabilization Local priority, from 1997 USDA/RD survey of villages	Completed	\$18,000,000	\$24,000,000	N/A	N/A
DMVA	1995	Funded	Army Aviation Operating Hangar, Ph I	Completed	\$500,000	\$6,380,000	N/A	N/A
COE	1995	Funded	Airport Asphalt Drum Removal	Completed	\$4,500,000	\$4,500,000	N/A	N/A
DOT&PF	1995	Funded	Ridgecrest Drive Rehabilitation, MP 0 to 0.85	Completed	\$282,583	\$3,129,383	N/A	Contract: Knik Constructic Company, Inc.
DEC/VSW	1995	Funded	Sewage Lagoon Completion Complete construction of additional sewage lagoon cell to accommodate expanding population	Completed	\$500,000	\$1,000,000	N/A	Direct Grant/Forc Account
DEC/VSW	1995	Funded	City Subdiv./Water Treatment Plant Design/Construction Design City Subdivision water treatment plant and restore original grade of sewer pipes at road crossing	Completed	\$800,000	\$800,000	N/A	Direct Grant/Forc Account
DCCED	1995	Funded	Braund Building Renovation Capital Matching. \$300K funded by ED 39 in FY 94	Completed	\$160,773	\$189,804	N/A	Direct Gar
			Original Townsite Design Reappropriated to construct					Direct

DEC/WSW	1995	Funded	Bethel piped water and sewer, SFY-2001	Completed	\$150,000	\$150,000	N/A	Grant/Forc Account
HUD/CGP	1995	Funded	Housing Modernization/Low Rent Units Porches & arctic entries	Completed	\$95,669	\$95,669	N/A	N/A
AHFC	1995	Funded	Weatherize 15 Homes	Completed	\$54,500	\$54,500	N/A	N/A
ANTHC	1995	Funded	Water and sewer for 3 homes IHS funding	Completed	\$0	\$52,000	N/A	N/A
DEC/WSW	1995	Funded	Kilbuck/Main Washeteria Lift Station Design Upgrade Kilbuck and Main lift station pumps and controls	Completed	\$50,000	\$50,000	N/A	Direct Grant/Forc Account
AHFC	1995	Funded	Housing Foundation Model Install space frame foundation at one location to determine if this foundation system is suitable for use in the Bethel area	Completed	\$30,000	\$30,000	N/A	N/A
DEC/WSW	1995	Funded	Bethel Hts & Tundra N. Water/Sewer Extension Continuation of Bethel Heights water amd sewer expansion to Western Addition #1	Completed	\$25,000	\$25,000	N/A	Direct Grant/Forc Account
EED	1994	Funded	LKSD Districtwide Water Treatment, Subsurface	Construction	\$4,684,246	\$4,779,842	N/A	Contract
DMVA	1994	Funded	Armory Expansion	Completed	\$1,000,000	\$4,000,000	N/A	N/A
DOT&PF	1994	Funded	Airport Runway Stabilization Correct the dip in the primary runway, created by subsurface instability. Construction Summer 94. ED 39	Completed	\$376,020	\$3,760,200	N/A	N/A
DOT&PF	1994	Funded	Airport Ph II Runway Paving	Completed	\$319,982	\$3,199,820	N/A	N/A
EED	1994	Funded	LKSD Districtwide Water Treatment, Surface Water	Construction	\$2,184,200	\$2,228,800	April 2002-Sept 2003	Force Account
USDA/RD	1994	Funded	Sewer Lagoon & Lift Stations	Completed	\$705,000	\$1,520,000	N/A	N/A
USDA/RD	1994	Funded	Waste Water Treatment	Completed	\$1,000,000	\$1,000,000	N/A	N/A
DEC/WSW	1994	Funded	Sewage Lagoon Construct additional sewage lagoon cell to accommodate expanding population	Completed	\$1,000,000	\$1,000,000	N/A	Direct Grant/Forc Account
DHSS	1994	Funded	YKHC Site Purchase For new Community Health Services Building	Completed	\$500,000	\$500,000	N/A	N/A
HUD/ICDBG	1994	Funded	Delta Support Living Project ICDBG Program	Completed	\$409,900	\$409,900	N/A	N/A
DCCED	1994	Funded	Braund Building Renovations Leg. Grant	Completed	\$300,000	\$300,000	N/A	Direct Grant
DMVA	1994	Funded	Bethel Unit Storage Bldg	Completed	\$0	\$275,000	N/A	N/A
DCCED	1994	Funded	Courthouse Roof Reconstruction Capital Matching	Completed	\$188,680	\$222,751	N/A	Direct Grant
			Magnetic Survey Airborne					

AEA	1994	Funded	magnetic survey of Bethel basin. Funds granted to Calista. \$158,000 is a RSA w/DNR. DNR to contract for services to perform study	Completed	\$175,000	\$175,000	N/A	N/A
DHSS	1994	Funded	Crisis/Respite Residential Facility Upgrades	Completed	\$102,000	\$102,000	N/A	N/A
AEA	1994	Funded	Bethel/NYAC Electric Intertie Design	Completed	\$84,030	\$84,030	N/A	N/A
DHSS	1994	Funded	YKHC Vehicle/Computers/Equipment	Completed	\$72,815	\$72,815	N/A	N/A
DHSS	1994	Funded	Bethel Community Services Group Home - Vehicle	Completed	\$45,500	\$45,500	N/A	N/A
DCCED	1994	Funded	Yukon Kuskokwim Health Corp - Water Safety Program Leg. Grant	Completed	\$39,300	\$39,300	N/A	Direct Gar
DCCED	1994	Funded	Orutsamiut Village Council - Office Remodel Leg. Grant	Completed	\$32,000	\$32,000	N/A	Direct Gar
DHSS	1994	Funded	Bethel Community Services Group Home - Lending Library	Completed	\$24,655	\$24,655	N/A	N/A
DHSS	1994	Funded	Bethel Community Services Group Home - Vehicle Purchase	Completed	\$16,785	\$16,785	N/A	N/A
DOT&PF	1993	Funded	Airport Rescue & Fire Fighting Building & Fence	Completed	\$135,039	\$1,350,390	N/A	N/A
DEC/VSW	1993	Funded	Bethel Heights Sewer Construct Bethel Heights water and sewer expansion to Western Addition #1 / Tundra North	Completed	\$800,000	\$800,000	N/A	Direct Grant/Forc Account
DCCED	1993	Funded	Sewage Improvements CDBG. Upgrade 40 low-to-moderate income homes from honeybucket haul to city sewer system	Completed	\$200,000	\$600,000	N/A	Direct Gar
DEC/VSW	1993	Funded	City Subdivision Piped Water Preliminary design report on piped sewer for City Subdivision	Completed	\$200,000	\$200,000	N/A	Direct Grant/Forc Account
DCCED	1993	Funded	Road Construction/Gravel Stockpile Leg. Grant	Completed	\$160,000	\$160,000	N/A	Direct Gar
DHSS	1993	Funded	Emergency Placement Shelter Construction	Completed	\$150,000	\$150,000	N/A	N/A
DEC/VSW	1993	Funded	Main Wastewater Pump Station Design and construct Main sewage pumping station	Completed	\$140,000	\$140,000	N/A	Direct Grant/Forc Account
DEC/VSW	1993	Funded	City Subdivision Wastewater Preliminary design report on piped water for City Subdivision	Completed	\$125,000	\$125,000	N/A	Direct Grant/Forc Account
DEC/VSW	1993	Funded	Kilbuk Wastewater Pumping Design and construct Kilbuk sewage pumping station	Completed	\$125,000	\$125,000	N/A	Direct Grant/Forc Account
DOT&PF	1993	Funded	Airport Lighting	Completed	\$11,400	\$114,000	N/A	N/A
DOT&PF	1993	Funded	Airport Taxiway G	Completed	\$8,200	\$82,000	N/A	N/A

DOT&PF	1993	Funded	Brown Slough Bridge Replacement	Completed	\$14,000	\$70,000	N/A	N/A
DOT&PF	1993	Funded	Bethel Area Transportation Study	Completed	\$55,015	\$55,015	N/A	N/A
DCCED	1993	Funded	Tourism Marketing for Middle Kuskokwim Region RDA	Completed	\$51,500	\$51,500	N/A	Direct Grant
AEA	1993	Funded	Bethel/Napakiak Electric Line Maintenance Maintenance on line to grant to community	Completed	\$50,000	\$50,000	N/A	N/A
AEA	1993	Funded	Bethel/Napakiak Line Survey & Map	Completed	\$21,328	\$21,328	N/A	N/A
HUD/AHFC	1992	Funded	Construct 87 Single Family Housing Units	Completed	\$1,056,759	\$12,037,000	N/A	N/A
DEC/MGL	1992	Funded	Sewage Lagoon Construction	Completed	\$1,863,000	\$2,263,000	N/A	N/A
DOT&PF	1992	Funded	Airport South Apron Construction	Completed	\$131,162	\$1,311,625	N/A	N/A
DHSS	1992	Funded	Bethel Children's Receiving Home - RDT	Completed	\$1,076,000	\$1,076,000	N/A	N/A
DEC/MGL	1992	Funded	Bethel Heights Sewer & Water	Completed	\$800,000	\$800,000	N/A	N/A
DEC/VSW	1992	Funded	Wastewater Treatment System Improvements Finish expansion of existing sewage lagoon; dikes heightened and islands removed	Completed	\$623,000	\$623,000	N/A	Direct Grant/Foro Account
DEC/MGL	1992	Funded	City Subdivision Water & Wastewater Kilbuck Wastewater and main pump station	Completed	\$590,000	\$590,000	N/A	N/A
DHSS	1992	Funded	YKHC Office Expansion RSA with DOT	Completed	\$400,000	\$400,000	N/A	N/A
DHSS	1992	Funded	Bethel Youth Facility - Repairs/Upgrades Water system improvements, window replacement, roof repair, new carpet	Completed	\$74,635	\$74,635	N/A	N/A
HUD/CGP	1992	Funded	Housing Modernization/Low Rent Units Install well for fire protection and to reduce utility costs	Completed	\$35,000	\$35,000	N/A	N/A
DHSS	1992	Funded	Bethel Prematernal Home Expansion	Completed	\$31,000	\$31,000	N/A	N/A
DHSS	1992	Funded	Bethel Youth Services - Design & Construction	Completed	\$30,800	\$30,800	N/A	N/A
DOT&PF	1992	Funded	Airport Highway	Completed	\$686,238	\$0	N/A	N/A
HUD/AHFC	1990	Funded	Housing Modernization/Bethel Heights Renovation of 117 HUD housing units. AHFC contribution FY 95 \$5.2 million	Completed	\$0	\$3,855,682	N/A	N/A
DEC/VSW	1990	Funded	Sewer Lagoon Begin expansion of existing sewage lagoon to meet growing population	Completed	\$485,137	\$485,137	N/A	Direct Grant/Foro Account
ANTHC	1990	Funded	BIA Housing water/sewer holding tanks IHS funding. 5	Completed	\$0	\$58,000	N/A	N/A

			BIA-HIP houses					
DEC/WSW	1990	Funded	Water Engineering/Water Treatment Plant Boilers Upgrade boilers, electrical and truck fill points at the Bethel Heights Water Treatment Plant	Completed	\$14,863	\$14,863	N/A	Direct Grant/Forc Account
DEC/WSW	1989	Funded	Solid Waste, Water, Sewer	Completed	\$740,000	\$740,000	N/A	Direct Grant/Forc Account
ANTHC	1989	Funded	HUD Housing/Wastewater IHS funding. Improve wastewater disposal system to connect 12 HUD houses	Completed	\$0	\$584,000	N/A	N/A
FAA	2006	Planned	Acquire Land/Easement For Approaches (List Parcels)	N/A	\$760,000	\$800,000	N/A	N/A
FAA	2006	Planned	Acquire Snow Removal Equipment	N/A	\$171,000	\$180,000	N/A	N/A
FAA	2005	Planned	Construct Parallel Runway 18L/36R Phase 1	N/A	\$9,950,000	\$10,473,684	N/A	N/A
FAA	2005	Planned	Construct Runway 18/36 Safety Area	N/A	\$6,000,000	\$6,315,790	N/A	N/A
FAA	2005	Planned	Construct Sand Storage Building	N/A	\$1,350,000	\$1,421,053	N/A	N/A
DOT&PF	2004	Planned	East Avenue Resurfacing Reconstruct and resurface East Avenue, a distance of about 2,300 feet, with recycled asphalt. Project does not include separated pathways or illumination.	N/A	\$16,300	\$180,000	N/A	Contract
DOT&PF	2004	Planned	4th Avenue, 7th Avenue, and Main Street Resurfacing Project Reconstruct and resurface 4th Avenue, a distance of 2,200 feet, 7th Avenue, a distance of about 3,200 feet and Main Street from 3rd to 7th Avenue, a distance of 1,612 feet. Project does not include separated pathways or illumination.	N/A	\$14,000	\$155,000	N/A	Contract
DOT&PF	2004	Planned	Akakeek Street Improvement Resurface Akakeek Street, a distance of approximately 2,900 feet. Project does not include separated pathways or illumination.	N/A	\$11,700	\$130,000	N/A	Contract
DOT&PF	2004	Planned	H-Marker Rd Improvements Resurface H-Marker Road, a distance of about 1,260'. Project does not include a separated pathway or illumination.	N/A	\$4,500	\$50,000	N/A	Contract
DOT&PF	2004	Planned	Bethel Army Readiness Building Design & Construction of a 45,000 square foot Readiness Center (Army) in Bethel, Alaska. Engineer's Estimate Range is \$20M to \$30M.	N/A	\$0	\$0	Advertise Date Est. Sept. 2004	N/A
			Bethel Army Readiness Site Prep Site preparation for				Advertise Date	

DOT&PF	2004	Planned	Armory in Bethel. Engineer's Estimate Range is \$1M to \$2.5M.	N/A	\$0	\$0	Est. April 2004	N/A
COE	2003	Planned	Erosion Protection/Riverbank Stabilization	Design	\$2,500,000	\$2,500,000	2003 - 2005	Contract: To Be Determined
DOT&PF	2003	Planned	BIA Headquarters: Road Resurfacing & Extension, Ph 2 Resurface BIA Headquarters Road to its terminus and extend the road approximately 3/4 mile to connect with the Kassulli Subdivision Road.	N/A	\$900	\$310,000	N/A	Contract
DHSS	2003	Planned	Bethel Youth Facility - Lift Station Relocate lift station to the exterior of the facility.	Preliminary	\$108,241	\$108,241	N/A	Contract
DOT&PF	2003	Planned	Bethel Airport Crosswind Runway	N/A	\$3,125	\$50,000	N/A	N/A
DOT&PF	2002	Planned	Construct New Public Health Facility 15,000 sq. ft. Bid advertising in Nov. 2001, subject to Legislative funding	N/A	\$5,000,000	\$5,000,000	N/A	Contract
DOT&PF	2002	Planned	Tundra Ridge Road Improvement Pave Tundra Ridge Road.	N/A	\$122,808	\$1,360,000	Design 2004, Anticipate Advertising In: January 2005	Contract
DOT&PF	2002	Planned	Airport Snow Removal Equipment - Loader w/Snow Blower	N/A	\$0	\$425,000	N/A	Contract
DOT&PF	2002	Planned	Airport Snow Removal Equipment - Dozer	N/A	\$0	\$200,000	N/A	Contract
DOT&PF	2001	Planned	Chief Eddie Hoffman Highway Rehabilitation and Separated Pathway Chief Eddie Hoffman Highway Rehabilitation from the Bethel Airport to Browns Slough Bridge, and a separated pathway from the Bethel Airport to the Bethel High School.	N/A	\$201,000	\$2,010,000	RFP for Design July 2003, Design 2004	Contract
EED	2005	Potential	New Bethel Elementary School FY05 CIP	N/A	\$15,512,044	\$15,828,616	N/A	N/A
EED	2005	Potential	Kilbuck Elementary Deferred Maintenance, Bethel FY05 CIP	N/A	\$5,293,929	\$5,401,968	N/A	N/A
EED	2005	Potential	Mikelnguut Elitnaurvat Elementary Deferred Maintenance, Bethel FY05 CIP	N/A	\$2,285,298	\$2,331,937	N/A	N/A
USDA/RD	2004	Potential	Waste and Water treatment Plant Just received application; no funding has been approved yet	N/A	\$12,910,000	\$12,910,000	N/A	N/A
N/A	2003	Potential	Aviation & Information Technology Training Center/AVCP Region	N/A	\$0	\$500,000	N/A	N/A

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Municipal Contact Information

MUNICIPAL CONTACT INFORMATION: As of 3/24/2005, Contact Indra Arriaga, Commerce, DCA - indra_arriaga@commerce.state.ak.us , 907.269.4521

ORG
TYPE
City

ORGANIZATION NAME MAYOR Hugh Dymont P. O. Box 1388 Bethel AK 99559 907-543-2047 907-543-4171 bobherra@alaska.com http://www.cityofbethel.org

URL

Email

FAX

PHONE

ZIP

STATE

CITY

ADDRESS

MAYOR Hugh Dymont

Muni Employees

<u>Name</u>	<u>Position</u>
Louann Cutler	Attorney
Sandra Modigh	City Clerk
Jane Neeser	Executive Assistant
Robert Strahan	Finance Director
George Young	Fire Chief
Robert Herron	Manager Parks & Recreation Director
Janet Athanas	Planning Director
John Malone	Police Chief
Howard Morris	Port Director
Howard Elliott	Public Works Director
Greg Sargent	Senior Services Director
Louise Charles	

Council Members

<u>Name</u>	<u>Term Ends</u>
Andrew McGowen	2007
Dan Leinberger	2006
David Trantham, Jr.	2007
Hugh Dymont, Mayor	2006
R. Thor Williams	2006
Stanley Rodgers, Vice Mayor	2005
Yolanda Jorgensen	2005

Central Regions Bid Calendar for Project in Bethel, Alaska

Alaska Department of Transportation and Public Facilities Central Region Bid Calendar

For Projects in Bethel, Alaska

As of: Sun Mar 27, 2005 at 10:31 AM AKST

Unless otherwise noted, Time of Bid Opening 2:00 P.M. Prevailing Time.
TO OBTAIN BID DOCUMENTS LISTED BELOW, PLEASE CONTACT THE APPROPRIATE DOTPF PLANS
ROOMS. THERE MAY BE A NON REFUNDABLE CHARGE.
CENTRAL REGION: Conference Room, Aviation Building, 4111 Aviation Ave., Anchorage, AK (907)269-0400
NORTHERN REGION: Main Conference Room, Room 204, 2301 Peger Rd., Fairbanks, AK (907)451-2247
SOUTHEAST REGION: Conference Room, 6860 Glacier Highway, Juneau, AK (907)465-8904

The information published in these reports must not be used as a basis for bid preparation.

BETHEL AIRPORT IMPROVEMENTS, STG 2

Project# / Federal#:56625 / N/A

Region: Central

Location: Bethel

Manager:James Amundsen **Phone:** (907)269-0605

Anticipate Advertising In: May 2005

Description of Work: Stage 2 of 4 stage project: Full project scope - Expand r/w 18-36 safety area; rehabilitate south end of r/w 18-36 pavement surface; construct a B-II ARC parallel runway; expand old GA apron as a new air taxi/cargo apron; expand the existing north air taxi apron and widen the air taxi access road and cul-de-sac.

Engineer's Estimate Range: \$10,000,000 to \$20,000,000

BETHEL SAND STORAGE BUILDING

Project# / Federal#:57314 / N/A

Region: Central

Location: Bethel

Manager:Kirk Warren **Phone:** (907)269-0826

Anticipate Advertising In: May 2005

Description of Work: Construct new Sand Storage Building at Bethel Alaska airport

Engineer's Estimate Range: \$1,000,000 to \$2,500,000

BETHEL PTARMIGAN ST IMPROVEMENT (GARVEE)

Project# / Federal#:55655 / STP-0001(300)

Region: Central

Location: Bethel

Manager:John E Dickenson **Phone:** (907)269-0572

Anticipate Advertising In: July 2005

Description of Work: Resurface Ptarmigan Street from Ridgecrest Drive to Tundra Ridge Road.

Engineer's Estimate Range: \$1,000,000 to \$2,500,000

Appendix G

City of Bethel Utility Fund Summary Budget
(Fiscal Year 2004 -2005)

UTILITY FUND SUMMARY

	FY02 Actual	FY03 Actual	FY04 actual	FY05 Budget	FY05 Revised Budget
Operating Revenues:	3,981,542	4,085,654	4,199,233	4,149,309	4,149,298
Operating Expenses for Services:					
Hauled Water	806,911	969,724	887,040	968,999	965,530
Hauled Sewer	597,915	720,182	714,122	898,920	862,803
Hauled Refuse	90,612	181,464	121,126	173,501	188,988
Piped Water	144,994	246,050	118,242	205,889	194,376
Piped Sewer	199,848	204,298	219,700	253,626	246,044
Water Treatment - BH	510,949	473,510	445,512	609,370	600,413
Water Treatment - CS	324,844	332,689	418,925	425,583	416,776
Landfill Operations	261,986	298,382	307,128	306,919	297,748
Sewer Lagoon	124,481	114,057	83,320	105,046	101,692
TOTAL OPERATING EXPENSES FOR SVS.	3,062,540	3,540,356	3,315,115	3,947,852	3,874,369
<i>Excess of Revenues over Operating Expenses for Services</i>	<i>919,002</i>	<i>545,298</i>	<i>884,118</i>	<i>201,457</i>	<i>274,929</i>
Operating Expenses for Non-Services:					
Utility Billing	-	-	-	182,339	178,737
Recycling Operations	3,914	8,440	50,252	70,134	69,850
Utilities Vehicle Maint.	570,920	784,760	731,087	848,013	845,119
Transfer Out to GF	-	-	-	-	-
TOTAL OPERATING EXPENSES FOR NON-SVS.	574,834	793,200	781,339	1,100,485	1,093,705
<i>Excess of Revenues over Svs. & Non-Svs. Expenses</i>	<i>344,168</i>	<i>(247,902)</i>	<i>102,779</i>	<i>(899,029)</i>	<i>(818,776)</i>
Project Expenses:					
Hauled Water-Feasibility Study	-	-	20,000	-	-
TOTAL PROJECT EXPENSES	-	-	20,000	-	-
<i>Excess of Rev. over Svs. & Non-Svs., & Project Expenses</i>	<i>344,168</i>	<i>(247,902)</i>	<i>82,779</i>	<i>(899,029)</i>	<i>(818,776)</i>
NET FUND INCOME (LOSS) BEFORE DEPRECIATION & AMORTIZATION				(899,029)	(818,776)
Depreciation & Amortization Expenses:					
TOTAL DEPRECIATION & AMORT. EXPENSES	830,880	1,313,643	-	1,203,704	1,203,704
<i>Excess Revenues over All Expenses</i>	<i>(830,880)</i>	<i>(1,313,643)</i>	<i>-</i>	<i>(2,102,733)</i>	<i>(2,022,480)</i>
Total Fund Revenues:	3,981,542	4,085,654	4,199,233	4,149,309	4,149,298
Less Total Fund Expenses less Depr. & Amort.	(3,637,374)	(4,333,556)	(4,116,454)	(5,048,338)	(4,968,074)
Less Total Fund Depreciation & Amortization	(830,880)	(1,313,643)	-	(1,203,704)	(1,203,704)
NET FUND INCOME (LOSS)	(486,712)	(1,561,545)	82,779	(2,102,733)	(2,022,480)

FY05 UTILITY FUND EXPENSE SUMMARY

	Personnel Expenses	Materials, Supplies & Services	Indirect Expenses	Total Operating Expenses	Total Revised Operating Expenses
Utility Billing	132,752	27,293	22,294	182,339	178,737
Hauled Water	646,506	218,118	104,375	968,999	965,530
Hauled Sewer	589,284	207,111	102,525	898,920	862,803
Hauled Refuse	92,008	55,733	25,759	173,501	188,988
Piped Water	140,911	40,416	24,562	205,889	194,376
Piped Sewer	138,674	82,835	32,117	253,626	246,044
Water Trmt. - BH	133,682	391,742	83,947	609,370	600,413
Water Trmt. - CS	133,090	234,892	57,602	425,583	416,776
Landfill Operations	158,078	108,052	40,789	306,919	297,748
Sewer Lagoon	51,914	39,014	14,118	105,046	101,692
Recycling Operations	51,353	10,556	8,226	70,134	69,850
Vehicle Maintenance	345,647	390,444	111,922	848,013	845,119
TOTALS	2,613,896	1,806,205	628,236	5,048,338	4,968,074

Utility Fund Capital Budget Overview

	FY 00 Actual	FY 2001 Actual	FY 2002 Actual	FY 2003 Actual	FY 2004 Revised Budget	FY 2005 Budget	FY 2005 Revised Budget
Salt (Landfill) FY00	16,000						
New Water Truck FY00	53,000						
2 New Sewer Trucks FY01		185,110					
Dumpsters FY01		29,950					
Litter Control Fence-Landfill FY01		3,103					
Shop/Garage for Landfill FY01		92,154					
4 Post Light Vehicle Lift FY01							
Water Truck Chassis FY01		44,925					
Tank for FY01 Water Truck Chassis FY02			72,350				
New Refuse Dumpster Truck FY02			172,041				
Recycling Dumpsters FY02			7,711				
Heavy Truck Lifting System FY02			40,000				
Water Truck (1) - New FY03							
Sewer Trucks (1) - New FY03				0			
Boom to reduce wave erosion of dike wall FY03				0			
Dumpsters Residential and Commercial				17,220	20,000	20,000	20,000
Used Nissan Pick-ups (4)				40,000			
Water Truck (2) - New FY04					0		
815F Sheepsfoot Compactor					275,000		
Total	69,000	355,242	292,102	57,220	295,000	20,000	20,000

UTILITY ENTERPRISE FUND REVENUES

		FY 00 Actual	FY 2001 Actual	FY 2002 Actual	FY 2003 Actual	FY 2004 Actual	FY 2005 Budget	FY 2005 Revised Budget
	Revenues:							
51-42-410	Trucked Water	812,864	1,091,338	1,236,700	1,449,528	1,351,801	1,253,484	1,485,768
51-42-412	Metered Piped Water (Comm.)	95,748	156,056	124,942	107,924	135,984	196,808	145,988
51-42-414	Unmetered Piped Water (Res.)	182,001	190,535	216,662	107,783	209,844	197,554	366,003
51-42-416	Contract Water	13,997	21,190	9,774	13,891	12,404	13,800	13,800
51-42-436	Pumphouse Water		1,595	1,984	2,464	2,794	2,450	2,450
	Total Water Services	1,104,610	1,460,714	1,590,062	1,681,590	1,712,827	1,664,096	2,014,009
51-43-411	Trucked Sewer	993,223	1,126,756	1,322,507	1,358,863	1,409,779	1,362,904	1,531,121
51-43-412	Metered Piped Sewer (Comm.)	408,192	475,173	438,439	442,477	485,429	511,494	521,102
51-43-414	Unmetered Piped Sewer (Res.)	60,754	63,286	70,671	66,365	64,549	61,595	124,800
51-43-416	Sewer Lagoon Dump Fee	6,346	7,775	4,407	3,520	2,221	3,600	3,600
	Total Sewer Services	1,468,515	1,672,990	1,836,024	1,871,225	1,961,978	1,939,593	2,180,622
51-44-412	Commercial Garbage Pickup	276,593	281,639	242,076	261,507	225,336	262,000	282,627
51-44-413	Residential Garbage Pickup	199,571	209,775	210,485	222,756	206,841	216,000	294,000
51-44-416	Landfill Dump Fee	39,983	52,138	71,994	47,584	61,247	60,000	60,000
	Total Solid Waste Services	516,147	543,552	524,555	531,847	493,424	538,000	636,627
51-45-410	Recycling Income			4,230	-	5,000	6,500	6,500
	Total Recycling Operations	-	-	4,230	-	5,000	6,500	6,500
51-45-434	Utility Penalty & Interest	7,625	-	18,036	24,487	30,095	24,000	24,000
51-45-435	Reconnect Fee	2,205	1,015	394	490	4,670	2,520	2,520
51-45-450	Senior Discounts	(31,870)	(31,357)	(32,982)	(33,907)	(32,693)	(32,900)	(32,900)
51-49-466	Cash Over/Short			242				
51-45-467	NSF Fees			355	400	75	300	300
51-45-468	Utility Inspection Fee	2,460	2,780	2,500	4,277	5,965	3,500	3,500
51-49-487	Interest Income	1,050	5,228	(4,504)	1,778	1,163	1,300	1,300
51-49-495	Miscellaneous Income	2,000	1,290	6	3,467	16,729	2,400	2,400
51-49-498	Insurance Claim Recovery for PY			42,624				
	Total Miscellaneous	(16,530)	(21,044)	26,671	992	26,004	1,120	1,120
	Total Revenues	3,072,742	3,656,212	3,981,542	4,085,654	4,199,233	4,149,309	4,838,878

This budget reflects anticipated Revenues if rates remain unchanged. Some change in projected revenues are evident and are a result of hauled services going to unmetered piped service and then to metered piped service in conjunction with the City Subdivision Piped Water and Sewer Project.

Utility Billing (51-80)		FY 00 Actual	FY 2001 Actual	FY 2002 Actual	FY 2003 Actual	FY 2004 Revised Budget	FY 2005 Budget	FY 2005 Revised Budget
PERSONNEL:								
	Salaries, Benefits & Taxes minus EGHB	-	-	-	-	-	115,592	115,593
	Employee Group Health Benefits	-	-	-	-	-	17,160	17,160
	Revision to Personnel Budget	-	-	-	-	-	-	(603)
	Total Personnel	-	-	-	-	-	132,752	132,150
MATERIALS, SUPPLIES, & SERVICES								
545	Training/Travel	-	-	-	-	-	3,000	-
561	Supplies	-	-	-	-	-	8,000	8,000
563	Wearing Apparel	-	-	-	-	-	-	-
567	Calcium Chloride	-	-	-	-	-	-	-
600	Tires & Wheels	-	-	-	-	-	-	-
601	Vehicle Parts	-	-	-	-	-	-	-
602	Gasoline/Diesel/Oil	-	-	-	-	-	532	532
622	Telephone	-	-	-	-	-	-	-
623	Heating Fuel	-	-	-	-	-	-	-
661	Vehicle Maint/Repairs	-	-	-	-	-	-	-
662	Property Maintenance	-	-	-	-	-	-	-
664	Computer Services	-	-	-	-	-	450	822
669	Other Purchased Services	-	-	-	-	-	-	-
683	Minor Equipment	-	-	-	-	-	2,400	2,400
685	Equipment	-	-	-	-	-	-	-
721	Insurance	-	-	-	-	-	4,211	3,839
722	Insurance Ded Exp & Other	-	-	-	-	-	-	-
724	Dues & Subscriptions	-	-	-	-	-	-	-
727	Advertising	-	-	-	-	-	300	300
733	Postage	-	-	-	-	-	5,700	5,700
735	Finance Charges/Penalties	-	-	-	-	-	-	-
736	Bank Charges	-	-	-	-	-	2,600	2,600
738	Bad Debts Expense	-	-	-	-	-	-	-
799	Miscellaneous	-	-	-	-	-	100	100
998	Administrative Overhead	-	-	-	-	-	22,294	22,294
	Total MS&S	-	-	-	-	-	49,587	46,587
	Total Operating Expenses	-	-	-	-	-	182,339	178,737
PROJECT EXPENSES (51-80-77X)								
		-	-	-	-	-	-	-
	Total Project Expenses	-	-	-	-	-	-	-
CAPITAL EXPENSES (51-80-69X)								
		-	-	-	-	-	-	-
	Total Capital Expenses	-	-	-	-	-	-	-
	Total Operating, Debt, Projects & Capital	-	-	-	-	-	182,339	178,737

Utility Billing 51-80

	FY 2004 Budget	FY 2005 Revised Budget
PERSONNEL		
Sales Tax/Utility Supervisor (50% x 42,552)	-	21,276
Customer Service Representative	-	34,395
Customer Service Representative	-	33,393
SALARIES	-	89,064
Annual Increase	-	1,069
Overtime	-	2,800
Subtotal	-	3,869
Social Security (6.2% of Temp Salary)		
Medicare (1.45% of Salary)	-	1,348
Employee Group Benefits (\$572 per month x 12 months x 2.5 FTE)	-	17,160
Unemployment (.8% of Salary)	-	744
Workers' Compensation	-	1,315
Accrued Vacation & Sick (7% of Salary)	-	6,234
Utility Benefit (\$253 per month x 12 months x 2.5 FTE x 65%)	-	4,934
PERS (8.7% of Salary)	-	8,085
BENEFITS & TAXES	-	39,820
SUBTOTAL PERSONNEL	-	132,753
<i>Revisions to Personnel Budget</i>	-	(603)
TOTAL PERSONNEL	-	132,150

Hauled Water (51-81)		FY 00 Actual	FY 2001 Actual	FY 2002 Actual	FY 2003 Actual	FY 2004 Actual	FY 2005 Budget	FY 2005 Revised Budget
PERSONNEL:								
	Salaries, Benefits & Taxes minus EGHB	-	463,894	523,244	551,812	554,818	575,121	575,120
	Employee Group Health Benefits	-	69,375	78,255	71,905	55,793	71,386	71,386
	Revision to Personnel Budget	-	-	-	-	(3,507)	-	(3,469)
	Total Personnel	461,339	533,269	601,499	623,717	607,104	646,506	643,037
MATERIALS, SUPPLIES, & SERVICES								
545	Training/Travel	2,907	662	70	1,251	-	1,950	1,950
561	Supplies	4,198	3,971	3,326	6,625	5,744	5,300	5,300
563	Wearing Apparel	3,738	4,528	2,737	4,962	3,790	3,550	3,550
567	Calcium Chloride	-	-	-	42,852	-	12,000	12,000
600	Tires & Wheels	7,892	7,227	7,173	9,582	15,783	10,000	10,000
601	Vehicle Parts	-	4,500	3,677	6,887	7,407	6,500	6,500
602	Gasoline/Diesel/Oil	37,419	34,280	48,477	56,593	67,927	87,840	87,840
621	Electricity (17% of City Shop)	-	-	-	-	-	14,105	14,105
622	Telephone	2,409	1,321	1,020	702	436	900	600
623	Heating Fuel (17% of City Shop)	-	-	-	-	-	16,575	16,215
626	Water/Sewer/Garbage (17% of City Shop)	-	-	-	-	-	2,285	2,285
661	Vehicle Maint/Repairs	122,366	-	(51)	-	-	-	-
662	Property Maint.-charge back (25% of 46,545)	9,996	-	-	-	-	11,636	11,636
664	Computer Services	-	-	-	36	361	-	660
669	Other Purchased Services	2,574	1,525	1,119	2,020	751	4,516	4,516
683	Minor Equipment	4,005	2,405	1,677	(7,779)	1,971	2,650	2,650
685	Equipment	-	-	-	2,168	5,034	2,000	2,000
721	Insurance	28,226	14,426	19,490	72,733	28,376	34,051	32,631
722	Insurance Ded Exp & Other	-	-	-	-	11,130	-	1,420
724	Dues & Subscriptions	-	-	9	133	-	260	26
727	Advertising	637	680	412	768	97	1,500	1,500
735	Finance Charges/Penalties	-	-	-	-	-	-	-
738	Bad Debts Expense	-	-	-	21,134	-	-	-
799	Miscellaneous	417	425	(4,180)	4,884	10	500	500
998	Administrative Overhead	114,264	119,628	120,456	120,456	131,119	104,375	104,375
	Total MS&S	342,919	195,578	205,412	346,007	279,936	322,493	322,493
	Total Operating Expenses	804,259	728,847	806,911	969,724	887,040	968,999	965,530
PROJECT EXPENSES (51-81-77X)								
771	Feasibility Study-Privatize Hauled W/S	-	-	-	-	20,000	-	-
	Total Project Expenses	-	-	-	-	20,000	-	-
CAPITAL EXPENSES (51-81-69X)								
690	Water Truck (2) New FY04	-	-	-	-	320,000	-	274,022
691	Water Truck Chassis (Used) FY01	-	44,925	-	-	-	-	-
692	Water Tank for Truck Chassis FY02	-	-	-	4,537	-	-	-
693	Vehicle -Used Nissan Pick-up FY03	-	-	-	-	-	-	-
694	Water Meters- Delivery Trucks	-	-	-	-	-	-	75,000
	Total Capital Expenses	40,000	44,925	-	4,537	320,000	-	349,022
	Total Operating, Debt, Projects & Capital	844,259	773,772	806,911	974,261	1,227,040	968,999	1,314,552

Hauled Water 51-81

	FY 2004 Budget	FY 2005 Revised Budget
PERSONNEL		
Public Works Director (15% x 82,070)	11,724	12,311
Operations Manager (15% of 51,435)	11,237	7,715
Projects and Safety Manager (30% x 51,733)	7,315	15,520
Utility Foreman (45% x 58,226)	26,202	26,202
Customer Service Representative (30 hours - 50% x 41,532)	15,121	15,575
Water Truck Driver	48,464	48,461
Water Truck Driver	37,149	38,256
Water Truck Driver	37,149	38,256
Water Truck Driver	37,149	38,256
Water Truck Driver	36,060	37,142
Water Truck Driver	-	37,149
Relief Water Driver	36,060	37,149
Relief Water Driver	36,060	37,149
Swing Shift Driver-Water	35,010	35,010
SALARIES	374,700	424,150
Annual Increases	15,825	3,929
Overtime	30,000	30,000
Subtotal	45,825	33,929
Social Security (6.2% of Temp Salary)	-	-
Medicare (1.45% of Salary)	6,098	6,642
Employee Group Health Benefit (\$572 per month x 12 months x 10.4 FTE)	55,793	71,386
Unemployment (.8% of Salary)	3,154	3,664
Workers' Compensation	14,467	16,668
Accrued Vacation & Sick (7% of Salary)	26,229	29,690
Utility Benefits (\$253 per month x 12 months x 10.4 FTE/PTE x 65%)	18,649	20,523
PERS (8.7% of Salary)	15,559	39,853
BENEFITS AND TAXES	139,949	188,427
SUBTOTAL PERSONNEL	560,474	646,506
<i>Revisions to Personnel Budget</i>	(3,507)	(3,469)
TOTAL PERSONNEL	556,967	643,037

Piped Water (51-82)		FY 00 Actual	FY 2001 Actual	FY 2002 Actual	FY 2003 Actual	FY 2004 Actual	FY 2005 Budget	FY 2005 Revised Budget
PERSONNEL:								
	Salaries, Benefits & Taxes minus EGHB	-	103,916	63,191	144,589	55,751	128,384	128,384
	Employee Group Health Benefits	-	11,625	10,152	10,611	10,775	12,527	12,527
	Revision to Personnel Budget	-	-	-	-	(2,088)	-	(6,917)
	Total Personnel	115,218	115,541	73,343	155,200	64,438	140,911	133,994
MATERIALS, SUPPLIES, & SERVICES								
520	Employee Housing Benefits	-	5,821	2,693	331	-	-	-
545	Training/Travel	2,028	100	-	1,464	240	1,500	1,500
561	Supplies	3,456	1,197	1,337	3,688	405	2,500	2,500
563	Wearing Apparel	575	324	333	1,071	189	800	800
592	Plumbing Supplies	634	2,481	-	1,973	5,660	4,000	4,000
600	Tires & Wheels	-	358	-	-	-	-	-
602	Gasoline/Diesel/Oil	1,359	2,315	2,973	6,118	2,866	2,328	2,328
621	Electricity	-	-	2,922	2,032	2,211	3,392	3,392
622	Telephone	856	2,009	2,415	2,527	4,458	2,100	2,100
623	Heating Fuel	1,291	819	1,603	1,048	1,217	3,250	3,250
649	Engineering Services	-	-	-	-	2,000	2,000	2,000
661	Vehicle Repairs	8,004	-	-	-	-	-	-
662	Property Maint.-charge back (2.5% of 46,545)	9,996	-	-	-	-	1,164	1,164
664	Computer Services	-	-	-	-	414	-	660
669	Other Purchased Services	10,584	428	762	1,500	412	-	-
683	Minor Equipment	825	3,089	583	633	6,692	1,363	1,363
685	Equipment	1,530	-	-	11,988	-	3,750	3,750
721	Insurance	10,608	5,618	3,088	1,867	9,767	11,720	6,464
724	Dues & Subscriptions	-	-	-	97	84	150	150
727	Advertising	-	5	5	508	-	200	200
732	Equipment Rental	-	-	-	350	-	-	-
738	Bad Debts Expense	-	-	-	595	-	-	-
799	Miscellaneous	-	52	-	124	5	200	200
998	Administrative Overhead	26,376	27,173	52,937	52,937	17,184	24,562	24,562
	Total MS&S	78,121	51,789	71,651	90,850	53,804	64,978	60,382
	Total Operating Expenses	193,339	167,330	144,994	246,050	118,242	205,889	194,376
PROJECT EXPENSES (51-82-77X)								
	Total Project Expenses	-	-	-	-	-	-	-
CAPITAL EXPENSES (51-82-69X)								
691	Vehicle - Used Nissan Pick-up FY03	-	-	-	-	-	-	-
	Total Capital Expenses	-	-	-	-	-	-	-
	Total Operating, Debt, Projects & Capital	193,339	167,330	144,994	246,050	118,242	205,889	194,376

Piped Water 51-82

	FY 2004 Budget	FY 2005 Revised Budget
PERSONNEL		
Public Works Director (5% x 82070)	3,908	4,104
Operations Manager (12.5% of 51,435)	9,364	6,429
Projects and Safety Manager (5% x 51,733)	2,438	2,587
Utility Foreman (25% x 51,733)	12,557	12,933
Utility Maintenance Worker (45% x 49,915)	22,462	22,462
Utility Maintenance Worker (45% x 49,915)	22,462	22,462
Utility Maintenance Worker (45% x 39,401)	-	17,214
Temp. Utility Maintenance Worker (6 months @ \$22.22/hr.)	-	-
SALARIES	73,191	88,190
Annual Increases	1,607	1,217
Overtime	13,500	13,500
Subtotal	15,107	14,717
Social Security (6.2% of Temp Salary)	-	-
Medicare (1.45% of Salary)	1,280	1,510
Employee Group Health Benefit (\$572 per month x 12 months x 1.375 FTE)	10,775	12,527
Unemployment (.8% of Salary)	662	833
Workers' Compensation	4,389	4,300
Accrued Vacation & Sick (7% of Salary)	5,123	6,173
Utility Benefits (\$253 per month x 12 months x 1.375 FTE/PTE x 65%)	3,601	3,601
PERS (8.7% of Salary)	3,267	9,059
BENEFITS AND TAXES	29,097	38,003
SUBTOTAL PERSONNEL	117,395	140,911
<i>Revisions to Personnel Budget</i>	(2,088)	(6,917)
TOTAL PERSONNEL	115,307	133,994

Bethel Heights Water Treatment Facility (51-83)		FY 00 Actual	FY 2001 Actual	FY 2002 Actual	FY 2003 Actual	FY 2004 Actual	FY 2005 Budget	FY 2005 Revised Budget
PERSONNEL:								
	Salaries, Benefits & Taxes minus EGHB	-	62,162	90,132	105,798	85,190	121,326	115,815
	Employee Group Health Benefits	-	6,750	13,536	13,755	10,627	12,355	12,355
	Revision to Personnel Budget	-	-	-	-	1,103	-	(5,511)
	Total Personnel	85,669	68,912	103,668	119,553	96,920	133,682	128,171
MATERIALS, SUPPLIES, & SERVICES								
520	Employee Housing Benefits	-	4,737	2,094	-	-	-	-
545	Training/Travel	-	1,673	100	884	-	3,100	3,100
561	Supplies	25,483	30,338	37,921	58,907	34,786	45,000	45,000
563	Wearing Apparel	649	455	475	604	88	500	500
592	Plumbing Supplies	712	1,129	4,941	-	-	2,750	2,750
600	Tires & Wheels	-	-	-	-	-	-	-
602	Gasoline/Diesel/Oil	2,302	80	74	386	1,055	798	798
621	Electricity (BHWTF)	117,203	121,269	129,641	117,079	119,496	138,762	138,762
622	Telephone	1,580	516	422	385	425	500	500
623	Heating Fuel (BHWTF)	139,758	131,342	155,700	93,693	107,165	166,250	166,250
649	Engineering Services	-	-	-	-	-	2,000	2,000
650	Lab Tests	3,077	4,742	4,764	4,600	2,742	6,500	6,500
661	Vehicle Repairs	3,996	-	-	-	-	-	-
662	Property Maint.-charge back (10% of 46,545)	15,932	-	-	-	-	4,655	4,655
669	Other Purchased Services	1,528	1,727	1,510	3,829	10,591	5,000	5,000
683	Minor Equipment	2,251	3,627	275	1,553	-	3,457	3,457
685	Equipment	-	-	3,834	-	-	3,750	3,750
721	Insurance	1,724	2,085	1,827	8,393	6,392	7,670	4,224
724	Dues & Subscriptions	-	50	50	-	-	250	250
727	Advertising	-	-	58	401	-	400	400
735	Finance Charges/Penalties	-	-	-	-	-	-	-
799	Miscellaneous	116	50	352	-	-	400	400
998	Administrative Overhead	35,160	23,460	63,243	63,243	65,852	83,947	83,947
	Total MS&S	351,471	327,280	407,281	353,957	348,592	475,689	472,243
	Total Operating Expenses	437,140	396,192	510,949	473,510	445,512	609,370	600,413
PROJECT EXPENSES (51-83-77X)								
	Total Project Expenses	-						
CAPITAL EXPENSES (51-83-69X)								
	Total Capital Expenses	-						
	Total Operating, Debt, Projects & Capital	437,140	396,192	510,949	473,510	445,512	609,370	600,413

Bethel Heights Water Treatment 51-83

	FY 2004 Budget	FY 2005 Revised Budget
PERSONNEL		
Public Works Director (5% x 82,070)	3,908	4,104
Operations Manager (5% of 51,435)	3,746	2,572
Projects and Safety Manager (5% x 51,733)	2,438	2,587
Utility Foreman (15% x 51,733)	7,534	7,760
Water Treatment Operator - Bethel Heights	49,912	49,912
Water Treatment Operator - Trainee - (50% x 39,401)	19,701	19,701
SALARIES	87,239	86,634
Annual Increases	1,318	1,099
Overtime	7,000	7,000
Subtotal	8,318	8,099
Social Security (6.2% of Temp Salary)	-	-
Medicare (1.45% of Salary)	1,386	1,374
Employee Group Health Benefit (\$572 per month x 12 months x 1.8 FTE)	10,627	12,355
Unemployment (.8% of Salary)	717	758
Workers' Compensation	3,399	6,604
Accrued Vacation & Sick (7% of Salary)	6,107	6,064
Utility Benefits (\$253 per month x 12 months x 1.8 FTE/PTE x 65%)	3,552	3,552
PERS (8.7% of Salary)	3,536	8,242
BENEFITS AND TAXES	29,324	38,949
SUBTOTAL PERSONNEL	124,881	133,682
<i>Revisions to Personnel Budget</i>	<i>1,103</i>	<i>(5,511)</i>
TOTAL PERSONNEL	125,984	128,171

City Sub Water Treatment Facility (51-84)		FY 00 Actual	FY 2001 Actual	FY 2002 Actual	FY 2003 Actual	FY 2004 Actual	FY 2005 Budget	FY 2005 Revised Budget
PERSONNEL:								
	Salaries, Benefits & Taxes minus EGHB	-	32,912	72,564	103,020	105,422	120,734	120,734
	Employee Group Health Benefits	-	4,500	13,536	13,755	10,627	12,355	12,355
	Revision to Personnel Budget	-	-	-	780	1,079	-	(5,496)
	Total Personnel		37,412	86,100	117,555	117,128	133,090	127,594
MATERIALS, SUPPLIES, & SERVICES								
520	Employee Housing Benefits	-	2,566	1,047	-	-	-	-
545	Training/Travel	-	-	1,730	172	1,010	2,500	2,500
561	Supplies	-	18,846	29,932	21,296	43,418	35,000	35,000
563	Wearing Apparel	-	-	253	-	66	600	600
592	Plumbing Supplies	-	1,675	934	668	2,849	300	300
600	Tires & Wheels	-	-	-	-	46	600	600
602	Gasoline/Diesel/Oil	-	404	2,072	1,408	953	1,330	1,330
621	Electricity (CSWTF)	-	28,582	51,532	47,792	57,607	57,521	57,521
622	Telephone	-	860	1,647	1,338	1,722	1,450	1,450
623	Heating Fuel (CSWTF)	-	41,101	78,065	69,409	104,469	100,000	100,000
649	Engineering Services	-	-	-	-	-	3,000	3,000
650	Lab Tests	-	630	2,671	2,898	3,770	4,750	4,750
661	Vehicle Repairs	-	-	-	-	-	-	-
662	Property Maint.-charge back (10% of 46,545)	-	-	-	-	-	4,655	4,655
664	Computer Services	-	-	-	-	-	-	660
669	Other Purchased Services	-	289	1,211	50	13,126	5,000	5,000
683	Minor Equipment	-	1,456	2,430	656	-	1,500	1,500
685	Equipment	-	-	-	-	-	3,000	3,000
721	Insurance	-	1,265	3,719	7,844	10,572	12,686	8,711
724	Dues & Subscriptions	-	-	-	-	-	250	250
727	Advertising	-	-	50	202	-	250	250
735	Finance Charges/Penalties	-	-	-	-	-	-	-
799	Miscellaneous	-	50	50	-	267	500	500
998	Administrative Overhead	-	12,763	61,401	61,401	61,922	57,602	57,602
	Total MS&S	-	110,487	238,744	215,134	301,797	292,494	289,183
	Total Operating Expenses	-	147,899	324,844	332,689	418,925	425,583	416,776
PROJECT EXPENSES (51-84-77X)								
	Total Project Expenses	-	-	-	-	-	-	-
CAPITAL EXPENSES (51-84-69X)								
	Total Capital Expenses	-	-	-	-	-	-	-
	Total Operating, Debt, Projects & Capital	-	147,899	324,844	332,689	418,925	425,583	416,776

City Sub Water Treatment 51-84

	FY 2004 Budget	FY 2005 Revised Budget
PERSONNEL		
Public Works Director (5% x 82,070)	3,908	4,104
Operations Manager (5% of 51,435)	3,746	2,572
Projects and Safety Manager (5% x 51,733)	2,438	2,587
Utility Foreman (15% x 51,733)	7,534	7,760
Water Treatment Operator - City Sub	49,912	49,912
Water Treatment Operator - Trainee - (50% x 39,401)	19,701	19,701
SALARIES	87,239	86,634
Annual Increases	1,318	1,099
Overtime	6,500	6,500
Subtotal	7,818	7,599
Social Security (6.2% of Temp Salary)	-	-
Medicare (1.45% of Salary)	1,378	1,366
Employee Group Health Benefit (\$572 per month x 12 months x 1.8 FTE)	10,627	12,355
Unemployment (.8% of Salary)	713	753
Workers' Compensation	3,399	6,567
Accrued Vacation & Sick (7% of Salary)	6,107	6,064
Utility Benefits (\$253 per month x 12 months x 1.8 FTE/PTE x 65%)	3,552	3,552
PERS (8.7% of Salary)	3,427	8,198
BENEFITS AND TAXES	29,203	38,857
SUBTOTAL PERSONNEL	124,260	133,090
<i>Revisions to Personnel Budget</i>	<i>1,079</i>	<i>(5,496)</i>
TOTAL PERSONNEL	125,339	127,594

PERSONNEL:								
	Salaries, Benefits & Taxes minus EGHB	-	373,669	328,756	362,913	417,737	524,762	498,403
	Employee Group Health Benefits	-	69,375	78,255	72,050	55,498	64,522	64,522
	Revision to Personnel Budget	-	-	-	-	10,844	-	-
	Total Personnel	382,520	443,044	407,011	434,963	484,079	589,284	562,925
MATERIALS, SUPPLIES, & SERVICES								
545	Training/Travel	2,150	748	3,513	-	100	1,950	1,950
561	Supplies	3,956	3,881	3,706	7,390	5,398	6,000	6,000
563	Wearing Apparel	3,346	3,529	3,197	2,851	4,138	4,400	4,400
567	Calcium Chloride	-	-	-	42,852	-	12,000	12,000
600	Tires & Wheels	4,511	1,224	3,031	7,829	4,902	8,116	8,116
601	Vehicle Parts	-	4,266	5,295	6,389	7,668	7,000	7,000
602	Gasoline/Diesel/Oil	23,512	43,458	41,913	51,043	59,257	76,240	76,240
621	Electricity (17% of City Shop)	-	-	-	-	-	14,105	14,105
622	Telephone	2,777	1,655	1,181	1,047	866	950	950
623	Heating Fuel (17% of City Shop)	-	-	-	-	-	16,575	16,575
626	Water/Sewer/Garbage (17% of City Shop)	-	-	-	-	-	2,285	2,285
661	Vehicle Maint/Repairs	117,824	-	-	-	-	-	-
662	Property Maint. - charge back (25% of 46,545)	9,996	-	-	-	-	11,636	11,636
663	Computer Services	1,872	-	-	36	-	-	-
669	Other Purchased Services	6,007	-	1,539	1,297	2,129	3,500	3,500
683	Minor Equipment	2,040	1,137	438	3,713	-	2,500	2,500
685	Equipment	2,620	3,783	-	-	708	2,000	2,000
721	Insurance	20,506	11,604	11,107	24,082	29,837	35,804	26,046
722	Insurance Ded Exp & Other	-	-	-	-	9,427	-	-
724	Dues & Subscriptions	-	100	-	-	-	300	300
727	Advertising	409	529	170	384	-	1,250	1,250
738	Bad Debts Expense	-	-	-	20,622	-	-	-
799	Miscellaneous	235	792	129	-	50	500	500
998	Administrative Overhead	121,860	119,628	115,684	115,684	105,563	102,525	102,525
	Total MS&S	323,621	196,334	190,904	285,219	230,043	309,636	299,878
	Total Operating Expenses	706,141	639,378	597,915	720,182	714,122	898,920	862,803
PROJECT EXPENSES (51-85-77X)								
	Total Project Expenses	-	-	-	-	-	-	-
CAPITAL EXPENSES (51-85-69X)								
691	Sewer Trucks (1) - New FY03	-	191,190	-	(52,140)	-	-	-
	Total Capital Expenses	40,000	191,190	-	(52,140)	-	-	-
	Total Operating, Debt, Projects & Capital	746,141	830,568	597,915	668,042	714,122	898,920	862,803

Hauled Sewer 51-85

	FY 2004	FY 2005
	Budget	Revised Budget
PERSONNEL		
Public Works Director (15% x 82,070)	11,724	12,311
Operations Manager (15% of 51,435)	11,237	7,715
Projects and Safety Manager (15% x 51,733)	7,315	7,760
Utility Foreman (45% x 58,226)	26,202	26,202
Customer Service Representative (30 hours - 50% x 41,532)	15,121	15,575
Evacuation Truck Driver	41,808	43,057
Evacuation Truck Driver	40,586	41,803
Evacuation Truck Driver	40,586	41,803
Evacuation Truck Driver	39,395	40,586
Evacuation Truck Driver	37,142	37,142
Evacuation Truck Driver	36,060	36,060
Evacuation Truck Driver	36,060	36,060
Relief Driver-Evacuation	35,010	35,010
SALARIES	378,246	381,083
Annual Increases	15,967	5,328
Overtime	20,000	20,000
Subtotal	35,967	25,328
Social Security (6.2% of Temp Salary)	-	-
Medicare (1.45% of Salary)	6,006	5,893
Employee Group Health Benefit (\$572 per month x 12 months x 9.4 FTE)	55,498	64,522
Unemployment (.8% of Salary)	3,107	3,252
Workers' Compensation	8,669	28,623
Accrued Vacation & Sick (7% of Salary)	26,477	26,676
Utility Benefits (\$253 per month x 12 months x 9.4 FTE/PTE x 65%)	18,550	18,550
PERS (8.7% of Salary)	15,326	35,358
BENEFITS AND TAXES	133,633	182,873
SUBTOTAL PERSONNEL	547,846	589,284
<i>Revisions to Personnel Budget</i>	<i>10,844</i>	<i>(26,359)</i>
TOTAL PERSONNEL	558,692	562,925

Piped Sewer (51-86)		FY 00 Actual	FY 2001 Actual	FY 2002 Actual	FY 2003 Actual	FY 2004 Actual	FY 2005 Budget	FY 2005 Revised Budget
PERSONNEL:								
	Salaries, Benefits & Taxes minus EGHB	-	71,870	64,232	73,684	120,105	126,147	126,147
	Employee Group Health Benefits	-	8,625	7,614	9,039	9,877	12,527	12,527
	Revision to Personnel Budget	-	-	-	-	(17)	-	(7,582)
	Total Personnel	78,923	80,495	71,846	82,723	129,965	138,674	131,092
MATERIALS, SUPPLIES, & SERVICES								
520	Employee Housing Benefit	-	5,827	2,693	331	-	-	-
545	Training/Travel	1,703	50	80	1,132	246	1,700	1,700
561	Supplies	2,987	1,764	(883)	1,837	4,970	4,000	4,000
563	Wearing Apparel	473	694	471	784	430	585	585
592	Plumbing Supplies	2,060	2,063	4,901	303	2,777	6,338	6,338
600	Tires & Wheels	-	-	-	-	342	488	488
602	Gasoline/Diesel/Oil	1,615	5,769	3,026	655	665	2,328	2,328
621	Electricity (Lift Stations & Mt. Bldg)	30,514	31,796	38,600	35,933	37,994	42,281	42,281
622	Telephone	-	-	111	841	1,304	-	1,400
623	Heating Fuel	258	985	2,426	1,048	1,334	5,500	5,500
649	Engineering Services	-	-	-	-	-	3,900	3,900
661	Vehicle Maint/Repair	8,004	-	100	-	-	-	-
662	Property Maint. - charge back (2.5% of 46,545)	9,996	-	-	-	-	1,164	1,164
669	Other Purchased Services	1,344	6,784	16,138	12,690	2,422	5,000	5,000
683	Minor Equipment	1,854	3,573	696	2,177	664	1,950	1,950
685	Equipment	7,031	8,350	12,273	7,148	-	2,000	2,000
721	Insurance	2,196	1,329	1,103	2,335	4,106	4,927	3,527
724	Dues & Subscriptions	-	100	-	-	-	150	150
727	Advertising	-	5	24	266	-	250	250
732	Equipment Rental	-	-	-	-	-	-	-
738	Bad Debts Expense	-	-	-	7,842	-	-	-
799	Miscellaneous	-	179	-	10	-	275	275
998	Administrative Overhead	44,316	45,654	46,243	46,243	32,481	32,117	32,117
	Total MS&S	114,351	114,922	128,002	121,575	89,735	114,952	114,952
	Total Operating Expenses	193,274	195,417	199,848	204,298	219,700	253,626	246,044
PROJECT EXPENSES (51-86-77X)								
	Total Project Expenses	-	-	-	-	-	-	-
CAPITAL EXPENSES (51-86-69X)								
691	Vehicle - Used Nissan Pick-up FY03	-	-	-	-	-	-	-
	Total Capital Expenses	-	-	-	-	-	-	-
	Total Operating, Debt, Projects & Capital	193,274	195,417	199,848	204,298	219,700	253,626	246,044

Piped Sewer 51-86

	FY 2004 Budget	FY 2005 Revised Budget
PERSONNEL		
Public Works Director (5% x 82,070)	3,908	4,104
Operations Manager (12.5% of 51,435)	9,364	6,429
Projects and Safety Manager (5% x 51,733)	2,438	2,587
Utility Foreman (25% x 51,733)	12,557	12,933
Utility Maintenance Worker (45% x 49,915)	22,462	22,462
Utility Maintenance Worker (45% x 49,915)	22,462	22,462
Utility Maintenance Worker (45% x 38,254)	-	17,214
SALARIES	73,191	88,191
Annual Increases	1,607	1,217
Overtime	11,500	11,500
Subtotal	13,107	12,717
Social Security (6.2% of Temp Salary)	-	0
Medicare (1.45% of Salary)	1,251	1,463
Employee Group Health Benefit (\$572 per month x 12 months x 1.375 FTE)	9,877	12,527
Unemployment (.8% of Salary)	647	807
Workers' Compensation	2,405	4,415
Accrued Vacation & Sick (7% of Salary)	6,041	6,173
Utility Benefits (\$253 per month x 12 months x 1.375 FTE/PTE x 65%)	3,301	3,601
PERS (8.7% of Salary)	3,193	8,779
BENEFITS AND TAXES	26,715	37,766
SUBTOTAL PERSONNEL	113,013	138,674
<i>Revisions to Personnel Budget</i>	(17)	(7,582)
TOTAL PERSONNEL	112,996	131,092

Sewer Lagoon (51-87)		FY 00 Actual	FY 2001 Actual	FY 2002 Actual	FY 2003 Actual	FY 2004 Actual	FY 2005 Budget	FY 2005 Revised Budget
PERSONNEL:								
	Salaries, Benefits & Taxes minus EGHB	-	21,821	32,005	28,916	16,898	48,139	48,139
	Employee Group Health Benefits	-	2,250	2,538	6,878	3,247	3,775	3,775
	Revision to Personnel Budget	-	-	-	-	256	-	(3,330)
	Total Personnel	30,901	24,071	34,543	35,794	20,401	51,914	48,584
MATERIALS, SUPPLIES, & SERVICES								
520	Employee Housing Benefits	-	4,723	2,094	-	-	-	-
545	Training/Travel	554	50	-	-	-	-	-
561	Supplies	6,653	1,221	71	59	1,589	900	900
563	Wearing Apparel	558	-	250	226	2,398	-	-
578	Gravel	-	6,500	-	-	-	-	-
592	Plumbing Supplies	-	-	-	-	-	-	-
600	Tires and Wheels	-	-	-	-	-	-	-
602	Gasoline/Diesel/Oil	710	-	158	200	344	6,921	6,921
649	Engineering Services	-	-	-	3,089	15,432	2,000	2,000
650	Lab Tests	2,783	2,676	2,762	2,901	2,045	3,000	3,000
661	Vehicle Maint/Repair	4,000	-	-	-	-	-	-
662	Property Maintenance	5,348	-	-	-	-	-	-
669	Other Purchased Services	10,362	-	6,209	860	860	1,000	1,000
683	Minor Equipment	-	3,740	275	-	-	700	700
685	Equipment	-	6,973	4,323	-	-	-	-
714	Interest Sewer Lagoon Bonds (\$1M)	40,566	37,321	33,894	30,276	26,456	22,424	22,424
721	Insurance	484	265	133	409	724	869	845
724	Dues & Subscriptions	-	-	-	-	-	300	300
727	Advertising	518	172	50	524	755	550	550
735	Finance Charges/Penalties	-	-	-	-	-	-	-
799	Miscellaneous	-	-	-	-	-	350	350
998	Administrative Overhead	55,392	56,064	39,719	39,719	12,316	14,118	14,118
	Total MS&S	127,928	119,705	89,938	78,263	62,919	53,132	53,108
	Total Operating Expenses	158,829	143,776	124,481	114,057	83,320	105,046	101,692
PROJECT EXPENSES (51-87-77X)								
	Total Project Expenses	-	-	-	-	-	-	-
CAPITAL EXPENSES (51-87-69X)								
	Total Capital Expenses	-	-	-	-	-	-	-
	Total Operating, Debt, Projects & Capital	158,829	143,776	124,481	114,057	83,320	105,046	101,692

Sewer Lagoon 51-87

	FY 2004 Budget	FY 2005 Revised Budget
PERSONNEL		
Public Works Director (5% x 82,070)	3,908	4,104
Operations Manager (5% of 51,435)	3,746	2,572
Projects and Safety Manager (5% x 51,733)	2,438	2,587
Utility Foreman (20% x 51,733)	10,045	10,347
Utility Maintenance Worker (10% x 49,915)	4,992	4,992
Utility Maintenance Worker (10% x 49,915)	4,992	4,992
Utility Maintenance Worker (10% x 38,254)	-	3,825
SALARIES	30,121	33,417
Annual Increases	1,148	475
Overtime	5,000	5,000
Subtotal	6,148	5,475
Social Security (6.2% of Temp Salary)	-	-
Medicare (1.45% of Salary)	526	564
Employee Group Health Benefit (\$572 per month x 12 months x .55 FTE)	3,247	3,775
Unemployment (.80% of Salary)	272	315
Workers' Compensation	748	1,519
Accrued Vacation & Sick (7% of Salary)	1,938	2,339
Utility Benefits (\$253 per month x 12 months x .55 FTE/PTE x 65%)	918	1,085
PERS (8.7% of Salary)	1,342	3,425
BENEFITS AND TAXES	8,991	13,022
SUBTOTAL PERSONNEL	45,260	51,914
<i>Revisions to Personnel Budget</i>	256	(3,330)
TOTAL PERSONNEL	45,516	48,584

Hauled Refuse (51-88)		FY 00 Actual	FY 2001 Actual	FY 2002 Actual	FY 2003 Actual	FY 2004 Actual	FY 2005 Budget	FY 2005 Revised Budget
PERSONNEL:								
	Salaries, Benefits & Taxes minus EGHB	-	68,180	33,083	68,580	70,990	83,772	83,772
	Employee Group Health Benefits	-	8,625	9,729	9,039	7,082	8,237	8,237
	Revision to Personnel Budget	-	-	-	-	1,638	-	(6,213)
	Total Personnel	74,184	76,805	42,812	77,619	79,710	92,008	85,795
MATERIALS, SUPPLIES, & SERVICES								
545	Training/Travel	1,800	-	660	-	-	850	850
561	Supplies	2,064	2,543	1,911	2,520	4,254	3,800	3,800
563	Wearing Apparel	442	1,165	236	187	243	300	300
567	Calcium Chloride	-	-	-	42,852	-	6,000	6,000
600	Tires & Wheels	4,937	1,662	2,353	3,247	-	3,000	3,000
601	Vehicle Parts	337	-	-	-	-	-	-
602	Gasoline/Diesel/Oil	11,695	12,160	13,364	16,712	16,216	20,837	20,837
661	Vehicle Maint/Repairs	65,004	-	-	-	-	-	-
662	Property Maintenance	5,004	-	-	-	-	-	-
669	Other Purchased Services	2,127	2,134	739	-	602	2,000	2,000
683	Minor Equipment	78	138	546	-	2,176	2,000	2,000
685	Equipment	1,462	2,250	-	-	2,942	8,539	8,539
691	Dumpsters	-	-	-	-	-	-	23,805
721	Insurance	4,364	3,124	3,660	7,830	5,964	7,157	5,052
724	Dues & Subscriptions	-	-	-	-	-	250	250
727	Advertising	324	207	-	-	58	500	500
735	Finance Charges/Penalties	-	-	-	3	-	-	-
738	Bad Debts Expense	-	-	-	6,274	-	-	-
799	Miscellaneous	5	-	121	10	-	500	50
998	Administrative Overhead	48,000	48,480	24,210	24,210	8,961	25,759	25,759
	Total MS&S	147,643	73,863	47,800	103,845	41,416	81,492	103,192
	Total Operating Expenses	221,827	150,668	90,612	181,464	121,126	173,501	188,988
PROJECT EXPENSES (51-88-77X)								
	Total Project Expenses	-	-	-	-	-	-	-
CAPITAL EXPENSES (51-88-69X)								
691	4 Yd. Dumpsters for Restaurants, Stores & Ho	-	-	-	17,220	20,000	20,000	20,000
692	New Refuse Dumpster Truck	-	-	172,041	-	-	-	-
	Total Capital Expenses	-	-	172,041	17,220	20,000	20,000	20,000
	Total Operating, Debt, Projects & Capital	221,827	150,668	262,653	198,684	141,126	193,501	208,988

Hauled Refuse 51-88

	FY 2004 Budget	FY 2005 Revised Budget
PERSONNEL		
Public Works Director (5% x 82070)	3,908	4,104
Operations Manager (5% of 51,435)	3,746	2,572
Projects and Safety Manager (5% x 51,733)	2,438	2,587
Utility Foreman (5% x 51,733)	2,911	2,587
Solid Waste Driver	41,808	43,057
SALARIES	54,811	54,906
Annual Increases	1,518	1,438
Overtime	4,500	4,500
Subtotal	6,018	5,938
Social Security (6.2% of Temp Salary)	-	-
Medicare (1.45% of Salary)	882	882
Employee Group Health Benefit (\$572 per month x 12 months x 1.2 FTE)	7,085	8,237
Unemployment (.8% of Salary)	456	487
Workers' Compensation	5,408	10,054
Accrued Vacation & Sick (7% of Salary)	3,837	3,843
Utility Benefits (\$253 per month x 12 months x 1.2 FTE/PTE x 65%)	2,368	2,368
PERS (8.7% of Salary)	2,251	5,293
BENEFITS AND TAXES	22,287	31,165
SUBTOTAL PERSONNEL	83,116	92,008
<i>Revisions to Personnel Budget</i>	1,638	(6,213)
TOTAL PERSONNEL	84,754	85,795

Landfill Operation (51-89)		FY 00 Actual	FY 2001 Actual	FY 2002 Actual	FY 2003 Actual	FY 2004 Actual	FY 2005 Budget	FY 2005 Revised Budget
PERSONNEL:								
	Salaries, Benefits & Taxes minus EGHB	76,995	94,413	81,324	135,918	139,350	142,977	142,977
	Employee Group Health Benefits	-	12,900	18,189	16,899	12,989	15,101	15,101
	Revision to Personnel Budget	-	-	-	-	2,761	-	(9,171)
	Total Personnel	76,995	107,313	99,513	152,817	155,100	158,078	148,907
MATERIALS, SUPPLIES, & SERVICES								
545	Training/Travel	2,074	2,045	800	834	1,373	2,000	2,000
561	Supplies	3,280	3,095	2,503	2,475	2,490	1,500	1,500
563	Wearing Apparel	650	803	735	779	711	600	600
567	Salt	-	-	-	-	-	5,000	5,000
576	Gravel	-	23,099	15,851	15,905	19,000	9,000	9,000
600	Tires & Wheels	457	505	-	324	212	1,989	1,989
601	Vehicle Parts	984	-	-	228	947	-	-
602	Gasoline/Diesel/Oil	469	1,249	760	3,501	10,520	7,980	7,980
621	Electricity (Dump Shack & 1/2 Recycle)	5,577	8,660	3,619	865	2,840	3,392	3,392
622	Telephone	-	79	815	329	415	500	500
623	Heating Fuel	40	4,981	6,141	5,914	4,011	8,725	8,725
649	Engineering Services	-	-	-	11,794	9,510	-	-
661	Vehicle Maint/Repair	9,022	-	420	-	-	-	-
662	Property Maintenance	5,004	-	-	-	-	-	-
669	Other Purchased Services	11,073	7,738	4,554	10,884	8,792	10,000	10,000
683	Minor Equipment	793	1,691	3,798	7,271	2,135	5,000	5,000
685	Equipment	1,900	1,714	150	-	4,639	-	-
707	Landfill Closure Costs	82,529	155,889	67,596	26,288	26,288	37,000	37,000
721	Insurance	3,302	2,615	1,526	2,131	7,070	8,366	9,113
724	Dues & Subscriptions	-	92	-	-	150	500	500
727	Advertising	328	266	128	15	65	1,000	1,000
732	Equipment Rental	-	-	-	3,000	-	5,000	4,253
738	Bad Debts Expense	-	-	-	774	-	-	-
746	Donation Recycling Center	-	-	-	-	-	-	-
799	Miscellaneous	405	-	943	120	5	500	500
998	Administrative Overhead	20,568	21,189	52,134	52,134	50,855	40,789	40,789
	Total MS&S	148,455	235,710	162,473	145,565	152,028	148,841	148,841
	Total Operating Expenses	225,450	343,023	261,986	298,382	307,128	306,919	297,748
PROJECT EXPENSES (51-89-77X)								
691	Litter Control Fence FY01	-	3,103	-	-	-	-	-
	Total Project Expenses	-	3,103	-	-	-	-	-
CAPITAL EXPENSES (51-89-69X)								
690	815F Sheepsfoot Compactor	-	-	-	-	275,000	-	-
693	Recycling Dumpsters	-	-	7,711	-	-	-	-
692	Shop/Garage FY01	-	92,154	-	-	-	-	-
	Total Capital Expenses	-	92,154	7,711	-	275,000	-	-
	Total Operating, Debt, Projects & Capital	225,450	438,280	269,697	298,382	582,128	306,919	297,748

Landfill Operations 51-89

	FY 2004 Budget	FY 2005 Revised Budget
PERSONNEL		
Public Works Director (5% x 82,070)	3,908	4,104
Operations Manager (5% of 51,435)	3,746	2,572
Projects and Safety Manager (5% x 51,733)	2,438	2,587
Utility Foreman (5% x 51,733)	2,911	2,587
Landfill Manager	44,349	45,679
Landfill Technician	39,874	41,070
SALARIES	97,226	98,598
Annual Increases	2,795	1,244
Overtime	6,000	6,000
Subtotal	8,795	7,244
Social Security (6.2% of Temp Salary)	-	-
Medicare (1.45% of Salary)	1,537	1,535
Employee Group Health Benefit (\$572 per month x 12 months x 2.2 FTE)	12,989	15,101
Unemployment (.8% of Salary)	795	847
Workers' Compensation	7,217	14,302
Accrued Vacation & Sick (7% of Salary)	6,806	6,902
Utility Benefits (\$253 per month x 12 months x 2.2 FTE/PTE x 65%)	4,341	4,341
PERS (8.7% of Salary)	3,923	9,208
BENEFITS AND TAXES	37,608	52,237
SUBTOTAL PERSONNEL	143,629	158,078
<i>Revisions to Personnel Budget</i>	2,761	(9,171)
TOTAL PERSONNEL	146,390	148,907

Recycling Operations (51-90)		FY 00 Actual	FY 2001 Actual	FY 2002 Actual	FY 2003 Actual	FY 2004 Actual	FY 2005 Budget	FY 2005 Revised Budget
PERSONNEL:								
	Salaries, Benefits & Taxes minus EGHB	-	-	-	-	21,948	44,489	44,489
	Employee Group Health Benefits	-	-	-	-	5,904	6,864	6,864
	Revision to Personnel Budget	-	-	-	-	(1,045)	-	(241)
	Total Personnel	-	-	-	-	26,807	51,353	51,112
MATERIALS, SUPPLIES, & SERVICES								
545	Training/Travel	-	-	-	-	-	-	-
561	Supplies	-	-	-	-	239	800	800
563	Wearing Apparel	-	-	-	-	390	175	175
600	Tires & Wheels	-	-	-	-	-	-	-
602	Gasoline/Diesel/Oil	-	-	-	-	-	-	-
621	Electricity	-	-	313	3,418	9,444	3,677	3,677
622	Telephone	-	-	-	364	398	-	-
623	Heating Fuel	-	-	2,184	3,252	3,479	3,125	3,125
660	Payment For Receipt of Cans	-	-	-	406	600	-	-
661	Vehicle Maint/Repair	-	-	-	-	-	-	-
669	Other Purchased Services	-	-	1,417	1,000	151	1,200	1,200
683	Minor Equipment	-	-	-	-	-	-	-
685	Equipment	-	-	-	-	-	-	-
721	Insurance	-	-	-	-	1,316	1,579	1,536
724	Dues & Subscriptions	-	-	-	-	-	-	-
727	Advertising	-	-	-	-	-	-	-
732	Equipment Rental	-	-	-	-	-	-	-
735	Finance Charges/Penalties	-	-	-	-	-	-	-
799	Miscellaneous	-	-	-	-	-	-	-
998	Administrative Overhead	-	-	-	-	7,428	8,226	8,226
	Total MS&S	-	-	3,914	8,440	23,445	18,782	18,739
	Total Operating Expenses	-	-	3,914	8,440	50,252	70,134	69,850
PROJECT EXPENSES (51-90-77X)								
	Total Project Expenses	-	-	-	-	-	-	-
CAPITAL EXPENSES (51-90-69X)								
	Total Capital Expenses	-	-	-	-	-	-	-
	Total Operating, Debt, Projects & Capital	-	-	3,914	8,440	50,252	70,134	69,850

Recycling Operations 51-90

	FY 2004 Budget	FY 2005 Revised Budget
PERSONNEL		
Solid Waste Coordinator	31,712	33,393
SALARIES	31,712	33,393
Annual Increases	1,681	1,627
Overtime	-	-
Subtotal	1,681	1,627
Social Security (6.2% of Temp Salary)	-	-
Medicare (1.45% of Salary)	484	508
Employee Group Health Benefit (\$572 per month x 12 months x 1 FTE)	5,904	6,864
Unemployment (.8% of Salary)	250	280
Workers' Compensation	1,916	1,323
Accrued Vacation & Sick (7% of Salary)	2,220	2,338
Utility Benefits (\$253 per month x 12 months x 1 FTE/PTE x 65%)	3,036	1,973
PERS (8.7% of Salary)	1,236	3,047
BENEFITS AND TAXES	15,046	16,333
SUBTOTAL PERSONNEL	48,439	51,353
<i>FY04 Revisions to Personnel Budget</i>	(1,045)	(241)
TOTAL PERSONNEL	47,394	51,112

Vehicle Maintenance (51-91)		FY 00 Actual	FY 2001 Actual	FY 2002 Actual	FY 2003 Actual	FY 2004 Actual	FY 2005 Budget	FY 2005 Revised Budget
Total Revenues		462,000	632,500	-	-	-	-	-

EXPENSES:

PERSONNEL:								
	Salaries, Benefits & Taxes minus EGHB	264,589	223,147	230,675	276,207	259,108	317,161	317,161
	Employee Group Health Benefits	-	31,125	34,686	40,086	30,403	28,486	28,486
	Revision to Personnel Budget	-	-	-	-	3,908	-	(2,894)
	Total Personnel	264,589	254,272	265,361	316,293	293,419	345,647	342,753
MATERIALS, SUPPLIES, & SERVICES								
545	Training/Travel	2,349	2,203	2,591	-	3,798	4,000	4,000
561	Supplies	12,059	6,939	8,731	16,080	22,493	20,000	20,000
563	Wearing Apparel	2,880	-	1,943	1,378	1,213	1,250	1,250
600	Tires & Wheels	823	-	2,785	3,130	4,567	4,000	4,000
601	Vehicle Parts	87,193	69,971	181,094	313,481	269,651	260,000	260,000
602	Gasoline/Lube Oil Products	2,954	3,484	7,911	8,336	5,313	14,968	14,968
621	Electricity (16% of City Shop)	-	-	-	-	-	13,275	13,275
622	Telephone	180	387	1,399	1,431	962	1,020	1,020
623	Heating Fuel (16% of City Shop)	-	-	-	-	-	15,600	15,600
626	Water/Sewer/Garbage (16% of City Shop)	-	-	-	-	-	2,150	2,150
662	Property Maintenance (25% of 46,545)	20,022	-	-	-	-	11,636	11,636
664	Computer Services	-	-	-	36	410	-	-
668	License, Registration and Titles	-	80	-	-	-	500	500
669	Other Purchased Services	2,611	5,794	8,359	16,405	2,581	15,000	15,000
683	Minor Equipment	4,466	2,876	7,888	9,874	5,969	4,800	8,697
685	Equipment	6,292	6,689	5,172	17,869	216	6,700	6,700
721	Insurance	6,652	4,268	2,141	4,765	9,871	11,845	7,948
724	Dues & Subscriptions	402	160	-	-	-	500	500
727	Advertising	1,595	529	466	408	-	700	700
732	Equipment Rental	-	-	-	-	-	2,000	2,000
735	Finance Charges/Penalties	-	-	-	65	-	-	-
799	Miscellaneous	122	325	100	230	-	500	500
998	Administrative Overhead	-	43,654	74,979	74,979	110,624	111,922	111,922
	Total MS&S	150,600	147,359	305,559	468,467	437,668	502,366	502,366
	Total Operating Expenses	415,189	401,631	570,920	784,760	731,087	848,013	845,119
PROJECT EXPENSES (51-91-77X)								
	Total Project Expenses	-	-	-	-	-	-	-
CAPITAL EXPENSES (51-91-69X)								
	Total Capital Expenses	-	-	-	-	-	-	-
	Total Operating, Debt, Projects & Capital	415,189	401,631	570,920	784,760	731,087	848,013	845,119

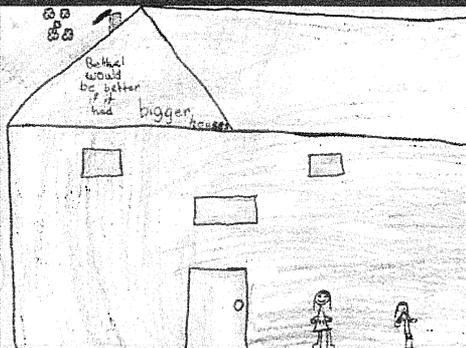
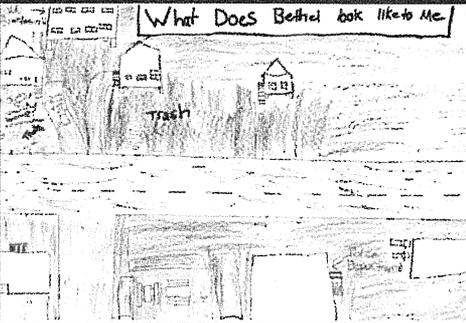
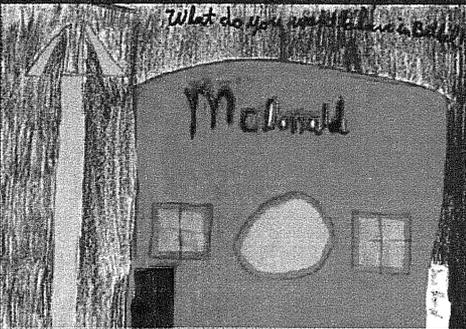
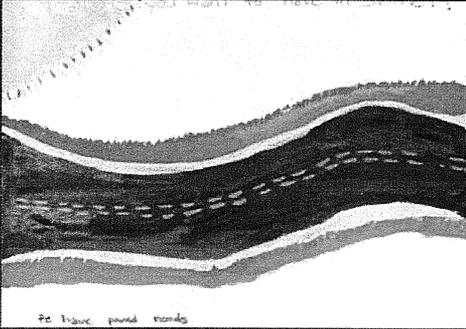
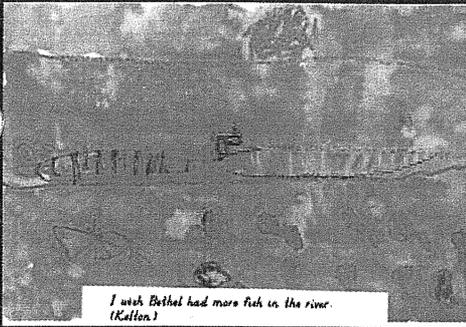
Vehicle Maintenance 51-91

	FY 2004 Budget	FY 2005 Revised Budget
PERSONNEL:		
Public Works Director (5% x 82,070)	3,908	4,104
Operations Manager (5% x 51,435)	3,746	2,572
Projects & Safety Manager (5% X 51,733)	2,438	2,587
Foreman	53,285	54,884
Mechanic II/Oiler	49,338	50,809
Mechanic II/Oiler	45,143	47,892
Mechanic I/Oiler	39,401	39,401
Mechanic II/Oiler	-	-
Mechanic II/Oiler	-	-
Temp. Mechanic I/Oiler (4 months at 6/E - \$19.51/hr)	12,486	12,486
SALARIES	209,745	214,734
Annual Increases	7,099	4,965
Overtime	25,000	30,000
Subtotal	32,099	34,965
Social Security (6.2% of Temp Salary)	774	774
Medicare (1.45% of Salary)	3,507	3,621
Employee Group Health Benefit (\$572 per month X 12 months X 4.15 FTE)	30,403	28,486
Unemployment (.8% of Salary)	1,814	1,998
Workers' Compensation	8,466	18,085
Accrued Vacation and Sick (7% of Salary)	13,808	14,157
Utility Benefit (\$253 per month x 12 months x 4.15 FTE/PTE x 65%)	10,163	8,190
PERS (8.7% of Salary)	8,486	20,638
BENEFITS AND TAXES	77,421	95,948
SUBTOTAL PERSONNEL	319,265	345,647
<i>Revisions to Personnel Budget</i>	3,908	(2,894)
TOTAL PERSONNEL	323,173	342,753

Appendix H

City of Bethel and ONC
Community Economic Development Strategy Plan

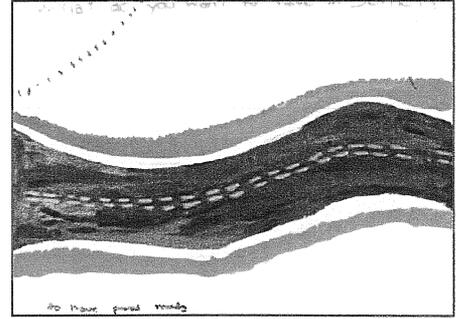
City of Bethel & ONC Community Economic Development Strategy Plan May 2003



Prepared by ASCG Incorporated
And the Community of Bethel

Acronyms

AHMTA	Alaska Mental Health Trust Authority
AIDEA	Alaska Industrial Development and Export Authority
AK DOL	Alaska Department of Labor
ADF&G	Alaska Department of Fish and Game
ARDOR	Alaska Regional Development Organization
ASWCD	Anchorage Soil and Water Conservation District
ATV	All-terrain Vehicle
AVCP	Association of Village Council Presidents
AVEC	Alaska Village Electric Cooperative
BBHC	Bristol Bay Health Corporation
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BNC	Bethel Native Corporation
CEDS	Comprehensive Economic Development Strategy
DCBD	Department of Community and Business Development
DCED	Department of Community and Economic Development
DEC	Department of Environmental Conservation
DNR	Department of Natural Resources
DOC	Department of Corrections
DOJ	Department of Justice
DOT	Department of Transportation and Public Facilities
EDA	Economic Development Administration
EDD	Economic Development District
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
LKSD	Lower Kuskokwim School District
NRCS	Natural Resources Conservation Service
ONC	Orutsararmiut Native Council
PFD	Permanent Fund Dividend
RC&D	Resource Conservation and Development
SBDC	Small Business Development Center
SWOT	Strengths, Weaknesses, Opportunities, Threats
UAF KUC	University of Alaska Fairbanks Kuskokwim Campus
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
VISTA	Volunteers in Service to America
YE	Yuut Elitnaurviat
Y-K Delta	Yukon-Kuskokwim Delta
YKHC	Yukon-Kuskokwim Health Corporation



*What do you want to have in Bethel?
To have paved roads. – Elizabeth T.*

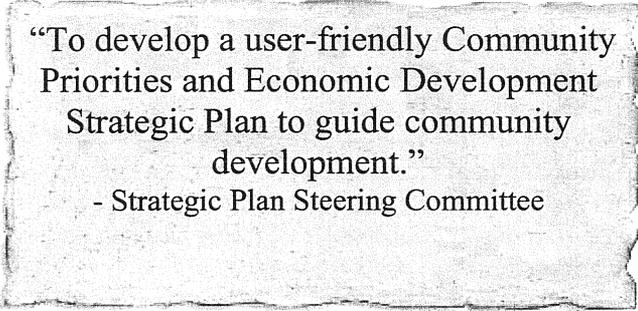
Definitions

Goals are general achievements that the community wishes to accomplish in the future. Goals provide guidance for developing objectives.

Objectives are specific and achievable projects in support of a goal.

Actions are task-oriented events that lead to implementation of projects/goals.

Vision is the traditional knowledge and foresight that the community uses to form goals and objectives. The community vision statement serves as the umbrella for the goals.



“To develop a user-friendly Community
Priorities and Economic Development
Strategic Plan to guide community
development.”
- Strategic Plan Steering Committee

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1.0 Introduction

The Bethel Comprehensive Economic Development Strategy (CEDS) was developed from a planning process with broad-based and diverse community participation that addressed the economic challenges and potential of the area. The strategic planning process began in July 2002. Funding to complete the strategic plan was obtained in part with Mini-Grant Assistance funds made available through the Department of Community and Economic Development and the Denali Commission.

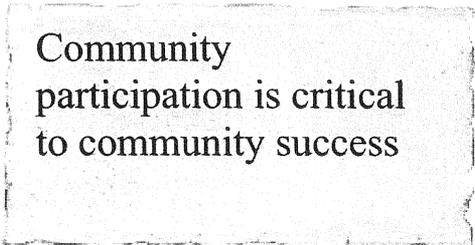
The Bethel CEDS can be used to help create jobs, develop a more stable and diversified economy, and improve the quality of life. The CEDS provides a mechanism for individuals, local government and private industry to coordinate economic development efforts. By offering safe and affordable housing, supportive training and education, skilled labor, and community and cultural events, businesses are more likely to invest in the people and community of Bethel and the region. With existing resources and infrastructure, such as the deep water port and the airport, health and social services, and regional government services, Bethel has the facilities that commerce needs.

This CEDS is required as a qualification for Economic Development Administration (EDA) assistance under its public works, economic adjustment and planning grant programs and is a prerequisite for designation by EDA as an economic development district (EDD).

Elements of a CEDS

According to the EDA, the CEDS must be the result of a continuing economic development planning process, developed with broad based and diverse community participation, and contain the following elements:

1. Analysis: Where are we now?
2. Vision: Where do we want to be?



Community participation is critical to community success

3. Action Plan: How do we get there?
4. Evaluation Criteria

Analysis: Where are we now?

The analysis section addresses the state of the local and regional economy, external trends and forces, partners for economic development, and resources for economic development.

The analysis includes:

- ✓ Demographic, labor force, and socioeconomic data
- ✓ Geographic, climatic, environmental, and natural resource profiles
- ✓ An infrastructure assessment
- ✓ Identification of major sectors of the local economies—past, present, and projected
- ✓ Factors that directly and indirectly affect economic performance
- ✓ Recognition of relationships between the community's economy, the region, and the state
- ✓ Strengths, Weaknesses, Opportunities & Threats (SWOT) to economic development

Vision: Where do we want to be?

The vision statement, goals, and objectives respond to the analysis of the community's development potential and challenges. The vision in this document describes where Bethel wants to be, what are their goals, what are the areas in which the community or region can build advantages, and how can the community's strengths and opportunities be maximized and its weaknesses and threats be minimized.

Action Plan: How do we get there?

The action plan describes the potential activities and groups each into economic development “themes” designed to achieve the goals and objectives identified in the vision. The action plan outlines the economic development strategies, activities, costs, projects, status, partnerships, schedule and performance measures. The purpose of the action plan is that it creates a set of strategies that address the economic development issues in the community, so that Bethel can better fulfill its mission, meet its mandates in some cases, and achieve its goals. The strategy represents a multi-year course of action for economic development and diversification activities in the community.

Evaluation Criteria

Performance measures have been identified to evaluate the progress of projects and actions in achieving the vision and goals. Performance measures are typically objective means of assessing the results of an action, program, service or product. Preparation of an evaluation would be the responsibility of the EDD under the guidance of the CEDS Steering Committee. At the end of each year the CEDS Plan Steering Committee will evaluate progress made on each task, will remove completed tasks, revise ongoing tasks, if needed, and add new tasks as appropriate.

ONC Mission Statement

The mission of ONC is to promote the general welfare, enhance independence, encourage self-sufficiency/self-motivation, enhance quality of life, and preserve cultural and traditional values of the tribe, and to exercise tribal authority over resources through educational, economic and social development opportunities.

Organization and Management

The City of Bethel and ONC partnered to lead the development of the CEDS and the implementation of the plan once adopted. A Bethel Strategic Plan Steering Committee was formed in July 2002 to serve as the principal facilitator in developing the strategic plan.

The CEDS planning process began with the collection of community input and economic development reports and plans from the community and the region. The public provided input into goals, objectives and potential actions. Members of the public at a meeting held in April 2003 also discussed Bethel's economic strengths, weaknesses, opportunities and threats (SWOT). This CEDS has been prepared not only to meet a prerequisite for designation as an EDD, but also to build lasting partnerships between numerous agencies and businesses in order to foster economic development activities and infrastructure for the area.

Bethel Strategic Planning Steering Committee

Colleen Soberay
Deputy City Manager
City of Bethel

Janette Persinger
City Clerk
City of Bethel

Kate Hammond
VISTA Member
City of Bethel

Flora Olrund
Executive Director
ONC

Michael Samuelson
Tribal Operations Program Director
ONC

Bob Angaiak
Economic Development Planner
AVCP

Andrei Jacobs
Grant Development Director
YKHC

Janelle Vanasse
Executive Director
People's Learning Center

Christy Schink
Library Director
Kuskokwim Consortium
Library

City of Bethel

Incorporated in 1957, the City of Bethel is a second-class, city manager form of government in an unorganized borough. The seven-member City Council is elected at large and serves as the legislative body. The city manager is appointed by the city council and manages and oversees daily governmental functions. The city also has a seven member appointed planning commission governed by Alaska Statute Title 29 and city municipal code. In addition to the city manager, there is a deputy city manager, city clerk, police chief, fire chief, port director, public works director, planning director, senior services director, and finance director.

Orutsararmiut Native Council

Orutsararmiut Native Council (ONC) is federally recognized as the tribal governing body for the Native village of Bethel and is a non-profit corporation serving more than 2,435 members. ONC is comprised of a traditional chief, seven council members elected by tribal members, and is supported by an administrative staff. ONC administers programs in tribal operations, juvenile justice, social services, education, employment and training, housing, natural resources, environmental, credit and finance, Johnson O'Malley (Cultural Heritage), and the Rippie Palace (pull tabs). ONC employs about 30 individuals. A program director or coordinator heads each of these programs.

CITY COUNCIL

Hugh Short, Jr., Mayor
Carl Berger, Vice-Mayor
Jerry Drake, Member
Andrei Jacobs, Member
Joy Shantz, Member
Stanley Rogers, Member
David Trantham, Member

ONC COUNCIL

Raymond Watson, Chairman
Henry J. Hunter,
Vice-Chairman
Gloria Simeon, Secretary
Robert Hoffman, Member
Gregory Hoffman, Sr.,
Member
Susan Murphy, Member
Mary Pavil, Member

Comprehensive Strategic Plan Steering Committee

Additional key players actively involved in the CEDS strategic planning included the Association of Village Council Presidents (AVCP), Yukon-Kuskokwim Health Corporation (YKHC), Yuut Elitnaurviat/People's Learning Center, Lower Kuskokwim School District, Kuskokwim Consortium Library, University of Alaska Kuskokwim Campus, and the State Division of Community and Business Development. Each steering committee member brought unique insight and traditional wisdom to this collaborative effort. The Bethel Strategic Plan Steering Committee was comprised of nine members that represent several individuals and groups, such as Alaska Natives, local government, education, healthcare, the elderly, youth, minorities, women, and underprivileged populations. To give value and direction to their efforts, the Steering Committee developed a project mission statement.

“Create a community supported strategic plan that sets measurable goals integrating services and improving the quality of life and standard of living”

- Strategic Plan Steering Committee

Action Committees

Once the Bethel CEDS is adopted, a CEDS Implementation Steering Committee will be formed to facilitate the use of the CEDS. Additionally, several subcommittees may be needed to ensure the action plan is implemented and the appropriate evaluation process is in place. The following subcommittees could be formed beginning in June 2003.

Subcommittees could be organized by **topic** such as:

- ✓ Health and education & training projects and activities
- ✓ Transportation related projects
- ✓ Housing projects
- ✓ Sewer, water, and solid waste related projects
- ✓ Business enhancement and marketing projects

Or subcommittees could be organized by overall **function** such as:

- ✓ Vision
- ✓ CEDS Analysis
- ✓ CEDS Plan
- ✓ CEDS Project Priority

Regardless of the approach taken, a coordinating entity will be needed to ensure proper reporting (within and external to the community) and communication.

2.0 Background

History and Culture

Bethel was first established by Yup'ik Eskimos who called the village "Mumtrekhlogamute," meaning "Smokehouse People," named for the nearby fish smokehouse. There were 41 people in Bethel during the 1880 U.S. Census. At that time, it was an Alaska Commercial Company Trading Post. The Moravian Church established a mission in the area in 1884. The community was moved to its present location due to erosion at the prior site. A post office was opened in 1905. Before long, Bethel was serving as a trading, transportation and distribution center for the Yukon-Kuskokwim Delta, which attracted Natives from surrounding villages. The City was incorporated in 1957. Over time, federal and state agencies established regional offices in Bethel. The traditional Yup'ik Eskimo practices and language remain predominant in the area. Subsistence activities are major contributors to residents' livelihoods.

Physical Conditions

Development in Bethel faces many constraints from the natural environment. The soils and geology, especially the permafrost, will continue to be governing factors when developing new areas or redeveloping portions of the older townsite.

Precipitation averages 16 inches a year in this area, with snowfall of 50 inches. Summer temperatures range from 62 to 42. Winter temperatures average 19 to -2. Surface hydrology will continue to pose a constraint to development. The flooding hazard will remain for Bethel, probably driving most development further away from the river. Sedimentation has become a problem, especially at the port, small boat harbor and immediately downriver.

The City may be faced not only with the high costs of maintaining the seawall but also with dredging to keep the port open. Wetlands are prevalent in the region, although, the General Permit (General Permit Number 83-4P) issued by the U.S. Corps of Engineers for Bethel, to some degree, lessens the permitting burden for individual housing.

Land and Housing

Land Use — Land use in Bethel has been strongly influenced by physical factors, land ownership, the availability of land for development, and historical development patterns. Physical limitations to development include the presence of permafrost, surface drainage problems, wind direction, and the proximity of the Kuskokwim River and subsequent erosion and flooding.

A mixed land use pattern has been traditionally acceptable to the community. There is a Bethel “downtown” or core commercial area, although over the last 10 years there has been pressure to locate commercial uses along the major roadways.

Housing — Housing continues to run in short supply. There have been infrastructure improvements, such as new sewer and water service, which have benefited the housing situation. As Bethel has grown, there has also been a shift in demand towards more single- and two-bedroom units and less higher-density apartment buildings. Based on the population projections in the 1997 Bethel Comprehensive Plan, nearly 1,200 additional dwelling units were estimated to be required.

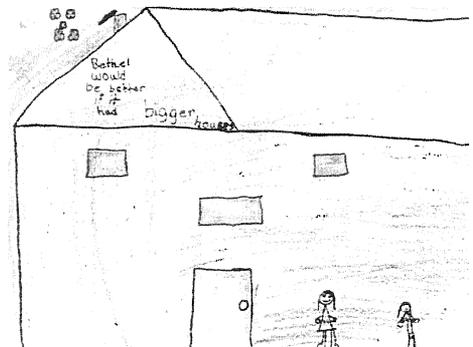
Assuming an average residential density of four units per developed acre, and accounting for physical constraints to land development, the plan predicted approximately 400 acres would be needed to be developed or redeveloped for residential uses in stages over the next 20 years.

Land Ownership — Bethel Native Corporation owns approximately 161,280 acres. The City completed its 14(c)(3) requirements in 1997 and owns approximately 1,200 acres.

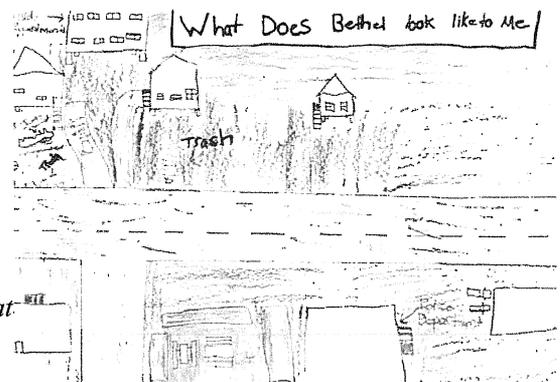
Bethel and Regional Infrastructure

Bethel serves as a transportation and distribution hub for the region. Bethel's central location and superior regional air and marine transportation

*City of Bethel & ONC Draft Economic Development Strat.
May 2003*



Bethel would be better if it had bigger houses. – Althea S.



What does Bethel look like to me? – Dustin H.

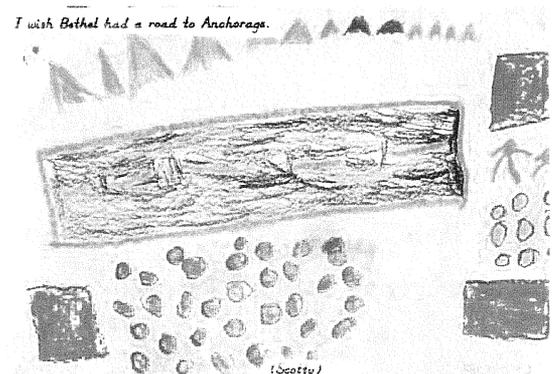
facilities have made it the hub for air passenger traffic and for marine and air distribution of dry cargo and fuels throughout the region. With ongoing maintenance and appropriate improvements to its transportation infrastructure, Bethel should be able to consolidate its role in the regional transportation system to serve the region's growing population.

In order to capitalize on its economic position, maintaining and improving the infrastructure that serves the activity centers will be important.

Sewer and Water — Bethel operates its own sewer and water system. The City-owned sewage lagoon is located north of the Department of Public Works building adjacent to the landfill. Wastewater collection is accomplished through a combination of an above-ground piped system and tanker trucks. The main source of drinking water is ground water, located predominantly under the permafrost. Water is distributed by truck and by piping. According to the 2000 census, of the 1,990 housing units within the city, only 261 units are connected to the piped water/sewer system. The average water/sewer haul bill is \$329 per month (City Finance Department, 2003). The location of the sewer and water piped systems has been identified as a potential constraint to road and trail connectivity. Hauled water/sewer system contributes to the high cost of living.

Roads and Trails — The existing roadway system, while being the major distribution hub for the surrounding towns and villages, also serves several other community needs. City utility vehicles and the “transit” operation offered by a large number of taxis make up a large part of the roadway users. Private cars, snowmachines, all terrain vehicles (ATVs), and bicycles mix with the truck and taxi traffic on a daily basis. Pedestrian movement via limited trails and boardwalks also figures strongly in the way people move around Bethel between residential and commercial areas.

Due to the existing layout of the roadway system, there are several areas of the city that have connectivity problems that impede circulation. The circulation of Bethel is dependent on Ridgcrest Drive for the movement of people to and from their residences resulting in a large volume of



vehicles, pedestrians and other modes of transportation in the area of Ridgecrest Drive between Third Avenue and Seventh Avenue. The lack of alternative routes to destinations in downtown Bethel adds to the large volume of vehicles concentrated in this area. Additionally, circulation is also impeded as a result of streets dead ending into commercial/industrial facilities or not connecting to existing roadways. While some of these dead ends are a result of anticipated city development, the resulting problem is a lack of circulation and consequently a concentration of roadway users in several busy areas.

Bethel's role as the transportation hub of the region dictates the need for quick and efficient transport of goods and merchandise in and around the City of Bethel. The transporting of goods is dependent on the local streets and highways for fulfilling this role. By providing efficient access to the port, the small boat harbor and H-marker and Hanger lakes, goods are transported either by air or the Kuskokwim River to surrounding villages. Additionally, roads are considered critical to opening up areas for new development, especially closer to town.

Airport — The airport is very important to the Bethel and regional economy. Continued maintenance of existing airport facilities as well as expansion of airport capacity will be important to the economy. The DOT&PF Bethel Airport Master Plan indicates that aviation-related transportation industries are the fastest growing industries in the City and add value to the local economy. There may be a need to explore the creation of an Airport Industrial Park for outdoor storage, warehousing, transfer facilities, and light industry.

Port — There are two marine transportation facilities serving Bethel—the Port of Bethel and the small boat harbor. The City owns and operates the port facilities. The Kuskokwim River is not navigable by ocean-going barges beyond the Port of Bethel. Port facilities include warehousing, beach staging for barges, cold storage facilities, stevedoring, and crane services. Additionally, Brown Slough is located adjacent to the cargo dock, located east of Oscar Way and Bridge Avenue. The slough is used by regional residents for mooring boats.

The Bethel port serves more passengers and communities and delivers more goods than any other mainland port in western Alaska. Though much of the fuel and cargo are consumed locally, many Kuskokwim River villages rely on these shipments.

Port expansion is currently constricted by existing land uses and potential threats from sedimentation of the river near the port's entrance.

Bethel also maintains a small boat harbor that consists of five floating docks, a turning channel, and a passageway to the Kuskokwim River. Moorages used for inter-village travel, recreation, and subsistence fishing are provided. The harbor has the capacity for 400 small boats and serves 300 boats on average per day.

Population

The City of Bethel's large population base in the Y-K region enables it to provide a supportive function for outlying villages. The population of the City of Bethel is primarily Alaska Native and is characterized by the continuation of a strong Yup'ik Eskimo culture. Although most of the region's wage and salary jobs are located in the City of Bethel, subsistence activities remain a vital part of residents' lives.

Table 2.1 lists the communities in the Bethel and Wade Hampton Census Areas.

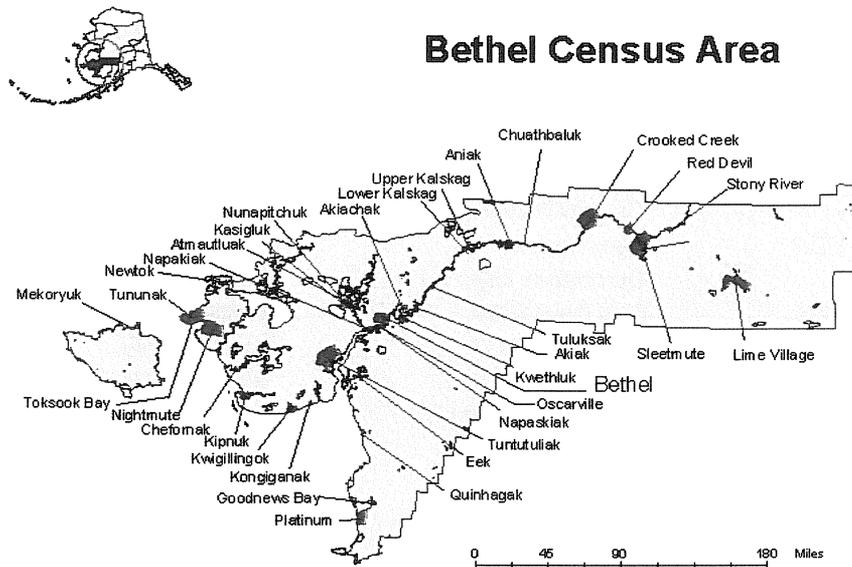
Table 2.1. Communities in the Bethel Area

Bethel Census Area		Wade Hampton Census Area
Akiachak CDP	Napaimute ANVSA	Alakanuk city
Akiak city	Napakiak city	Algaacig ANVSA
Aniak city	Napaskiak city	Andreafsky ANVSA
Atmautluak CDP	Newtok CDP	Bill Moore's ANVSA
Bethel city	Nightmute city	Chevak city
Chefornak city	Nunapitchuk city	Chulloonawick ANVSA
Chuathbaluk city	Oscarville CDP	Emmonak city
Crooked Creek CDP	Platinum city	Hamilton ANVSA
Eek city	Quinhagak city	Hooper Bay city
Georgetown ANVSA	Red Devil CDP	Kotlik city
Goodnews Bay city	Sleetmute CDP	Marshall city
Kalskag ANVSA	Stony River CDP	Mountain Village city
Kasigluk CDP	Toksook Bay city	Nunam Iqua ANVSA
Kipnuk CDP	Tuluksak CDP	Ohogamiut ANVSA
Kongiganak CDP	Tuntutuliak CDP	Paimiut ANVSA
Kwethluk city	Tununak CDP	Pilot Station city
Kwigillingok CDP	Upper Kalskag city	Pitkas Point CDP
Kwinhagak ANVSA		Russian Mission city
Lime Village CDP		St. Mary's city
Lower Kalskag city		Scammon Bay city
Mekoryuk city		Sheldon Point (Nunam Iqua) city

Source: US Census Bureau, Census 2000 Demographic Profiles.

Figure 2.1 shows Bethel in relation to the Census Areas and the rest of the state.

Figure 2.1. Bethel Census Area and the State of Alaska



Source: Alaska Department of Labor And Workforce Development, Research and Analysis and US Census Bureau, 2000 Tigerline files.

Residents of the City of Bethel account for 34 percent of the population of the Bethel Census Area. The population of Bethel grew approximately 1.6 percent per year between the 1990 and 2000 census years. According to estimates by the Alaska Department of Labor, the population of the City of Bethel has increased at an average annual rate of 2.1 percent between 2000 and 2002. Most of the growth throughout the region has been due to natural increase, not in migration. However, growth in the City of Bethel is, in part, due to people relocating from outlying villages to seek employment.

Table 2.2. Population Changes

Place	1990	2000	Number Change	Percent Change	Annual Percent Change
Bethel	4,687	5,471	784	16.73	1.56
Bethel Census Area	13,656	16,006	2,350	17.21	1.60
Wade Hampton Census Area	5,791	7,028	1,237	21.36	1.95

Source: U.S. Census Bureau, Census 1990 and Census 2000.

Population Density

The Bethel area encompasses about 44 square miles of land and just over 5 square miles of water. There are 125 people per square mile in the City of Bethel, compared to 0.4 people per square mile in the Bethel and Wade Hampton Census Areas. Bethel has about 46 houses per square mile (Table 2.3). At the time of Census 2000, there were 1,990 total housing units.

Table 2.3. Population Density

Place	Population per Square Mile	Housing Units per Square Mile
Bethel	125.0	45.5
Bethel Census Area	0.4	0.1
Wade Hampton Census Area	0.4	0.1

Source: U.S. Census Bureau, Census 1990 and Census 2000.

Median Age

A notable demographic attribute of Bethel and the surrounding census areas is the young median age of the population (Table 2.4). The median age in 2000 was 29.1 compared to the Alaska median age of 32.4, and the national median age of 35.3. However, the population of Bethel is actually a bit older than the population in the entire Bethel and Wade Hampton Census Areas.

Table 2.4 Median Age

Place	2000
Bethel	29.1
Bethel Census Area	25.3
Wade Hampton Census Area	20.0

Source: U.S. Census Bureau, Census 2000.

Age Distribution

Age distribution gives an indication of whether the population of a community is generally young or old, growing or declining. It is a predictor of future school enrollments, an indicator of what sorts of resources and programs the community may need for specific age cohort groups, and one source of information about the available labor force. In Table 2.5

the age distribution of the City of Bethel is compared to the Bethel Census Area as a whole, the Wade-Hampton Census Area, and Alaska.

Table 2.5. Age Distribution, 2000

Age Grouping	City of Bethel (%)	Bethel Census Area (%)	Wade Hampton Census Area (%)	Alaska (%)
Under 5	10.2	10.0	10.6	7.6
School Age 5-19	28.1	32.9	39.4	25.6
Young Workforce (20-34)	20.8	20.2	19.6	20.7
Boomers (35-54)	31.6	26.0	20.6	33.3
Mature Workforce (55-64)	5.4	5.7	4.9	7.2
65 Years and Over	3.9	5.2	5.0	5.7

Source: Derived from U.S. Census Bureau, Census 2000.

The relatively low median age in the Bethel area is due in part to the size of family households (Table 2.6). The average family size in the City of Bethel is 3.0 persons compared to 4.41 in the Bethel Census Area and 4.95 in the Wade Hampton Census Area. The average household size for the State as a whole is 2.74. In the City of Bethel almost half of all households have children under 18.

Table 2.6. Average Family and Household Size and Percent of Households with Children Under 18

Type of Household	City of Bethel	Bethel Census Area	Wade Hampton Census Area	State of Alaska
Family Size	3.65	4.41	4.95	3.28
Household Size	3.00	3.73	4.38	2.74
Households with Children Under 18 (%)	49.50	58.50	69.50	42.90

Source: U.S. Bureau of the Census. Census 2000.

Gender

Like much of Alaska, Bethel has slightly more men than women in its population. In 2000, the male to female ratio was 1.10 (Table 2.7).

Table 2.7. Gender

Place	Male	Female	Male to Female
City of Bethel	2,871	2,600	1.10
Bethel Census Area	8,500	7,506	1.13
Wade Hampton Census Area	3,666	3,362	1.09

Source: U.S. Census Bureau, Census 2000.

Ethnic Background of Bethel Residents

According to Census 2000, Alaska Native and American Indian peoples make up 68 percent of the population, while non-natives make up 32 percent in the City of Bethel. Table 2.8 shows the ethnicity of Bethel residents. The numbers in the table add up to more than the Bethel population because individuals could elect to be reported in more than one racial group. Approximately 7 percent of the population reported two or more races.



What do you want Bethel to look like? Mall, roads, car wash & swimming pool. – Jessica L.

Table 2.8. Ethnicity of Bethel Residents

Race Alone or in Combination with One or More Races	Number	Percent
White	1,794	32.8
Black or African American	85	1.6
American Indian and Alaska Native	3,719	68.0
Asian	192	3.5
Native Hawaiian and Other Pacific Islander	22	0.4
Other	46	0.8

Source: U.S. Census Bureau, Census 2000.

3.0 Economic Analysis:

Where are we now?

Summary of Bethel's Economy

The City of Bethel, with an estimated 2002 population of 5,736, is the largest and most diverse community in Western Alaska. Bethel is located at the mouth of the Kuskokwim River about 40 miles inland from the Bering Sea, and is the commercial hub and support center for 56 surrounding Alaska Native villages located within the Yukon-Kuskokwim Delta (Y-K Delta) region. The City of Bethel is the major airway intersection, freight and distribution center, and largest meeting place and headquarters for health care and government services in the Y-K region. Private sector companies and tribal organizations administering public housing and social, educational, and cultural services, maintain their principal offices in Bethel.

Bethel has come a long way in the last 10 years. Employment in the Bethel census area grew at more than twice the rate of population growth. Today 73 percent of Bethel's working age population is in the workforce, which is greater than Alaska as a whole at 71.3 percent. Bethel's poverty rate, while still high, is only 1.8 percent higher than for all of Alaska.

Bethel has a number of significant employers who play a key role in the local economy as indicated in Table 3.1.

Table 3.1 Top Ten Employers in Bethel, 2002

Employer	Number of Employees
Lower Kuskokwim School District	1,142
Yukon Kuskokwim Health Corporation	1,110
Association of Village Council Presidents (AVCP)	306
AVCP Housing Authority	134
Non-School Personnel	122
City of Bethel	113
Coastal Villages Seafoods Inc	113
Bethel Community Services Inc	112
Alaska Commercial Company	97
Alaska Dept. of Health & Social Services	86

Source: ADOL&WD, Special data request, May 2003.

The City of Bethel's economy has numerous strengths. Service industries and government provided the most job growth for Bethel in recent years. Health care, led by the Yukon-Kuskokwim Health Corporation, has the greatest area of job growth in the service sector, while local government realized additional job growth. In fact, Federal and State employment actually decreased over the last 10 years. Employment in education grew significantly due to reductions in class size and increased enrollment. Public administration also increased due to expanded activities among tribal groups like AVCP, AVCP Housing and ONC.

Also important to Bethel's employment diversification is the steady growth in private sector jobs particularly in transportation and service jobs which provide services both to Bethel residents and to residents of the Bethel and Wade Hampton census districts.

According to the Bureau of Economic Analysis (2000), income from all sources into the Bethel census area is \$305.6 million. Personal income in the City of Bethel is estimated to comprise over half the regional income, according to a comparison of regional and city income in the City of Bethel Comprehensive Plan (1997). Personal per capita income in the Bethel area ranks 23rd out of 27 census areas. The City of Bethel, however, has the

second lowest poverty rate in the Bethel census area. Fifty-nine percent of Bethel area income is from net earnings from payroll jobs and self-employment.

Government Funding — Transfer payments, which include all payments in cash or in-kind from government sources, amounted to 32 percent of total income into the Bethel census area. Statewide transfer payments account on average for 11 percent. The public sector transferred nearly \$97.5 million to the Bethel area. The main reason for public sector spending in the Bethel census area was due to the federal health care mandate for Alaska's Native population.

The second largest portion of transfer payments included the Alaska Permanent Fund dividend (PFD) distributions. Thirty million dollars in PFDs were disbursed to 15,589 residents in the Bethel area in 2000. Permanent fund dividends have a significant economic impact in the City of Bethel. According to city officials, the population swells with the distribution of PFDs, placing a strain on public services and city infrastructure. While this measure considers the larger Bethel census area, since Bethel provides key hub services to this area, a significant portion of this income will also directly affect the Bethel economy.

Income maintenance payments, commonly referred to as welfare, comprise 18 percent of transfer payments in the Bethel Census Area. This includes family assistance, security income payments, general relief, foster care, adoption assistance and heating assistance.

Payments to non-profit organizations and businesses comprise three percent of the \$305.6 million personal income into the Bethel area (2000). This funding passes through local organizations and businesses for certain purposes and directly or indirectly benefits the local population.

Noteworthy is federal and state governments' significant influence over employment in the private sector. For example, the area's second largest employer, the Yukon-Kuskokwim Health Corporation, a private nonprofit corporation, with 1,110 employees in 2002 depends on public funding for the provision of its services. Also, many construction jobs depend on public capital budgets or grants.

Regional Hub — Being a hub city, Bethel hosts the regional hospital, the largest school district in the region, all state service agencies, the regional Native non-profit corporation, and a satellite campus of the University of Alaska Fairbanks. As a supply and distribution

center, the City of Bethel provides fuel, transportation, medical care and other services to this region. Bethel operates the only deep-water port in Western Alaska and hosts the third busiest airport in the state. These major employers bring to Bethel many high wage professional jobs.

Conversely, as a hub, Bethel's job market also supports many low wage service jobs. Because the local labor pool lacks enough highly qualified individuals to fill the highest wage professional positions, many of these positions are recruited from outside of the region. These recruited professionals contribute to the 32 percent non-Native population and unfortunately result in a disproportionate number of local Alaska Native individuals in the ranks of low socio-economic status. The employment statistics of the two largest employers in Bethel reflect this disparity. Although both the Yukon-Kuskokwim Health Corporation (YKHC) and the Lower Kuskokwim School District (LKSD) have an Alaska Native hire rate over 70 percent, both distribute over 50 percent of their payroll to non-Native individuals.

The high cost of living in Bethel exacerbates the income gap. The University of Alaska Fairbanks Cooperative Extension compares the price of 104 food items in various cities in Alaska including Bethel. The list they use is generally the same as the U.S. Department of Agriculture's Low-Cost Food Plan. In December 2002, a week's worth of groceries for a family of four would have cost \$190.71 in Bethel, compared to \$101.95 in Anchorage. That makes Bethel's food costs 87 percent higher than those of Anchorage's residents. Housing costs in Bethel are also significantly higher than in Anchorage. The number of wage earners needed to buy an average house in Bethel is 2.9. This figure is nearly double of that of Anchorage (AK DOL, 2000). Energy costs in Bethel are also high. The average residential hauled water/sewer bill is \$329 per month. Gasoline is currently \$2.71 per gallon. Milk is more than \$7 per gallon with tax. There is no public transportation in Bethel. Available transportation includes taxicabs with rates of \$4 to \$10 per person.

Bethel's Future Economic Outlook

The general trend expected for Bethel is gradual economic growth and an improving economic picture for Bethel's residents. Bethel's population grew at a faster rate than

Alaska on average over the last decade (1990-2000).¹ Regionalization, the movement of village residents into Bethel for wage and salary jobs and education and training, will continue to contribute to the city's population growth. Jobs in the private sector, including construction, retail, trade, and services will continue to grow. Local government jobs have increased at a faster rate than federal and state government jobs. Some further growth in local government support services is expected as the economy of Bethel grows. Much of the growing employment in Bethel will continue to be a result of job expansion in the service sector, particularly those provided by Native corporations and nonprofits.²

DCED data indicates that there is potential for employment in construction trades. Capital improvement projects in the Bethel census area such as airport improvements, water and sewer facilities, health facilities, replacement of bulk fuel tanks, roads, boardwalks, homes, schools, electric utility upgrades, and potential transportation and other improvements related to the anticipated Donlin Creek Mine represent sizable public investment and future generation of local jobs. The key for the Bethel economy will be to maximize the local benefits of increases in construction and service sector activities. Historically, capital projects have provided only limited opportunities for local employment, but with increased efforts in local workforce development, like the Yuut Elitnaurviat/People's Learning Center, Bethel could maximize the economic benefit it receives from future capital construction efforts in the region.

Given increased regionalization, Bethel's population growth can be expected to exceed the projected statewide average of 1.4% per year over the next decade. In fact, over the last two year's the city's population grew by 2.1%. The City of Bethel's large population base and supportive functions for outlying villages suggests that the majority of the region's wage and salary jobs will continue to be located in the City.³ Growth in income has outpaced population growth from 1990 to 2000, and the region is continuing to see a number of economically beneficial projects on the horizon in healthcare and education and resource development sectors.

¹ Institute of Social and Economic Research, *Trends in Alaska's People and Economy, Alaska 20/20 Partnership*, University of Alaska, October 2001.

² Livingston Slone, Inc., *YUUT Elitnaurviat People's Learning Center Feasibility Study*; June 2002.

³ Department of Labor and Workforce Development, *Alaska Economic Trends*, September 2002.

Strengths, Weaknesses, Opportunities, & Threats (SWOT) Analysis

In this step of the Bethel Economic Development Strategic Planning process, the community's internal strengths and weaknesses were identified, along with the external opportunities and threats. The analysis of these four elements is known as the SWOT analysis. It is a useful tool for clarifying conditions within which the community operates. While the community visioning step provided very useful information about the values of the community, the SWOT analysis supplies an overall view of the community and the economic factors that affect it. The SWOT analysis provides clues as to how to frame the strategies needed to take advantage of the opportunities facing Bethel in the near future as well as in the long term.

Strengths are resources or capabilities that help the community accomplish its mission. **Weaknesses** are the deficiencies in resources or capabilities that hinder the community's ability to accomplish its mission.

Strengths	Weaknesses
<ul style="list-style-type: none">• Bethel dominates the region wage and cash economy• Bethel accounts for majority of the region's wage employment yet only has a third of region's population• Busiest airport and port – regional hub and the year-round transshipment point for passengers, mail, and cargo• Adequate land base available for growth and expansion• Strong Yup'ik culture and rich subsistence tradition provide an important economic and cultural contribution• Diverse community	<ul style="list-style-type: none">• Significant gap between Native and non-Native income• Cost of living diminishes purchasing power of personal income• Deficit in the housing stock• Bethel is relatively prosperous yet is in one of Alaska's poorest regions• Past land development pattern resulted in increased cost in roads, sewer, water, utilities, and public safety services• Environmental conditions (permafrost, wetlands, flooding, drainage, dust, etc.) present constraints to land development• Weather and isolation can contribute to social problems related to substance abuse• Lack of population with higher education, skills

Opportunities are the outside factors that affect the community in a favorable way. **Threats** are the outside factors or situations that could affect the community in a negative way.

Opportunities	Threats
<ul style="list-style-type: none"> • Funding for expansion and improvements to infrastructure will benefit housing situation • Continued state funding for road and trail improvements will open up areas for new development especially those lands closer to town • Expansion of airport and port facilities will benefit existing as well as future economic prospects • Growing local and regional demand for development of health care services • Growing market for local arts and crafts 	<ul style="list-style-type: none"> • Need to be prepared in the event of reductions in traditional state and federal funds • Lack of adequate Port facilities (e.g. storage, access) could threaten community's position as a major transshipment point for future regional economic development (e.g. energy development and mining) • Changes in funding sources and allocation formulas to rural Alaska • Lack of marketing capacity/capabilities locally

Bethel's Economic Data

In the following sections, economic information about the City of Bethel is outlined and later compared with similar information from the Bethel and Wade Hampton census areas and the State of Alaska to provide a context to understand the City's local economy.

City of Bethel Employment — Health care employment has shown the greatest expansion for the City of Bethel. School employment has increased due in part to higher enrollments and in part to improved pupil-teacher ratios. Employment in federal and state government has decreased. Employment in the seafood industry has declined as well. In fact, the last fish processing plant in Bethel closed in 2001.

Jobs in the private sector, which include construction, retail, trade, wholesale trade and services, are growing. Private sector jobs have increased 48 percent, while state and local government jobs have increased 18 percent. The growing employment is a result of job expansion in the service sector, particularly those provided by Native corporations and organizations.

The largest industry in Bethel is the educational, health, and social services industry, which employs 39 percent of the workforce, compared to 21 percent for all of Alaska. This high proportion is due to the top two employers in the region providing health and social services and education services. Another important sector of the Bethel economy is the subsistence.

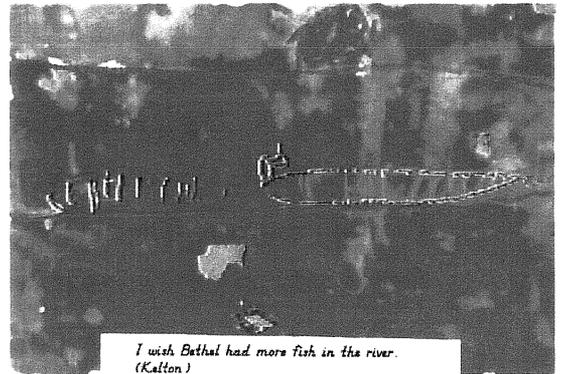
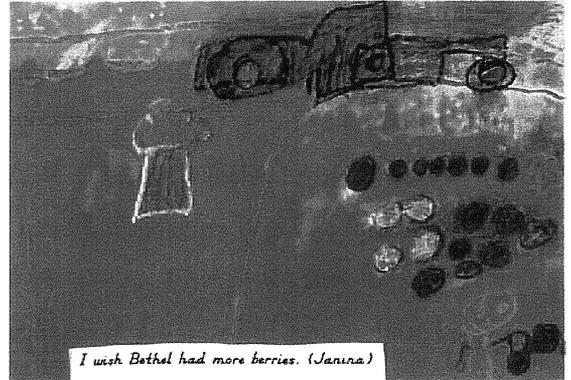
Health and Social Services — Health services is the fastest growing sector in the Alaska economy and one of the largest economic sectors. This growth is also reflected in the Bethel area where the Yukon-Kuskokwim Health Corporation is the second largest employer in the region but the largest employer in the City of Bethel. According to an April 2003 article in Alaska Economic Trends, five percent of all health services employment in the State of Alaska is in the Bethel Census Area. YKHC employs 1,100 people locally in Bethel and approximately 400 to 500 individuals at their sub-regional clinics in St. Mary's, Emmonak, Aniak, Toksook Bay, and Hooper Bay.⁴ YKHC is the largest employer in Bethel and the seventh largest employer in the State. Nearly 71% of their labor force is Alaska Native. However, non-Alaska Natives generally hold higher paid positions. Revenue is generated from Medicaid and private payments. Approximately half of the revenue is generated from Medicaid.

Education — The Lower Kuskokwim School District (LKSD) is the second largest employer in the City of Bethel. With increasing regionalization, LKSD employment in the City will increase. The UAF Kuskokwim campus also provides employment in Bethel as well as educational opportunities important in the development of an economic strategy. With the construction of the People's Learning Center, more educational opportunities will be available, while creating more jobs.

⁴ Meeting between ASCG, Inc. /Teresa Fredrickson and YKHC staff, April 2, 2003.

Subsistence — The *Community Priorities and Economic Development Strategy* is a cooperative effort to build a bridge between the market economy and subsistence-based lifestyle aimed at improving economic conditions while retaining and reinforcing local traditions.

Subsistence activities can be important to a community not only as primary source of nourishment but also for its role in maintaining cultural traditions. The smaller communities in the Bethel Census are very dependent on wild food harvests. According to Alaska Department of Fish and Game surveys, residents of the City of Bethel show less dependence on wild food because a cash economy predominates in Bethel. ADF&G surveys show an average annual harvest of 690 pounds per person. The average annual wild-food harvest ranges from 402 pounds to 1,328 in outlying villages but averages only 261 pounds per person in the City of Bethel.⁵



⁵ Bethel Census Area: Economic Overview, Department of Community and Economic Development accessed at www.dced.state.ak.us/cbd/AEIS/Bethel/General.

Other Bethel Industries — The second and third largest industries in Bethel are public administration and transportation warehousing, and utilities—each of which employs about 14 percent of the workforce. As a regional hub, it makes sense that Bethel has many businesses that support the rest of the region.

Table 3.2 compares employment by industry for the City of Bethel with Alaska and the U.S. What stands out is the percentage of employment in the education, health and social services industries. Approximately 40 percent of the labor force living in the City of Bethel are employed in education, health, and social services industries compared to 22 percent for Alaska as a whole and 20 percent for the U.S.

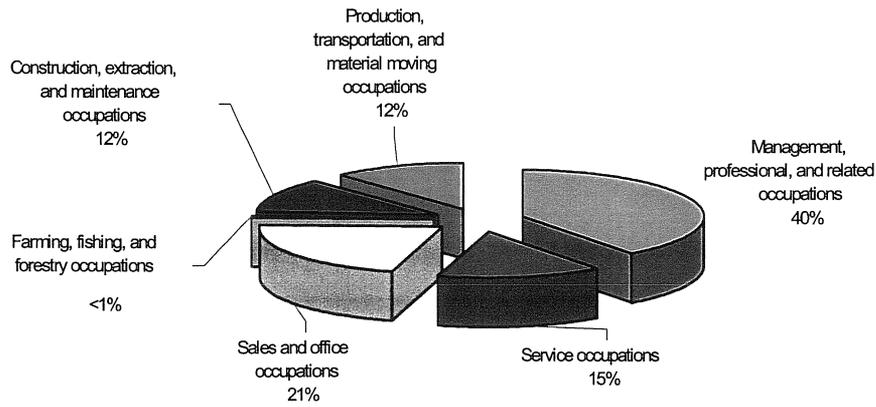
Table 3.2. Employment by Industry for the City of Bethel, Alaska, and the U.S. - Census 2000

Industry	Bethel	Alaska	U.S.
Agriculture, Forestry, Fishing and Hunting, and Mining	0.6	4.9	1.9
Construction	5.1	7.3	6.8
Manufacturing	0.2	3.3	14.1
Wholesale Trade	0.7	2.6	3.6
Retail Trade	7.9	11.6	11.7
Transportation and Warehousing, and Utilities	14.0	8.9	5.2
Information	1.6	2.7	3.1
Finance, Insurance, Real Estate, and Rental and Leasing	2.9	4.6	6.9
Professional, Scientific, Management, Administrative, and Waste Management Services	2.7	7.6	9.3
Educational, Health, and Social Services	40.4	21.7	19.9
Arts, Entertainment, Recreation, Accommodation, and Food Services	4.1	8.6	7.9
Other Services (except public administration)	6.3	5.6	4.9
Public Administration	13.6	10.7	4.8
Total	100.	100	100

Source: U.S. Bureau of the Census, Census 2000.

According to the U.S. Census 2000, 40 percent of the labor force living in Bethel is employed in management, professional, and related occupations, followed by just over 21 percent in sales and office occupations, and approximately 15 percent in service occupations.

Figure 3.1. Employment by Occupation for the City of Bethel - Census 2000



There are 483 business licenses held in Bethel for various types of businesses. Just over one-quarter of business licenses are in the property rental category, followed by medical, legal, consulting, and counseling services. These business licenses are indicative of the role that small businesses play in the City's economy. Small businesses generate local jobs and help to retain wealth (e.g. expenditures) in Bethel. Supporting small business development is an important diversification strategy found in the economic development plan. Table 3.3 shows the number of business licenses held in various categories.

Table 3.3. Business Licenses in the City of Bethel as of April 2003

Type of Business	Description	Number of Businesses
Bed Tax	Bed & Breakfast, Hotel/Motels	15
Computer Specialist	Service/Repair/Consulting	2
Construction/Mfg	Building/Fabricating	15
Entertainment & Recreation	Concert-Bowling-Museums	3
Financial Institutions	Banks & Lending Institutions	3
Fish Processing	Fish Processing	1
Freight/Transportation	Air/Truck/Barge/Freight & Passengers	19
Gaming Tax	Selling Games of Change or Skill	12
Information Services	News Paper -Radio-TV-Cable-Phone	13
Non Profit Revenue Share	Alaska State Revenue Sharing	5
Personal Service	Beauty/Barber Shop/Child Care/Catering/Janitorial etc.	43
Professional Service	Medical-Legal-Consulting-Counseling Services	101
Property Rental	Rental of Real Property	124
Repair & Maintenance	Repair-Remodel Home-Auto Etc.	24
Restaurant	Prepared Food Sales	18
Retail Sales	Retail Sales	56
Taxi	Taxi Cab (Road or River)	7
Trade Contractor	Painting/Electric/Heating/Welding	22
Total		483

Table 3.4 below shows the top employers for the years 1995 and 2002 in the Bethel Census Area, based on the number of employees. The largest three employers are Lower Kuskokwim School District, Yukon Kuskokwim Health Corporation, and various agencies of State government.

Table 3.4. Top Employers in Bethel, 1995⁶ and 2002

Employer	Number of Employees	
	1995	2002
Lower Kuskokwim School District	881	1,142
Yukon Kuskokwim Health Corporation	652	1,110
Association of Village Council Presidents (AVCP)	201	306
Omni Enterprises	214	
AVCP Housing Authority	93	134
Non-School Personnel		122
City of Bethel	83	113
Coastal Villages Seafoods Inc		113
Bethel Community Services Inc	63	112
Alaska Commercial Company		97
Alaska Dept. of Health & Social Services	92	86
Yute Air Alaska, Inc.	88	
University of Alaska	65	
ANICA, Inc.	64	

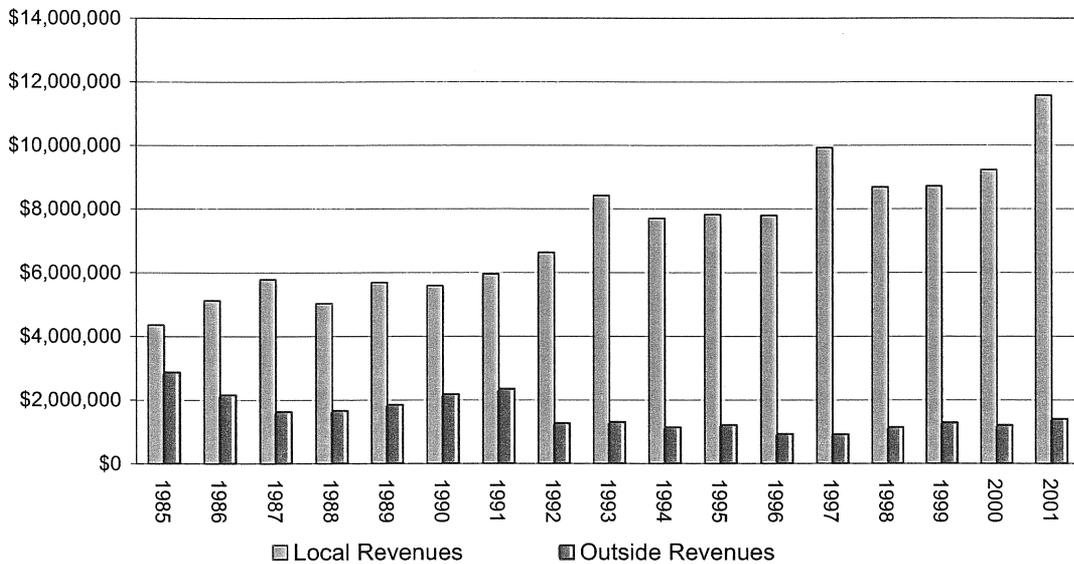
Source: ADOL&WD, special data request, May 2003.

City of Bethel Revenues and Expenditures — An analysis of the historical local revenues and expenditures also show a growing economy in Bethel. This section examines revenues and expenditure data from 1985 to 2001 provided by the City of Bethel.

⁶ HDR/Kevin Waring & Associates/Montgomery Watson, *City of Bethel Comprehensive Plan*, 1997.

Local revenues to the City are generated from a sales tax (and sales tax penalties/interest), gaming fee, transient lodging tax, business licenses, and alcohol use taxes. The City of Bethel's local and outside operating revenues are shown in Figure 3.2. Local revenues have grown steadily over the last several years, reaching nearly \$11.6 million in 2001, compared to outside revenues of \$1.4 million. Enterprise and local tax revenues are the two major components of the City's local revenues, accounting for more than three-quarters of the total.

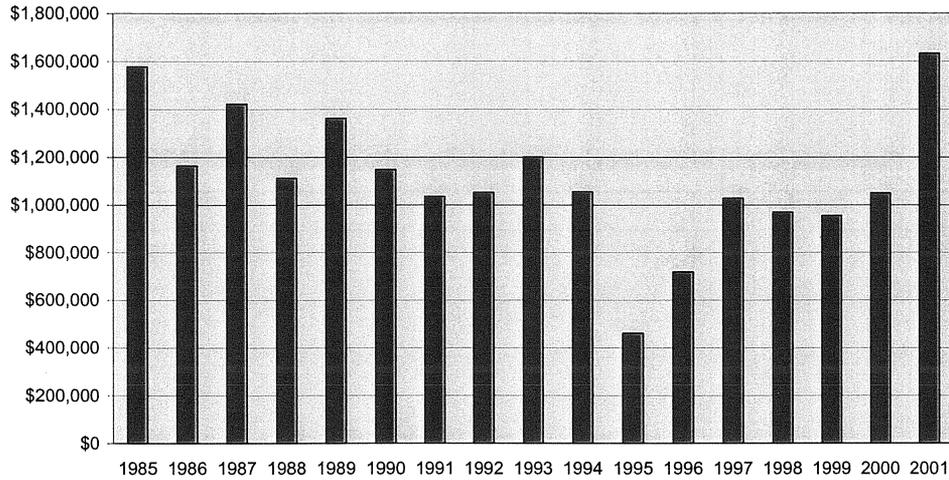
Figure 3.2. City of Bethel Local and Outside Operating Revenues, FY 1985 to FY 2001



Source: State Division of Community and Business Development, 2003.

General government expenditures for the City of Bethel have also increased since 1985 as shown in Figure 3.3. The spending amount has varied over the past several years, with more than \$1.6 million being spent in 2001.

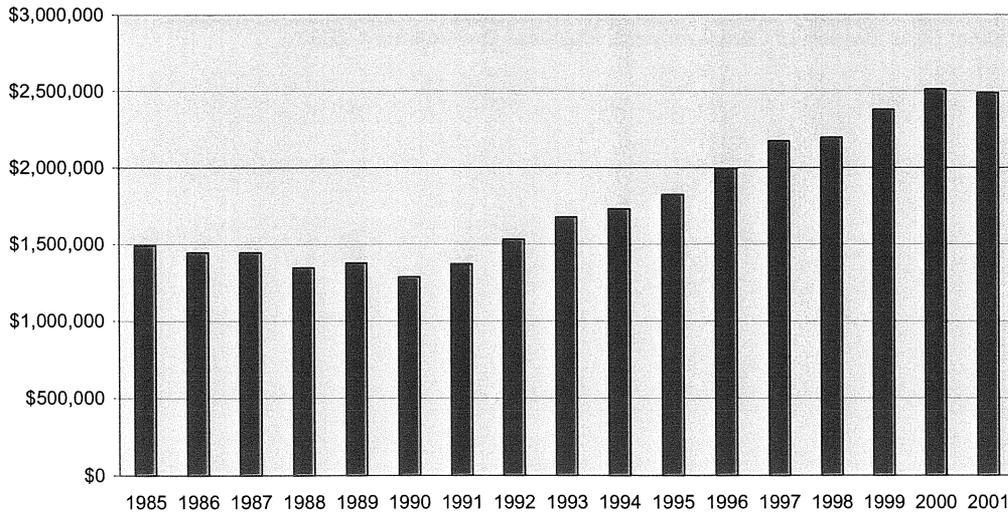
Figure 3.3. City of Bethel, General Government Expenditures, FY 1985 to FY 2001



Source: State Division of Community and Business Development, 2003.

Public safety expenditures by the City of Bethel have grown steadily since 1990, although a slight decline in 2001 brought spending to just under \$2.5 million.

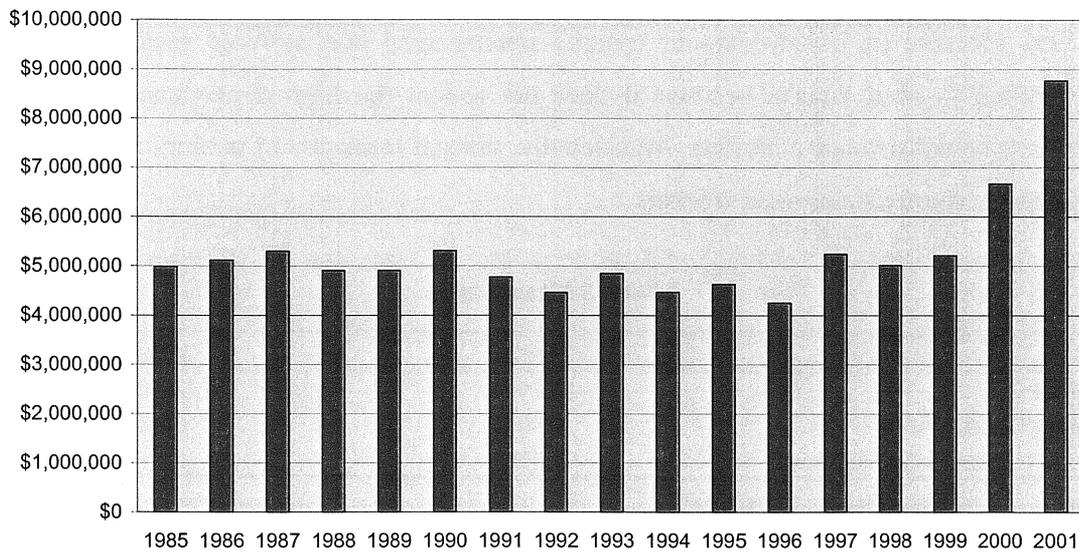
Figure 3.4. City of Bethel Public Safety Expenditures, FY1985 to FY 2001



Source: City of Bethel, 2003

The City of Bethel's public services expenditures remained steady between \$4 million and \$5.5 million from 1985 to 1999, but increased significantly in 2000 and 2001 (Figure 3.5). In 2000, expenditures increased to \$6.7 million, and in 2001 expenditures reached nearly \$8.8 million. No single category of expenditure accounts for this large increase. The largest increases in expenditures were seen for water and sewer (up \$1.4 million, 58 percent from 1999 to 2001) and miscellaneous public services (up \$1.2 million, 139 percent from 1999 to 2001).

Figure 3.5. City of Bethel Public Services Expenditures, FY1985 to FY 2001



Source: State Division of Community and Business Development, 2003.

Bethel Economic Comparison — In this section the local Bethel economy and related factors are compared to other nearby areas. Information from the 2000 Census was used and focused on communities in the Bethel and Wade Hampton Census areas.

Labor and Workforce Development

A community's labor force provides a measure of how much employment and economic activity a community may have. Labor force is defined as the number of persons 16 years of age or older who are either working or actively seeking employment. Unemployment levels are based on the number of people in the labor force that are unemployed and looking for employment. The labor force in Bethel was 2,699 in 2000 (Table 3.5). Noteworthy is that while the population of Bethel accounts for 34 percent of the population

of the Bethel Census Area, Bethel accounts for 41 percent of the labor force in the Bethel Census Area.

In 2000, 73 percent of the Bethel population 16 years and over was in the labor force. In contrast, the labor force participation rate in the Bethel Census area was about 63 percent and 59 percent in the Wade Hampton Census Area. The unemployment rate in the City of Bethel was 6.5 percent at the time of Census 2000. Table 3.5 shows the number of people in the labor force in Bethel and in the Bethel and Wade Hampton Census Areas in 1990 and 2000.

A Department of Community and Economic Development (DCED) report indicates that the normal measure of unemployment (people unemployed and actively seeking work) is misleading in rural Alaska because it does not reflect the high dependence of its rural residents on subsistence activities. Additionally, normal measures of unemployment do not take into account discouraged workers.

Table 3.5. Labor Force

Place	1990	2000
Bethel	2,218	2,699
Bethel Census Area	4,831	6,446
Wade Hampton Census Area	1,879	2,399

Source: U.S. Census Bureau, Census 2000.

Table 3.6 shows the class of workers for the City of Bethel compared to the Bethel and Wade Hampton Census Areas and the State of Alaska for Census 2000. Private sector employment in the City of Bethel has been growing as a result of the expansion in retail trade and services as Bethel has evolved into the regional economic hub for the Yukon-Kuskokwim Delta.

Table 3.6. Class of Worker, Census 2000

Class of Workers	City of Bethel	Bethel Census Area	Wade Hampton Census Area	Alaska
Private Wage and Salary Workers	57.0	43.2	40.3	64.9
Government Workers	37.7	53.0	57.7	26.8
Self-Employed Workers in Own but Not Incorporated Business	5.0	3.6	1.9	8.0

Source: U.S. Census Bureau, Census 2000.

Non-resident labor statistics need to be included in a CEDS and are available for the Bethel Census Area. About 9 percent of the workforce in the Bethel Census Area was composed of non-resident workers in 2001. This reflects a gradual decline since 1999.

For the private sector alone, non-residents made up 11 percent of the employment in 2001, although this ratio has also declined over the past few years (Table 3.7).

Table 3.7. Bethel Census Area Non-Resident Employment

	1999	2000	2001
Private Sector Percent Non-Resident Workers (Percent)	12.3	11.6	11.0
Government and Private Percent Non-Resident Workers (Percent)	10.3	10.1	8.9

Source: Alaska Department of Labor and Workforce Development, Nonresidents Working in Alaska (1999 through 2001 editions)

Education and Training

Over 22 percent of Bethel residents have a bachelor's degree or higher and over 84 percent have graduated from high school. The city's population is well educated compared to residents in the rest of the Bethel and Wade Hampton Census Areas. This high level of educational attainment is related to the economic and educational opportunities available in this relatively large community.

Table 3.8. Educational Attainment, 2000

Place	Percent Less Than Ninth Grade	Percent High School Graduate or Higher	Percent Bachelor's Degree or Higher
Bethel	7.4	84.2	22.7
Bethel Census Area	17.8	71.0	13.1
Wade Hampton Census Area	21.7	66.3	9.1

Source: U.S. Census Bureau, Census 2000.

Training Opportunities — Developing a skilled workforce that can provide labor for capital projects in Bethel and the nearby communities can also contribute to the local economy. The Yuut Elitnaurviat (YE) is a proposed vocational education and training facility whose mission is to help build a skilled workforce in the city and region, with an overall goal of placing local people in local high-wage jobs. YE is scheduled for design and development in 2003, with construction complete by 2004. A feasibility study for the Learning Center was conducted June 2002. YE, modeled after the Bethel Alternative Boarding School, is a non-profit corporation with nine partner agencies. These partners will assume education and training program responsibilities in the following areas— construction trades, healthcare, and education for early childhood. It is anticipated that local jobs will be generated during the construction of the Learning Center, as well as permanent staff positions on an on-going basis.

Income — Personal income trends provide an important measure of economic activity for a local area over time. Personal income consists of income received by persons from participation in production, from government and business transfer payments, and from government interest. When compared to state and national trends, it provides an indication of how well the local area's economy is performing.

In 1999, the median household income for Bethel residents was \$57,321 and per capita income was \$20,267. Noteworthy is that the median household income of the City of Bethel respondents is much higher than the median household income for the U.S., but Bethel's per capita income is lower. This difference can be attributed to the larger household size in the City of Bethel (3.65 for families, 3.00 for all households).

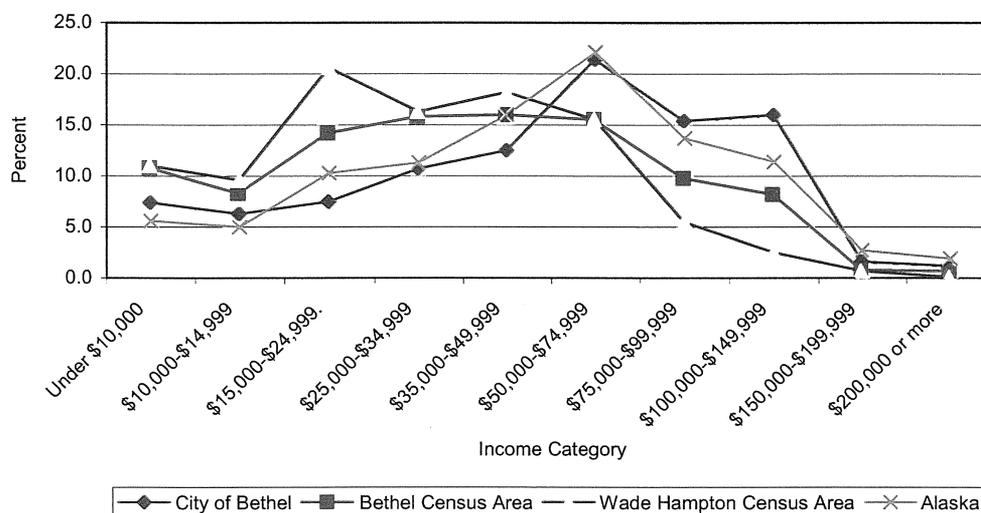
Table 3.9. Per Capita and Median Household Income

Place	Per-Capita		Median Household	
	1989	1999	1989	1999
Bethel	14,413	20,267	42,232	57,321
Bethel Census Area	8,833	12,603	25,402	35,701
Wade Hampton Census Area	6,519	8,717	20,586	30,184
Alaska	17,610	22,660	41,408	51,571
U.S.	14,420	21,587	35,225	41,994

Source: Census 1990, Census 2000.

Figure 3.6 shows that the income distribution of the City of Bethel had a higher proportion of households with incomes below \$50,000 than the State of Alaska and a lower percentage of households with incomes \$50,000 and above. Over 10 percent of households in the Bethel and Wade Hampton Census Areas have incomes under \$10,000 compared to 7.4 percent in the City of Bethel.

Figure 3.6. Household Income Distribution



Poverty Rates — Poverty rates are income based and do not take into account subsistence. Table 3.10 compares poverty status for the City of Bethel with the Bethel Census and Wade Hampton Census Areas and the State. The City of Bethel has the second lowest poverty rate in the Bethel area. The poverty rate for the City of Bethel in each of the three categories in the table below is lower than in the census areas but higher than the State. For example, in the City of Bethel, 10.6 percent of families fell below the poverty level

compared to 18.7 percent in the Bethel Census Area, 24.4 percent in Wade Hampton, and 6.7 in Alaska as a whole. The poverty income level for the Bethel Census Area is \$17,029 for four-person households.⁷

Table 3.10. Poverty Status in 1999

Place	Families in Poverty (%)	Single-Mother Families in Poverty (%)	Individuals in Poverty (%)
Bethel	10.6	25.1	11.2
Bethel Census Area	18.7	28.6	20.6
Wade Hampton Census Area	24.4	34.4	26.2
Alaska	6.7	20.0	9.4

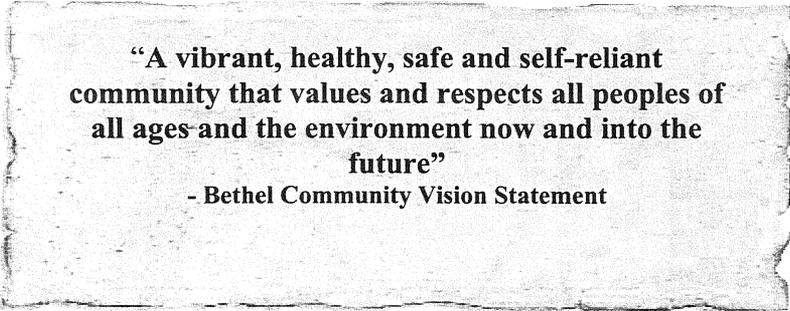
Source: U.S. Census Bureau, Census 2000, DP-3.

⁷ *Alaska Economic Trends*, September 2002.

4.0 Vision, Goals & Objectives: Where Do We Want To Be?

Vision

The community's vision reflects the region's rich culture and promising future. The vision statement describes the qualities and principles in which the community believes:



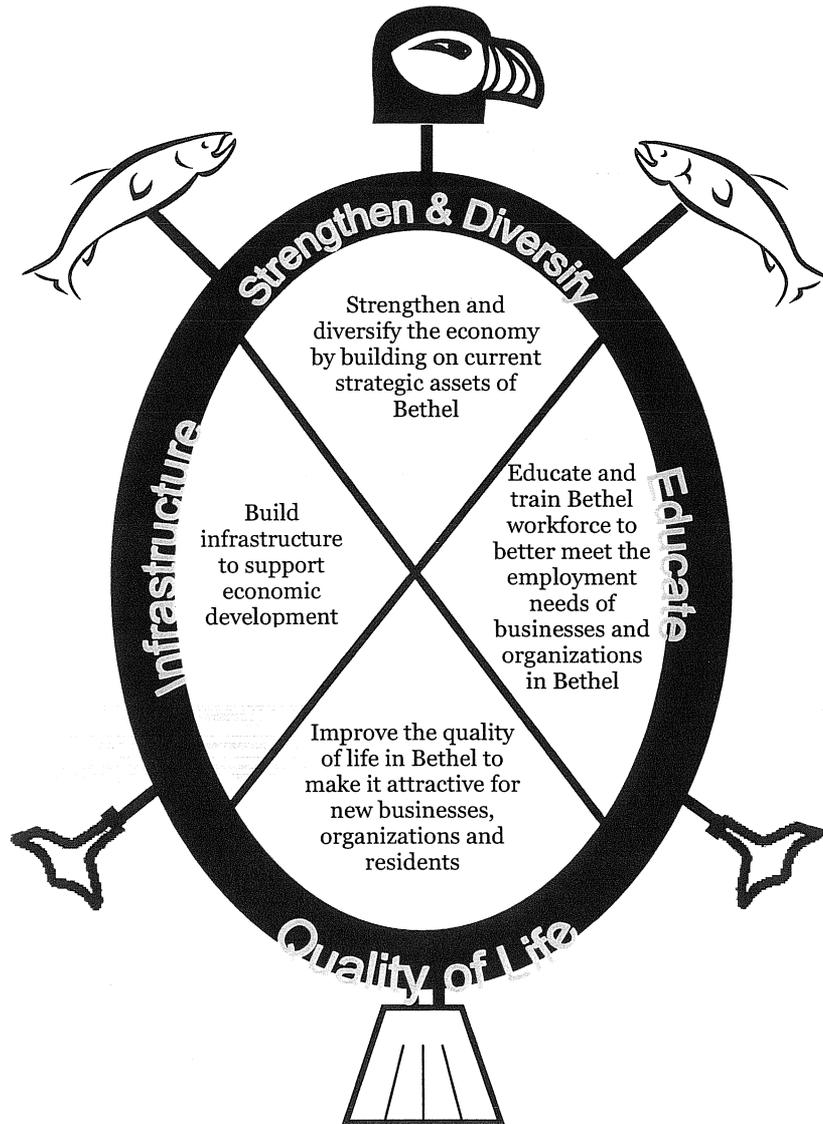
**“A vibrant, healthy, safe and self-reliant
community that values and respects all peoples of
all ages and the environment now and into the
future”
- Bethel Community Vision Statement**

In order to create a vibrant place where individuals want to live and work, the community knows that they must strengthen and diversify the economy by inventorying their existing assets and preparing for future opportunities.

Goals and Objectives

The following goals and objectives were compiled from the draft goals and objectives developed through community meetings and outreach over the past year. After a thorough analysis of community input, the goals and objectives were shaped into four major themes that encompass the community goals and objectives. These themes highlight *strengthening and diversifying the economy, education and training, building infrastructure, and improving the quality of life*. Item numbers in parenthesis indicate the original task item numbers as identified by the community.

In addition, the community identified “challenge objectives,” which are included behind the action plan. Due to issues such as ownership or revenue streams, the challenge objectives were either deemed difficult to implement or proposed to community members to take action individually or as a group. Challenge objectives are supported by the community and will be reviewed annually.



GOALS AND OBJECTIVES*

Strengthen and Diversify	Educate and Train	Infrastructure	Quality of Life	
<p>Goal 1. Strengthen and diversify the economy by building on current strategic assets of Bethel</p>	<p>Goal 2. Educate and train Bethel Workforce to better meet the employment needs of business and organizations in Bethel or moving to Bethel</p>	<p>Goal 3. Build infrastructure to support economic development</p>	<p>Goal 4. Improve the quality of life in Bethel to make it attractive</p>	
<p>Objective 1. Develop sustainable industries/businesses (1.2)</p> <p>Objective 2. Promote and publicize Bethel and the community (5.1)</p> <p>Objective 3. Promote Yup'ik culture and Bethel History (5.2)</p>	<p>Objective 1. Support the continued development of local hire effort (1.1)</p> <p>Objective 2. Improve the quality of education and decrease dropout rate (8.2)</p>	<p>Objective 1. Expand community infrastructure to accommodate growing population and provide for basic services (3.1)</p> <p>Objective 2. Develop transportation Infrastructure (3.2)</p>	<p>Objective 1. Preserve and promote Bethel's role in the region as the educational, transportation, public administration, economic and health care hub (1.3)</p> <p>Objective 3. Ensure appropriate and safe housing for vulnerable populations (2.1)</p> <p>Objective 5. Improve the air quality in the Bethel area (4.1)</p> <p>Objective 7. Improve solid and hazardous waste management practices (4.3)</p> <p>Objective 9. Expand public safety services (6.3)</p> <p>Objective 11. Reduce drug and alcohol dependence creating a healthier community (8.1)</p>	<p>Objective 2. Support and foster efforts to lower the cost of living in Bethel (1.4)</p> <p>Objective 4. Increase opportunities for safe and affordable housing (2.2)</p> <p>Objective 6. Conserve and improve open/green space and fish and wildlife habitats in Bethel and the surrounding areas (4.2)</p> <p>Objective 8. Encourage community involvement in public safety (6.1)</p> <p>Objective 10. Promote healthy active living and lifestyles for people of all ages living in the community (7.1)</p>

*Taken from Community meetings and outreach held between October 2002 and April 2003

5.0 Action Plan: How Do We Get There?

To reach their goals, the community established benchmarks and timelines to take advantage of the local and regional trends impacting workforce development, land use, infrastructure development, and services. Careful analysis of existing plans, such as the 2002 Bethel Airport Master Plan, the Bethel Transportation Plan, the 1997 City of Bethel Comprehensive Plan, the 2002 Yuut Elitnaurviat study, the 1994 Port Plan, and the 2002 AVCP Comprehensive Economic Development Strategy Plan, was performed in order to assist the community in the preparation of their main goals and objectives.

This action plan is the outcome of an extensive collaborate effort to stimulate employment, leverage local resources, protect the environment, and promote economic activity for the area. Categorized by short-term (first two years), mid-term (years three to five), and long-term (years six through 10) objectives, this action plan organizes concrete programs into flexible planning activities that builds on the community's current strengths but provides clear, realistic results.

The following tables present specific actions needed to accomplish the community goals and objectives presented earlier. These actions draw primarily from information provided at the public meetings and community outreach. In the *first column*, actions are shown in bold in the shaded area. They are followed below by specific tasks. In the *second column*, the actions are tied to community economic goals and objectives presented earlier in this plan. The *third column* shows the status of the action and costs (when known) followed by a proposed target date for action completion in the fourth column. The *last column* describes performance measures for the main action. The performance measures are shown in the shaded area and are intended to evaluate the progress of activities in achieving the goals of the comprehensive strategy. The performance measures should be reviewed on a regular basis (at least annually) to gauge the success of implementing the actions. Suggestions are also made in this column for potential partners or resources to consult and resource agencies for possible assistance in implementing the action.

Short Term Action Plan: The First Two Years

Short Term Action Plan - The First Two Years Strengthen and Diversify Economy

Action	Goals/Objectives Met	Status/Cost if known	Target Date	Performance Measures/Potential Partners
Develop Small business center and expand workforce investment	Goal 2, Objective 1			Performance Measures Small Business Center operating plan developed
Subcommittee decides on strategy for developing small business center, site, seeks funding			Sep-03	Potential Partners/Resources UAF-KUC, Job Center, SBDC, City, AVCP, ONC, YKHC, Chamber, ARDOR
Estimate cost of SBDC start-up and 1st year costs				UAF-KUC, Job Center, SBDC, City, AVCP, ONC, YKHC, Chamber, ARDOR
Research funding for SBDC start-up, work with AK/UAA SBDC				UAF-KUC, Job Center, SBDC, City, AVCP, ONC, YKHC, Chamber, ARDOR
Funding application submitted, implementation/operations strategy developed			Jun-05	UAF-KUC, Job Center, SBDC, City, AVCP, ONC, YKHC, Chamber, ARDOR
Participate in Workforce Investment Council and develop 5-year workforce development plan			Jun-05	UAF-KUC, Job Center, SBDC, City, AVCP, ONC, People's Learning Center, Chamber, ARDOR
Track local hire rates			Jul-04	Job Center, SBDC, City, AVCP, ONC, YKHC, Chamber, ARDOR
Investigate other working clearing houses			Aug-03	UAF-KUC, Job Center, SBDC, AVCP, People's Learning Center, Chamber, ARDOR
Accumulate information needed for working clearing house			Jan-04	UAF-KUC, Job Center, SBDC, AVCP, People's Learning Center, Chamber, ARDOR
Create a youth council to advise on youth oriented workforce development service delivery				UAF-KUC, Job Center, SBDC, City, AVCP, ONC, YKHC, People's Learning Center, Chamber, ARDOR
Seek funding sources to establish rotating capital loan fund			May-05	UAF-KUC, Chamber, ARDOR, local banks
Coordinate with People's Learning Center on design and construction schedule			May-03	Subcommittee
Coordinate with ONC on Tribal College progress and accreditation			May-04	Subcommittee
Develop Bethel's role as regional hub	Goal 1, Objective 1			Performance Measures Increased dependency on Bethel as service center, sales increased
Research customer needs in region through calls and brainstorming			Jan-05	Potential Partners/Resources ARDOR, Chamber, City, YKHC, ONC, BNC, AVCP, DCED
Inventory list of unmet or underserved needs			Jan-05	ARDOR, Chamber, City, YKHC, ONC, BNC, AVCP, DCED
Identify areas for improved services and develop strategy for meeting regional needs			May-05	ARDOR, Chamber, City, YKHC, ONC, BNC, AVCP, DCED
Begin discussions on ways to strengthen ARDOR			Jan-04	ARDOR, Chamber, City, ONC, BNC, AVCP, DCED
Organize contests to develop a Bethel symbol and slogan	Goal 1, Objective 2			Performance Measures Contest complete, symbol and slogan chosen
Subcommittee meets to decide on contest rules			Sep-03	Potential Partners/Resources Chamber, City, ARDOR, ONC, AVCP, YKHC, other groups
Develop contest ad, place in paper			Oct-03	Subcommittee
Choose and advertise contest winner(s)			Jan-04	Subcommittee
Seek funding for first run, submit funding request			Jan-04	Subcommittee

Short Term Action Plan - The First Two Years

Print marketing items using symbol and slogan	Goal 1, Objective 2	Performance Measures Symbol and slogan on promotional items (such as cups, t-shirts) for sale
Obtain materials and cost quotes		Potential Partners/Resources Chamber, People's Learning Center, ARDOR, City
Determine costs for promotional items		Chamber, People's Learning Center, ARDOR, City
Develop accounting system for selling and tracking items		Potential Partners/Resources Chamber, People's Learning Center, ARDOR, City
Determine number of items		Chamber, People's Learning Center, ARDOR, City
Secure funding (grants/fundraisers, etc)		
Place order		
Place items for sale in businesses, stores.		Chamber, People's Learning Center, ARDOR, City
Erect a Bethel Welcome sign	Goal 1, Objective 2	Performance Measures Sign designed and in place
Marketing Subcommittee determines sign location, sign material, recruit artists volunteers, seek funding		Potential Partners/Resources Subcommittee
Marketing Subcommittee reviews and approves sign design submitted, submits funding request		Subcommittee
Location for sign approved		Subcommittee
Sign and supports ordered, manufactured		Subcommittee
Sign installed		Subcommittee
Promote and Publicize Bethel Events	Goal 1, Objective 1	Performance Measures Increase number of visitors to Bethel area
Camal		Potential Partners/Resources Chamber of Commerce, Cama-I' organizers, volunteers, DCED, City
Kuskokwim 300		Chamber of Commerce, volunteers, DCED, City
Investigate construction of K-300 building		Chamber of Commerce, volunteers, DCED, City
Market and promote traditional arts, crafts and cultural diversity in and around Bethel	Goal 1, Objective 3	Performance Measures Increased number of artists items displayed and for sale, web site developed, maintained and used
Place arts/crafts for sale in hotels, etc. for resale		Potential Partners/Resources Bethel Council of the Arts, SBDC, Chamber, ARDOR, AVCP, local artists, hotels
Marketing Subcommittee meets to further develop strategy		Bethel Council of the Arts, SBDC, Chamber, ARDOR, AVCP, local artists
Determine web design maintenance strategy		Subcommittee
Contact web designer to discuss project		Subcommittee
Design website		Subcommittee
Advertise for local artists to market on web site		Subcommittee
Post website		Subcommittee
Form Regional Artists Group		Subcommittee
Begin research for Cultural/Tribal Learning Center to teach visitors and children about Yupik traditions		Subcommittee

Short Term Action Plan - The First Two Years

Education

Goal Objectives Met	Status	Target Date	Performance Measures/Potential Partners
Organize Job and College fairs			Performance Measures Job Fair conducted, unemployment rate decreased
Goal 2, Objective 1 & 2			

Education Subcommittee meets to discuss strategy			Nov-03	Potential Partners/Resources JAF KUC, YKHC, ONC, AVCP, People's Learning Center, Job Center, Tundra Center
Potential employers contacted, date agreed to			Jan-04	Subcommittee

Potential educators contacted, date agreed to				May-04	Subcommittee
Get commitment from presenters				Jun-03	Subcommittee
Arrange meeting supplies, agendas etc.				Jul-04	Subcommittee
Advertise job fair				Nov-04	Subcommittee
Advertise college fair				Apr-05	Subcommittee

Infrastructure

Research feasibility of alternative and/or centralized power generation	Goals 3, Objective 1				Performance Measures Alternative energy feasibility study funded, contractor chosen
Meet to discuss scope of work and funding sources, coordinate with Calista regional energy plan				Oct-03	Potential Partners/Resources AIDEA, City, BNC, Callista, AVCP, ONC
Meet with AVEC to discuss current demand, AVCP, ONC support PCE benefits					AIDEA, City, BNC, Callista, AVCP, ONC
Research funding, submit application for alt. energy study				Sep-04	AIDEA, City, BNC, Callista, AVCP, ONC
Develop scope of work, advertise RFP				Jan-05	AIDEA, City, BNC, Callista, AVCP, ONC
Review proposals, select consultant				Oct-04	AIDEA, City, BNC, Callista, AVCP, ONC
Improve and expand piped water and sewer service	Goals 3, Objective 1				Performance Measures Funding for next phase of sewer and water improvements received, next phase of improvements begun
Develop Sanitation Subcommittee		W&S Plan done		Jun-03	Potential Partners/Resources: City, ONC, USDA local office
Review sanitation plan, schedule of projects				Jun-03	City, ONC
Gather letters of support, resolutions other supporting documents				Jul-03	City, ONC
Submit VSW funding application for water and sewer improvements				Oct-04	City
Continue to meet and submit USDA Grant or other loan applications				On-going	City, DEC, ONC, USDA
Develop Scope of work, advertise RFP for the design and construction of a primary wastewater treatment facility		Design done, Est. cost=\$9m		Jan-04	City, DEC, ONC, USDA
Evaluate RFP's, Select Contractor, Award Contract, Negotiate Contract				May-04	City, DEC, ONC, USDA
Reconstruct main lift station		Funded		Oct-03	City
Install two additional wastewater lift stations				May-05	City, ONC, USDA
Improve Solid Waste disposal, expand recycling	Goals 3 & 4, Objective 1 & 7				Performance Measures Landfill projects funded, recycling efforts expanded
Sanitation Subcommittee meets to formulate strategy				Nov-03	Potential Partners/Resources City, DEC, ONC, Callista, EPA
Improvements outlined for recycling operations				Nov-03	City, DEC, ONC, Callista, EPA

**Short Term Action Plan - The First Two Years
Infrastructure (continued)**

Action	Goals/Objectives Met	Status/Costs (if known)	Target Date	Performance Measures/Potential Partners
			Jan-04	City, DEC, ONC, Callista, EPA
Grant funding researched				

Recycling grant(s) submitted				May-04	City, DEC, ONC, Calista, EPA
Funding for full time recycling coordinator sought				FY 2004	City, ONC (City Budget)
Submit application for full time recycling coordinator				Jan-05	Potential Partners/Resources City, ONC, AVCP
Award purchase order for compactor/bailer unit				Jan-04	City, DEC, ONC, BNC, Calista, EPA
Track City of Bethel Water and Sewer Master Plan				Apr-04	City, DEC, ONC, BNC, Calista, EPA
Implement Recycled Paper/Cardboard Fire Log Project			\$100K	Sep-04	City, DEC, ONC, BNC, Calista, EPA
Begin Public Awareness Recycling Campaign				Mar-03	City, DEC, ONC, BNC, Calista, EPA
Improve Solid Waste disposal, expand recycling (same as above?)	Goals 3 & 4, Objective 1 & 7				Performance Measures Dumpsters with cages installed
Seek funding for cages/fencing for dumpsters					Potential partners/Resources
Construct fences around dumpsters to contain debris				Jan-04	City, ONC,
Explore public transit system	Goals 3, Objective 2			Jun-05	City, ONC
Subcommittee meets to discuss strategy & need for transit study				Oct-03	Potential Partners/Resources DOT, ONC, City, AVCP, BNC, AHMTA, BCS
Secure funding for a transit feasibility study				Jan-04	Potential Partners DOT, ONC, City, AVCP, BNC, AHMTA
Contract consultant for public transit study				Mar-04	Potential Partners DOT, ONC, City, AVCP, BNC, AHMTA
Explore feasibility of local airport sponsorship and implementation of airport projects	Goals 3, Objective 2				Performance Measures Airport Sponsorship Feasibility Plan in Airport Improvement Plan
FAA planner contacted				Oct-03	Potential Partners/Resources City, AVCP, FAA, DOT&PF
Letters of support for study sought and submitted to FAA				Jan-04	City, AVCP, FAA, DOT&PF
Work with FAA planner to develop DBE plan				Sep-04	City, AVCP, FAA, DOT&PF
FAA includes airport sponsorship Plan to AIP spending Plan				Jun-05	City, AVCP, FAA, DOT&PF
Support airport master plan with written requests to DOT&PF for projects				Jan-04	City, AVCP, FAA, DOT&PF
Improve Bethel surface transportation network, reduce dust	Goals 3, Objective 2				Performance Measures Improved surface transportation, reduced dust, decreased health complaints
Meet to discuss strategy for road and trail improvements				Sep-03	Potential Partners/Resources DOT, BIA, ONC, City, Calista, AVCP, DEC, UAF KUC, BLM, BNC, CES, NRCS, RC&D, AK, Plant
BIA, DOT and Denali Commission contacted for latest funding schedule				Jun-03	Potential Partners/Resources DOT, BIA, ONC, City, Calista, AVCP, DEC, UAF KUC, BLM, BNC, CES, NRCS, RC&D, AK, Plant Materials Center

Short Term Action Plan - The First Two Years Infrastructure (continued)

Action	Goal/Objectives Met	Status/Costs (if known)	Target Date	Performance Measures/Potential Partners
Gather letters of support for Bethel road and trail improvement projects			May-04	DOT, BIA, ONC, City, Calista, AVCP, DEC, UAF KUC, BLM, BNC, CES, NRCS, RC&D, AK, Plant Materials Center

Application(s) submitted for road improvements		May-04	DOT, BIA, ONC, City, Calista, AVCP, DEC, UAF KUC, BLM, BNC, CES, NRCS, RC&D, AK Plant Materials Center
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Contact T2 Center at DOT and TTAP at BIA to learn of latest dust control methods			Jun-03	DOT, BIA, ONC, City, Calista, AVCP, DEC, UAF KUC, BLM, BNC, CES, NRCS, RC&D, AK, Plant Materials Center
Apply to BIA for 2% planning funds to finish road inventory			Aug-03	DOT, BIA, ONC, City, Calista, AVCP, DEC, UAF KUC, BLM, BNC, CES, NRCS, RC&D, AK, Plant Materials Center
Support Dust Busters			Jun-03	DOT, BIA, ONC, City, Calista, AVCP, DEC, UAF KUC, BLM, BNC, CES, NRCS, RC&D, AK, Plant Materials Center
Discuss ways to track dust affects on the elderly and local population			Dec-03	Potential Partners/Resources YKHC, City, ONC, Calista Elder Council
Track ONC dust mitigation study			Jan-04	YKHC, City, ONC, Calista Elder Council
Research funding sources for additional dust monitoring sites			Aug-03	DOT, BIA, ONC, City, Calista, AVCP, DEC, UAF KUC, BLM, BNC, CES, NRCS, RC&D, AK, Plant Materials Center
Improve and expand the Bethel Port and boat harbor	Goals 3, Objective 2			Performance Measures Port committee formed, port opportunities expanded
Review port plan, update existing port plan and assess 3 year upcoming port needs			Sep-03	Potential Partners/Resources City, USACE, BNC, Denali Commission
Identify and support anticipated needs of current port operations			May-04	City, USACE, BNC, Denali Commission
Identify important linkages between port, airport, market			May-04	City, USACE, BNC, Denali Commission
Research designating port as industrial district			Jun-04	City, USACE, BNC, Denali Commission
Identify and secure suitable sites for marine-related storage			Aug-04	City, USACE, BNC, Denali Commission
Establish ordinances regarding boat parking			May-04	City, USACE, BNC, Denali Commission
Research enlarging public boat harbor			Dec-03	City, USACE, BNC, Denali Commission
Quality of Life				
Construct and operate an Assisted Living Home Program	Goal 4, Objective 1			Performance Measures Assisted Living Home Center built and operated
Complete current feasibility study and assessment			May-03	Potential Partners/Resources YKHC, City, AVCP housing, Calista Elder Council, Bethel Family Clinic
Work with YKHC to implement study, provide support letters as needed			May-03	YKHC, City, AVCP housing, Calista Elder Council, Bethel Family Clinic
Construct and operate Skilled Nursing Home and Primary Care Center	Goal 4, Objective 1			Performance Measures Primary Care Center and Skilled Nursing Home Operational
Support efforts to develop Skilled Nursing Home			Jan-03	Potential Partners/Resources YKHC, ONC, Calista Elder Council, AVCP housing, City, Department of Health and Social Services, Bethel Family Clinic
Support efforts to develop Primary Care Center			Jan-03	YKHC, ONC, Calista Elder Council, AVCP housing, City, Department of Health and Social Services, Bethel Family Clinic
Increase and protect existing green space	Goal 4, Objective 6			Performance Measures Green spaces identified, steps begun to protect and expand
Research City authority to regulate green space/parks			Sep-03	Potential Partners/Resources City, DEC, ASWCD, NRCS, ADF&G, USFWS, UAF-KUC, Park Service, State Parks

Short Term Action Plan - The First Two Years

Quality of Life (continued)

Action	Goals/Objectives Met	Status/Costs if known	Target Date	Performance Measures/Potential Partners
Inventory existing green space, potential green spaces threatened by development			Jan-04	City, DEC, ASWCD, NRCS, ADF&G, USFWS, UAF-KUC, Park Service, State Parks
Research grant funding for increasing and protecting green spaces			Jan-04	City, DEC, ASWCD, NRCS, ADF&G, USFWS, UAF-KUC, Park Service, State Parks

Collect habitat and subsistence maps Research Adopt a Park programs				Jun-04 Sep-03	City, DEC, ASWCD, NRCS, ADF&G, USFWS, UAF-KUC, Park Service, State Parks City, DEC, ASWCD, NRCS, ADF&G, USFWS, UAF-KUC, Park Service, State Parks
Contain Loose/uncontrolled animals	Goal 4, Objective 9				Performance Measures Reduced number of loose pet complaints
Research other communities animal ordinance and enforcement policies				Oct-03	Potential Partners/Resources City, ADF&G, USFWS, Department of Public Safety
Develop public awareness campaign				Nov-03	Potential Partners City, ADF&G, USFWS, Department of Public Safety
Expand and Improve Public Safety System	Goal 4, Objective 9				Performance Measures Reduced crime rate, reduced injuries related to helmet and car seat usage, increase in informants, applications submitted for jail, police facility
Meet to discuss requirement for new jail				Sep-03	Potential Partners/Resources DOC, DOJ, City, YKHC, BBHC, LKSD, Tundra Center
Meet to discuss requirement for police facility expansion				Sep-03	DOC, DOJ, City, YKHC, BBHC, LKSD, Tundra Center
Meet to discuss improvements to 9-1-1 dispatch				Sep-03	DOC, DOJ, City, YKHC, BBHC, LKSD, Tundra Center
Research funding sources for required needs				Sep-03	DOC, DOJ, City, YKHC, BBHC, LKSD, Tundra Center
Submit required funding applications				May-04	DOC, DOJ, City, YKHC, BBHC, LKSD, Tundra Center
Determine site location for new police facility				Sep-03	DOC, DOJ, City, YKHC, BBHC, LKSD, Tundra Center
Meet with Police to discuss informant policies, how to improve, expand program				Sep-03	DOC, DOJ, City, YKHC, BBHC, LKSD, Tundra Center
Intensify enforcement practices for controlled substance and inhalant abuse				Jan-03	DOC, DOJ, City, YKHC, BBHC, LKSD, Tundra Center
Provide "take home" cruisers to increase neighborhood police presence				Aug-04	DOC, DOJ, City, YKHC, BBHC, LKSD, Tundra Center
Educate public on injury prevention, arrange classes on gun lock safety, bicycle safety, car seat safety, & ATV snow machine helmet use				On-going	DOC, DOJ, City, YKHC, BBHC, LKSD, Tundra Center
Establish Neighborhood Watch/Crime Stoppers program				Aug-04	DOC, DOJ, City, YKHC, BBHC, LKSD, Tundra Center, Department of Public Safety, Alaska State Troopers
Establish Neighborhood Watch/Crime Stoppers Hotline				Aug-04	DOC, DOJ, City, YKHC, BBHC, LKSD, Tundra Center, Department of Public Safety, Alaska State Troopers
Expand firefighting training capabilities	Goal 4, Objective 9				Performance Measures Application submitted for training tower
Determine site location for tower		Done		Mar-03	Potential Partners/Resources Department of Public Safety, City
Research funding sources and charitable events for required training tower funds				Jan-03	Department of Public Safety, City
Gather LOS plan to move forward				Sep-04	Department of Public Safety, City

Short Term Action Plan - The First Two Years
Quality of Life (continued)

Action	Goals/Objectives Met	Status/Costs if known	Target Date	Performance Measures/Potential Partners
				Performance Measures Reduction in crime, alcohol and substance abuse rates down
Action	Goals/Objectives Met	Status/Costs if known	Target Date	Performance Measures/Potential Partners
				Performance Measures Reduction in crime, alcohol and substance abuse rates down
Reduce the use of alcohol and illegal drugs	Goal 4, Objective 9		Aug-03	Potential Partners/Resources City, ONC, AVCP, YKHC, Department of Public Safety
Establish system and benchmarks to track current rates				

Meet to define problem and prepare strategy plan			Sep-03	City, ONC, AVCP, YKHC, LKSD
Meet with Police to discuss alcohol bootleg and illegal drug enforcement, informants			Nov-03	City, ONC, AVCP, YKHC, LKSD
Begin to formulate media campaign concerning alcohol and substance abuse			Jan-03	City, ONC, AVCP, YKHC, LKSD
Begin to develop education plan to reduce dependence on alcohol and illegal drugs, educate parents, youth (DARE, GREAT)			Jun-03	City, ONC, AVCP, YKHC, LKSD
Establish a Tribal Justice System	Goal 4, Objective 9 & Goal 1, Objective 3			Performance Measures Funding applications submitted for Tribal Youth Court Program and Tribal Court
Meet to discuss plan and implementation strategy			Sep-03	Potential Partners/Resources ONC, AVCP
Develop letters of support for funding requests			Jan-04	ONC, AVCP
Track progress of Tribal Youth Court			Jan-04	ONC, AVCP
Support ONC Self Determination Efforts				Performance Measures Increased number of PL-638 contracts
Work with ONC and provide support letters and incorporate Self Determination language in grants/plans			Ongoing	Potential Partners/Resources ONC, AVCP, City
Foster and promote land development	Goal 3, Objective 1 & Goal 4, Objective 4			Performance Measures Additional lots available for development
Meet to discuss strategy for marketing commercial and residential lands, removing barriers			Oct-03	Potential Partners/Resources City, BNC, AVCP Housing, DCED, ONC
Develop strategy to educate allotment owners on opportunities, rights, etc.			Mar-04	City, BNC, AVCP Housing, DCED, ONC
Contact real estate office to determine barriers to establishing local real estate office			Nov-03	City, BNC, AVCP Housing, DCED, ONC
Form Construction Coop to reduce cost of materials			Jan-05	City, BNC, AVCP Housing, DCED, ONC
Foster and promote housing development	Goal 4, Objective 4			Performance Measures Create affordable housing
Begin discussions on creating affordable housing			Jan-04	Potential Partners/Resources City, BNC, AVCP Housing, DCED, ONC
Develop Employee Housing			Ongoing	City, BNC, AVCP Housing, DCED, ONC
Form Construction Coop to reduce cost of materials			Jan-05	City, BNC, AVCP Housing, DCED, ONC
Support ONC Housing Development			Ongoing	City, BNC, AVCP Housing, DCED, ONC
Develop healthy activities for youth and adults	Goal 4, Objective 10			Performance Measures Opportunities for healthy activities increased

Short Term Action Plan - The First Two Years
Quality of Life (continued)

Action	Goal/Objectives Met	Status/Goals if known	Target Date	Performance Measures/Potential Partners
Meet to develop strategy for increased activities			Sep-03	Potential Partners/Resources City, ONC, AVCP, LKSD, YKHC, YMCA, Boys & Girls Club, Department of Health and Social Services, DNR
Meet with LKSD to determine extent of out of school activities and how to expand current program			Jun-03	City, ONC, AVCP, LKSD, YKHC, YMCA, Boys & Girls Club, Department of Health and Social Services, DNR
Research Boys and Girls Clubs, YMCA, Big Brothers Big Sisters			Jun-03	City, ONC, AVCP, LKSD, YKHC, YMCA, Boys & Girls Club, Department of Health and Social Services, DNR

Research parks and recreation funds		Sep-03	City, ONC, AVCP, LKSD, YKHC, YMCA, Boys & Girls Club, Department of Health and Social Services, DNR
Research community multi-use recreational facilities		Apr-04	City, ONC, AVCP, LKSD, YKHC, YMCA, Boys & Girls Club, Department of Health and Social Services, DNR
Seek funding to expand after-school activities		Oct-04	City, ONC, AVCP, LKSD, YKHC, YMCA, Boys & Girls Club, Department of Health and Social Services, DNR

Medium Term Action Plan: Years Three through Five

Medium Term Action Plan - Years Three through Five Strengthen and Diversify Economy

Action	Goals/Objectives Met	Status/Costs (if known)	Target Date	Performance Measures/Potential Partners
Develop small business center and expand workforce investment	Goal 2, Objective 1			Performance Measures Small Business Center operating plan developed
Develop scope of work for business center design, coordinate with funding agency			Jul-04	<i>Potential Partners/Resources</i> UAF-KUC, Job Center, SBDC, City AVCP, ONC, YKHC, Chamber, ARDOR, DCED
Advertise design of small business center			Jun-05	UAF-KUC, Job Center, SBDC, City AVCP, ONC, YKHC, Chamber, ARDOR
Choose consultant and negotiate contract			Jan-06	UAF-KUC, Job Center, SBDC, City AVCP, ONC, YKHC, Chamber, ARDOR
Provide input into building design, seek funding for construction			May-06	Learning Center
Continue participation in Workforce Investment Council and assist in implementing 5-year workforce development plan			Aug-06	UAF-KUC, Job Center, SBDC, City AVCP, ONC, YKHC, Chamber, ARDOR, People's
Participate with youth council to advise on youth oriented workforce development			Jul-05	Learning Center
Establish rotating capital loan fund, obtain funding			Oct-05	UAF-KUC, Chamber, ARDOR, local banks
Continue to coordinate with AVCP on the Tribal College and accreditation			Jan-06	AVCP, ONC
Develop Bethel's role as regional hub	Goal 1, Objective 1			Performance Measures Increased dependency on Bethel as service center, sales increased
Begin implementation of regional strategy enhancing hub services			May-06	<i>Potential Partners/Resources</i> ARDOR, Chamber, City, YKHC, ONC, BNC, AVCP
Develop strategies to strengthen ARDOR			Jun-06	ARDOR, Chamber, City, YKHC, ONC, BNC, AVCP, DCED
Market and promote traditional arts, crafts and cultural diversity in and around Bethel	Goal 1, Objective 3			Performance Measures Increased number of artists items displayed and for sale, web site developed, maintained and used
Continue to maintain website and analyze successes and failures			Jan-04	<i>Potential Partners/Resources</i> Subcommittee
Redesign website as needed			Jan-04	Subcommittee
Analyze current and potential marketing opportunities			Feb-04	Subcommittee
talents			Jun-04	Subcommittee
Advertise for local artists to market on web site			Sep-04	Subcommittee
Develop scope of work, curriculum for Tribal Learning Center			Oct-06	AVCP, ONC
Promote and Publicize Bethel Events	Goal 1, Objective 1			Performance Measures Increase number of visitors to Bethel area
Track number of Cama-i participants and observers			Ongoing	<i>Potential Partners/Resources</i> Camai volunteers, Chamber of Commerce
Track number of K-300 participants and observers			Ongoing	K-300 volunteers, Chamber of Commerce
Determine site location and obtain site control for K-300 building			Sep-05	DCED, K-300 volunteers, Chamber of Commerce

Medium Term Action Plan - Years Three to Five Education

Action	Goal/Objectives Met	Status/Costs (if known)	Target Date	Performance Measures/Potential Partners
Continue to conduct Job and College fairs	Goal 2, Objectives 1 & 2			Performance Measures Job Fair conducted, unemployment rate decreased
Assess previous college and job fairs				Potential Partners/Resources Subcommittee, Job Center
Develop process for annual college and job fairs				Subcommittee, Job Center
Identify partners to continue efforts				Subcommittee
Conduct annual job and college fair				Job Center, Employers, UAA-KUC
Track local employment rates				ARDOR, Employers, Job Center
Infrastructure				
Research feasibility of alternative and/or centralized power generation	Goals 3, Objective 1			Performance Measures Alternative energy feasibility study funded, contractor chosen
Negotiate with consultant for energy feasibility study			Nov-04	Potential Partners/Resources AIDEA, City, BNC, Calista, AVCP
Manage consultant contract, assist with study development			Jan-05	AIDEA, City, BNC, Calista, AVCP
Review study and implementation of energy alternatives			Feb-04	AIDEA, City, BNC, Calista, AVCP
Track current demands, PCE Benefits			Feb-04	AIDEA, City, BNC, Calista, AVCP
Improve water and sewer service	Goals 3, Objective 1			Performance Measures Funding for next phase of sewer and water improvements received, next phase of improvements begun
Review consultant work, coordinate with funding agencies				Potential Partners/Resources City, ONC
Improve water and sewer service				City, ONC
Continue to meet and submit other applications				City, ONC
Improve Solid Waste disposal, expand recycling	Goals 3, Objective 1			Performance Measures Landfill projects funded, recycling efforts expanded
Work with recycling coordinator to assess additional needs			May-05	Potential Partners/Resources City, AVCP, DEC, ONC, BRC
Seek funding for needs recommended by recycling coordinator			Jul-05	City, AVCP, DEC, ONC, BRC
Continue public awareness campaign			Ongoing	City, AVCP, DEC, ONC, BRC
Begin sales of recycled paper/cardboard fire logs			Ongoing	City, AVCP, DEC, ONC, BRC
Master Plan			Ongoing	City, AVCP, DEC, ONC, BRC
Research/seek funding for vehicle crusher			May-04	BRC, City, AVCP, ONC
Install Compactor/Bailer Unit			Jan-04	City, AVCP, DEC, ONC, BRC
Design and construct landfill improvements			Jan-04	City, DEC, ONC, BRC

Medium Term Action Plan - Years Three to Five Infrastructure

Action	Goals/Objectives Met	Status/Costs (If Known)	Target Date	Performance Measures/Potential Partners
Explore public transit system	Goals 3, Objective 2			Performance Measures Discussions begun for feasibility of transit system
Act on recommendation from subcommittee regarding public transit			Oct-03	Potential Partners/Resources DOT, ONC, City, AVCP, BNC
Explore feasibility of local airport sponsorship and implementation of airport projects	Goals 3, Objective 2			Performance Measures Airport Sponsorship Feasibility Plan in Airport Improvement Plan
Develop scope of work for airport sponsorship			Oct-03	Potential Partners & Potential Resources
Letters of support for study sought and submitted to FAA			Jan-04	City, AVCP, FAA, DOT&PF
Advertise and select consultant for study			Sep-04	City, AVCP, FAA, DOT&PF
Assist with study, coordinate with DOT&PF on airport projects			Jan-05	City, AVCP, FAA, DOT&PF
Improve Bethel surface transportation network, reduce dust	Goals 3, Objective 2			Performance Measures Improved surface transportation, reduced dust, decreased health complaints
Submit funding request for additional dust monitoring stations				Potential Partners/Resources
Write letter to BIA and DOT to support acceleration of road improvements			Oct-04	DOT, BIA, ONC, City, Calista, AVCP, DEC, UAF KUC, BLM, BNC, CES, NRCs, RC&D, AK, Plant Materials Center, Denali Commission
Gather letters of support for Bethel road and trail improvement projects			Oct-04	DOT, BIA, ONC, City, Calista, AVCP, DEC, UAF KUC, BLM, BNC, CES, NRCs, RC&D, AK, Plant Materials Center, Denali Commission
Apply for funding, organize fund raiser, volunteers to expand roadside plantings to reduce dust			Oct-04	DOT, BIA, ONC, City, Calista, AVCP, DEC, UAF KUC, BLM, BNC, CES, NRCs, RC&D, AK, Plant Materials Center, Denali Commission
Continue to monitor ONC dust mitigation study			May-05	DOT, BIA, ONC, City, Calista, AVCP, DEC, UAF KUC, BLM, BNC, CES, NRCs, RC&D, AK, Plant Materials Center, Denali Commission
Track number of respiratory and health related cases			Ongoing	DOT, BIA, ONC, City, Calista, AVCP, DEC, UAF KUC, BLM, BNC, CES, NRCs, RC&D, AK, Plant Materials Center, Denali Commission
Contact T2 Center at DOT and TTAP at BIA to learn of latest dust control methods			May-05	DOT, BIA, ONC, City, Calista, AVCP, DEC, UAF KUC, BLM, BNC, CES, NRCs, RC&D, AK, Plant Materials Center, Denali Commission
Improve and expand the Bethel Port and boat harbor	Goals 3, Objective 2			Performance Measures Port committee formed, port opportunities expanded
Seek funding to update Port and Harbor Plan			Jun-04	Potential Partners/Resources
Submit applications for Ports and Harbor Plan Update			Jun-04	City of Bethel, USACE, BNC, Denali Commission
Advertise and select consultant for Plan Update			Sep-04	City of Bethel, USACE, BNC, Denali Commission
Work with Consultant to identify current and future needs			Sep-04	City of Bethel, USACE, BNC, Denali Commission
Submit funding request to implement Plan Update recommendations			Jun-05	City of Bethel, USACE, BNC, Denali Commission
Sea Wall improvements completed			Jun-05	City of Bethel, USACE, BNC, Denali Commission

Medium Term Action Plan - Years Three to Five Quality of Life

Action	Goals/Objectives Met	Status/Costs if known	Target Date	Performance Measures/Potential Partners
Construct and operate an Assisted Living Home Program	Goal 4, Objective 10			Performance Measures Assisted Living Home Center built and operated
Continue to coordinate and support YKHC efforts			Ongoing	Potential Partners/Resources YKHC, City, AVCP housing, Calista Elder Council, Bethel Family Clinic
Construct and operate Skilled Nursing Home and Primary Care Center	Goal 4, Objective 10			Performance Measures Skilled Nursing Home and Primary Care Center operating
Track construction schedule for Skilled Nursing Home			Ongoing	Potential Partners/Resources YKHC, AVCP Housing, Calista Elder Council, Bethel Family Clinic,
Construction complete for Primary Care Center			May-05	YKHC, AVCP Housing, Calista Elder Council, Bethel Family Clinic
Increase and protect existing green space	Goal 4, Objective 6			Performance Measures Green spaces identified, steps begun to protect and expand
Develop strategy to implement Adopt-A-Park Program			Apr-04	Potential Partners/Resources City, DEC, ASWCD, NRCS, ADF&G, USFWS, UAF-KUC, Park Service, State Parks
Expand annual clean-up day to include all green/open spaces			Oct-04	City, DEC, ASWCD, NRCS, ADF&G, USFWS, UAF-KUC, Park Service, State Parks
Protect and buffer existing subsistence and habitat areas			Jan-04	City, DEC, ASWCD, NRCS, ADF&G, USFWS, UAF-KUC, Park Service, State Parks
Contain Loose/uncontrolled animals	Goal 4, Objective 10		Apr-05	City, DEC, ASWCD, NRCS, ADF&G, USFWS, UAF-KUC, Park Service, State Parks
Continue work to educate public about containing loose/uncontrolled animals, fine as necessary, enforce codes				Performance Measures Reduced number of loose pet complaints
Expand and Improve Public Safety System	Goal 4, Objective 9		Ongoing	Potential Partners/Resources City, ADF&G, USFWS
Continue to meet with Police to discuss ways to expand and improve public safety system			Sep-04	Performance Measures Reduce crime rate, reduce injuries related to helmet and car seat usage, increase in informants, applications submitted for jail, police facility
Continue strict enforcement of controlled substance and inhalant abuse			Ongoing	Potential Partners/Resources DOC, DOJ, City, YKHC, BBHC, LKSD, Tundra Center
Install Neighborhood Watch Hotline			Jan-05	DOC, DOJ, City, YKHC, BBHC, LKSD,
Continue injury prevention programs			Jan-03	DOC, DOJ, City, YKHC, BBHC, LKSD

Medium Term Action Plan - Years Three to Five

Quality of Life (Continued)

Action	Goals/Objectives Met	Status/Costs If Known	Target Date	Performance Measures
Improve firefighting capabilities	Goal 4, Objective 9			Performance Measures Application submitted for training tower
Meet with fire support personnel to detail further needs			Aug-03	Potential Partners/Resources Department of Public Safety, City
Submit funding request for improving firefighting capabilities				Department of Public Safety, City
Reduce the use of alcohol and illegal drugs	Goal 4, Objective 11			Performance Measures Reduction in crime, alcohol and substance abuse rates down
Continue to develop education plan, support DARE, GREAT			Ongoing	Potential Partners/Resources City, ONC, AVCP, YKHC, LKSD
Meet with Police to discuss alcohol bootleg and illegal drug enforcement			Jun-04	City, ONC, AVCP, YKHC,
Continue to track alcohol and illegal drug use			Ongoing	City, ONC, AVCP, YKHC, LKSD
Implement media campaign concerning alcohol and substance abuse			Aug-03	City, ONC, AVCP, YKHC, LKSD
Establish a Tribal Justice System	Goal 4, Objective 9			Performance Measures Funding applications submitted for Tribal Youth Court Program and Tribal Court
Continue to coordinate with ONC to implement plan			Ongoing	Potential Partners/Resources ONC, AVCP
Support ONC Self Determination Efforts	Goal 4, Objective 1			Performance Measures Increased number of PL-638 contracts
Work to continue support for ONC Self Determination			Ongoing	Potential Partners/Resources ONC, AVCP
Foster and promote land development	Goal 4, Objective 1,3,4			Performance Measures Additional lots available for development
Implement strategies for marketing commercial and residential lands, removing barriers			Jan-04	Potential Partners/Resources City, BNC, AVCP Housing, DCED
Continue to educate allotment owners on opportunities, rights, etc.			Ongoing	BNC, AVCP Housing, DCED
Establish local real estate office			May-04	City, BNC, AVCP Housing, DCED
Foster and promote housing development	Goal 4, Objective 4			Performance Measures Increase in available housing
Implement strategies to create affordable housing			Aug-04	Potential Partners/Resources City, BNC, AVCP Housing, DCED, YKHC, Tundra Center
Construct additional employee housing			May-05	City, BNC, AVCP Housing, DCED, YKHC
Track ONC housing development			Ongoing	City, BNC, AVCP Housing, DCED, YKHC
Construction Coop purchasing materials			Jan-06	City, BNC, AVCP Housing, DCED, YKHC

Medium Term Action Plan - Year s Three to Five

Quality of Life (Continued)

Action	Goal Objectives Met	Status/Costs (If known)	Target Date	Performance Measures
Develop healthy activities for youth and adults	Goal 4, Objective 10			Performance Measures Lower Crime rate, reduction in health problems
Develop applications for Boys and Girls club			Sep-03	Potential Partners/Resources City, ONC, LKSD, YKHC, YMCA, Boys & Girls Club, Department of Health and Social Services
Implement out of/after school activities, locate volunteers			Jan-04	City, ONC, LKSD, YKHC, YMCA, Boys & Girls Club, Department of Health and Social Services
Obtain site control to construct community recreational center				City, ONC, AVCP, LKSD, YKHC, YMCA, Boys & Girls Club, Department of Health and Social Services
Obtain funds to construct and build recreational center			Jan-05	City, ONC, LKSD, YKHC, YMCA, Boys & Girls Club, Department of Health and Social Services
Apply for park expansion funding requests			Apr-04	City, ONC, LKSD, YKHC, Department of Health and Social Services

Appendix I

Multiple Water Treatment Plant vs. Booster Pump
Station Evaluation



December 30, 2004

City of Bethel
Department of Public Works.
P.O. Box 388
Bethel, Alaska 99559

Attn: Mr. Greg Sargent,
Public Works Director

Re: Bethel Water and Sewer Master Plan Update (9641.02)
Evaluation of 10 Water Treatment Plants vs. 3 Water Treatment Plants with
Booster Pump Stations

Dear Mr. Sargent:

The purpose of this evaluation is to evaluate providing potable water services to the community through the construction of ten water treatment facilities (as proposed in the 1996 Water and Sewer Master Plan Update) compared to constructing three water treatment facilities with 7 booster pump stations.

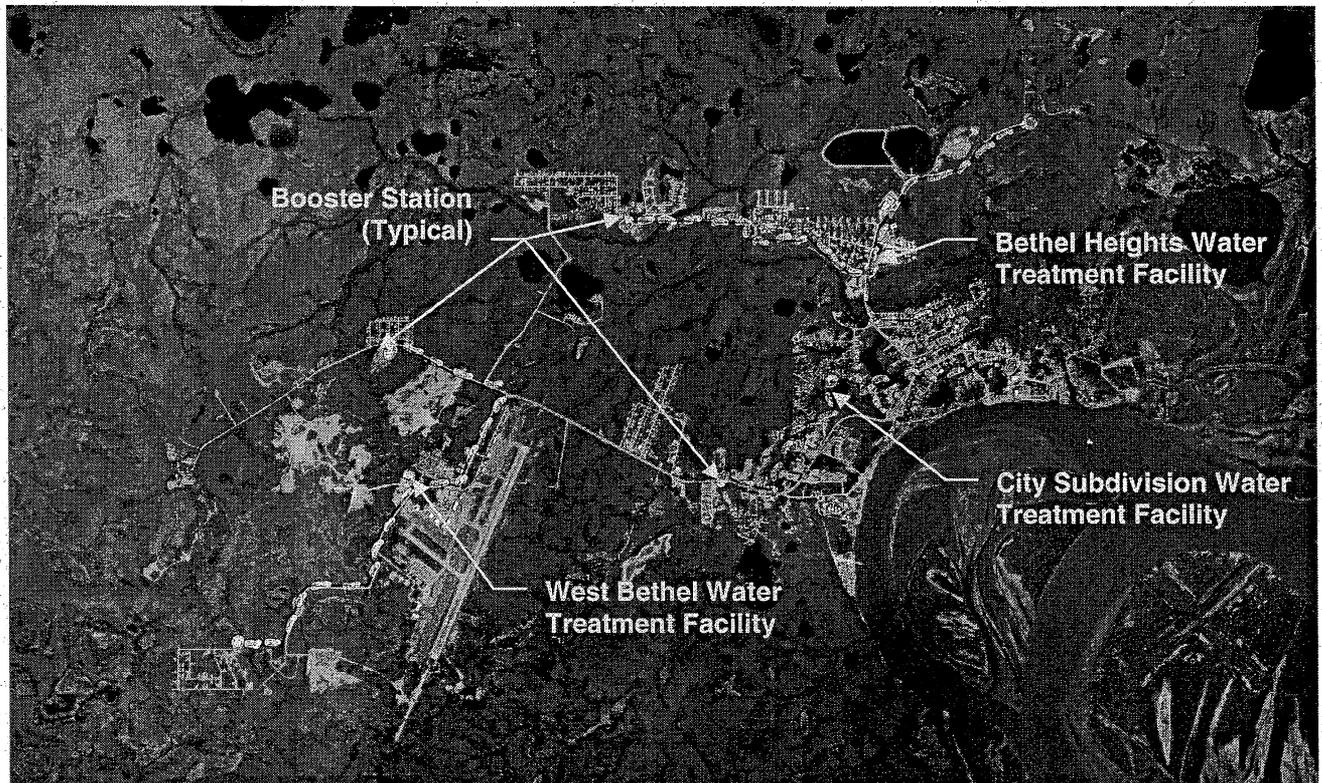
Option 1 – Ten Water Treatment Plants:

Option 1 includes constructing a water treatment plant within each subdivision (defined as a service area in the 1996 Water and Sewer Master Plan). Each water treatment facility would include a mechanical water treatment plant, water storage, and pumps and controls to serve a piped water system within each subdivision. The estimated capital cost for Option 1 is \$42.9 million. The estimated annual operations and maintenance costs for Option 1 is \$5.3 million (see the attached support documents).

Option 2 – Three Water Treatment Plants w/ Seven Booster Station:

Option 2 includes constructing three water treatment plants adequately sized to serve the entire community. The Bethel Heights Water Treatment Facility would provide services to Bethel Heights Subdivision, Heraldsen Subdivision, the north half of the "Avenues" area, Martina Oscar Subdivision, Uivug Subdivision, Tundra Ridge Subdivision and H-Mark Lake. The City Subdivision Water Treatment Facility would provide service to City Subdivision, City Center, the south half of the "Avenues" area, Mission Lake Subdivision, the Harbor area, Nunvik Subdivision, and Blueberry Subdivision. A new water treatment plant would be constructed near the Bethel Airport to serve the remaining development in west Bethel. The layout of the proposed system is depicted on Figure 1.

Figure 1
Layout of Option 2 – Three Water Treatment Plants w/ Seven Booster Stations



The estimated capital cost to for Option 2 is \$44.2 million. The estimate annual operations and maintenance costs for Option 2 is \$3.0 million (see attached support documents).

Conclusions

Based on this evaluation we recommend Option 2 because the operations and maintenance costs are significantly less than Option 1.

If you have any questions or require additional information, please do not hesitate to contact us.

Sincerely,

CRW ENGINEERING GROUP

D. Michael Rabe, P.E.
Project Manager

Attachment

City of Bethel
Bethel Water and Sewer Master Plan Update

TEN LOCAL WTP, OPTION-1

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL COST	ITEM TOTAL
A Bethel Heights WTP Upgrades						
1	Water storage tank	gal	400,000	\$2	\$800,000	
2	Water treatment plant upgrades	sf	3,200	\$600	\$1,920,000	
3	Truck fill	ea	1	\$200,000	\$200,000	
4	Contingency			15%	\$438,000	
	Total Estimated Construction Cost:				\$3,358,000	
5	Engineering/CA/Admin			30%	\$1,007,400	
	Total Estimated Project Cost:					\$4,365,400
B City Subdivision WTP Improvements						
1	Water storage tank	gal	500,000	\$2	\$1,000,000	
2	Water treatment plant upgrades	sf	4,500	\$600	\$2,700,000	
3	Truck fill	ea	1	\$200,000	\$200,000	
4	Contingency			15%	\$585,000	
	Total Estimated Construction Cost:				\$4,485,000	
5	Engineering/CA/Admin			30%	\$1,345,500	
	Total Estimated Project Cost:					\$5,830,500
C Kasayuli Subd. WTP Improvements						
1	Water storage tank	gal	400,000	\$2	\$800,000	
2	Water treatment plant upgrades	sf	3,500	\$600	\$2,100,000	
3	Truck fill	ea	1	\$200,000	\$200,000	
4	Contingency			15%	\$465,000	
	Total Estimated Construction Cost:				\$3,565,000	
5	Engineering/CA/Admin			30%	\$1,069,500	
	Total Estimated Project Cost:					\$4,634,500
D Tundra Ridge WTP Improvements						
1	Water storage tank	gal	350,000	\$2	\$700,000	
2	Water treatment plant upgrades	sf	3,500	\$600	\$2,100,000	
3	Truck fill	ea	1	\$200,000	\$200,000	
4	Contingency			15%	\$450,000	
	Total Estimated Construction Cost:				\$3,450,000	
5	Engineering/CA/Admin			30%	\$1,035,000	
	Total Estimated Project Cost:					\$4,485,000
E Nunivak Subd. WTP Improvements						
1	Water storage tank	gal	200,000	\$2	\$400,000	
2	Water treatment plant upgrades	sf	3,000	\$600	\$1,800,000	
3	Truck fill	ea	1	\$200,000	\$200,000	
4	Contingency			15%	\$360,000	
	Total Estimated Construction Cost:				\$2,760,000	
5	Engineering/CA/Admin			30%	\$828,000	
	Total Estimated Project Cost:					\$3,588,000
F Blueberry Subd. WTP Improvements						
1	Water storage tank	gal	300,000	\$2	\$600,000	
2	Water treatment plant upgrades	sf	3,500	\$600	\$2,100,000	
3	Truck fill	ea	1	\$200,000	\$200,000	
4	Contingency			15%	\$435,000	
	Total Estimated Construction Cost:				\$3,335,000	
5	Engineering/CA/Admin			30%	\$1,000,500	
	Total Estimated Project Cost:					\$4,335,500

**City of Bethel
Bethel Water and Sewer Master Plan Update**

TEN LOCAL WTP, OPTION-1

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL COST	ITEM TOTAL
G Larson Subd. WTP Improvements						
1	Water storage tank	gal	200,000	\$2	\$400,000	
2	Water treatment plant upgrades	sf	3,000	\$600	\$1,800,000	
3	Truck fill	ea	1	\$200,000	\$200,000	
4	Contingency			15%	\$360,000	
	Total Estimated Construction Cost:				\$2,760,000	
5	Engineering/CA/Admin			30%	\$828,000	
	Total Estimated Project Cost:					\$3,588,000
H Kilbuck/Mission Lake WTP Improvements						
1	Water storage tank	gal	550,000	\$2	\$1,100,000	
2	Water treatment plant upgrades	sf	4,500	\$600	\$2,700,000	
3	Truck fill	ea	1	\$200,000	\$200,000	
4	Contingency			15%	\$600,000	
	Total Estimated Construction Cost:				\$4,600,000	
5	Engineering/CA/Admin			30%	\$1,380,000	
	Total Estimated Project Cost:					\$5,980,000
I Airport WTP Improvements						
1	Water storage tank	gal	80,000	\$2	\$160,000	
2	Water treatment plant upgrades	sf	3,000	\$600	\$1,800,000	
3	Truck fill	ea	1	\$200,000	\$200,000	
4	Contingency			15%	\$324,000	
	Total Estimated Construction Cost:				\$2,484,000	
5	Engineering/CA/Admin			30%	\$745,200	
	Total Estimated Project Cost:					\$3,229,200
J Haroldsen Estates Water Station						
1	Water storage tank	gal	100,000	\$2	\$200,000	
2	Water treatment plant upgrades	sf	2,500	\$600	\$1,500,000	
3	Truck fill	ea	1	\$200,000	\$200,000	
4	Contingency			15%	\$285,000	
	Total Estimated Construction Cost:				\$2,185,000	
5	Engineering/CA/Admin			30%	\$655,500	
	Total Estimated Project Cost:					\$2,840,500
TOTAL WATER SOURCE OPTIONS:						\$42,876,600

**OPERATION AND MAINTENANCE COSTS
PIPED WATERSYSTEM W/ 10 WTP(s)**

Design Assumptions:

User Data

Current Population (2004)	5921 Estimated
Current number of residential services	1535 Bethel
Current number of commercial services	45 Bethel
Current total number of services	1580 Bethel
Population (2024)	8133 1.6% growth
Future number of residential services	2109 Calculated
Future number of commercial services	62 Calculated
Future total number of services	2170 Calculated

Estimated Demands:

Residential Demand	60 gpcd
Commercial Demand (businesses, schools & government facilities)	5 gpcd
Estimated Total Demand	65 gpcd

System Data - Water Treatment Facility

Piped water system and interim truck haul operations	
Assume 12 water treatment facilities need for city	
Water Treatment Building	2000 sf
Electrical Equipment	
Water treatment pumps	
Backwash	20 hp
Backwash waste	20 hp
Well	20 hp
Glycol plant pump	2 hp
Glycol process pump	1 hp
Building air handler	10 hp
Building lights	0.5 watts/hr/sf
Heating Fuel Demand	
Building heat (Maintained at 70 °F)	10 BTU/hr/sf

System Data - Booster Pump Station Facility

Piped circulating water system and interim truck haul operations	
Assume 12 booster pump station facilities needed	
Booster pump station building	2000 sf
Electrical Equipment	
Water main circ pumps	
Loop 1	5 hp
Loop 2	5 hp
Loop 3	5 hp
Water Main pressure pumps	
Loop 1	10 hp
Loop 2	10 hp
Loop 3	10 hp
Water treatment pumps	
Water storage tank circ loop pump	5 hp
Sewer glycol circ pumps	
Loop 1	1.5 hp
Loop 2	1.5 hp
Loop 3	1.5 hp
Glycol plant pump	1.5 hp
Glycol process pump	1 hp
Booster pumps	50 hp
Building air handler	15 hp
Building lights	0.5 watts/hr/sf

**OPERATION AND MAINTENANCE COSTS
PIPED WATERSYSTEM W/ 10 WTP(s)**

Heating Fuel Demand			
Circulating mains	Unit	Quantity	Rate of Heat Loss
Water mains (avg for each subdivision)	ft	40,300	50 BTU/day ft
Sewer mains (avg for each subdivision)	ft	23,100	50 BTU/day ft
Building heat (Maintained at 70 °F)	sf	2,000	10 BTU/hr/sf
Water Storage Tank (Maintained @ 45 °F)	gallon	500,000	0.3 BTU/gal/day

Operational Cost Data

Cost per kWh (includes power cost adjustment of \$0.1378)	\$0.22 kWh
Cost per gallon of heating fuel	\$2.55 gal
Administrative cost per service	\$15.00 month
Burdened labor rate for a laborer (includes taxes & benefits)	\$25.00 hr
Burdened labor rate for an operator (includes taxes & benefits)	\$32.00 hr

Other Assumptions

	No. of Employees	No. of Facilities	Estimated hr/wk	
Labor				
Water treatment facilities - operator	1.3	12	45	702 hr/wk
Booster pump stations/W&S mains - laborer	1.5	12	45	810 hr/wk
Minor parts and supplies				30 % of labor
Expected Equipment Life				
Pumps				10 yr
Heat exchangers				15 yr
Boilers				15 yr
System controls				15 yr
Inflation Rate				3 %
Available energy per gallon of heating fuel				100,000 BTU/gal
Insurance				\$15,000 yr

Estimated Electrical Demand

Water Treatment Facility

	Size (hp)	Usage (hr/day)	Annual Demand (kwh)
Water treatment pumps			
Backwash	20	4	21,783
Backwash waste	20	4	21,783
Well	20	4	21,783
Glycol plant pump	2	24	13,070
Glycol process pump	1	24	6,535
Building air handler	10	10	27,229
Building lights		10	3,650

Total for one water treatment plant: 115,833
 Total for ten water treatment plants: **1,158,335**

Booster Pump Station Facility

	Size (hp)	Usage (hr/day)	Annual Demand (kwh)
Water main circ pumps			
Loop 1	5	24	32,675
Loop 2	5	24	32,675
Loop 3	5	24	32,675
Water Main pressure pumps			
Loop 1	10	6	16,337
Loop 2	10	6	16,337
Loop 3	10	6	16,337
Water treatment pumps			
Water storage tank circ loop pump	5	24	32,675
Glycol process pump	1	24	6,535
Booster pumps	50	1	13,615
Building air handler	15	10	40,844
Building lights		10	3,650

Total for one booster pump station: 244,354
 Total for ten booster pump stations: **2,443,544**

**OPERATION AND MAINTENANCE COSTS
PIPED WATERSYSTEM W/ 10 WTP(s)**

Estimated Heating Demand

Water Treatment Facility

	Usage (hr/day)	Quantity sf	Rate of heat loss per unit	Annual Demand (1000 BTU)
Heating Fuel Demand				
Building heat	sf	2000	10	87,600
Total for one water treatment plants:				262,800
Total for ten water treatment plants:				2,628,000

Booster Pump Station Facility

	Unit	Quantity	Rate of heat loss per unit	Annual Demand (1000 BTU)
Water & Sewer mains				
Water Loops	ft	40,300	50	735,475
Building heat	sf	2,000	10	87,600
Water Storage Tank	gallon	500,000	0.3	657,000
Total for one booster pump station w/ water mains:				1,480,075
Total for ten booster pump stations w/ watermains:				14,800,750

Estimated Annual Operations and Maintenance Costs

Water Treatment Facility

Administration	\$97,666
Labor	\$1,168,128
Minor parts and supplies	\$350,438
Electricity	\$249,969
Heating Fuel	\$67,014
Insurance	\$3,750
Subtotal	\$1,936,965

Booster Pump Station Facility

Administration	\$97,666
Labor	\$1,053,000
Minor parts and supplies	\$315,900
Electricity	\$527,317
Heating Fuel	\$377,419
Insurance	\$3,750
Subtotal	\$2,375,052

Combinde Annual Water and Sewer O&M Costs

Administration	\$195,000
Labor	\$2,221,000
Minor parts and supplies	\$666,000
Electricity	\$777,000
Heating Fuel	\$444,000
Insurance	\$8,000

TOTAL ANNUAL O&M COSTS (ALL FACILITIES): **\$4,311,000**

\$166 service per month

Repair and replacement Costs

	Life yr	Capital Cost \$	Inflation Rate %	Annual Cost \$
Pumps	10	\$2,019,000	3	\$271,337
Heat Exchangers	10	\$480,000	3	\$64,508
Boilers	15	\$3,000,000	3	\$311,593
System Controls	10	\$1,200,000	3	\$161,270
TOTAL ANNUAL R&R COSTS:				\$809,000

Reserve

5% of annual O&M costs TOTAL ANNUAL RESERVE: **\$216,000**

TOTAL ANNUAL OPERATING CASHFLOW: **\$5,336,000**

TOTAL ESTIMATED MONTHLY COSTS PER SERVICE: **\$205**

service per month

**OPERATION AND MAINTENANCE COSTS
PIPED WATERSYSTEM W/ 10 WTP(s)**

Estimate Assumptions:

- 1 This operations and maintenance cost estimate is based on full build out of the selected water and sewer alternatives recommended in the Bethel Water and Sewer Master Plan Update dated
- 2 Improvements include:
 - a Ten water treatment plants
 - b Ten booster pump station facilities w/water storage. Each booster pump station provides piped water and sewer service to a specific area of the city (subdivision) and includes water circulation/pressurization, water storage tank, standby power, fire pump, and sewer glycol heating. In reality three of the booster pump stations are included in the water treatment facilities; however, for this estimate they are treated independently.
 - c Water mains and sewer mains to service each subdivision are included with the cost estimate for the booster pump station.
- 3 All costs are in 2004 dollars.
- 4 This cost estimate is prepared as part of the Bethel Water and Sewer Master Plan Update - 65% Submittal.

Date Completed: November 29, 2004

Completed By: D. Michael Rabe, PE / CRW Engineering Group, LLC

**City of Bethel
Bethel Water and Sewer Master Plan Update**

THREE REGION WTP W/ BOOSTER STATIONS, OPTION-2

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL COST	ITEM TOTAL
A Bethel Heights WTP Upgrades						
1	Water storage tank	gal	400,000	\$2	\$800,000	
2	Water treatment plant upgrades	sf	3,200	\$600	\$1,920,000	
3	Truck fill	ea	1	\$200,000	\$200,000	
4	Contingency			15%	\$438,000	
	Total Estimated Construction Cost:				\$3,358,000	
5	Engineering/CA/Admin			30%	\$1,007,400	
	Total Estimated Project Cost:					\$4,365,400
B City Subdivision WTP Improvements						
1	Water storage tank	gal	500,000	\$2	\$1,000,000	
2	Water treatment plant upgrades	sf	4,500	\$600	\$2,700,000	
3	Truck fill	ea	1	\$200,000	\$200,000	
4	Contingency			15%	\$585,000	
	Total Estimated Construction Cost:				\$4,485,000	
5	Engineering/CA/Admin			30%	\$1,345,500	
	Total Estimated Project Cost:					\$5,830,500
C West Bethel Water Treatment Plant Improvements						
1	Water storage tank	gal	80,000	\$2	\$160,000	
2	Water treatment plant upgrades	sf	3,000	\$600	\$1,800,000	
3	Truck fill	ea	1	\$200,000	\$200,000	
4	Contingency			15%	\$324,000	
	Total Estimated Construction Cost:				\$2,484,000	
5	Engineering/CA/Admin			30%	\$745,200	
	Total Estimated Project Cost:					\$3,229,200
D Kasayuli Subd. Water Station						
1	Water line from WBWTF	lf	9,200	\$125	\$1,150,000	
2	Heat trace	lf	9,200	\$20	\$184,000	
3	Water storage tank	gal	400,000	\$2	\$800,000	
4	Booster pump station	sf	2,500	\$500	\$1,250,000	
5	Truck fill	ea	1	\$200,000	\$200,000	
6	Contingency			15%	\$537,600	
	Total Estimated Construction Cost:				\$4,121,600	
7	Engineering/CA/Admin			30%	\$1,236,480	
	Total Estimated Project Cost:					\$5,358,080
E Tundra Ridge Subd. Water Station						
1	Water line from FWWTF	lf	4,450	\$125	\$556,250	
2	Heat trace	lf	4,450	\$20	\$89,000	
3	Water storage tank	gal	350,000	\$2	\$700,000	
4	Booster pump station	sf	2,500	\$500	\$1,250,000	
5	Truck fill	ea	1	\$200,000	\$200,000	
6	Contingency			15%	\$419,288	
	Total Estimated Construction Cost:				\$3,214,538	
7	Engineering/CA/Admin			30%	\$964,361	
	Total Estimated Project Cost:					\$4,178,899

City of Bethel
Bethel Water and Sewer Master Plan Update

THREE REGION WTP W/ BOOSTER STATIONS, OPTION-2

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL COST	ITEM TOTAL
F	Nunivak Subd. Water Station					
1	Water line from FWWTF	lf	5,700	\$125	\$712,500	
2	Heat trace	lf	5,700	\$20	\$114,000	
3	Water storage tank	gal	500,000	\$2	\$1,000,000	
4	Booster pump station	sf	3,000	\$500	\$1,500,000	
5	Truck fill	ea	1	\$200,000	\$200,000	
6	Contingency			15%	\$528,975	
	Total Estimated Construction Cost:				\$4,055,475	
7	Engineering/CA/Admin			30%	\$1,216,643	
	Total Estimated Project Cost:					\$5,272,118
G	Larson Subd. Water Station					
1	Water line from KSWTF	lf	6,200	\$125	\$775,000	
2	Heat trace	lf	6,200	\$20	\$124,000	
3	Water storage tank	gal	200,000	\$2	\$400,000	
4	Booster pump station	sf	2,500	\$500	\$1,250,000	
5	Truck fill	ea	1	\$200,000	\$200,000	
6	Contingency			15%	\$412,350	
	Total Estimated Construction Cost:				\$3,161,350	
7	Engineering/CA/Admin			30%	\$948,405	
	Total Estimated Project Cost:					\$4,109,755
H	Kilbuck Water Station					
1	Water line from BHWTF	lf	4,300	\$125	\$537,500	
2	Heat trace	lf	4,300	\$20	\$86,000	
3	Water storage tank	gal	250,000	\$2	\$500,000	
4	Booster pump station	sf	2,500	\$500	\$1,250,000	
5	Truck fill	ea	1	\$200,000	\$200,000	
6	Contingency			15%	\$386,025	
	Total Estimated Construction Cost:				\$2,959,525	
7	Engineering/CA/Admin			30%	\$887,858	
	Total Estimated Project Cost:					\$3,847,383
I	Mission Lake Water Station					
1	Water line from CSWTF	lf	6,000	\$125	\$750,000	
2	Heat trace	lf	6,000	\$20	\$120,000	
3	Water storage tank	gal	300,000	\$2	\$600,000	
4	Booster pump station	sf	2,500	\$500	\$1,250,000	
5	Truck fill	ea	1	\$200,000	\$200,000	
6	Contingency			15%	\$438,000	
	Total Estimated Construction Cost:				\$3,358,000	
7	Engineering/CA/Admin			30%	\$1,007,400	
	Total Estimated Project Cost:					\$4,365,400
J	Haroldsen Estates Water Station					
1	Water line from BHWTF	lf	7,000	\$125	\$875,000	
2	Heat trace	lf	7,000	\$20	\$140,000	
3	Water storage tank	gal	100,000	\$2	\$200,000	
4	Booster pump station	sf	2,000	\$500	\$1,000,000	
5	Truck fill	ea	1	\$200,000	\$200,000	
6	Contingency			15%	\$362,250	
	Total Estimated Construction Cost:				\$2,777,250	
7	Engineering/CA/Admin			30%	\$833,175	
	Total Estimated Project Cost:					\$3,610,425
TOTAL WATER SOURCE OPTIONS:						\$44,167,159

**OPERATION AND MAINTENANCE COSTS
PIPED WATERSYSTEM w/ 3 REGIONAL WTP(s)**

Design Assumptions:

User Data

Current Population (2004)	5921 Estimated
Current number of residential services	1535 Bethel
Current number of commercial services	45 Bethel
Current total number of services	1580 Bethel
Population (2024)	8133 1.6% growth
Future number of residential services	2109 Calculated
Future number of commercial services	62 Calculated
Future total number of services	2170 Calculated

Estimated Demands:

Residential Demand	60 gpcd
Commercial Demand (businesses, schools & government facilities)	5 gpcd
Estimated Total Demand	65 gpcd

System Data - Water Treatment Facility

Piped water system and interim truck haul operations	
Assume 3 water treatment facilities need for city	
Water Treatment Building	3000 sf
Electrical Equipment	
Water treatment pumps	
Backwash	30 hp
Backwash waste	30 hp
Well	40 hp
Glycol plant pump	2 hp
Glycol process pump	1 hp
Building air handler	15 hp
Building lights	0.5 watts/hr/sf
Heating Fuel Demand	
Building heat (Maintained at 70 °F)	10 BTU/hr/sf

System Data - Booster Pump Station Facility

Piped circulating water system and interim truck haul operations			
Assume 10 booster pump station facilities needed			
Booster pump station building	3000 sf		
Electrical Equipment			
Water main circ pumps			
Loop 1	5 hp		
Loop 2	5 hp		
Loop 3	5 hp		
Water Main pressure pumps			
Loop 1	10 hp		
Loop 2	10 hp		
Loop 3	10 hp		
Water treatment pumps			
Water storage tank circ loop pump	5 hp		
Glycol plant pump	1.5 hp		
Glycol process pump	1 hp		
Booster pumps	50 hp		
Building air handler	15 hp		
Building lights	0.5 watts/hr/sf		
Heating Fuel Demand			
Circulating mains	Unit	Quantity	Rate of Heat Loss
Water mains (avg for each subdivision)	ft	40,300	50 BTU/day ft
Building heat (Maintained at 70 °F)	sf	3,000	10 BTU/hr/sf
Water Storage Tank (Maintained @ 45 °F)	gallon	500,000	0.3 BTU/gal/day

**OPERATION AND MAINTENANCE COSTS
PIPED WATERSYSTEM w/ 3 REGIONAL WTP(s)**

Operational Cost Data

Cost per kWh (includes power cost adjustment of \$0.1378)	\$0.22 kWh
Cost per gallon of heating fuel	\$2.55 gal
Administrative cost per service	\$15.00 month
Burdened labor rate for a laborer (includes taxes & benefits)	\$25.00 hr
Burdened labor rate for an operator (includes taxes & benefits)	\$32.00 hr

Other Assumptions

	No. of Employees	No. of Facilities	Estimated hr/wk	
Labor				
Water treatment facilities - operator	1.3	3	45	175.5 hr/wk
Booster pump stations/W&S mains - laborer	1	10	45	450 hr/wk
Minor parts and supplies				30 % of labor
Expected Equipment Life				
Pumps				10 yr
Heat exchangers				15 yr
Boilers				15 yr
System controls				15 yr
Inflation Rate				3 %
Available energy per gallon of heating fuel				100,000 BTU/gal
Insurance				\$15,000 yr

Estimated Electrical Demand

Water Treatment Facility

	Size (hp)	Usage (hr/day)	Annual Demand (kwh)
Water treatment pumps			
Backwash	30	4	32,675
Backwash waste	30	4	32,675
Well	40	4	43,566
Glycol plant pump	2	24	13,070
Glycol process pump	1	24	6,535
Building air handler	15	10	40,844
Building lights		10	5,475
Total for one water treatment plant:			174,839
Total for three water treatment plants:			524,518

Booster Pump Station Facility

	Size (hp)	Usage (hr/day)	Annual Demand (kwh)
Water main circ pumps			
Loop 1	5	24	32,675
Loop 2	5	24	32,675
Loop 3	5	24	32,675
Water Main pressure pumps			
Loop 1	10	6	16,337
Loop 2	10	6	16,337
Loop 3	10	6	16,337
Water treatment pumps			
Water storage tank circ loop pump	5	24	32,675
Glycol plant pump	1.5	24	9,802
Glycol process pump	1	24	6,535
Booster pumps	50	1	13,615
Building air handler	15	10	40,844
Building lights		10	5,475
Total for one booster pump station:			255,982
Total for ten booster pump stations:			2,559,818

**OPERATION AND MAINTENANCE COSTS
PIPED WATERSYSTEM w/ 3 REGIONAL WTP(s)**

Estimated Heating Demand

Water Treatment Facility

	Usage (hr/day)	Quantity sf	Rate of heat loss per unit	Annual Demand (1000 BTU)
Heating Fuel Demand				
Building heat	sf	3000	10	131,400
Total for one water treatment plants:				394,200
Total for three water treatment plants:				1,182,600

Booster Pump Station Facility

	Unit	Quantity	Rate of heat loss per unit	Annual Demand (1000 BTU)
Water & Sewer mains				
Water Loops	ft	40,300	50	735,475
Building heat	sf	3,000	10	131,400
Water Storage Tank	gallon	500,000	0.3	657,000
Total for one booster pump station w/ water and sewer mains:				1,523,875
Total for ten booster pump stations w/ water and sewer mains:				15,238,750

Estimated Annual Operations and Maintenance Costs

Water Treatment Facility

Administration	\$97,666
Labor	\$292,032
Minor parts and supplies	\$87,610
Electricity	\$113,191
Heating Fuel	\$30,156
Insurance	\$3,750
Subtotal	\$624,405

Booster Pump Station Facility

Administration	\$97,666
Labor	\$585,000
Minor parts and supplies	\$175,500
Electricity	\$552,409
Heating Fuel	\$388,588
Insurance	\$3,750
Subtotal	\$1,802,913

Combinde Annual Water and Sewer O&M Costs

Administration	\$195,000
Labor	\$877,000
Minor parts and supplies	\$263,000
Electricity	\$666,000
Heating Fuel	\$419,000
Insurance	\$8,000

TOTAL ANNUAL O&M COSTS (ALL FACILITIES): **\$2,428,000**

\$93 service per month

Repair and replacement Costs

	Life yr	Capital Cost \$	Inflation Rate %	Annual Cost \$
Pumps	10	\$1,063,000	3	\$142,858
Heat Exchangers	10	\$260,000	3	\$34,942
Boilers	15	\$1,800,000	3	\$186,956
System Controls	10	\$650,000	3	\$87,355
TOTAL ANNUAL R&R COSTS:				\$452,000

Reserve

5% of annual O&M costs TOTAL ANNUAL RESERVE: **\$121,000**

TOTAL ANNUAL OPERATING CASHFLOW: **\$3,001,000**

TOTAL ESTIMATED MONTHLY COSTS PER SERVICE: **\$115**

service per month

**OPERATION AND MAINTENANCE COSTS
PIPED WATERSYSTEM w/ 3 REGIONAL WTP(s)**

Estimate Assumptions:

- 1 This operations and maintenance cost estimate is based on full build out of the selected water and sewer alternatives recommended in the Bethel Water and Sewer Master Plan Update dated
- 2 Improvements include:
 - a Three water treatment plants
 - b Ten booster pump station facilities w/water storage. Each booster pump station provides piped water and sewer service to a specific area of the city (subdivision) and includes water circulation/pressurization, water storage tank, standby power, fire pump, and sewer glycol heating. In reality three of the booster pump stations are included in the water treatment facilities; however, for this estimate they are treated independently.
 - c Water mains and sewer mains to service each subdivision are included with the cost estimate for the booster pump station.
- 3 All costs are in 2004 dollars.
- 4 This cost estimate is prepared as part of the Bethel Water and Sewer Master Plan Update - 65% Submittal.

Date Completed: November 29, 2004

Completed By: D. Michael Rabe, PE / CRW Engineering Group, LLC

Appendix J

Multiple Wastewater Treatment vs. Lift Station/Force
Main Evaluation



December 6, 2004

City of Bethel
Department of Finance
P.O. Box 388
Bethel, Alaska 99559

Attn: Mr. Robert Strahan,
Finance Director

Re: Bethel Water and Sewer Master Plan Update (9641.02)
Public Works and Finance Committee

Dear Mr. Strahan:

During our meeting with the Public Works Committee and the Finance Committee, we were requested to summarize our evaluation of the comparison of collecting wastewater via a lift station and associated force main and discharging at a regional wastewater treatment plant verses constructing a packaged wastewater treatment plant locally.

We chose to evaluate the alternatives based on the Kasayuli Subdivision because of the extensive information we have on this service area. A summary of the costs for each alternative are provided in Table 1. Detailed costs are attached.

Table 1 – Estimated capital costs, operations and maintenance costs, and total annualized costs comparison based on interest rate of 4% per annum, and 20 year recovery period

Haul Distances	Capital Costs	Annual O&M Costs	Total Annual Recovery Costs
Lift Station / Force Main	\$3,123,000	\$12,000	\$242,000
Wastewater Treatment Plan	\$3,770,000	\$77,000	\$354,300

Based on this evaluation the Lift Station / Force Main alternative is the most cost effective. If you have any questions or require additional information, please do not hesitate to contact us.

Sincerely,

CRW ENGINEERING GROUP

D. Michael Rabe, P.E.
Project Manager

Capital / O&M Recovery Cost Comparison

Option 1 - Kasayuli Subdivision lift station / force main

Capital Costs - \$3,123,000 (2004)

O&M Costs - \$12,000 / Year (2004)

Assume $i = 4\%$ $N = 20$ years

Capital Recovery = $(A/P, i, N) = 0.05102$

Capital Recovery (1) = $(0.0736)(3,123,000) + 12,000$
~~= \$211,300~~ \rightarrow $\$242,000$

Option 2 - Kasayuli Subdivision Wastewater Treatment Plant

Capital Cost - \$3,770,000 (2004)

O&M Costs - \$77,000 / Year (2004)

Capital Recovery (2) = $(0.0736)(3,770,000) + 77,000$
~~= \$267,300~~ \rightarrow $\$354,000$

BETHEL WATER AND SEWER FEASIBILITY STUDY

CAPITAL IMPROVEMENTS
Wastewater Alternatives

Kasayuli Subdivision Lift Station & Forcemain

Description	Quantity	Units	Unit Price	Cost
Mobilization	1	LS	\$50,000	\$50,000
Lift Station	1	LS	\$500,000	\$500,000
Dump Station Improvements	1	LS	\$200,000	\$200,000
Force Main (6-inch)	9,200	LF	\$125	\$1,150,000
Heat Trace	9,200	LF	\$20	\$184,000
Land Acquisition	0.5	acre	\$10,000	\$5,000

Subtotal \$2,089,000

15% Contingency \$313,350

Total Estimated Construction Cost \$2,402,350

30% Engineering/CA/Admin \$720,705

Total Estimated Project Cost: \$3,123,055

BETHEL WATER AND SEWER FEASIBILITY STUDY

OPERATIONS AND MAINTENANCE

Kasayuli Subdivision Lift Station O&M

Design Assumptions:

User Data:

Year 2024 design population (equivalent)	1,200 people
Year 2024 Design Services	329 services
Estimated daily wastewater (includes infiltration)	65 gpcd
Estimated daily wastewater volume	78,000 gallons

System Data:

Electrical	
Lift Station Pump	5 hp

Operational Costs:

Cost per kWh	\$0.38
Burdened Labor Rate	\$25 /hr

Capital Costs:

Lift Station Pumps	\$10,000
Electrical Controls and Instrumentation	\$15,000

Other Assumptions:

Labor	
Operation and maintenance of the plant	2 hr/wk
Misc Materials, supplies and equipment	\$500 /yr
Expected equipment life	
Lift Station Pump	10 yr
Instrumentation	20 yr
Inflation	3 %
Insurance	\$1,000 /yr

Estimated Yearly Electrical Demand

Equipment	Size	Units	Average Usage (hr/day)	Yearly Demand (kwh)
Lift Station Pump	7.5	hp	6.0	16,331
Total				16,331

Estimated Annual Operation & Maintenance Cost

Labor	\$2,600
Materials (Routine O&M and repairs)	\$500
Electricity	\$6,206
Equipment Replacement Cost	
Lift Station Pump	\$1,344
Electrical Controls and Instrumentation	\$820
Insurance	\$1,000
Total	\$12,469

Estimated Monthly Wastewater Treatment Cost Per Service: \$3.16

CRW ENGINEERING GROUP, LLC

3940 Arctic Blvd. • Suite 300
Anchorage, Alaska 99503
(907) 562-3252 Fax 561-2273

JOB _____

SHEET NO. _____ OF _____

CALCULATED BY _____ DATE _____

CHECKED BY _____ DATE _____

SCALE _____

Number of people per household = 3.65
Water Usage = 65 gpd

Number of Lots
Kasayuli West = 124
Kasayuli East = 77
Baven West = 64
Baven East = 52
Baven South = 2

Total = 329

Wastewater Flow:

Flow = $329 (3.65) (65) = 78,000$ gpd (Average)

Maximum Day Peaking Factor = 2.5

Max Day Flow = 195,000 gpd

Peak Hour Peaking Factor = 4

Peak Hour Flow = 312,000 gpd = 220 gpm

From Kasayuli Lift Station to Existing FAA Lift Station

Input:

Pipe	6-inch HDPE
Pipe Inside Diameter	5.349 in
Pipe Length	9,200 ft
Kinematic Viscosity	1.41E-05 ft ² /s
Smoothness (e)	0.00084 in
Number of Bends	10
Long Sweep Elbo Coefficient, K	0.6
Pump Elevation	98
Lift Station Inlet	80

Output:

Flow Rate (gpm)	Flow Rate (ft ³ /s)	Velocity (ft/s)	Reynold's #	Ratio (e/D)	f (Swamee & Jain)	Frictional Headloss (ft)	Frictional Headloss (psi)	Bends Frictional Headloss (psi)	Total Frictional Head Loss (ft)	Total Frictional Head Loss (psi)	Total Head Loss (ft)	Total Head Loss (psi)
220	0.490	3.14	9.93E+04	0.00016	0.01878972	59.4	25.8	0.92	60.3	26.15	42.3	18.4

Assumed pump efficiency = 0.45

Assumed electrical efficiency = 0.75

BHP = (GPM x Ft) / (3960 x Hydraulic Eff)

BHP = 5.3

Electrical Hp = 7.02

Say a 7.5 Hp pump

BETHEL WATER AND SEWER FEASIBILITY STUDY

CAPITAL IMPROVEMENTS
Wastewater Alternatives

Kasayuli Subdivision Wastewater Treatment - Package Plant

Description	Quantity	Units	Unit Price	Cost
Mobilization	1	LS	\$50,000	\$50,000
Lift Station/Dumpstation	1	LS	\$500,000	\$500,000
Force Main (6-inch)	1,000	LF	\$125	\$125,000
Heat Trace	1,000	LF	\$20	\$20,000
Headworks	1	LS	\$100,000	\$100,000
Yard Piping	1	LS	\$25,000	\$25,000
Package Plant	1	LS	\$325,000	\$325,000
Field erection of plant	1	LS	\$50,000	\$50,000
Sludge Holding Tank	1	LS	\$40,000	\$40,000
Disinfection facilities	1	LS	\$75,000	\$75,000
Yard Improvements	1	LS	\$50,000	\$50,000
Building (36-feet X 80-feet)	2,880	SF	\$400	\$1,152,000
Land Acquisition	1	acre	\$10,000	\$10,000

Subtotal \$2,522,000
 15% Contingency \$378,300

Total Estimated Construction Cost \$2,900,300
 30% Engineering/CA/Admin \$870,090

Total Estimated Project Cost: \$3,770,390

BETHEL WATER AND SEWER FEASIBILITY STUDY

OPERATIONS AND MAINTENANCE

Kasayuli Subdivision Package Plant O&M

Design Assumptions:

User Data:

Year 2024 design population (equivalent)	1,200 people
Year 2024 Design Services	329 services
Estimated daily wastewater (includes infiltration)	65 gpcd
Estimated daily wastewater volume	78,000 gallons

System Data:

Building Area (30'x75')	2,250 ft ²
Electrical	
Lift Station Pump	5 hp
FE Transfer Pump	0.38 Kw
Air blower	2.25 Kw
Geo-Reactor Gear Drive (5 units)	0.56 Kw
UV Disinfection	2 kw
Sludge dewatering system	5 hp
Building hydronic circ pump	0.5 hp
Boilers	0.25 hp
Building air handler	0.5 hp
Building lights	0.4 watts/hr/ft ²
Miscellaneous Electrical *	1,500 kWh/yr
Heating Demand	
Building (maintained @ 60 F)	160,000,000 BTU/yr

Operational Costs:

Cost per kWh	\$0.38
Cost per gallon heating fuel	\$3.50
Administrative costs	\$10,000 /yr
Burdened Labor Rate	\$25 /hr

Capital Costs:

Lift Station Pumps	\$7,500
FE Transfer Pumps	\$2,000
Air Blower	\$3,500
UV Disinfection	\$30,000
Dewatering pump	\$5,000
Boilers	\$5,000
Electrical Controls and Instrumentation	\$50,000

Other Assumptions:

Labor	
Operation and maintenance of the plant	10 hr/wk
Dewatered sludge disposal	\$1,000 /yr
Misc Materials, supplies and equipment	\$2,000 /yr
Expected equipment life	
Lift Station Pump	10 yr
FE Transfer Pump	10 yr
Blowers	10 yr
UV Disinfection	15 yr
Dewatering pump	10 yr
Boilers	10 yr
Electrical Controls and Instrumentation	20 yr
Inflation	3 %
Available energy per gallon of heating fuel	100,000 BTU
Insurance	\$7,500 /yr
Effluent and Process testing	\$3,000 /yr

BETHEL WATER AND SEWER FEASIBILITY STUDY

OPERATIONS AND MAINTENANCE

Estimated Yearly Electrical Demand

Equipment	Size	Units	Average Usage (hr/day)	Yearly Demand (kwh)
Lift Station Pump	5	hp	6.0	10,887
FE Transfer Pump	0.38	Kw	24.0	3,329
Air Blower	2.25	Kw	1.0	821
Geo-Reactor Gear Drive (5 units)	0.56	Kw	24.0	24,528
UV Disinfection (kw)	2	kw	24.0	17,520
Dewatering system	5	hp	1.0	1,815
Building hydronic circ pump	0.5	hp	8	1,452
Boilers	0.25	hp	6	544
Building air handler	0.5	hp	6	1,089
Building lights			4	1,314
Miscellaneous				1,500
Total				64,799

Estimated Yearly Fuel Demand

Equipment	Quantity	Units	Yearly Demand (1,000 BTU)
Wastewater treatment plant building	18,265	BTU/hr	160,000
Total			160,000

Estimated Annual Operation & Maintenance Cost

Administration	\$10,000
Labor	\$13,000
Dewatered sludge disposal	\$1,000
Materials (Routine O&M and repairs)	\$2,000
Electricity	\$24,623
Fuel Demand	\$5,600
Equipment Replacement Cost	
Lift Station Pump	\$1,008
FE Transfer Pump	\$269
Blowers	\$470
UV Disinfection	\$3,116
Dewatering pump	\$672
Boilers	\$672
Electrical Controls and Instrumentation	\$4,515
Effluent and Process testing	\$3,000
Insurance	\$7,500
Total	\$77,446

Estimated Monthly Wastewater Treatment Cost Per Service: \$19.63

* Includes miscellaneous electrical-powered equipment

Appendix K

Water Modeling Data

Bethel Water and Sewer Facilities Master Plan Update

Water Treatment, Distribution and Storage System

Modeling Summary

April 2005

Introduction

Mathematical modeling was performed as part of the preparation of this master plan to support concept level hydraulic sizing, assessment of various options and generation of preliminary project cost estimates for the community's water systems. This modeling was comprised of two primary formats:

- Haested Methods *WaterCAD* (concept level hydraulic sizing)
- Microsoft *Excel* spreadsheets (options assessment and cost estimates)

A portion of the hydraulic modeling involved the water distribution systems at Bethel Heights and City Subdivisions to provide a basis for modeling the future distribution systems included in this planning effort. The steps taken and findings arising from these studies are summarized below.

General Objectives

Progressive elimination of the truck haul delivery system has been a primary City objective since master planning conducted in 1995. This master plan recommended that smaller water treatment plants be located in about a dozen service areas throughout the City. However, the actual costs of constructing the Bethel Heights Water Treatment Plant (BHWTP), City Subdivision WTP (CSWTP) and the City Subdivision water distribution and sewer collection systems were found to be significantly higher than that estimated in the 1995 master plan. In addition, capital funding through Village Safe Water (VSW) was limited to about \$3 million per year, thereby requiring several funding cycles to build up sufficient funds for constructing the various phases of this infrastructure. Consequently, the City began considering the possibility of constructing a few regionally-sized WTPs and extending transmission lines to watering point and storage facilities located in outlying areas.

The strategy for developing such an infrastructure involves the design and construction of a "backbone" system that would steadily bring water and sewer service closer to remote consumers, thereby gradually reducing the cost of truck hauling by shortening haul routes. As funding allows, the regional WTPs would be constructed in key locations and provided with truck fill facilities for localizing the truck haul service. Transmission lines would then extend outward from the WTPs to neighboring subdivision communities and terminate at local watering points featuring pressure boosting, water heating and water storage facilities. These improvements would comprise the "backbone" system. Eventually, each watering point facility (also called "booster stations") would be provided with circulation pumps to serve local piped water distribution loops.

Ultimately, the work provided by a fleet of trucks and truck drivers would be replaced by a linked network of regionally-sized WTPs, transmission lines, local watering point and storage facilities and water distribution loops. However, the cost effectiveness of doing so needed verification, in primarily two ways:

- Relative to a truck haul system.
- Relative to providing multiple, smaller water treatment plants.

The modeling and analysis effort performed for this master plan centered on these two perspectives.

Modeling Steps

1. The BHWTP and CSWTP distribution system loops were modeled using *WaterCAD* to provide the City with approximate hydraulic models of these systems that can be calibrated and optimized as the need arises. In addition, this exercise provided a basis grounded in the characteristics of two actual distributions systems to use in modeling the future distribution systems analyzed in this master plan. Pipeline layout, sizes and elevations were input, in addition to design water demands and performance characteristics of the existing pressure, circulation and high demand pumps located at each water treatment plant.
2. Concept level hydraulic models were generated for the following service areas:
 - Kasayuli and Raven subdivisions (with service to FAA housing development)
 - Larsen and Hoffman subdivisions (with service to FAA housing development)
 - Tundra Ridge and H-Marker Lake subdivisions
 - Nunvak and Blueberry subdivisions
 - Mission Lake and Port districts
 - Kilbuck (i.e. "Avenues") district
 - Haroldsen Estates subdivision
 - Hospital district

These models were developed to an approximate extent for concept level sizing of water lines, pumps and water storage tanks (WSTs) based on estimated water demands. Water demands and storage volume estimates were based on similar criteria used for Bethel Heights and City Subdivisions (Section 8.1):

- Average daily demand (ADD) is based on 65 GCPD.
- Peak hourly demand (PHD) is estimated by $125 + (1.2 \times (N-50))$, where N is the number of dwellings served.
- Maximum daily demand (MDD) equates to $PHD \div 1.75$.
- Each dwelling equates to 3.65 persons.
- WST volume is comprised of reserve, equalization and fire protection volumes, as follows:
 - Reserve volume is based on $3 \times ADD$.
 - Equalization volume is based on $MDD - \text{tank fill rate} \times 480 \text{ minutes (8 hours)}$.

- Fire protection volume equates to 500 GPM x 120 minutes (2 hours).
- For simplistic estimating purposes, WST backwash volume is based on 15% of ADD for tanks contributing to WTP filtration system.

General configuration diagrams of each model are included in this appendix. ADD and water storage volume estimates for each service area are summarized in Drawing 5, found in the Drawings section of this master plan.

3. Hydraulic and heating calculations were made to evaluate the relative costs of circulating and heating water in transmission lines that would extend between regional WTPs and remote watering point facilities at each service area. Three scenarios were evaluated:
 - *Scenario 1:* Water is heated and circulated in 6-inch diameter HDPE transmission loops between the WTP and watering point facility.
 - *Scenario 2:* Water is heated by glycol circulated in 1½-inch diameter HPDE loops between the WTP and watering point facility. Glycol is heated at the WTP only.
 - *Scenario 3:* Water is heated by glycol circulated in 1½-inch diameter HPDE loops between the WTP and watering point facility. Glycol is heated at the WTP and then reheated at the watering point facility before returning to the WTP.

In all scenarios, the pressure pumps and circulation pumps were assumed to be located in the WTP. In this analysis, the second scenario was determined to be the most economical approach. Heating costs between water and glycol circulation were generally comparable, but pumping costs were considerably higher for water circulation, primarily due to higher assumed flow rates. Water circulation was presumed to be circulated at a velocity of about 2 feet per second (200 GPM) while the glycol circulation rate was estimated to be 6 GPM (about 1 feet per second). A more detailed analysis performed in later design stages should evaluate transmission heating options based on more optimized fluid flow rates. Cost summaries are included in this appendix.

4. Capital and operations and maintenance life-cycle costs were evaluated for two temperature cases:
 - *Case 1 (average case):* 15 degree F ambient temperature for 7 months of the year.
 - *Case 2 (extreme case):* minus 40 degrees F ambient temperature for 12 months of the year.

Four infrastructure scenarios were reviewed for each of the above temperature cases:

- *Scenario 1:* Four regional WTPs at Bethel Heights Subdivision, City Subdivision, Kasayuli Subdivision and in the “Donut Hole” area, serving a total of 11 watering point facilities located at various service areas.
- *Scenario 2:* Same as above, but with 10 service areas, some of which are served by different regional WTPs.
- *Scenario 3:* Three regional WTPs at Bethel Heights Subdivision, City Subdivision, and the FAA housing development, serving a total of 10 watering point facilities located at various service areas.

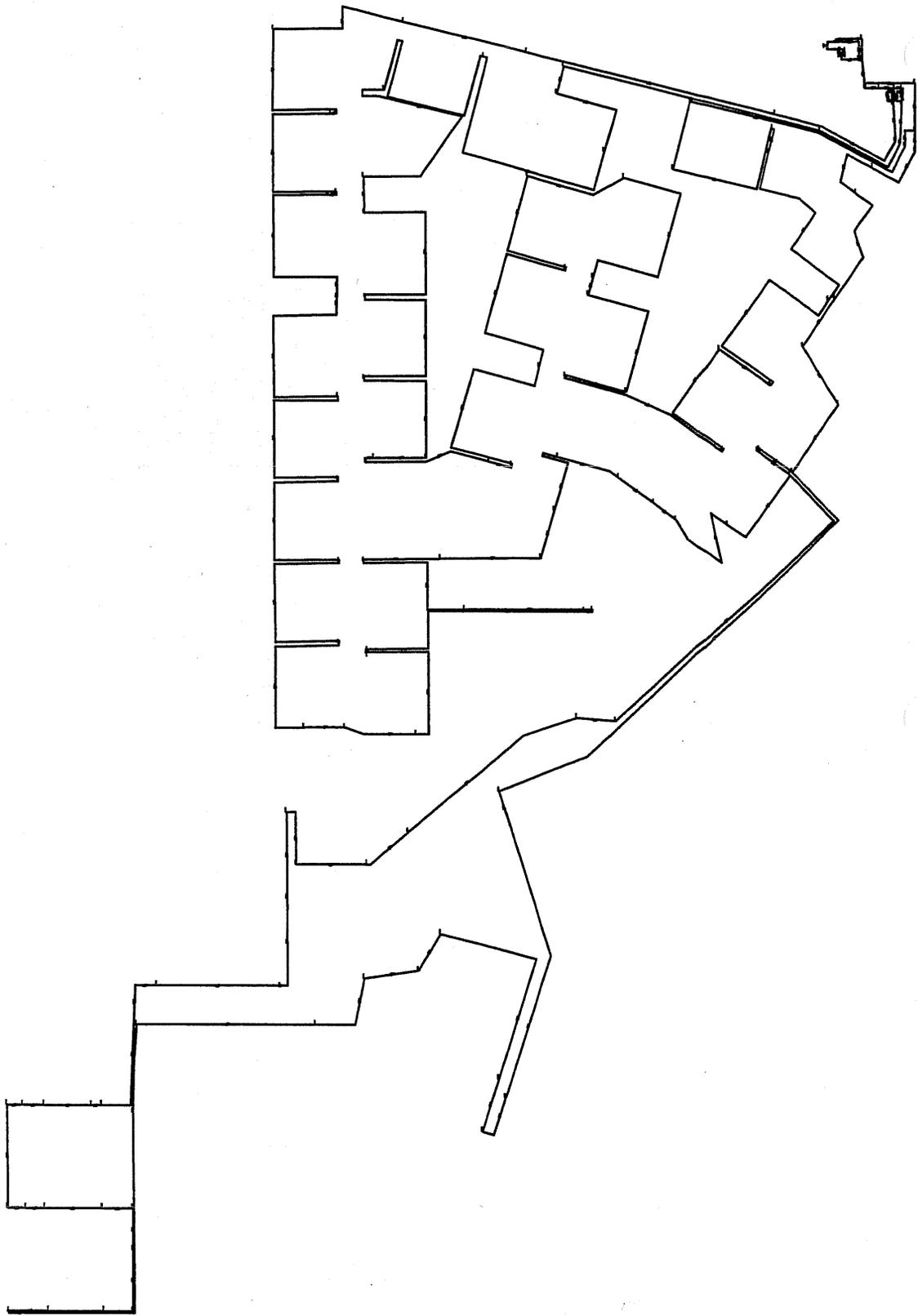
- *Scenario 4:* Eight smaller WTPs at Bethel Heights, City, Kasayuli, Larsen, Nunvak, and Tundra Ridge subdivisions, and the Mission Lake and Kilbuck districts.

The costs of heating and circulation water in distribution loops within each service area were not included in this comparative analysis; as such costs would be associated with any scenario. However, the costs of heating transmission line water were associated with the costs of each watering point facility. In both temperature cases, the third scenario was determined to be the most economical. From this result, it was further ascertained that the BHWTP would likely be eventually replaced by a new WTP, as the facility has experienced significant aging. A new facility might be constructed in the Donut Area to allow the existing BHWTP to operate during construction and facilitate a relatively easy system switchover. After WTP construction, the BHWTP could be converted to a watering point facility. In addition, the WTP located at the FAA site was generally termed the West Bethel WTP (WBWTP).

Cost summaries and assumptions are included in this appendix. This evaluation was later updated by an analysis that compared the relative costs of three regional WTPs with watering point facilities (i.e. “pump stations”) versus that for ten smaller WTPs (see Appendix I). In addition, capital and O&M cost evaluated were updated, the results of which are included in Appendix M and N, respectively.

5. Although this master plan doesn’t evaluate in depth the relative benefits of a truck haul versus a piped water distribution system, a conceptual level cost comparison was nevertheless made to support the recommendations and is included in Appendix M.

END



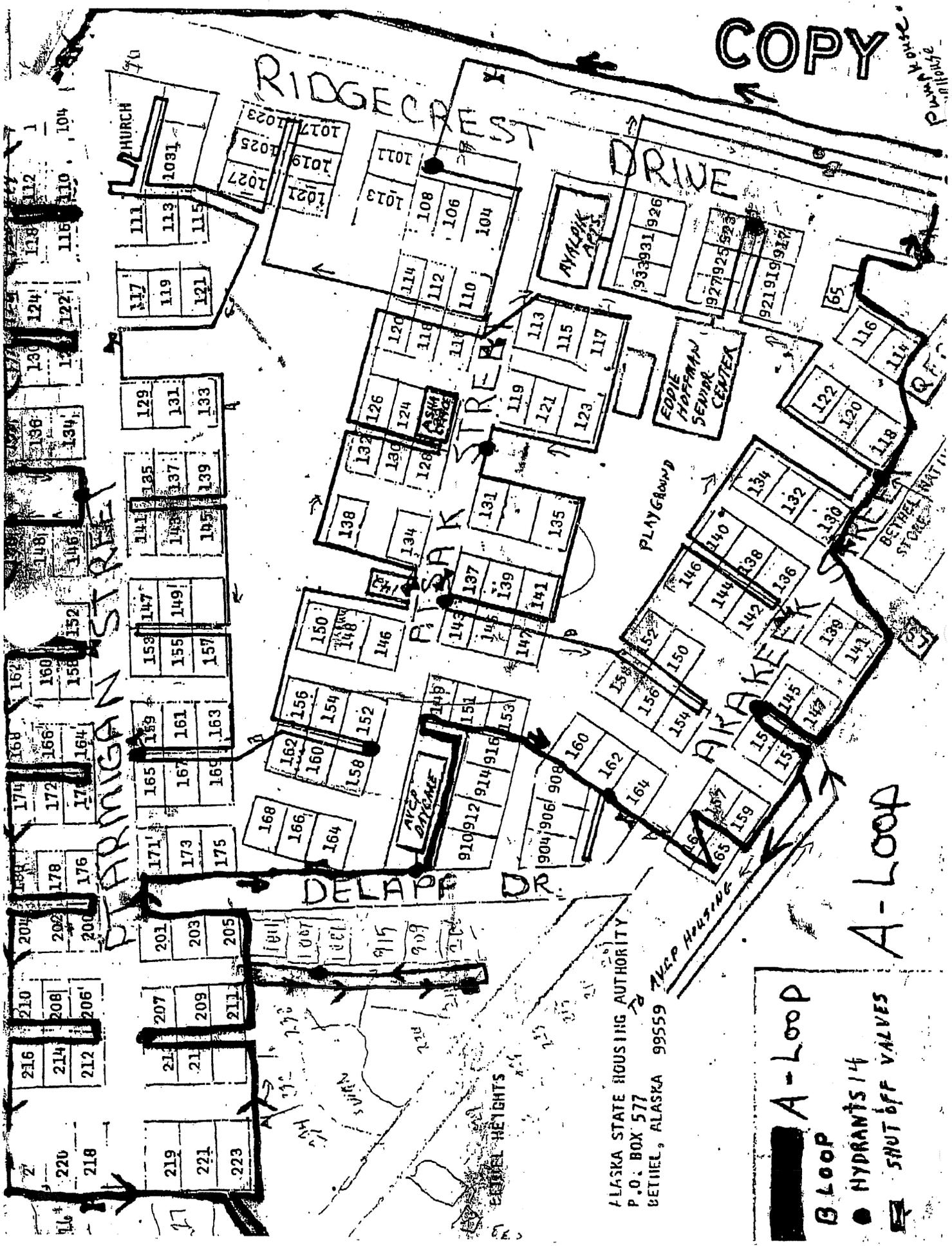
Bethel Heights Demands

Service Area		Dwellings	Population	Avgerage Daily Flow		Max Daily Demand		Peak Hourly Demand gpm
				GPD	gpm	GPD	gpm	
Current and Planned Service								
2A	Bethel Heights Loop A	181	661	42,942	30	232,210	161	282
2A	Bethel Heights Loop B	104	380	24,674	17	156,178	108	190
2A	LKSD Schools, City Laundromat, AVCP, Institutions, Apartments	55	201	13,049	9	107,794	75	131
	Bethel Heights Truck Haul							
	Sub Total	340	1,241	80,665	56	496,183	345	603
	Backwash & WTP			6,453	4	39,695	28	48
	Totals		1,241	87,118	60	535,877	372	651
Potential Extended Service								
1B	Kilbuck South	107	391	25,386	18	159,141	111	193
1B	Kilbuck North	148	540	35,113	24	199,625	139	243
6A	Haroldsen Estates	79	288	18,743	13	131,493	91	160
	Sub Total	334	1,219	79,242	55	490,258	340	596
	Backwash & WTP			6,339	4	39,221	27	48
	Totals	334	1,219	85,581	59	529,479	368	643
Grand Total				172,699	120	1,065,356	740	1,295

1. Uses 3.65 persons per dwelling for homes.
2. Uses 65 gal per capita per day for homes.
3. Maximum Day Demand is Peak Hourly Demand / 1.75
4. Peak Hourly Demand is $125 + (1.2 \times (N - 50))$ where N is number of dwellings.

COPY

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ALASKA STATE HOUSING AUTHORITY
 P.O. BOX 577
 BETHEL, ALASKA 99559

- A-Loop**
- B LOOP**
- HYDRANTS 1/4
- SHUT OFF VALVES

A-Loop

ARMIGAN STREET

RIDGECREST

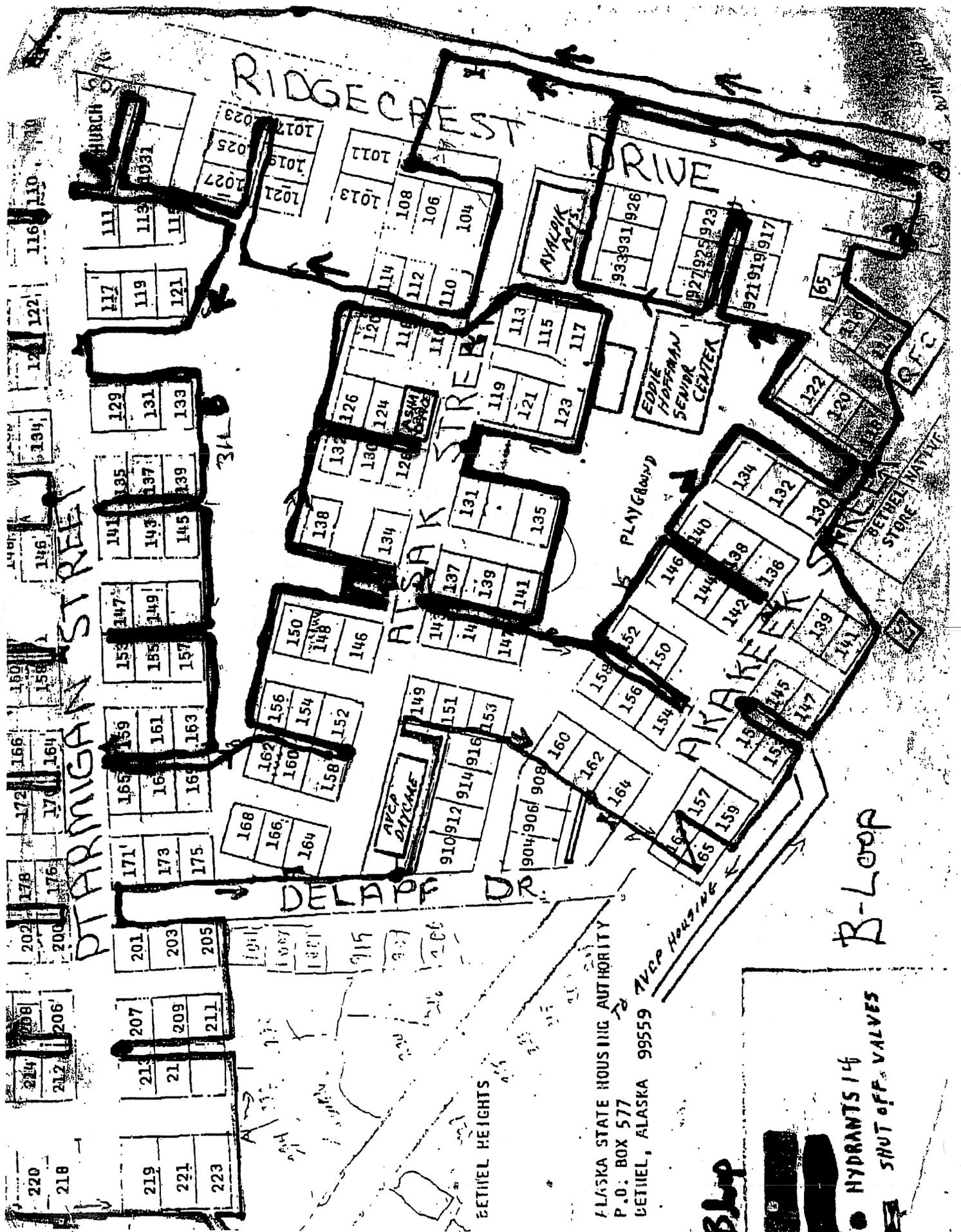
DRIFT

PARK STREET

DELATOR DR.

AKAKEEK

BETHEL HEIGHTS



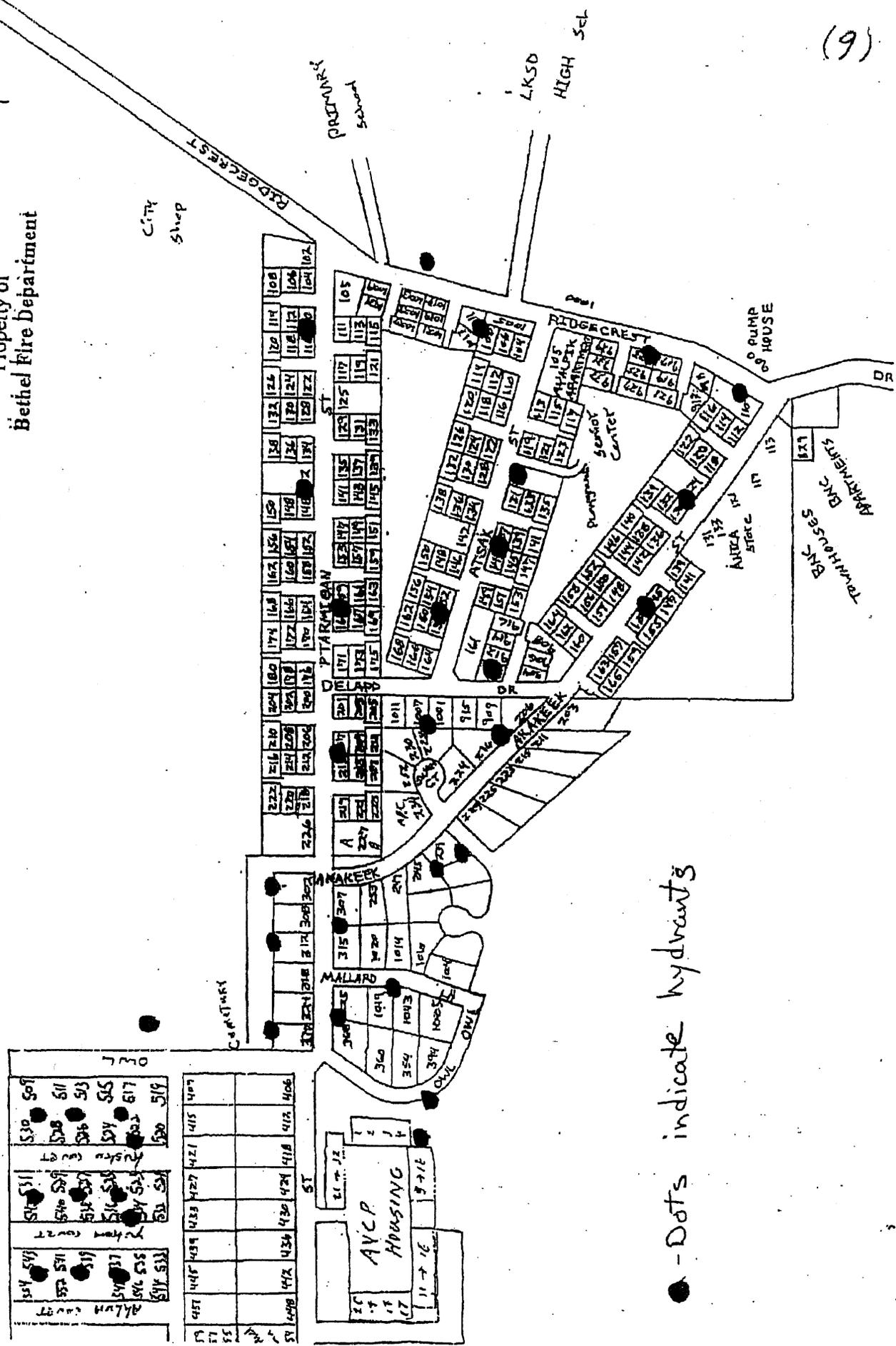
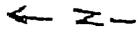
ALASKA STATE HOUSING AUTHORITY
 P.O. BOX 577
 BETHEL, ALASKA 99559

● HYDRANTS 14
 SHUT OFF VALVES

B-Loop

Property of
Bethel Fire Department

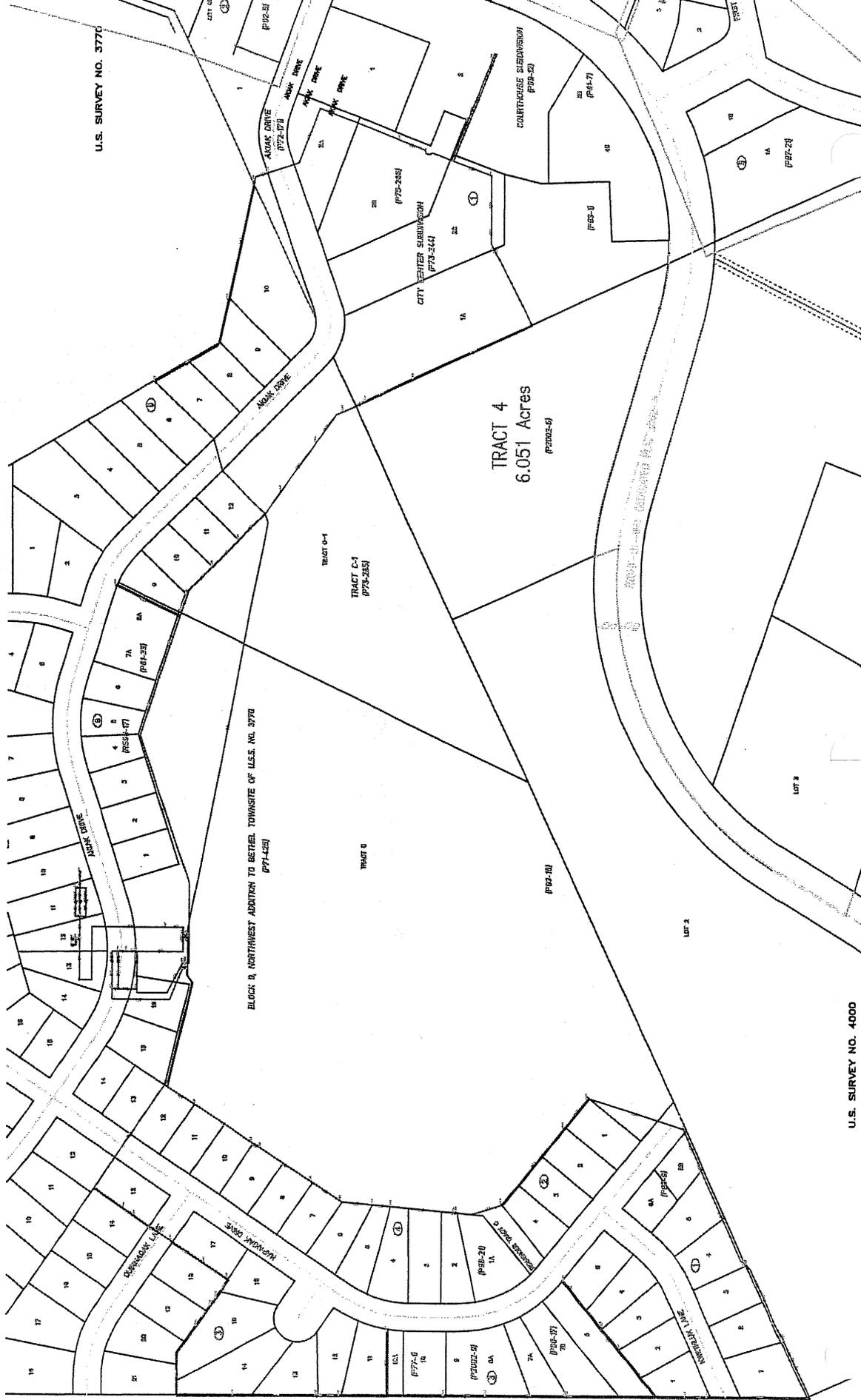
City
Shop



● - Dots indicate hydrants

CITY SUBDIVISION

U.S. SURVEY NO. 3770



TRACT 4
6.051 Acres
(P2002-6)

BLOCK B, NORTHWEST ADDITION TO BETHEL, TOWNSHIP OF U.S.S. NO. 3770
(P74-28)

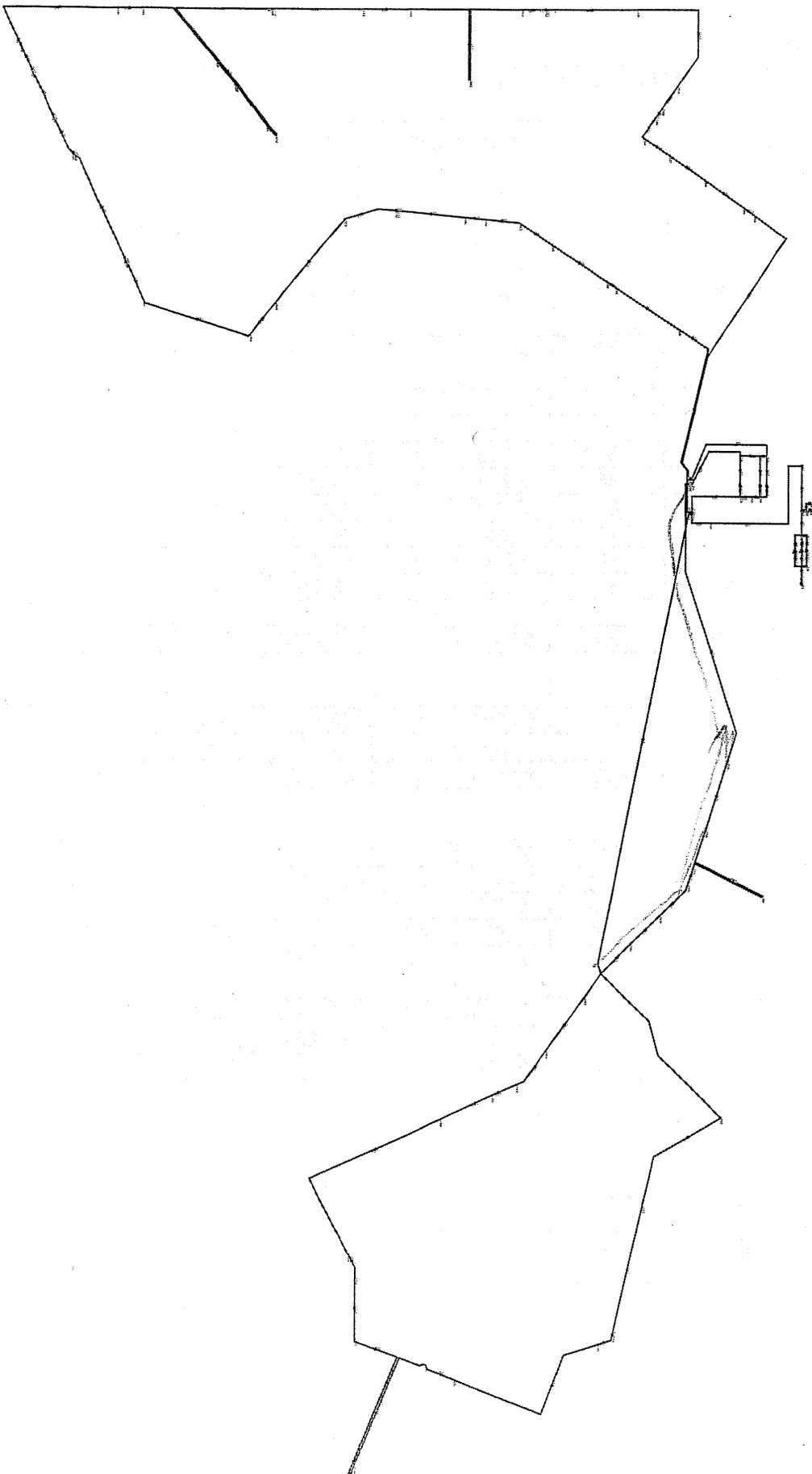
TRACT C-1
(P73-285)

TRACT D-1

TRACT D

TRACT D-2

U.S. SURVEY NO. 4000



City Subdivision Demands

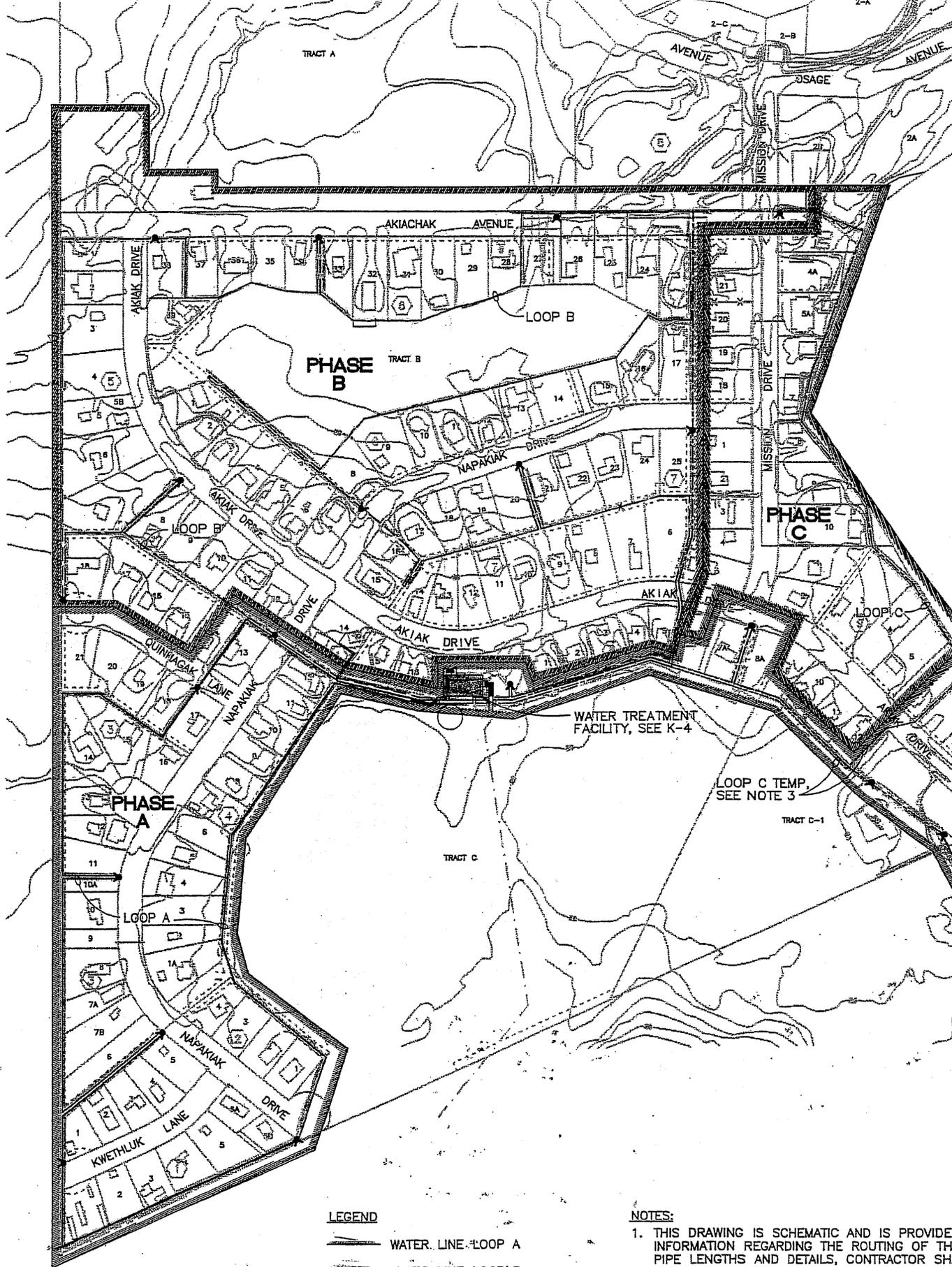
Service Area		Dwellings	Population	Average Daily Flow		Max Daily Demand		Peak Hourly Demand gpm
				GPD	gpm	GPD	gpm	
Current and Planned Service								
1A	City Subdivision Loop A	47	172	11,151	7.74	99,895	69.37	121.40
1A	City Subdivision Loop B	75	274	17,794	12.36	127,543	88.57	155.00
1A	City Subdivision Loop C Phase A	20	73	4,745	3.30	73,234	50.86	89.00
1A	City Subdivision Loop C Phase C	23	84	5,457	3.79	76,197	52.91	92.60
3C	YE Learning Center							
	Dorm Phase 1	N/A	88	5,720	4	13,156	9	18
	Dorm Phase 2	N/A	88	5,720	4	13,156	9	18
	Dorm Phase 3	N/A	88	5,720	4	13,156	9	18
	Transients Phase 1	N/A	72	4,680	3	10,764	7	15
	Transients Phase 2	N/A	60	3,900	3	8,970	6	12
	Transients Phase 3	N/A	60	3,900	3	8,970	6	12
1D	Governmental Offices	53	193	12,574	9	105,819	73	129
	City Subdivision Truck Haul							
	Sub Total	218	1,252	81,361	57	550,860	383	679
	Backwash & WTP			6,509	5	44,069	31	54
	Total		1,252	87,869	61	594,929	413	734

Potential Extended Service

1C	Mission Lake	148	540	35,113	24	199,625	139	243
1C	Harbor	161	588	38,197	27	212,462	148	258
1D	1D less Gov. Offices	37	135	8,778	6	90,021	63	109
1D	Hospital District	N/A	N/A	67,870	47	156,101	108	212
1A	City Subdivision Loop C Extension	11	40	2,610	2	64,347	45	78
	Sub Total	357	1,303	152,568	106	722,556	502	900
	Backwash & WTP			12,205	8	57,804	40	72
	Total		1,303	164,774	114	780,360	542	973

Grand Total	2,555	252,643	175	1,375,289	955	1,706
--------------------	--------------	----------------	------------	------------------	------------	--------------

1. Uses 3.65 persons per dwelling for homes and 4 persons per dwelling for dorms.
2. Uses 65 gal per capita per day for homes and dorms and 20 gal per capita per day for transients
3. 1A, 1C and 1D Maximum Day Demand is Peak Hourly Demand / 1.75
YE Learning Center Maximum Day Demand is 2.3 x Average Daily Demand
4. 1A, 1C and 1D Peak Hourly Demand is $125 + (1.2 \times (N - 50))$ where N is number of dwellings.
YE Learning Center Peak Hourly Demand is 4.5 x Average Daily Demand

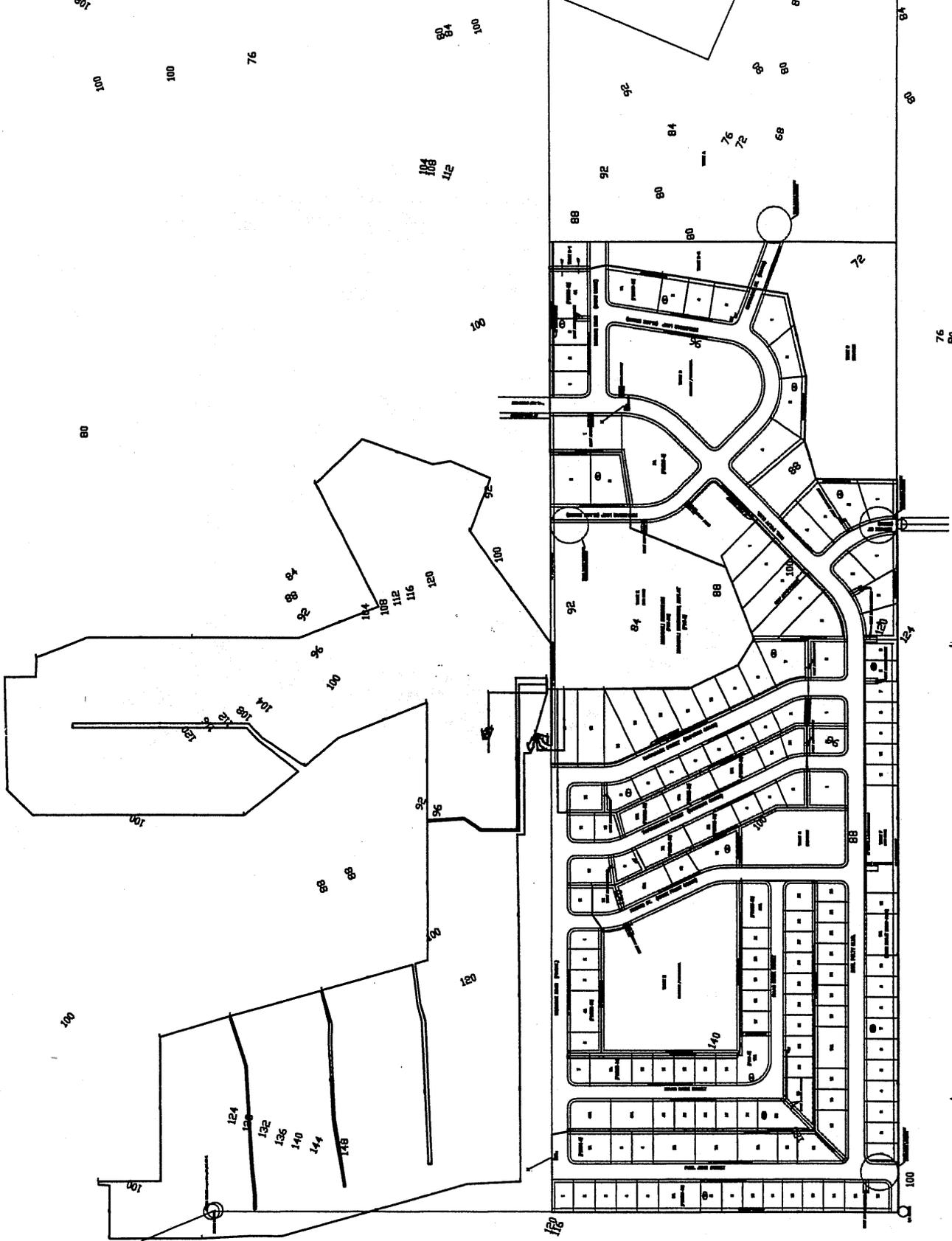


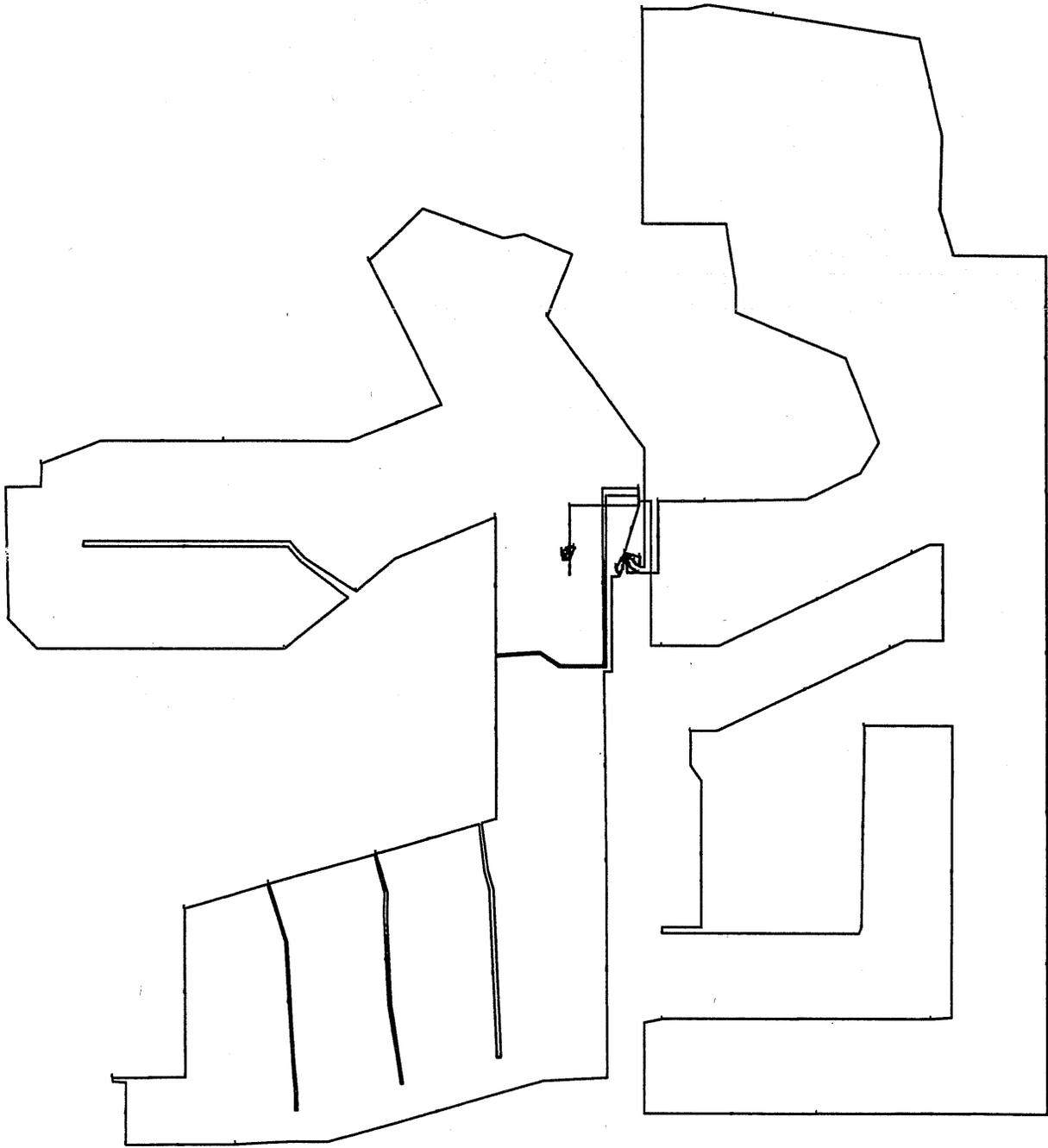
LEGEND

-  WATER LINE LOOP A
-  WATER LINE LOOP B
-  WATER LINE LOOP C
-  TEMP WATER LINE LOOP C
-  PROJECT PHASE BOUNDARY
-  FIRE HYDRANT

NOTES:

1. THIS DRAWING IS SCHEMATIC AND IS PROVIDED FOR INFORMATION REGARDING THE ROUTING OF THE PIPE LENGTHS AND DETAILS, CONTRACTOR SHALL PROVIDE PROFILE DRAWINGS.
2. SERVICE UTILITY BOX CONNECTION TO LOOP C TO BE INSTALLED DURING PHASE C WORK. SEE SERVICE SCHEDULE FOR DETAILS.
3. LOOP C TEMP PIPING TO BE INSTALLED DURING PHASE C WORK. SEE INTERSECTION DETAILS.





Kasayuli Demands

Service Area		Dwellings	Population	Avgerage Daily Flow		Max Daily Demand		Peak Hourly Demand gpm
				GPD	gpm	GPD	gpm	
Planned Service								
5A	Kasayuli	166	606	39,384	27	217,399	151	264
5C	Raven 1 & 2	178	650	42,231	29	229,248	159	279
5b	Larsen & Hoffman	173	631	41,044	29	224,311	156	273
4	FAA	60	219	14,235	10	112,731	78	137
	Sub Total	577	2,106	136,893	95	783,689	544	952
	Backwash & WTP			10,951	8	62,695	44	76
	Totals		2,106	147,845	103	846,384	588	1,029

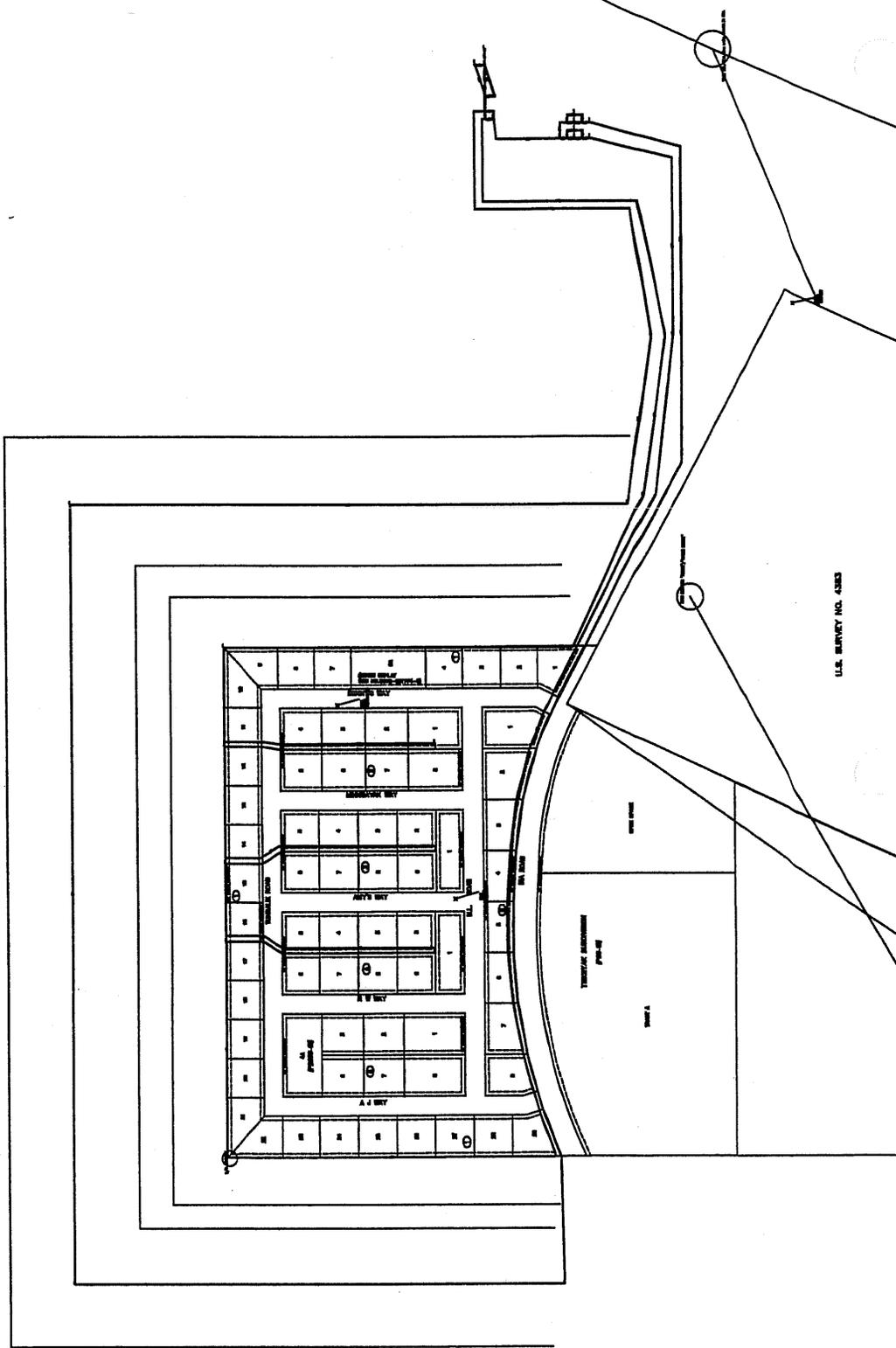
1. Uses 3.65 persons per dwelling for homes.
2. Uses 65 gal per capita per day for homes.
3. Maximum Day Demand is Peak Hourly Demand / 1.75
4. Peak Hourly Demand is $125 + (1.2 \times (N - 50))$ where N is number of dwellings.

Storage

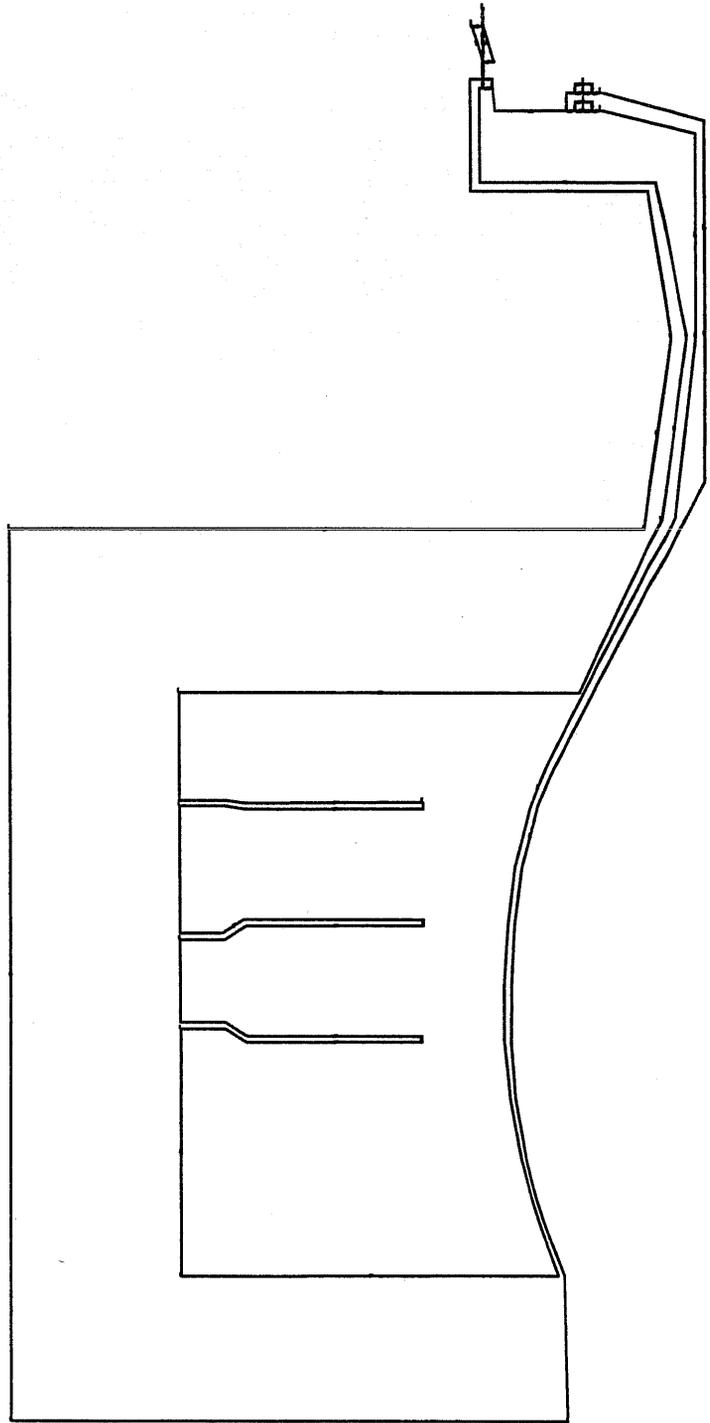
Remote Tanks	Fire Flow		Average Daily Demand		Max Daily Demand		Fill Rate		Reserve	Fire	Equalization	Total
	Duration (min)	gpm	GPD	gpm	GPD	gpm	Duration (hrs)	gpm				
Hoffman & Larson	60	500	41,040	29	94,392	66	8	200	123,120	30,000	0	153,120
FAA	60	500	14,227	10	32,723	23	8	200	42,682	30,000	0	72,682
Nunivak	60	500	112,896	78	259,661	180	8	200	338,688	30,000	163,661	532,349
Tundra Ridge	60	500	76,147	53	175,139	122	8	200	228,442	30,000	79,139	337,580
Mission Lake	60	500	73,310	51	168,614	117	8	200	219,931	30,000	72,614	322,545
Kilbuck	60	500	60,480	42	139,104	97	8	200	181,440	30,000	43,104	254,544
Haroldsen Estates	60	500	18,720	13	43,056	30	8	200	56,160	30,000	0	86,160
Kasayuli	60	500	81,619	57	187,724	130	8	200	244,858	30,000	91,724	366,582
CSWTP - Hospital District	60	500	67,680	47	155,664	108	8	200	203,040	30,000	59,664	292,704

1. Reserve is 3x ADD
2. Fire is 500gpm for 60min
3. Equalization is MDD - Fill Rate for 8 hrs.
4. Backwash is 15% of ADD for contributing tanks.

LARSEN SUBDIVISION



U.S. SURVEY NO. 4323



Kasayuli Demands

Service Area		Dwellings	Population	Avgerage Daily Flow		Max Daily Demand		Peak Hourly Demand gpm
				GPD	gpm	GPD	gpm	
Planned Service								
5A	Kasayuli	166	606	39,384	27	217,399	151	264
5C	Raven 1 & 2	178	650	42,231	29	229,248	159	279
5b	Larsen & Hoffman	173	631	41,044	29	224,311	156	273
4	Airport	60	219	14,235	10	112,731	78	137
	Sub Total	577	2,106	136,893	95	783,689	544	952
	Backwash & WTP			10,951	8	62,695	44	76
	Totals		2,106	147,845	103	846,384	588	1,029

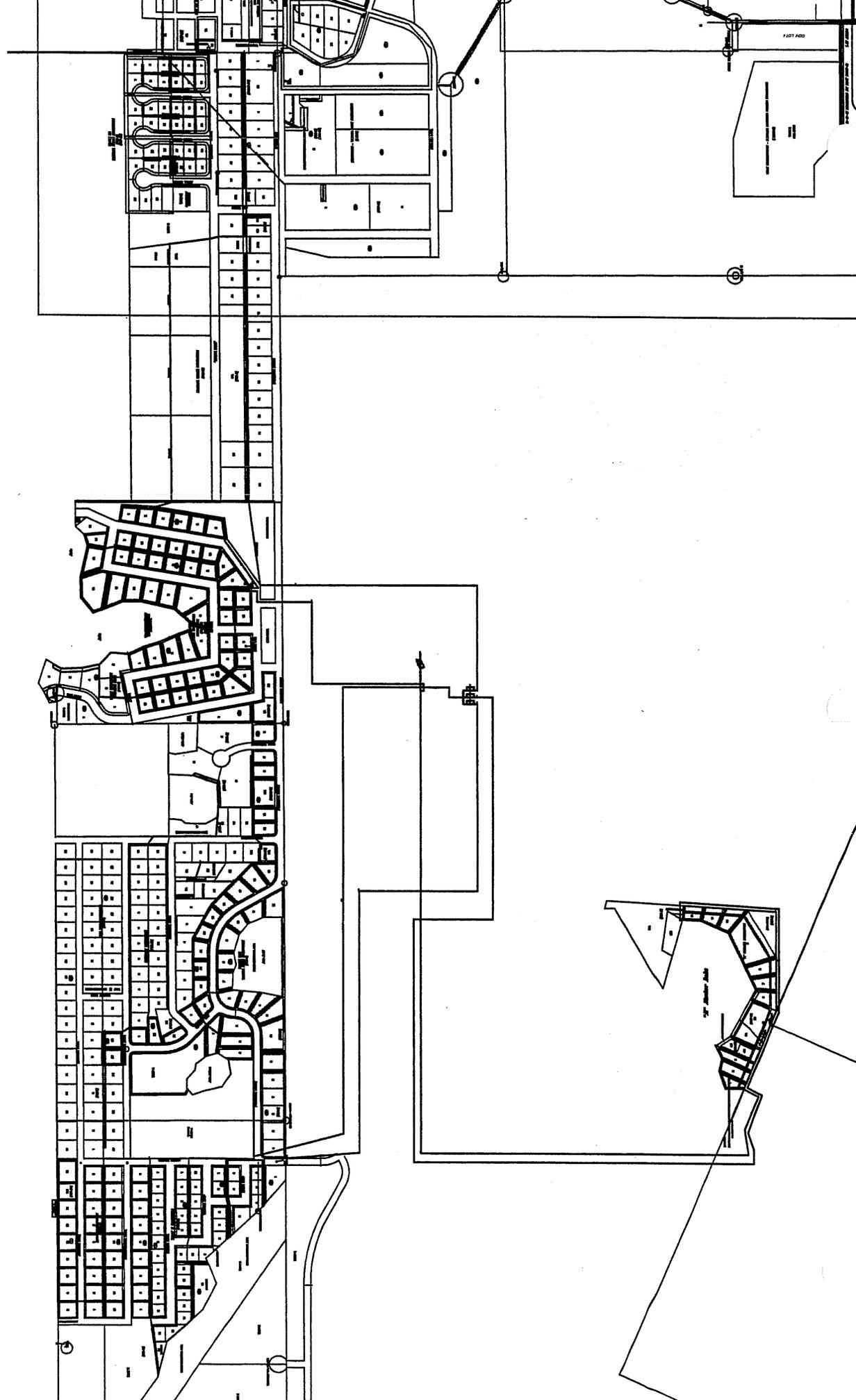
1. Uses 3.65 persons per dwelling for homes.
2. Uses 65 gal per capita per day for homes.
3. Maximum Day Demand is Peak Hourly Demand / 1.75
4. Peak Hourly Demand is $125 + (1.2 \times (N - 50))$ where N is number of dwellings.

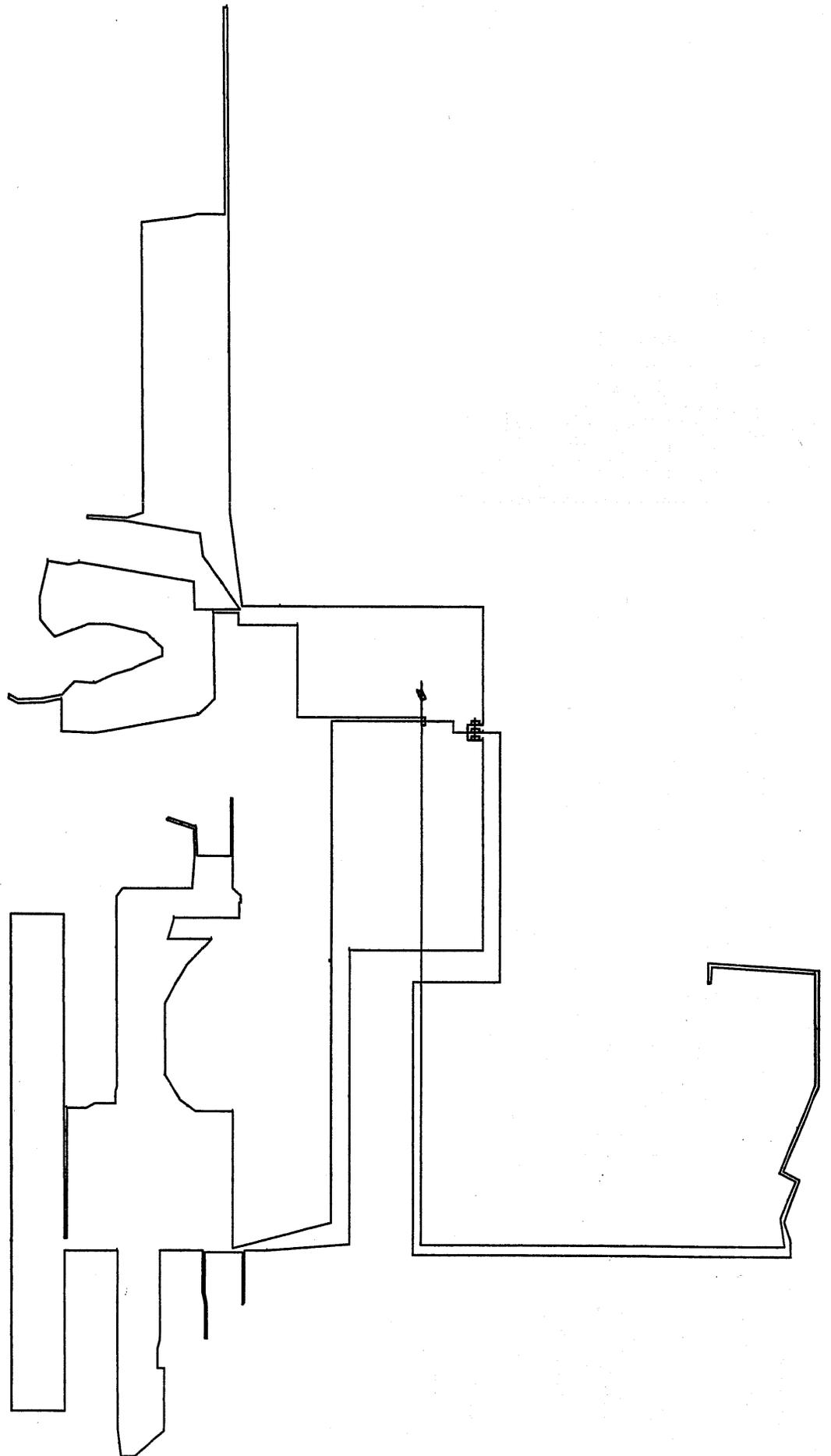
Storage

Remote Tanks	Fire Flow		Average Daily Demand		Max Daily Demand		Fill Rate		Reserve	Fire	Equalization	Total
	Duration (min)	gpm	GPD	gpm	GPD	gpm	Duration (hrs)	gpm				
Hoffman & Larson	60	500	41,040	29	94,392	66	8	200	123,120	30,000	0	153,120
FAA	60	500	14,400	10	33,120	23	8	200	43,200	30,000	0	73,200
Nunivak	60	500	112,896	78	259,661	180	8	200	338,688	30,000	163,661	532,349
Tundra Ridge	60	500	76,147	53	175,139	122	8	200	228,442	30,000	79,139	337,580
Mission Lake	60	500	73,310	51	168,614	117	8	200	219,931	30,000	72,614	322,545
Kilbuck	60	500	60,480	42	139,104	97	8	200	181,440	30,000	43,104	254,544
Haroldsen Estates	60	500	18,720	13	43,056	30	8	200	56,160	30,000	0	86,160
Calculated	60	500	55,279	38	127,142	88	8	200	165,837	30,000	31,142	226,979
CSWTP - Hospital District	60	500	67,680	47	155,664	108	8	200	203,040	30,000	59,664	292,704

1. Reserve is 3x ADD
2. Fire is 500gpm for 60min
3. Equalization is MDD - Fill Rate for 8 hrs.
4. Backwash is 15% of ADD for contributing tanks.

TUNDRA RIDGE SUBDIVISION





Storage

Remote Tanks	Fire Flow		Average Daily Demand		Max Daily Demand		Fill Rate		Reserve	Fire	Equalization	Total
	Duration (min)	gpm	GPD	gpm	GPD	gpm	Duration (hrs)	gpm				
									gal	gal	gal	gal
Hoffman & Larson	60	500	47,520	33	109,296	76	8	200	142,560	30,000	13,296	185,856
FAA	60	500	14,400	10	33,120	23	8	200	43,200	30,000	0	73,200
Nunivak	60	500	112,896	78	259,661	180	8	200	338,688	30,000	163,661	532,349
Tundra Ridge	60	500	76,147	53	175,139	122	8	200	228,442	30,000	79,139	337,580
Mission Lake	60	500	73,310	51	168,614	117	8	200	219,931	30,000	72,614	322,545
Kilbuck	60	500	60,480	42	139,104	97	8	200	181,440	30,000	43,104	254,544
Haroldsen Estates	60	500	18,720	13	43,056	30	8	200	56,160	30,000	0	86,160
Calculated	60	500	55,279	38	127,142	88	8	200	165,837	30,000	31,142	226,979
CSWTP - Hospital District	60	500	67,680	47	155,664	108	8	200	203,040	30,000	59,664	292,704

1. Reserve is 3x ADD
2. Fire is 500gpm for 60min
3. Equalization is MDD - Fill Rate for 8 hrs.
4. Backwash is 15% of ADD for contributing tanks.

Donut Hole Demands

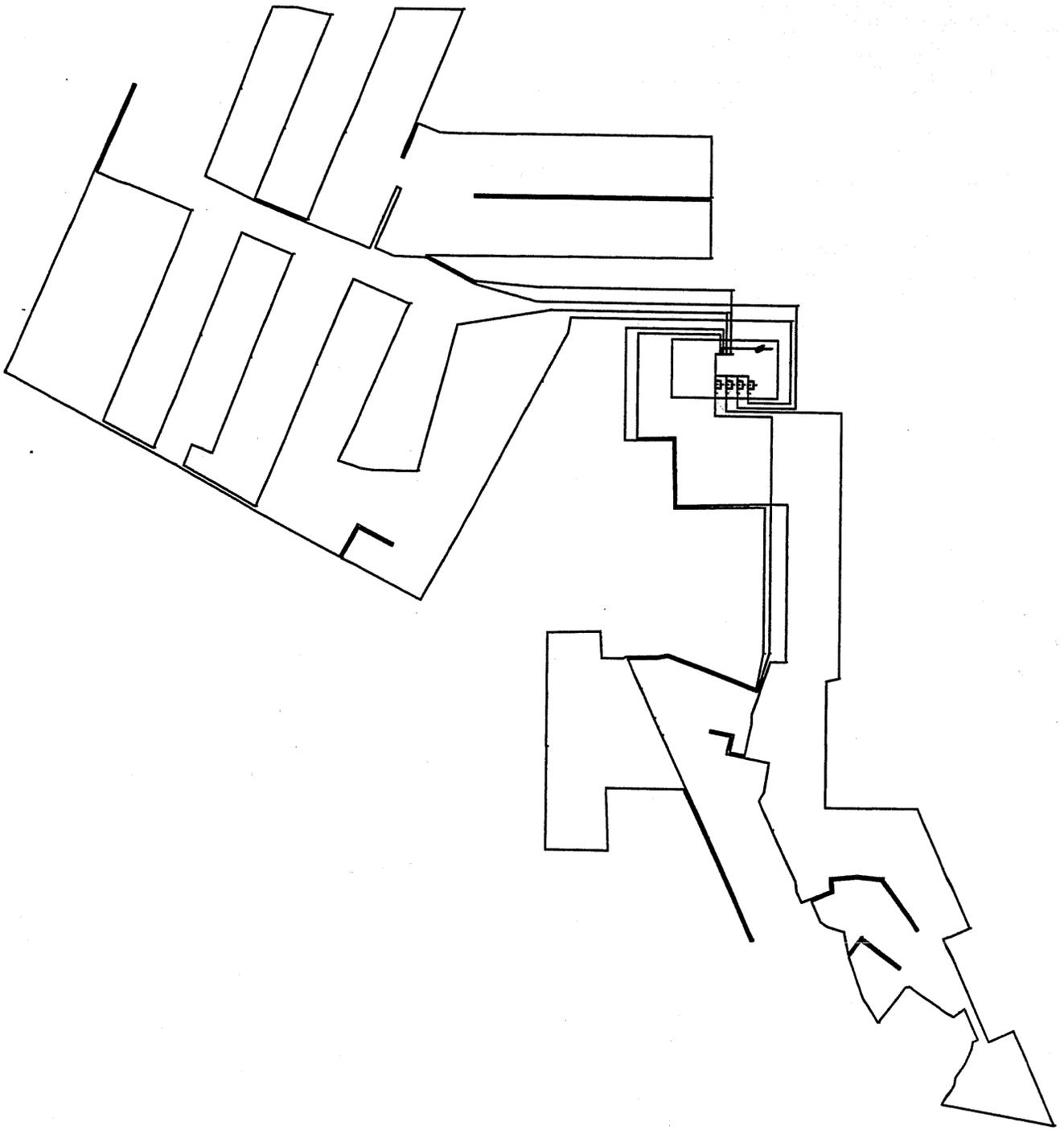
Service Area		Dwellings	Population	Average Daily Flow		Max Daily Demand		Peak Hourly Demand gpm
				GPD	gpm	GPD	gpm	
Planned Service								
2B	UIVUQ Loop	110	402	26,098	18	162,103	113	197
2C	Tundra Ridge	196	715	46,501	32	247,022	172	300
2F	"H" Marker Subdivision	15	55	3,559	2	68,297	47	83
3A	Blueberry Field 1	256	934	60,736	42	306,267	213	372
3A	Blueberry Field 2							
3B	Nunivak Estates	120	438	28,470	20	171,977	119	209
3B	Trailer Park	100	365	23,725	16	152,229	106	185
	Sub Total	797	2,909	189,088	131	1,107,895	769	1,346
	Backwash & WTP			15,127	11	88,632	62	108
	Totals		2,909	204,215	142	1,196,526	831	1,454

1. Uses 3.65 persons per dwelling for homes.
2. Uses 65 gal per capita per day for homes.
3. Maximum Day Demand is Peak Hourly Demand / 1.75
4. Peak Hourly Demand is $125 + (1.2 \times (N - 50))$ where N is number of dwellings.



U.S. SURVEY
No. 4117

SHANNON
&
BLUESBERRY
SUBDIVISIONS



Donut Hole Demands

Service Area		Dwellings	Population	Avgerage Daily Flow		Max Daily Demand		Peak Hourly Demand gpm
				GPD	gpm	GPD	gpm	
Planned Service								
2B	UIVUQ Loop	110	402	26,098	18	162,103	113	197
2C	Tundra Ridge	196	715	46,501	32	247,022	172	300
2F	"H" Marker Subdivision	15	55	3,559	2	68,297	47	83
3A	Blueberry Field 1	256	934	60,736	42	306,267	213	372
3A	Blueberry Field 2							
3B	Nunivak Estates	75	274	17,794	12	127,543	89	155
3B	Trailer Park	145	529	34,401	24	196,663	137	239
	Sub Total	797	2,909	189,088	131	1,107,895	769	1,346
	Backwash & WTP			15,127	11	88,632	62	108
	Totals		2,909	204,215	142	1,196,526	831	1,454

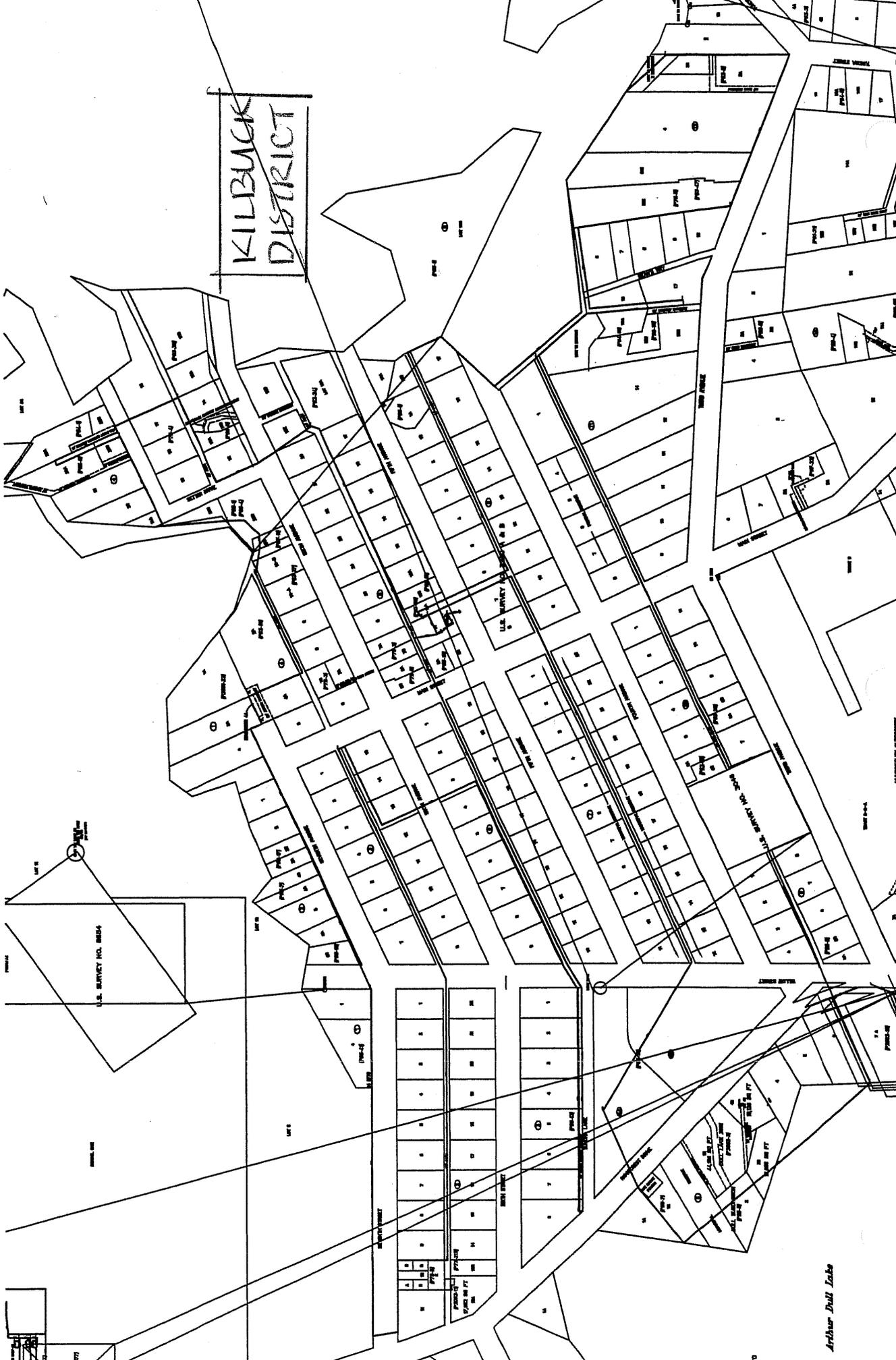
1. Uses 3.65 persons per dwelling for homes.
2. Uses 65 gal per capita per day for homes.
3. Maximum Day Demand is Peak Hourly Demand / 1.75
4. Peak Hourly Demand is $125 + (1.2 \times (N - 50))$ where N is number of dwellings.

Storage

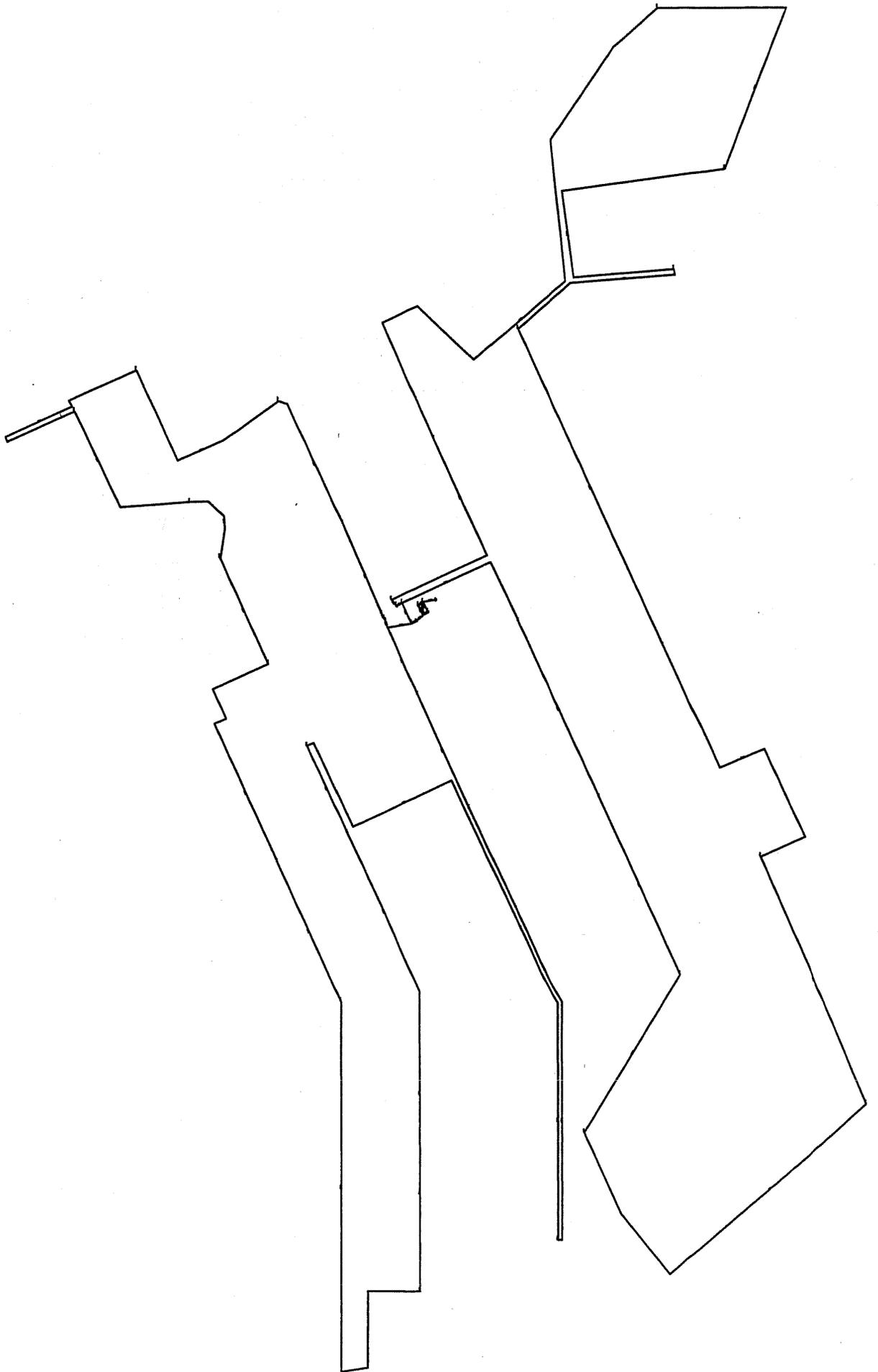
Remote Tanks	Fire Flow		Average Daily Demand		Max Daily Demand		Fill Rate		Reserve	Fire	Equalization	Total
	Duration (min)	gpm	GPD	gpm	GPD	gpm	Duration (hrs)	gpm				
Hoffman & Larson	60	500	47,520	33	109,296	76	200	8	142,560	30,000	13,296	165,856
FAA	60	500	14,400	10	33,120	23	200	8	43,200	30,000	0	73,200
Nunivak	60	500	112,896	78	259,661	180	200	8	338,688	30,000	163,661	532,349
Tundra Ridge	60	500	74,880	52	172,224	120	200	8	224,640	30,000	76,224	330,864
Mission Lake	60	500	73,310	51	168,614	117	200	8	219,931	30,000	72,614	322,545
Kilbuck	60	500	60,480	42	139,104	97	200	8	181,440	30,000	43,104	254,544
Haroldson Estates	60	500	18,720	13	43,056	30	200	8	56,160	30,000	0	86,160
Calculated	60	500	55,279	38	127,142	88	200	8	165,837	30,000	31,142	226,979
CSWTP - Hospital District	60	500	67,680	47	155,664	108	200	8	203,040	30,000	59,664	292,704

1. Reserve is 3x ADD
2. Fire is 500gpm for 60min
3. Equalization is MDD - Fill Rate for 8 hrs.
4. Backwash is 15% of ADD for contributing tanks.

KILBUCK DISTRICT



U.S. SURVEY NO. 1834



Bethel Heights Demands

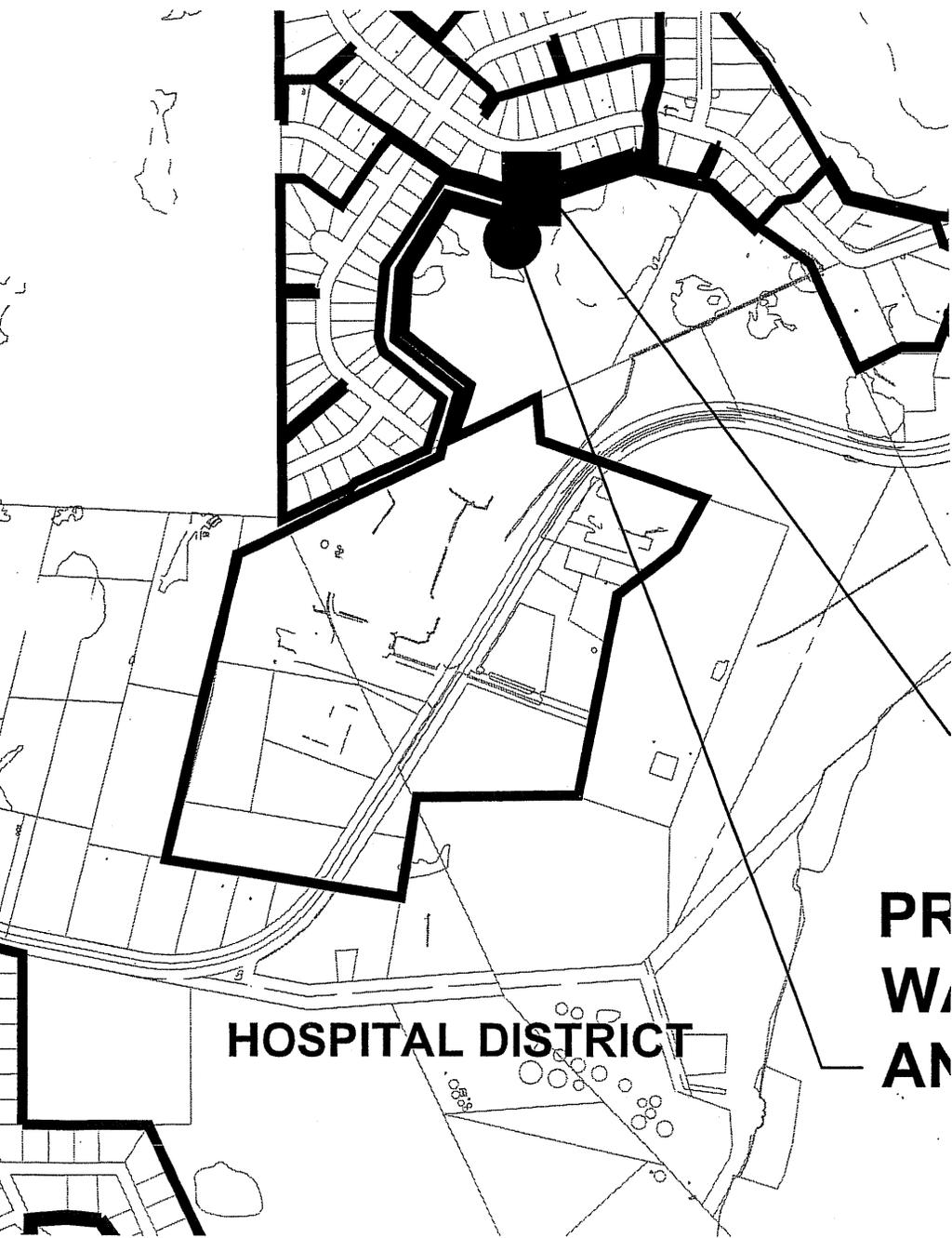
Service Area		Dwellings	Population	Average Daily Flow		Max Daily Demand		Peak Hourly Demand gpm
				GPD	gpm	GPD	gpm	
Current and Planned Service								
2A	Bethel Heights Loop A	181	661	42,942	30	232,210	161	282
2A	Bethel Heights Loop B	104	380	24,674	17	156,178	108	190
2A	LKSD Schools, City Laundromat, AVCP, Institutions, Apartments	55	201	13,049	9	107,794	75	131
	Bethel Heights Truck Haul							
	Sub Total	340	1,241	80,665	56	496,183	345	603
	Backwash & WTP			6,453	4	39,695	28	48
	Totals		1,241	87,118	60	535,877	372	651
Potential Extended Service								
1B	Kilbuck South	107	391	25,386	18	159,141	111	193
1B	Kilbuck North	148	540	35,113	24	199,625	139	243
6A	Haroldsen Estates	79	288	18,743	13	131,493	91	160
	Sub Total	334	1,219	79,242	55	490,258	340	596
	Backwash & WTP			6,339	4	39,221	27	48
	Totals	334	1,219	85,581	59	529,479	368	643
Grand Total				172,699	120	1,065,356	740	1,295

1. Uses 3.65 persons per dwelling for homes.
2. Uses 65 gal per capita per day for homes.
3. Maximum Day Demand is Peak Hourly Demand / 1.75
4. Peak Hourly Demand is $125 + (1.2 \times (N - 50))$ where N is number of dwellings.

Storage

Remote Tanks	Fire Flow		Average Daily Demand		Max Daily Demand		Fill Rate		Reserve	Fire	Equalization	Total
	Duration (min)	gpm	GPD	gpm	GPD	gpm	Duration (hrs)	gpm				
Hoffman & Larson	60	500	47,520	33	109,296	76	8	200	142,560	30,000	13,296	185,856
FAA	60	500	14,400	10	33,120	23	8	200	43,200	30,000	0	73,200
Nunivak	60	500	112,320	78	258,336	179	8	200	336,960	30,000	162,336	529,296
Tundra Ridge	60	500	74,880	52	172,224	120	8	200	224,640	30,000	76,224	330,864
Mission Lake	60	500	73,310	51	168,614	117	8	200	219,931	30,000	72,614	322,545
Kilbuck	60	500	60,480	42	139,104	97	8	200	181,440	30,000	43,104	254,544
Haroldsen Estates	60	500	18,720	13	43,056	30	8	200	56,160	30,000	0	86,160
Calculated	60	500	55,279	38	127,142	88	8	200	165,837	30,000	31,142	226,979
CSWTP - Hospital District	60	500	67,680	47	155,664	108	8	200	203,040	30,000	59,664	292,704

1. Reserve is 3x ADD
2. Fire is 500gpm for 60min
3. Equalization is MDD - Fill Rate for 8 hrs.
4. Backwash is 15% of ADD for contributing tanks.



HOSPITAL DISTRICT

**PR
WA
AN**

HOSPITAL DISTRICT

City Subdivision Demands

Service Area		Dwellings	Population	Average Daily Flow		Max Daily Demand		Peak Hourly Demand gpm
				GPD	gpm	GPD	gpm	
Current and Planned Service								
1A	City Subdivision Loop A	47	172	11,151	7.74	99,895	69.37	121.40
1A	City Subdivision Loop B	75	274	17,794	12.36	127,543	88.57	155.00
1A	City Subdivision Loop C Phase A	20	73	4,745	3.30	73,234	50.86	89.00
1A	City Subdivision Loop C Phase C	23	84	5,457	3.79	76,197	52.91	92.60
3C YE Learning Center								
	Dorm Phase 1	N/A	88	5,720	4	13,156	9	18
	Dorm Phase 2	N/A	88	5,720	4	13,156	9	18
	Dorm Phase 3	N/A	88	5,720	4	13,156	9	18
	Transients Phase 1	N/A	72	4,680	3	10,764	7	15
	Transients Phase 2	N/A	60	3,900	3	8,970	6	12
	Transients Phase 3	N/A	60	3,900	3	8,970	6	12
1D	Governmental Offices	53	193	12,574	9	105,819	73	129
	City Subdivision Truck Haul							
	Sub Total	218	1,252	81,361	57	550,860	383	679
	Backwash & WTP			6,509	5	44,069	31	54
	Total		1,252	87,869	61	594,929	413	734

Potential Extended Service

1C	Mission Lake	148	540	35,113	24	199,625	139	243
1C	Harbor	161	588	38,197	27	212,462	148	258
1D	1D less Gov. Offices	37	135	8,778	6	90,021	63	109
1D	Hospital District	N/A	N/A	67,870	47	156,101	108	212
1A	City Subdivision Loop C Extension	11	40	2,610	2	64,347	45	78
	Sub Total	357	1,303	152,568	106	722,556	502	900
	Backwash & WTP			12,205	8	57,804	40	72
	Total		1,303	164,774	114	780,360	542	973

Grand Total	2,555	252,643	175	1,375,289	955	1,706
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1. Uses 3.65 persons per dwelling for homes and 4 persons per dwelling for dorms.
2. Uses 65 gal per capita per day for homes and dorms and 20 gal per capita per day for transients
3. 1A, 1C and 1D Maximum Day Demand is Peak Hourly Demand / 1.75
YE Learning Center Maximum Day Demand is 2.3 x Average Daily Demand
4. 1A, 1C and 1D Peak Hourly Demand is $125 + (1.2 \times (N - 50))$ where N is number of dwellings.
YE Learning Center Peak Hourly Demand is 4.5 x Average Daily Demand

Hospital District Services

~~5) YKCC - Yukon-Kuskokwim Correctional Center~~

Jail - 9,511 gpd

Bldg. 800 - 4,332 gpd

Hospital - 48,724 gpd

Fish & Wildlife - 2,329 gpd

Bell v. Albas Corp. - 487 gpd

Juvenile facility - 2,487 gpd

67,870 gpd - metered ADD

↳ 300,000 gal
Storage tank

Storage

Remote Tanks	Fire Flow		Average Daily Demand		Max Daily Demand		Fill Rate		Reserve	Fire	Equalization	Total
	Duration (min)	gpm	GPD	gpm	GPD	gpm	Duration (hrs)	gpm				
Hoffman & Larson	60	500	47,520	33	109,296	76	8	200	142,560	30,000	13,296	185,856
FAA	60	500	14,400	10	33,120	23	8	200	43,200	30,000	0	73,200
Nunivak	60	500	112,320	78	258,336	179	8	200	336,960	30,000	162,336	529,296
Tundra Ridge	60	500	74,880	52	172,224	120	8	200	224,640	30,000	76,224	330,864
Mission Lake	60	500	73,310	51	168,614	117	8	200	219,931	30,000	72,614	322,545
Kilbuck	60	500	60,480	42	139,104	97	8	200	181,440	30,000	43,104	254,544
Haroldsen Estates	60	500	18,720	13	43,056	30	8	200	56,160	30,000	0	86,160
Calculated	60	500	55,279	38	127,142	88	8	200	165,837	30,000	31,142	226,979
CSWTP - Hospital District	60	500	67,680	47	155,664	108	8	200	203,040	30,000	59,664	292,704

WTP Tanks	Fire Flow		Average Daily Demand		Max Daily Demand		Fill Rate		Reserve	Fire	Equalization	Sub Total	Backwash	Total
	Duration (min)	gpm	GPD	gpm	GPD	gpm	Duration (hrs)	gpm						
CSWTP	60	500	99,360	69	228,528	159	8	200	298,080	30,000	132,528	460,608	25,901	486,509
BHWTP	60	500	80,640	56	185,472	129	8	200	241,920	30,000	89,472	361,392	23,976	385,368
Kasayuli	60	500	80,640	56	185,472	129	8	200	241,920	30,000	89,472	361,392	21,384	382,776
Donut Hole	0	0	80,640	0	0	0	8	200	0	0	0	0	28,080	28,080

1. Reserve is 3x ADD
2. Fire is 500gpm for 60min
3. Equalization is MDD - Fill Rate for 8 hrs.
4. Backwash is 15% of ADD for contributing tanks.

3,000 gal

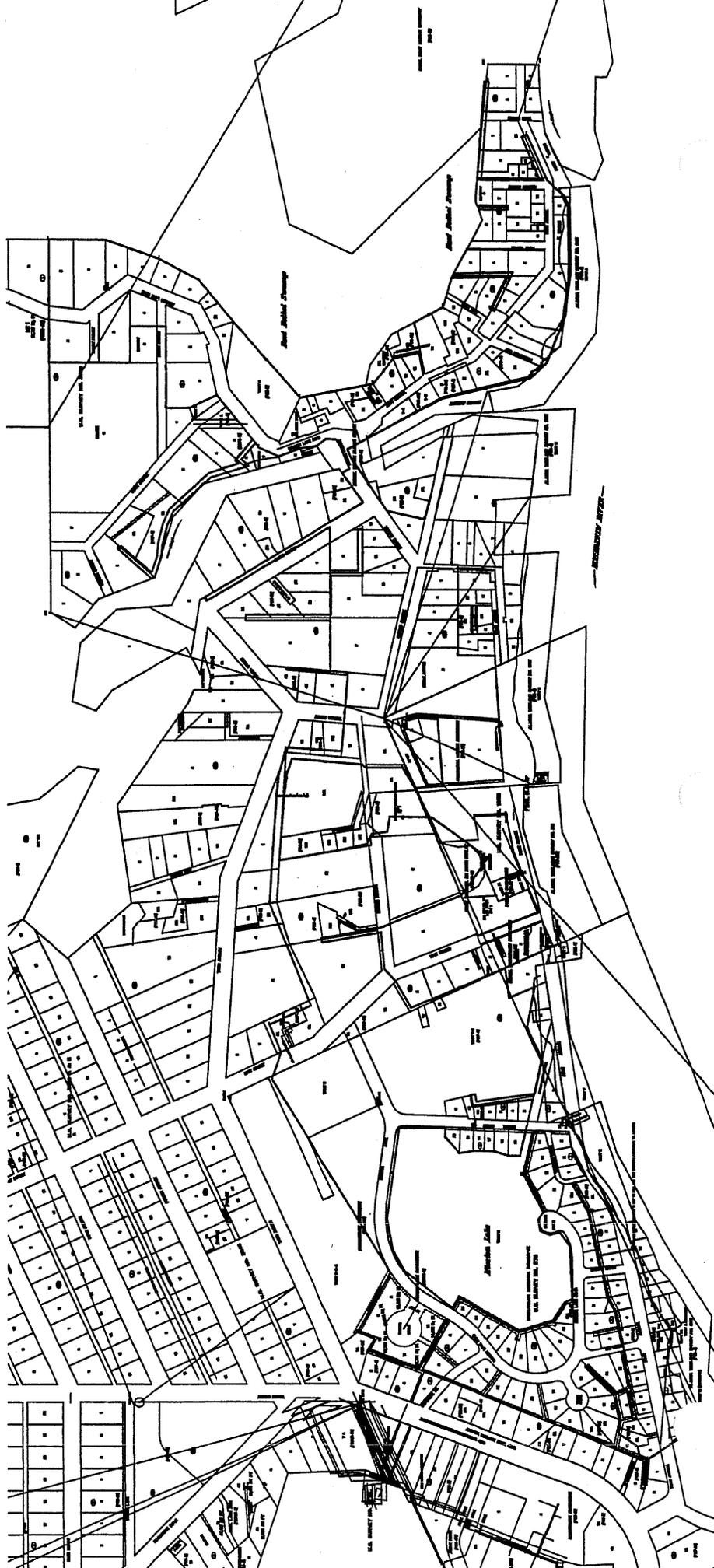
2.5 gPod

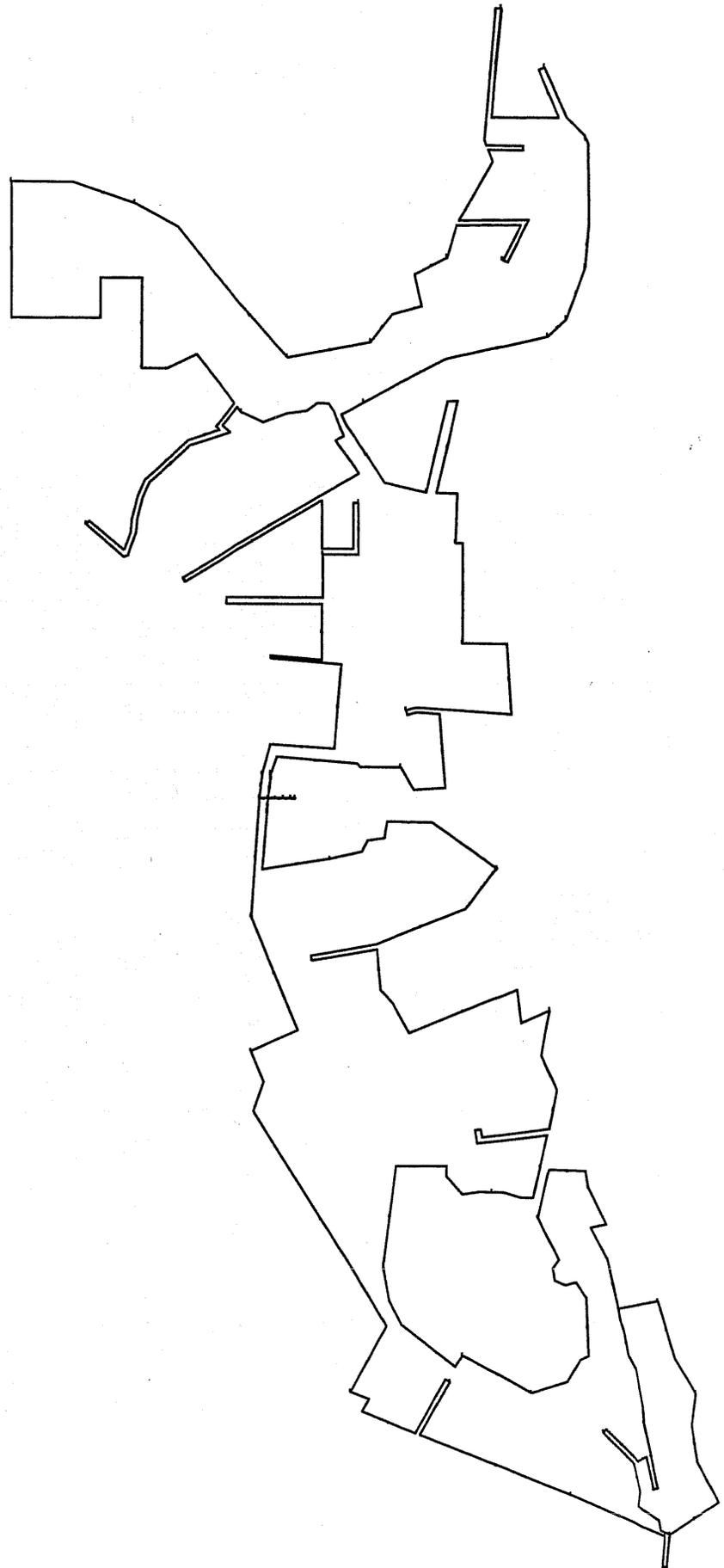
~20 mph

MISSION LAICE DISTRICT

2,500 gal / Truck

1,000 gal / Tank





City Subdivision Demands

Service Area		Dwellings	Population	Average Daily Flow		Max Daily Demand		Peak Hourly Demand gpm
				GPD	gpm	GPD	gpm	
Current and Planned Service								
1A	City Subdivision Loop A	47	172	11,151	7.74	99,895	69.37	121.40
1A	City Subdivision Loop B	75	274	17,794	12.36	127,543	88.57	155.00
1A	City Subdivision Loop C Phase A	20	73	4,745	3.30	73,234	50.86	89.00
1A	City Subdivision Loop C Phase C	23	84	5,457	3.79	76,197	52.91	92.60
3C	YE Learning Center							
	Dorm Phase 1	N/A	88	5,720	4	13,156	9	18
	Dorm Phase 2	N/A	88	5,720	4	13,156	9	18
	Dorm Phase 3	N/A	88	5,720	4	13,156	9	18
	Transients Phase 1	N/A	72	4,680	3	10,764	7	15
	Transients Phase 2	N/A	60	3,900	3	8,970	6	12
	Transients Phase 3	N/A	60	3,900	3	8,970	6	12
1D	Governmental Offices	53	193	12,574	9	105,819	73	129
	City Subdivision Truck Haul							
	Sub Total	218	1,252	81,361	57	550,860	383	679
	Backwash & WTP			6,509	5	44,069	31	54
	Total		1,252	87,869	61	594,929	413	734

Potential Extended Service

1C	Mission Lake	148	540	35,113	24	199,625	139	243
1C	Harbor	161	588	38,197	27	212,462	148	258
1D	1D less Gov. Offices	37	135	8,778	6	90,021	63	109
1D	Hospital District	N/A	N/A	67,870	47	156,101	108	212
1A	City Subdivision Loop C Extension	11	40	2,610	2	64,347	45	78
	Sub Total	357	1,303	152,568	106	722,556	502	900
	Backwash & WTP			12,205	8	57,804	40	72
	Total		1,303	164,774	114	780,360	542	973

Grand Total	2,555	252,643	175	1,375,289	955	1,706
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2. Uses 65 gal per capita per day for homes and dorms and 20 gal per capita per day for transients
3. 1A, 1C and 1D Maximum Day Demand is Peak Hourly Demand / 1.75
YE Learning Center Maximum Day Demand is 2.3 x Average Daily Demand
4. 1A, 1C and 1D Peak Hourly Demand is $125 + (1.2x(N-50))$ where N is number of dwellings.
YE Learning Center Peak Hourly Demand is 4.5 x Average Daily Demand

MDD = 412
 PHD = 57

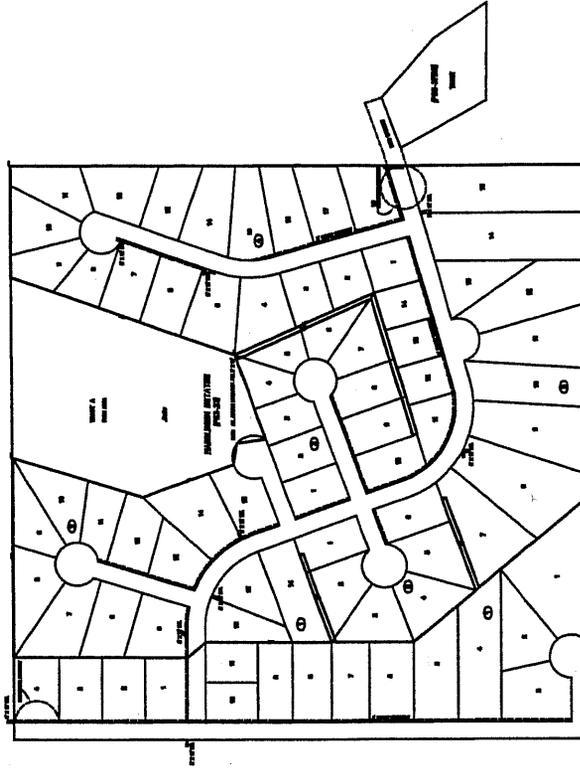
Storage

Remote Tanks	Fire Flow		Average Daily Demand		Max Daily Demand		Fill Rate		Reserve	Fire	Equalization	Total
	Duration (min)	gpm	GPD	gpm	GPD	gpm	Duration (hrs)	gpm				
Hoffman & Larson	60	500	47,520	33	109,296	76	8	200	142,560	30,000	13,296	185,856
FAA	60	500	14,400	10	33,120	23	8	200	43,200	30,000	0	73,200
Nunivak	60	500	112,320	78	258,336	179	8	200	336,960	30,000	162,336	529,296
Tundra Ridge	60	500	74,880	52	172,224	120	8	200	224,640	30,000	76,224	330,864
Mission Lake	60	500	73,310	51	168,614	117	8	200	219,937	30,000	72,614	322,545
Kilbuck	60	500	60,480	42	139,104	97	8	200	181,440	30,000	43,104	254,544
Haroldsen Estates	60	500	18,720	13	43,056	30	8	200	56,160	30,000	0	86,160
Calculated	60	500	55,279	38	127,142	88	8	200	165,837	30,000	31,142	226,979
CSWTP - Hospital District	60	500	67,680	47	155,664	108	8	200	203,040	30,000	59,664	292,704

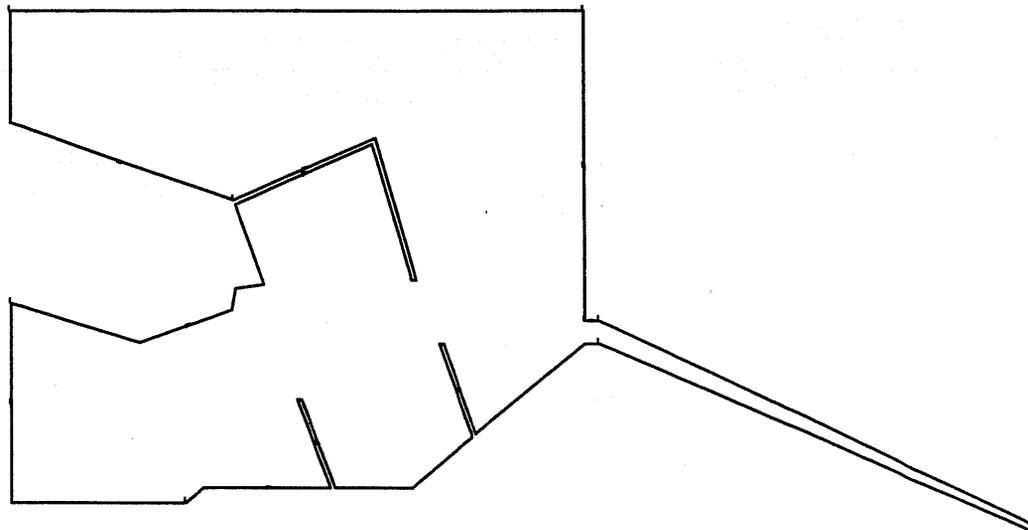
Storage tank
Size

WTP Tanks	Fire Flow		Average Daily Demand		Max Daily Demand		Fill Rate		Reserve	Fire	Equalization	Sub Total	Backwash	Total
	Duration (min)	gpm	GPD	gpm	GPD	gpm	Duration (hrs)	gpm						
CSWTP	60	500	99,360	69	228,528	159	8	200	298,080	30,000	132,528	460,608	25,901	486,509
BHWTP	60	500	80,640	56	185,472	129	8	200	241,920	30,000	89,472	361,392	23,976	385,368
Kasayuli	60	500	80,640	56	185,472	129	8	200	241,920	30,000	89,472	361,392	21,384	382,776
Donut Hole	0	0	80,640	0	0	0	8	200	0	0	0	0	28,080	28,080

1. Reserve is 3x ADD
2. Fire is 500gpm for 60min
3. Equalization is MDD - Fill Rate for 8 hrs.
4. Backwash is 15% of ADD for contributing tanks.



HAKOLDSSEN SUBDIVISION



Bethel Heights Demands

Service Area		Dwellings	Population	Average Daily Flow		Max Daily Demand		Peak Hourly Demand gpm
				GPD	gpm	GPD	gpm	
Current and Planned Service								
2A	Bethel Heights Loop A	181	661	42,942	30	232,210	161	282
2A	Bethel Heights Loop B	104	380	24,674	17	156,178	108	190
2A	LKSD Schools, City Laundromat, AVCP, Institutions, Apartments	55	201	13,049	9	107,794	75	131
	Bethel Heights Truck Haul							
	Sub Total	340	1,241	80,665	56	496,183	345	603
	Backwash & WTP			6,453	4	39,695	28	48
	Totals		1,241	87,118	60	535,877	372	651
Potential Extended Service								
1B	Kilbuck South	107	391	25,386	18	159,141	111	193
1B	Kilbuck North	148	540	35,113	24	199,625	139	243
6A	Haroldsen Estates	79	288	18,743	13	131,493	91	160
	Sub Total	334	1,219	79,242	55	490,258	340	596
	Backwash & WTP			6,339	4	39,221	27	48
	Totals	334	1,219	85,581	59	529,479	368	643
Grand Total				172,699	120	1,065,356	740	1,295

1. Uses 3.65 persons per dwelling for homes.
2. Uses 65 gal per capita per day for homes.
3. Maximum Day Demand is Peak Hourly Demand / 1.75
4. Peak Hourly Demand is $125 + (1.2 \times (N - 50))$ where N is number of dwellings.

Storage

Remote Tanks	Fire Flow		Average Daily Demand		Max Daily Demand		Fill Rate		Reserve	Fire	Equalization	Total
	Duration (min)	gpm	GPD	gpm	GPD	gpm	Duration (hrs)	gpm				
Hoffman & Larson	60	500	47,520	33	109,296	76	8	200	142,560	30,000	13,296	185,856
FAA	60	500	14,400	10	33,120	23	8	200	43,200	30,000	0	73,200
Nunivak	60	500	112,320	78	258,336	179	8	200	336,960	30,000	162,336	529,296
Tundra Ridge	60	500	74,880	52	172,224	120	8	200	224,640	30,000	76,224	330,864
Mission Lake	60	500	73,310	51	168,614	117	8	200	219,931	30,000	72,614	322,545
Kilbuck	60	500	60,480	42	139,104	97	8	200	181,440	30,000	43,104	254,544
Haroldsen Estates	60	500	18,720	13	43,056	30	8	200	56,160	30,000	0	86,160
Calculated	60	500	55,279	38	127,142	88	8	200	165,837	30,000	31,142	226,979
CSWTP - Hospital District	60	500	67,680	47	155,664	108	8	200	203,040	30,000	59,664	292,704

1. Reserve is 3x ADD
2. Fire is 500gpm for 60min
3. Equalization is MDD - Fill Rate for 8 hrs.
4. Backwash is 15% of ADD for contributing tanks.

WATER TRANSMISSION (WTP → REMOTE STORAGE TANK)

Scenarios:

1. Water is circulated in 6" HDPE to keep from freezing. The water is heated to 60 deg. F at WTP. Pressure pump (1 - 4 hp) is sized to rise water in tank to 24 ft above ground level at 200 gpm. Circulation pumps (5 - 16 hp) are sized to overcome friction and minor losses through the loop at 200 gpm.
2. Water is held stagnant in the 6" HDPE transmission line and heated by glycol in 1 1/2" HDPE to prevent freezing. Glycol is heated to 120 deg. F in the WTP and is run out and back. Pressure pump (3 - 9 hp) is sized to overcome friction and minor losses and rise water in the tank to 24 ft. above the ground surface at 200 gpm. Glycol circulation pump (0.11 - 0.39 hp) is sized to transport glycol through the loop at 6 gpm.
3. Water is held stagnant in the 6" HDPE transmission line and heated by 1-1/2" HDPE glycol line to prevent freezing. Two glycol lines heat the water pipe. Each is heated to 120 deg. F at opposing ends and flow in opposite directions. Pressure pump (3 - 9 hp) is sized to overcome friction and minor losses and rise water in the tank to 24 ft. above the ground surface at 200 gpm. Glycol circulation pumps (0 - 0.2 hp) are sized; one to transport glycol from WTP to tank and one to transport glycol from tank to WTP at 6 gpm.

Boilers are estimated to be 75% efficient. Diesel provides 140,000 Btu / gallon and costs \$3.50 / gallon.

Pump cost is calculated by: Required kW x hours of operation per day x \$0.30/kW

1.

Pressure Pumps

Tank	Distance from WTP (ft)	Elevation (ft)		K Value	Fill Rate (gpm)	Velocity (ft/sec)	Pipe Headloss Gradient (ft/1000ft)	Minor Headloss (ft)	Pipe Headloss (ft)	Elevation Head (ft)	Total Required Head (ft)	Required HP (hp)	Energy Requirement (kW)
		Begin	End										
Hoffman & Larson	15,400	115	128	6.5	200	2.78	6.58	0.78	101.33	13.00	13.00	1.0	0.76
FAA	10,500	115	124	6.5	200	2.78	6.58	0.78	89.09	9.00	9.00	0.7	0.53
Nunivak	5,700	24	72	3.9	200	2.78	6.58	0.47	37.51	48.00	48.00	3.7	2.80
Tundra Ridge	4,450	24	58	3.9	200	2.78	6.58	0.47	29.28	34.00	34.00	2.6	1.98
Mission Lake	6,000	32	32	10	200	2.78	6.58	1.20	39.48	0.00	0.00	0.0	0.00
Kilbuck	4,300	14	30	5.6	200	2.78	6.58	0.67	28.29	16.00	16.00	1.2	0.93
Haroldsen	7,000	14	32	5.7	200	2.78	6.58	0.68	46.06	18.00	18.00	1.4	1.05

**Pressure Pumps run 8 hrs per day

Circulation Pumps

Tank	Distance from WTP (ft)	K Values		Flow Rate		Velocity		Pipe Headloss Gradient		Minor Headloss		Pipe Headloss Total (ft)	Total Required Head (ft)	Required HP (hp)	Energy Requirement (kW)
		To Tank	To WTP	To Tank	To WTP	To Tank	To WTP	To Tank	To WTP						
Hoffman & Larson	15,400	6.5	15	200	200	2.78	2.78	6.58	6.58	0.78	1.80	202.66	205.24	15.93	11.95
FAA	10,500	6.5	15	200	200	2.78	2.78	6.58	6.58	0.78	1.80	138.18	140.76	10.92	8.19
Nunivak	5,700	3.9	9.8	200	200	2.78	2.78	6.58	6.58	0.47	1.18	75.01	76.66	5.95	4.46
Tundra Ridge	4,450	3.9	9.8	200	200	2.78	2.78	6.58	6.58	0.47	1.18	58.56	60.21	4.67	3.50
Mission Lake	6,000	10	22	200	200	2.78	2.78	6.58	6.58	1.20	2.64	78.96	82.80	6.43	4.82
Kilbuck	4,300	5.6	13.2	200	200	2.78	2.78	6.58	6.58	0.67	1.58	56.59	58.84	4.57	3.42
Haroldsen	7,000	5.7	13.4	200	200	2.78	2.78	6.58	6.58	0.68	1.61	92.12	94.41	7.33	5.49

* Circulation Pumps run 24 hrs per day

1. Pipe Headloss is based on flow rate and pipe material / diameter
2. Minor Headloss is $K(V^2/2g)$
3. Pipe Headloss is gradient * distance / 1000
4. Elevation Head is difference in elevation from WTP to tank
5. Total head for pressure pump is only the elevation head, the pipe friction loss and minor loss is overcome by the circulation pumps.
6. Required HP is $Q^2H/3966 * .65$
7. Energy required is $0.75 * hp$
8. Cost is $kWh * 8hr \text{ pumping per day} * \$0.30 \text{ per kWh} * 365 \text{ days per year}$
24hr pumping per day for circulation pumps

2.

Pressure Pumps

Tank	Distance from WTP (ft)	Elevation		K Value	Fill Rate (gpm)	Velocity (ft/sec)	Pipe Headloss Gradient (ft/1000ft)	Minor Headloss (ft)	Pipe Headloss (ft)	Elevation Head (ft)	Total Required Head (ft)	Required HP (hp)	Energy Requirement (kW)
		Begin (ft)	End (ft)										
Hoffman & Larson	15,400	115	128	6.5	200	2.78	6.58	0.78	101.33	13.00	115.11	9.0	6.71
FAA	10,500	115	124	6.5	200	2.78	6.58	0.78	69.09	9.00	78.87	6.1	4.60
Nunivak	5,700	24	72	3.9	200	2.78	6.58	0.47	37.51	48.00	85.97	6.7	5.02
Tundra Ridge	4,450	24	58	3.9	200	2.78	6.58	0.47	29.28	34.00	63.75	5.0	3.72
Mission Lake	6,000	32	32	10	200	2.78	6.58	1.20	39.48	0.00	40.68	3.2	2.37
Kilbuck	4,300	14	30	5.6	200	2.78	6.58	0.87	28.29	16.00	44.97	3.5	2.62
Haroldsen	7,000	14	32	5.7	200	2.78	6.58	0.68	46.06	18.00	64.74	5.0	3.78

**Pressure Pumps run 8 hrs per day

Glycol Circulation 1 1/2" HDPE

Tank	Distance from WTP (ft)	Elevation		K Value	Flow Rate (gpm)	Velocity (ft/sec)	Pipe Headloss Gradient (ft/1000ft)	Minor Headloss (ft)	Pipe Headloss (ft)	Elevation Head (ft)	Total Required Head (ft)	Required HP (hp)	Energy Requirement (kW)
		Begin (ft)	End (ft)										
Hoffman & Larson	15,400	115	115	15	6	1.015	5.41	0.24	166.63	0	166.87	0.39	0.29
FAA	10,500	115	115	15	6	1.015	5.41	0.24	113.61	0	113.85	0.27	0.20
Nunivak	5,700	24	24	9.8	6	1.015	5.41	0.16	61.87	0	61.83	0.14	0.11
Tundra Ridge	4,450	24	24	9.8	6	1.015	5.41	0.16	48.15	0	48.31	0.11	0.08
Mission Lake	6,000	32	32	22	6	1.015	5.41	0.35	64.92	0	65.27	0.15	0.11
Kilbuck	4,300	14	14	13.2	6	1.015	5.41	0.21	46.53	0	46.74	0.11	0.08
Haroldsen	7,000	14	14	13.4	6	1.015	5.41	0.21	75.74	0	75.95	0.18	0.13

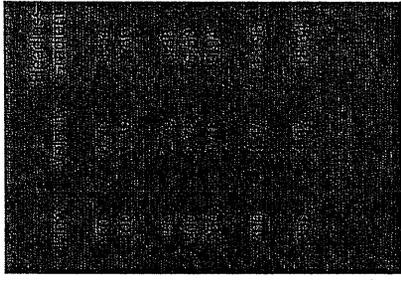
* Circulation Pumps run 24 hrs per day

1. Pipe Headloss is based on flow rate and pipe material / diameter
2. Minor Headloss is $K \cdot (V^2 / 2g)$
3. Pipe Headloss is gradient * distance / 1000
4. Elevation Head is difference in elevation from WTP to tank
5. Total head for pressure pump is sum of minor, friction and elevation loss.
6. Required HP is $Q \cdot H / 3960 \cdot \eta$
7. Energy required is $0.75 \cdot \text{hp}$
8. Cost is $\text{kWh} \cdot 8 \text{hr pumping per day} \cdot \$0.30 \text{ per kWh} \cdot 365 \text{ days per year}$
20hr pumping per day for circulation pumps

3.

Pressure Pumps

Tank	Distance from WTP (ft)	Elevation		K Value	Fill Rate (gpm)	Velocity (ft/sec)	Pipe Headloss Gradient (ft/1000ft)	Minor Headloss (ft)	Pipe Headloss (ft)	Elevation Head (ft)	Total Required Head (ft)	Required HP (hp)	Energy Requirement (kW)	Energy Cost (\$/day)
		Begin (ft)	End (ft)											
Hoffman & Larson	15,400	115	128	6.5	200	2.78	6.58	0.78	101.33	13.00	115.11	9.0	6.71	\$15.12
FAA	10,500	115	124	6.5	200	2.78	6.58	0.78	69.09	9.00	78.87	6.1	4.60	\$11.01
Nunivak	5,700	24	72	3.9	200	2.78	6.58	0.47	37.51	48.00	85.97	6.7	5.02	\$12.01
Tundra Ridge	4,450	24	58	3.9	200	2.78	6.58	0.47	29.28	34.00	63.75	5.0	3.72	\$8.92
Mission Lake	6,000	32	32	10	200	2.78	6.58	1.20	39.48	0.00	40.68	3.2	2.37	\$5.70
Kilbuck	4,300	14	30	5.6	200	2.78	6.58	0.67	28.29	16.00	44.97	3.5	2.62	\$6.49
Haroldsen	7,000	14	32	5.7	200	2.78	6.58	0.68	46.06	18.00	64.74	5.0	3.78	\$9.03



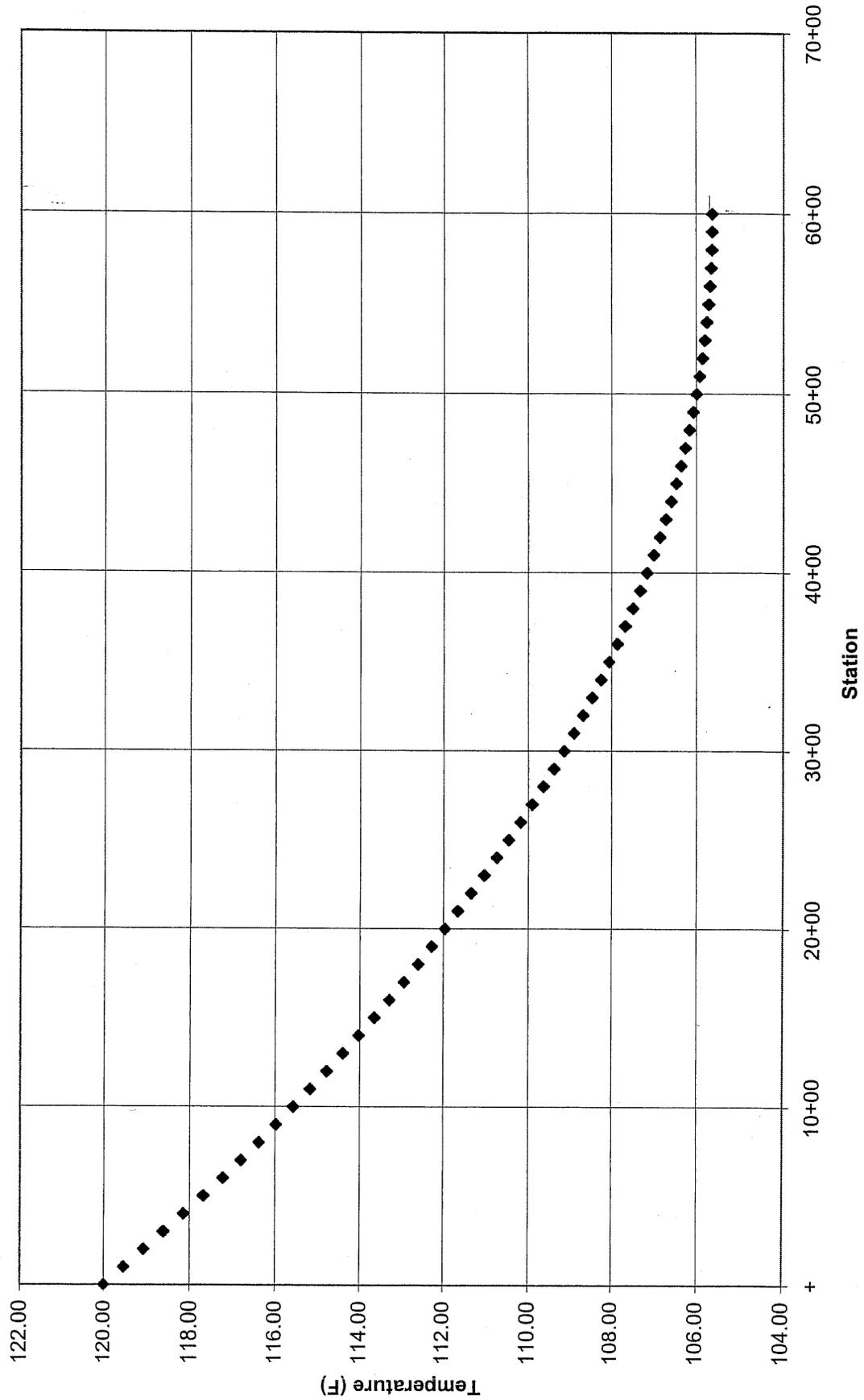
Glycol Circulation 1 1/2" HDPE

Tank	Distance from WTP (ft)	Elevation		K Value	Flow Rate (gpm)	Velocity (ft/sec)	Pipe Headloss Gradient (ft/1000ft)	Minor Headloss (ft)	Pipe Headloss (ft)	Elevation Head (ft)	Total Required Head WTP to Tank (ft)	Total Required Head Tank to WTP (ft)	Required HP to Tank (hp)	Required HP to WTP (hp)	Energy Requirement to Tank (kW)	Energy Requirement to WTP (kW)	Energy Cost to Tank (\$/day)	Energy Cost to WTP (\$/year)	Energy Cost Total (\$/year)
		Begin (ft)	End (ft)																
Hoffman & Larson	15,400	115	128	8.5	6	1.015	5.41	0.14	83.31	13	96.45	70.45	0.23	0.16	0.17	0.12	\$1.22	\$0.89	\$2.10
FAA	10,500	115	124	8.5	6	1.015	5.41	0.14	56.81	9	65.94	47.94	0.15	0.11	0.12	0.08	\$0.83	\$0.60	\$1.43
Nunivak	5,700	24	72	5.9	6	1.015	5.41	0.09	30.84	48	78.93	0.00	0.18	0.00	0.14	0.00	\$0.99	\$0.00	\$0.99
Tundra Ridge	4,450	24	58	5.9	6	1.015	5.41	0.09	24.07	34	58.17	0.00	0.14	0.00	0.10	0.00	\$0.73	\$0.00	\$0.73
Mission Lake	6,000	32	32	12	6	1.015	5.41	0.19	32.46	0	32.65	32.65	0.08	0.08	0.06	0.06	\$0.41	\$0.41	\$0.82
Kilbuck	4,300	14	30	7.6	6	1.015	5.41	0.12	23.26	16	39.38	7.38	0.09	0.02	0.07	0.01	\$0.50	\$0.09	\$0.59
Haroldsen	7,000	14	32	7.7	6	1.015	5.41	0.12	37.87	18	56.99	19.99	0.13	0.05	0.10	0.03	\$0.71	\$0.25	\$0.96

Operation and Maintenance Costs per day

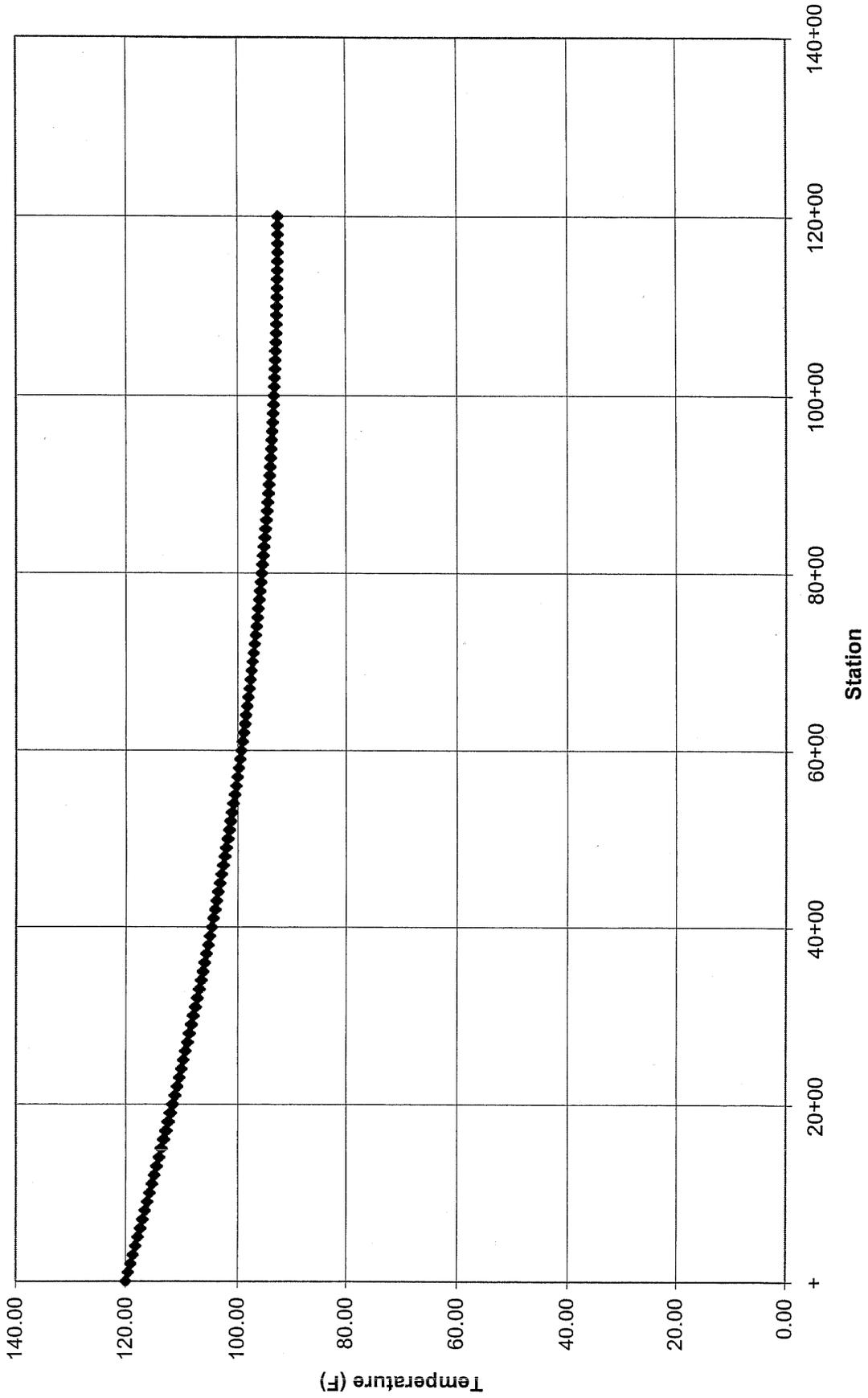
Mission Lake Subdivision						
	<i>Water Pressure Pump</i>	<i>Water Circulation Pump</i>	<i>Water Boiler</i>	<i>Glycol Circulation Pump</i>	<i>Glycol Boiler</i>	Totals
Scenario						
1.	\$0.00	\$34.70	\$53.45			\$88.15
2.	\$5.70			\$0.82	\$57.52	\$64.04
3.	\$5.70			\$0.82	\$60.11	\$66.63

Glycol with Reheat at Both Ends



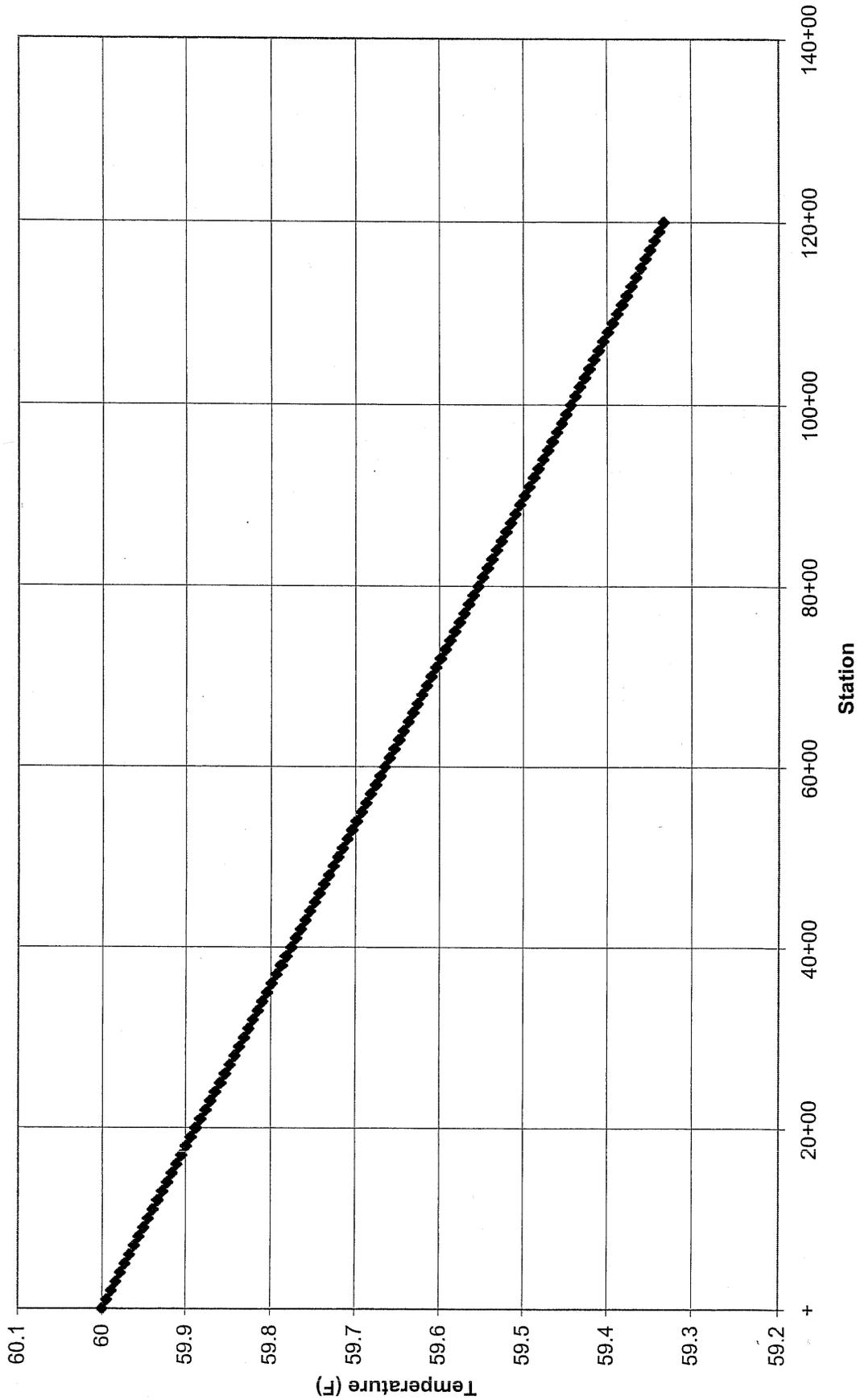
MISSION LAKE DISTRICT

Glycol loop w/ reheat at one end



MISSION LAKE DISTRICT

WATER CIRCULATION
Temperature Change

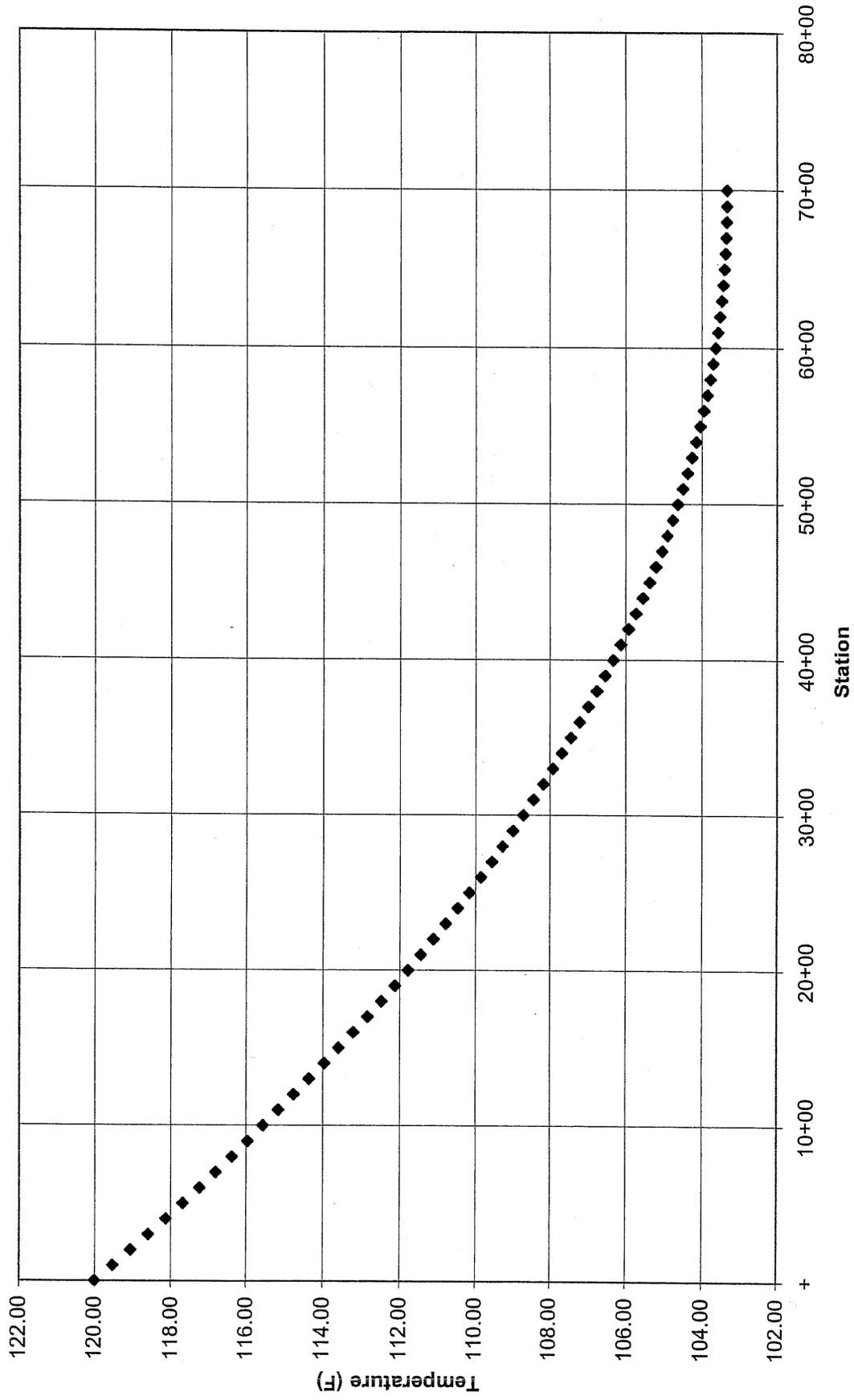


MISSION LAKE DISTRICT

Operation and Maintenance Costs per day

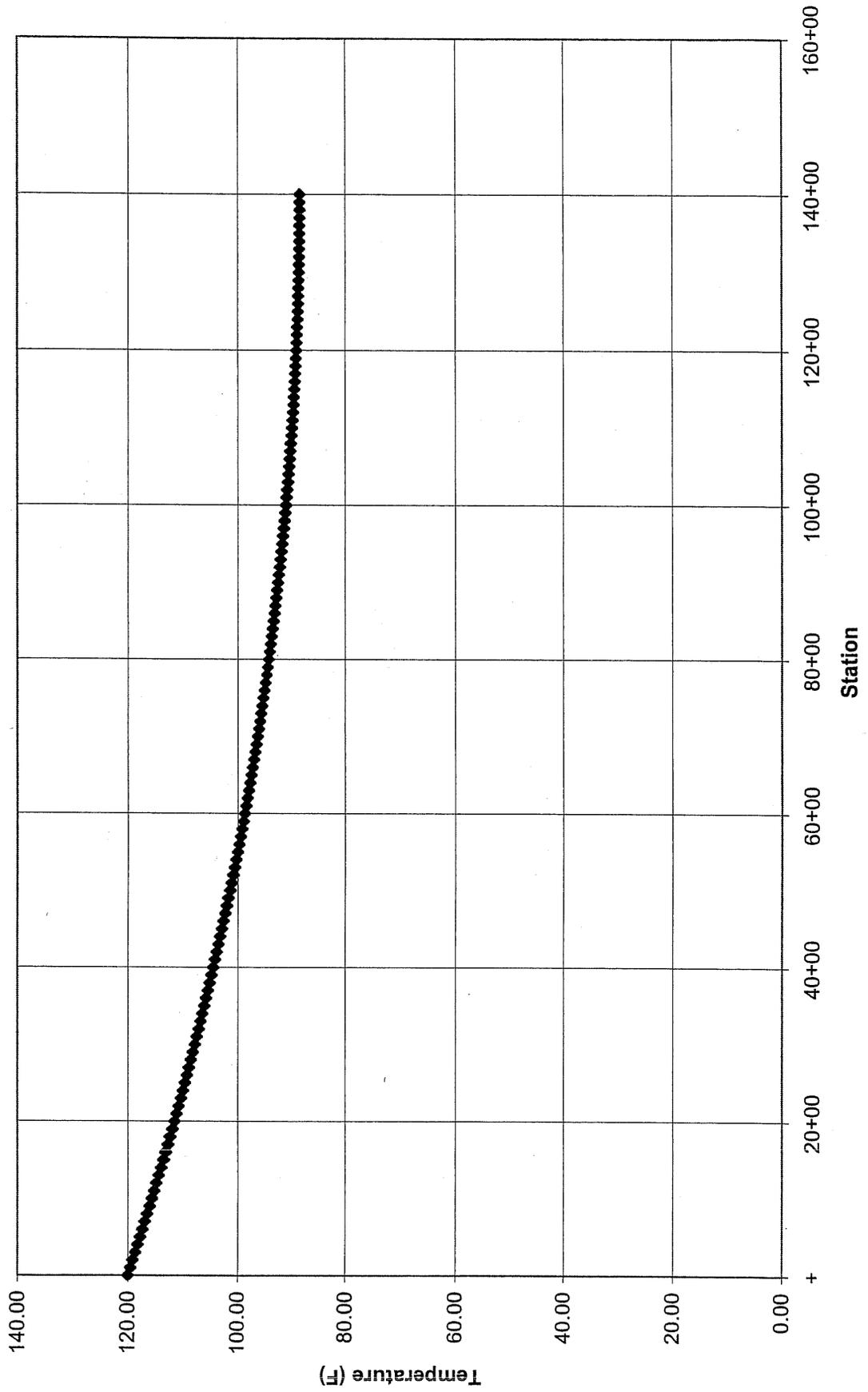
Haroldsen Subdivision						
	<i>Water Pressure Pump</i>	<i>Water Circulation Pump</i>	<i>Water Boiler</i>	<i>Glycol Circulation Pump</i>	<i>Glycol Boiler</i>	Totals
Scenario						
1.	\$2.52	\$39.56	\$41.52			\$83.61
2.	\$9.06			\$0.96	\$66.12	\$76.14
3.	\$9.06			\$0.96	\$69.73	\$79.75

Glycol with Reheat at Both Ends



HAROLDSEN SUBMISSION

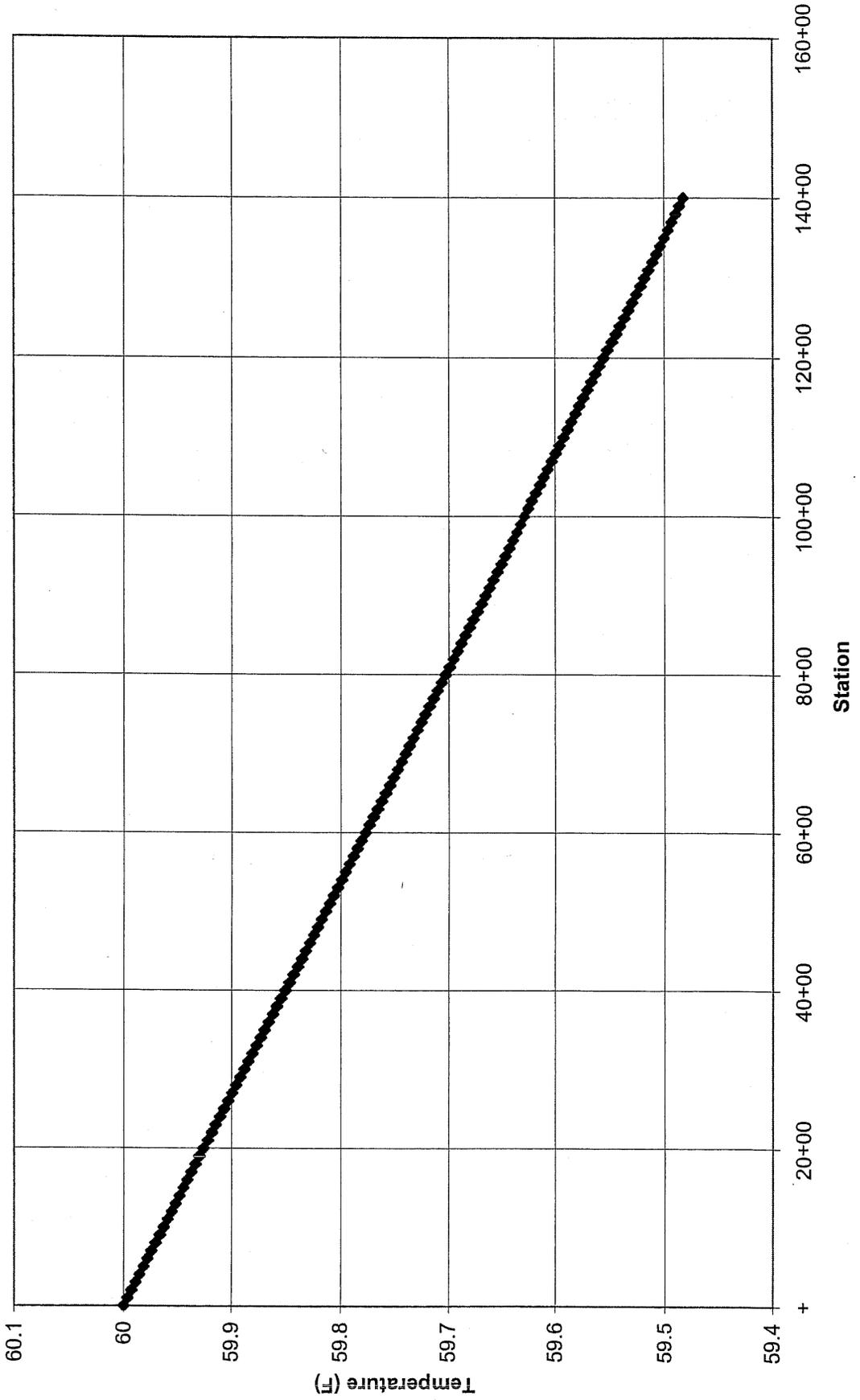
Glycol loop w/ reheat at one end



HAROLD SENN SUBMISSION

WATER CIRCULATION

Temperature Change



HARROLDSON SUBDIVISION

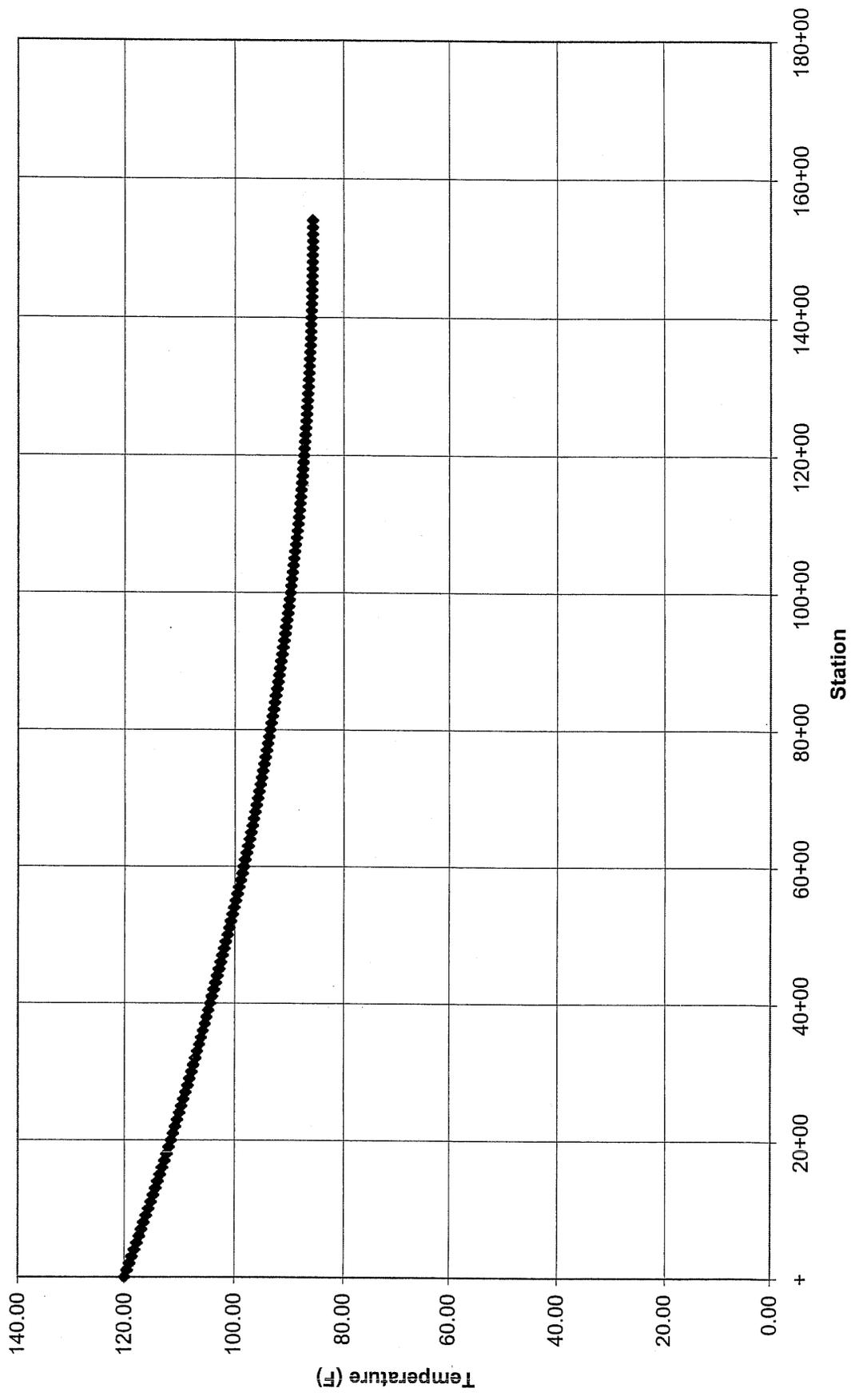
Operation and Maintenance Costs per day

Larsen Subdivision from Kasayuli						
	Water Pressure Pump	Water Circulation Pump	Water Boiler	Glycol Circulation Pump	Glycol Boiler	Totals
Scenario						
1.	\$1.82	\$86.01	\$90.98			\$178.81
2.	\$16.12			\$2.10	\$134.15	\$152.37
3.	\$16.12			\$2.10	\$143.60	\$161.82

No good
will not work
too long to
much heat
loss.
glycol
temp <
water
temp

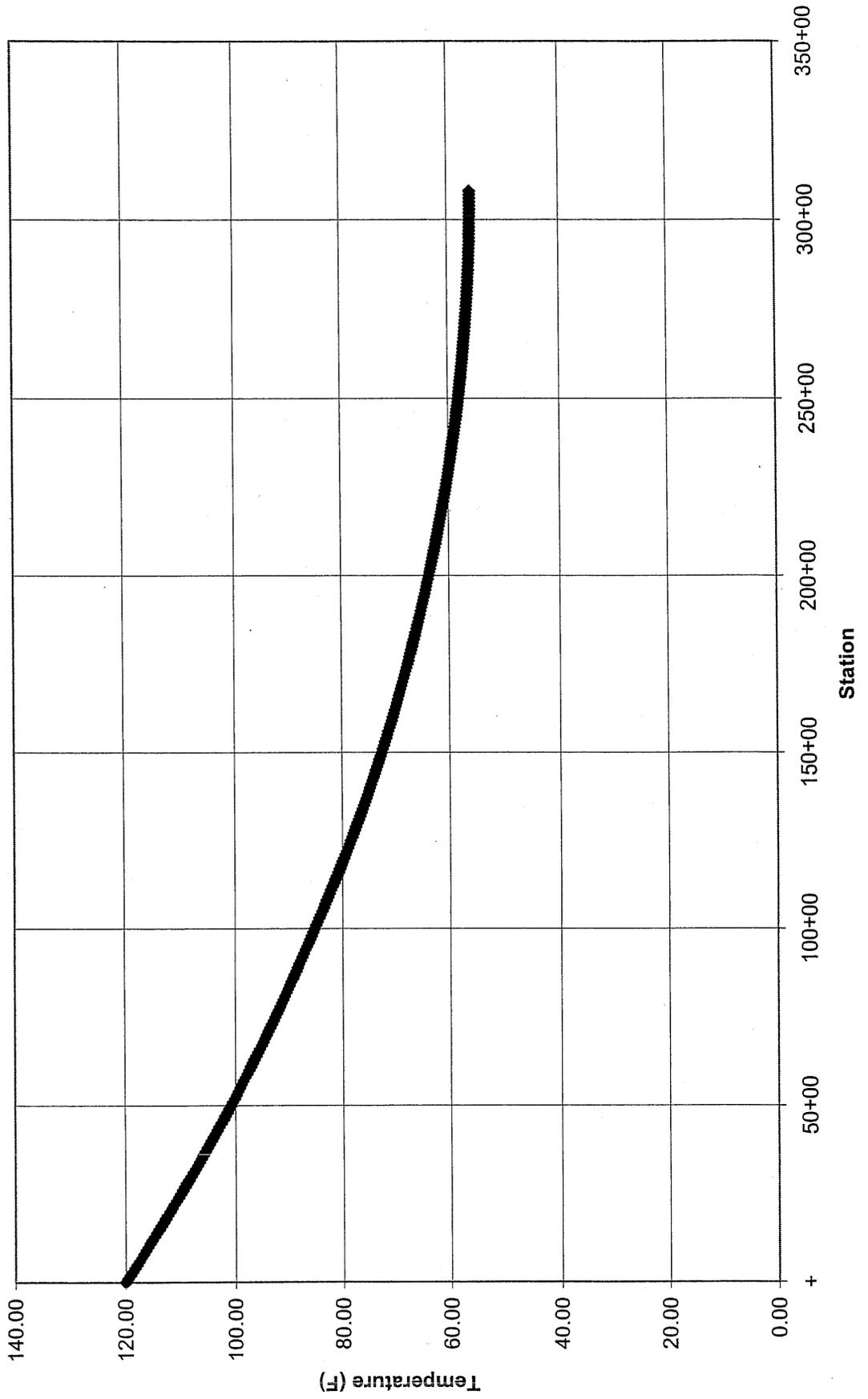
Larsen from FAA Tank location By estimation and interpolation of other sites.

Glycol with Reheat at Both Ends



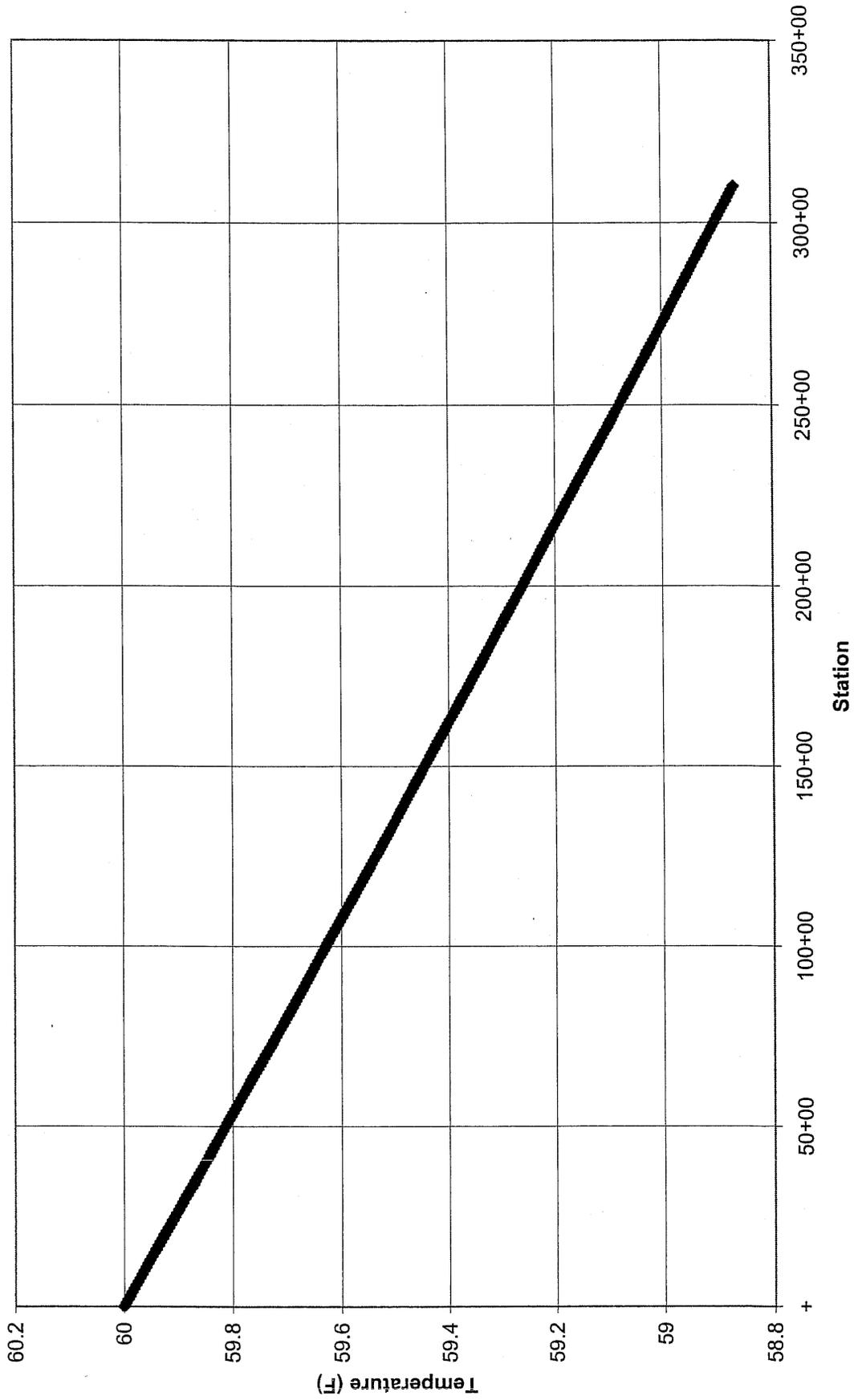
LARSEN SUBDIVISION

Glycol loop w/ reheat at one end



LARSEN SUBDIVISION

WATER CIRCULATION
Temperature Change H₂O

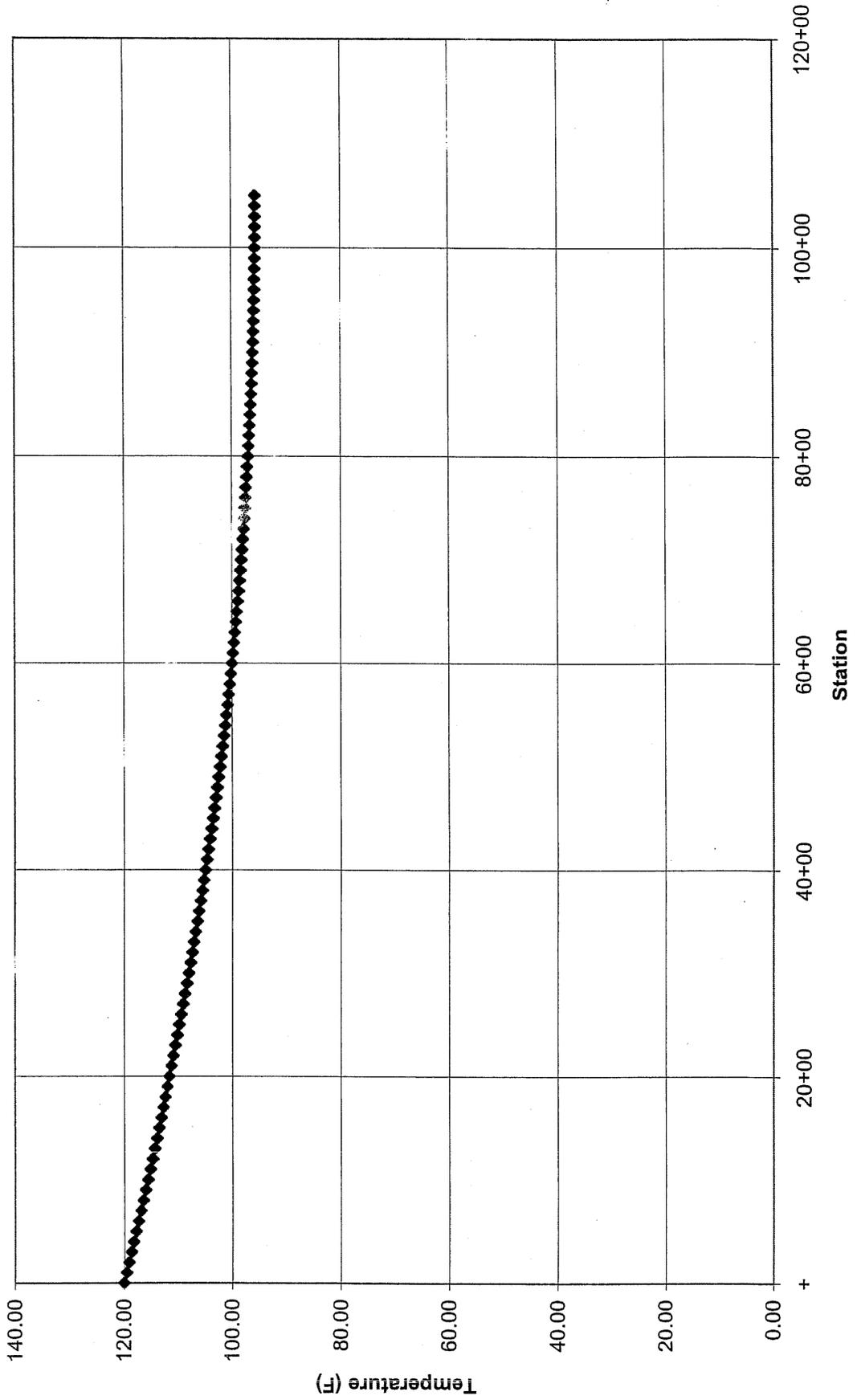


LARSEN SUBDIVISION

Operation and Maintenance Costs per day

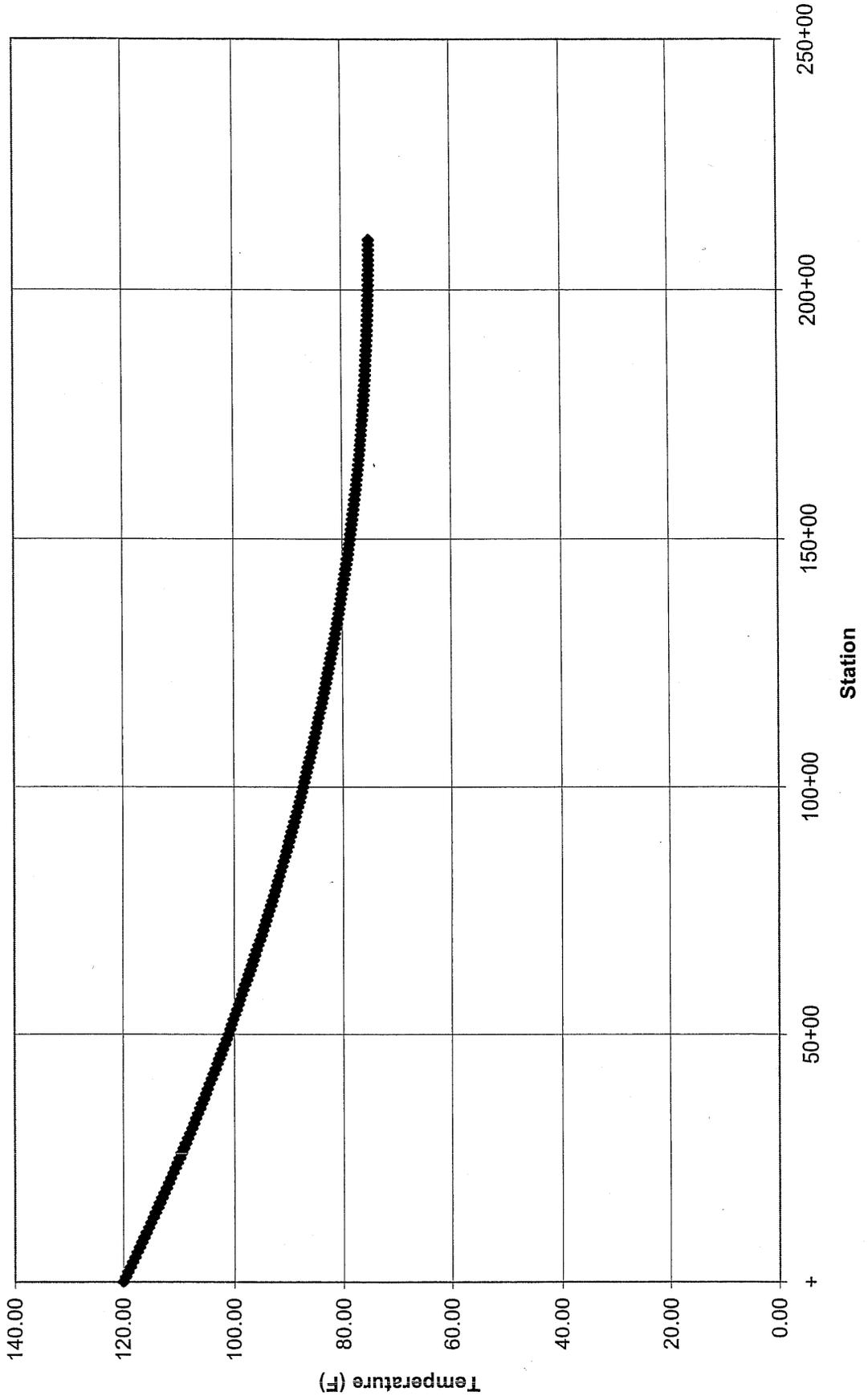
FAA from Kasayuli						
	<i>Water Pressure Pump</i>	<i>Water Circulation Pump</i>	<i>Water Boiler</i>	<i>Glycol Circulation Pump</i>	<i>Glycol Boiler</i>	Totals
Scenario						
1.	\$1.26	\$58.99	\$93.02			\$153.27
2.	\$11.04			\$1.43	\$94.13	\$106.61
3.	\$11.04			\$1.43	\$102.11	\$114.59

Glycol with Reheat at Both Ends



FAA

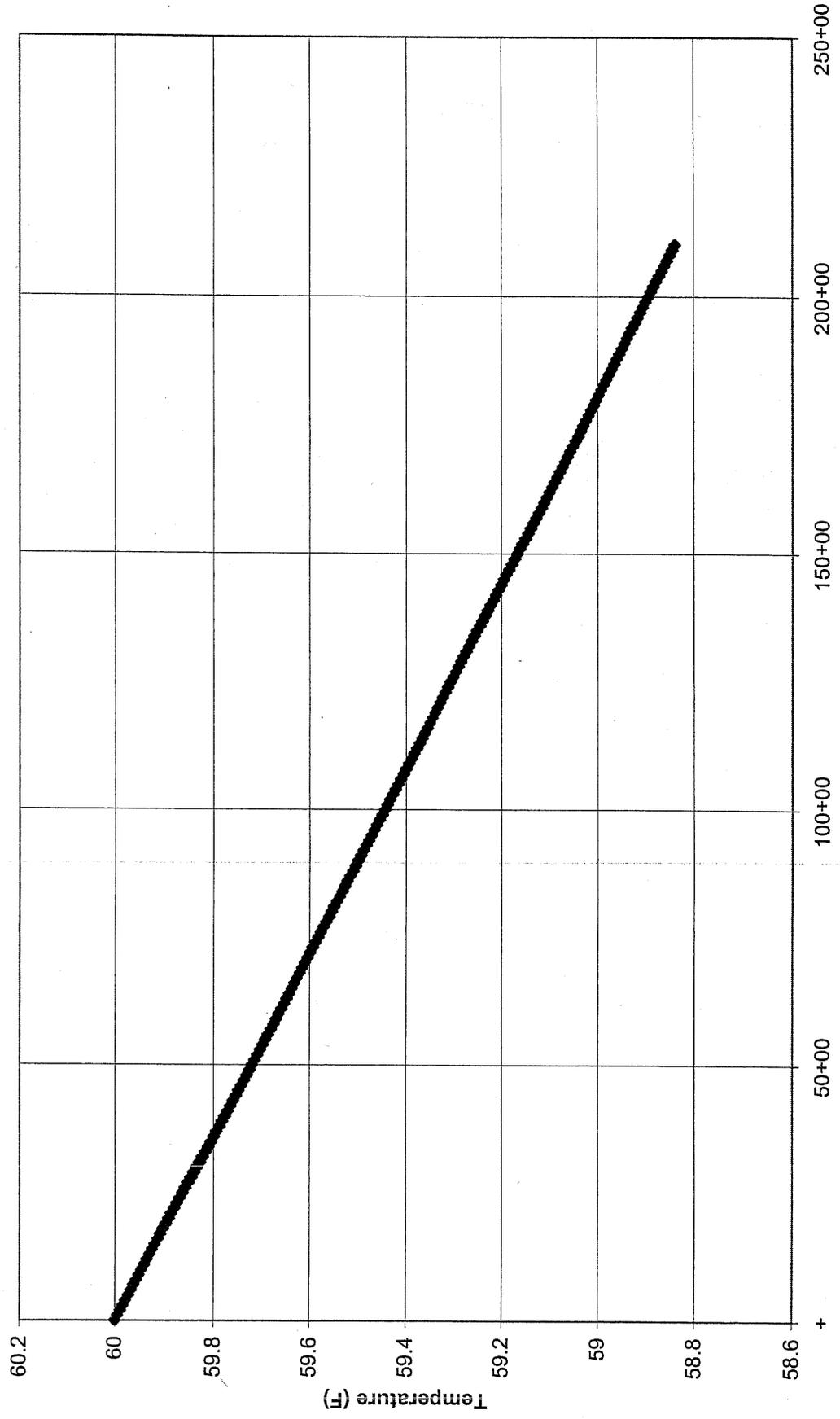
Glycol loop w/ reheat at one end



FAA

WATER CIRCULATION

Temperature Change

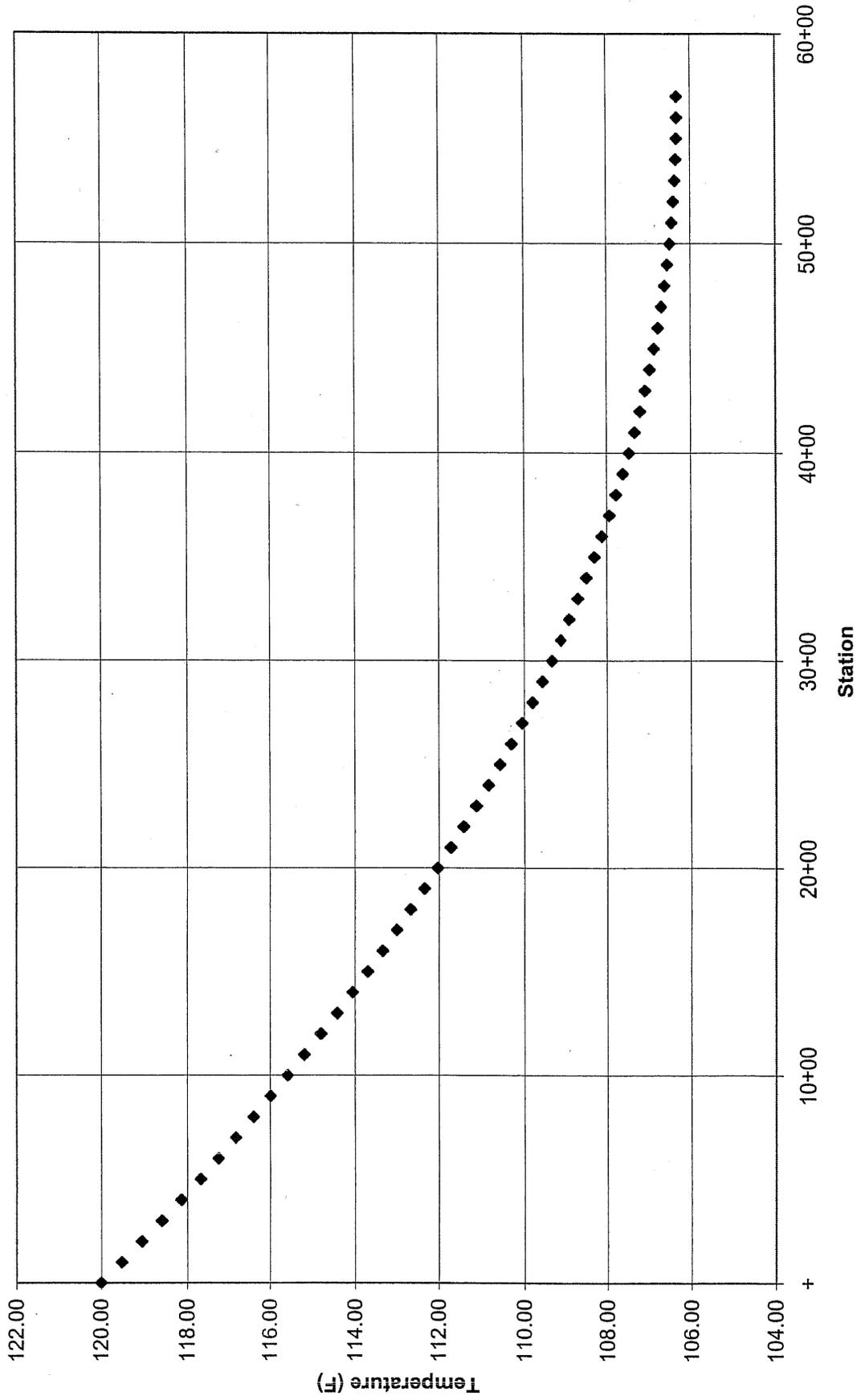


PAA

Operation and Maintenance Costs per day

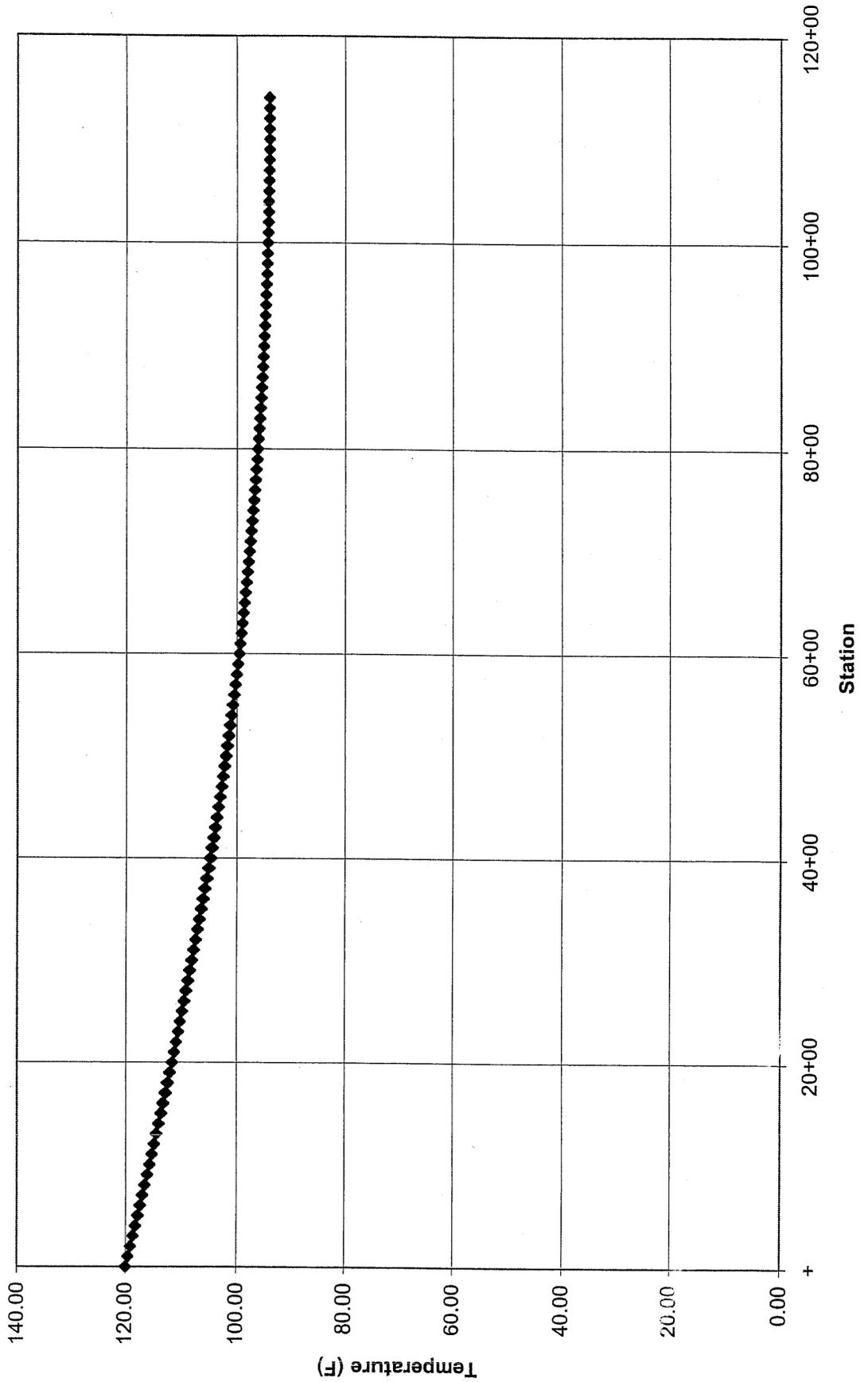
Nunivak Subdivision from Donut Hole						
	<i>Water Pressure Pump</i>	<i>Water Circulation Pump</i>	<i>Water Boiler</i>	<i>Glycol Circulation Pump</i>	<i>Glycol Boiler</i>	Totals
Scenario						
1.	\$6.72	\$32.12	\$33.87			\$72.71
2.	\$12.04			\$0.78	\$54.91	\$67.73
3.	\$12.04			\$0.99	\$57.22	\$70.25

Glycol with Reheat at Both Ends



NUNYAK SUBMISSION

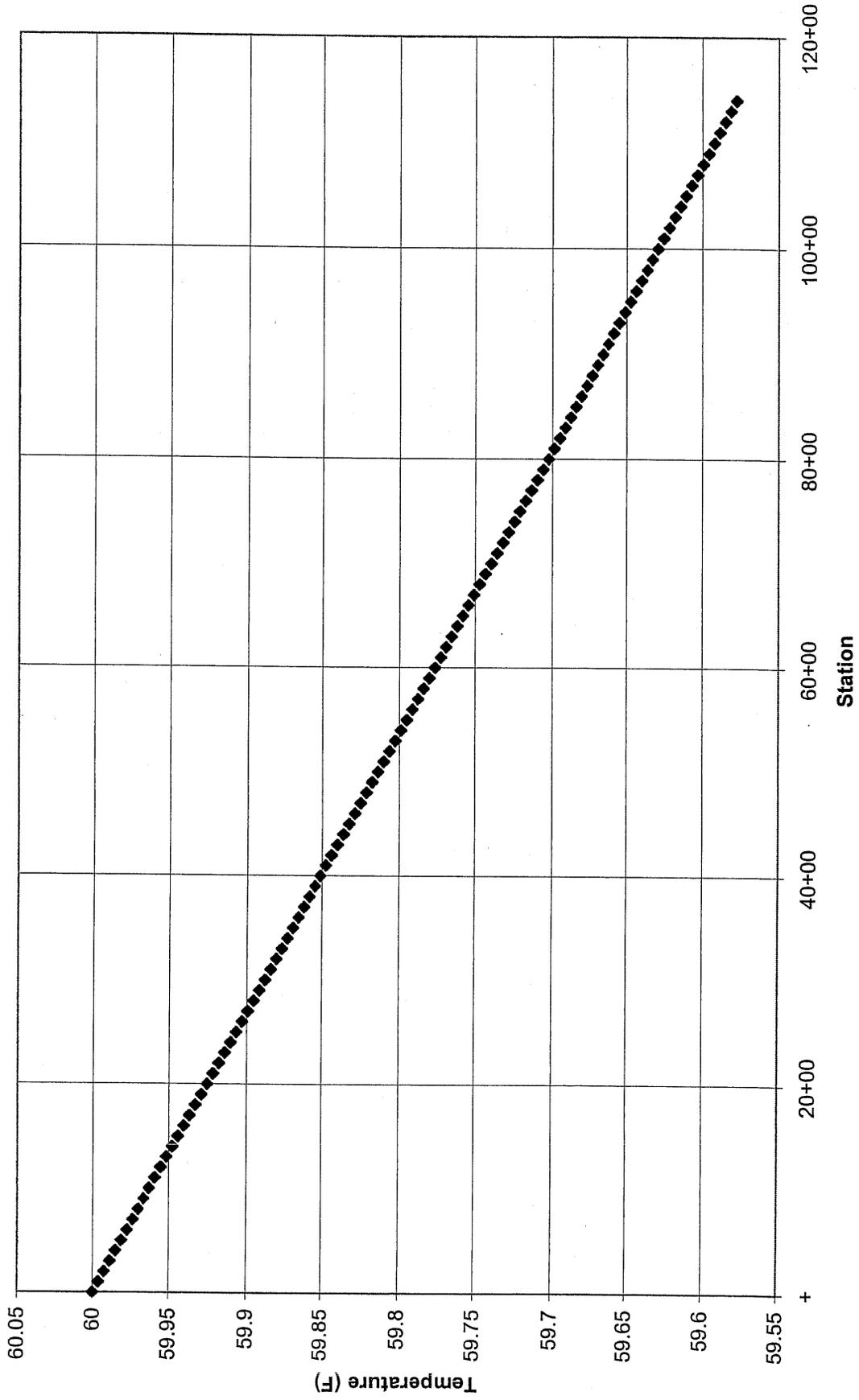
Glycol loop w/ reheat at one end



NUMVAX SUBMISSION

WATER CIRCULATION

Temperature Change



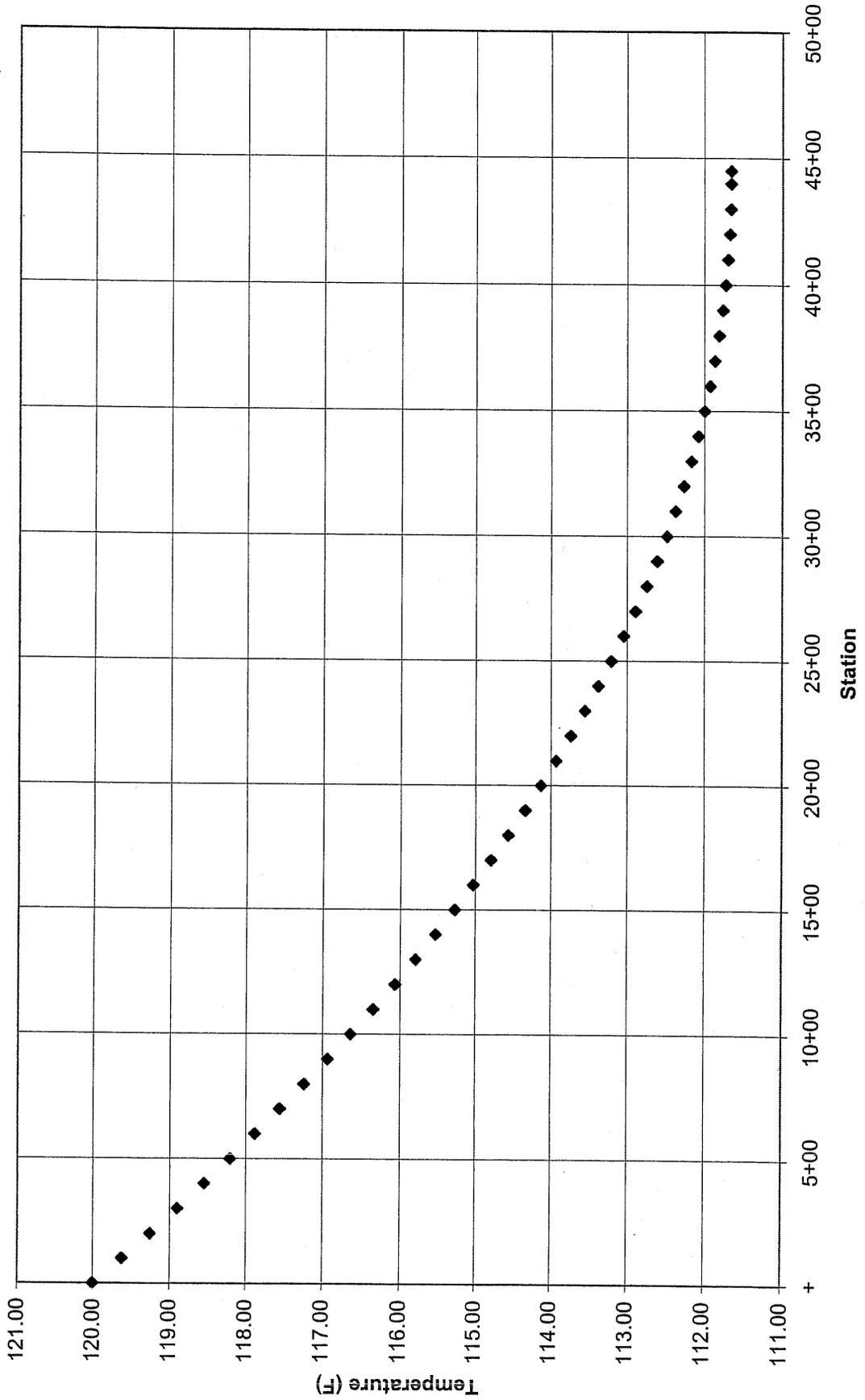
MUNIVAK SUBMISSION

Operation and Maintenance Costs per day

Tundra Ridge Subdivision from Donut Hole						
	Water Pressure Pump	Water Circulation Pump	Water Boiler	Glycol Circulation Pump	Glycol Boiler	Totals
Scenario						
1.	\$4.76	\$25.23	\$26.48			\$56.47
2.	\$8.92			\$0.61	\$43.67	\$53.20
3.	\$8.92			\$0.73	\$34.93	\$44.59

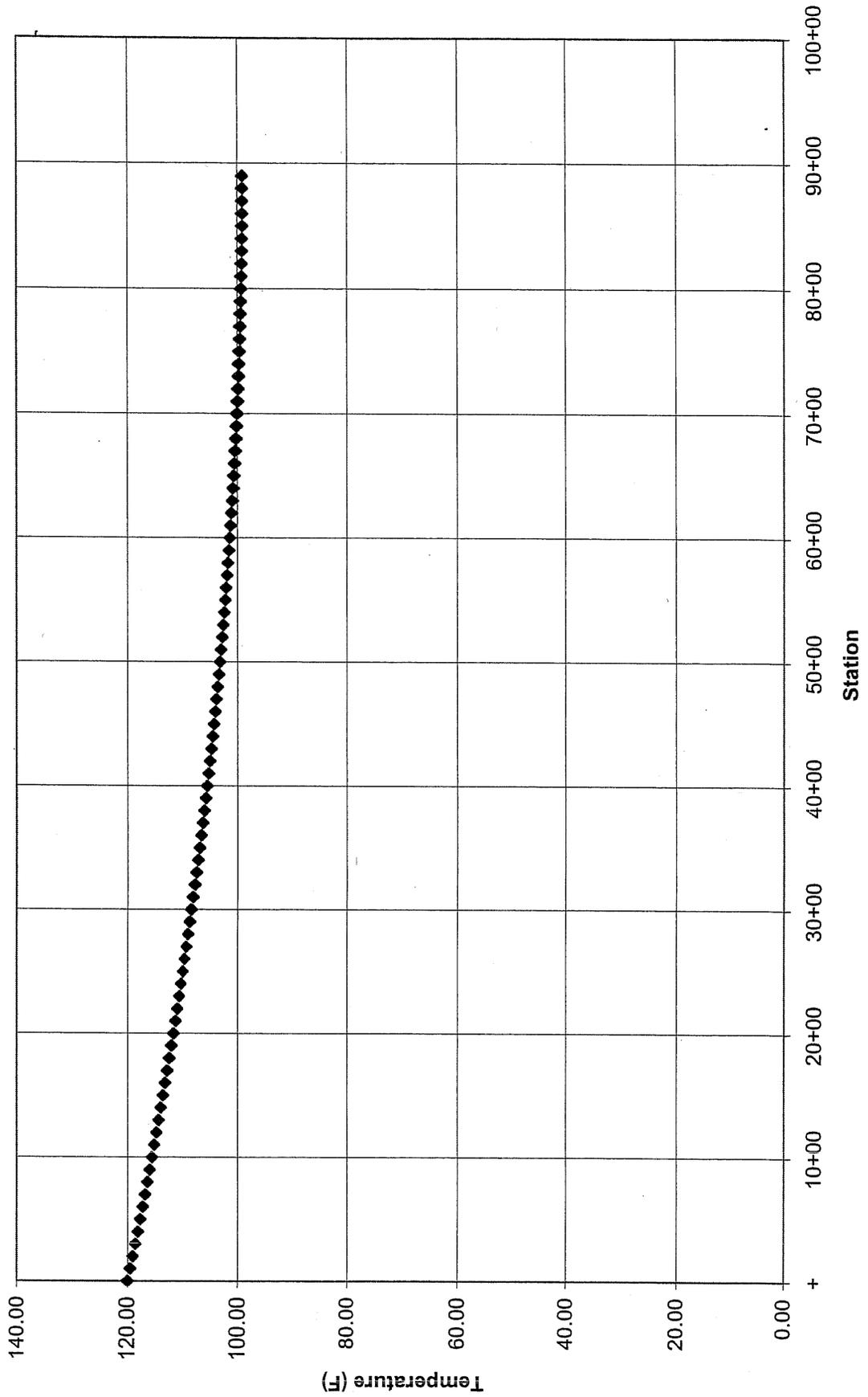
From BETHEL HEIGHTS —
 By estimation and interpolation of 8 other
 Scenarios.

Glycol with Reheat at Both Ends



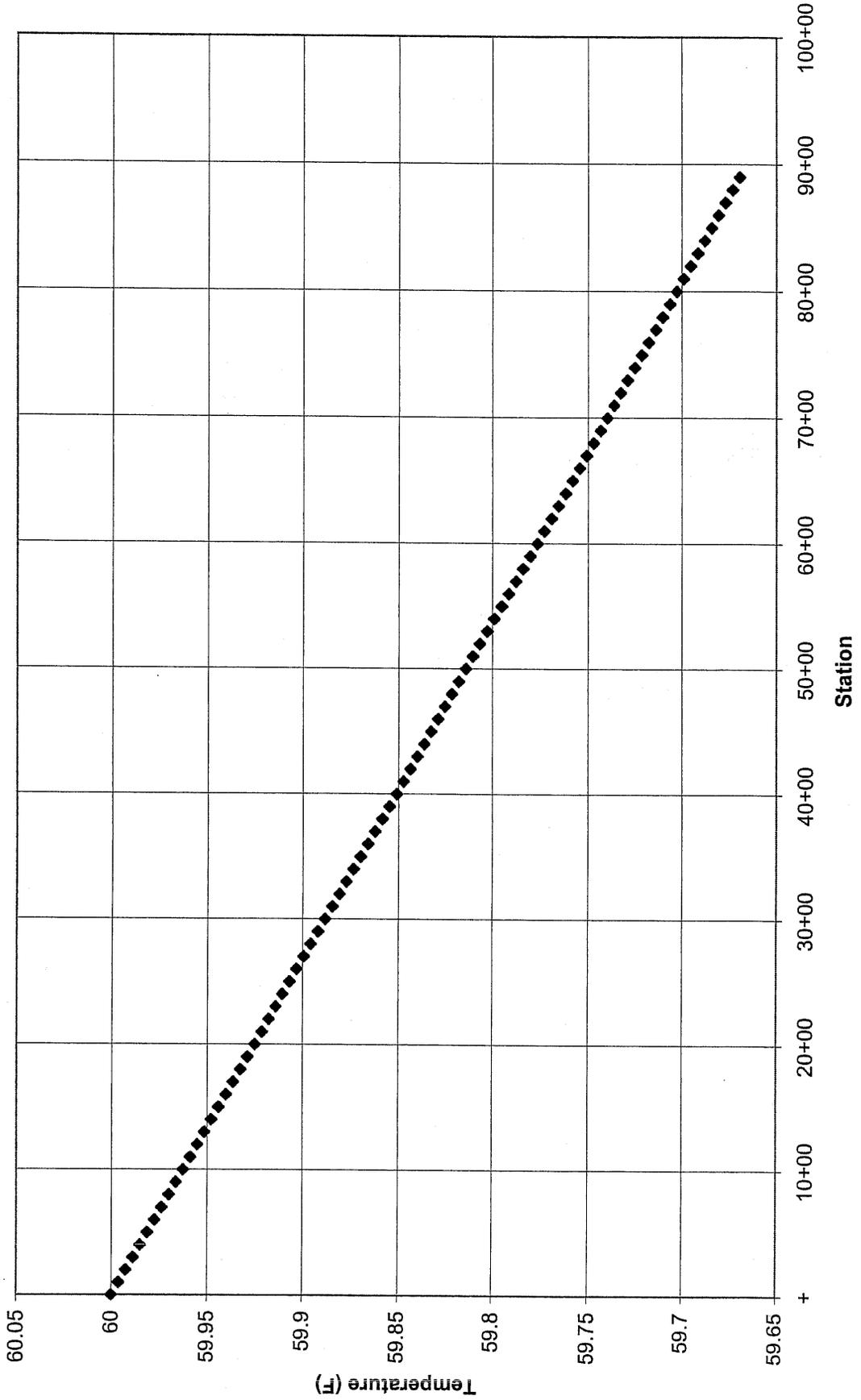
TUNDRA RIDGE

Glycol loop w/ reheat at one end



TUNDRA RIDGE

WATER CIRCULATION
Temperature Change



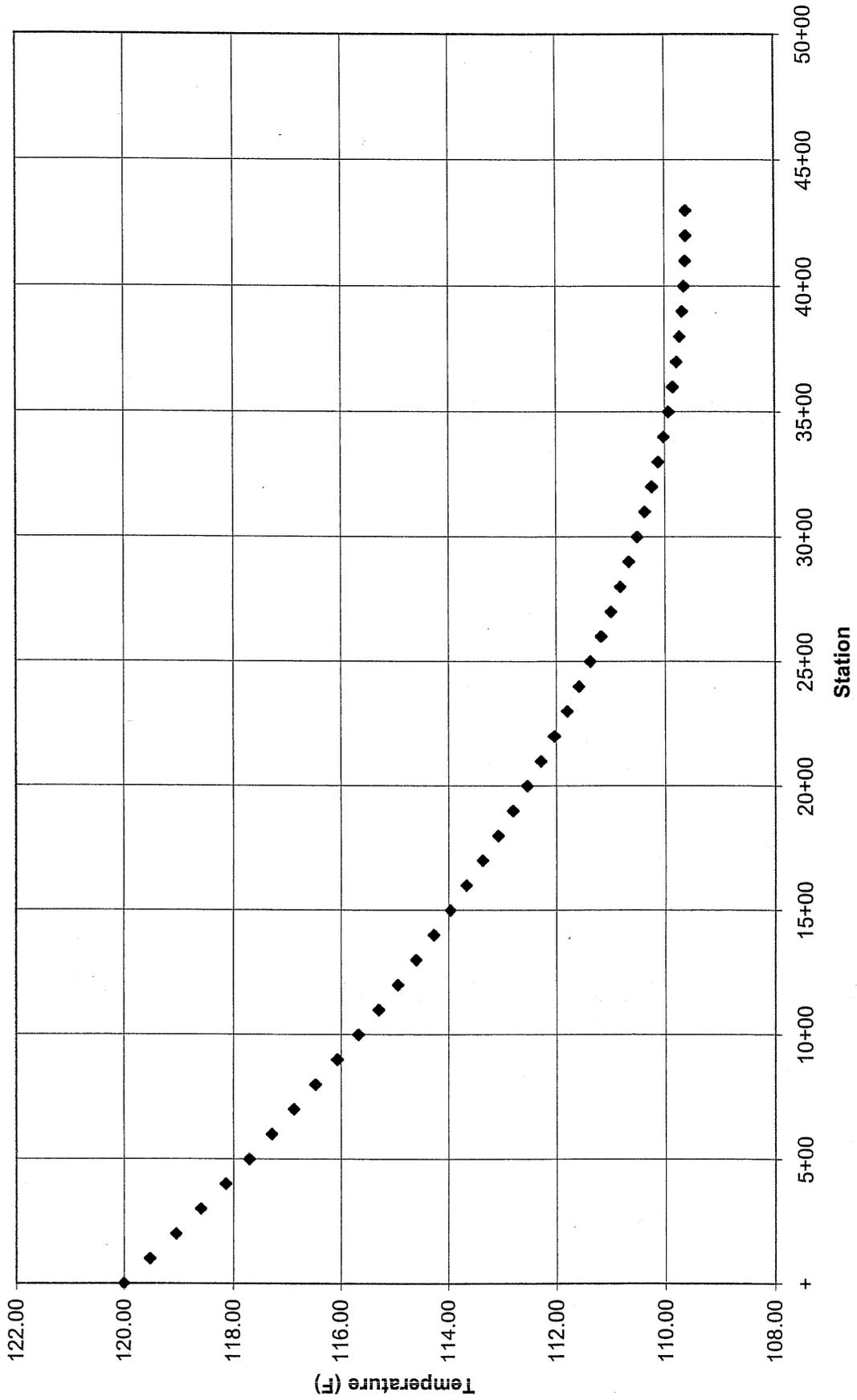
TUNDRA RIGGS

Operation and Maintenance Costs per day

Area

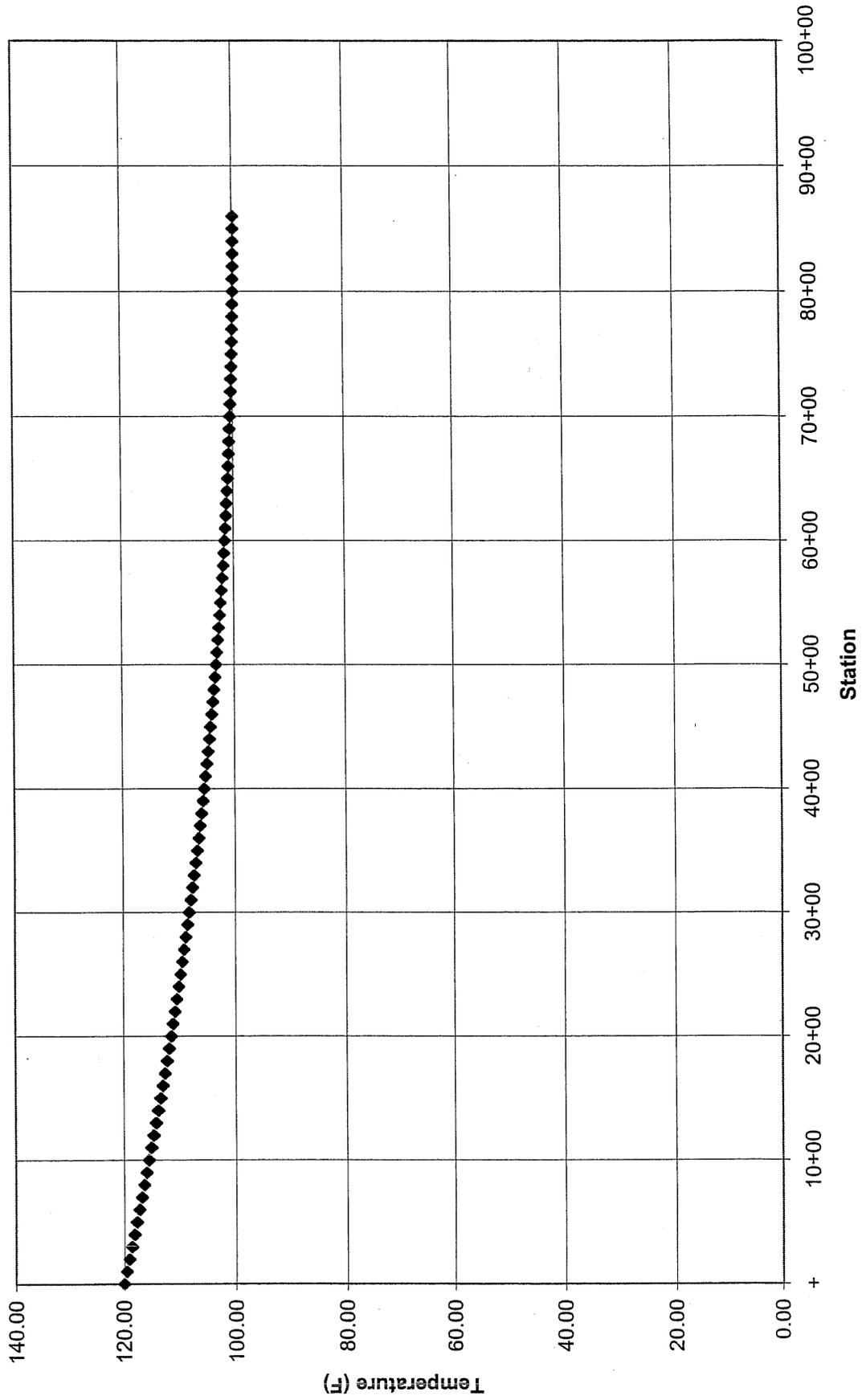
Kilbuck Subdivision						
	Water Pressure Pump	Water Circulation Pump	Water Boiler	Glycol Circulation Pump	Glycol Boiler	Totals
Scenario						
1.	\$2.24	\$24.66	\$25.59			\$52.49
2.	\$6.30			\$0.59	\$42.29	\$49.18
3.	\$6.30			\$0.59	\$43.43	\$50.32

Glycol with Reheat at Both Ends



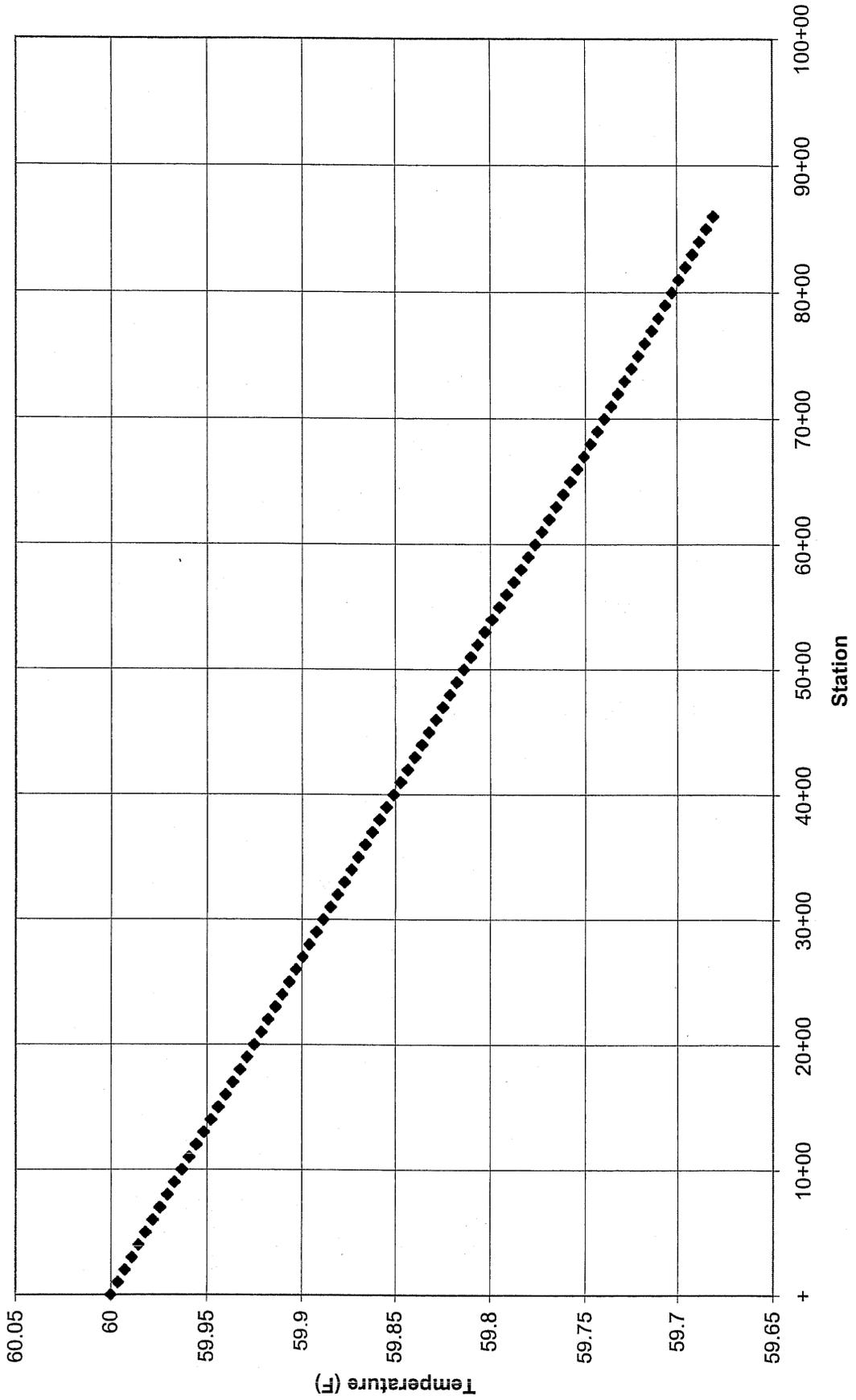
K4BUCK DISTRICT

Glycol loop w/ reheat at one end



KILBUCK DISTRICT

Hyd Circulated
Temperature Change



KULBALK DISTRICT

ESTIMATED OPERATION, MAINTENANCE COSTS

SCENARIO 1
AUGUST, 2004

15% F for 7 years plus

late cycle

replacement cost amortized over 20 yrs.

o & m

Area	Annual Cost (\$)	Annual WTP Capitol Cost Over 20 yrs. (\$)	Annual WST Capitol Cost Over 20 yrs. (\$)	Services	Average Daily Demand (gpd)
CSWTP	\$ 481,175.45	\$ -	\$ -		209,966
CS Water Tank	\$ 15,691.64		\$ -	290	
Mission Lake Water Tank	\$ 25,791.27		\$ 49,190.00	309	
Hospital District Water Tank	\$ 15,577.75		\$ 49,190.00	286	
BHWTP	\$ 344,763.24	\$ -	\$ -		141,164
BH Water Tank	\$ 16,143.25		\$ -	340	
Kilbuck Water Tank	\$ 23,129.04		\$ 40,992.00	255	
DHWTP	\$ 438,877.33	\$ 250,866.00	\$ -		189,088
DH Water Tank	\$ 14,428.53		\$ 8,198.00		
Tundra Ridge Water Tank	\$ 24,071.67		\$ 57,389.00	321	
Nunivak Water Tank	\$ 29,407.43		\$ 81,984.00	476	
Kasayuli WTP	\$ 336,138.68	\$ 250,866.00	\$ -		136,893
Kasayuli Water Tank	\$ 16,020.14		\$ 65,587.00	344	
FAA Water Tank	\$ 30,335.21		\$ 12,298.00	60	
Larsen Water Tank	\$ 39,480.90		\$ 32,794.00	173	
Totals	\$ 1,851,031.54	\$ 501,732.00	\$ 397,622.00	2,854	677,112

Cost per service per year \$ 963.70
 Cost per service per month \$ 80.31

water only

ESTIMATED OPERATION & MAINTENANCE COSTS
SCENARIO 2
AUGUST, 2004

15°F for 7 months.

Area	Annual Cost (\$)	Annual WTP Capitol Cost Over 20 yrs. (\$)	Annual WST Capitol Cost Over 20 yrs. (\$)	Services	Average Daily Demand (gpd)
CSWTP	\$ 481,175.45	\$ -			209,966.25
CS Water Tank	\$ 15,691.64		\$ -	290	
Mission Lake Water Tank	\$ 70,161.27		\$ 49,190.00	309	
Hospital District Water Tank	\$ 15,577.75		\$ 49,190.00	286	
BHWTP	\$ 493,957.60	\$ -			217,321.00
BH Water Tank	\$ 16,143.25		\$ -	340	
Tundra Ridge Water Tank	\$ 36,093.33		\$ 57,389.00	321	
Kilbuck Water Tank	\$ 23,129.04		\$ 40,992.00	255	
DHWTP	\$ 289,682.97	\$ 250,866.00			112,931.00
Hospital District Water Tank	\$ 16,682.47		\$ 81,984.00	476	
Nunivak Water Tank					
FAAWTP	\$ 336,138.68	\$ 250,866.00			136,893.25
Kasayuli Water Tank	\$ 32,342.19		\$ 65,587.00	344	
FAA Water Tank	\$ 14,298.53		\$ 12,298.00	60	
Larsen Water Tank	\$ 35,223.77		\$ 32,794.00	173	
Totals	\$1,876,297.96	\$ 501,732.00	\$ 389,424.00	2,854	677,111.50

Cost per service per year \$ 969.68
 Cost per service per month \$ 80.81

ESTIMATED OPERATION & MAINTENANCE COSTS
SCENARIO 3
AUGUST, 2004

150F for 7 months

Area	Annual Cost (\$)	Annual WTP Capitol Cost Over 20 yrs. (\$)	Annual WST Capitol Cost Over 20 yrs. (\$)	Services	Average Daily Demand (gpd)
CSWTP	\$ 707,885.68	\$ -	\$ -		322,897
CS Water Tank	\$ 15,691.64		\$ -	290	
Mission Lake Water Tank	\$ 25,791.27		\$ 49,190.00	309	
Nunivak Water Tank	\$ 33,358.79		\$ 81,984.00	476	
Hospital District Water Tank	\$ 15,577.75		\$ 49,190.00	286	
BHWTP	\$ 493,957.60	\$ -	\$ -		217,321
BH Water Tank	\$ 16,143.25		\$ -	340	
Tundra Ridge Water Tank	\$ 36,093.33		\$ 57,389.00	321	
Kilbuck Water Tank	\$ 23,096.28		\$ 40,992.00	255	
FAAWTP	\$ 338,240.51	\$ 250,866.00			136,893
Kasayuli Water Tank	\$ 32,342.19		\$ 65,587.00	344	
FAA Water Tank	\$ 14,298.53		\$ 12,298.00	60	
Larsen Water Tank	\$ 34,869.77		\$ 32,794.00	173	
Totals	\$1,787,346.60	\$ 250,866.00	\$ 389,424.00	2,854	677,112

Cost per service per year \$ 850.61
 Cost per service per month \$ 70.88

No DHWTP!

ESTIMATED OPERATIONAL MAINTENANCE COST
 SMALLER INDEPENDENT WTP'S
 AUGUST, 2004

(Scenario 4)

WTP	Annual Cost (\$)	Annual WTP Capitol Cost Over 20 yrs. (\$)	Annual WST Capitol Cost Over 20 yrs. (\$)	Services	Average Daily Demand (gpd)
CSWTP	\$ 340,500.73	\$ -	\$ -	576	136,656.00
BHWTP	\$ 222,815.45	\$ -	\$ -	340	80,665.00
Kilbuck WTP	\$ 190,388.18	\$ 215,011.00	\$ 40,992.00	255	60,498.75
Mission Lake WTP	\$ 217,625.01	\$ 215,011.00	\$ 49,190.00	309	73,310.25
Nunivak WTP	\$ 294,196.01	\$ 215,011.00	\$ 81,984.00	476	112,931.00
Tundra Ridge WTP	\$ 222,608.60	\$ 215,011.00	\$ 57,389.00	321	76,157.25
Kasayuli WTP	\$ 232,160.49	\$ 215,011.00	\$ 57,389.00	344	81,614.00
Larsen WTP	\$ 180,048.92	\$ 215,011.00	\$ 40,992.00	233	55,279.25
Totals	\$ 1,900,343.39	\$ 1,290,066.00	\$ 327,936.00	2,854	677,111.50

Cost per service per year \$ 1,232.78
 Cost per service per month \$ 102.73

ESTIMATED OPERATION , MAINTENANCE COSTS
SCENARIO 1
AUGUST, 2004

CASE B

Area	Annual Cost (\$)	Annual WTP Capitol Cost Over 20 yrs. (\$)	Annual WST Capitol Cost Over 20 yrs. (\$)	Services	Average Daily Demand (gpd)
CSWTP	\$ 481,175.45	\$ -			209,966
CS Water Tank	\$ 15,691.64		\$ -	290	
Mission Lake Water Tank	\$ 46,204.20		\$ 49,190.00	309	
Hospital District Water Tank	\$ 15,577.75		\$ 49,190.00	286	
BHWTP	\$ 344,763.24	\$ -			141,164
BH Water Tank	\$ 16,143.25		\$ -	340	
Kilbuck Water Tank	\$ 37,903.83		\$ 40,992.00	255	
DHWTP	\$ 438,877.33	\$ 250,866.00			189,088
DH Water Tank	\$ 14,428.53		\$ 8,198.00		
Tundra Ridge Water Tank	\$ 39,346.03		\$ 57,389.00	321	
Nunivak Water Tank	\$ 48,836.89		\$ 81,984.00	476	
Kasayuli WTP	\$ 336,138.68	\$ 250,866.00			136,893
Kasayuli Water Tank	\$ 16,020.14		\$ 65,587.00	344	
FAA Water Tank	\$ 67,525.71		\$ 12,298.00	60	
Larsen Water Tank	\$ 92,637.47		\$ 32,794.00	173	
Totals	\$2,011,270.14	\$ 501,732.00	\$ 397,622.00	2,854	677,112

Cost per service per year \$ 1,019.84
Cost per service per month \$ 84.99

**ESTIMATED OPERATION & MAINTENANCE COSTS
SCENARIO 2
AUGUST, 2004**

Area	Annual Cost (\$)	Annual WTP Capital Cost Over 20 yrs. (\$)	Annual WST Capital Cost Over 20 yrs. (\$)	Services	Average Daily Demand (gpd)
CSWTP	\$ 481,175.45	\$ -			209,966.25
CS Water Tank	\$ 15,691.64		\$ -	290	
Mission Lake Water Tank	\$ 90,574.20		\$ 49,190.00	309	
Hospital District Water Tank	\$ 15,577.75		\$ 49,190.00	286	
BHWTP	\$ 493,957.60	\$ -			217,321.00
BH Water Tank	\$ 16,143.25		\$ -	340	
Tundra Ridge Water Tank	\$ 39,346.03		\$ 57,389.00	321	
Kilbuck Water Tank	\$ 37,903.83		\$ 40,992.00	255	
DHWTP	\$ 289,682.97	\$ 250,866.00			112,931.00
Hospital District Water Tank					
Numivak Water Tank	\$ 16,682.47		\$ 81,984.00	476	
FAAWTP	\$ 336,138.68	\$ 250,866.00			136,893.25
Kasayuli Water Tank	\$ 69,552.47		\$ 65,587.00	344	
FAA Water Tank	\$ 14,298.53		\$ 12,298.00	60	
Larsen Water Tank	\$ 65,029.01		\$ 32,794.00	173	
Totals	\$1,981,753.89	\$ 501,732.00	\$ 389,424.00	2,854	677,111.50

Cost per service per year \$ 1,006.63
 Cost per service per month \$ 83.89

**ESTIMATED OPERATION & MAINTENANCE COSTS
SCENARIO 3
AUGUST, 2004**

Area	Annual Cost (\$)	Annual WTP Capitol Cost Over 20 yrs. (\$)	Annual WST Capitol Cost Over 20 yrs. (\$)	Services	Average Daily Demand (gpd)
CSWTP	\$ 707,885.68	\$ -			322,897
CS Water Tank	\$ 15,691.64		\$ -	290	
Mission Lake Water Tank	\$ 46,204.20		\$ 49,190.00	309	
Nunivak Water Tank	\$ 48,944.02		\$ 81,587.00	476	
Hospital District Water Tank	\$ 15,577.75		\$ 49,190.00	286	
BHWTP	\$ 493,957.60	\$ -			217,321
BH Water Tank	\$ 16,143.25		\$ -	340	
Tundra Ridge Water Tank	\$ 39,346.03		\$ 57,389.00	321	
Kilbuck Water Tank	\$ 37,903.83		\$ 40,992.00	255	
FAAWTP	\$ 338,240.51	\$ 250,866.00			136,893
Kasayuli Water Tank	\$ 69,552.47		\$ 65,587.00	344	
FAA Water Tank	\$ 14,298.53		\$ 12,298.00	60	
Larsen Water Tank	\$ 64,675.01		\$ 32,794.00	173	
Totals	\$1,908,420.52	\$ 250,866.00	\$ 389,027.00	2,854	677,112

Cost per service per year \$ 892.89
 Cost per service per month \$ 74.41

ESTIMATED OPERATIONAL MAINTENANCE COST
 SMALLER INDEPENDENT WTP'S
 AUGUST, 2004

Higher heating cost?

WTP	Annual O&M Cost (\$)	Annual WTP Capitol Cost Over 20 yrs. (\$)	Annual WST Capitol Cost Over 20 yrs. (\$)	Services	Average Daily Demand (gpd)
CSWTP	\$ 340,500.73	-	\$ -	576	136,656.00
BHWTP	\$ 222,815.45	-	\$ -	340	80,665.00
Kilbuck WTP	\$ 190,388.18	\$ 215,011.00	\$ 40,992.00	255	60,498.75
Mission Lake WTP	\$ 217,625.01	\$ 215,011.00	\$ 49,190.00	309	73,310.25
Nunivak WTP	\$ 294,196.01	\$ 215,011.00	\$ 81,984.00	476	112,931.00
Tundra Ridge WTP	\$ 222,608.60	\$ 215,011.00	\$ 57,389.00	321	76,157.25
Kasayuli WTP	\$ 232,160.49	\$ 215,011.00	\$ 65,587.00	344	81,614.00
Larsen WTP	\$ 180,048.92	\$ 215,011.00	\$ 32,794.00	233	55,279.25
Totals	\$ 1,900,343.39	\$ 1,290,066.00	\$ 327,936.00	2,854	677,111.50

Cost per service per year \$ 1,232.78
 Cost per service per month \$ 102.73

Appendix L

Sewer Modeling Data

Bethel Water and Sewer Facilities Master Plan Update

Piped Sewer Collection System

Sewer Modeling Summary

April 2005

Introduction

Included in the preparation of the Bethel Water and Sewer Facilities Master Plan Update a computer model of the existing as well as proposed piped sewer collection facilities was completed.

The existing sewer collection facilities include 1) A “backbone” sewer collection systems; and 2) Two piped sewer collection systems. These systems are described in more detail below:

1. A sewer “backbone” collection force main (4 to 14 inch diameter) that extends from the Bethel Airport to the Wastewater Treatment Lagoons and includes the FAA Lift Station, QFC#2 Lift Station and the Main Lift Station. Additionally, a 4 inch diameter force main extends the above force main from 6th Avenue to the Kilbuck Lift Station located near Main Street. This system is considered the “backbone” sewer collection system
2. There are currently two piped systems that serve existing subdivision.
 - a. An aboveground pressure sewer collection system within City Subdivision and City Center. This system connects to the “backbone” force main” at several locations throughout the City Subdivision.
 - b. An aboveground gravity sewer collection system within the ASHA/AVCP Housing (Bethel Heights) that flow to three lift stations (AVCP #1, AVCP #2, and ASHA Lift Stations). All flows connect to the “backbone” force main near the Bethel Heights Water Treatment Facility.

The water and sewer master recommends extending the “backbone” sewer collection system to all subdivision to initially serve the existing truck haul system. Lift Stations at each subdivision would include a sewer truck-haul dump station. Once the backbone system is completed the City would construct a pressure sewer collection system at each subdivision that would be connected to the backbone sewer system.

Computer Modeling Programs

The backbone sewer collection system was computer modeled using SewerCADD (© Heastad Methods, Inc.) software. Included in the appendix of the water and sewer master plan updated is the computer modeling reports for the scenarios listed below. A complete hard copy of the computer modeling effort is fully documented in the supplemental report titled the Bethel Water and Sewer Facility Master Plan Update – Sewer Modeling Notebook (CRW/2005) which is available at the City of Bethel Public Works Department. Hard copies of the computer modeling effort for the following scenarios are included in Appendix L of the Bethel Water and Sewer Facilities Master Plan Update:

- Existing “Backbone” Sewer Collection System After the Phase A Improvements
- Full Build-out, Average Pipe Flow with Truck Dump Scenario
- Full Build-out, No Pipe Flow with Truck Dump Scenario
- Full Build-out, Peak Pipe Flow with No Truck Dump Scenario

The pressure sewer collection system for each subdivision was computer modeled using the UxPGM808 (© Barnes Pressure Systems) software. A complete hard copy of the computer modeling effort is fully documented in the supplemental report titled the Bethel Water and Sewer Facility Master Plan Update – Sewer Modeling Notebook (CRW/2005) which is available at the Bethel Public Works Department.

A computer model was not performed for the AVCP/ASHA Housing (Bethel Heights) sewer collection system.

Assumptions

The following assumptions were made as part of the computer modeling effort:

1. Sewer truck-haul discharge rate: 400 gpm
2. Pipe: HDPE
3. Sewage Flows: Sewage flows were estimated from actual well log data collected as part of the City of Bethel Solid Waste and Sewage Lagoon Facilities Master Plan Update (2002/CH2M Hill). A summary of these flows is attached.
4. Sewage Flows are based on the full development of all current subdivision and the development of the proposed Raven Subdivision (located north of the existing Kasayuli Subdivision) and the proposed Hoffman Subdivision (located around the existing Larson Subdivision).

**Bethel Water and Sewer Master Plan Update
Existing Forcemain Peak Flow**

Node or LS	Pipe Segment	Length (ft)	Pipe Dia. (in)	Average Daily Flow (gpd)	Average Flow (gpm)	Peak Daily Flow (gpd)	Peak Flow (gpm)	Cum Peak Flow (gpm)	Comments
FAA LS	1	9450	3	7200	10	28800	20	53	Head Limitation (heastad)
QFC#2 LS	2	1963	6	55830	78	223320	155	285	Head Limitation (heastad)
Pacifica	3	314	6	2655	4	10620	7	292	
Jail	4	494	6	9511	13	38044	26	319	
Juvenile	5	292	6	2487	3	9948	7	326	
Bldg. 800	6	35	6	4332	6	17328	12	338	
BUC	7	977	6	487	1	1948	1	339	
Hospital	8	658	6	48724	68	194896	135	474	
USFS	9	806	6	2329	3	9316	6	481	
CSWTF	10	689	8	56400	39	225600	157	638	470 gpm for two hours (backwash)
City Subd. S.	11	328	10	9900	14	39600	28	665	
City Center S.	12	372	10	5850	8	23400	16	681	
City Center N.	13	1286	10	11250	16	45000	31	713	
City Subd. N.	14	619	10	12870	18	51480	36	748	
Kilbuck FM	15	847	10	12970	18	51880	36	784	
Ridgecrest Connection	16	686	8	4000	6	16000	11	795	Blackstock and Tundra Center
Main LS	18	651	14	69900	97	279600	194	990	Lift station capacity = 2130 gpm
Pipe Reducer/ASHA	19	3017	10	72000	100	288000	200	1190	
Lagoon				0	0	0	0	1190	
				388695		1525980			

Assumptions:

1. Peaking Factor = 4.
2. Average daily flows from City of Bethel Solid Waste and Sewage Lagoon Facilities Design Study / Master Plan Update (CH2M Hill/2002).

QFC Lift Station Average Flow

Collection Area	Unit	Average Flow	Comments
Day Care Center	gpd	958	
Prematerial Home	gpd	2335	
Trailer Court	gpd	4687	
Quick Food Center	gpd	650	
Truck Evacuation	gpd	72000	100
Total:	gpd	80630	
Avg. Piped Flow	gpd	80630	
Peak Piped Flow	gpd	322520	
QFC #2 Capacity	gpd	302400	

Kilbuck Lift Station Peak Flow

Collection Area	Unit	Average Flow
Kilbuck Elementary School	gpd	7331
National Guard Armory	gpd	1987
Alaska Commercial Co.	gpd	2424
Tundra Womens Coalition	gpd	377
BNC Offices	gpd	851
Total:	gpd	12970

Main Lift Station Peak Flow

Collection Area	Unit	Peak Flow	Comments
Laundromat	gpd	9000	50 gpm (peak)
Bethel High School	gpd	45000	250 gpm (peak)
BHWTF	gpd	225600	470 gpm for two hours (backwash)
Total:	gpd	279600	
		69900	Average

**Bethel Water and Sewer Master Plan Update
Existing Pipe Capacity**

Pipe Diameter (in)	Max.* Flow (gpm)
2	59
3	132
4	235
6	528
8	939
10	1,468
12	2,114
14	2,877

Max Vel. = 6 fps

Forcemain Segment	Existing Pipe Size (in)	Existing Peak Flow (gpm)	Max. Allowable Capacity (gpm)	Available Capacity (gpm)
FAA to QFC2	4	55	235	180
QFC2 to CSWTF	6	462	528	66
SCWTF to City Center	8	671	939	268
City Center to Kilbuck	10	781	1,468	687
Kilbuck to Ridgecrest	12	829	2,114	1,285
Ridgecrest to Main	10	829	1,468	639
Main to Reducer	14	899	2,877	1,978
Reducer to Lagoon	12	899	2,114	1,215

Scenario: Existing Sewer with CSW&S and Main Lift Station

Pump Report

Label	To Pipe	Ground Elevation (ft)	Pump Type	Pump Power (Hp)	Shutoff Head (ft)	Shutoff Discharge (gpm)	Design Head (ft)	Design Discharge (gpm)	Maximum Operating Discharge (gpm)	Maximum Operating Head (ft)	Initial Relative Speed Factor	Initial Status	Control Status	Pressure Flow (gpm)	Intake Pump Pressure (psi)	Discharge Pump Pressure (psi)	Pump Head (ft)	Description
Main LS Pump	Main LS Discharge Pipe	4.00	Standard (3 Po		100.00	0.00	27.00	1,900.00	2,130.00	0.00	1.00	On	On	1,266.53	4.76	37.69	76.11	
FAA Pumps	FAA Discharge Pipe	82.00	Standard (3 Po		56.00	0.00	48.50	78.00	140.00	0.00	1.00	On	On	101.35	-0.43	15.81	37.55	
Kilbuck Pump	Kilbuck Discharge Pipe	9.00	Standard (3 Po		63.00	0.00	37.00	85.00	175.00	0.00	1.00	On	On	98.43	0.87	14.66	31.88	
QFC2 Pumps	QFC2 Discharge Pipe	40.00	Standard (3 Po		76.00	0.00	46.00	335.00	600.00	0.00	1.00	On	On	269.65	2.16	25.86	54.78	

Scenario: Existing Sewer with CSW&S and Main Lift Station

Pressure Pipe Report

Label	Upstream Node	Upstream Invert Elevation (ft)	Downstream Node	Downstream Invert Elevation (ft)	User Defined Length?	Length (ft)	Diameter (in)	Material	Minor Loss Coefficient	Check Valve?	Pressure Flow (gpm)	Velocity (ft/s)	Pressure Pipe Headloss (ft)	Description
Main LS Suction	Main LS WW	5.00	Main LS Pumps	4.00	true	1.00	42.0	Ductile Iro	0.00	true	1,266.53	0.29	0.00	
Main LS Discharge	Main LS Pumps	4.00	Main LS Discharge	18.00	true	14.00	14.0	PVC	0.00	true	1,266.53	2.64	0.02	
FM-17	Main LS Discharge	18.00	Pipe Reducer	20.00	true	651.00	14.0	Ductile Iro	0.00	false	1,266.53	2.64	1.21	
FM-18	Pipe Reducer	20.00	Lagoon Outlet	50.00	true	3,017.00	10.0	Ductile Iro	2.30	false	1,466.53	5.99	39.05	
FAA Suction	FAA-WW	80.00	FAA Pumps	82.00	true	1.00	42.0	Ductile Iro	4.61	true	101.35	0.02	0.00	
FAA Discharge Pipe	FAA Pumps	82.00	FAA Discharge	92.00	false	13.00	3.0	Ductile Iro	0.00	true	101.35	4.60	0.41	
FM-1	FAA Discharge	92.00	QFC MH	45.00	true	3,450.00	4.0	Ductile Iro	0.00	false	101.35	2.59	72.81	
Kilbuck Suction	Kilbuck WW	9.00	Kilbuck Pumps	9.00	true	1.00	42.0	PVC	0.00	true	98.43	0.02	0.00	
Kilbuck Discharge Pipe	Kilbuck Pumps	9.00	Kilbuck Discharge	14.00	true	7.00	4.0	PVC	0.00	false	98.43	2.51	0.04	
FM-34	Kilbuck Discharge	14.00	Kilbuck FM	15.00	true	2,300.00	4.0	Ductile Iro	0.00	false	98.43	2.51	16.79	
QFC2 Suction	QFC2 WW	41.00	QFC2 Pumps	40.00	true	1.00	42.0	Ductile Iro	4.61	true	269.65	0.06	0.00	
QFC2 Discharge Pipe	QFC2 Pumps	40.00	QFC2 Discharge	47.00	true	7.00	6.0	Ductile Iro	0.00	true	269.65	3.06	0.05	
FM-2	QFC2 Discharge	47.00	Pacifica	40.00	true	1,963.00	6.0	Ductile Iro	0.00	false	269.65	3.06	12.85	
FM-3	Pacifica	40.00	Jail	36.00	true	314.00	6.0	Ductile Iro	0.00	false	277.03	3.14	2.16	
FM-4	Jail	36.00	Juvenile	36.00	true	494.00	6.0	Ductile Iro	0.00	false	303.45	3.44	4.03	
FM-5	Juvenile	36.00	Bldg. 800	40.00	true	292.00	6.0	Ductile Iro	0.00	false	310.36	3.52	2.48	
FM-6	Bldg. 800	40.00	BUC	40.00	true	35.00	6.0	Ductile Iro	0.00	false	322.39	3.66	0.32	
FM-7	BUC	40.00	Hospital	40.00	true	977.00	6.0	Ductile Iro	1.00	false	323.74	3.67	9.18	
FM-8	Hospital	40.00	USFS	40.00	true	658.00	6.0	Ductile Iro	0.00	false	459.09	5.21	11.54	
FM-9	USFS	40.00	CSWTF	22.00	true	806.00	6.0	Ductile Iro	0.68	false	465.56	5.28	14.80	
FM-10	CSWTF	22.00	CSW&S South	25.00	true	689.00	8.0	Ductile Iro	3.28	false	622.22	3.97	6.03	
FM-11	CSW&S South	25.00	City Center South	22.00	true	328.00	10.0	Ductile Iro	2.16	false	649.72	2.65	1.15	
FM-12	City Center South	22.00	City Center North	18.00	true	372.00	10.0	Ductile Iro	3.24	false	665.97	2.72	1.45	
FM-13	City Center North	18.00	CSW&S North	17.00	true	1,286.00	10.0	Ductile Iro	2.80	false	697.22	2.85	4.41	
FM-14	CSW&S North	17.00	Kilbuck FM	15.00	true	847.00	10.0	Ductile Iro	2.36	false	732.97	2.99	3.26	
FM-15	Kilbuck FM	15.00	Ridgecrest	11.00	true	847.00	10.0	Ductile Iro	3.54	false	867.43	3.54	4.70	
FM-16	Ridgecrest	11.00	Main LS MH	16.67	true	686.00	10.0	Ductile Iro	2.66	false	878.54	3.59	3.86	

Scenario: Existing Sewer with CSW&S and Main Lift Station

Pressure Junction Report

Label	X (ft)	Y (ft)	Ground Elevation (ft)	Sanitary Load Type	Inflow Load Type	Calculated Load (gpm)	Pressure (psi)	Description
Main LS Discharge	0,123.20	0,337.87	18.00	<None>	None	0.00	31.62	
Pipe Reducer	0,123.20	0,352.48	20.00	Pattern Loa	None	-200.00	30.24	
FAA Discharge	9,877.76	0,013.24	92.00	<None>	None	0.00	11.31	
Kilbuck Discharge	0,231.52	0,223.86	14.00	<None>	None	0.00	12.48	
QFC2 Discharge	9,933.76	0,042.19	47.00	<None>	None	0.00	22.81	
Pacific	9,984.65	0,021.07	40.00	Pattern Loa	None	-7.37	20.28	
Jail	9,984.00	0,048.48	36.00	Pattern Loa	None	-26.42	21.08	
Juvenile	9,984.00	0,070.88	36.00	Pattern Loa	None	-6.91	19.34	
Bldg. 800	9,984.00	0,094.56	40.00	Pattern Loa	None	-12.03	16.53	
BUC	9,984.00	0,117.92	40.00	Pattern Loa	None	-1.35	16.39	
Hospital	0,009.74	0,135.38	40.00	Pattern Loa	None	-135.34	12.42	
USFS	0,035.38	0,151.70	40.00	Pattern Loa	None	-6.47	7.43	
CSWTF	0,035.34	0,183.24	22.00	Pattern Loa	None	-156.67	8.81	
CSW&S South	0,060.50	0,183.84	25.00	Pattern Loa	None	-27.50	4.90	
City Center South	0,085.42	0,178.08	22.00	Pattern Loa	None	-16.25	5.71	
City Center North	0,091.20	0,198.56	18.00	Pattern Loa	None	-31.25	6.81	
CSW&S North	0,091.20	0,223.84	17.00	Pattern Loa	None	-35.75	5.33	
Kilbuck FM	0,123.16	0,223.84	15.00	Pattern Loa	None	-36.03	4.78	
Ridgecrest	0,123.16	0,258.08	11.00	Pattern Loa	None	-11.11	4.48	

Scenario: Existing Sewer with CSW&S and Main Lift Station

Node Loading Report (Steady-state)

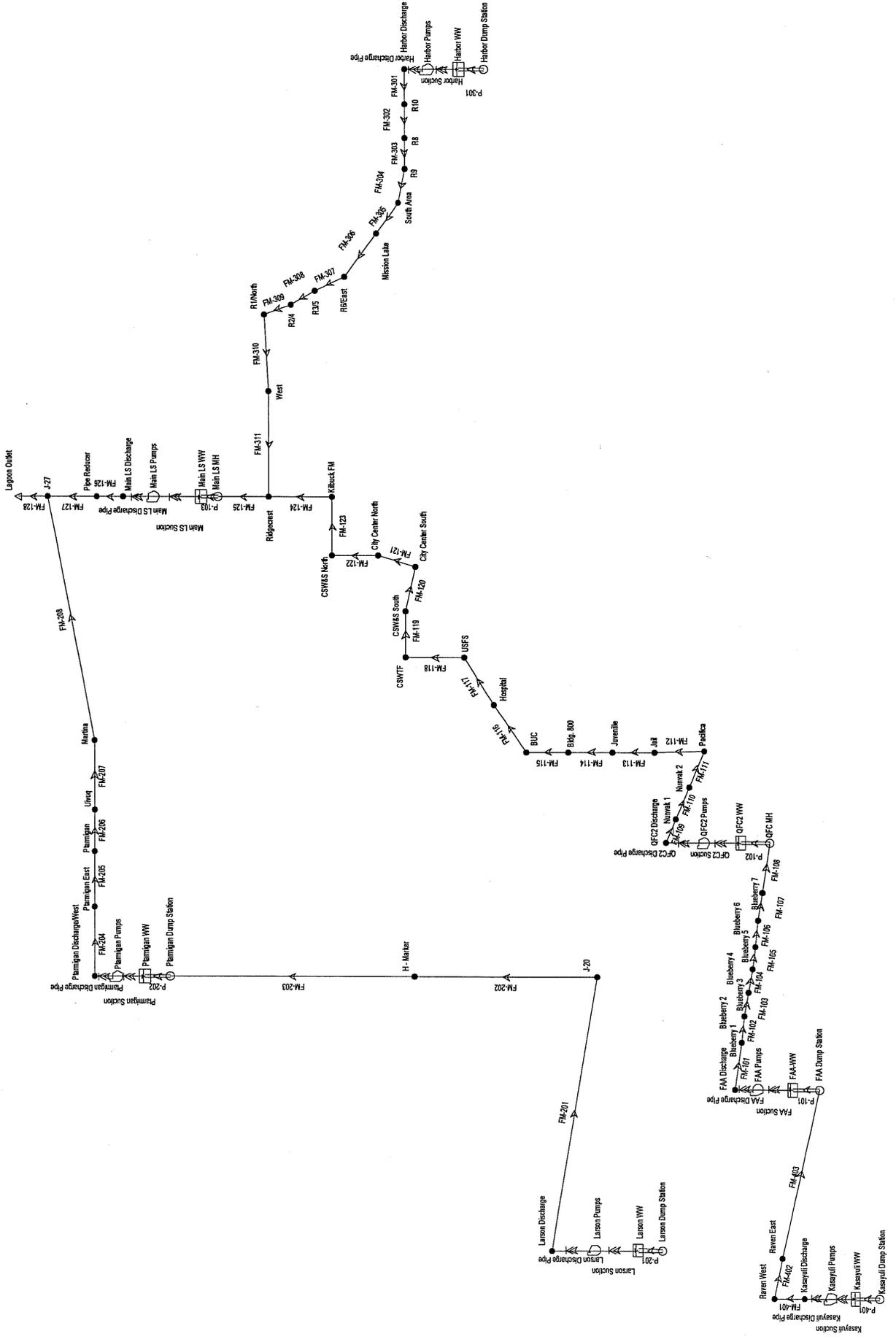
Label	Sanitary Load Type	Sanitary Unit Load Type	Sanitary Unit Load Units	Sanitary Unit Load Count	Sanitary Pattern Base Flow (gpd)	Sanitary Pattern Load (gpd)	Inflow Load Type	Inflow Pattern Base Flow (gpd)	Inflow Pattern Load (gpd)	Known Flow (gpd)	Has Diversion?	Diversion Target	Diversion Rating Table
Main LS WW	<None>	<None>	N/A	N/A	0.00	Fixed	None	0.00	Fixed	0.00			
Main LS Discharge	<None>	<None>	N/A	N/A	0.00	Fixed	None	0.00	Fixed	0.00			
Pipe Reducer	Pattern Load	<None>	N/A	N/A	288,000.00	Fixed	None	0.00	Fixed	0.00	false	N/A	Edit
Main LS MH	Pattern Load	<None>	N/A	N/A	279,600.00	Fixed	None	0.00	Fixed	0.00	false	N/A	Edit
QFC MH	Pattern Load	<None>	N/A	N/A	223,320.00	Fixed	None	0.00	Fixed	0.00			
FAA-WW	Pattern Load	<None>	N/A	N/A	28,800.00	Fixed	None	0.00	Fixed	0.00			
FAA Discharge	<None>	<None>	N/A	N/A	0.00	Fixed	None	0.00	Fixed	0.00			
Kilbuck WW	<None>	<None>	N/A	N/A	0.00	Fixed	None	0.00	Fixed	0.00			
Kilbuck Discharge	<None>	<None>	N/A	N/A	0.00	Fixed	None	0.00	Fixed	0.00			
QFC2 WW	<None>	<None>	N/A	N/A	0.00	Fixed	None	0.00	Fixed	0.00			
QFC2 Discharge	<None>	<None>	N/A	N/A	0.00	Fixed	None	0.00	Fixed	0.00			
Pacific	Pattern Load	<None>	N/A	N/A	10,620.00	Fixed	None	0.00	Fixed	0.00			
Jail	Pattern Load	<None>	N/A	N/A	38,044.00	Fixed	None	0.00	Fixed	0.00			
Juvenile	Pattern Load	<None>	N/A	N/A	9,948.00	Fixed	None	0.00	Fixed	0.00			
Bldg. 800	Pattern Load	<None>	N/A	N/A	17,328.00	Fixed	None	0.00	Fixed	0.00			
BUC	Pattern Load	<None>	N/A	N/A	1,948.00	Fixed	None	0.00	Fixed	0.00			
Hospital	Pattern Load	<None>	N/A	N/A	194,896.00	Fixed	None	0.00	Fixed	0.00			
USFS	Pattern Load	<None>	N/A	N/A	9,316.00	Fixed	None	0.00	Fixed	0.00			
CSWTF	Pattern Load	<None>	N/A	N/A	225,600.00	Fixed	None	0.00	Fixed	0.00			
CSW&S South	Pattern Load	<None>	N/A	N/A	39,600.00	Fixed	None	0.00	Fixed	0.00			
City Center South	Pattern Load	<None>	N/A	N/A	23,400.00	Fixed	None	0.00	Fixed	0.00			
City Center North	Pattern Load	<None>	N/A	N/A	45,000.00	Fixed	None	0.00	Fixed	0.00			
CSW&S North	Pattern Load	<None>	N/A	N/A	51,480.00	Fixed	None	0.00	Fixed	0.00			
Kilbuck FM	Pattern Load	<None>	N/A	N/A	51,880.00	Fixed	None	0.00	Fixed	0.00			
Ridgecrest	Pattern Load	<None>	N/A	N/A	16,000.00	Fixed	None	0.00	Fixed	0.00			
Kilbuck Dump S	Pattern Load	<None>	N/A	N/A	51,880.00	Fixed	None	0.00	Fixed	0.00	false	N/A	Edit

Scenario: Existing Sewer with CSW&S and Main Lift Station

Node Loading Report (Steady-state)

Total Sanitary Flow (gpd)	Total Wet Weather Flow (gpd)	Total System Known Flow (gpd)	Pumped Flow (gpd)	Total Diverted Flow In (gpd)	Total Flow (gpd)	Percent Diverted Out (%)	Non-Diverted Flow Out (gpd)	Total Flow Out (gpd)
318,660.00	0.00	0.00	0.00	0.00	318,660.00	N/A	N/A	N/A
318,660.00	0.00	0.00	0.00	0.00	318,660.00	0.0	318,660.00	318,660.00
252,120.00	0.00	0.00	0.00	0.00	252,120.00	0.0	252,120.00	252,120.00
28,800.00	0.00	0.00	0.00	0.00	28,800.00	N/A	N/A	N/A
51,880.00	0.00	0.00	0.00	0.00	51,880.00	N/A	N/A	N/A
252,120.00	0.00	0.00	0.00	0.00	252,120.00	N/A	N/A	N/A
51,880.00	0.00	0.00	0.00	0.00	51,880.00	0.0	51,880.00	51,880.00

Scenario: Full Buildout Avg Pipe with Truck Dump Scenario



Scenario: Full Buildout Avg Pipe with Truck Dump Scenario

Wet Well Report

Label	Ground Elevation (ft)	Base Elevation (ft)	Minimum Elevation (ft)	Initial Alarm Elevation (ft)	Alarm Elevation (ft)	Maximum Elevation (ft)	Wet Well Diameter (ft)	Average Area (ft ²)	Sanitary Load Type	Inflow Load Type	Known Flow (gpd)	Total Flow (gpd)	Force Mair Discharge (gpm)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Gravity Element Headloss (ft)
Ptarmigan W	40.50	20.00	25.00	32.00	35.00	40.00	20.00	314.2	<None>	None	0.00	878,318.09	727.96	32.00	32.00	0.00
Main LS WW	20.50	0.00	5.00	15.00	17.00	20.00	30.00	706.9	<None>	None	0.00	809,731.33	2,184.47	15.00	15.00	0.00
Larson WW	110.50	90.00	95.00	98.00	100.00	110.00	10.00	78.5	<None>	None	0.00	466,920.00	433.19	98.00	98.00	0.00
FAA-WW	94.50	78.50	80.00	81.00	84.00	94.00	10.00	78.5	<None>	None	0.00	763,199.56	676.89	81.00	81.00	0.00
Harbor WW	12.50	-8.00	-3.00	7.00	8.00	12.00	10.00	78.5	<None>	None	0.00	459,720.00	522.67	7.00	7.00	0.00
QFC2 WW	48.50	28.00	33.00	40.00	42.00	48.00	20.00	314.2	<None>	None	0.00	292,770.92	964.25	40.00	40.00	0.00
Kasayuli WW	120.50	100.00	105.00	110.00	111.00	120.00	20.00	314.2	<None>	None	0.00	480,780.00	491.26	110.00	110.00	0.00

Scenario: Full Buildout Avg Pipe with Truck Dump Scenario

Wet Well Report

Description

Scenario: Full Buildout Avg Pipe with Truck Dump Scenario

Pump Report

Label	To Pipe	Ground Elevation (ft)	Pump Type	Pump Power (Hp)	Shutoff Head (ft)	Shutoff Discharge (gpm)	Design Head (ft)	Design Discharge (gpm)	Maximum Operating Discharge (gpm)	Maximum Operating Head (ft)	Initial Relative Speed Factor	Initial Status	Control Status	Pressure Flow (gpm)	Intake Pump Pressure (psi)	Discharge Pump Pressure (psi)	Pump Head (ft)
Ptarmigan Pump	Ptarmigan Discharge Pipe	24.00	Standard (3 Po		125.00	0.00	76.00	546.00	900.00	40.00	1.00		On	727.96	3.46	28.43	57.72
Main LS Pumps	Main LS Discharge Pipe	4.00	Standard (3 Po		72.50	0.00	56.00	1,945.00	3,700.00	0.00	1.00		On	2,184.47	4.76	26.80	50.94
Larson Pumps	Larson Discharge Pipe	94.00	Standard (3 Po		53.00	0.00	31.00	370.00	750.00	0.00	1.00		On	433.19	1.73	13.08	26.23
FAA Pumps	FAA Discharge Pipe	79.00	Standard (3 Po		126.00	0.00	89.00	355.00	900.00	0.00	1.00		On	676.89	0.86	17.92	39.42
Harbor Pumps	Harbor Discharge Pipe	-2.00	Standard (3 Po		125.00	0.00	76.00	546.00	900.00	40.00	1.00		On	522.67	3.89	37.77	78.30
QFC2 Pumps	QFC2 Discharge Pipe	31.00	Standard (3 Po		125.00	0.00	76.00	546.00	900.00	40.00	1.00		On	964.25	3.89	18.29	33.29
Kasayuli Pump	Kasayuli Discharge Pipe	104.00	Standard (3 Po		53.00	0.00	31.00	370.00	750.00	0.00	1.00		On	491.26	2.60	11.98	21.69

Scenario: Full Buildout Avg Pipe with Truck Dump Scenario

Pump Report

Description

Scenario: Full Buildout Avg Pipe with Truck Dump Scenario

Pressure Pipe Report

Label	Upstream Node	Upstream Invert Elevation (ft)	Downstream Node	Downstream Invert Elevation (ft)	User Defined Length?	Length (ft)	Diameter (in)	Material	Minor Loss Coefficient	Check Valve?	Pressure Flow (gpm)	Velocity (ft/s)	Pressure Pipe Headloss (ft)	Description
Ptarmigan Suction	Ptarmigan WW	25.00	Ptarmigan Pumps	24.00	true	1.00	42.0	Ductile Iro	0.00	true	727.96	0.17	0.00	
Ptarmigan Discharge	Ptarmigan Pumps	24.00	Ptarmigan Discharge/Manhole	38.00	false	12.00	10.0	Ductile Iro	0.00	true	727.96	2.97	0.04	
FM-204	Ptarmigan Discharge/Manhole	38.00	Ptarmigan East	32.00	true	2,530.00	10.0	PVC	0.00	false	748.96	3.06	7.00	
FM-205	Ptarmigan East	32.00	Ptarmigan	30.00	true	320.00	10.0	PVC	0.00	false	754.08	3.08	0.90	
FM-206	Ptarmigan	30.00	Uivuuq	30.00	true	1,230.00	10.0	PVC	0.00	false	764.46	3.12	3.53	
FM-207	Uivuuq	30.00	Martina	30.00	true	2,480.00	10.0	PVC	0.00	false	775.83	3.17	7.32	
FM-208	Martina	30.00	J-27	0.00	true	3,145.00	10.0	PVC	0.00	false	782.33	3.20	15.43	
Main LS Suction	Main LS WW	5.00	Main LS Pumps	4.00	true	1.00	42.0	Ductile Iro	0.00	true	2,184.47	0.51	0.00	
Main LS Discharge Pipe	Main LS Pumps	4.00	Main LS Discharge	18.00	true	14.00	14.0	Ductile Iro	0.00	true	2,184.47	4.55	0.07	
FM-126	Main LS Discharge	18.00	Pipe Reducer	20.00	true	651.00	14.0	PVC	0.00	false	2,184.47	4.55	2.54	
FM-127	Pipe Reducer	20.00	J-27	0.00	true	1,517.00	14.0	PVC	2.30	false	2,384.47	4.97	7.84	
FM-128	J-27	0.00	Lagoon Outlet	50.00	true	1,500.00	18.0	PVC	2.30	false	3,166.81	3.99	3.99	
Larson Suction	Larson WW	95.00	Larson Pumps	94.00	true	1.00	42.0	Ductile Iro	0.00	true	433.19	0.10	0.00	
Larson Discharge Pipe	Larson Pumps	94.00	Larson Discharge	105.00	true	1.00	6.0	Ductile Iro	0.00	true	433.19	4.92	0.02	
FM-201	Larson Discharge	105.00	J-20	84.00	true	2,200.00	6.0	PVC	0.00	false	433.19	4.92	26.59	
FM-202	J-20	84.00	H - Marker	40.00	true	2,500.00	6.0	PVC	0.00	false	433.19	4.92	30.21	
FM-203	H - Marker	40.00	Ptarmigan Dump Station	31.00	true	2,900.00	6.0	PVC	0.00	false	438.94	4.98	35.91	
FAA Suction	FAA-WW	80.00	FAA Pumps	79.00	true	1.00	42.0	Ductile Iro	4.61	true	676.89	0.16	0.00	
FAA Discharge Pipe	FAA Pumps	79.00	FAA Discharge	92.00	false	13.00	8.0	Ductile Iro	0.00	true	676.89	4.32	0.12	
FM-101	FAA Discharge	92.00	Blueberry 1	62.00	true	3,650.00	8.0	Ductile Iro	0.00	false	676.89	4.32	50.10	
FM-102	Blueberry 1	62.00	Blueberry 2	62.00	true	575.00	8.0	PVC	0.00	false	681.76	4.35	3.96	
FM-103	Blueberry 2	62.00	Blueberry 3	64.00	true	300.00	8.0	PVC	0.00	false	688.64	4.40	2.11	
FM-104	Blueberry 3	64.00	Blueberry 4	72.00	true	300.00	8.0	PVC	0.00	false	697.89	4.45	2.16	
FM-105	Blueberry 4	72.00	Blueberry 5	72.00	true	350.00	8.0	PVC	0.00	false	707.39	4.52	2.58	
FM-106	Blueberry 5	72.00	Blueberry 6	66.00	true	500.00	8.0	PVC	0.00	false	724.39	4.62	3.86	
FM-107	Blueberry 6	66.00	Blueberry 7	60.00	true	500.00	8.0	PVC	0.00	false	731.26	4.67	3.92	
FM-108	Blueberry 7	60.00	QFC MH	41.00	true	1,250.00	8.0	PVC	0.00	false	736.76	4.70	9.95	
Harbor Suction	Harbor WW	-3.00	Harbor Pumps	-2.00	true	1.00	42.0	Ductile Iro	0.00	true	522.67	0.12	0.00	
Harbor Discharge Pipe	Harbor Pumps	-2.00	Harbor Discharge	10.00	true	12.00	6.0	Ductile Iro	0.00	true	522.67	5.93	0.27	
FM-301	Harbor Discharge	10.00	R10	10.00	true	250.00	6.0	PVC	0.00	false	522.67	5.93	4.28	
FM-302	R10	10.00	R8	10.00	true	200.00	6.0	PVC	0.00	false	527.30	5.98	3.48	
FM-303	R8	10.00	R9	10.00	true	240.00	6.0	PVC	0.00	false	531.55	6.03	4.24	
FM-304	R9	10.00	South Area	10.00	true	470.00	6.0	PVC	0.00	false	535.80	6.08	8.42	
FM-305	South Area	10.00	Mission Lake	10.00	true	750.00	6.0	PVC	0.00	false	543.67	6.17	13.80	
FM-306	Mission Lake	10.00	R6/East	10.00	true	1,450.00	8.0	PVC	0.00	false	564.30	3.60	7.04	

Scenario: Full Buildout Avg Pipe with Truck Dump Scenario

Pressure Pipe Report

Label	Upstream Node	Upstream Invert Elevation (ft)	Downstream Node	Downstream Invert Elevation (ft)	User Defined Length?	Length (ft)	Diameter (in)	Material	Minor Loss Coefficient	Check Valve?	Pressure Flow (gpm)	Velocity (ft/s)	Pressure Pipe Headloss (ft)	Description
FM-307	R6/East	10.00	R3/5	10.00	true	380.00	8.0	PVC	0.00	false	575.55	3.67	1.91	
FM-308	R3/5	10.00	R2/4	10.00	true	380.00	8.0	PVC	0.00	false	585.42	3.74	1.98	
FM-309	R2/4	10.00	R1/North	10.00	true	380.00	8.0	PVC	0.00	false	596.05	3.80	2.04	
FM-310	R1/North	10.00	West	10.00	true	600.00	8.0	PVC	0.00	false	608.42	3.88	3.35	
FM-311	West	10.00	Ridgecrest	11.00	true	2,070.00	8.0	PVC	0.00	false	621.17	3.96	12.01	
QFC2 Suction	QFC2 WW	33.00	QFC2 Pumps	31.00	true	1.00	42.0	Ductile Iro	4.61	true	964.25	0.22	0.00	
QFC2 Discharge Pipe	QFC2 Pumps	31.00	QFC2 Discharge	47.00	true	7.00	10.0	Ductile Iro	0.00	true	964.25	3.94	0.04	
FM-109	QFC2 Discharge	47.00	Nunvak 1	52.00	true	725.00	10.0	PVC	0.00	false	964.25	3.94	3.20	
FM-110	Nunvak 1	52.00	Nunvak 2	54.00	true	300.00	10.0	PVC	0.00	false	980.50	4.01	1.37	
FM-111	Nunvak 2	54.00	Pacifica	40.00	true	825.00	10.0	PVC	0.00	false	986.50	4.03	3.80	
FM-112	Pacifica	40.00	Jail	36.00	true	314.00	10.0	PVC	0.00	false	988.35	4.04	1.45	
FM-113	Jail	36.00	Juvenile	36.00	true	494.00	10.0	PVC	0.00	false	989.01	4.04	2.29	
FM-114	Juvenile	36.00	Bldg. 800	40.00	true	292.00	10.0	PVC	0.00	false	990.74	4.05	1.36	
FM-115	Bldg. 800	40.00	BUC	40.00	true	35.00	10.0	PVC	0.00	false	993.74	4.06	0.16	
FM-116	BUC	40.00	Hospital	40.00	true	977.00	10.0	Ductile Iro	1.00	false	994.08	4.06	6.21	
FM-117	Hospital	40.00	USFS	40.00	true	658.00	10.0	PVC	0.00	false	1,027.92	4.20	3.27	
FM-118	USFS	40.00	CSWTF	22.00	true	806.00	10.0	PVC	0.68	false	1,029.54	4.21	4.21	
FM-119	CSWTF	22.00	CSW&S South	25.00	true	689.00	10.0	PVC	3.28	false	1,068.70	4.37	4.65	
FM-120	CSW&S South	25.00	City Center South	22.00	true	328.00	10.0	PVC	2.16	false	1,082.45	4.42	2.45	
FM-121	City Center South	22.00	City Center North	18.00	true	372.00	10.0	PVC	3.24	false	1,090.58	4.45	3.06	
FM-122	City Center North	18.00	CSW&S North	17.00	true	1,286.00	10.0	PVC	2.80	false	1,106.20	4.52	8.21	
FM-123	CSW&S North	17.00	Kilbuck FM	15.00	true	847.00	12.0	PVC	2.36	false	1,124.08	3.19	2.42	
FM-124	Kilbuck FM	15.00	Ridgecrest	11.00	true	847.00	12.0	PVC	3.54	false	1,133.08	3.21	2.64	
FM-125	Ridgecrest	11.00	Main LS MH	16.67	true	686.00	12.0	PVC	2.66	false	1,757.04	4.98	4.81	
Kasayuli Suction	Kasayuli WW	105.00	Kasayuli Pumps	104.00	true	1.00	42.0	PVC	0.00	true	491.26	0.11	0.00	
Kasayuli Discharge P	Kasayuli Pumps	104.00	Kasayuli Discharge	116.00	true	12.00	6.0	Ductile Iro	0.00	true	491.26	5.57	0.24	
FM-401	Kasayuli Discharge	116.00	Raven West	94.00	true	500.00	6.0	PVC	0.00	false	491.26	5.57	7.63	
FM-402	Raven West	94.00	Raven East	108.00	true	500.00	6.0	PVC	0.00	false	503.00	5.71	7.97	
FM-403	Raven East	108.00	FAA Dump Station	82.00	true	3,030.00	8.0	PVC	0.00	false	517.25	3.30	33.19	

Scenario: Full Buildout Avg Pipe with Truck Dump Scenario

Pressure Junction Report

Label	X (ft)	Y (ft)	Ground Elevation (ft)	Sanitary Load Type	Inflow Load Type	Calculated Load (gpm)	Pressure (psi)	Description
Piarnigan Discharge	9,859.78	0,353.72	38.00	Pattern Loa	None	-21.00	22.36	
Piarnigan East	9,897.91	0,353.71	32.00	Pattern Loa	None	-5.13	21.93	
Piarnigan	9,928.61	0,353.86	30.00	Pattern Loa	None	-10.38	22.40	
Uivuuq	9,951.39	0,353.85	30.00	Pattern Loa	None	-11.38	20.88	
Martina	9,990.17	0,354.02	30.00	Pattern Loa	None	-6.50	17.71	
Main LS Discharge	0,123.20	0,337.87	18.00	<None>	None	0.00	20.71	
Pipe Reducer	0,123.20	0,352.48	20.00	Pattern Loa	None	-200.00	18.75	
J-27	0,123.30	0,379.73	0.00	<None>	None	0.00	24.01	
Larson Discharge	9,709.82	0,104.25	105.00	<None>	None	0.00	8.31	
J-20	9,859.76	0,079.69	84.00	<None>	None	0.00	5.90	
H - Marker	9,859.76	0,178.57	40.00	Pattern Loa	None	-5.75	11.86	
FAA Discharge	9,798.27	0,004.19	92.00	<None>	None	0.00	12.25	
Blueberry 1	9,824.42	0,000.31	62.00	Pattern Loa	None	-4.88	3.55	
Blueberry 2	9,838.35	9,998.41	62.00	Pattern Loa	None	-6.88	1.84	
Blueberry 3	9,851.65	9,996.19	64.00	Pattern Loa	None	-9.25	0.06	
Blueberry 4	9,864.79	9,994.45	72.00	Pattern Loa	None	-9.50	-4.34	
Blueberry 5	9,876.67	9,992.71	72.00	Pattern Loa	None	-17.00	-5.45	
Blueberry 6	9,891.39	9,990.81	66.00	Pattern Loa	None	-6.88	-4.53	
Blueberry 7	9,906.91	9,988.60	60.00	Pattern Loa	None	-5.50	-3.63	
Harbor Discharge	0,357.16	0,183.72	10.00	<None>	None	0.00	32.46	
R10	0,338.46	0,183.73	10.00	Pattern Loa	None	-4.63	30.61	
R8	0,319.98	0,183.71	10.00	Pattern Loa	None	-4.25	29.11	
R9	0,302.83	0,183.82	10.00	Pattern Loa	None	-4.25	27.27	
South Area	0,285.01	0,187.03	10.00	Pattern Loa	None	-7.88	23.63	
Mission Lake	0,267.75	0,199.77	10.00	Pattern Loa	None	-20.63	17.66	
R6/East	0,244.10	0,217.39	10.00	Composite	None	-11.25	14.61	
R3/5	0,236.18	0,233.22	10.00	Composite	None	-9.88	13.78	
R2/4	0,228.93	0,246.42	10.00	Composite	None	-10.63	12.93	
R1/North	0,223.65	0,260.93	10.00	Composite	None	-12.38	12.05	
West	0,181.42	0,258.07	10.00	Pattern Loa	None	-12.75	10.60	
QFC2 Discharge	9,933.76	0,042.19	47.00	<None>	None	0.00	11.35	
Nunvak 1	9,946.85	0,036.67	52.00	Pattern Loa	None	-16.25	7.81	
Nunvak 2	9,964.74	0,029.39	54.00	Pattern Loa	None	-6.00	6.35	
Pacifica	9,984.65	0,021.07	40.00	Pattern Loa	None	-1.84	10.76	
Jail	9,984.00	0,048.48	36.00	Pattern Loa	None	-0.66	11.86	
Juvenile	9,984.00	0,070.88	36.00	Pattern Loa	None	-1.73	10.87	

Scenario: Full Buildout Avg Pipe with Truck Dump Scenario

Pressure Junction Report

Label	X (ft)	Y (ft)	Ground Elevation (ft)	Sanitary Load Type	Inflow Load Type	Calculated Load (gpm)	Pressure (psi)	Description
Bldg. 800	9,984.00	0,094.56	40.00	Pattern Load	None	-3.01	8.56	
BUC	9,984.00	0,117.92	40.00	Pattern Load	None	-0.34	8.49	
Hospital	0,009.74	0,135.38	40.00	Pattern Load	None	-33.84	5.80	
USFS	0,035.38	0,151.70	40.00	Pattern Load	None	-1.62	4.38	
CSWTF	0,035.34	0,183.24	22.00	Pattern Load	None	-39.17	10.35	
CSW&S South	0,060.50	0,183.84	25.00	Pattern Load	None	-13.75	7.04	
City Center South	0,085.42	0,178.08	22.00	Pattern Load	None	-8.13	7.28	
City Center North	0,091.20	0,198.56	18.00	Pattern Load	None	-15.63	7.68	
CSW&S North	0,091.20	0,223.84	17.00	Pattern Load	None	-17.87	4.56	
Kilbuck FM	0,123.16	0,223.84	15.00	Pattern Load	None	-9.01	4.38	
Ridgecrest	0,123.16	0,258.08	11.00	Pattern Load	None	-2.78	4.97	
Kasayuli Discharge	9,683.63	9,965.71	116.00	<None>	None	0.00	6.69	
Raven West	9,683.61	9,982.46	94.00	Pattern Load	None	-11.74	12.91	
Raven East	9,705.95	9,977.72	108.00	Composite	None	-14.25	3.40	

Scenario: Full Buildout Avg Pipe with Truck Dump Scenario

Node Loading Report (Steady-state)

Label	Sanitary Load Type	Sanitary Unit Load Type	Sanitary Unit Load Units	Sanitary Unit Load Count	Sanitary Pattern Base Flow (gpd)	Sanitary Base Load (gpd)	Inflow Load Type	Inflow Pattern Base Flow (gpd)	Inflow Pattern	Known Flow (gpd)	Has Diversion?	Diversion Target	Diversion Rating Table
Main LS MH	Pattern Load	<None>	N/A	N/A	279,600.00	279,600.00	None	0.00	Fixed	0.00	false	N/A	Edit
Ptarmigan WW	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
Ptarmigan Discharge/M	Pattern Load	<None>	N/A	N/A	30,240.00	30,240.00	None	0.00	Fixed				
Ptarmigan East	Pattern Load	<None>	N/A	N/A	7,380.00	7,380.00	None	0.00	Fixed				
Ptarmigan	Pattern Load	<None>	N/A	N/A	14,940.00	14,940.00	None	0.00	Fixed				
Uivuuq	Pattern Load	<None>	N/A	N/A	16,380.00	16,380.00	None	0.00	Fixed				
Martina	Pattern Load	<None>	N/A	N/A	9,360.00	9,360.00	None	0.00	Fixed	0.00			
Main LS WW	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed				
Main LS Discharge	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed				
Pipe Reducer	Pattern Load	<None>	N/A	N/A	288,000.00	288,000.00	None	0.00	Fixed				
J-27	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed				
Ptarmigan Dump Station	Composite	<None>	N/A	N/A	246,240.00	246,240.00	None	0.00	Fixed	0.00	false	N/A	Edit
Larson WW	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
Larson Discharge	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed				
J-20	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed				
H - Marker	Pattern Load	<None>	N/A	N/A	8,280.00	8,280.00	None	0.00	Fixed				
Larson Dump Station	Composite	<None>	N/A	N/A	466,920.00	466,920.00	None	0.00	Fixed	0.00	false	N/A	Edit
QFC MH	Composite	<None>	N/A	N/A	231,830.00	231,830.00	None	0.00	Fixed	0.00	false	N/A	Edit
FAA-WW	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
FAA Discharge	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed				
Blueberry 1	Pattern Load	<None>	N/A	N/A	7,020.00	7,020.00	None	0.00	Fixed				
Blueberry 2	Pattern Load	<None>	N/A	N/A	9,900.00	9,900.00	None	0.00	Fixed				
Blueberry 3	Pattern Load	<None>	N/A	N/A	13,320.00	13,320.00	None	0.00	Fixed				
Blueberry 4	Pattern Load	<None>	N/A	N/A	13,680.00	13,680.00	None	0.00	Fixed				
Blueberry 5	Pattern Load	<None>	N/A	N/A	24,480.00	24,480.00	None	0.00	Fixed				
Blueberry 6	Pattern Load	<None>	N/A	N/A	9,900.00	9,900.00	None	0.00	Fixed				
Blueberry 7	Pattern Load	<None>	N/A	N/A	7,920.00	7,920.00	None	0.00	Fixed	0.00			
Harbor WW	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed				
Harbor Discharge	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed				
R10	Pattern Load	<None>	N/A	N/A	6,660.00	6,660.00	None	0.00	Fixed				
R8	Pattern Load	<None>	N/A	N/A	6,120.00	6,120.00	None	0.00	Fixed				
R9	Pattern Load	<None>	N/A	N/A	6,120.00	6,120.00	None	0.00	Fixed				
South Area	Pattern Load	<None>	N/A	N/A	11,340.00	11,340.00	None	0.00	Fixed				
Mission Lake	Pattern Load	<None>	N/A	N/A	29,700.00	29,700.00	None	0.00	Fixed				

Scenario: Full Buildout Avg Pipe with Truck Dump Scenario

Node Loading Report (Steady-state)

Label	Sanitary Load Type	Sanitary Unit Load Type	Sanitary Unit Load Units	Sanitary Unit Load Count	Sanitary Pattern Base Flow (gpd)	Sanitary Pattern	Sanitary Base Load (gpd)	Inflow Load Type	Inflow Pattern Base Flow (gpd)	Inflow Pattern	Known Flow (gpd)	Has Diversion?	Diversion Target	Diversion Rating Table
R6/East	Composite	<None>	N/A	N/A	16,200.00	<Composite	16,200.00	None	0.00	Fixed				
R3/5	Composite	<None>	N/A	N/A	14,220.00	<Composite	14,220.00	None	0.00	Fixed				
R2/4	Composite	<None>	N/A	N/A	15,300.00	<Composite	15,300.00	None	0.00	Fixed				
R1/North	Composite	<None>	N/A	N/A	17,820.00	<Composite	17,820.00	None	0.00	Fixed				
West	Pattern Loa	<None>	N/A	N/A	18,360.00	Fixed	18,360.00	None	0.00	Fixed	0.00			
QFC2 WW	<None>	<None>	N/A	N/A	0.00	Fixed	0.00	None	0.00	Fixed				
QFC2 Discharge	<None>	<None>	N/A	N/A	0.00	Fixed	0.00	None	0.00	Fixed				
Nunvak 1	Pattern Loa	<None>	N/A	N/A	23,400.00	Fixed	23,400.00	None	0.00	Fixed				
Nunvak 2	Pattern Loa	<None>	N/A	N/A	8,640.00	Fixed	8,640.00	None	0.00	Fixed				
Pacifica	Pattern Loa	<None>	N/A	N/A	2,655.00	Fixed	2,655.00	None	0.00	Fixed				
Jail	Pattern Loa	<None>	N/A	N/A	951.00	Fixed	951.00	None	0.00	Fixed				
Juvenile	Pattern Loa	<None>	N/A	N/A	2,487.00	Fixed	2,487.00	None	0.00	Fixed				
Bldg. 800	Pattern Loa	<None>	N/A	N/A	4,332.00	Fixed	4,332.00	None	0.00	Fixed				
BUC	Pattern Loa	<None>	N/A	N/A	487.00	Fixed	487.00	None	0.00	Fixed				
Hospital	Pattern Loa	<None>	N/A	N/A	48,724.00	Fixed	48,724.00	None	0.00	Fixed				
USFS	Pattern Loa	<None>	N/A	N/A	2,329.00	Fixed	2,329.00	None	0.00	Fixed				
CSWTF	Pattern Loa	<None>	N/A	N/A	56,400.00	Fixed	56,400.00	None	0.00	Fixed				
CSW&S South	Pattern Loa	<None>	N/A	N/A	19,800.00	Fixed	19,800.00	None	0.00	Fixed				
City Center South	Pattern Loa	<None>	N/A	N/A	11,700.00	Fixed	11,700.00	None	0.00	Fixed				
City Center North	Pattern Loa	<None>	N/A	N/A	22,500.00	Fixed	22,500.00	None	0.00	Fixed				
CSW&S North	Pattern Loa	<None>	N/A	N/A	25,740.00	Fixed	25,740.00	None	0.00	Fixed				
Kilbuck FM	Pattern Loa	<None>	N/A	N/A	12,970.00	Fixed	12,970.00	None	0.00	Fixed				
Ridgecrest	Pattern Loa	<None>	N/A	N/A	4,000.00	Fixed	4,000.00	None	0.00	Fixed				
Harbor Dump Station	Composite	<None>	N/A	N/A	459,720.00	<Composite	459,720.00	None	0.00	Fixed	0.00	false	N/A	Edit
FAA Dump Station	Composite	<None>	N/A	N/A	18,360.00	<Composite	18,360.00	None	0.00	Fixed	0.00	false	N/A	Edit
Kasayuli WW	<None>	<None>	N/A	N/A	0.00	Fixed	0.00	None	0.00	Fixed	0.00			
Kasayuli Discharge	<None>	<None>	N/A	N/A	0.00	Fixed	0.00	None	0.00	Fixed				
Raven West	Pattern Loa	<None>	N/A	N/A	16,900.00	Fixed	16,900.00	None	0.00	Fixed				
Raven East	Composite	<None>	N/A	N/A	20,520.00	<Composite	20,520.00	None	0.00	Fixed				
Kasayuli Dump Station	Composite	<None>	N/A	N/A	480,780.00	<Composite	480,780.00	None	0.00	Fixed	0.00	false	N/A	Edit

Scenario: Full Buildout Avg Pipe with Truck Dump Scenario

Node Loading Report (Steady-state)

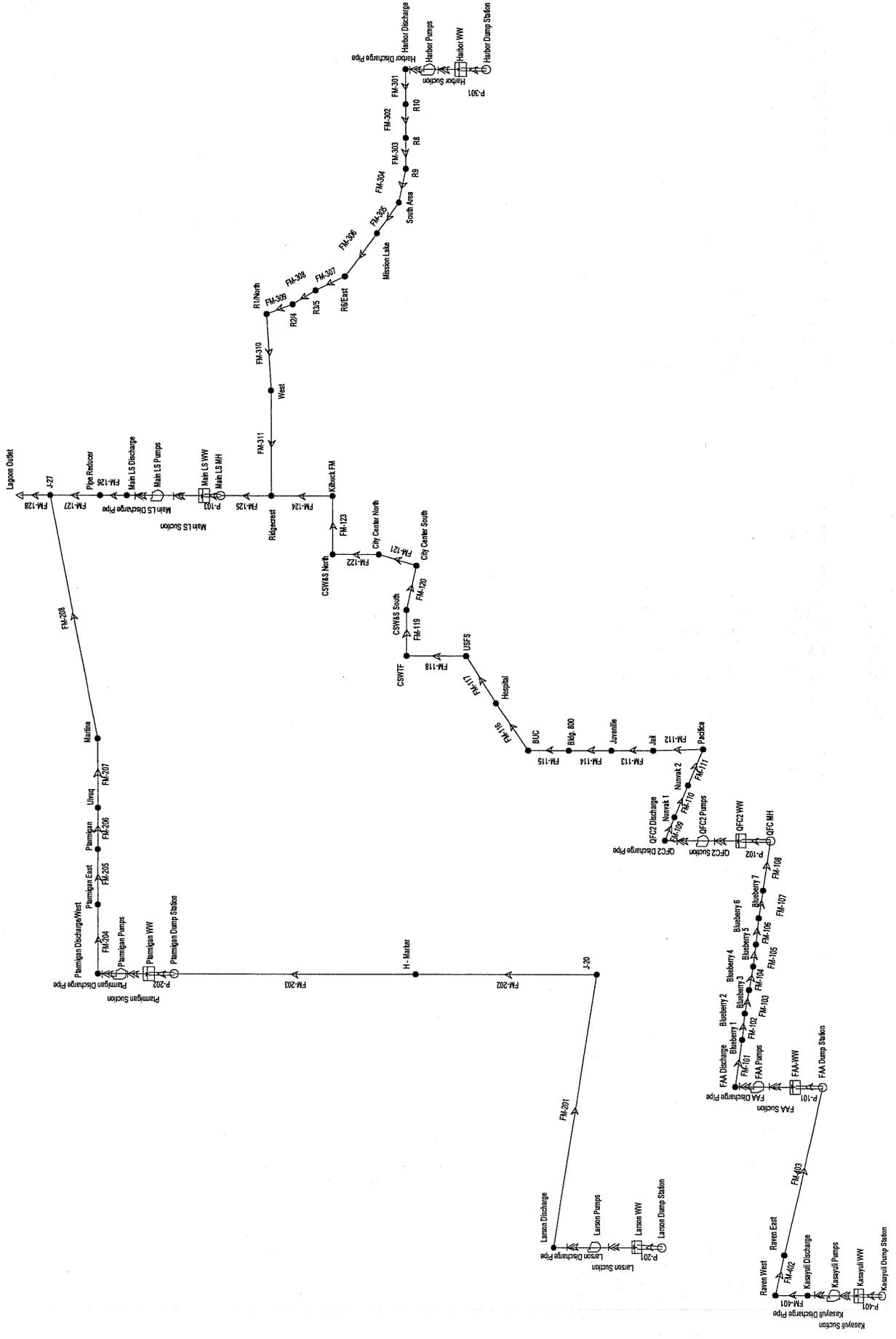
Total Sanitary Flow (gpd)	Total Weather Flow (gpd)	System Known Flow (gpd)	Pumped Flow (gpd)	Total Diverted Flow In (gpd)	Total Flow (gpd)	Percent Diverted Out (%)	Non-Diverted Flow Out (gpd)	Total Flow Out (gpd)
279,600.00	0.00	0.00	530,131.33	0.00	809,731.33	0.0	809,731.33	809,731.33
246,240.00	0.00	0.00	632,078.09	0.00	878,318.09	N/A	N/A	N/A
279,600.00	0.00	0.00	530,131.33	0.00	809,731.33	N/A	N/A	N/A
246,240.00	0.00	0.00	632,078.09	0.00	878,318.09	0.0	878,318.09	878,318.09
466,920.00	0.00	0.00	0.00	0.00	466,920.00	N/A	N/A	N/A
466,920.00	0.00	0.00	0.00	0.00	466,920.00	0.0	466,920.00	466,920.00
231,830.00	0.00	0.00	060,940.92	0.00	292,770.92	0.0	292,770.92	292,770.92
18,360.00	0.00	0.00	744,839.56	0.00	763,199.56	N/A	N/A	N/A
459,720.00	0.00	0.00	0.00	0.00	459,720.00	N/A	N/A	N/A

Scenario: Full Buildout Avg Pipe with Truck Dump Scenario

Node Loading Report (Steady-state)

Total Sanitary Flow (gpd)	Total Weather Flow (gpd)	Total Wet System Known Flow (gpd)	Pumped Flow (gpd)	Total Diverted Flow In (gpd)	Total Flow (gpd)	Percent Diverted Out (%)	Non-Diverted Flow Out (gpd)	Total Flow Out (gpd)
231,830.00	0.00	0.00	060,940.92	0.00	292,770.92	N/A	N/A	N/A
459,720.00	0.00	0.00	0.00	0.00	459,720.00	0.0	459,720.00	459,720.00
18,360.00	0.00	0.00	744,839.56	0.00	763,199.56	0.0	763,199.56	763,199.56
480,780.00	0.00	0.00	0.00	0.00	480,780.00	N/A	N/A	N/A
480,780.00	0.00	0.00	0.00	0.00	480,780.00	0.0	480,780.00	480,780.00

Scenario: Full Buildout Peak Truck Haul with No Piped Services Scenario



Scenario: Full Buildout Peak Truck Haul with No Piped Services Scenario

Wet Well Report

Label	Ground Elevation (ft)	Base Elevation (ft)	Minimum Elevation (ft)	Initial Elevation (ft)	Alarm Elevation (ft)	Maximum Elevation (ft)	Wet Well Diameter (ft)	Average Area (ft ²)	Sanitary Load Type	Inflow Load Type	Known Flow (gpd)	Total Flow (gpd)	Force Mair Discharge (gpm)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Gravity Element Headloss (ft)
Ptarmigan W	40.50	20.00	25.00	32.00	35.00	40.00	20.00	314.2	<None>	None	0.00	973,471.38	676.11	32.00	32.00	0.00
Main LS WW	20.50	0.00	5.00	15.00	17.00	20.00	30.00	706.9	<None>	None	0.00	991,445.37	2,191.87	15.00	15.00	0.00
Larson WW	110.50	90.00	95.00	98.00	100.00	110.00	10.00	78.5	<None>	None	0.00	432,000.00	376.02	98.00	98.00	0.00
FAA-WW	94.50	78.50	80.00	81.00	84.00	94.00	10.00	78.5	<None>	None	0.00	533,401.08	452.22	81.00	81.00	0.00
Harbor WW	12.50	-8.00	-3.00	7.00	8.00	12.00	10.00	78.5	<None>	None	0.00	432,000.00	571.50	7.00	7.00	0.00
QFC2 WW	48.50	28.00	33.00	40.00	42.00	48.00	20.00	314.2	<None>	None	0.00	1,083,197.33	768.52	40.00	40.00	0.00
Kasayuli WW	120.50	100.00	105.00	110.00	111.00	120.00	20.00	314.2	<None>	None	0.00	432,000.00	319.42	110.00	110.00	0.00

Scenario: Full Buildout Peak Truck Haul with No Piped Services Scenario

Wet Well Report

Description

Scenario: Full Buildout Peak Truck Haul with No Piped Services Scenario

Pump Report

Label	To Pipe	Ground Elevation (ft)	Pump Type	Pump Power (Hp)	Shutoff Head (ft)	Shutoff Discharge (gpm)	Design Head (ft)	Design Discharge (gpm)	Maximum Operating Discharge (gpm)	Maximum Operating Head (ft)	Initial Relative Speed Factor	Initial Status	Control Status	Pressure Flow (gpm)	Intake Pump Pressure (psi)	Discharge Pump Pressure (psi)	Pump Head (ft)
Ptarmigan Pump	Ptarmigan Discharge Pipe	24.00	Standard (3 Po		125.00	0.00	76.00	546.00	900.00	40.00	1.00		On	676.11	3.46	30.71	62.98
Main LS Pumps	Main LS Discharge Pipe	4.00	Standard (3 Po		72.50	0.00	56.00	1,945.00	3,700.00	0.00	1.00		On	2,191.87	4.76	26.73	50.78
Larson Pumps	Larson Discharge Pipe	94.00	Standard (3 Po		26.00	0.00	19.00	170.00	425.00	0.00	1.00		On	376.02	1.73	3.54	4.18
FAA Pumps	FAA Discharge Pipe	79.00	Standard (3 Po		126.00	0.00	89.00	355.00	900.00	0.00	1.00		On	452.22	0.86	33.36	75.11
Harbor Pumps	Harbor Discharge Pipe	-2.00	Standard (3 Po		125.00	0.00	76.00	546.00	900.00	40.00	1.00		On	571.50	3.89	35.68	73.47
QFC2 Pumps	QFC2 Discharge Pipe	31.00	Standard (3 Po		125.00	0.00	76.00	546.00	900.00	40.00	1.00		On	768.52	3.89	27.07	53.58
Kasayuli Pump	Kasayuli Discharge Pipe	104.00	Standard (3 Po		53.00	0.00	31.00	370.00	750.00	0.00	1.00		On	319.42	2.60	17.60	34.68

Scenario: Full Buildout Peak Truck Haul with No Piped Services Scenario

Pump Report

Description	

Scenario: Full Buildout Peak Truck Haul with No Piped Services Scenario

Pressure Pipe Report

Label	Upstream Node	Upstream Invert Elevation (ft)	Downstream Node	Downstream Invert Elevation (ft)	User Defined Length?	Length (ft)	Diameter (in)	Material	Minor Loss Coefficient	Check Valve?	Pressure Flow (gpm)	Velocity (ft/s)	Pressure Pipe Headloss (ft)	Description
Ptarmigan Suction	Ptarmigan WW	25.00	Ptarmigan Pumps	24.00	true	1.00	42.0	Ductile Iro	0.00	true	676.11	0.16	0.00	
Ptarmigan Discharge	Ptarmigan Pumps	24.00	Ptarmigan Discharge	38.00	false	12.00	8.0	Ductile Iro	0.00	true	676.11	4.32	0.11	
FM-204	Ptarmigan Discharge	38.00	Ptarmigan East	32.00	true	2,530.00	8.0	PVC	0.00	false	676.11	4.32	17.17	
FM-205	Ptarmigan East	32.00	Ptarmigan	30.00	true	320.00	8.0	PVC	0.00	false	676.11	4.32	2.17	
FM-206	Ptarmigan	30.00	Uivuq	30.00	true	1,230.00	10.0	PVC	0.00	false	676.11	2.76	2.82	
FM-207	Uivuq	30.00	Martina	30.00	true	2,480.00	10.0	PVC	0.00	false	676.11	2.76	5.68	
FM-208	Martina	30.00	J-27	0.00	true	3,145.00	10.0	PVC	0.00	false	676.11	2.76	11.78	
Main LS Suction	Main LS WW	5.00	Main LS Pumps	4.00	true	1.00	42.0	Ductile Iro	0.00	true	2,191.87	0.51	0.00	
Main LS Discharge	Main LS Pumps	4.00	Main LS Discharge	18.00	true	14.00	14.0	Ductile Iro	0.00	true	2,191.87	4.57	0.07	
FM-126	Main LS Discharge	18.00	Pipe Reducer	20.00	true	651.00	14.0	PVC	0.00	false	2,191.87	4.57	2.56	
FM-127	Pipe Reducer	20.00	J-27	0.00	true	1,517.00	14.0	PVC	2.30	false	2,391.87	4.99	7.89	
FM-128	J-27	0.00	Lagoon Outlet	50.00	true	1,500.00	18.0	PVC	2.30	false	3,067.97	3.87	3.76	
Larson Suction	Larson WW	95.00	Larson Pumps	94.00	true	1.00	42.0	Ductile Iro	0.00	true	376.02	0.09	0.00	
Larson Discharge	Larson Pumps	94.00	Larson Discharge	105.00	true	1.00	6.0	Ductile Iro	0.00	true	376.02	4.27	0.01	
FM-201	Larson Discharge	105.00	J-20	84.00	true	2,200.00	6.0	PVC	0.00	false	376.02	4.27	20.46	
FM-202	J-20	84.00	H - Marker	40.00	true	2,500.00	6.0	PVC	0.00	false	376.02	4.27	23.25	
FM-203	H - Marker	40.00	Ptarmigan Dump Static	31.00	true	2,900.00	6.0	PVC	0.00	false	376.02	4.27	26.97	
FAA Suction	FAA-WW	80.00	FAA Pumps	79.00	true	1.00	42.0	Ductile Iro	4.61	true	452.22	0.10	0.00	
FAA Discharge	FAA Pumps	79.00	FAA Discharge	92.00	false	13.00	6.0	Ductile Iro	0.00	true	452.22	5.13	0.22	
FM-101	FAA Discharge	92.00	Blueberry 1	62.00	true	3,650.00	6.0	Ductile Iro	0.00	false	452.22	5.13	96.38	
FM-102	Blueberry 1	62.00	Blueberry 2	62.00	true	575.00	6.0	PVC	0.00	false	452.22	5.13	7.52	
FM-103	Blueberry 2	62.00	Blueberry 3	64.00	true	300.00	8.0	PVC	0.00	false	452.22	2.89	0.97	
FM-104	Blueberry 3	64.00	Blueberry 4	72.00	true	300.00	8.0	PVC	0.00	false	452.22	2.89	0.97	
FM-105	Blueberry 4	72.00	Blueberry 5	72.00	true	350.00	8.0	PVC	0.00	false	452.22	2.89	1.13	
FM-106	Blueberry 5	72.00	Blueberry 6	66.00	true	500.00	8.0	PVC	0.00	false	452.22	2.89	1.61	
FM-107	Blueberry 6	66.00	Blueberry 7	60.00	true	500.00	8.0	PVC	0.00	false	452.22	2.89	1.61	
FM-108	Blueberry 7	60.00	QFC MH	41.00	true	1,250.00	8.0	PVC	0.00	false	452.22	2.89	4.03	
Harbor Suction	Harbor WW	-3.00	Harbor Pumps	-2.00	true	1.00	42.0	Ductile Iro	0.00	true	571.50	0.13	0.00	
Harbor Discharge	Harbor Pumps	-2.00	Harbor Discharge	10.00	true	12.00	6.0	Ductile Iro	0.00	true	571.50	6.48	0.32	
FM-301	Harbor Discharge	10.00	R10	10.00	true	250.00	6.0	PVC	0.00	false	571.50	6.48	5.05	
FM-302	R10	10.00	R8	10.00	true	200.00	6.0	PVC	0.00	false	571.50	6.48	4.04	
FM-303	R8	10.00	R9	10.00	true	240.00	6.0	PVC	0.00	false	571.50	6.48	4.85	
FM-304	R9	10.00	South Area	10.00	true	470.00	6.0	PVC	0.00	false	571.50	6.48	9.49	
FM-305	South Area	10.00	Mission Lake	10.00	true	750.00	6.0	PVC	0.00	false	571.50	6.48	15.14	
FM-306	Mission Lake	10.00	R6/East	10.00	true	1,450.00	8.0	PVC	0.00	false	571.50	3.65	7.21	

Scenario: Full Buildout Peak Truck Haul with No Piped Services Scenario

Pressure Pipe Report

Label	Upstream Node	Upstream Invert Elevation (ft)	Downstream Node	Downstream Invert Elevation (ft)	User Defined Length?	Length (ft)	Diameter (in)	Material	Minor Loss Coefficient	Check Valve?	Pressure Flow (gpm)	Velocity (ft/s)	Pressure Pipe Headloss (ft)	Description
FM-307	R6/East	10.00	R3/5	10.00	true	380.00	8.0	PVC	0.00	false	571.50	3.65	1.89	
FM-308	R3/5	10.00	R2/4	10.00	true	380.00	8.0	PVC	0.00	false	611.00	3.90	2.14	
FM-309	R2/4	10.00	R1/North	10.00	true	380.00	8.0	PVC	0.00	false	611.00	3.90	2.14	
FM-310	R1/North	10.00	West	10.00	true	600.00	10.0	PVC	0.00	false	611.00	2.50	1.14	
FM-311	West	10.00	Ridgecrest	11.00	true	2,070.00	10.0	PVC	0.00	false	611.00	2.50	3.93	
QFC2 Suction	QFC2 WW	33.00	QFC2 Pumps	31.00	true	1.00	42.0	Ductile Iro	4.61	true	768.52	0.18	0.00	
QFC2 Discharge Pipe	QFC2 Pumps	31.00	QFC2 Discharge	47.00	true	7.00	8.0	Ductile Iro	0.00	true	768.52	4.91	0.08	
FM-109	QFC2 Discharge	47.00	Nunvak 1	52.00	true	725.00	8.0	PVC	0.00	false	768.52	4.91	6.24	
FM-110	Nunvak 1	52.00	Nunvak 2	54.00	true	300.00	8.0	PVC	0.00	false	768.52	4.91	2.58	
FM-111	Nunvak 2	54.00	Pacifica	40.00	true	825.00	8.0	PVC	0.00	false	768.52	4.91	7.10	
FM-112	Pacifica	40.00	Jail	36.00	true	314.00	8.0	PVC	0.00	false	775.90	4.95	2.75	
FM-113	Jail	36.00	Juvenile	36.00	true	494.00	8.0	PVC	0.00	false	802.32	5.12	4.60	
FM-114	Juvenile	36.00	Bldg. 800	40.00	true	292.00	8.0	PVC	0.00	false	809.22	5.17	2.76	
FM-115	Bldg. 800	40.00	BUC	40.00	true	35.00	8.0	PVC	0.00	false	821.26	5.24	0.34	
FM-116	BUC	40.00	Hospital	40.00	true	977.00	8.0	Ductile Iro	1.00	false	822.61	5.25	12.86	
FM-117	Hospital	40.00	USFS	40.00	true	658.00	10.0	PVC	0.00	false	957.95	3.91	2.87	
FM-118	USFS	40.00	CSWTF	22.00	true	806.00	10.0	PVC	0.68	false	964.42	3.94	3.73	
FM-119	CSWTF	22.00	CSW&S South	25.00	true	689.00	10.0	PVC	3.28	false	1,003.59	4.10	4.13	
FM-120	CSW&S South	25.00	City Center South	22.00	true	328.00	10.0	PVC	2.16	false	1,058.59	4.32	2.35	
FM-121	City Center South	22.00	City Center North	18.00	true	372.00	10.0	PVC	3.24	false	1,091.09	4.46	3.07	
FM-122	City Center North	18.00	CSW&S North	17.00	true	1,286.00	10.0	PVC	2.80	false	1,153.59	4.71	8.88	
FM-123	CSW&S North	17.00	Kilbuck FM	15.00	true	847.00	12.0	PVC	2.36	false	1,225.09	3.48	2.84	
FM-124	Kilbuck FM	15.00	Ridgecrest	11.00	true	847.00	12.0	PVC	3.54	false	1,261.12	3.58	3.23	
FM-125	Ridgecrest	11.00	Main LS MH	16.67	true	686.00	12.0	PVC	2.66	false	1,883.23	5.34	5.49	
Kasayuli Suction	Kasayuli WW	105.00	Kasayuli Pumps	104.00	true	1.00	42.0	PVC	0.00	true	319.42	0.07	0.00	
Kasayuli Discharge P	Kasayuli Pumps	104.00	Kasayuli Discharge	116.00	true	12.00	6.0	Ductile Iro	0.00	true	319.42	3.62	0.11	
FM-401	Kasayuli Discharge	116.00	Raven West	94.00	true	500.00	6.0	PVC	0.00	false	319.42	3.62	3.44	
FM-402	Raven West	94.00	Raven East	108.00	true	500.00	6.0	PVC	0.00	false	319.42	3.62	3.44	
FM-403	Raven East	108.00	FAA Dump Station	82.00	true	3,030.00	6.0	PVC	0.00	false	319.42	3.62	55.20	

Scenario: Full Buildout Peak Truck Haul with No Piped Services Scenario

Pressure Junction Report

Label	X (ft)	Y (ft)	Ground Elevation (ft)	Sanitary Load Type	Inflow Load Type	Calculated Load (gpm)	Pressure (psi)	Description
Ptarmigan Discharge/M	9,859.78	0,353.72	38.00	<None>	None	0.00	24.61	
Ptarmigan East	9,897.91	0,353.71	32.00	Pattern Loa	None	0.00	19.77	
Ptarmigan	9,928.61	0,353.86	30.00	Pattern Loa	None	0.00	19.70	
Uivuuq	9,951.39	0,353.85	30.00	Pattern Loa	None	0.00	18.48	
Martina	9,990.17	0,354.02	30.00	Pattern Loa	None	0.00	16.03	
Main LS Discharge	0,123.20	0,337.87	18.00	<None>	None	0.00	20.64	
Pipe Reducer	0,123.20	0,352.48	20.00	Pattern Loa	None	-200.00	18.67	
J-27	0,123.30	0,379.73	0.00	<None>	None	0.00	23.91	
Larson Discharge	9,709.82	0,104.25	105.00	<None>	None	0.00	-1.22	
J-20	9,859.76	0,079.69	84.00	<None>	None	0.00	-0.99	
H - Marker	9,859.76	0,178.57	40.00	Pattern Loa	None	0.00	7.99	
FAA Discharge	9,798.27	0,004.19	92.00	<None>	None	0.00	27.64	
Blueberry 1	9,824.42	0,000.31	62.00	Pattern Loa	None	0.00	-1.08	
Blueberry 2	9,838.35	9,998.41	62.00	Pattern Loa	None	0.00	-4.34	
Blueberry 3	9,851.65	9,996.19	64.00	Pattern Loa	None	0.00	-5.62	
Blueberry 4	9,864.79	9,994.45	72.00	Pattern Loa	None	0.00	-9.50	
Blueberry 5	9,876.67	9,992.71	72.00	Pattern Loa	None	0.00	-9.99	
Blueberry 6	9,891.39	9,990.81	66.00	<None>	None	0.00	-8.09	
Blueberry 7	9,906.91	9,988.60	60.00	Pattern Loa	None	0.00	-6.19	
Harbor Discharge	0,357.16	0,183.72	10.00	<None>	None	0.00	30.35	
R10	0,338.46	0,183.73	10.00	Pattern Loa	None	0.00	28.17	
R8	0,319.98	0,183.71	10.00	Pattern Loa	None	0.00	26.42	
R9	0,302.83	0,183.82	10.00	Pattern Loa	None	0.00	24.33	
South Area	0,285.01	0,187.03	10.00	Pattern Loa	None	0.00	20.22	
Mission Lake	0,267.75	0,199.77	10.00	Pattern Loa	None	0.00	13.67	
R6/East	0,244.10	0,217.39	10.00	<None>	None	0.00	10.55	
R3/5	0,236.18	0,233.22	10.00	Composite	None	-39.50	9.73	
R2/4	0,228.93	0,246.42	10.00	<None>	None	0.00	8.81	
R1/North	0,223.65	0,260.93	10.00	<None>	None	0.00	7.88	
West	0,181.42	0,258.07	10.00	Pattern Loa	None	0.00	7.39	
QFC2 Discharge	9,933.76	0,042.19	47.00	<None>	None	0.00	20.12	
Nunvak 1	9,946.85	0,036.67	52.00	Pattern Loa	None	0.00	15.25	
Nunvak 2	9,964.74	0,029.39	54.00	Pattern Loa	None	0.00	13.27	
Pacifica	9,984.65	0,021.07	40.00	Pattern Loa	None	-7.37	16.26	
Jail	9,984.00	0,048.48	36.00	Pattern Loa	None	-26.42	16.80	
Juvenile	9,984.00	0,070.88	36.00	Pattern Loa	None	-6.91	14.81	

Scenario: Full Buildout Peak Truck Haul with No Piped Services Scenario

Pressure Junction Report

Label	X (ft)	Y (ft)	Ground Elevation (ft)	Sanitary Load Type	Inflow Load Type	Calculated Load (gpm)	Pressure (psi)	Description
Bldg. 800	9,984.00	0,094.56	40.00	Pattern Loa	None	-12.03	11.88	
BUC	9,984.00	0,117.92	40.00	Pattern Loa	None	-1.35	11.73	
Hospital	0,009.74	0,135.38	40.00	Pattern Loa	None	-135.34	6.17	
USFS	0,035.38	0,151.70	40.00	Pattern Loa	None	-6.47	4.93	
CSWTF	0,035.34	0,183.24	22.00	Pattern Loa	None	-39.17	11.10	
CSW&S South	0,060.50	0,183.84	25.00	Pattern Loa	None	-55.00	8.02	
City Center South	0,085.42	0,178.08	22.00	Pattern Loa	None	-32.50	8.30	
City Center North	0,091.20	0,198.56	18.00	Pattern Loa	None	-62.50	8.70	
CSW&S North	0,091.20	0,223.84	17.00	Pattern Loa	None	-71.50	5.29	
Kilbuck FM	0,123.16	0,223.84	15.00	Pattern Loa	None	-36.03	4.93	
Ridgecrest	0,123.16	0,258.08	11.00	Pattern Loa	None	-11.11	5.26	
Kasayuli Discharge	9,683.63	9,965.71	116.00	<None>	None	0.00	12.36	
Raven West	9,683.61	9,982.46	94.00	Pattern Loa	None	0.00	20.39	
Raven East	9,705.95	9,977.72	108.00	Pattern Loa	None	0.00	12.85	

Scenario: Full Buildout Peak Truck Haul with No Piped Services Scenario

Node Loading Report (Steady-state)

Label	Sanitary Load Type	Sanitary Unit Load Type	Sanitary Unit Load Units	Sanitary Unit Load Count	Sanitary Pattern Base Flow (gpd)	Sanitary Base Load (gpd)	Inflow Load Type	Inflow Pattern Base Flow (gpd)	Inflow Pattern	Known Flow (gpd)	Has Diversion?	Diversion Target	Diversion Rating Table
Main LS MH	Pattern Loa	<None>	N/A	N/A	279,600.00	279,600.00	None	0.00	Fixed	0.00	false	N/A	Edit
Ptarmigan WW	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
Ptarmigan Discharge/M	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
Ptarmigan East	Pattern Loa	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
Ptarmigan	Pattern Loa	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
Uivuuq	Pattern Loa	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
Martina	Pattern Loa	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
Main LS WW	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
Main LS Discharge	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
Pipe Reducer	Pattern Loa	<None>	N/A	N/A	288,000.00	288,000.00	None	0.00	Fixed	0.00			
J-27	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
Ptarmigan Dump Statit	Pattern Loa	<None>	N/A	N/A	432,000.00	432,000.00	None	0.00	Fixed	0.00	false	N/A	Edit
Larson WW	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
Larson Discharge	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
J-20	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
H - Marker	Pattern Loa	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
Larson Dump Station	Pattern Loa	<None>	N/A	N/A	432,000.00	432,000.00	None	0.00	Fixed	0.00			
QFC MH	Pattern Loa	<None>	N/A	N/A	432,000.00	432,000.00	None	0.00	Fixed	0.00			
FAA-WW	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
FAA Discharge	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
Blueberry 1	Pattern Loa	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
Blueberry 2	Pattern Loa	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
Blueberry 3	Pattern Loa	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
Blueberry 4	Pattern Loa	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
Blueberry 5	Pattern Loa	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
Blueberry 6	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
Blueberry 7	Pattern Loa	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
Harbor WW	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
Harbor Discharge	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
R10	Pattern Loa	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
R8	Pattern Loa	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
R9	Pattern Loa	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
South Area	Pattern Loa	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
Mission Lake	Pattern Loa	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			

Scenario: Full Buildout Peak Truck Haul with No Piped Services Scenario

Node Loading Report (Steady-state)

Label	Sanitary Load Type	Sanitary Unit Load Type	Sanitary Unit Load Units	Sanitary Unit Load Count	Sanitary Pattern Base Flow (gpd)	Sanitary Pattern Base Load (gpd)	Inflow Load Type	Inflow Pattern Base Flow (gpd)	Inflow Pattern Load	Known Flow (gpd)	Has Diversion?	Diversion Target	Diversion Rating Table
R6/East	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
R3/5	Composite	<None>	N/A	N/A	56,880.00	56,880.00	None	0.00	Fixed	0.00			
R2/4	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
R1/North	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
West	Pattern Load	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
QFC2 WW	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00	0.00		
QFC2 Discharge	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
Nunvak 1	Pattern Load	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
Nunvak 2	Pattern Load	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
Pacificca	Pattern Load	<None>	N/A	N/A	10,620.00	10,620.00	None	0.00	Fixed	0.00			
Jail	Pattern Load	<None>	N/A	N/A	38,044.00	38,044.00	None	0.00	Fixed	0.00			
Juvenile	Pattern Load	<None>	N/A	N/A	9,948.00	9,948.00	None	0.00	Fixed	0.00			
Bldg. 800	Pattern Load	<None>	N/A	N/A	17,328.00	17,328.00	None	0.00	Fixed	0.00			
BUC	Pattern Load	<None>	N/A	N/A	1,948.00	1,948.00	None	0.00	Fixed	0.00			
Hospital	Pattern Load	<None>	N/A	N/A	194,896.00	194,896.00	None	0.00	Fixed	0.00			
USFS	Pattern Load	<None>	N/A	N/A	9,316.00	9,316.00	None	0.00	Fixed	0.00			
CSWTF	Pattern Load	<None>	N/A	N/A	56,400.00	56,400.00	None	0.00	Fixed	0.00			
CSW&S South	Pattern Load	<None>	N/A	N/A	79,200.00	79,200.00	None	0.00	Fixed	0.00			
City Center South	Pattern Load	<None>	N/A	N/A	46,800.00	46,800.00	None	0.00	Fixed	0.00			
City Center North	Pattern Load	<None>	N/A	N/A	90,000.00	90,000.00	None	0.00	Fixed	0.00			
CSW&S North	Pattern Load	<None>	N/A	N/A	102,960.00	102,960.00	None	0.00	Fixed	0.00			
Kilbuck FM	Pattern Load	<None>	N/A	N/A	51,880.00	51,880.00	None	0.00	Fixed	0.00			
Ridgecrest	Pattern Load	<None>	N/A	N/A	16,000.00	16,000.00	None	0.00	Fixed	0.00			
Harbor Dump Station	Pattern Load	<None>	N/A	N/A	432,000.00	432,000.00	None	0.00	Fixed	0.00			
FAA Dump Station	Composite	<None>	N/A	N/A	73,440.00	73,440.00	None	0.00	<Composite	0.00			
Kasayuli WW	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00	0.00	false	Edit
Kasayuli Discharge	<None>	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00	0.00	false	Edit
Raven West	Pattern Load	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
Raven East	Pattern Load	<None>	N/A	N/A	0.00	0.00	None	0.00	Fixed	0.00			
Kasayuli Dump Station	Pattern Load	<None>	N/A	N/A	432,000.00	432,000.00	None	0.00	Fixed	0.00	0.00	false	Edit

Scenario: Full Buildout Peak Truck Haul with No Piped Services Scenario

Node Loading Report (Steady-state)

Total Sanitary Flow (gpd)	Total Weather Flow (gpd)	System Known Flow (gpd)	Pumped Flow (gpd)	Total Diverted Flow In (gpd)	Total Flow (gpd)	Percent Diverted Out (%)	Non-Diverted Flow Out (gpd)	Total Flow Out (gpd)
279,600.00	0.00	0.00	711,845.37	0.00	991,445.37	0.0	991,445.37	991,445.37
432,000.00	0.00	0.00	541,471.38	0.00	973,471.38	N/A	N/A	N/A
279,600.00	0.00	0.00	711,845.37	0.00	991,445.37	N/A	N/A	N/A
432,000.00	0.00	0.00	541,471.38	0.00	973,471.38	0.0	973,471.38	973,471.38
432,000.00	0.00	0.00	0.00	0.00	432,000.00	N/A	N/A	N/A
432,000.00	0.00	0.00	0.00	0.00	432,000.00	0.0	432,000.00	432,000.00
432,000.00	0.00	0.00	651,197.33	0.00	883,197.33	0.0	883,197.33	883,197.33
73,440.00	0.00	0.00	459,961.08	0.00	533,401.08	N/A	N/A	N/A
432,000.00	0.00	0.00	0.00	0.00	432,000.00	N/A	N/A	N/A

Scenario: Full Buildout Peak Truck Haul with No Piped Services Scenario

Node Loading Report (Steady-state)

Total Sanitary Flow (gpd)	Total Wet Weather Flow (gpd)	System Known Flow (gpd)	Pumped Flow (gpd)	Total Diverted Flow In (gpd)	Total Flow (gpd)	Percent Diverted Out (%)	Non-Diverted Flow Out (gpd)	Total Flow Out (gpd)
432,000.00	0.00	0.00	651,197.33	0.00	083,197.33	N/A	N/A	N/A
432,000.00	0.00	0.00	0.00	0.00	432,000.00	0.0	432,000.00	432,000.00
73,440.00	0.00	0.00	459,961.08	0.00	533,401.08	0.0	533,401.08	533,401.08
432,000.00	0.00	0.00	0.00	0.00	432,000.00	N/A	N/A	N/A
432,000.00	0.00	0.00	0.00	0.00	432,000.00	0.0	432,000.00	432,000.00

Scenario: Full Buildout Pipe Peak With No Truck Haul Scenario

Wet Well Report

Label	Ground Elevation (ft)	Base Elevation (ft)	Minimum Elevation (ft)	Initial Alarm Elevation (ft)	Alarm Elevation (ft)	Wet Well Diameter (ft)	Average Area (ft²)	Sanitary Load Type	Inflow Load Type	Known Flow (gpd)	Total Flow (gpd)	Forcemain Discharge (gpm)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Gravity Element Headloss (ft)
Ptarmigan W	40.50	20.00	25.00	32.00	35.00	20.00	314.2	<None>	None	0.00	406,939.50	287.27	32.00	32.00	0.00
Main LS WW	20.50	0.00	5.00	15.00	17.00	30.00	706.9	<None>	None	0.00	898,898.71	2,208.75	15.00	15.00	0.00
Larson WW	110.50	90.00	95.00	98.00	100.00	10.00	78.5	<None>	None	0.00	209,520.00	175.60	98.00	98.00	0.00
FAA-WW	94.50	78.50	80.00	81.00	84.00	10.00	78.5	<None>	None	0.00	511,526.21	437.92	81.00	81.00	0.00
Harbor WW	12.50	-8.00	-3.00	7.00	8.00	10.00	78.5	<None>	None	0.00	110,880.00	109.03	7.00	7.00	0.00
QFC2 WW	48.50	28.00	33.00	40.00	42.00	20.00	314.2	<None>	None	0.00	999,205.92	723.18	40.00	40.00	0.00
Kasayuli WW	120.50	100.00	105.00	110.00	111.00	20.00	314.2	<None>	None	0.00	195,120.00	200.28	110.00	110.00	0.00

Scenario: Full Buildout Pipe Peak With No Truck Haul Scenario

Wet Well Report

Description

Scenario: Full Buildout Pipe Peak With No Truck Haul Scenario

Pump Report

Label	To Pipe	Ground Elevation (ft)	Pump Type	Pump Power (Hp)	Shutoff Head (ft)	Shutoff Discharge (gpm)	Design Head (ft)	Design Discharge (gpm)	Maximum Operating Discharge (gpm)	Initial Relative Speed Factor	Initial Status	Control Status	Pressure Flow (gpm)	Intake Pump Pressure (psi)	Discharge Pump Pressure (psi)	Pump Head (ft)
Ptarmigan Pump	Ptarmigan Discharge Pipe	24.00	Standard (3 Po		101.00	0.00	79.00	250.00	460.00	1.00		On	287.27	3.46	33.69	69.86
Main LS Pump	Main LS Discharge Pipe	4.00	Standard (3 Po		72.50	0.00	56.00	1,945.00	3,700.00	1.00		On	2,208.75	4.76	26.56	50.39
Larson Pumps	Larson Discharge Pipe	94.00	Standard (3 Po		26.00	0.00	19.00	170.00	425.00	1.00		On	175.60	1.73	9.81	18.67
FAA Pumps	FAA Discharge Pipe	79.00	Standard (3 Po		126.00	0.00	89.00	355.00	900.00	1.00		On	437.92	0.86	34.27	77.21
Harbor Pumps	Harbor Discharge Pipe	-2.00	Standard (3 Po		62.00	0.00	40.00	77.00	170.00	1.00		On	109.03	3.89	15.72	27.32
QFC2 Pumps	QFC2 Discharge Pipe	31.00	Standard (3 Po		125.00	0.00	76.00	546.00	900.00	1.00		On	723.18	3.89	29.08	58.21
Kasayuli Pump	Kasayuli Discharge Pipe	104.00	Standard (3 Po		35.00	0.00	31.00	135.00	425.00	1.00		On	200.28	2.60	14.09	26.57

Scenario: Full Buildout Pipe Peak With No Truck Haul Scenario

Pump Report

Description

Scenario: Full Buildout Pipe Peak With No Truck Haul Scenario

Pressure Pipe Report

Label	Upstream Node	Upstream Invert Elevation (ft)	Downstream Node	Downstream Invert Elevation (ft)	User Defined Length?	Length (ft)	Diameter (in)	Material	Minor Loss Coefficient	Check Valve?	Pressure Flow (gpm)	Velocity (ft/s)	Pressure Pipe Headloss (ft)	Description
Ptarmigan Suction	Ptarmigan WW	25.00	Ptarmigan Pumps	24.00	true	1.00	42.0	Ductile Iro	0.00	true	287.27	0.07	0.00	
Ptarmigan Discharge	Ptarmigan Pumps	24.00	Ptarmigan Discharge/M	38.00	false	12.00	6.0	Ductile Iro	0.00	true	287.27	3.26	0.09	
FM-204	Ptarmigan Discharge/M	38.00	Ptarmigan East	32.00	true	2,530.00	6.0	PVC	0.00	false	287.27	3.26	14.29	
FM-205	Ptarmigan East	32.00	Ptarmigan	30.00	true	320.00	6.0	PVC	0.00	false	307.77	3.49	2.05	
FM-206	Ptarmigan	30.00	Ulvuq	30.00	true	1,230.00	6.0	PVC	0.00	false	349.27	3.96	9.98	
FM-207	Ulvuq	30.00	Martina	30.00	true	2,480.00	8.0	PVC	0.00	false	394.77	2.52	6.21	
FM-208	Martina	30.00	J-27	0.00	true	5,145.00	8.0	PVC	0.00	false	420.77	2.69	14.51	
Main LS Suction	Main LS WW	5.00	Main LS Pumps	4.00	true	1.00	42.0	Ductile Iro	0.00	true	2,208.75	0.51	0.00	
Main LS Discharge Pipe	Main LS Pumps	4.00	Main LS Discharge	18.00	true	14.00	14.0	Ductile Iro	0.00	true	2,208.75	4.60	0.07	
FM-126	Main LS Discharge	18.00	Pipe Reducer	20.00	true	651.00	14.0	PVC	0.00	false	2,208.75	4.60	2.59	
FM-127	Pipe Reducer	20.00	J-27	0.00	true	1,517.00	14.0	PVC	2.30	false	2,408.75	5.02	7.99	
FM-128	J-27	0.00	Lagoon Outlet	50.00	true	1,500.00	18.0	PVC	2.30	false	2,829.51	3.57	3.23	
Larson Suction	Larson WW	95.00	Larson Pumps	94.00	true	1.00	42.0	Ductile Iro	0.00	true	175.60	0.04	0.00	
Larson Discharge Pipe	Larson Pumps	94.00	Larson Discharge	105.00	true	1.00	4.0	Ductile Iro	0.00	true	175.60	4.48	0.02	
FM-201	Larson Discharge	105.00	J-20	84.00	true	2,200.00	4.0	PVC	0.00	false	175.60	4.48	35.99	
FM-202	J-20	84.00	H - Marker	40.00	true	2,500.00	4.0	PVC	0.00	false	175.60	4.48	40.89	
FM-203	H - Marker	40.00	Ptarmigan Dump Static	31.00	true	2,900.00	6.0	PVC	0.00	false	198.60	2.25	8.27	
FAA Suction	FAA-WW	80.00	FAA Pumps	79.00	true	1.00	42.0	Ductile Iro	4.61	true	437.92	0.10	0.00	
FAA Discharge Pipe	FAA Pumps	79.00	FAA Discharge	92.00	false	13.00	6.0	Ductile Iro	0.00	true	437.92	4.97	0.21	
FM-101	FAA Discharge	92.00	Blueberry 1	62.00	true	3,650.00	6.0	Ductile Iro	0.00	false	437.92	4.97	90.81	
FM-102	Blueberry 1	62.00	Blueberry 2	62.00	true	575.00	6.0	PVC	0.00	false	457.42	5.19	7.69	
FM-103	Blueberry 2	62.00	Blueberry 3	64.00	true	300.00	8.0	PVC	0.00	false	484.92	3.10	1.10	
FM-104	Blueberry 3	64.00	Blueberry 4	72.00	true	300.00	8.0	PVC	0.00	false	521.92	3.33	1.26	
FM-105	Blueberry 4	72.00	Blueberry 5	72.00	true	350.00	8.0	PVC	0.00	false	559.92	3.57	1.68	
FM-106	Blueberry 5	72.00	Blueberry 6	66.00	true	500.00	8.0	PVC	0.00	false	627.92	4.01	2.96	
FM-107	Blueberry 6	66.00	Blueberry 7	60.00	true	500.00	8.0	PVC	0.00	false	627.92	4.01	2.96	
FM-108	Blueberry 7	60.00	QFC MH	41.00	true	1,250.00	8.0	PVC	0.00	false	649.92	4.15	7.89	
Harbor Suction	Harbor WW	-3.00	Harbor Pumps	-2.00	true	1.00	42.0	Ductile Iro	0.00	true	109.03	0.03	0.00	
Harbor Discharge Pipe	Harbor Pumps	-2.00	Harbor Discharge	10.00	true	12.00	6.0	Ductile Iro	0.00	true	109.03	1.24	0.01	
FM-301	Harbor Discharge	10.00	R10	10.00	true	250.00	6.0	PVC	0.00	false	109.03	1.24	0.23	
FM-302	R10	10.00	R8	10.00	true	200.00	6.0	PVC	0.00	false	127.53	1.45	0.25	
FM-303	R8	10.00	R9	10.00	true	240.00	6.0	PVC	0.00	false	144.53	1.64	0.38	
FM-304	R9	10.00	South Area	10.00	true	470.00	6.0	PVC	0.00	false	161.53	1.83	0.91	
FM-305	South Area	10.00	Mission Lake	10.00	true	750.00	6.0	PVC	0.00	false	193.03	2.19	2.03	
FM-306	Mission Lake	10.00	R6/East	10.00	true	1,450.00	8.0	PVC	0.00	false	275.53	1.76	1.87	

Scenario: Full Buildout Pipe Peak With No Truck Haul Scenario

Pressure Pipe Report

Label	Upstream Node	Upstream Invert Elevation (ft)	Downstream Node	Downstream Invert Elevation (ft)	User Defined Length?	Length (ft)	Diameter (in)	Material	Minor Loss Coefficient	Check Valve?	Pressure Flow (gpm)	Velocity (ft/s)	Pressure Pipe Headloss (ft)	Description
FM-307	R6/East	10.00	R3/5	10.00	true	380.00	8.0	PVC	0.00	false	320.53	2.05	0.65	
FM-308	R3/5	10.00	R2/4	10.00	true	380.00	8.0	PVC	0.00	false	360.03	2.30	0.80	
FM-309	R2/4	10.00	R1/North	10.00	true	380.00	8.0	PVC	0.00	false	402.53	2.57	0.99	
FM-310	R1/North	10.00	West	10.00	true	600.00	10.0	PVC	0.00	false	452.03	1.85	0.65	
FM-311	West	10.00	Ridgecrest	11.00	true	2,070.00	10.0	PVC	0.00	false	503.03	2.05	2.74	
QFC2 Suction	QFC2 WW	33.00	QFC2 Pumps	31.00	true	1.00	42.0	Ductile Iro	4.61	true	723.18	0.17	0.00	
QFC2 Discharge Pipe	QFC2 Pumps	31.00	QFC2 Discharge	47.00	true	7.00	8.0	Ductile Iro	0.00	true	723.18	4.62	0.07	
FM-109	QFC2 Discharge	47.00	Nunvak 1	52.00	true	725.00	8.0	PVC	0.00	false	723.18	4.62	5.57	
FM-110	Nunvak 1	52.00	Nunvak 2	54.00	true	300.00	8.0	PVC	0.00	false	788.18	5.03	2.71	
FM-111	Nunvak 2	54.00	Pacifica	40.00	true	825.00	8.0	PVC	0.00	false	812.18	5.18	7.86	
FM-112	Pacifica	40.00	Jail	36.00	true	314.00	8.0	PVC	0.00	false	819.55	5.23	3.04	
FM-113	Jail	36.00	Juvenile	36.00	true	494.00	8.0	PVC	0.00	false	845.97	5.40	5.08	
FM-114	Juvenile	36.00	Bldg. 800	40.00	true	292.00	8.0	PVC	0.00	false	852.88	5.44	3.05	
FM-115	Bldg. 800	40.00	BUC	40.00	true	35.00	8.0	PVC	0.00	false	864.92	5.52	0.37	
FM-116	BUC	40.00	Hospital	40.00	true	977.00	8.0	Ductile Iro	1.00	false	866.27	5.53	14.15	
FM-117	Hospital	40.00	USFS	40.00	true	658.00	10.0	PVC	0.00	false	1,001.61	4.09	3.12	
FM-118	USFS	40.00	CSWTF	22.00	true	806.00	10.0	PVC	0.68	false	1,008.08	4.12	4.05	
FM-119	CSWTF	22.00	CSW&S South	25.00	true	689.00	10.0	PVC	3.28	false	1,047.25	4.28	4.48	
FM-120	CSW&S South	25.00	City Center South	22.00	true	328.00	10.0	PVC	2.16	false	1,102.25	4.50	2.54	
FM-121	City Center South	22.00	City Center North	18.00	true	372.00	10.0	PVC	3.24	false	1,134.75	4.64	3.30	
FM-122	City Center North	18.00	CSW&S North	17.00	true	1,286.00	10.0	PVC	2.80	false	1,197.25	4.89	9.52	
FM-123	CSW&S North	17.00	Kilbuck FM	15.00	true	847.00	12.0	PVC	2.36	false	1,268.75	3.60	3.03	
FM-124	Kilbuck FM	15.00	Ridgecrest	11.00	true	847.00	12.0	PVC	3.54	false	1,304.78	3.70	3.45	
FM-125	Ridgecrest	11.00	Main LS MH	16.67	true	686.00	12.0	PVC	2.66	false	1,818.92	5.16	5.14	
Kasayuli Suction	Kasayuli WW	105.00	Kasayuli Pumps	104.00	true	1.00	42.0	PVC	0.00	true	200.28	0.05	0.00	
Kasayuli Discharge P	Kasayuli Pumps	104.00	Kasayuli Discharge	116.00	true	12.00	6.0	Ductile Iro	0.00	true	200.28	2.27	0.05	
FM-401	Kasayuli Discharge	116.00	Raven East	94.00	true	500.00	6.0	PVC	0.00	false	200.28	2.27	1.45	
FM-402	Raven East	94.00	Raven West	108.00	true	500.00	6.0	PVC	0.00	false	247.23	2.81	2.14	
FM-403	Raven West	108.00	FAA Dump Station	82.00	true	3,030.00	6.0	PVC	0.00	false	304.23	3.45	50.43	

Scenario: Full Buildout Pipe Peak With No Truck Haul Scenario

Pressure Junction Report

Label	X (ft)	Y (ft)	Ground Elevation (ft)	Sanitary Load Type	Inflow Load Type	Calculated Load (gpm)	Pressure (psi)	Description
Ptarmigan Discharge	9,859.78	0,353.72	38.00	<None>	None	0.00	27.59	
Ptarmigan East	9,897.91	0,353.71	32.00	Pattern Loa	None	-20.50	24.01	
Ptarmigan	9,928.61	0,353.86	30.00	Pattern Loa	None	-41.50	23.98	
Uivuuq	9,951.39	0,353.85	30.00	Pattern Loa	None	-45.50	19.67	
Martina	9,990.17	0,354.02	30.00	Pattern Loa	None	-26.00	16.98	
Main LS Discharge	0,123.20	0,337.87	18.00	<None>	None	0.00	20.47	
Pipe Reducer	0,123.20	0,352.48	20.00	Pattern Loa	None	-200.00	18.48	
J-27	0,123.30	0,379.73	0.00	<None>	None	0.00	23.68	
Larson Discharge	9,709.82	0,104.25	105.00	<None>	None	0.00	5.04	
J-20	9,859.76	0,079.69	84.00	<None>	None	0.00	-1.44	
H - Marker	9,859.76	0,178.57	40.00	Pattern Loa	None	-23.00	-0.10	
FAA Discharge	9,798.27	0,004.19	92.00	<None>	None	0.00	28.56	
Blueberry 1	9,824.42	0,000.31	62.00	Pattern Loa	None	-19.50	2.25	
Blueberry 2	9,838.35	9,998.41	62.00	Pattern Loa	None	-27.50	-1.08	
Blueberry 3	9,851.65	9,996.19	64.00	Pattern Loa	None	-37.00	-2.42	
Blueberry 4	9,864.79	9,994.45	72.00	Pattern Loa	None	-38.00	-6.43	
Blueberry 5	9,876.67	9,992.71	72.00	Pattern Loa	None	-68.00	-7.15	
Blueberry 6	9,891.39	9,990.81	66.00	<None>	None	0.00	-5.84	
Blueberry 7	9,906.91	9,988.60	60.00	Pattern Loa	None	-22.00	-4.52	
Harbor Discharge	0,357.16	0,183.72	10.00	<None>	None	0.00	10.52	
R10	0,338.46	0,183.73	10.00	Pattern Loa	None	-18.50	10.42	
R8	0,319.98	0,183.71	10.00	Pattern Loa	None	-17.00	10.31	
R9	0,302.83	0,183.82	10.00	Pattern Loa	None	-17.00	10.14	
South Area	0,285.01	0,187.03	10.00	Pattern Loa	None	-31.50	9.75	
Mission Lake	0,267.75	0,199.77	10.00	Pattern Loa	None	-82.50	8.87	
R6/East	0,244.10	0,217.39	10.00	Composite	None	-45.00	8.06	
R3/5	0,236.18	0,233.22	10.00	Composite	None	-39.50	7.78	
R2/4	0,228.93	0,246.42	10.00	Composite	None	-42.50	7.44	
R1/North	0,223.65	0,260.93	10.00	Composite	None	-49.50	7.01	
West	0,181.42	0,258.07	10.00	Pattern Loa	None	-51.00	6.73	
GFC2 Discharge	9,933.76	0,042.19	47.00	<None>	None	0.00	22.12	
Nurvak 1	9,946.85	0,036.67	52.00	Pattern Loa	None	-65.00	17.55	
Nurvak 2	9,964.74	0,029.39	54.00	Pattern Loa	None	-24.00	15.51	
Pacifica	9,984.65	0,021.07	40.00	Pattern Loa	None	-7.37	18.17	
Jail	9,984.00	0,048.48	36.00	Pattern Loa	None	-26.42	18.58	
Juvenile	9,984.00	0,070.88	36.00	Pattern Loa	None	-6.91	16.38	

Scenario: Full Buildout Pipe Peak With No Truck Haul Scenario

Pressure Junction Report

Label	X (ft)	Y (ft)	Ground Elevation (ft)	Sanitary Load Type	Inflow Load Type	Calculated Load (gpm)	Pressure (psi)	Description
Bldg. 800	9,984.00	0,094.56	40.00	Pattern Loa	None	-12.03	13.34	
BUC	9,984.00	0,117.92	40.00	Pattern Loa	None	-1.35	13.17	
Hospital	0,009.74	0,135.38	40.00	Pattern Loa	None	-135.34	7.05	
USFS	0,035.38	0,151.70	40.00	Pattern Loa	None	-6.47	5.70	
CSWTF	0,035.34	0,183.24	22.00	Pattern Loa	None	-39.17	11.74	
CSW&S South	0,060.50	0,183.84	25.00	Pattern Loa	None	-55.00	8.50	
City Center South	0,085.42	0,178.08	22.00	Pattern Loa	None	-32.50	8.70	
City Center North	0,091.20	0,198.56	18.00	Pattern Loa	None	-62.50	9.00	
CSW&S North	0,091.20	0,223.84	17.00	Pattern Loa	None	-71.50	5.32	
Kilbuck FM	0,123.16	0,223.84	15.00	Pattern Loa	None	-36.03	4.87	
Ridgecrest	0,123.16	0,258.08	11.00	Pattern Loa	None	-11.11	5.11	
Kasayuli Discharge	9,683.63	9,965.71	116.00	<None>	None	0.00	8.88	
Raven West	9,683.61	9,982.46	94.00	Pattern Loa	None	-46.94	17.77	
Raven East	9,705.95	9,977.72	108.00	Pattern Loa	None	-57.00	10.79	

Scenario: Full Buildout Pipe Peak With No Truck Haul Scenario

Node Loading Report (Steady-state)

Label	Sanitary Load Type	Sanitary Unit Load Type	Sanitary Unit Load Units	Sanitary Unit Load Count	Sanitary Pattern Base Flow (gpd)	Sanitary Pattern Load (gpd)	Inflow Load Type	Inflow Pattern Base Flow (gpd)	Inflow Pattern Load (gpd)	Known Flow (gpd)	Has Diversion?	Diversion Target	Diversion Rating Table
Main LS MH	Pattern Loa	<None>	N/A	N/A	279,600.00	Fixed	None	0.00	Fixed	0.00	false	N/A	Edit
Ptarmigan WW	<None>	<None>	N/A	N/A	0.00	Fixed	None	0.00	Fixed	0.00			
Ptarmigan Discharge	<None>	<None>	N/A	N/A	0.00	Fixed	None	0.00	Fixed	0.00			
Ptarmigan East	Pattern Loa	<None>	N/A	N/A	29,520.00	Fixed	None	0.00	Fixed	0.00			
Ptarmigan	Pattern Loa	<None>	N/A	N/A	59,760.00	Fixed	None	0.00	Fixed	0.00			
Uivuuq	Pattern Loa	<None>	N/A	N/A	65,520.00	Fixed	None	0.00	Fixed	0.00			
Martina	Pattern Loa	<None>	N/A	N/A	37,440.00	Fixed	None	0.00	Fixed	0.00			
Main LS WW	<None>	<None>	N/A	N/A	0.00	Fixed	None	0.00	Fixed	0.00			
Main LS Discharge	<None>	<None>	N/A	N/A	0.00	Fixed	None	0.00	Fixed	0.00			
Pipe Reducer	Pattern Loa	<None>	N/A	N/A	288,000.00	Fixed	None	0.00	Fixed	0.00			
J-27	<None>	<None>	N/A	N/A	0.00	Fixed	None	0.00	Fixed	0.00			
Ptarmigan Dump Station	Pattern Loa	<None>	N/A	N/A	120,960.00	Fixed	None	0.00	Fixed	0.00	false	N/A	Edit
Larson WW	<None>	<None>	N/A	N/A	0.00	Fixed	None	0.00	Fixed	0.00			
Larson Discharge	<None>	<None>	N/A	N/A	0.00	Fixed	None	0.00	Fixed	0.00			
J-20	<None>	<None>	N/A	N/A	0.00	Fixed	None	0.00	Fixed	0.00			
H - Marker	Pattern Loa	<None>	N/A	N/A	33,120.00	Fixed	None	0.00	Fixed	0.00			
Larson Dump Station	Composite	<None>	N/A	N/A	209,520.00	<Composite	None	0.00	Fixed	0.00	false	N/A	Edit
GFC MH	Pattern Loa	<None>	N/A	N/A	63,320.00	Fixed	None	0.00	Fixed	0.00	false	N/A	Edit
FAA-WW	<None>	<None>	N/A	N/A	0.00	Fixed	None	0.00	Fixed	0.00			
FAA Discharge	<None>	<None>	N/A	N/A	0.00	Fixed	None	0.00	Fixed	0.00			
Blueberry 1	Pattern Loa	<None>	N/A	N/A	28,080.00	Fixed	None	0.00	Fixed	0.00			
Blueberry 2	Pattern Loa	<None>	N/A	N/A	39,600.00	Fixed	None	0.00	Fixed	0.00			
Blueberry 3	Pattern Loa	<None>	N/A	N/A	53,280.00	Fixed	None	0.00	Fixed	0.00			
Blueberry 4	Pattern Loa	<None>	N/A	N/A	54,720.00	Fixed	None	0.00	Fixed	0.00			
Blueberry 5	Pattern Loa	<None>	N/A	N/A	97,920.00	Fixed	None	0.00	Fixed	0.00			
Blueberry 6	<None>	<None>	N/A	N/A	0.00	Fixed	None	0.00	Fixed	0.00			
Blueberry 7	Pattern Loa	<None>	N/A	N/A	31,680.00	Fixed	None	0.00	Fixed	0.00			
Harbor WW	<None>	<None>	N/A	N/A	0.00	Fixed	None	0.00	Fixed	0.00			
Harbor Discharge	<None>	<None>	N/A	N/A	0.00	Fixed	None	0.00	Fixed	0.00			
R10	Pattern Loa	<None>	N/A	N/A	26,640.00	Fixed	None	0.00	Fixed	0.00			
R8	Pattern Loa	<None>	N/A	N/A	24,480.00	Fixed	None	0.00	Fixed	0.00			
R9	Pattern Loa	<None>	N/A	N/A	24,480.00	Fixed	None	0.00	Fixed	0.00			
South Area	Pattern Loa	<None>	N/A	N/A	45,360.00	Fixed	None	0.00	Fixed	0.00			
Mission Lake	Pattern Loa	<None>	N/A	N/A	118,800.00	Fixed	None	0.00	Fixed	0.00			

Scenario: Full Buildout Pipe Peak With No Truck Haul Scenario

Node Loading Report (Steady-state)

Label	Sanitary Load Type	Sanitary Unit Load Type	Sanitary Unit Load Units	Sanitary Unit Load Count	Sanitary Pattern Base Flow (gpd)	Sanitary Pattern Load	Sanitary Base Load (gpd)	Inflow Load Type	Inflow Pattern Base Flow (gpd)	Inflow Pattern Load	Inflow Pattern	Known Flow (gpd)	Has Diversion?	Diversion Target	Diversion Rating Table
R6/East	Composite	<None>	N/A	N/A	64,800.00	<Composite	64,800.00	None	0.00	Fixed					
R3/5	Composite	<None>	N/A	N/A	56,880.00	<Composite	56,880.00	None	0.00	Fixed					
R2/4	Composite	<None>	N/A	N/A	61,200.00	<Composite	61,200.00	None	0.00	Fixed					
R1/North	Composite	<None>	N/A	N/A	71,280.00	<Composite	71,280.00	None	0.00	Fixed					
West	Pattern Loa	<None>	N/A	N/A	73,440.00	Fixed	73,440.00	None	0.00	Fixed		0.00			
QFC2 WW	<None>	<None>	N/A	N/A	0.00	Fixed	0.00	None	0.00	Fixed					
QFC2 Discharge	<None>	<None>	N/A	N/A	0.00	Fixed	0.00	None	0.00	Fixed					
Nunvak 1	Pattern Loa	<None>	N/A	N/A	93,600.00	Fixed	93,600.00	None	0.00	Fixed					
Nunvak 2	Pattern Loa	<None>	N/A	N/A	34,560.00	Fixed	34,560.00	None	0.00	Fixed					
Pacifica	Pattern Loa	<None>	N/A	N/A	10,620.00	Fixed	10,620.00	None	0.00	Fixed					
Jail	Pattern Loa	<None>	N/A	N/A	38,044.00	Fixed	38,044.00	None	0.00	Fixed					
Juvenile	Pattern Loa	<None>	N/A	N/A	9,948.00	Fixed	9,948.00	None	0.00	Fixed					
Bldg. 800	Pattern Loa	<None>	N/A	N/A	17,328.00	Fixed	17,328.00	None	0.00	Fixed					
BUC	Pattern Loa	<None>	N/A	N/A	1,948.00	Fixed	1,948.00	None	0.00	Fixed					
Hospital	Pattern Loa	<None>	N/A	N/A	194,896.00	Fixed	194,896.00	None	0.00	Fixed					
USFS	Pattern Loa	<None>	N/A	N/A	9,316.00	Fixed	9,316.00	None	0.00	Fixed					
CSWTF	Pattern Loa	<None>	N/A	N/A	56,400.00	Fixed	56,400.00	None	0.00	Fixed					
CSW&S South	Pattern Loa	<None>	N/A	N/A	79,200.00	Fixed	79,200.00	None	0.00	Fixed					
City Center South	Pattern Loa	<None>	N/A	N/A	46,800.00	Fixed	46,800.00	None	0.00	Fixed					
City Center North	Pattern Loa	<None>	N/A	N/A	90,000.00	Fixed	90,000.00	None	0.00	Fixed					
CSW&S North	Pattern Loa	<None>	N/A	N/A	102,960.00	Fixed	102,960.00	None	0.00	Fixed					
Kilbuck FM	Pattern Loa	<None>	N/A	N/A	51,880.00	Fixed	51,880.00	None	0.00	Fixed					
Ridgecrest	Pattern Loa	<None>	N/A	N/A	16,000.00	Fixed	16,000.00	None	0.00	Fixed					
Harbor Dump Station	Composite	<None>	N/A	N/A	110,880.00	<Composite	110,880.00	None	0.00	Fixed					
FAA Dump Station	Composite	<None>	N/A	N/A	73,440.00	<Composite	73,440.00	None	0.00	Fixed					
Kasayuli WW	<None>	<None>	N/A	N/A	0.00	Fixed	0.00	None	0.00	Fixed					
Kasayuli Discharge	<None>	<None>	N/A	N/A	0.00	Fixed	0.00	None	0.00	Fixed					
Raven West	Pattern Loa	<None>	N/A	N/A	67,600.00	Fixed	67,600.00	None	0.00	Fixed					
Raven East	Pattern Loa	<None>	N/A	N/A	82,080.00	Fixed	82,080.00	None	0.00	Fixed					
Kasayuli Dump Station	Pattern Loa	<None>	N/A	N/A	195,120.00	Fixed	195,120.00	None	0.00	Fixed					

Scenario: Full Buildout Pipe Peak With No Truck Haul Scenario

Node Loading Report (Steady-state)

Total Sanitary Flow (gpd)	Total Wet Weather Flow (gpd)	System Known Flow (gpd)	Pumped Flow (gpd)	Total Diverted Flow In (gpd)	Total Flow (gpd)	Percent Diverted Out (%)	Non-Diverted Flow Out (gpd)	Total Flow Out (gpd)
279,600.00	0.00	0.00	619,238.71	0.00	898,838.71	0.0	898,838.71	898,838.71
120,960.00	0.00	0.00	285,979.50	0.00	406,939.50	N/A	N/A	N/A
279,600.00	0.00	0.00	619,238.71	0.00	898,838.71	N/A	N/A	N/A
120,960.00	0.00	0.00	285,979.50	0.00	406,939.50	0.0	406,939.50	406,939.50
209,520.00	0.00	0.00	0.00	0.00	209,520.00	N/A	N/A	N/A
209,520.00	0.00	0.00	0.00	0.00	209,520.00	0.0	209,520.00	209,520.00
63,320.00	0.00	0.00	935,885.92	0.00	999,205.92	0.0	999,205.92	999,205.92
73,440.00	0.00	0.00	438,086.21	0.00	511,526.21	N/A	N/A	N/A
110,880.00	0.00	0.00	0.00	0.00	110,880.00	N/A	N/A	N/A

Scenario: Full Buildout Pipe Peak With No Truck Haul Scenario

Node Loading Report (Steady-state)

Total Sanitary Flow (gpd)	Total Weather Flow (gpd)	Total Wet System Known Flow (gpd)	Pumped Flow (gpd)	Total Diverted Flow In (gpd)	Total Flow (gpd)	Percent Diverted Out (%)	Non-Diverted Flow Out (gpd)	Total Flow Out (gpd)
63,320.00	0.00	0.00	935,885.92	0.00	999,205.92	N/A	N/A	N/A
110,880.00	0.00	0.00	0.00	0.00	110,880.00	0.0	110,880.00	110,880.00
73,440.00	0.00	0.00	438,086.21	0.00	511,526.21	0.0	511,526.21	511,526.21
195,120.00	0.00	0.00	0.00	0.00	195,120.00	N/A	N/A	N/A
195,120.00	0.00	0.00	0.00	0.00	195,120.00	0.0	195,120.00	195,120.00

Appendix M

Estimated Capital Costs

Project Schedule for First \$30 Million in Capital
Improvements

Construction Manpower Estimate for First Three Capital
Improvement Projects

Estimated Capital Costs

City of Bethel
Bethel Water and Sewer Master Plan Update - 95% Submittal

WATER AND SEWER IMPROVEMENTS
PROJECT PRIORITIZATION AND FUNDING SUMMARY

Based on Actual Bethel Construction Bid Cost Data

PRIORITY	CODE (a)	ITEM NO.	DESCRIPTION	PRESENT COST (b)	CUMULATIVE COST (b)	VSW-SFY FUNDING	NO. YEARS	CUMULATIVE FUNDING (c)	
1	S	1	QFC No. II Lift Station and Forcemain Upgrade	\$4,153,984	\$4,153,984	2006	1	\$10,000,000	BACKBONE WATER AND SEWER IMPROVEMENTS
2	S	2	Main Forcemain Upgrade (Ridgcrest to Lagoon)	\$1,202,624	\$5,356,608	2006	1	\$10,000,000	
3	W	1	Bethel Heights Piped Water and Sewer Upgrades	\$2,248,000	\$7,604,608	2006	1	\$10,000,000	
4	S	3	Wastewater Treatment Facility	\$18,944,000	\$26,548,608	2006/08	3	\$30,000,000	
5	W	2	Small West Water Treatment Plant	\$3,315,680	\$29,864,288	2008	3	\$30,000,000	
6	S	4	FAA Lift Station Upgrades	\$1,192,320	\$31,056,608	2008/09	4	\$40,000,000	
7	S	5	Garage / Shop Facility	\$4,416,000	\$35,472,608	2009	4	\$40,000,000	
8	S	6	Kasayuli Subdivision Lift Station and Forcemain	\$3,687,360	\$39,159,968	2009	4	\$40,000,000	
9	W	3	Kasayuli Subd. Water Station	\$5,275,648	\$44,435,616	2009/10	5	\$50,000,000	
10	S	7	Ptarmigan Lift Station and Forcemain	\$4,631,648	\$49,067,264	2010	5	\$50,000,000	
11	W	4	Tundra Ridge Subd. Water Station	\$4,114,608	\$53,181,872	2010/11	6	\$60,000,000	
12	W	5	Nunivak Subd. Water Station	\$5,191,008	\$58,372,880	2011	6	\$60,000,000	
13	S	8	Larson Subdivision Lift Station and Forcemain	\$3,388,544	\$61,761,424	2011/12	7	\$70,000,000	
14	W	6	Larson Subd. Water Station	\$4,046,528	\$65,807,952	2012	7	\$70,000,000	
15	S	9	Harbor Area Lift Station and Forcemain	\$3,303,168	\$69,111,120	2012	7	\$70,000,000	
16	W	7	Kilbuck Water Station	\$3,699,406	\$72,810,526	2012/13	8	\$80,000,000	
17	W	8	Mission Lake Water Station	\$4,298,240	\$77,108,766	2013	8	\$80,000,000	
18	W	9	Hospital Area Water Storage	\$4,879,680	\$81,988,446	2013/14	9	\$90,000,000	
19	W	10	Enlarge West Water Treatment Plant	\$2,208,000	\$84,196,446	2014	9	\$90,000,000	
20	P	1	Kilbuck North (Avenues)	\$9,965,469	\$94,161,915	2014/15	10	\$100,000,000	SUBDIVISION PIPED WATER AND SEWER IMPROVEMENTS
21	P	2	Kilbuck South (Avenues)	\$5,371,938	\$99,533,853	2016	10	\$100,000,000	
22	P	3	Mission Lake Area West	\$5,902,734	\$105,436,587	2016/17	11	\$110,000,000	
23	P	4	Mission Lake Area East	\$5,902,734	\$111,339,321	2016/17	12	\$120,000,000	
24	P	5	Harbor Area West	\$7,076,094	\$118,415,415	2017	12	\$120,000,000	
25	P	6	Harbor Area East	\$7,076,094	\$125,491,509	2017/18	13	\$130,000,000	
26	P	7	Nunivak Subdivision West	\$4,246,375	\$129,737,884	2018	13	\$130,000,000	
27	P	8	Nunivak Subdivision East	\$7,035,844	\$136,773,728	2019	14	\$140,000,000	
28	P	9	Blueberry Subdivision Southeast	\$6,136,328	\$142,910,056	2019/20	15	\$150,000,000	
29	P	10	Blueberry Subdivision Southwest	\$6,136,328	\$149,046,384	2020	15	\$150,000,000	
30	P	11	Blueberry Subdivision Northwest	\$5,419,734	\$154,466,118	2020/21	16	\$160,000,000	
31	P	12	Blueberry Subdivision Northeast	\$5,419,734	\$159,885,853	2021	16	\$160,000,000	
32	P	13	Tundra Ridge Subdivision South	\$8,362,297	\$168,248,149	2021/22	17	\$170,000,000	
33	P	14	Tundra Ridge Subdivision North	\$8,362,297	\$176,610,446	2022/23	18	\$180,000,000	
34	P	15	Uivuuq Subdivision	\$7,789,813	\$184,400,259	2023/24	19	\$190,000,000	
35	P	16	Larson Subdivision	\$6,500,375	\$190,900,634	2024/25	20	\$200,000,000	
36	P	17	Airport Facilities	\$5,081,563	\$195,982,196	2025	20	\$200,000,000	
37	P	18	Kasayuli Subdivision East	\$8,154,938	\$204,137,134	2025/26	21	\$210,000,000	
38	P	19	Kasayuli Subdivision West	\$8,154,938	\$212,292,071	2026/27	22	\$220,000,000	
39	P	20	H-Marker Lake Area	\$2,034,063	\$214,326,134	2027	22	\$220,000,000	
40	P	21	Raven Subdivision West	\$6,093,563	\$220,419,696	2027/28	23	\$230,000,000	
41	P	22	Raven Subdivision East	\$5,322,344	\$225,742,040	2028	23	\$230,000,000	
42	S	10	Haroldsen Subdivision Lift Station and Forcemain	\$2,620,160	\$228,362,200	2028	23	\$230,000,000	
43	W	11	Haroldsen Estates Water Station	\$3,554,880	\$231,917,080	2028/29	24	\$240,000,000	
44	P	23	Haroldsen Estates	\$6,014,500	\$237,931,580	2029	24	\$240,000,000	

Notes:

- (a) S = Backbone Sewer Improvements; W = Backbone Water Improvements; P = Piped Water & Sewer Improvements
- (b) Capital costs in 2005 dollars (present worth) +/- 15%
- (c) Funding based on fixed rate of \$10,000,000 per year

City of Bethel
Bethel Water and Sewer Master Plan Update - 95% Submittal

BACKBONE WATER SYSTEM OPTIONS

NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	LINE COST	TOTAL COST	
1	Bethel Heights Piped Water and Sewer Upgrades						
	Water main replacement	lf	5,000	\$75	\$375,000		
	Water service connections	ls	1	\$250,000	\$250,000		
	Water distribution pump & control upgrades	ls	1	\$500,000	\$500,000		
	Sewer road crossing upgrades	ea	13	\$25,000	\$325,000		
	Sewer main improvements	lf	5,000	\$50	\$250,000		
	Contingency			15%	\$56,250		
	Total Estimated Construction Cost:					\$1,756,250	
	Administration (Bethel/VSW)			3%	\$52,688		
	Project Management			5%	\$87,813		
	Engineering Design			8%	\$140,500		
	Construction Management			12%	\$210,750		
	Total Estimated Project Cost:						\$2,248,000
2	Small West Water Treatment Plant						
	Pilot Study	ls	1	\$250,000	\$250,000		
	Water line from FWWTF	lf	2,500	\$125	\$312,500		
	Heat trace	lf	2,500	\$20	\$50,000		
	Water storage tank	gal	120,000	\$2	\$240,000		
	Water treatment plant upgrades	sf	2,000	\$600	\$1,200,000		
	Truck fill	ea	1	\$200,000	\$200,000		
	Contingency			15%	\$337,875		
	Total Estimated Construction Cost:					\$2,590,375	
	Administration (Bethel/VSW)			3%	\$77,711		
	Project Management			5%	\$129,519		
	Engineering Design			8%	\$207,230		
	Construction Management			12%	\$310,845		
	Total Estimated Project Cost:						\$3,315,680
3	Kasayuli Subd. Water Station						
	Water line from WBWTF	lf	9,200	\$125	\$1,150,000		
	Heat trace	lf	9,200	\$20	\$184,000		
	Water storage tank	gal	400,000	\$2	\$800,000		
	Booster pump station	sf	2,500	\$500	\$1,250,000		
	Truck fill	ea	1	\$200,000	\$200,000		
	Contingency			15%	\$537,600		
	Total Estimated Construction Cost:					\$4,121,600	
	Administration (Bethel/VSW)			3%	\$123,648		
	Project Management			5%	\$206,080		
	Engineering Design			8%	\$329,728		
	Construction Management			12%	\$494,592		
	Total Estimated Project Cost:						\$5,275,648
4	Tundra Ridge Subd. Water Station						
	Water line from FWWTF	lf	4,450	\$125	\$556,250		
	Heat trace	lf	4,450	\$20	\$89,000		
	Water storage tank	gal	350,000	\$2	\$700,000		
	Booster pump station	sf	2,500	\$500	\$1,250,000		
	Truck fill	ea	1	\$200,000	\$200,000		
	Contingency			15%	\$419,288		
	Total Estimated Construction Cost:					\$3,214,538	
	Administration (Bethel/VSW)			3%	\$96,436		
	Project Management			5%	\$160,727		
	Engineering Design			8%	\$257,163		
	Construction Management			12%	\$385,745		
	Total Estimated Project Cost:						\$4,114,608

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BACKBONE WATER SYSTEM OPTIONS

NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	LINE COST	TOTAL COST
5	Nunivak Subd. Water Station					
	Water line from FWWTF	lf	5,700	\$125	\$712,500	
	Heat trace	lf	5,700	\$20	\$114,000	
	Water storage tank	gal	500,000	\$2	\$1,000,000	
	Booster pump station	sf	3,000	\$500	\$1,500,000	
	Truck fill	ea	1	\$200,000	\$200,000	
	Contingency			15%	\$528,975	
	Total Estimated Construction Cost:				\$4,055,475	
	Administration (Bethel/VSW)			3%	\$121,664	
	Project Management			5%	\$202,774	
	Engineering Design			8%	\$324,438	
	Construction Management			12%	\$486,657	
	Total Estimated Project Cost:					\$5,191,008
6	Larson Subd. Water Station					
	Water line from KSWTF	lf	6,200	\$125	\$775,000	
	Heat trace	lf	6,200	\$20	\$124,000	
	Water storage tank	gal	200,000	\$2	\$400,000	
	Booster pump station	sf	2,500	\$500	\$1,250,000	
	Truck fill	ea	1	\$200,000	\$200,000	
	Contingency			15%	\$412,350	
	Total Estimated Construction Cost:				\$3,161,350	
	Administration (Bethel/VSW)			3%	\$94,841	
	Project Management			5%	\$158,068	
	Engineering Design			8%	\$252,908	
	Construction Management			12%	\$379,362	
	Total Estimated Project Cost:					\$4,046,528
7	Kilbuck Water Station					
	Water line from BHWTF	lf	4,300	\$125	\$537,500	
	Heat trace	lf	4,300	\$20	\$86,000	
	Water storage tank	gal	250,000	\$2	\$500,000	
	Booster pump station	sf	2,500	\$500	\$1,250,000	
	Truck fill	ea	1	\$200,000	\$200,000	
	Contingency			15%	\$386,025	
	Total Estimated Construction Cost:				\$2,959,525	
	Administration			5%	\$147,976	
	Engineering			8%	\$236,762	
	Construction Management			12%	\$355,143	
	Total Estimated Project Cost:					\$3,699,406
8	Mission Lake Water Station					
	Water line from CSWTF	lf	6,000	\$125	\$750,000	
	Heat trace	lf	6,000	\$20	\$120,000	
	Water storage tank	gal	300,000	\$2	\$600,000	
	Booster pump station	sf	2,500	\$500	\$1,250,000	
	Truck fill	ea	1	\$200,000	\$200,000	
	Contingency			15%	\$438,000	
	Total Estimated Construction Cost:				\$3,358,000	
	Administration (Bethel/VSW)			3%	\$100,740	
	Project Management			5%	\$167,900	
	Engineering Design			8%	\$268,640	
	Construction Management			12%	\$402,960	
	Total Estimated Project Cost:					\$4,298,240

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BACKBONE WATER SYSTEM OPTIONS

NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	LINE COST	TOTAL COST
9	Hospital Area Water Storage					
	Water line from CSWTF	lf	7,000	\$125	\$875,000	
	Heat trace	lf	7,000	\$20	\$140,000	
	Water storage tank	gal	300,000	\$2	\$600,000	
	Booster pump station	sf	3,000	\$500	\$1,500,000	
	Truck fill	ea	1	\$200,000	\$200,000	
	Contingency			15%	\$497,250	
	Total Estimated Construction Cost:				\$3,812,250	
	Administration (Bethel/VSW)			3%	\$114,368	
	Project Management			5%	\$190,613	
	Engineering Design			8%	\$304,980	
	Construction Management			12%	\$457,470	
	Total Estimated Project Cost:					\$4,879,680
10	Enlarge West Water Treatment Plant					
	Water treatment facility	sf	2,500	\$600	\$1,500,000	
	Contingency			15%	\$225,000	
	Total Estimated Construction Cost:				\$1,725,000	
	Administration (Bethel/VSW)			3%	\$51,750	
	Project Management			5%	\$86,250	
	Engineering Design			8%	\$138,000	
	Construction Management			12%	\$207,000	
	Total Estimated Project Cost:					\$2,208,000
11	Haroldsen Estates Water Station					
	Water line from BHWTF	lf	7,000	\$125	\$875,000	
	Heat trace	lf	7,000	\$20	\$140,000	
	Water storage tank	gal	100,000	\$2	\$200,000	
	Booster pump station	sf	2,000	\$500	\$1,000,000	
	Truck fill	ea	1	\$200,000	\$200,000	
	Contingency			15%	\$362,250	
	Total Estimated Construction Cost:				\$2,777,250	
	Administration (Bethel/VSW)			3%	\$83,318	
	Project Management			5%	\$138,863	
	Engineering Design			8%	\$222,180	
	Construction Management			12%	\$333,270	
	Total Estimated Project Cost:					\$3,554,880
TOTAL WATER SOURCE OPTIONS:						\$42,831,678
Summary of Quantities:						
	Water line / Heat trace	lf	57,350			
	Water storage tanks	gal	2,520,000			
	Booster pump station	sf	18,000			
	Truck fill	ea	9			
	Water treatment plant	sf	2,500			
	Water treatment plant upgrades	sf	4,500			

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BACKBONE SEWER SYSTEM OPTIONS

NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	LINE COST	TOTAL COST
1	QFC No. II Lift Station and Forcemain Upgrade					
	Lift station	ea	1	\$1,250,000	\$1,250,000	
	Sewer forcemain	lf	9,200	\$125	\$1,150,000	
	Heat trace	lf	9,200	\$20	\$184,000	
	Demolish existing forcemain	lf	9,200	\$15	\$138,000	
	Reestablish services	ea	10	\$10,000	\$100,000	
	Contingency			15%	\$423,300	
	Total Estimated Construction Cost:					\$3,245,300
	Administration (Bethel/VSW)			3%	\$97,359	
	Project Management			5%	\$162,265	
	Engineering Design			8%	\$259,624	
	Construction Management			12%	\$389,436	
	Total Estimated Project Cost:					\$4,153,984
2	Main Forcemain Upgrade (Ridgcrest to Lagoon)					
	Sewer forcemain	lf	3,700	\$175	\$647,500	
	Heat trace	lf	3,700	\$20	\$74,000	
	Demolish existing forcemain	lf	3,700	\$15	\$55,500	
	Reestablish services	ea	4	\$10,000	\$40,000	
	Contingency			15%	\$122,550	
	Total Estimated Construction Cost:					\$939,550
	Administration (Bethel/VSW)			3%	\$28,187	
	Project Management			5%	\$46,978	
	Engineering Design			8%	\$75,164	
	Construction Management			12%	\$112,746	
	Total Estimated Project Cost:					\$1,202,624
3	Wastewater Treatment Facility					
	Wastewater Treatment Facility	ls	1	\$12,000,000	\$12,000,000	
	Decommission Existing Lagoons	ls	1	\$1,000,000	\$1,000,000	
	Contingency			15%	\$1,800,000	
	Total Estimated Construction Cost:					\$14,800,000
	Administration (Bethel/VSW)			3%	\$444,000	
	Project Management			5%	\$740,000	
	Engineering Design			8%	\$1,184,000	
	Construction Management			12%	\$1,776,000	
	Total Estimated Project Cost:					\$18,944,000
4	FAA Lift Station Upgrades					
	Lift station upgrades	ls	1	\$200,000	\$200,000	
	Upgrade pump controls	ls	1	\$50,000	\$50,000	
	Sewer forcemain	lf	3,500	\$125	\$437,500	
	Heat trace	lf	3,500	\$20	\$70,000	
	Demolish existing forcemain	lf	3,500	\$15	\$52,500	
	Contingency			15%	\$121,500	
	Total Estimated Construction Cost:					\$931,500
	Administration (Bethel/VSW)			3%	\$27,945	
	Project Management			5%	\$46,575	
	Engineering Design			8%	\$74,520	
	Construction Management			12%	\$111,780	
	Total Estimated Project Cost:					\$1,192,320

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BACKBONE SEWER SYSTEM OPTIONS

NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	LINE COST	TOTAL COST
5	Garage / Shop Facility					
	Garage / Shop Facility	sf	10,000	\$300	\$3,000,000	
	Contingency			15%	\$450,000	
	Total Estimated Construction Cost:				\$3,450,000	
	Administration (Bethel/VSW)			3%	\$103,500	
	Project Management			5%	\$172,500	
	Engineering Design			8%	\$276,000	
	Construction Management			12%	\$414,000	
	Total Estimated Project Cost:					\$4,416,000
6	Kasayuli Subdivision Lift Station and Forcemain					
	Lift station	ea	1	\$1,000,000	\$1,000,000	
	Dump station improvements	ea	1	\$200,000	\$200,000	
	Forcemain	lf	9,000	\$125	\$1,125,000	
	Heat trace	lf	9,000	\$20	\$180,000	
	Contingency			15%	\$375,750	
	Total Estimated Construction Cost:				\$2,880,750	
	Administration (Bethel/VSW)			3%	\$86,423	
	Project Management			5%	\$144,038	
	Engineering Design			8%	\$230,460	
	Construction Management			12%	\$345,690	
	Total Estimated Project Cost:					\$3,687,360
7	Ptarmigan Lift Station and Forcemain					
	Lift station	ea	1	\$1,250,000	\$1,250,000	
	Dump station improvements	ea	1	\$200,000	\$200,000	
	Forcemain	lf	11,700	\$125	\$1,462,500	
	Heat trace	lf	11,700	\$20	\$234,000	
	Contingency			15%	\$471,975	
	Total Estimated Construction Cost:				\$3,618,475	
	Administration (Bethel/VSW)			3%	\$108,554	
	Project Management			5%	\$180,924	
	Engineering Design			8%	\$289,478	
	Construction Management			12%	\$434,217	
	Total Estimated Project Cost:					\$4,631,648
8	Larson Subdivision Lift Station and Forcemain					
	Lift station	ea	1	\$1,000,000	\$1,000,000	
	Dump station improvements	ea	1	\$200,000	\$200,000	
	Forcemain	lf	7,600	\$125	\$950,000	
	Heat trace	lf	7,600	\$20	\$152,000	
	Contingency			15%	\$345,300	
	Total Estimated Construction Cost:				\$2,647,300	
	Administration (Bethel/VSW)			3%	\$79,419	
	Project Management			5%	\$132,365	
	Engineering Design			8%	\$211,784	
	Construction Management			12%	\$317,676	
	Total Estimated Project Cost:					\$3,388,544

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BACKBONE SEWER SYSTEM OPTIONS

NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	LINE COST	TOTAL COST
9	Harbor Area Lift Station and Forcemain					
	Lift station	ea	1	\$1,000,000	\$1,000,000	
	Dump station improvements	ea	1	\$200,000	\$200,000	
	Forcemain	lf	7,200	\$125	\$900,000	
	Heat trace	lf	7,200	\$20	\$144,000	
	Contingency			15%	\$336,600	
	Total Estimated Construction Cost:				\$2,580,600	
	Administration (Bethel/VSW)			3%	\$77,418	
	Project Management			5%	\$129,030	
	Engineering Design			8%	\$206,448	
	Construction Management			12%	\$309,672	
	Total Estimated Project Cost:					\$3,303,168
10	Haroldsen Subdivision Lift Station and Forcemain					
	Lift station	ea	1	\$1,000,000	\$1,000,000	
	Dump station improvements	ea	1	\$200,000	\$200,000	
	Forcemain	lf	4,000	\$125	\$500,000	
	Heat trace	lf	4,000	\$20	\$80,000	
	Contingency			15%	\$267,000	
	Total Estimated Construction Cost:				\$2,047,000	
	Administration (Bethel/VSW)			3%	\$61,410	
	Project Management			5%	\$102,350	
	Engineering Design			8%	\$163,760	
	Construction Management			12%	\$245,640	
	Total Estimated Project Cost:					\$2,620,160
TOTAL SEWER FORCEMAIN OPTIONS:						\$47,539,808
Summary of Quantities:						
	Lift stations:	ea	7			
	Dump station improvements	ea	7			
	Forcemain / Heat trace	lf	55,900			
	Demolition of existing pipe	lf	16,400			
	Reestablish services	ea	14			

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PIPED WATER AND SEWER SERVICE OPTIONS

NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	LINE COST	TOTAL COST
1	Kilbuck North (Avenues)					
	Water main	lf	12,000	\$130	\$1,560,000	
	Sewer main	lf	7,700	\$130	\$1,001,000	
	Heat trace	lf	7,700	\$15	\$115,500	
	Services	ea	133	\$32,000	\$4,256,000	
	Contingency			15%	\$1,039,875	
	Total Estimated Construction Cost:				\$7,972,375	
	Administration			5%	\$398,619	
	Engineering			8%	\$637,790	
	Construction Management			12%	\$956,685	
	Total Estimated Project Cost:					\$9,965,469
2	Kilbuck South (Avenues)					
	Water main	lf	12,000	\$130	\$1,560,000	
	Sewer main	lf	4,200	\$130	\$546,000	
	Heat trace	lf	4,200	\$15	\$63,000	
	Services	ea	49	\$32,000	\$1,568,000	
	Contingency			15%	\$560,550	
	Total Estimated Construction Cost:				\$4,297,550	
	Administration			5%	\$214,878	
	Engineering			8%	\$343,804	
	Construction Management			12%	\$515,706	
	Total Estimated Project Cost:					\$5,371,938
3	Mission Lake Area					
	Water main	lf	16,000	\$130	\$2,080,000	
	Sewer main	lf	12,500	\$130	\$1,625,000	
	Heat trace	lf	12,500	\$15	\$187,500	
	Services	ea	135	\$32,000	\$4,320,000	
	Contingency			15%	\$1,231,875	
	Total Estimated Construction Cost:				\$9,444,375	
	Administration			5%	\$472,219	
	Engineering			8%	\$755,550	
	Construction Management			12%	\$1,133,325	
	Total Estimated Project Cost:					\$11,805,469
4	Harbor Area					
	Water main	lf	21,500	\$130	\$2,795,000	
	Sewer main	lf	16,400	\$130	\$2,132,000	
	Heat trace	lf	16,400	\$15	\$246,000	
	Services	ea	146	\$32,000	\$4,672,000	
	Contingency			15%	\$1,476,750	
	Total Estimated Construction Cost:				\$11,321,750	
	Administration			5%	\$566,088	
	Engineering			8%	\$905,740	
	Construction Management			12%	\$1,358,610	
	Total Estimated Project Cost:					\$14,152,188

City of Bethel
Bethel Water and Sewer Master Plan Update - 95% Submittal

PIPED WATER AND SEWER SERVICE OPTIONS

NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	LINE COST	TOTAL COST
5	Nunivak Subdivision West					
	Water main	lf	7,250	\$130	\$942,500	
	Sewer main	lf	3,500	\$130	\$455,000	
	Heat trace	lf	3,500	\$15	\$52,500	
	Services	ea	47	\$32,000	\$1,504,000	
	Contingency			15%	\$443,100	
	Total Estimated Construction Cost:				\$3,397,100	
	Administration			5%	\$169,855	
	Engineering			8%	\$271,768	
	Construction Management			12%	\$407,652	
	Total Estimated Project Cost:					\$4,246,375
6	Nunivak Subdivision East					
	Water main	lf	10,600	\$130	\$1,378,000	
	Sewer main	lf	7,700	\$130	\$1,001,000	
	Heat trace	lf	7,700	\$15	\$115,500	
	Services	ea	75	\$32,000	\$2,400,000	
	Contingency			15%	\$734,175	
	Total Estimated Construction Cost:				\$5,628,675	
	Administration			5%	\$281,434	
	Engineering			8%	\$450,294	
	Construction Management			12%	\$675,441	
	Total Estimated Project Cost:					\$7,035,844
7	Blueberry Subdivision South					
	Water main	lf	17,000	\$130	\$2,210,000	
	Sewer main	lf	12,300	\$130	\$1,599,000	
	Heat trace	lf	12,300	\$15	\$184,500	
	Services	ea	142	\$32,000	\$4,544,000	
	Contingency			15%	\$1,280,625	
	Total Estimated Construction Cost:				\$9,818,125	
	Administration			5%	\$490,906	
	Engineering			8%	\$785,450	
	Construction Management			12%	\$1,178,175	
	Total Estimated Project Cost:					\$12,272,656
8	Blueberry Subdivision North					
	Water main	lf	14,000	\$130	\$1,820,000	
	Sewer main	lf	10,100	\$130	\$1,313,000	
	Heat trace	lf	10,100	\$15	\$151,500	
	Services	ea	133	\$32,000	\$4,256,000	
	Contingency			15%	\$1,131,075	
	Total Estimated Construction Cost:				\$8,671,575	
	Administration			5%	\$433,579	
	Engineering			8%	\$693,726	
	Construction Management			12%	\$1,040,589	
	Total Estimated Project Cost:					\$10,839,469

City of Bethel
Bethel Water and Sewer Master Plan Update - 95% Submittal

PIPED WATER AND SEWER SERVICE OPTIONS

NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	LINE COST	TOTAL COST
9	Tundra Ridge Subdivision					
	Water main	lf	18,300	\$130	\$2,379,000	
	Sewer main	lf	15,500	\$130	\$2,015,000	
	Heat trace	lf	15,500	\$15	\$232,500	
	Services	ea	219	\$32,000	\$7,008,000	
	Contingency			15%	\$1,745,175	
	Total Estimated Construction Cost:				\$13,379,675	
	Administration			5%	\$668,984	
	Engineering			8%	\$1,070,374	
	Construction Management			12%	\$1,605,561	
	Total Estimated Project Cost:					\$16,724,594
10	Uivuuq Subdivision					
	Water main	lf	13,000	\$130	\$1,690,000	
	Sewer main	lf	7,400	\$130	\$962,000	
	Heat trace	lf	7,400	\$15	\$111,000	
	Services	ea	83	\$32,000	\$2,656,000	
	Contingency			15%	\$812,850	
	Total Estimated Construction Cost:				\$6,231,850	
	Administration			5%	\$311,593	
	Engineering			8%	\$498,548	
	Construction Management			12%	\$747,822	
	Total Estimated Project Cost:					\$7,789,813
11	Larson Subdivision					
	Water main	lf	8,700	\$130	\$1,131,000	
	Sewer main	lf	8,600	\$130	\$1,118,000	
	Heat trace	lf	8,600	\$15	\$129,000	
	Services	ea	67	\$32,000	\$2,144,000	
	Contingency			15%	\$678,300	
	Total Estimated Construction Cost:				\$5,200,300	
	Administration			5%	\$260,015	
	Engineering			8%	\$416,024	
	Construction Management			12%	\$624,036	
	Total Estimated Project Cost:					\$6,500,375
12	Airport Facilities					
	Water main	lf	12,400	\$130	\$1,612,000	
	Sewer main	lf	6,200	\$130	\$806,000	
	Heat trace	lf	6,200	\$15	\$93,000	
	Services	ea	32	\$32,000	\$1,024,000	
	Contingency			15%	\$530,250	
	Total Estimated Construction Cost:				\$4,065,250	
	Administration			5%	\$203,263	
	Engineering			8%	\$325,220	
	Construction Management			12%	\$487,830	
	Total Estimated Project Cost:					\$5,081,563

City of Bethel
Bethel Water and Sewer Master Plan Update - 95% Submittal

PIPED WATER AND SEWER SERVICE OPTIONS

NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	LINE COST	TOTAL COST
13	Kasayuli Subdivision					
	Water main	lf	16,600	\$130	\$2,158,000	
	Sewer main	lf	16,800	\$130	\$2,184,000	
	Heat trace	lf	16,800	\$15	\$252,000	
	Services	ea	211	\$32,000	\$6,752,000	
	Contingency			15%	\$1,701,900	
	Total Estimated Construction Cost:				\$13,047,900	
	Administration			5%	\$652,395	
	Engineering			8%	\$1,043,832	
	Construction Management			12%	\$1,565,748	
	Total Estimated Project Cost:					\$16,309,875
14	H-Marker Lake Area					
	Water main	lf	3,600	\$130	\$468,000	
	Sewer main	lf	3,000	\$130	\$390,000	
	Heat trace	lf	3,000	\$15	\$45,000	
	Services	ea	16	\$32,000	\$512,000	
	Contingency			15%	\$212,250	
	Total Estimated Construction Cost:				\$1,627,250	
	Administration			5%	\$81,363	
	Engineering			8%	\$130,180	
	Construction Management			12%	\$195,270	
	Total Estimated Project Cost:					\$2,034,063
15	Raven Subdivision West					
	Water main	lf	11,500	\$130	\$1,495,000	
	Sewer main	lf	4,800	\$130	\$624,000	
	Heat trace	lf	4,800	\$15	\$72,000	
	Services	ea	64	\$32,000	\$2,048,000	
	Contingency			15%	\$635,850	
	Total Estimated Construction Cost:				\$4,874,850	
	Administration			5%	\$243,743	
	Engineering			8%	\$389,988	
	Construction Management			12%	\$584,982	
	Total Estimated Project Cost:					\$6,093,563
16	Raven Subdivision East					
	Water main	lf	9,500	\$130	\$1,235,000	
	Sewer main	lf	5,100	\$130	\$663,000	
	Heat trace	lf	5,100	\$15	\$76,500	
	Services	ea	54	\$32,000	\$1,728,000	
	Contingency			15%	\$555,375	
	Total Estimated Construction Cost:				\$4,257,875	
	Administration			5%	\$212,894	
	Engineering			8%	\$340,630	
	Construction Management			12%	\$510,945	
	Total Estimated Project Cost:					\$5,322,344

City of Bethel
Bethel Water and Sewer Master Plan Update - 95% Submittal

PIPED WATER AND SEWER SERVICE OPTIONS

NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	LINE COST	TOTAL COST
17	Haroldsen Estates					
	Water main	lf	7,900	\$130	\$1,027,000	
	Sewer main	lf	5,000	\$130	\$650,000	
	Heat trace	lf	5,000	\$15	\$75,000	
	Services	ea	76	\$32,000	\$2,432,000	
	Contingency			15%	\$627,600	
	Total Estimated Construction Cost:				\$4,811,600	
	Administration			5%	\$240,580	
	Engineering			8%	\$384,928	
	Construction Management			12%	\$577,392	
	Total Estimated Project Cost:					\$6,014,500
	TOTAL WATER SOURCE OPTIONS:					\$147,560,094
	Summary of Quantities:					
	Water main	lf	211,850			
	Sewer main	lf	146,800			
	Heat trace	lf	146,800			
	Services	ea	1,857			

Project Schedule for First \$30 Million in Capital Improvements

Construction Manpower Estimate for First Three Capital Improvement Projects

**QFC #2 Lift Station and Force Main Upgrades
ESTIMATED CONSTRUCTION MAN HOURS**

ACTIVITY	MAN HOURS	HOURS	MISC. COST	LABOR	MATERIALS	EQUIPMENT	TOOLS	FREIGHT	TOTAL
CONSTRUCTION PHASE 60 DAYS									
Mob & Set Up Job	1 MAN @ 80 Hrs.	80		80					80
Working Foreman	1 Man @ 560 Hrs.	560		560					560
Operator	1 Man @ 560 Hrs.	560		560					560
Duckbill Installation	2 Man @ 120 Hrs.	240		240					240
Labor Installing Timber Supports	3 Men @ 491	1,472		1,472					1,472
Labor Welding Pipe	2 Man @ 690 Hrs.	1,380		1,380					1,380
Heat Trace Installation	3 Men @ 60 Hrs.	180		180					180
Heat Trace Termination	1 Man @ 5 Hrs. ea. /23	115		115					115
Stage Materials	2 Men @ 230 Hrs.	460		460					460
Reestablish Services	3 Men @ 20 Hrs.	600		600					600
Flush & Test	3 Men @ 120 Hrs.	360		360					360
Demo Existing	4 Men @ 368 Hrs.	1,472		1,472					1,472
TOTAL		7,479	0	7,479	0	0	0	0	7,479

**Bethel Heights Piped Water and Sewer Upgrades
ESTIMATED CONSTRUCTION MAN HOURS**

ACTIVITY	MAN HOURS	HOURS	MISC. COST	LABOR	MATERIALS	EQUIPMENT	TOOLS	FREIGHT	TOTAL
CONSTRUCTION PHASE 65 DAYS									
Mob & Set Up Job	1 MAN @ 40 Hrs.	40		40					40
Working Foreman	1 Man @ 650 Hrs.	650		650					650
Operator	1 Man @ 650 Hrs.	650		650					650
Welder Installing Pipe Supports	2 Men @ 500 Hrs	1,000		1,000					1,000
Labor Welding Pipe/ Waterline	2 Man @ 375 Hrs.	750		750					750
Labor Welding Pipe/ S.S.	2 Man @ 375 Hrs.	750		750					750
Stage Materials	2 Men @ 250 Hrs.	250		250					250
240 Water Service Connections	6 Men @ 960 Hrs.	960		960					960
Flush & Test Water & Sewer	3 Men @ 180 Hrs.	540		540					540
Demo Existing Water & Sewer	4 Men @ 381.5 Hrs	1,526		1,526					1,526
Labor-Demo Existing Road Crossing	2 Men @ 20 Hrs.	520		520					520
Labor- Install New Road Crossing	2 Men @ 20 Hrs.	520		520					520
TOTAL		8,156	0	8,156	0	0	0	0	8,156

Main Force Main Upgrades

ESTIMATED CONSTRUCTION MAN HOURS

ACTIVITY	MAN HOURS	HOURS	MISC. COST	LABOR	MATERIALS	EQUIPMENT	TOOLS	FREIGHT	TOTAL
CONSTRUCTION PHASE 30 DAYS									
Mob & Set Up Job	1 MAN @ 40 Hrs.	80		80					80
Working Foreman	1 Man @280 Hrs.	280		280					280
Operator	1 Man @ 280 Hrs.	280		280					280
Duckbill Installation	2 Man @ 60 Hrs.	120		120					120
Labor Installing Timber Supports	3 Men @ 200 Hrs.	600		600					600
Labor Welding Pipe	2 Man @ 173 Hrs.	345		345					345
Heat Trace Installation	3 Men @ 30 Hrs.	90		90					90
Heat Trace Termination	1 Man @ 5 Hrs. ea. /12	58		58					58
Stage Materials	2 Men @ 115 Hrs.	230		230					230
Reestablish Services	3 Men @ 10 Hrs.	120		120					120
Flush & Test	3 Men @ 60 Hrs.	180		180					180
Demo Existing	4 Men @ 184 Hrs.	736		736					736
TOTAL		3,119	0	3,119	0	0	0	0	3,119

Appendix N

Estimated O&M Costs



January 25, 2005

City of Bethel
Department of Finance
P.O. Box 388
Bethel, Alaska 99559

Attn: Mr. Robert Strahan,
Finance Director

Re: Bethel Water and Sewer Master Plan Update (9641.02)
Public Works and Finance Committee

Dear Mr. Strahan:

The *City of Bethel Water and Sewer Facilities Master Plan Update (Dames & Moore / 1996)* established the community's goal to convert the existing truck-haul water distribution system with a piped system. This goal remains unchanged; therefore, the current master plan update document will not reevaluate truck-haul verses piped delivery systems. The recommended strategy presented in the 1996 master plan included construction of a water treatment facility within a service area (subdivision) immediately followed by construction of a piped water distribution and sewer collection system within this service area. The Phase 1 Improvements identified in the 1996 master plan included approximately \$29 million worth of infrastructure:

- Upgrade the Bethel Heights Water Treatment Facility. This project was completed in 1999.
- A new water treatment facility as City Subdivision. This project was completed in 2000.
- A new piped water distribution and sewer collection system within City Subdivision. These improvements were completed in three project phases (A, B, & C). Phase A was completed in 2003, Phase B was completed in 2004. Phase C is anticipated to be completed in 2005.

The following improvements were added to Phase 1 due to deficiencies discovered during design:

- Decommission the City Center Water Treatment Facility, and replace the piped water and sewer system within City Center. This system would be connected to the piped water and sewer system at City Subdivision. These improvements were included in the Phase A project discussed above.
- Upgrade the backbone sewer force main that crosses Ridgecrest Drive near 6th Avenue. This project is included in the Phase C project discussed above. Phase C is anticipated to be completed in 2005.

The Phase 1 Improvements began in 1997 and will be completed in 2005. The project completion schedule was limited to the funding constraints (generally \$3.3 million per year). Project funds were accumulated ("stacked") until there were enough funds to complete a specific project.

Through completion of the Phase 1 Improvements the City recognized that the water and sewer development strategy recommended in the 1996 master plan was having a detrimental impact on the cost of operating the existing water and sewer truck-haul systems. The cost of operating a truck-haul water distribution and sewer collection system is directly proportional to the length of the haul. However, the City's truck-haul rate structure is not based on the length of the haul; rather it is based on the number of haul trips and gallons served. It is assumed that the costs related to the haul distances are balanced out between short-haul distance and long-haul distance consumers. However, the water and sewer development strategy recommended in the 1996 master plan systematically would eliminate the short distance truck-haul consumers leaving the more expensive long truck-haul distance consumers.

To evaluate the impact we prepared estimated operations and maintenance (O&M) as well as capital recovery costs for four of water and sewer system improvement scenarios: 1) Existing truck haul water and sewer systems; 2) Future truck haul water and sewer system for long-haul operations [based on the 1996 master plan strategy]; 3) Future truck haul water and sewer systems after "backbone" improvements are constructed; and 4) Future piped water and sewer systems (all improvements are constructed). The results of this evaluation are attached and are summarized in Table 1.

Table 1

Estimated monthly O&M and capital recovery costs per service for four scenarios of water and sewer system development at Bethel (interest rate of 3% per annum, and 30 year recovery period)

Water and Sewer System	Monthly O&M Costs	Monthly Capital Costs	Total Monthly Estimated Rate
1) Existing Truck Haul	\$285	\$55	\$340
2) Future Truck Haul 1996 Master Plan	\$377	\$66	\$443
3) Future Truck Haul w/ Backbone	\$229	\$79	\$308
4) Future with all Pipes	\$188	\$26	\$214

Please note that the capital recovery costs include an annual reserve to replace major pieces of equipment that will need to be replaced during the 30 year evaluation period (pumps, air handling units, boilers, trucks, etc.). It does not include replacement cost of the initial VSW grant funded improvement that are anticipated to last beyond the 30 year evaluation period (pipes, booster stations water treatment facilities, lift stations, wastewater treatment facility, etc.).

This evaluation shows that there is a significant impact to the cost to water and sewer truck haul operations and maintenance (the estimated rates would have to be increased from \$340/mo. to \$443/mo) based on the water and sewer improvement strategy recommended in the 1996 master plan. Consumer water and sewer rates would not be reduced until they were connected to the piped water and sewer improvements.

Based on the water and sewer development strategy recommended in the *City of Bethel Water and Sewer Master Plan Update – 65% Document (CRW / January 2005)*, which recommends that backbone water and sewer facilities be extended to each service area (subdivision) prior to construction of the piped water and sewer services. The short-term goal of this strategy would serve to shorten truck-haul distances. Ultimately, these improvements would serve the City's long-term

Mr. Robert Strahan
January 25, 2005
Page 3 of 3

goal of providing piped water and sewer services to the entire community. This evaluation shows that there is a progressive reduction of estimated water and sewer rates. The estimated water and sewer truck haul rates would be reduced from \$340/mo. to \$308/mo. based on the recommended strategy in the 65% document. Ultimately, the rates would be reduced to \$214/mo. once the customers have connected to the piped water and sewer systems.

If you have any questions or require additional information, please do not hesitate to contact us.

Sincerely,

CRW ENGINEERING GROUP



D. Michael Rabe, P.E.
Project Manager

Attachment

**OPERATION AND MAINTENANCE COSTS
LONG TRUCK-HAUL WATER AND SEWER SYSTEM (1996 MASTER PLAN STRATEGY)**

Design Assumptions:

User Data

Current Population (2004)	5921 Estimated
Current number of residential services	1535 Bethel
Current number of commercial services	45 Bethel
Current total number of services	1580 Bethel
Population (2024)	8133 1.6% growth
Future number of residential services	2109 Calculated
Future number of commercial services	62 Calculated
Future total number of services	2170 Calculated

Estimated Demands:

Residential Demand	60 gpcd
Commercial Demand (businesses, schools & government facilities)	5 gpcd
Estimated Total Demand	65 gpcd

System Data - Water Treatment Facility

Piped water system and interim truck haul operations

Assume 2 water treatment facilities for city

Water Treatment Building	3000 sf
Electrical Equipment	
Water treatment pumps	
Backwash	30 hp
Backwash waste	30 hp
Well	40 hp
Glycol plant pump	2 hp
Glycol process pump	1 hp
Building air handler	15 hp
Building lights	0.5 watts/hr/sf

Heating Fuel Demand

Building heat (Maintained at 70 °F)	10 BTU/hr/sf
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System Data - Piped Systems (Bethel Heights and City Subdivision)

Piped circulating water system and interim truck haul operations

Assume 2 booster pump station facilities needed

Booster pump station building	3000 sf
Electrical Equipment	
Water main circ pumps	
Loop 1	5 hp
Loop 2	5 hp
Loop 3	5 hp
Water Main pressure pumps	
Loop 1	10 hp
Loop 2	10 hp
Loop 3	10 hp
Water treatment pumps	
Water storage tank circ loop pump	5 hp
Sewer glycol circ pumps	
Loop 1	1.5 hp
Loop 2	1.5 hp
Loop 3	1.5 hp
Glycol plant pump	1.5 hp
Glycol process pump	1 hp
Booster pumps	50 hp
Building air handler	15 hp
Building lights	0.5 watts/hr/sf

**OPERATION AND MAINTENANCE COSTS
LONG TRUCK-HAUL WATER AND SEWER SYSTEM (1996 MASTER PLAN STRATEGY)**

Heating Fuel Demand			
Circulating mains	Unit	Quantity	Rate of Heat Loss
Water mains (avg for each subdivision)	ft	35,000	50 BTU/day ft
Sewer mains (avg for each subdivision)	ft	25,000	50 BTU/day ft
Building heat (Maintained at 70 °F)	sf	3,000	10 BTU/hr/sf
Water Storage Tank (Maintained @ 45 °F)	gallon	500,000	0.3 BTU/gal/day

System Data - Wastewater Treatment Facility

Piped water system and interim truck haul operations		
Assume 1 wastewater treatment facilities need for city		
Wastewater Treatment Building		15000 sf
Electrical Equipment		
Wastewater treatment pumps		
Sludge pumps		5 hp
Hydronic pumps		1 hp
Misc. pumps		5 hp
Glycol plant pump		2 hp
Glycol process pump		1 hp
Building air handler		25 hp
Building lights		0.5 watts/hr/sf
Heating Fuel Demand		
Building heat (Maintained at 70 °F)		10 BTU/hr/sf

System Data - Truck Haul Operations

Assume truck fill station at each of three WTF		
Assume two truck dump/lift station at airport and QFC#2		
Estimated number of truck haul customers in Bethel		1174 truck haul customers

Truck Fill Station		1000 sf
Electrical Equipment		
Water storage tank fill pump		10 hp
Truck water fill pump		10 hp
Glycol plant pump		2 hp
Glycol process pump		1 hp
Building air handler		25 hp
Building lights		0.5 watts/hr/sf

Heating Fuel Demand	Unit	Quantity	Rate of Heat Loss
Building heat (Maintained at 70 °F)	sf	1,000	10 BTU/hr/sf

Dump/Lift stations		15 hp
Number of lift stations for community		4 ea

Heating Fuel Demand	Unit	Quantity	Rate of Heat Loss
Sewer force mains	sf	6,000	50 BTU/day ft

Home Water and Sewer System Assumptions:

Home holding tank size		1000 gallon
Calculated service interval		1.0 trip/week
Home water tank size		500 gallon
Calculated service interval		2.0 trip/week

**OPERATION AND MAINTENANCE COSTS
LONG TRUCK-HAUL WATER AND SEWER SYSTEM (1996 MASTER PLAN STRATEGY)**

Truck Haul Sewer System Operational Assumptions:

Distance from subdivision to dump station	5 miles
Sewer evacuation rate	200 gpm
Sewer truck discharge rate	400 gpm
Sewer truck tank size	3000 gallons
Average speed	25 mph
Setup time per service	1 min/service
Calculated number of service per trip	3 homes
Calculated time per sewer service to subdivision	0.8 hours
Time to serve subdivision	322.9 hours
Number of sewer trucks needed to serve subdivision	8.1 trucks

Truck Haul Water System Operational Assumptions:

Distance from subdivision to water fill station	2 miles
Water truck fill rate	400 gpm
Water truck discharge rate	150 gpm
Water truck tank size	3000 gallons
Average speed	25 mph
Setup time per service	2 min/service
Calculated number of service per trip	6 homes
Calculated time per water service to subdivision	0.7 hours
Time to serve subdivision	271.6 hours
Number of water trucks needed to serve subdivision	6.8 trucks

System Data - Water and Sewer Facilities

Truck-haul water & sewer system	14.9 trucks
Truck O&M Costs	\$10.00 /hr
Truck-haul garage	700 sf/truck
Electrical Equipment	
Truck Garage Air Handler	50 hp
Truck Garage Lights	0.5 watts/hr/sf
Heating Fuel Demand	
Truck Garage (Maintained at 50 °F)	10403 sf 10 BTU/hr/sf

Service Data

Each house has a circ pump, glycol circ pump, grinder pump, HW heater, toilet, sink, tub/shower, and kitchen sink
Home owner to pay for the costs of operating the circ pump, grinder pump, HW heater, and all appliances

Operational Cost Data

Cost per kWh (includes power cost adjustment of \$0.1378)	\$0.22 kWh
Cost per gallon of heating fuel	\$2.55 gal
Administrative cost per service	\$10.00 month
Burdened labor rate for a laborer/driver/mechanic (includes taxes & benefits)	\$25.00 hr
Burdened labor rate for an operator (includes taxes & benefits)	\$32.00 hr

Other Assumptions

	No. of Employees	No. of Facilities	Estimated hr/wk	
Labor				
Water treatment facilities - operator	1	2	45	90 hr/wk
Booster pump stations/W&S mains - laborer	1	2	45	90 hr/wk
Wastewater treatment facilities - operator	2	1	45	90 hr/wk
Truck haul operations - drivers	14.9	1	45	669 hr/wk
Truck haul operations - mechanic	2.0	1	45	90 hr/wk
Minor parts and supplies				30 % of labor
Expected Equipment Life				
Pumps				10 yr
Heat exchangers				15 yr
Boilers				15 yr
System controls				15 yr
Inflation Rate				3 %
Available energy per gallon of heating fuel				100,000 BTU/gal
Insurance				\$15,000 yr

**OPERATION AND MAINTENANCE COSTS
LONG TRUCK-HAUL WATER AND SEWER SYSTEM (1996 MASTER PLAN STRATEGY)**

Estimated Electrical Demand

<u>Water Treatment Facility</u>	Size	Usage	Annual Demand
	(hp)	(hr/day)	(kwh)
Water treatment pumps			
Backwash	30	4	32,675
Backwash waste	30	4	32,675
Well	40	4	43,566
Glycol plant pump	2	24	13,070
Glycol process pump	1	24	6,535
Building air handler	15	10	40,844
Building lights		10	5,475
Total for one water treatment plant:			174,839
Total for two water treatment plants:			349,679

<u>Booster Pump Station Facility</u>	Size	Usage	Annual Demand
	(hp)	(hr/day)	(kwh)
Water main circ pumps			
Loop 1	5	24	32,675
Loop 2	5	24	32,675
Loop 3	5	24	32,675
Water Main pressure pumps			
Loop 1	10	6	16,337
Loop 2	10	6	16,337
Loop 3	10	6	16,337
Water treatment pumps			
Water storage tank circ loop pump	5	24	32,675
Sewer glycol circ pumps			
Loop 1	1.5	24	9,802
Loop 2	1.5	24	9,802
Loop 3	1.5	24	9,802
Glycol plant pump	1.5	24	9,802
Glycol process pump	1	24	6,535
Booster pumps	50	1	13,615
Building air handler	15	10	40,844
Building lights		10	5,475
Total for one booster pump station:			285,389
Total for two booster pump stations:			570,778

<u>Wastewater Treatment Facility</u>	Units	Size	Usage	Annual Demand
	ea	(hp)	(hr/day)	(kwh)
Wastewater treatment pumps				
Sludge pumps		5	8	10,892
Hydronic pumps		1	24	6,535
Misc. pumps		5	24	32,675
Glycol plant pump		2	24	13,070
Glycol process pump		1	24	6,535
Building air handler		25	10	68,073
Building lights			10	27,375
Lift Stations	4	15	12	196,049
Total for one wastewater treatment plant:				361,203

<u>Truck Haul Operations</u>	Size	Usage	Annual Demand
	(hp)	(hr/day)	(kwh)
Truck garage air handler	50	10	136,145
Truck garage lights		10	18,986
Subtotal			155,131

Estimated Heating Demand

<u>Water Treatment Facility</u>	Usage	Quantity	Rate of heat	Annual Demand
	(hr/day)	sf	loss per unit	(1000 BTU)
Heating Fuel Demand				
Building heat		3000	10	131,400
Total for one water treatment plants:				394,200

**OPERATION AND MAINTENANCE COSTS
LONG TRUCK-HAUL WATER AND SEWER SYSTEM (1996 MASTER PLAN STRATEGY)**

<u>Booster Pump Station Facility</u>	Unit	Quantity	Rate of heat loss per unit	Annual Demand (1000 BTU)
Water & Sewer mains				
Water Loops	ft	35,000	50	638,750
Sewer Mains	ft	25,000	50	456,250
Building heat	sf	3,000	10	131,400
Water Storage Tank	gallon	500,000	0.3	657,000
Total for one booster pump station w/ water and sewer mains:				1,883,400
Total for two booster pump stations w/ water and sewer mains:				3,766,800

<u>Wastewater Treatment Facility</u>	Unit	Quantity	Rate of heat loss per unit	Annual Demand (1000 BTU)
Heating Fuel Demand				
Building heat	sf	15,000	10	657,000
Total for one wastewater treatment plant and lift stations / force mains:				657,000

<u>Truck Haul Operations</u>	Unit	Quantity	Rate of heat loss per unit	Annual Demand (1000 BTU)
Truck garage heat	sf	10,403	10	37,972
Sewer force mains	ft	45,000	50	821,250
Subtotal:				859,222

Estimated Annual Operations and Maintenance Costs

<u>Water Treatment Facility</u>	
Administration	\$32,555
Labor	\$149,760
Minor parts and supplies	\$44,928
Electricity	\$75,461
Heating Fuel	\$10,052
Insurance	\$3,750
Subtotal	\$316,506

<u>Booster Pump Station Facility</u>	
Administration	\$65,111
Labor	\$117,000
Minor parts and supplies	\$35,100
Electricity	\$123,174
Heating Fuel	\$96,053
Insurance	\$3,750
Subtotal	\$440,188

<u>Wastewater Treatment Facility</u>	
Administration	\$32,555
Labor	\$149,760
Minor parts and supplies	\$44,928
Electricity	\$77,948
Heating Fuel	\$16,754
Insurance	\$3,750
Subtotal	\$325,694

<u>Truck Haul Operations</u>	
Administration	\$130,221
Labor	\$986,409
Minor parts and supplies	\$295,923
Electricity	\$33,477
Heating Fuel	\$21,910
Truck O&M	\$4,594,098
Insurance	\$3,750
Subtotal	\$6,065,789

**OPERATION AND MAINTENANCE COSTS
LONG TRUCK-HAUL WATER AND SEWER SYSTEM (1996 MASTER PLAN STRATEGY)**

Combinde Annual Water and Sewer O&M Costs

Administration	\$260,000
Labor	\$1,403,000
Minor parts and supplies	\$421,000
Electricity	\$310,000
Heating Fuel	\$145,000
Truck O&M	\$4,594,000
Insurance	\$15,000

TOTAL ANNUAL O&M COSTS (ALL FACILITIES): \$7,148,000 \$377 service per month

Repair and replacement Costs

	Life	Capital	Inflation	Annual
	yr	Cost	Rate	Cost
		\$	%	\$
Pumps	10	\$462,000	3	\$62,089
Heat Exchangers	10	\$250,000	3	\$33,598
Boilers	15	\$650,000	3	\$67,512
System Controls	10	\$520,000	3	\$69,884
Trucks	7	\$3,715,425	3	\$652,786

TOTAL ANNUAL R&R COSTS: \$886,000

Reserve

5% of annual O&M costs

TOTAL ANNUAL RESERVE: \$357,000

TOTAL ANNUAL OPERATING CASHFLOW: \$8,391,000

TOTAL ESTIMATED MONTHLY COSTS PER SERVICE: \$443 service per month

Estimate Assumptions:

- 1 This operations and maintenance cost estimate is based on existing system operations as configured as of November 2004.
- 2 Improvements include:
 - a Two water treatment plants (BHWTF & CSWTF)
 - b Two booster pump station facilities w/water storage. Each booster pump station provides piped water and sewer service to a specific area of the city (subdivision) and includes water circulation/pressurization, water storage tank, standby power, fire pump, and sewer glycol heating. The two of the booster pump stations are included in the water treatment facilities; however, for this estimate they are treated independently.
 - c Truck fill station located at each WTF.
 - d One wastewater treatment plant.
- 3 All costs are in 2004 dollars.
- 4 This cost estimate is prepared as part of the Bethel Water and Sewer Master Plan Update - 65% Submittal.

Date Completed: November 29, 2004

Completed By: D. Michael Rabe, PE / CRW Engineering Group, LLC

**OPERATION AND MAINTENANCE COSTS
EXISTING TRUCK-HAUL WATER AND SEWER SYSTEM**

Design Assumptions:

User Data

Current Population (2004)	5921 Estimated
Current number of residential services	1535 Bethel
Current number of commercial services	45 Bethel
Current total number of services	1580 Bethel
Population (2024)	8133 1.6% growth
Future number of residential services	2109 Calculated
Future number of commercial services	62 Calculated
Future total number of services	2170 Calculated

Estimated Demands:

Residential Demand	60 gpcd
Commercial Demand (businesses, schools & government facilities)	5 gpcd
Estimated Total Demand	65 gpcd

System Data - Water Treatment Facility

Piped water system and interim truck haul operations	
Assume 2 water treatment facilities for city	
Water Treatment Building	3000 sf
Electrical Equipment	
Water treatment pumps	
Backwash	30 hp
Backwash waste	30 hp
Well	40 hp
Glycol plant pump	2 hp
Glycol process pump	1 hp
Building air handler	15 hp
Building lights	0.5 watts/hr/sf
Heating Fuel Demand	
Building heat (Maintained at 70 °F)	10 BTU/hr/sf

System Data - Piped Systems (Bethel Heights and City Subdivision)

Piped circulating water system and interim truck haul operations	
Assume 2 booster pump station facilities needed	
Booster pump station building	3000 sf
Electrical Equipment	
Water main circ pumps	
Loop 1	5 hp
Loop 2	5 hp
Loop 3	5 hp
Water Main pressure pumps	
Loop 1	10 hp
Loop 2	10 hp
Loop 3	10 hp
Water treatment pumps	
Water storage tank circ loop pump	5 hp
Sewer glycol circ pumps	
Loop 1	1.5 hp
Loop 2	1.5 hp
Loop 3	1.5 hp
Glycol plant pump	1.5 hp
Glycol process pump	1 hp
Booster pumps	50 hp
Building air handler	15 hp
Building lights	0.5 watts/hr/sf

**OPERATION AND MAINTENANCE COSTS
EXISTING TRUCK-HAUL WATER AND SEWER SYSTEM**

Heating Fuel Demand			
	Unit	Quantity	Rate of Heat Loss
Circulating mains			
Water mains (avg for each subdivision)	ft	35,000	50 BTU/day ft
Sewer mains (avg for each subdivision)	ft	25,000	50 BTU/day ft
Building heat (Maintained at 70 °F)	sf	3,000	10 BTU/hr/sf
Water Storage Tank (Maintained @ 45 °F)	gallon	500,000	0.3 BTU/gal/day

System Data - Wastewater Treatment Facility

Piped water system and interim truck haul operations			
Assume 1 wastewater treatment facilities need for city			
Wastewater Treatment Building			15000 sf
Electrical Equipment			
Wastewater treatment pumps			
Sludge pumps			5 hp
Hydronic pumps			1 hp
Misc. pumps			5 hp
Glycol plant pump			2 hp
Glycol process pump			1 hp
Building air handler			25 hp
Building lights			0.5 watts/hr/sf
Heating Fuel Demand			
Building heat (Maintained at 70 °F)			10 BTU/hr/sf

System Data - Truck Haul Operations

Assume truck fill station at each of three WTF			
Assume two truck dump/lift station at airport and QFC#2			
Estimated number of truck haul customers in Bethel			1174 truck haul customers
Truck Fill Station			1000 sf
Electrical Equipment			
Water storage tank fill pump			
Truck water fill pump			10 hp
Glycol plant pump			2 hp
Glycol process pump			1 hp
Building air handler			25 hp
Building lights			0.5 watts/hr/sf
Heating Fuel Demand			
Building heat (Maintained at 70 °F)	Unit	Quantity	Rate of Heat Loss
	sf	1,000	10 BTU/hr/sf
Dump/Lift stations			
Number of lift stations for community			15 hp
			4 ea
Heating Fuel Demand			
Sewer force mains	Unit	Quantity	Rate of Heat Loss
	sf	6,000	50 BTU/day ft
Home Water and Sewer System Assumptions:			
Home holding tank size			1000 gallon
Calculated service interval			1.0 trip/week
Home water tank size			500 gallon
Calculated service interval			2.0 trip/week

**OPERATION AND MAINTENANCE COSTS
EXISTING TRUCK-HAUL WATER AND SEWER SYSTEM**

Truck Haul Sewer System Operational Assumptions:

Distance from subdivision to dump station	1.5 miles
Sewer evacuation rate	200 gpm
Sewer truck discharge rate	400 gpm
Sewer truck tank size	3000 gallons
Average speed	25 mph
Setup time per service	1 min/service
Calculated number of service per trip	3 homes
Calculated time per sewer service to subdivision	0.5 hours
Time to serve subdivision	213.3 hours
Number of sewer trucks needed to serve subdivision	5.3 trucks

Truck Haul Water System Operational Assumptions:

Distance from subdivision to water fill station	2 miles
Water truck fill rate	400 gpm
Water truck discharge rate	150 gpm
Water truck tank size	3000 gallons
Average speed	25 mph
Setup time per service	2 min/service
Calculated number of service per trip	6 homes
Calculated time per water service to subdivision	0.7 hours
Time to serve subdivision	271.6 hours
Number of water trucks needed to serve subdivision	6.8 trucks

System Data - Water and Sewer Facilities

Truck-haul water & sewer system	12.1 trucks
Truck O&M Costs	\$10.00 /hr
Truck-haul garage	700 sf/truck
Electrical Equipment	
Truck Garage Air Handler	50 hp
Truck Garage Lights	0.5 watts/hr/sf
Heating Fuel Demand	
Truck Garage (Maintained at 50 °F)	8486 sf 10 BTU/hr/sf

Service Data

Each house has a circ pump, glycol circ pump, grinder pump, HW heater, toilet, sink, tub/shower, and kitchen sink
Home owner to pay for the costs of operating the circ pump, grinder pump, HW heater, and all appliances

Operational Cost Data

Cost per kWh (includes power cost adjustment of \$0.1378)	\$0.22 kWh
Cost per gallon of heating fuel	\$2.55 gal
Administrative cost per service	\$10.00 month
Burdened labor rate for a laborer/driver/mechanic (includes taxes & benefits)	\$25.00 hr
Burdened labor rate for an operator (includes taxes & benefits)	\$32.00 hr

Other Assumptions

	No. of Employees	No. of Facilities	Estimated hr/wk	
Labor				
Water treatment facilities - operator	1	2	45	90 hr/wk
Booster pump stations/W&S mains - laborer	1	2	45	90 hr/wk
Wastewater treatment facilities - operator	2	1	45	90 hr/wk
Truck haul operations - drivers	12.1	1	45	546 hr/wk
Truck haul operations - mechanic	2.0	1	45	90 hr/wk
Minor parts and supplies				30 % of labor
Expected Equipment Life				
Pumps				10 yr
Heat exchangers				15 yr
Boilers				15 yr
System controls				15 yr
Inflation Rate				3 %
Available energy per gallon of heating fuel				100,000 BTU/gal
Insurance				\$15,000 yr

**OPERATION AND MAINTENANCE COSTS
EXISTING TRUCK-HAUL WATER AND SEWER SYSTEM**

Estimated Electrical Demand

<u>Water Treatment Facility</u>	Size	Usage	Annual Demand
	(hp)	(hr/day)	(kwh)
Water treatment pumps			
Backwash	30	4	32,675
Backwash waste	30	4	32,675
Well	40	4	43,566
Glycol plant pump	2	24	13,070
Glycol process pump	1	24	6,535
Building air handler	15	10	40,844
Building lights		10	5,475
Total for one water treatment plant:			174,839
Total for two water treatment plants:			349,679

<u>Booster Pump Station Facility</u>	Size	Usage	Annual Demand
	(hp)	(hr/day)	(kwh)
Water main circ pumps			
Loop 1	5	24	32,675
Loop 2	5	24	32,675
Loop 3	5	24	32,675
Water Main pressure pumps			
Loop 1	10	6	16,337
Loop 2	10	6	16,337
Loop 3	10	6	16,337
Water treatment pumps			
Water storage tank circ loop pump	5	24	32,675
Sewer glycol circ pumps			
Loop 1	1.5	24	9,802
Loop 2	1.5	24	9,802
Loop 3	1.5	24	9,802
Glycol plant pump	1.5	24	9,802
Glycol process pump	1	24	6,535
Booster pumps	50	1	13,615
Building air handler	15	10	40,844
Building lights		10	5,475
Total for one booster pump station:			285,389
Total for two booster pump stations:			570,778

<u>Wastewater Treatment Facility</u>	Units	Size	Usage	Annual Demand
	ea	(hp)	(hr/day)	(kwh)
Wastewater treatment pumps				
Sludge pumps		5	8	10,892
Hydronic pumps		1	24	6,535
Misc. pumps		5	24	32,675
Glycol plant pump		2	24	13,070
Glycol process pump		1	24	6,535
Building air handler		25	10	68,073
Building lights			10	27,375
Lift Stations	4	15	12	196,049
Total for one wastewater treatment plant:				361,203

<u>Truck Haul Operations</u>	Size	Usage	Annual Demand
	(hp)	(hr/day)	(kwh)
Truck garage air handler	50	10	136,145
Truck garage lights		10	15,486
Subtotal			151,631

Estimated Heating Demand

<u>Water Treatment Facility</u>	Usage	Quantity	Rate of heat	Annual Demand
	(hr/day)	sf	loss per unit	(1000 BTU)
Heating Fuel Demand				
Building heat	sf	3000	10	131,400
Total for one water treatment plants:				394,200

**OPERATION AND MAINTENANCE COSTS
EXISTING TRUCK-HAUL WATER AND SEWER SYSTEM**

<u>Booster Pump Station Facility</u>	Unit	Quantity	Rate of heat loss per unit	Annual Demand (1000 BTU)
Water & Sewer mains				
Water Loops	ft	35,000	50	638,750
Sewer Mains	ft	25,000	50	456,250
Building heat	sf	3,000	10	131,400
Water Storage Tank	gallon	500,000	0.3	657,000
Total for one booster pump station w/ water and sewer mains:				1,883,400
Total for two booster pump stations w/ water and sewer mains:				3,766,800

<u>Wastewater Treatment Facility</u>	Unit	Quantity	Rate of heat loss per unit	Annual Demand (1000 BTU)
Heating Fuel Demand				
Building heat	sf	15,000	10	657,000
Total for one wastewater treatment plant and lift stations / force mains:				657,000

<u>Truck Haul Operations</u>	Unit	Quantity	Rate of heat loss per unit	Annual Demand (1000 BTU)
Truck garage heat	sf	8,486	10	30,973
Sewer force mains	ft	45,000	50	821,250
Subtotal:				852,223

Estimated Annual Operations and Maintenance Costs

<u>Water Treatment Facility</u>	
Administration	\$32,555
Labor	\$149,760
Minor parts and supplies	\$44,928
Electricity	\$75,461
Heating Fuel	\$10,052
Insurance	\$3,750
Subtotal	\$316,506

<u>Booster Pump Station Facility</u>	
Administration	\$65,111
Labor	\$117,000
Minor parts and supplies	\$35,100
Electricity	\$123,174
Heating Fuel	\$96,053
Insurance	\$3,750
Subtotal	\$440,188

<u>Wastewater Treatment Facility</u>	
Administration	\$32,555
Labor	\$149,760
Minor parts and supplies	\$44,928
Electricity	\$77,948
Heating Fuel	\$16,754
Insurance	\$3,750
Subtotal	\$325,694

<u>Truck Haul Operations</u>	
Administration	\$130,221
Labor	\$826,158
Minor parts and supplies	\$247,848
Electricity	\$32,722
Heating Fuel	\$21,732
Truck O&M	\$3,056,596
Insurance	\$3,750
Subtotal	\$4,319,027

**OPERATION AND MAINTENANCE COSTS
EXISTING TRUCK-HAUL WATER AND SEWER SYSTEM**

Combinde Annual Water and Sewer O&M Costs

Administration	\$260,000
Labor	\$1,243,000
Minor parts and supplies	\$373,000
Electricity	\$309,000
Heating Fuel	\$145,000
Truck O&M	\$3,057,000
Insurance	\$15,000

TOTAL ANNUAL O&M COSTS (ALL FACILITIES): \$5,402,000

\$285 service per month

Repair and replacement Costs

	Life	Capital	Inflation	Annual
	yr	Cost	Rate	Cost
		\$	%	\$
Pumps	10	\$462,000	3	\$62,089
Heat Exchangers	10	\$250,000	3	\$33,598
Boilers	15	\$650,000	3	\$67,512
System Controls	10	\$520,000	3	\$69,884
Trucks	7	\$3,030,591	3	\$532,464

TOTAL ANNUAL R&R COSTS: \$766,000

Reserve

5% of annual O&M costs

TOTAL ANNUAL RESERVE: \$270,000

TOTAL ANNUAL OPERATING CASHFLOW: \$6,438,000

TOTAL ESTIMATED MONTHLY COSTS PER SERVICE: \$340

service per month

Estimate Assumptions:

- 1 This operations and maintenance cost estimate is based on existing system operations as configured as of November 2004.
- 2 Improvements include:
 - a Two water treatment plants (BHWTF & CSWTF)
 - b Two booster pump station facilities w/water storage. Each booster pump station provides piped water and sewer service to a specific area of the city (subdivision) and includes water circulation/pressurization, water storage tank, standby power, fire pump, and sewer glycol heating. The two of the booster pump stations are included in the water treatment facilities; however, for this estimate they are treated independently.
 - c Truck fill station located at each WTF.
 - d One wastewater treatment plant.
- 3 All costs are in 2004 dollars.
- 4 This cost estimate is prepared as part of the Bethel Water and Sewer Master Plan Update - 65% Submittal.

Date Completed: November 29, 2004

Completed By: D. Michael Rabe, PE / CRW Engineering Group, LLC

**OPERATION AND MAINTENANCE COSTS
FUTURE TRUCK-HAUL WATER AND SEWER SYSTEM WITH BACKBONE FACILITIES**

Design Assumptions:

User Data

Current Population (2004)	5921	Estimated
Current number of residential services	1535	Bethel
Current number of commercial services	45	Bethel
Current total number of services	1580	Bethel
Population (2024)	8133	1.6% growth
Future number of residential services	2109	Calculated
Future number of commercial services	62	Calculated
Future total number of services	2170	Calculated

Estimated Demands:

Residential Demand	60	gpcd
Commercial Demand (businesses, schools & government facilities)	5	gpcd
Estimated Total Demand	65	gpcd

System Data - Water Treatment Facility

Piped water system and interim truck haul operations		
Assume 3 water treatment facilities need for city		
Water Treatment Building	3000	sf
Electrical Equipment		
Water treatment pumps		
Backwash	30	hp
Backwash waste	30	hp
Well	40	hp
Glycol plant pump	2	hp
Glycol process pump	1	hp
Building air handler	15	hp
Building lights	0.5	watts/hr/sf
Heating Fuel Demand		
Building heat (Maintained at 70 °F)	10	BTU/hr/sf

System Data - Piped Systems (Bethel Heights and City Subdivision)

Piped circulating water system and interim truck haul operations		
Assume 2 booster pump station facilities needed		
Booster pump station building	3000	sf
Electrical Equipment		
Water main circ pumps		
Loop 1	5	hp
Loop 2	5	hp
Loop 3	5	hp
Water Main pressure pumps		
Loop 1	10	hp
Loop 2	10	hp
Loop 3	10	hp
Water treatment pumps		
Water storage tank circ loop pump	5	hp
Sewer glycol circ pumps		
Loop 1	1.5	hp
Loop 2	1.5	hp
Loop 3	1.5	hp
Glycol plant pump	1.5	hp
Glycol process pump	1	hp
Booster pumps	50	hp
Building air handler	15	hp
Building lights	0.5	watts/hr/sf

**OPERATION AND MAINTENANCE COSTS
FUTURE TRUCK-HAUL WATER AND SEWER SYSTEM WITH BACKBONE FACILITIES**

Heating Fuel Demand	Unit	Quantity	Rate of Heat Loss
Circulating mains			
Water mains (avg for each subdivision)	ft	35,000	50 BTU/day ft
Sewer mains (avg for each subdivision)	ft	25,000	50 BTU/day ft
Building heat (Maintained at 70 °F)	sf	3,000	10 BTU/hr/sf
Water Storage Tank (Maintained @ 45 °F)	gallon	500,000	0.3 BTU/gal/day

System Data - Wastewater Treatment Facility

Piped water system and interim truck haul operations			
Assume 1 wastewater treatment facilities need for city			
Wastewater Treatment Building			15000 sf
Electrical Equipment			
Wastewater treatment pumps			
Sludge pumps			5 hp
Hydronic pumps			1 hp
Misc. pumps			5 hp
Glycol plant pump			2 hp
Glycol process pump			1 hp
Building air handler			25 hp
Building lights			0.5 watts/hr/sf
Heating Fuel Demand			
Building heat (Maintained at 70 °F)			10 BTU/hr/sf

System Data - Truck Haul Operations

Assume truck fill station at each subdivision served from one of three WTF			
Assume eight truck dump/lift station at each subdivision w/force main to WWTF			
Estimated services per subdivision (total of 10 service areas - subdivisions)			217 services
Truck Fill Station			
			1000 sf
Electrical Equipment			
Water storage tank fill pump			10 hp
Truck water fill pump			10 hp
Glycol plant pump			2 hp
Glycol process pump			1 hp
Building air handler			25 hp
Building lights			0.5 watts/hr/sf
Heating Fuel Demand			
Building heat (Maintained at 70 °F)	Unit	Quantity	Rate of Heat Loss
Water storage tank fill line	sf	1,000	10 BTU/hr/sf
Water Storage Tank (Maintained @ 45 °F)	ft	5,000	50 BTU/day ft
	gallon	50,000	0.3 BTU/gal/day
Dump/Lift stations			
Number of lift stations for community			15 hp
			9 ea
Heating Fuel Demand			
Sewer force mains	Unit	Quantity	Rate of Heat Loss
	sf	5,000	50 BTU/day ft

Home Water and Sewer System Assumptions:

Home holding tank size			1000 gallon
Calculated service interval			1.0 trip/week
Home water tank size			500 gallon
Calculated service interval			2.0 trip/week

**OPERATION AND MAINTENANCE COSTS
FUTURE TRUCK-HAUL WATER AND SEWER SYSTEM WITH BACKBONE FACILITIES**

Truck Haul Sewer System Operational Assumptions:

Distance from subdivision to dump station	0.5 miles
Sewer evacuation rate	150 gpm
Sewer truck discharge rate	400 gpm
Sewer truck tank size	3000 gallons
Average speed	25 mph
Setup time per service	5 min/service
Calculated number of service per trip	3 homes
Calculated time per sewer service to subdivision	0.7 hours
Time to serve subdivision	54.1 hours
Number of sewer trucks needed to serve subdivision	1.4 trucks

Truck Haul Water System Operational Assumptions:

Distance from subdivision to water fill station	0.5 miles
Water truck fill rate	400 gpm
Water truck discharge rate	100 gpm
Water truck tank size	3000 gallons
Average speed	25 mph
Setup time per service	5 min/service
Calculated number of service per trip	6 homes
Calculated time per water service to subdivision	1.0 hours
Time to serve subdivision	75.3 hours
Number of water trucks needed to serve subdivision	1.9 trucks

System Data - Water and Sewer Facilities

Truck-haul water & sewer system	3.2 trucks
Truck O&M Costs	\$10.00 /hr
Truck-haul garage	700 sf/truck
Electrical Equipment	
Truck Garage Air Handler	10 hp
Truck Garage Lights	0.5 watts/hr/sf
Heating Fuel Demand	
Truck Garage (Maintained at 50 °F)	2265 sf 10 BTU/hr/sf

Service Data

Each house has a circ pump, glycol circ pump, grinder pump, HW heater, toilet, sink, tub/shower, and kitchen sink
Home owner to pay for the costs of operating the circ pump, grinder pump, HW heater, and all appliances

Operational Cost Data

Cost per kWh (includes power cost adjustment of \$0.1378)	\$0.22 kWh
Cost per gallon of heating fuel	\$2.55 gal
Administrative cost per service	\$15.00 month
Burdened labor rate for a laborer/driver/mechanic (includes taxes & benefits)	\$25.00 hr
Burdened labor rate for an operator (includes taxes & benefits)	\$32.00 hr

Other Assumptions

	No. of Employees	No. of Facilities	Estimated hr/wk	
Labor				
Water treatment facilities - operator	1	3	45	135 hr/wk
Booster pump stations/W&S mains - laborer	1	2	45	90 hr/wk
Wastewater treatment facilities - operator	3	1	45	135 hr/wk
Truck haul operations - drivers	3.2	9	45	1310 hr/wk
Truck haul operations - mechanic	4.0	1	45	180 hr/wk
Minor parts and supplies				30 % of labor
Expected Equipment Life				
Pumps				10 yr
Heat exchangers				15 yr
Boilers				15 yr
System controls				15 yr
Inflation Rate				3 %
Available energy per gallon of heating fuel				100,000 BTU/gal
Insurance				\$15,000 yr

**OPERATION AND MAINTENANCE COSTS
FUTURE TRUCK-HAUL WATER AND SEWER SYSTEM WITH BACKBONE FACILITIES**

Estimated Electrical Demand

<u>Water Treatment Facility</u>	Size	Usage	Annual Demand
	(hp)	(hr/day)	(kwh)
Water treatment pumps			
Backwash	30	4	32,675
Backwash waste	30	4	32,675
Well	40	4	43,566
Glycol plant pump	2	24	13,070
Glycol process pump	1	24	6,535
Building air handler	15	10	40,844
Building lights		10	5,475
Total for one water treatment plant:			174,839
Total for three water treatment plants:			524,518

<u>Booster Pump Station Facility</u>	Size	Usage	Annual Demand
	(hp)	(hr/day)	(kwh)
Water main circ pumps			
Loop 1	5	24	32,675
Loop 2	5	24	32,675
Loop 3	5	24	32,675
Water Main pressure pumps			
Loop 1	10	6	16,337
Loop 2	10	6	16,337
Loop 3	10	6	16,337
Water treatment pumps			
Water storage tank circ loop pump	5	24	32,675
Sewer glycol circ pumps			
Loop 1	1.5	24	9,802
Loop 2	1.5	24	9,802
Loop 3	1.5	24	9,802
Glycol plant pump	1.5	24	9,802
Glycol process pump	1	24	6,535
Booster pumps	50	1	13,615
Building air handler	15	10	40,844
Building lights		10	5,475
Total for one booster pump station:			285,389
Total for two booster pump stations:			570,778

<u>Wastewater Treatment Facility</u>	Size	Usage	Annual Demand
	(hp)	(hr/day)	(kwh)
Wastewater treatment pumps			
Sludge pumps	5	8	10,892
Hydronic pumps	1	24	6,535
Misc. pumps	5	24	32,675
Glycol plant pump	2	24	13,070
Glycol process pump	1	24	6,535
Building air handler	25	10	68,073
Building lights		10	27,375
Total for one wastewater treatment plant:			165,154

<u>Truck Haul Operations</u>	Size	Usage	Annual Demand
	(hp)	(hr/day)	(kwh)
Truck garage air handler	10	10	27,229
Truck garage lights		10	4,134
Lift station	15	12	49,012
Total for one garage per subdivision:			80,375
Total for all eight subdivisions:			642,999

Estimated Heating Demand

<u>Water Treatment Facility</u>	Usage	Quantity	Rate of heat	Annual Demand
	(hr/day)	sf	loss per unit	(1000 BTU)
Heating Fuel Demand				
Building heat	sf	3000	10	131,400
Total for one water treatment plants:				394,200

**OPERATION AND MAINTENANCE COSTS
FUTURE TRUCK-HAUL WATER AND SEWER SYSTEM WITH BACKBONE FACILITIES**

<u>Booster Pump Station Facility</u>	Unit	Quantity	Rate of heat loss per unit	Annual Demand (1000 BTU)
Water & Sewer mains				
Water Loops	ft	35,000	50	638,750
Sewer Mains	ft	25,000	50	456,250
Building heat	sf	3,000	10	131,400
Water Storage Tank	gallon	500,000	0.3	657,000
Total for one booster pump station w/ water and sewer mains:				1,883,400
Total for two booster pump stations w/ water and sewer mains:				3,766,800

<u>Wastewater Treatment Facility</u>	Unit	Quantity	Rate of heat loss per unit	Annual Demand (1000 BTU)
Heating Fuel Demand				
Building heat	sf	15,000	10	657,000
Total for one wastewater treatment plant and lift stations / force mains:				657,000

<u>Truck Haul Operations</u>	Unit	Quantity	Rate of heat loss per unit	Annual Demand (1000 BTU)
Truck garage heat	sf	2,265	10	8,267
Water storage tank fill line	ft	5,000	50	91,250
Water storage tank	gallon	50,000	0.3	5,475
Sewer force mains	ft	5,000	50	91,250
Total for one garage per subdivision:				196,242
Total for all eight subdivisions:				1,569,940

Estimated Annual Operations and Maintenance Costs

<u>Water Treatment Facility</u>	
Administration	\$48,833
Labor	\$224,640
Minor parts and supplies	\$67,392
Electricity	\$113,191
Heating Fuel	\$10,052
Insurance	\$3,750
Subtotal	\$467,858

<u>Booster Pump Station Facility</u>	
Administration	\$97,666
Labor	\$117,000
Minor parts and supplies	\$35,100
Electricity	\$123,174
Heating Fuel	\$96,053
Insurance	\$3,750
Subtotal	\$472,743

<u>Wastewater Treatment Facility</u>	
Administration	\$48,833
Labor	\$224,640
Minor parts and supplies	\$67,392
Electricity	\$35,640
Heating Fuel	\$16,754
Insurance	\$3,750
Subtotal	\$397,009

<u>Truck Haul Operations</u>	
Administration	\$195,332
Labor	\$1,937,644
Minor parts and supplies	\$581,293
Electricity	\$138,759
Heating Fuel	\$40,033
Truck O&M	\$1,742,266
Insurance	\$3,750
Subtotal	\$4,639,079

**OPERATION AND MAINTENANCE COSTS
FUTURE TRUCK-HAUL WATER AND SEWER SYSTEM WITH BACKBONE FACILITIES**

Combinde Annual Water and Sewer O&M Costs

Administration	\$391,000
Labor	\$2,504,000
Minor parts and supplies	\$751,000
Electricity	\$411,000
Heating Fuel	\$163,000
Truck O&M	\$1,742,000
Insurance	\$15,000

TOTAL ANNUAL O&M COSTS (ALL FACILITIES): **\$5,977,000**

\$229 service per month

Repair and replacement Costs

	Life	Capital Cost	Inflation Rate	Annual Cost
	yr	\$	%	\$
Pumps	10	\$462,000	3	\$62,089
Heat Exchangers	10	\$250,000	3	\$33,598
Boilers	15	\$650,000	3	\$67,512
System Controls	10	\$520,000	3	\$69,884
Trucks	5	\$6,471,584	3	\$1,500,468

TOTAL ANNUAL R&R COSTS: **\$1,734,000**

Reserve

5% of annual O&M costs

TOTAL ANNUAL RESERVE: **\$299,000**

TOTAL ANNUAL OPERATING CASHFLOW: **\$8,010,000**

TOTAL ESTIMATED MONTHLY COSTS PER SERVICE: **\$308**

service per month

Estimate Assumptions:

- 1 This operations and maintenance cost estimate is based on build out of backbone facilities to support truck haul operations and existing piped systems.
- 2 Improvements include:
 - a Three water treatment plants
 - b Two booster pump station facilities w/water storage. Each booster pump station provides piped water and sewer service to a specific area of the city (subdivision) and includes water circulation/pressurization, water storage tank, standby power, fire pump, and sewer glycol heating. In reality two of the booster pump stations are included in the water treatment facilities; however, for this estimate they are treated independently.
 - c Eight truck fill station with water storage tank and truck dump/lift station to support a specific area of the city (subdivision).
 - d One wastewater treatment plant.
- 3 All costs are in 2004 dollars.
- 4 This cost estimate is prepared as part of the Bethel Water and Sewer Master Plan Update - 65% Submittal.

Date Completed: November 29, 2004

Completed By: D. Michael Rabe, PE / CRW Engineering Group, LLC

Water Treatment Facilities	Size	Unit	Quantity	Number Facilities	Unit Cost	Pumps Cost	Ht Exch Cost	Boiler Cost	Control Costs	Truck Costs
<u>Water Treatment Facilities</u>										
Water treatment pumps										
Backwash	30 hp		2	3	\$15,000	\$90,000				
Backwash waste	30 hp		1	3	\$15,000	\$45,000				
Well	40 hp		2	3	\$20,000	\$120,000				
Glycol plant pump	1.5 hp		2	3	\$1,000	\$6,000				
Glycol process pump	0.75 hp		2	3	\$750	\$4,500				
Heat exchanger	BTU		2	3	\$10,000		\$60,000			
Boilers	BTU		2	3	\$50,000			\$300,000		
System Controls	1 ea		1	3	\$50,000				\$150,000	
<u>Booster Pump Station Facilities</u>										
Water main circ pumps										
Loop 1	5 hp		1	2	\$2,500	\$5,000				
Loop 2	5 hp		1	2	\$2,500	\$5,000				
Loop 3	5 hp		1	2	\$2,500	\$5,000				
Water Main pressure pumps										
Loop 1	10 hp		1	2	\$5,000	\$10,000				
Loop 2	10 hp		1	2	\$5,000	\$10,000				
Loop 3	10 hp		1	2	\$5,000	\$10,000				
Water treatment pumps										
Water storage tank circ loop pump	5 hp		1	2	\$2,500	\$5,000				
Sewer glycol circ pumps										
Loop 1	1.5 hp		1	2	\$1,000	\$2,000				
Loop 2	1.5 hp		1	2	\$1,000	\$2,000				
Loop 3	1.5 hp		1	2	\$1,000	\$2,000				
Glycol plant pump	1.5 hp		1	2	\$1,000	\$2,000				
Glycol process pump	0.75 hp		1	2	\$750	\$1,500				
Booster pumps	50 hp		1	2	\$50,000	\$100,000				
Heat exchanger	BTU		2	2	\$10,000		\$40,000	\$300,000		
Boilers	BTU		2	2	\$75,000					
System Controls	1 ea		1	2	\$50,000				\$100,000	
<u>Wastewater Treatment Facilities</u>										
Wastewater treatment pumps										
Sludge pumps	5 hp		2	1	\$2,500	\$5,000				
Hydronic pumps	1 hp		2	1	\$1,000	\$2,000				
Misc. pumps	5 hp		2	1	\$2,500	\$5,000				
Glycol plant pump	2 hp		2	1	\$1,500	\$3,000				
Glycol process pump	1 hp		2	1	\$1,000	\$2,000				
Heat exchanger	BTU		2	1	\$10,000	\$20,000				
Boilers	BTU		2	1	\$75,000		\$150,000	\$50,000		
System Controls	1 ea		1	1	\$50,000					
Lift station pumps	15 hp		2	9	\$15,000				\$270,000	
<u>Truck Haul Operations</u>										
Truck replacement	1 ea		3	8	\$250,000	\$462,000	\$250,000	\$650,000	\$520,000	\$6,471,584
					Total Costs:					\$6,471,584

**OPERATION AND MAINTENANCE COSTS
FUTURE PIPED WATER AND SEWER SYSTEM**

Design Assumptions:

User Data

Current Population (2004)	5921 Estimated
Current number of residential services	1535 Bethel
Current number of commercial services	45 Bethel
Current total number of services	1580 Bethel
Population (2024)	8133 1.6% growth
Future number of residential services	2109 Calculated
Future number of commercial services	62 Calculated
Future total number of services	2170 Calculated

Estimated Demands:

Residential Demand	60 gpcd
Commercial Demand (businesses, schools & government facilities)	5 gpcd
Estimated Total Demand	65 gpcd

System Data - Water Treatment Facility

Piped water system and interim truck haul operations	
Assume 3 water treatment facilities need for city	
Water Treatment Building	3000 sf
Electrical Equipment	
Water treatment pumps	
Backwash	30 hp
Backwash waste	30 hp
Well	40 hp
Glycol plant pump	2 hp
Glycol process pump	1 hp
Building air handler	15 hp
Building lights	0.5 watts/hr/sf
Heating Fuel Demand	
Building heat (Maintained at 70 °F)	10 BTU/hr/sf

System Data - Booster Pump Station Facility

Piped circulating water system and interim truck haul operations	
Assume 10 booster pump station facilities needed	
Booster pump station building	3000 sf
Electrical Equipment	
Water main circ pumps	
Loop 1	5 hp
Loop 2	5 hp
Loop 3	5 hp
Water Main pressure pumps	
Loop 1	10 hp
Loop 2	10 hp
Loop 3	10 hp
Water treatment pumps	
Water storage tank circ loop pump	5 hp
Sewer glycol circ pumps	
Loop 1	1.5 hp
Loop 2	1.5 hp
Loop 3	1.5 hp
Glycol plant pump	1.5 hp
Glycol process pump	1 hp
Booster pumps	50 hp
Building air handler	15 hp
Building lights	0.5 watts/hr/sf

**OPERATION AND MAINTENANCE COSTS
FUTURE PIPED WATER AND SEWER SYSTEM**

Heating Fuel Demand			
Circulating mains	Unit	Quantity	Rate of Heat Loss
Water mains (avg for each subdivision)	ft	40,300	50 BTU/day ft
Sewer mains (avg for each subdivision)	ft	23,100	50 BTU/day ft
Building heat (Maintained at 70 °F)	sf	3,000	10 BTU/hr/sf
Water Storage Tank (Maintained @ 45 °F)	gallon	500,000	0.3 BTU/gal/day

System Data - Wastewater Treatment Facility

Piped water system and interim truck haul operations		
Assume 1 wastewater treatment facilities need for city		
Wastewater Treatment Building		15000 sf
Electrical Equipment		
Wastewater treatment pumps		
Sludge pumps		5 hp
Hydronic pumps		1 hp
Misc. pumps		5 hp
Glycol plant pump		2 hp
Glycol process pump		1 hp
Building air handler		25 hp
Building lights		0.5 watts/hr/sf
Heating Fuel Demand		
Building heat (Maintained at 70 °F)		10 BTU/hr/sf
Lift stations		
Number of lift stations for community		15 hp
Sewer force main		9 ea
		45000 ft

Service Data

Each house has a circ pump, glycol circ pump, grinder pump, HW heater, toilet, sink, tub/shower, and kitchen sink
Home owner to pay for the costs of operating the circ pump, grinder pump, HW heater, and all appliances

Operational Cost Data

Cost per kWh (includes power cost adjustment of \$0.1378)	\$0.22 kWh
Cost per gallon of heating fuel	\$2.55 gal
Administrative cost per service	\$15.00 month
Burdened labor rate for a laborer (includes taxes & benefits)	\$25.00 hr
Burdened labor rate for an operator (includes taxes & benefits)	\$32.00 hr

Other Assumptions

	No. of	No. of	Estimated	
Labor	Employees	Facilities	hr/wk	
Water treatment facilities - operator	1.3	3	45	175.5 hr/wk
Booster pump stations/W&S mains - laborer	1	10	45	450 hr/wk
Wastewater treatment facilities - operator	4	1	45	180 hr/wk
Minor parts and supplies				30 % of labor
Expected Equipment Life				
Pumps				10 yr
Heat exchangers				15 yr
Boilers				15 yr
System controls				15 yr
Inflation Rate				3 %
Available energy per gallon of heating fuel				100,000 BTU/gal
Insurance				\$15,000 yr

**OPERATION AND MAINTENANCE COSTS
FUTURE PIPED WATER AND SEWER SYSTEM**

Estimated Electrical Demand

<u>Water Treatment Facility</u>	Size	Usage	Annual Demand
	(hp)	(hr/day)	(kwh)
Water treatment pumps			
Backwash	30	4	32,675
Backwash waste	30	4	32,675
Well	40	4	43,566
Glycol plant pump	2	24	13,070
Glycol process pump	1	24	6,535
Building air handler	15	10	40,844
Building lights		10	5,475
Total for one water treatment plant:			174,839
Total for three water treatment plants:			524,518

<u>Booster Pump Station Facility</u>	Size	Usage	Annual Demand
	(hp)	(hr/day)	(kwh)
Water main circ pumps			
Loop 1	5	24	32,675
Loop 2	5	24	32,675
Loop 3	5	24	32,675
Water Main pressure pumps			
Loop 1	10	6	16,337
Loop 2	10	6	16,337
Loop 3	10	6	16,337
Water treatment pumps			
Water storage tank circ loop pump	5	24	32,675
Sewer glycol circ pumps			
Loop 1	1.5	24	9,802
Loop 2	1.5	24	9,802
Loop 3	1.5	24	9,802
Glycol plant pump	1.5	24	9,802
Glycol process pump	1	24	6,535
Booster pumps	50	1	13,615
Building air handler	15	10	40,844
Building lights		10	5,475
Total for one booster pump station:			285,389
Total for ten booster pump stations:			2,853,891

<u>Wastewater Treatment Facility</u>	Size	Usage	Annual Demand
	(hp)	(hr/day)	(kwh)
Wastewater treatment pumps			
Sludge pumps	5	8	10,892
Hydronic pumps	1	24	6,535
Misc. pumps	5	24	32,675
Glycol plant pump	2	24	13,070
Glycol process pump	1	24	6,535
Building air handler	25	10	68,073
Building lights		10	27,375
Lift station pump operations	9	15	441,110
Total for one wastewater treatment plant:			165,154

Estimated Heating Demand

<u>Water Treatment Facility</u>	Usage	Quantity	Rate of heat	Annual Demand
	(hr/day)	sf	loss per unit	(1000 BTU)
Heating Fuel Demand				
Building heat	sf	3000	10	131,400
Total for three water treatment plants:				394,200

<u>Booster Pump Station Facility</u>	Unit	Quantity	Rate of heat	Annual Demand
			loss per unit	(1000 BTU)
Water & Sewer mains				
Water Loops	ft	40,300	50	735,475
Sewer Mains	ft	23,100	50	421,575
Building heat	sf	3,000	10	131,400
Water Storage Tank	gallon	500,000	0.3	657,000
Total for one booster pump station w/ water and sewer mains:				1,945,450
Total for ten booster pump stations w/ water and sewer mains:				19,454,500

**OPERATION AND MAINTENANCE COSTS
FUTURE PIPED WATER AND SEWER SYSTEM**

<u>Wastewater Treatment Facility</u>	Unit	Quantity	Rate of heat loss per unit	Annual Demand (1000 BTU)
Heating Fuel Demand				
Building heat	sf	15,000	10	657,000
Sewer force main	ft	45,000	50	821,250
Total for one wastewater treatment plant and lift stations / force mains:				1,478,250

Estimated Annual Operations and Maintenance Costs

Water Treatment Facility

Administration	\$97,666
Labor	\$292,032
Minor parts and supplies	\$87,610
Electricity	\$113,191
Heating Fuel	\$10,052
Insurance	\$3,750
Subtotal	\$604,301

Booster Pump Station Facility

Administration	\$97,666
Labor	\$585,000
Minor parts and supplies	\$175,500
Electricity	\$615,870
Heating Fuel	\$496,090
Insurance	\$3,750
Subtotal	\$1,973,876

Wastewater Treatment Facility

Administration	\$195,332
Labor	\$299,520
Minor parts and supplies	\$89,856
Electricity	\$35,640
Heating Fuel	\$37,695
Insurance	\$7,500
Subtotal	\$665,544

Combinde Annual Water and Sewer O&M Costs

Administration	\$391,000
Labor	\$1,177,000
Minor parts and supplies	\$353,000
Electricity	\$765,000
Heating Fuel	\$544,000
Insurance	\$15,000

TOTAL ANNUAL O&M COSTS (ALL FACILITIES): **\$3,245,000**

\$125 service per month

Repair and replacement Costs

	Life	Capital Cost	Inflation Rate	Annual Cost
	yr	\$	%	\$
Pumps	10	\$1,100,000	3	\$147,831
Heat Exchangers	10	\$410,000	3	\$55,101
Boilers	15	\$1,850,000	3	\$192,149
System Controls	10	\$920,000	3	\$123,640
TOTAL ANNUAL R&R COSTS:				\$519,000

Reserve

5% of annual O&M costs TOTAL ANNUAL RESERVE: **\$162,000**

TOTAL ANNUAL OPERATING CASHFLOW: **\$3,926,000**

TOTAL ESTIMATED MONTHLY COSTS PER SERVICE: **\$151**

service per month

OPERATION AND MAINTENANCE COSTS FUTURE PIPED WATER AND SEWER SYSTEM

Estimate Assumptions:

- 1 This operations and maintenance cost estimate is based on full build out of the selected water and sewer alternatives recommended in the Bethel Water and Sewer Master Plan Update dated
- 2 Improvements include:
 - a Three water treatment plants
 - b Ten booster pump station facilities w/water storage. Each booster pump station provides piped water and sewer service to a specific area of the city (subdivision) and includes water circulation/pressurization, water storage tank, standby power, fire pump, and sewer glycol heating. In reality three of the booster pump stations are included in the water treatment facilities; however, for this estimate they are treated independently.
 - c Water mains and sewer mains to service each subdivision are included with the cost estimate for the booster pump station.
 - d One wastewater treatment plant, and nine lift stations with associated sewer force mains.
- 3 All costs are in 2004 dollars.
- 4 This cost estimate is prepared as part of the Bethel Water and Sewer Master Plan Update - 65% Submittal.

Date Completed: November 29, 2004

Completed By: D. Michael Rabe, PE / CRW Engineering Group, LLC

REPLACEMENT COSTS

Water Treatment Facilities	Size	Unit	Quantity	Number Facilities	Unit Cost	Pumps Cost	Ht Exch Cost	Boiler Cost	Control Costs
<u>Water treatment pumps</u>									
Backwash	30 hp		2	3	\$15,000	\$90,000			
Well	30 hp		1	3	\$15,000	\$45,000			
	40 hp		2	3	\$20,000	\$120,000			
Glycol plant pump	1.5 hp		2	3	\$1,000	\$6,000			
Glycol process pump	0.75 hp		2	3	\$750	\$4,500			
Heat exchanger	BTU		2	3	\$10,000		\$60,000		
Boilers	BTU		2	3	\$50,000			\$300,000	
System Controls	1 ea		1	3	\$50,000				\$150,000
<u>Booster Pump Station Facilities</u>									
<u>Water main circ pumps</u>									
Loop 1	5 hp		1	10	\$2,500	\$25,000			
Loop 2	5 hp		1	10	\$2,500	\$25,000			
Loop 3	5 hp		1	10	\$2,500	\$25,000			
<u>Water Main pressure pumps</u>									
Loop 1	10 hp		1	10	\$5,000	\$50,000			
Loop 2	10 hp		1	10	\$5,000	\$50,000			
Loop 3	10 hp		1	10	\$5,000	\$50,000			
<u>Water treatment pumps</u>									
Water storage tank circ loop pump	5 hp		1	10	\$2,500	\$25,000			
<u>Sewer glycol circ pumps</u>									
Loop 1	1.5 hp		1	10	\$1,000	\$10,000			
Loop 2	1.5 hp		1	10	\$1,000	\$10,000			
Loop 3	1.5 hp		1	10	\$1,000	\$10,000			
Glycol plant pump	0.75 hp		1	10	\$750	\$7,500			
Glycol process pump	50 hp		1	10	\$50,000	\$500,000			
Booster pumps	BTU		2	10	\$10,000		\$200,000		
Heat exchanger	BTU		2	10	\$75,000			\$1,500,000	
Boilers	BTU		2	10	\$75,000				
System Controls	1 ea		1	10	\$50,000				\$500,000
<u>Wastewater Treatment Facilities</u>									
<u>Wastewater treatment pumps</u>									
Sludge pumps	5 hp		2	1	\$2,500	\$5,000			
Hydronic pumps	1 hp		2	1	\$1,000	\$2,000			
Misc. pumps	5 hp		2	1	\$2,500	\$5,000			
Glycol plant pump	2 hp		2	1	\$1,500	\$3,000			
Glycol process pump	1 hp		2	1	\$1,000	\$2,000			
Heat exchanger	BTU		2	1	\$10,000	\$20,000			
Boilers	BTU		2	1	\$75,000		\$150,000		
System Controls	1 ea		1	1	\$50,000			\$50,000	
Lift station pumps	15 hp		2	9	\$15,000				\$270,000
Total Costs:						\$1,100,000	\$410,000	\$1,850,000	\$920,000

BETHEL WATER AND SEWER PROJECT PHASE 1

ESTIMATE OPERATION & MAINTENANCE COST FOR SERVICE SIDE OF SYSTEM

ASSUMPTIONS

Bethel Utilities Electric Service

1 Electric Rate \$0.3713 per KWh (FY2004 without power cost equalization)

Single Unit Grinder Pump

2 Grinder Pump Size 1 Hp (1Hp = 0.7457 KW)
3 Grinder Pump Rate 0.994 KW (includes Hp rating to power input efficiency factor of 0.75)
4 Grinder Pump Operation 0.417 Hours of operation per day
5 Grinder Pump Flow Rate 10 gpm
6 Sewer Flow Rate 250 gpd

Water Circulation Pump

7 Water Pump Size 0.114 Hp (1Hp = 0.7457 KW) (Input power, not rated Hp)
8 Water Pump Rate 0.085 KW
9 Water Pump Operation 24 Hours of operation per day

Glycol Circulation Pump

10 Water Pump Size 0.181 Hp (1Hp = 0.7457 KW) (Input power, not rated Hp)
11 Water Pump Rate 0.135 KW
12 Water Pump Operation 24 Hours of operation per day

ESTIMATED MONTHLY ELECTRICAL COSTS

13 Single Unit Grinder Pump \$4.61 per month
14 Water Circulation Pump \$22.72 per month
15 Glycol Circulation Pump \$36.09 per month

16 Estimated Monthly Cost \$63.43 per month

ESTIMATED MAINTENANCE AND REPLACEMENT COSTS

Stators will need to be replaced on the pumps about every 7 to 10 years at an estimated cost of \$300 per grinder pump unit
If a sewer grinder pump needs to be replaced the estimated replacement cost is \$1500.00 per grinder pump unit.
Water circulation pump will need to be replaced about every 7 to 10 years at an estimated cost of \$100.00.
Glycol circulation pump will need to be replaced about every 7 to 10 years at an estimated cost of \$200.00.

TYPICAL RATE COMPARISON - TRUCK HAUL VS. PIPED SYSTEM

Typical Truck Haul Rate \$260.26 per month (assumes 500 gal water tank filled 2 times per week
and 1000 gal sewer tank emptied 1 per week)
Piped System Rate \$131.51 per month
Electrical Costs \$63.43 per month (assumes average winter temperatures)
Total Estimated Piped System Rate \$194.94 per month in winter

This rate comparison is based on the City's current water and sewer rate schedule.

By: CRW Engineering Group, LLC
29-Oct-04

BETHEL WATER AND SEWER PROJECT PHASE 1

ESTIMATE OPERATION & MAINTENANCE COST FOR SERVICE SIDE OF SYSTEM

ASSUMPTIONS

Bethel Utilities Electric Service

1 Electric Rate \$0.3713 per KWh (FY2004 without power cost equalization)

Single Unit Grinder Pump

2 Grinder Pump Size 1 Hp (1Hp = 0.7457 KW)
3 Grinder Pump Rate 0.994 KW (includes Hp rating to power input efficiency factor of 0.75)
4 Grinder Pump Operation 0.417 Hours of operation per day
5 Grinder Pump Flow Rate 10 gpm
6 Sewer Flow Rate 250 gpd

Water Circulation Pump

7 Water Pump Size 0.114 Hp (1Hp = 0.7457 KW) (Input power, not rated Hp)
8 Water Pump Rate 0.085 KW
9 Water Pump Operation 24 Hours of operation per day

Heat Trace - Service Lines

10 Heat Trace Length 125 Feet (average length of service is 100 ft plus 25 ft inside grinder pump station)
11 Heat Trace Rate 0.005 KW per foot
12 Heat Trace Operation 24 Hours of operation per day (typical winter)

ESTIMATED MONTHLY ELECTRICAL COSTS

13 Single Unit Grinder Pump \$4.61 per month
14 Water Circulation Pump \$22.72 per month
15 Heat Trace - Service Lines (*) \$167.09 per month

* (Note - The heat trace is self limiting - operations depends on various conditions including ambient air temperature, water and wastewater temperature, and water and wastewater volume.)

16 **Average Cost - Winter Months** \$194.42 per month (for 7 months)
17 **Average Cost - Summer Months** \$27.34 per month (for 5 months)

ESTIMATED MAINTENANCE AND REPLACEMENT COSTS

Stators will need to be replaced on the pumps about every 7 to 10 years at an estimated cost of \$300 per grinder pump unit
If a sewer grinder pump needs to be replaced the estimated replacement cost is \$1500.00 per grinder pump unit.
Water circulation pump will need to be replaced about every 7 to 10 years at an estimated cost of \$100.00.
Heat trace will have to be replaced about every 10 to 15 years at an estimated cost of \$15/ft (average cost of \$1,275.00).

TYPICAL RATE COMPARISON - TRUCK HAUL VS. PIPED SYSTEM

Typical Truck Haul Rate \$260.26 per month (assumes 500 gal water tank filled 2 times per week and 1000 gal sewer tank emptied 1 per week)
Piped System Rate \$131.51 per month
Electrical Costs \$124.80 per month (averaged)
Total Estimated Piped System Rate \$256.31 per month (averaged)

This rate comparison is based on the City's current water and sewer rate schedule.

By: CRW Engineering Group, LLC
29-Oct-04

BETHEL WATER AND SEWER PROJECT PHASE 1

ESTIMATE OPERATION & MAINTENANCE COST FOR HOME SIDE OF SYSTEM

ASSUMPTIONS

Bethel Utilities Electric Service

1 Electric Rate \$0.2713 per KWh (FY2004 with partial power cost equalization)

Hot Water Heater

2 Heating Elements 9 KW (2 - 4500 watt elements)
3 Recovery Rate 18 gph (at 90° F rise)
4 Water Heater Operation 3.6 Hours of operation per day
5 Water Usage 260 gpd (assumed family of 4 @ 65 gpcd)
6 Hot Water Usage 65 gpd (25% of water usage)

Washer and Dryer

7 Electric Rate 4.5 KW (combination unit)
8 Usage rate 0.5 Hour per person per day
9 Washer and Dryer Usage 2 Hours per day (assumes family of 4)

ESTIMATED MONTHLY ELECTRICAL COSTS - PIPED SYSTEM

10 Hot Water Heater \$264.52 per month
11 Washer and Dryer \$270.00 per month
Total Estimate Montly Cost: \$534.52 per month

ESTIMATED MONTHLY ELECTRICAL COSTS - TRUCK HAUL SYSTEM

12 Usage Rate Ratio 0.38 (25 gpcd truck haul rate/65 gpcd piped rate)
13 Hot Water Heater \$101.74 per month
14 Washer and Dryer \$103.85 per month
Total Estimate Montly Cost: \$205.58 per month

By: CRW Engineering Group, LLC
29-Oct-04

Appendix O

Bethel Water and Sewer Business Plan
(95% Document)

City of Bethel, Alaska
WATER AND SEWER BUSINESS PLAN
Bethel Water and Sewer Master Plan Update

March 2005

INTRODUCTION

The City of Bethel, Alaska (City) was incorporated in 1957 as a second-class city within an unorganized borough. The City is responsible for administration of the local government including sanitation utilities, which include water, sewer and solid waste services.

In 1996, the City, in conjunction with the State of Alaska, Village Safe Water Program (VSW), completed an update to the City's water and sewer master plan that recommended the existing truck haul water deliver and sewer collection system be replaced with a piped water and sewer system.

In 2002, the City of Bethel, in conjunction with VSW completed a draft update to the City's sanitary sewer lagoon and solid waste master plan. This document recommended that the City should replace the lagoon with a mechanical sanitary sewer treatment plant, replace the existing "Main" sanitary sewer lift station, upgrade the solid waste facility to include better compaction equipment and utilize a solid waste baler.

In 2003, the City in conjunction with VSW retained CRW Engineering Group, LLC (CRW) to assist with the preparation of a Water and Sewer Feasibility Study for the Kasayuli Subdivision. The Kasayuli Subdivision was developed by the Yukon-Kuskokwim Health Corporation and is currently receiving water and sewer service through the City's truck-haul system. This service has severely impacted the City's truck-haul operations because the subdivision is located so far from the existing water treatment plants and sewage lagoon. The goal of the Study was to evaluate and prioritize alternatives to upgrade water and sewer facilities in west Bethel.

In 2004, the City in conjunction with VSW retained CRW to update the City's water and sewer master plan. This business plan is prepared and included with the master plan document. This business plan will address proposed water and sewer improvements for the City. The City of Bethel currently operates two types of water and sewer systems: (1) Two piped systems that serve 406 customers and (2) a truck-haul system that serves 1,174 customers. This Business Plan is based on replacing the existing truck-haul system with a piped water and sewer system with an estimated annual operating budget of \$3,926,000 - a significant savings over the existing truck haul costs.

The City of Bethel has determined that the most effective mechanism to provide for the health and welfare of the community and to manage sanitation utilities is to utilize their current administration to operate, maintain, construct and replace the city's sanitation systems. This Business Plan is the first step towards ensuring the adequate management of the sanitation utilities by the City of Bethel.

PROJECT OVERVIEW

The overall proposed water and sewer improvement projects for the City will be constructed in phases as funding becomes available. Improvements include:

1. Construct a new water treatment facility and water storage tank in west Bethel. The City will ultimately operate a total of three water treatment facilities.
2. Upgrade the existing “backbone” sanitary sewer force main system to accommodate existing and future flows. Project includes upgrading three lift stations and associated force mains. The system improvements will be sized to initially handle truck-haul operations and ultimately to serve piped improvements.
3. Expand the “backbone” sanitary sewer system to outlying service areas. The project includes constructing six new lift stations and associated force mains. The system improvements will be sized to initially handle truck-haul operations and ultimately to serve piped improvements.
4. Construct eight water booster pump stations with water storage tanks to serve outlying service areas. The system improvements will be sized to initially handle truck-haul operations and ultimately to serve piped improvements.
5. Construct above ground piped water and sewer system to replace the existing truck haul system for the entire City.
6. Replace the existing sanitary sewer lagoon with a new wastewater treatment plant.

CURRENT UTILITY MANAGEMENT

The City of Bethel currently bills approximately 1,580 customers for water and sewer services (1,174 hauled and 406 piped). The City currently operates two water treatment facilities that includes a piped water circulation system. The remaining residents obtain water through the City’s truck haul system or self haul. The City operates both a central piped sewage disposal system and a hauled sewage disposal system. Sewage treatment includes a facultative sewage lagoon. A very small fraction of sewage is still generated from “honey buckets”. Currently, residents and commercial facilities pay the following water and sewer fees, which were established on July 1, 2004:

- Truck Haul Water Delivery - \$0.04 per gallon (average)
- Truck Haul Sewer Collection - \$24.00 per evacuation plus \$0.10 per gallon
- Residential Piped Water System - \$86.25 per month
- Residential Pipe Sewer System - \$27.00 per month
- Commercial Piped Water System - \$17.25 per 1000 gallons
- Commercial Pipe Sewer System - \$12.00 per 1000 gallons

The Department of Public Works (DPW) operates and maintains the City's sanitation systems. DPW is directed by the Public Works Director under the direction of the City Manager and is assisted by an Operation Manager. The Finance Director is responsible for directing the financial operational, audit procedures, and accounting practices relating to sanitation operations, billing, accounts receivable, and payables.

FISCAL CONTROLS AND ACCOUNTING PRACTICES

The City Council approves both an operating and capital budget. The City maintains an encumbrance accounting system as the method to maintain budgetary control. Encumbered amounts lapse at year-end.

The City accounts are organized on the basis of fund and account groups, each of which is considered a separate accounting entity. Fund activity consists of assets, liabilities, fund equity, revenues, and expenditures/expenses as appropriate. Resources are accounted for in the individual funds based upon the purposes for which they are intended. The City of Bethel derives an overwhelming majority, seventy-one percent (73%); of its general fund revenues from a 5% sales tax. The Council and Administration has established the following objectives for the General Fund:

- Use conservative revenue projections to promote a stable fund balance of \$1 million or more, not including the Endowment Fund balance.
- Evaluation of General Fund resources and uses of these funds.

The City of Bethel remains in excellent financial position. It continues to enjoy a positive General Fund balance throughout the last decade while achieving significant improvements in infrastructure and service. Capital improvements as well as debt service will be funded using the General Fund balance in the coming budget year. The Sanitation Utilities Fund has not been profitable for the last five years. The shortfall has been funded through the General Fund. To address this shortfall the City Council approved a 25% rate increase on July 1, 2004.

OPERATION OF NEW SANITATION UTILITIES

The City of Bethel will continue to operate the new sanitation facilities under the existing organization structures as depicted in the organization chart located in the following section. The administrative staff; consisting of the City Manager, Public Works Director, and the Operations Manager will oversee the design, construction, operation, maintenance, and management of the system. Their powers and duties shall include (but not be limited to):

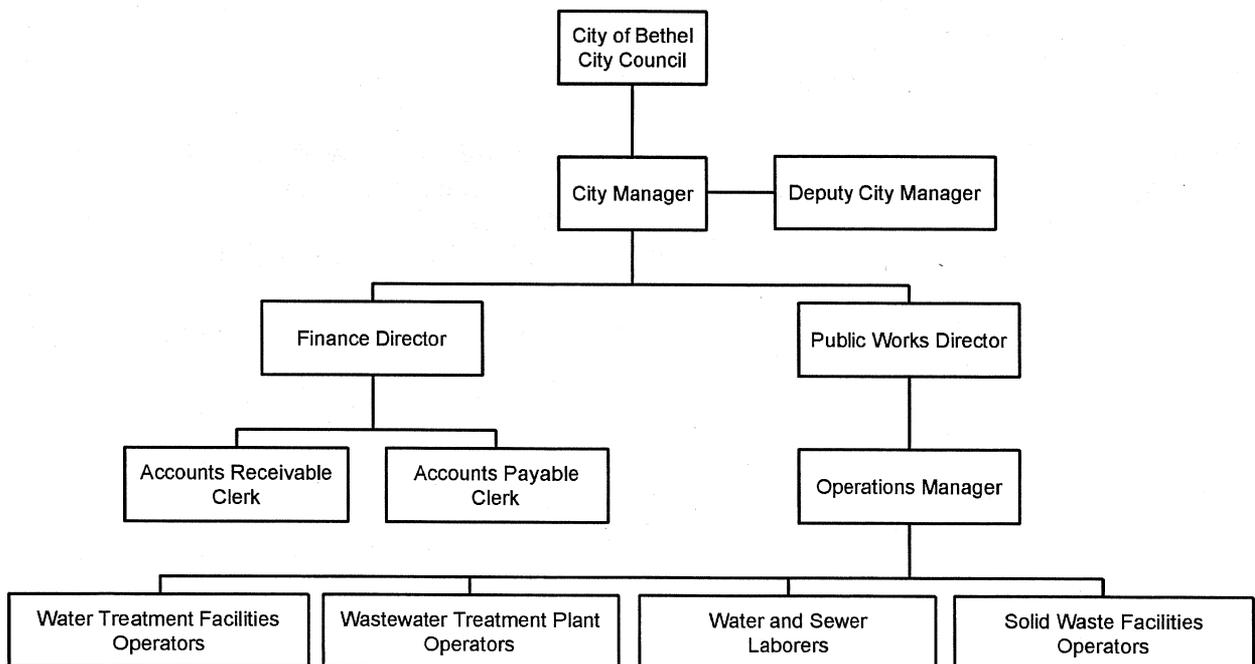
- Appoint, train, hire, promote, layoff, suspend, demote, or remove all employees for the sanitation systems.
- Administer the water and sewer system budgets and capital improvement programs as enacted by the City of Bethel.
- Prepare and submit to the City of Bethel, annual budgets, capital improvement requests, and make recommendations thereon for the efficient and economical operation of the sanitation systems.

- Prepare and submit to the City of Bethel at the end of each fiscal year a report on the finances and administrative activities of the sanitation systems; and prepare and make available for public distribution an annual report on the sanitation system finances.
- Formulate and enforce the general rules and polices pertaining to sanitation system operation practices within the City and generally have full and complete surveillance of all the system and their operation and fiscal affairs, including the maintenance operation, expansion, extension, and improvement of the public utilities.
- Study and make recommendations generally on public utility matters such as, but not limited to; rates, fiscal matters, personnel staffing, labor relations, expansion or extension of services, and public relations.

STAFFING AND TRAINING

Day-to-day management of the new sanitation facilities will be divided between the existing positions of the Public Works Director and the Finance Director. The Public Works Director will manage the water, sewer and solid waste facilities and the Finance Director will manage the finances of the utilities. Because the new systems are more complex than the existing truck haul systems, the City recently created a new position (Operations Manager as depicted in the organization chart) to provide additional sanitation utilities expertise. The Public Works Director, Operations Manager, Finance Director and associated personnel will receive training pertinent to utility management. Advice regarding appropriate training will be sought through the Department of Community and Economic Development, Rural Utility Business Advisor Program, (RUBA). The following organizational chart illustrates the staff relationships of the proposed Sanitation Utilities in Bethel:

Bethel Sanitation Utilities Organization Chart



The positions shown on the chart are not dedicated entirely to the operations of the sanitation utilities. Each of the positions performs other functions for the City of Bethel. A brief description of the duties relating only to the sanitation utilities follows.

City Manager: Responsible for oversight of operations as they relate to the sanitation utilities.

Finance Director: Responsible for directing financial planning and accounting practices relating to sanitation utilities. Oversees budgeting, audit, tax accounting, and activities of the accounts receivable and accounts payable clerks.

Public Works Director: Responsible for oversight and management of the physical sanitation facilities.

Accounts Receivable Clerk: Responsible for proper maintenance of accounts receivable and receipt of cash.

Accounts Payable Clerk: Responsible for proper maintenance of accounts payable, and cash disbursements.

Operations Manager: Responsible for the day-to-day operations and maintenance of the physical sanitation utilities.

Water Treatment Facilities Operators: Responsible for inspecting the water treatment facilities, minor maintenance and repairs, and coordinating major maintenance and repairs.

WasteWater Treatment Plant Operators: Responsible for inspecting the wastewater treatment facility, minor maintenance and repairs, and coordinating major maintenance and repairs.

Water and Sewer Laborers: Responsible for performing labor as necessary to upkeep and maintain the water and sewer pipeline utilities.

Solid Waste Facility Operators: Responsible for operating and maintaining the solid waste facility, minor maintenance and repairs, and coordinating major maintenance and repairs.

FINANCIAL ESTIMATES

The following financial estimates are preliminary in nature and are in year 2004 dollars; however, the assumption is that there are fully functioning piped water and sewer systems in place, serving the entire community with an estimated 2,170 service connections. All estimates and assumptions contained in this report are preliminary and are anticipated to change as the project progresses. Actual revenues and expenses will vary throughout the life of the sanitation utilities and these estimates should not be considered final.

Key Financial Assumptions:

Specific assumptions are included at the bottom of all costs tables presented in this report. Assumptions are also included on the attached Operations and Maintenance Costs spreadsheet.

Estimated Annual Revenue:

The revenue required to support the proposed improvements will be met by using a variety of sources including commercial, residential and other facility user fees and community-generated revenues such as a sales tax. Revenue generated from within the community will fund the annual operations and maintenance costs to operate the system. The revenue requirement will be estimated based on projected annual costs for the preferred system.

Estimated Annual Revenue

Revenue Source	Annual Estimate
Commercial User Fees (56 connections @ \$3,000 year) ^{1,2}	\$168,000
Residential User Fees (1,898 connections @\$151/month) ³	\$3,439,000
General Fund Contribution	\$400,000
	\$4,007,000

(1) 62 commercial connections with 90% rate of collection = 56 connections

(2) Average rate for all commercial users. Includes Lower Kuskokwim School District - \$76,000/year

(3) 2109 residential connections with 90% rate of collection =1,898 connections

Estimated Annual Expenses

There are two cost categories that will be incurred in the ongoing operation and upkeep of the sanitation utilities – Operations and Maintenance (O&M) and Repairs and Replacements (R&R).

Operations and Maintenance

The City of Bethel will incur a number of expenses relating to the O&M of the system. O&M items are defined as expenses that are incurred on a regular basis to sustain the operation of utility assets and the cost of utility administration. The following are operations and maintenance estimates for the proposed sanitation (in a completed state) for the City of Bethel:

Estimated Annual O&M Expenses

Operations & Maintenance Expenses¹	Annual Estimate
Administration	\$391,000
Labor	\$1,177,000
Materials	\$353,000
Electricity	\$765,000
Heating Fuel	\$544,000
Insurance	\$15,000
	\$3,245,000

¹ Estimated using "City of Bethel – Water and Sewer Facility Master Plan Update (65%/2005/CRW)

Repairs and Replacement Move

R&R costs are those expenses defined, as items costing greater than \$5,000 and/or that are not replaced on an annual basis. R&R costs are capital costs (pumps, heat exchangers, boilers, system controls, etc.) that will be depreciated over the useful life of the item rather than expensed in the year incurred.

An estimate has been made of the expected annual R&R costs for major equipment, i.e. pumps, heat exchangers, boilers, and system controls. The details of these calculations (such as expected equipment life, and equipment costs over the life of the project) are shown on the attached Operations and Maintenance Costs spreadsheet. The total amount that should be set aside annually for major equipment R&R costs is \$519,000.

Reserve

An annual reserve based on 5% of O&M costs (\$162,000) has been included. This reserve will allow the utility to build up a reserve account that will be available for working capital to cover unexpected expenses or system improvements.

Cashflow and Profit/Loss Statements

An estimated annual cashflow and profit/loss statement for the City of Bethel’s proposed sanitation facilities are included below.

Annual Estimated Operating Cashflow

The Annual Estimated Operating Income Statement depicts the taxable Net Income, based upon generally accepted utility accounting principles. Expenses on the Income Statement will not, for example, include long-term capital expenditures such as the R&R costs, but rather will include the associated depreciation expense over a multi-year period. It is assumed that the original system costs are not expensed by the Utility given that these costs are contributed capital or grant-funded.

Annual Estimated Operating Cashflow

Cash Sources	
Commercial User Fees	\$168,000
Residential User Fees	\$3,439,000
General Fund Contribution	\$400,000
	<u>\$4,007,000</u>
Cash Uses	
Annual Operations and Maintenance (O&M) Costs	\$3,245,000
Annual Repair and Replacement (R&R) Costs	\$519,000
Annual Reserve Account	\$162,000
	<u>\$3,926,000</u>
Excess (Shortage) of Cash Over Expenditures	\$81,000

Based upon the preliminary estimates for the City of Bethel’s Sanitation Utility, the annual excess of Cash Over Expenditures will be approximately \$81,000.

Annual Estimated Operating Income Statement

The Annual Estimated Operating Income Statement depicts the taxable Net Income, based upon generally accepted utility accounting principles. Expenses on the Income Statement will not, for example, include long-term capital expenditures such as the R&R costs, but rather will include the associated depreciation expense over a multi-year period. It is assumed that the

original system costs are not expensed by the Utility given that these costs are contributed capital or grant-funded.

Annual Estimated Operating Income Statement

Revenue	
Commercial User Fees	\$168,000
Residential User Fees	\$3,439,000
	\$3,607,000
Expenses	
Annual Operations and Maintenance Costs	\$3,245,000
Depreciation ¹	\$681,000
	\$3,926,000
Net Operating Income	(\$319,000)
Net Operating Income	(\$319,000)
Plus: General Fund Contribution	\$400,000
Annual Estimated Cashflow	\$81,000

¹ Depreciation is estimated based solely on R&R and Reserve estimates

Based upon the preliminary estimates for the City of Bethel's Sanitation Utility, the Annual Estimated Cashflow will be approximately \$81,000. The Annual Estimated Cashflow does not include extraordinary expenses such as the future cost of total system replacement. The following discusses future capital replacement.

Future Capital Replacement Costs

Ultimately, the City of Bethel's Sanitation Utility will require major capital replacement. Given a system design life of 30 years, it would be necessary to accumulate sufficient funding to replace the Bethel system at the end of 30 years. The annual portion of such an annuity, or the equivalent annual cycle cost (EACC), is calculated below. For this calculation the design life of the system is set at 30 years and the design life factor (DLF), using an interest rate of 4%, is 0.0578. Therefore, based on an estimated capital cost (CC) for the system of \$250,000,000, the equivalent annual capital cost would be:

$$\begin{aligned}
 \text{EACC} &= \text{CC} \times \text{DLF} \\
 &= (\$250,000,000 \times 0.0578) \\
 &= \mathbf{\$14,450,000} \text{ (per year)}
 \end{aligned}$$

Summary of Total Revenue and Expenses / Rate of Return

Based on the previous discussion of revenues and expenses, and a review of the resulting cashflow and operating income statements, the impact of the future capital replacement costs are significant. The following table is a summary of operating revenue and expenses including an estimate of the total annual amount necessary to replace the City of Bethel's Sanitation Utility in 30 years.

Summary of Total Revenue and Expenses / Rate of Return

Revenue

Commercial User Fees	\$168,000
Residential User Fees	\$3,439,000
Local Contribution	\$400,000
Annualized Capital Replacement Subsidy	<u>\$14,450,000</u>
	\$18,457,000

Expenses / Rate of Return

Annualized Operations and Maintenance Costs	\$3,245,000
Repair and Replacement Fund	\$519,000
Reserve	\$162,000
Rate of Return	\$81,000
Equivalent Annual Replacement Costs	<u>\$14,450,000</u>
	\$18,457,000

**OPERATION AND MAINTENANCE COSTS
FUTURE PIPED WATER AND SEWER SYSTEM**

Design Assumptions:

User Data

Current Population (2004)	5921 Estimated
Current number of residential services	1535 Bethel
Current number of commercial services	45 Bethel
Current total number of services	1580 Bethel
Population (2024)	8133 1.6% growth
Future number of residential services	2109 Calculated
Future number of commercial services	62 Calculated
Future total number of services	2170 Calculated
 Estimated Demands:	
Residential Demand	60 gpcd
Commercial Demand (businesses, schools & government facilities)	5 gpcd
Estimated Total Demand	65 gpcd

System Data - Water Treatment Facility

Piped water system and interim truck haul operations	
Assume 3 water treatment facilities need for city	
Water Treatment Building	3000 sf
Electrical Equipment	
Water treatment pumps	
Backwash	30 hp
Backwash waste	30 hp
Well	40 hp
Glycol plant pump	2 hp
Glycol process pump	1 hp
Building air handler	15 hp
Building lights	0.5 watts/hr/sf
 Heating Fuel Demand	
Building heat (Maintained at 70 °F)	10 BTU/hr/sf

System Data - Booster Pump Station Facility

Piped circulating water system and interim truck haul operations	
Assume 10 booster pump station facilities needed	
Booster pump station building	3000 sf
Electrical Equipment	
Water main circ pumps	
Loop 1	5 hp
Loop 2	5 hp
Loop 3	5 hp
Water Main pressure pumps	
Loop 1	10 hp
Loop 2	10 hp
Loop 3	10 hp
Water treatment pumps	
Water storage tank circ loop pump	5 hp
Sewer glycol circ pumps	
Loop 1	1.5 hp
Loop 2	1.5 hp
Loop 3	1.5 hp
Glycol plant pump	1.5 hp
Glycol process pump	1 hp
Booster pumps	50 hp
Building air handler	15 hp
Building lights	0.5 watts/hr/sf

**OPERATION AND MAINTENANCE COSTS
FUTURE PIPED WATER AND SEWER SYSTEM**

Heating Fuel Demand			
Circulating mains	Unit	Quantity	Rate of Heat Loss
Water mains (avg for each subdivision)	ft	40,300	50 BTU/day ft
Sewer mains (avg for each subdivision)	ft	23,100	50 BTU/day ft
Building heat (Maintained at 70 °F)	sf	3,000	10 BTU/hr/sf
Water Storage Tank (Maintained @ 45 °F)	gallon	500,000	0.3 BTU/gal/day

System Data - Wastewater Treatment Facility

Piped water system and interim truck haul operations		
Assume 1 wastewater treatment facilities need for city		
Wastewater Treatment Building		15000 sf
Electrical Equipment		
Wastewater treatment pumps		
Sludge pumps		5 hp
Hydronic pumps		1 hp
Misc. pumps		5 hp
Glycol plant pump		2 hp
Glycol process pump		1 hp
Building air handler		25 hp
Building lights		0.5 watts/hr/sf
Heating Fuel Demand		
Building heat (Maintained at 70 °F)		10 BTU/hr/sf
Lift stations		15 hp
Number of lift stations for community		9 ea
Sewer force main		45000 ft

Service Data

Each house has a circ pump, glycol circ pump, grinder pump, HW heater, toilet, sink, tub/shower, and kitchen sink
Home owner to pay for the costs of operating the circ pump, grinder pump, HW heater, and all appliances

Operational Cost Data

Cost per kWh (includes power cost adjustment of \$0.1378)	\$0.22 kWh
Cost per gallon of heating fuel	\$2.55 gal
Administrative cost per service	\$15.00 month
Burdened labor rate for a laborer (includes taxes & benefits)	\$25.00 hr
Burdened labor rate for a operator (includes taxes & benefits)	\$32.00 hr

Other Assumptions

	No. of Employees	No. of Facilities	Estimated hr/wk	
Labor				
Water treatment facilities - operator	1.3	3	45	175.5 hr/wk
Booster pump stations/W&S mains - laborer	1	10	45	450 hr/wk
Wastewater treatment facilities - operator	4	1	45	180 hr/wk
Minor parts and supplies				30 % of labor
Expected Equipment Life				
Pumps				10 yr
Heat exchangers				15 yr
Boilers				15 yr
System controls				15 yr
Inflation Rate				3 %
Available energy per gallon of heating fuel				100,000 BTU/gal
Insurance				\$15,000 yr

**OPERATION AND MAINTENANCE COSTS
FUTURE PIPED WATER AND SEWER SYSTEM**

Estimated Electrical Demand

<u>Water Treatment Facility</u>	Size	Usage	Annual Demand
	(hp)	(hr/day)	(kwh)
Water treatment pumps			
Backwash	30	4	32,675
Backwash waste	30	4	32,675
Well	40	4	43,566
Glycol plant pump	2	24	13,070
Glycol process pump	1	24	6,535
Building air handler	15	10	40,844
Building lights		10	5,475
Total for one water treatment plant:			174,839
Total for three water treatment plants:			524,518

<u>Booster Pump Station Facility</u>	Size	Usage	Annual Demand
	(hp)	(hr/day)	(kwh)
Water main circ pumps			
Loop 1	5	24	32,675
Loop 2	5	24	32,675
Loop 3	5	24	32,675
Water Main pressure pumps			
Loop 1	10	6	16,337
Loop 2	10	6	16,337
Loop 3	10	6	16,337
Water treatment pumps			
Water storage tank circ loop pump	5	24	32,675
Sewer glycol circ pumps			
Loop 1	1.5	24	9,802
Loop 2	1.5	24	9,802
Loop 3	1.5	24	9,802
Glycol plant pump	1.5	24	9,802
Glycol process pump	1	24	6,535
Booster pumps	50	1	13,615
Building air handler	15	10	40,844
Building lights		10	5,475
Total for one booster pump station:			285,389
Total for ten booster pump stations:			2,853,891

<u>Wastewater Treatment Facility</u>	Size	Usage	Annual Demand
	(hp)	(hr/day)	(kwh)
Wastewater treatment pumps			
Sludge pumps	5	8	10,892
Hydronic pumps	1	24	6,535
Misc. pumps	5	24	32,675
Glycol plant pump	2	24	13,070
Glycol process pump	1	24	6,535
Building air handler	25	10	68,073
Building lights		10	27,375
Lift station pump operations	9	15	441,110
Total for one wastewater treatment plant:			165,154

Estimated Heating Demand

<u>Water Treatment Facility</u>	Usage	Quantity	Rate of heat	Annual Demand
	(hr/day)	sf	loss per unit	(1000 BTU)
Heating Fuel Demand				
Building heat	sf	3000	10	131,400
Total for three water treatment plants:				394,200

<u>Booster Pump Station Facility</u>	Unit	Quantity	Rate of heat	Annual Demand
			loss per unit	(1000 BTU)
Water & Sewer mains				
Water Loops	ft	40,300	50	735,475
Sewer Mains	ft	23,100	50	421,575
Building heat	sf	3,000	10	131,400
Water Storage Tank	gallon	500,000	0.3	657,000
Total for one booster pump station w/ water and sewer mains:				1,945,450
Total for ten booster pump stations w/ water and sewer mains:				19,454,500

**OPERATION AND MAINTENANCE COSTS
FUTURE PIPED WATER AND SEWER SYSTEM**

<u>Wastewater Treatment Facility</u>	Unit	Quantity	Rate of heat loss per unit	Annual Demand (1000 BTU)
Heating Fuel Demand				
Building heat	sf	15,000	10	657,000
Sewer force main	ft	45,000	50	821,250
Total for one wastewater treatment plant and lift stations / force mains:				1,478,250

Estimated Annual Operations and Maintenance Costs

Water Treatment Facility

Administration	\$97,666
Labor	\$292,032
Minor parts and supplies	\$87,610
Electricity	\$113,191
Heating Fuel	\$10,052
Insurance	\$3,750
Subtotal	\$604,301

Booster Pump Station Facility

Administration	\$97,666
Labor	\$585,000
Minor parts and supplies	\$175,500
Electricity	\$615,870
Heating Fuel	\$496,090
Insurance	\$3,750
Subtotal	\$1,973,876

Wastewater Treatment Facility

Administration	\$195,332
Labor	\$299,520
Minor parts and supplies	\$89,856
Electricity	\$35,640
Heating Fuel	\$37,695
Insurance	\$7,500
Subtotal	\$665,544

Combinde Annual Water and Sewer O&M Costs

Administration	\$391,000
Labor	\$1,177,000
Minor parts and supplies	\$353,000
Electricity	\$765,000
Heating Fuel	\$544,000
Insurance	\$15,000

TOTAL ANNUAL O&M COSTS (ALL FACILITIES): **\$3,245,000**

\$125 service per month

Repair and replacement Costs

	Life	Capital Cost	Inflation Rate	Annual Cost
	yr	\$	%	\$
Pumps	10	\$1,100,000	3	\$147,831
Heat Exchangers	10	\$410,000	3	\$55,101
Boilers	15	\$1,850,000	3	\$192,149
System Controls	10	\$920,000	3	\$123,640
TOTAL ANNUAL R&R COSTS:				\$519,000

Reserve

5% of annual O&M costs TOTAL ANNUAL RESERVE: **\$162,000**

TOTAL ANNUAL OPERATING CASHFLOW: **\$3,926,000**

TOTAL ESTIMATED MONTHLY COSTS PER SERVICE: **\$151** service per month

**OPERATION AND MAINTENANCE COSTS
FUTURE PIPED WATER AND SEWER SYSTEM**

Estimate Assumptions:

- 1 This operations and maintenance cost estimate is based on full build out of the selected water and sewer alternatives recommended in the Bethel Water and Sewer Master Plan Update dated
- 2 Improvements include:
 - a Three water treatment plants
 - b Ten booster pump station facilities w/water storage. Each booster pump station provides piped water and sewer service to a specific area of the city (subdivision) and includes water circulation/pressurization, water storage tank, standby power, fire pump, and sewer glycol heating. In reality three of the booster pump stations are included in the water treatment facilities; however, for this estimate they are treated independently.
 - c Water mains and sewer mains to service each subdivision are included with the cost estimate for the booster pump station.
 - d One wastewater treatment plant, and nine lift stations with associated sewer force mains.
- 3 All costs are in 2005 dollars.
- 4 This cost estimate is prepared as part of the Bethel Water and Sewer Master Plan Update
- 5 Total estimated monthly costs to the consumer is \$214 (added \$63 for circulation pump operations).

Date Completed: March 27, 2005

Completed By: D. Michael Rabe, PE / CRW Engineering Group, LLC

REPLACEMENT COSTS

Water Treatment Facilities	Size	Unit	Quantity	Number Facilities	Unit Cost	Pumps Cost	Ht Exch Cost	Boiler Cost	Control Costs
<u>Water treatment pumps</u>									
Backwash	30 hp		2	3	\$15,000	\$90,000			
Backwash waste	30 hp		1	3	\$15,000	\$45,000			
Well	40 hp		2	3	\$20,000	\$120,000			
Glycol plant pump	1.5 hp		2	3	\$1,000	\$6,000			
Glycol process pump	0.75 hp		2	3	\$750	\$4,500			
Heat exchanger	BTU		2	3	\$10,000		\$60,000		
Boilers	BTU		2	3	\$50,000			\$300,000	
System Controls	1 ea		1	3	\$50,000				\$150,000
<u>Booster Pump Station Facilities</u>									
<u>Water main circ pumps</u>									
Loop 1	5 hp		1	10	\$2,500	\$25,000			
Loop 2	5 hp		1	10	\$2,500	\$25,000			
Loop 3	5 hp		1	10	\$2,500	\$25,000			
<u>Water Main pressure pumps</u>									
Loop 1	10 hp		1	10	\$5,000	\$50,000			
Loop 2	10 hp		1	10	\$5,000	\$50,000			
Loop 3	10 hp		1	10	\$5,000	\$50,000			
<u>Water treatment pumps</u>									
Water storage tank circ loop pump	5 hp		1	10	\$2,500	\$25,000			
<u>Sewer glycol circ pumps</u>									
Loop 1	1.5 hp		1	10	\$1,000	\$10,000			
Loop 2	1.5 hp		1	10	\$1,000	\$10,000			
Loop 3	1.5 hp		1	10	\$1,000	\$10,000			
Glycol plant pump	1.5 hp		1	10	\$1,000	\$10,000			
Glycol process pump	0.75 hp		1	10	\$750	\$7,500			
Booster pumps	50 hp		1	10	\$50,000	\$500,000			
Heat exchanger	BTU		2	10	\$10,000		\$200,000		
Boilers	BTU		2	10	\$75,000			\$1,500,000	
System Controls	1 ea		1	10	\$50,000				\$500,000
<u>Wastewater Treatment Facilities</u>									
<u>Wastewater treatment pumps</u>									
Sludge pumps	5 hp		2	1	\$2,500	\$5,000			
Hydronic pumps	1 hp		2	1	\$1,000	\$2,000			
Misc. pumps	5 hp		2	1	\$2,500	\$5,000			
Glycol plant pump	2 hp		2	1	\$1,500	\$3,000			
Glycol process pump	1 hp		2	1	\$1,000	\$2,000			
Heat exchanger	BTU		2	1	\$10,000	\$20,000	\$150,000		
Boilers	BTU		2	1	\$75,000			\$50,000	
System Controls	1 ea		1	1	\$50,000				\$270,000
Lift station pumps	15 hp		2	9	\$15,000				
Total Costs:						\$1,100,000	\$410,000	\$1,850,000	\$920,000