STATE OF ALASKA
ALASKA CLEAN/DRINKING WATER FUND
GREEN PROJECT ASSESSMENT FORM

As applicable under the EPA annual capitalization grants provided to the Alaska Clean Water Fund (ACWF) and Alaska Drinking Water Fund (ADWF) loan programs, a portion of funds appropriated shall be for projects to address green infrastructure, water or energy efficiency improvements or other environmentally innovative activities." To meet this condition under the federal grant for administering these funds, this assessment form is provided to document this eligibility or what is termed a "Categorical" or "Business Case" justification, which will be reviewed by DEC for provisional compliance. For more information on green infrastructure development, please review the following EPA web site:

http://cfpub.epa.gov/npdes/home.cfm?program_id=298

For those projects requiring a "Business Case," Part 2 will require completion to qualify a "traditional project" as green; justification is broken down into two parts, technical and financial. The technical part should use information from a variety of sources such as maintenance or operation records, engineering studies, project plans or other applicable documentation to identify problems (including any data on water and/or energy inefficiencies) in the existing facility, and that clarifies the technical benefits from the project in water and/or energy efficiency terms. Financial justification needs to show estimated savings to a project based on the technical benefits, and demonstrate that the green component of the project provides a substantial savings and environmental benefit.

For more information and assistance in completing this assessment form, please contact the Municipal Matching Grants & Loans program in Anchorage at 907-269-7673, or in Juneau at 907-465-5300.

GENERAL INFORMATION

Name of Community City of Nome

Address Nome Joint Utility System
PO Box 70 Nome, AK 99762

Contact Name John Handeland Title General Mgr Telephone (907) 443-6587

PROJECT INFORMATION

Project Name Nome Water & Sewer Replacement Ph.II Location Nome, Alaska

Project Type: _____ New Construction __X__ Upgrades

_____ Stormwater Infrastructure _____ Energy Efficiency Project

__X__ Water Efficiency Project _____ Innovative Environmental Project

Green Project Description: Replacement of aging water distribution piping which is experiencing a high rate of failure and leakage, primarily due to thawing and settlement of ice-rich permafrost beneath the pipe. This settlement has caused severe movement and deformation of the pipe, numerous water main breaks and extensive leakage. The water leakage greatly increases thawing of the underlying permafrost, further exacerbating settlement of the water main piping.

PART 1 – GREEN PROJECT CATEGORY & COSTS

Identify the most appropriate "Green" Clean Water or Drinking Water category project type. Note, any selection with (BC) at the end will require a Business Case demonstration.

ENERGY EFFICIENCY – the use of improved technologies and practices to reduce the energy consumption of water quality projects.

_____ Wastewater/water utility energy audits _____ Clean power for public owned facilities

_____ Leak detection equipment _____Retrofits/upgrades to pumps & treatment processes (BC)

_____ Replace/rehabilitation of distribution (BC) _____ Other:_____(BC)

WATER EFFICIENCY – the use of improved technologies and practices to deliver equal or better services with less water.

_____ Water meters _____ Fixture Retrofit _____ Landscape/Irrigation

_____ Graywater or other water recycling __X__ Replace/rehabilitation of distribution (BC)

_____ Leak detection equipment _____ OTHER: _____ (BC)

GREEN INFRASTRUCTURE – Practices that manage and treat stormwater and that maintain and restore natural hydrology by infiltrating, evapotranspiring and capturing and using stormwater.

_____ Green Streets _____ Water harvesting and reuse

_____ Porous pavement, bioretention, trees, green roofs, water gardens, constructed wetlands

_____ Hydromodification for riparian buffers, floodplains, and wetlands

_____ Downspout disconnection to remove stormwater from combined sewers and storm sewers

_____ OTHER: _____ (BC)

ENVIRONMENTALLY INNOVATIVE PROJECTS – Demonstrate new/innovative approaches to managing water resources in a more sustainable way. This may include projects that achieve pollution prevention or pollutant removal with reduced costs and projects that foster adaptation of water protection programs and practices to climate change.

_____ Wetland restoration _____ Decentralized wastewater treatment solutions

_____ Water reuse _____ Green stormwater infrastructure _____ Water balance approaches

_____ Adaptation to climate change _____ Integrated water resource management

_____ OTHER: _____ (BC)

PROJECT & GREEN COMPONENT COSTS

	TOTAL PROJECT COSTS	TOTAL "GREEN" COMPONENT COSTS
Administration	$ 159,200	$ 159,200
Legal	$	$
Preliminary Studies/Reports	$	$
Engineering Design	$ 79,600	$ 79,600
Inspection/Surveying/Construction Management	$ 119,400	$ 119,400
Construction	$ 1,034,800	$ 1,034,800
Equipment	$ 398,000	$ 398,000
Contingencies	$ 199,000	$ 199,000
Other _____	$	$
Total Costs	$ 1,990,000	$ 1,990,000

PART 2 – PROJECT "BUSINESS CASE" TECHNICAL/FINANCIAL ASSESSMENT

TECHNICAL ANALYSIS OF BENEFITS*

In addition to this form, a supporting technical and financial analysis is required to verify energy and water saving efficiencies for any green component of the project. For green infrastructure and innovative environmental type projects, the analysis should include any applicable efficiency and environmental benefits. For assisting MGL in evaluating "Business Case" assessments of water main, meter, and pump facility replacement type projects, the attached form titled "ADWF - Water/Energy Efficiency Determination - Water Main Replacement/Meter/Pump Facility" is required to be completed. Once the form is complete along with any supporting documentation, please submit documentation to the MGL program for review and concurrence. Note, only water/energy efficiencies that achieve a 20% or greater increase in efficiency will categorically qualify as a Green project.

CERTIFICATION STATEMENT:

I certify the above information is current and accurate.

Michael R. Erdman, PE
Name

Project Engineer
Title


Signature

20 May 2013
Date

Submit Completed Form to:

Alaska Department of Environmental Conservation
Municipal Matching Grants & Loans
555 Cordova Street
Anchorage, AK 99501-2617

ADWF - Water/Energy Efficiency Determination
Water Main Replacement/Meter/Pump Facility

General Information

Community/System Name	City of Nome - Nome Joint Utility System
Project Name	Nome Water & Sewer Replacement Project - Phase II
Estimate Total Cost	$1,990,000

Water Main Replacement

1	Percent loss within the distribution system?	30-40%
2	Water main material & C-values of pipe to be replaced?	"Sclaircore" pre-insulated HDPE
3	Water main age?	Approximately 29 years
4	Approximately what pipe length is to be replaced and what percentage of total distribution mains will the project replace?	3,780 Feet, 4% of Total Distribution System (32% of ("East End" Distribution System with Most Serious Leakage)
5	Number of breaks recorded in past twelve months for the area to be replaced? (based on O&M records)	12 (Calendar Year 2011)
6	Estimated water lost due to breaks and leaks	Average 176,000 gallons per day.
7	Primary reason for breaks?	Settlement and movement of water mains due to thawing ice-rich permafrost.
8	How much of an impact on distribution system water loss is this project expected to have?	Since this project will replace 32% of mains within the area with the most serious history of breaks and leakage, overall water loss is estimated to be reduced by 50%.
9	Are there other efficiencies to be gained by the replacement? (i.e. reduced head and therefore less energy loss in an upstream pump station, etc.)	Yes. In addition to breaks and leaks, pipe movement has caused extreme deformation of mains, significantly reducing effective cross-sectional area, which increases friction loss and pumping head.

Meter Installation/Replacement

10	Is meter installation/replacement part of this project?	No
11	Reason for replacement?	N/A
12	If so, estimated cost of meter installation/replacement?	N/A

Pump Facilities

13	Are pumps or pumping facilities part of the project?	No
14	Age of existing pumps or pumping facilities?	N/A
15	Existing pump/motor efficiency rating, if known?	N/A
16	New pump/motor efficiency rating.	N/A
17	List the manufacture, make, and model of key components (motors, pumps, etc.)	N/A
18	Document that the energy efficiency specifications for the proposed equipment demonstrate substantial savings over other currently available equipment	N/A

Information Provided by:

Name and Title of persons providing above information?	Michael R. Erdman, P.E., Project Engineer
Affiliation?	CE2 Engineers, Inc.
Address (both mailing & location if different)?	8221 Dimond Hook Drive Anchorage, AK 99507
Contact Phone Number?	907-349-1010
E-Mail Address	m.erdman@ce2engineers.com

GREEN PROJECT BUSINESS CASE

CITY OF NOME – NOME JOINT UTILITY SYSTEM

WATER & SEWER REPLACEMENT PROJECT – PHASE II

(Supplement to Alaska Drinking Water Fund GREEN PROJECT ASSESSMENT)

Summary

Many of the existing water and sewer mains within the City of Nome were constructed in the 1980's using buried, insulated, "Sclaircore" arctic pipe. The engineering "state of the art" at the time indicated that the use of this pre-insulated piping would minimize heat loss from the pipes, and consequently limit any thawing of the surrounding and underlying ice-rich permafrost.

Unfortunately, time has shown that the permafrost beneath the utility piping has indeed been thawing dramatically. The general trend of warming global temperatures has also contributed to this thawing. The ice-rich permafrost in the project area is extremely "thaw unstable". As the ice lenses thaw, the ground shifts and settles dramatically. As a result the water and sewer pipes have been subject to extreme movement, sometimes settling five feet or more, and numerous breaks have occurred.

The stresses on the piping system as a result of this settling has resulted in separation of pipe fittings and service line connections, failure of water main pipe fuses, splits in the main HDPE pipe. Major breaks and leaks can be detected when water surfaces, but the majority of leaks are undetected and result in a substantial waste of water.

This project will replace existing, failing, "Sclaircore" piping in the East End of Nome where a majority of the pipe failures leaks have occurred. New piping will be a modern arctic pipe with a rigid corrugated aluminum pipe jacket, which is much more resistant to deflection. Piping will be installed within a reinforced trench section, developed by NJUS, which removes thaw-unstable soil from beneath the pipe zone, and replaces it with compacted, reinforced gravel fill. The resulting installation is much more resistant to settling due to thawing permafrost.

Technical Information in Support of Green Project Status

Between 2008 and 2010, total water use increased by 35%, despite a negligible population increase. Repair and replacement of water mains since 2010 has stemmed the increase in usage, but has not yet substantially reduced the water loss due to breaks in the aging and failing water mains.

Water usage in 2012 was still 33% higher than the recorded usage in 2008. The population increased only 5%.

Given that normal system losses of 10-20% were included in the 2008 figures, Estimated that water loss within the distribution system is more than 30%, and possibly 40% or higher.

In addition to the cost impact of the water loss, the large volume of water leaking into the trench zone further contributes to the thawing of the underlying and surrounding permafrost.

The Water & Sewer Replacement Project Phase II (Sclaircore Replacement) will replace piping in an area where the most frequent and serious failures and leaks have been occurring. By targeting the area with the most serious problem, we intend with this project to reduce the overall rate of water loss 50%, to a total of 20% or less.

Financial Information in Support of Green Project Status

The overall cost of water distribution and treatment in 2012 was $767,500, to produce treat and distribute 183,500,000 gallons of water. Therefore, the unit cost was $4.18 per 1,000 gallons.

Based upon the estimated rate of loss, NJUS is spending over $269,000 per year to produce, treat and distribute water which is lost through leaks in the distribution system.

The proposed project will reduce water loss in the system by 88,000 gallons per day, with a cost savings of up to $135,000 annually.

Attachments

- NJUS Water Volume Records, 2008-2012
- Location Map – Documented Leaks

CITY OF NOME - NOME JOINT UTILITY SYSTEM
Water Volume Records (2008 - 2012)

	Water				
	2008	2009	2010	2011	2012
Gallons	138,197,000	165,500,000	189,591,000	182,248,000	183,500,000
Population	3570		3598	3629	3759

			% Change
Increase in Annual Water Usage (2008 to 2010)	51,394,000	Gallons	37%
Population Increase (2008 - 2010)	28		1%

15 McClain Belmont point

1A Prospect Ave Belmont Pt.

50 Belmont

12A Belmont South of Josie Stiles

11A Belmont Upper Prospect

10A Lower Belmont Prospect 2

BERING SEA

LOCATION MAP - DOCUMENTED LEAKS

GRAPHIC SCALE

150 0 75 150 300 600

(IN FEET)

NORTH

LEGEND

- PROJECT AREA
- GRAVITY SEWER
- WATER
- FORCEMAIN
- HYDRANT
- MANHOLE
- CLEANOUT

NOME JOINT UTILITY SYSTEM

a component unit of CITY OF NOME

P.O. Box 70 • Nome, Alaska 99762 • (907) 443-NJUS • Fax (907) 443-6336

Scale: AS SHOWN

Date: JUNE 2011

Drawn: LAP

PROPOSED NOME WATER AND SEWER IMPROVEMENTS "SCLAIRCORE" REPLACEMENT PROJECT

NOME, ALASKA

FIGURE 1