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 PETERSBURG

Address P.O. BOX 329
PETERSBURG AK 99833

Contact Name KARL HAGERMAN Title PUBLIC WORKS DIRECTOR Telephone (907) 772-4430

PROJECT INFORMATION

ACWF # 685221

Project Name PUMPSTATION 5 UPGRADE Location PETERSBURG AK

Project Type: _____ New Construction __X__ Upgrades

_____ Stormwater Infrastructure __X__ Energy Efficiency Project

_____ Water Efficiency Project _____ Innovative Environmental Project

Green Project Description: THIS PROJECT WILL REPLACE THREE, 24 YEAR OLD, 75 HP WASTEWATER PUMPS. THESE PUMPS SERVE PETERSBURG'S LARGEST AND MOST CRITICAL PUMP STATION. WEAR ON WET END PARTS, WHICH ARE NO LONGER READILY AVAILABLE, HAS CAUSED A REDUCTION IN FLOW CAPABILITIES AND WASTED ENERGY. NEW, HIGHER EFFICIENCY PUMPS WILL BE INSTALLED AND WILL BE DRIVEN BY NEW VARIABLE FREQUENCY DRIVES FOR ADDITIONAL PUMPING EFFICIENCIES.

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
_X_ 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
_____ 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	$	$
Legal	$	$
Preliminary Studies/Reports	$	$
Engineering Design	$ 53,000	$
Inspection/Surveying/Construction Management	$ 59,000	$
Construction	$ 486,000	$ 310,000
Equipment	$	$
Contingencies	$ 130,000	$
Other _____	$	$
Total Costs	$ 728,000	$ 310,000

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.

KARL HALVERSON
Name

PUBLIC WORKS DIRECTOR
Title

Karl Halverson
Signature

6/3/12
Date

Submit Completed Form to:

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

Green Project Business Case

City of Petersburg Pumpstation 5 Upgrade Project

Business Case Summary

The City of Petersburg's Pumpstation 5 Upgrade Project is very important to Petersburg's wastewater collection system. Pumpstation 5 is the largest and most critical pumpstation in the Petersburg system. It is the last pumpstation in the system and it lifts all wastewater from the community to the Wastewater Treatment Plant on 14th Street in Petersburg. The station is comprised of a drywell, wetwell and control building. The drywell contains three, 75 horsepower Allis Chalmers vertically mounted wastewater pumps. The wetwell accepts the wastewater from the collection system and is the vessel that the pumpstation uses as its suction source. The control building contains the pump controls and motor drives. Two of the pumps are controlled by variable frequency drive units (vfd's) and a backup pump is operated by way of a "soft start" motor starter. The vfd's are controlled by an ultrasonic level sensor that is suspended above the wastewater in the wetwell.

The pumps were installed in 1988, with occasional impeller replacement when larger solids passing through the pumps caused damage. At this time, the company does not support parts supply for Petersburg's model of pump. For any wet end parts required for repair, the brass or cast iron parts must be cast from older molds with no parts stocked in any warehouse. This method of parts procurement is very expensive to the City. Currently, pump impellers, volutes and wear rings are worn and have resulted in a drop in pumping capacity to the treatment plant. There have been various upgrades to the control system of the station, but the current vfd's are approximately 14 years old and are nearing the end of their life cycle.

The Upgrade project will serve to rehabilitate the drywell interior surfaces so that corrosion and pitting of the steel structure will not be compromised and allow ground water to infiltrate the drywell and damage the pumping system. The bulk of the work will be to replace the existing pumps with Flygt pumps that are not only much more efficient, but are supported by parts suppliers in Alaska. New vfd's will most likely be of Allen Bradley manufacture – although final design and specifications for all equipment has not been completed.

Technical Information and Support of Green Project Status

The technical information in support of the green project principles is fairly simple in this project.

Included in this packet are pump curves for both the original pumps and the proposed new pumps. In reading the pump curve information, we find that with a head of 104 feet and a flow of 1900 gpm, the pumps were rated at 80% pump efficiency. The pumps have not been capable of providing 1900 gpm for many years due to pump wear. This has created a situation in which the pumps have had to work harder and longer to pump the same amount of wastewater as they could when new. This is wasted energy.

The proposed replacement pumps, Flygt model NT 3301 HT are rated to provide up to 85 horsepower to the pump end. In reviewing the pump curve and technical information provided for this model, we see that the pumps are rated at 92.5% pumping efficiency at 100% load and up to 94% efficient at 50% load. This is a gain of up to 12.5% in efficiency at full load and higher at 50% load – from when the original pumps were new and in perfect working order. They are additionally rated to provide the original pumpstation design flow per pump of 1900 gpm at approximately 100 feet of head.

Financial Information in Support of Green Project Status

Unfortunately, the power supply to Pumpstation 5 is not separately metered from the power distribution system. The critical nature of the station resulted in the City supplying the station's power from the wastewater treatment plant in order to take advantage of the 250kW standby generator and transfer switch to power both the plant and the station in the event of an outage. This situation makes it very difficult to quantify the financial benefits of upgrading the pumps to more efficient models as there are no electrical use records for the Pumpstation 5 to base calculations from. In lieu of better information, the City has provided some justification statements and calculations on electrical savings based upon known flow capacities of the old pumps, rated flow capacity of the new pumps and the known and rated amperages of the pumps respectively.

It is believed that the basic assumptions of cost savings due to large improvements in pump efficiency as the result of this project will be sufficient to justify the "green" nature of this project. When a pump is laboring at less than 80% efficiency to move a certain volume of wastewater it is not difficult to see that a pump rated at 92.5 – 94% efficiency will work at least 10% less to achieve the same amount of work over time. This reduction in work directly equates to fewer kilowatt hours over the course of daily energy use and adds up to substantial savings annually.

Additionally, the restoration of original flow characteristics of the pump station will also save electrical costs. The following calculations are presented to illustrate this.

Given values:
Daily flow = 350,000 gallons

Old pump: amperage = 92A (measured)
kW load = 44kW (calculated)
max flow = 1700 gpm (measured at treatment plant flow meter)

New pump: amperage = 89A (rated)
kW load = 42kW (calculated)
max flow = 1900 gpm (rated)

Old pump electrical use per day

350,000 gal/1700 gpm/60 minutes per hour = 3.43 hours of operation of the pump.

3.43 hours x 44kW = 150 kWh per day

New pump electrical use per day

350,000gal/1900 gpm/ 60 minutes per day = 3.07 hours of operation of the pump.

3.07 hours x 42kW = 128 kWh per day

This results in a reduction of 22 kWh per day and a 14.7% savings in electrical costs.

Completed by: Karl Hagerman, Public Works Director

Attachments

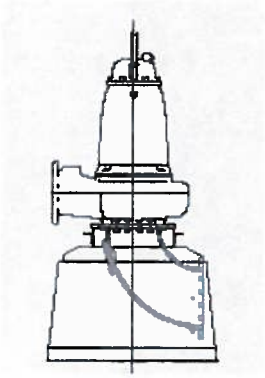
Pump Curves: 1988 Allis Chalmers NSW Vertical Non-clog Pump.

2012 Flygt NT 3301 HT Pump.

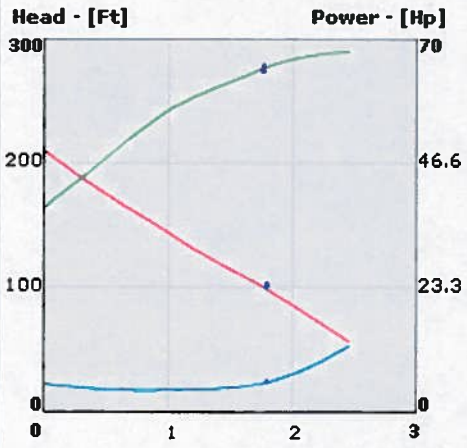
FLYGT

PRODUCT: NT 3301 HT

Product picture



Curves Enlarge



Pump Data

Curve id: 63-466-00-0150 Impeller: 466 Poles: 4 - pole Motor: 35-25-4AA Frequency: 60 Hz

Motor Data

Rated output power Hp (kW)	Ø	Nominal voltage (V)	Full load current (A)	Locked rotor current (A)	Locked rotor kVA	Locked rotor code letter kVA/Hp	Poles/rpm
85 (63)	3	460	101	430	342	D	4/1775

Pump motor Hp	Efficiency			Power factor		
	100% load	75% load	50% load	100% load	75% load	50% load
85	92.5	93.5	94	0.85	0.83	0.76

Cable Data

HP	Cables	Volts	Max. length (Ft)	Cable size/Nominal OD.	Conductors (In one cable)	Type	Part number
85	1	460	490	#1/3-2-1-GC 1.64"-(41.7mm)	(3) 1 AWG (PWR) (2) 10 AWG (CTRL) (1) 4 AWG (GND) (1) 8 AWG (GC)	STD	942111

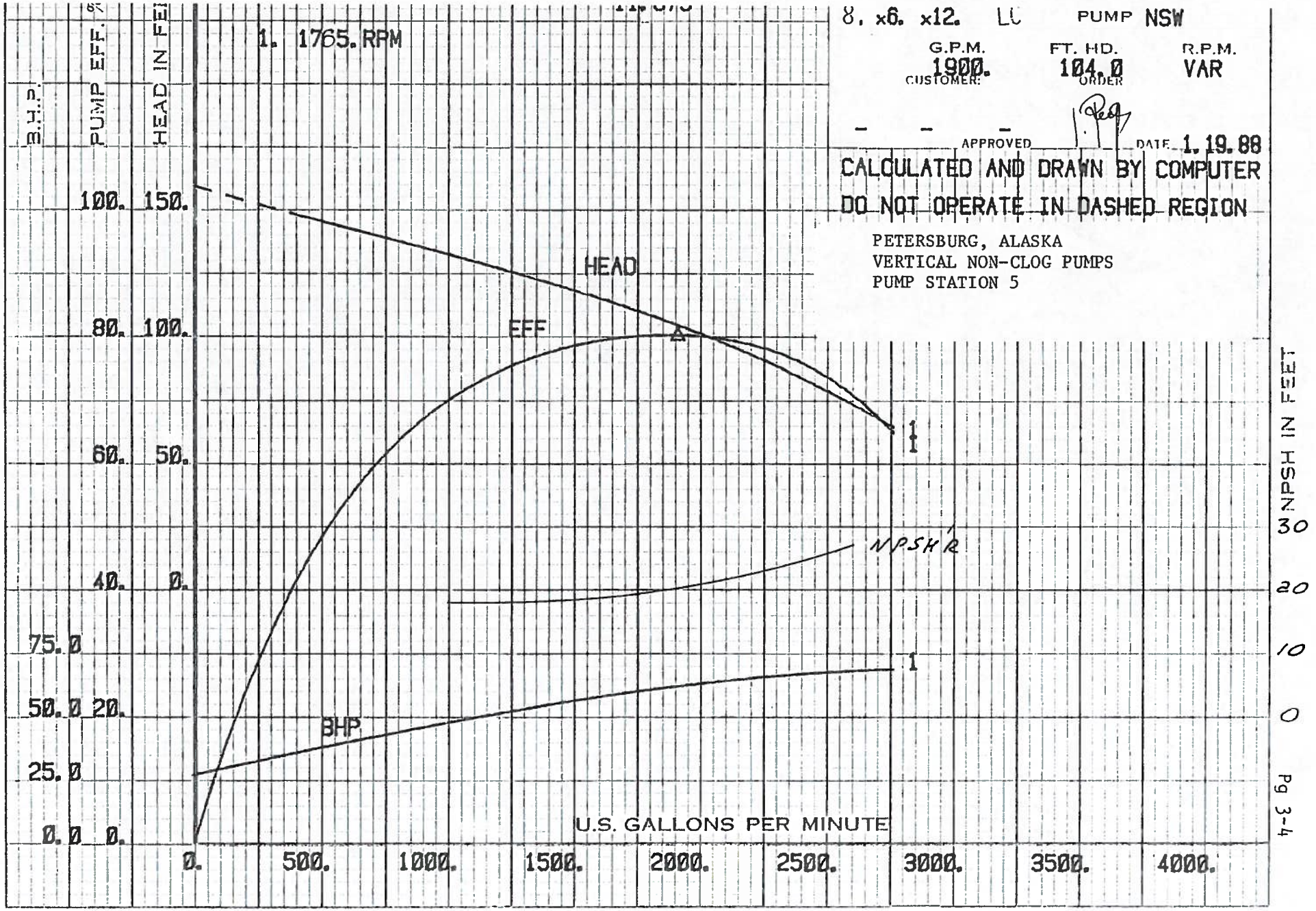
Available Outlet and Inlet Sizes

Outlet Drilled Flange	6"
Inlet Drilled Flange	10"

Warm Liquid Data

Rtd. Amb. Temp.	Rtd. Curr.(1)	Rtd. Curr.(2)	De-rated Shaft Power
70° C / 158° F	89 A	NaN A	74.4 Hp

Engineered for life


8. x6. x12. LC
PUMP NSW
G.P.M. 1900.
FT. HD. 104.0
R.P.M. VAR
CUSTOMER:
ORDER
APPROVED
DATE 1.19.88
CALCULATED AND DRAWN BY COMPUTER
DO NOT OPERATE IN DASHED REGION
PETERSBURG, ALASKA
VERTICAL NON-CLOG PUMPS
PUMP STATION 5
1. 1765. RPM
B.H.P.
PUMP EFF. %
HEAD IN FEET
100. 150.
80. 100.
60. 50.
40. 0.
75.0
50.0 20.
25.0
0.0 0.
HEAD
EFF
NPSHR
BHP
U.S. GALLONS PER MINUTE
0. 500. 1000. 1500. 2000. 2500. 3000. 3500. 4000.
NPSH IN FEET
30
20
10
0
Pg 3-4
CURVES SHOW APPROXIMATELY THE CHARACTERISTICS AT THE INDICATED SPEED WHEN PUMPING
WITH SPECIFIC GRAVITY OF
NO GUARANTEE IS MADE EXCEPT FOR RATED POINT.