

# Gary Paxton Industrial Park

Raw Water Infrastructure Discussion

Sitka's Fresh Water Assets

March 21<sup>st</sup>, 2019

# Sitka's Fresh Water Assets for Bulk Export and Public Industrial Use

- ◎ The City and Borough of holds water rights from the State of Alaska via [Certificate of Appropriation ADL 43826](#) and [Certificate of Appropriation LAS 19669.](#)
- ◎ These certificates of appropriation are an asset attached to the Industrial Park as ownership of the former APC mill property transferred to the City and Borough of Sitka.

# History on CBS Water Rights

- Since the Industrial Park Board was established in 2000, by Ordinance 00-1568, the Board has been directly involved in negotiations related to the lease or sales of all assets of the Industrial Park, including the raw water assets attached to State of Alaska water appropriations certificates ADL 43826 and LAW 19669.
- Prior to 2000, the City and Borough of Sitka had a contract with Global H<sub>2</sub>O Resources for the purchase and export of bulk water from the Blue Lake reservoir. Negotiations for this first bulk water export contract were previously handled by CBS staff and approved by the Assembly.
- Past CBS Assembly and Administration has directed the Park Board to market and negotiate water contracts in the past, although nothing is codified.

# The Bulk Export Resource

Sitka has 29,235 Acre feet/year (Af/yr) of water available for export annually. Based on USGS records, the average inflow into Blue Lake is 319,998 Af/yr. The bulk water export allocation is roughly 9% of the total inflow of water into Blue Lake.

- 1 Acre-foot (Af) = 325,851 US gallons.
- 1 Metric Tonne (t wt) = 264.17 gallons

Sitka's water rights are granted by the State with the following certificates. The State's certificates are granted on a "use them or lose them" basis. The CBS demonstrates use by referencing its contract with various entities wishing to export water.

State of Alaska Certificate	Metric Tonne	Acre Feet	Annual Gallons
#LAS 19669	17,268,857	14,000	4,561,914,000
#ADL 43826	18,792,217	15,235	4,964,339,985
<hr/> TOTAL Permitted	<hr/> 36,061,074	<hr/> 29,235	<hr/> 9,526,253,985

# Revenue Potential for Bulk Export

Sitka Current sales price for bulk export is  
\$0.01/US gallon

9,526,253,985 Gallons available for export  
annually

$9,526,253,985 \times \$0.01 = \$95,269,985$   
Annually

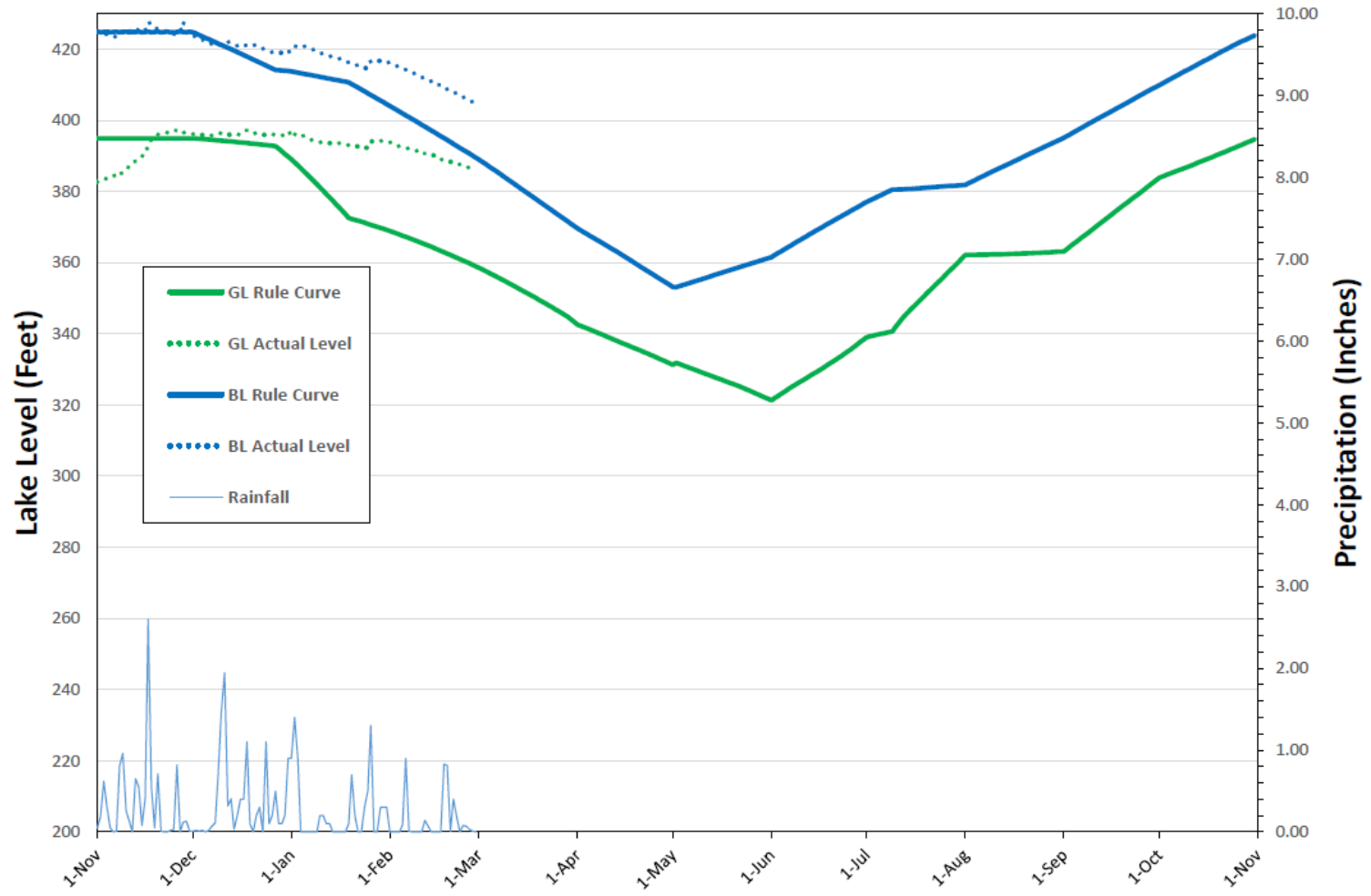
# The Public Industrial Water Resource

Sitka has 19,492 Acre feet/year (Af/yr) of water available for Public Industrial Use. Based on USGS records, the average inflow into Blue Lake is 319,998 Af/yr. The Public Industrial water allocation is roughly 6% of the total inflow of water into Blue Lake.

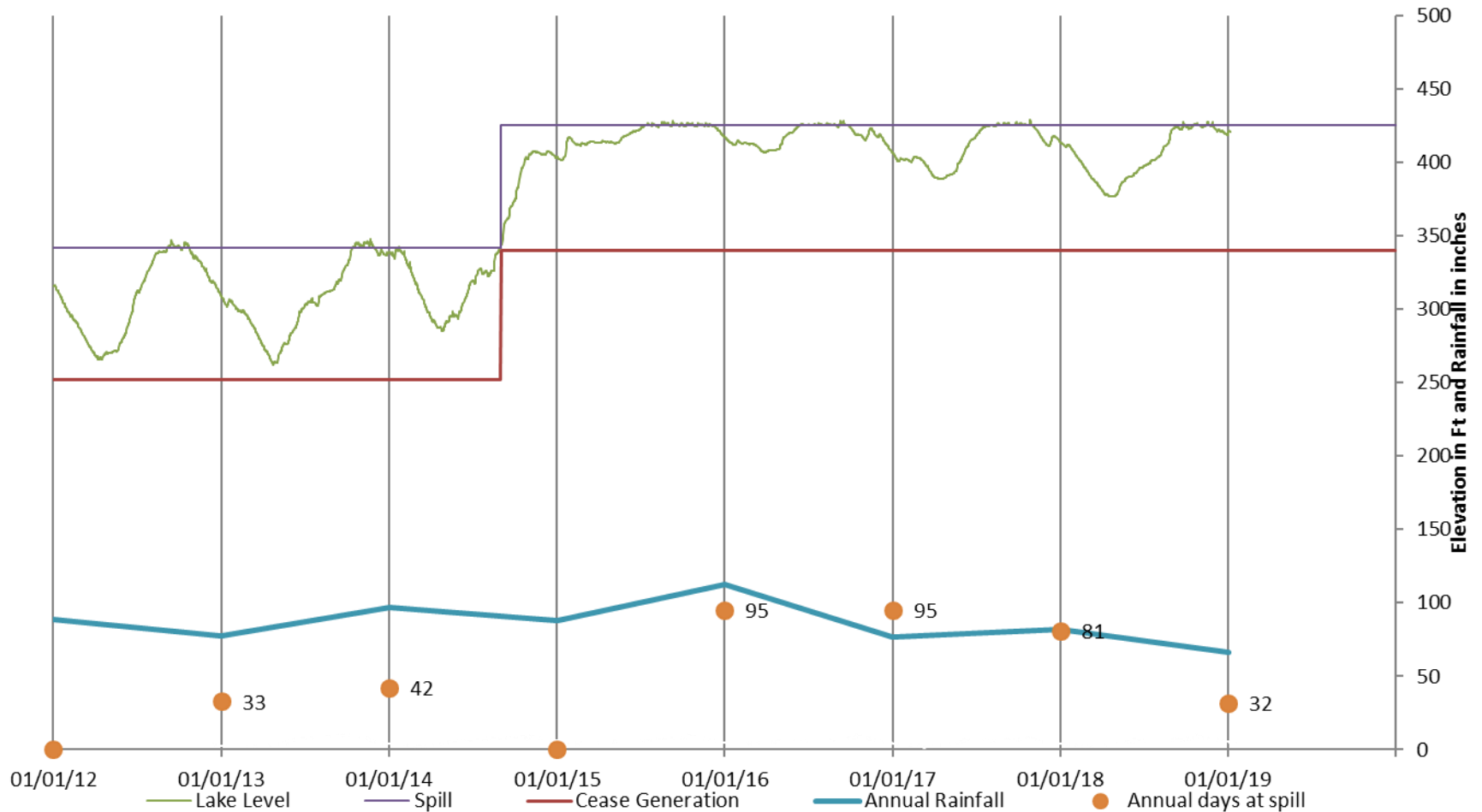
State of Alaska Certificate	Metric Tonne	Acre Feet	Annual Gallons
#ADL 43826	24,043,183	19,492	6,351,487,692

*\* NSRAA current contract allows for use of 6.4 Million Gallons per Day (7,169 Af/yr) of Public Industrial Water. This represents 2% of inflow. Expansion would be 3% of total.*

## Sitka Blue Lake and Green Lake versus Rule Curves Water Year 2019



# Blue Lake water availability data





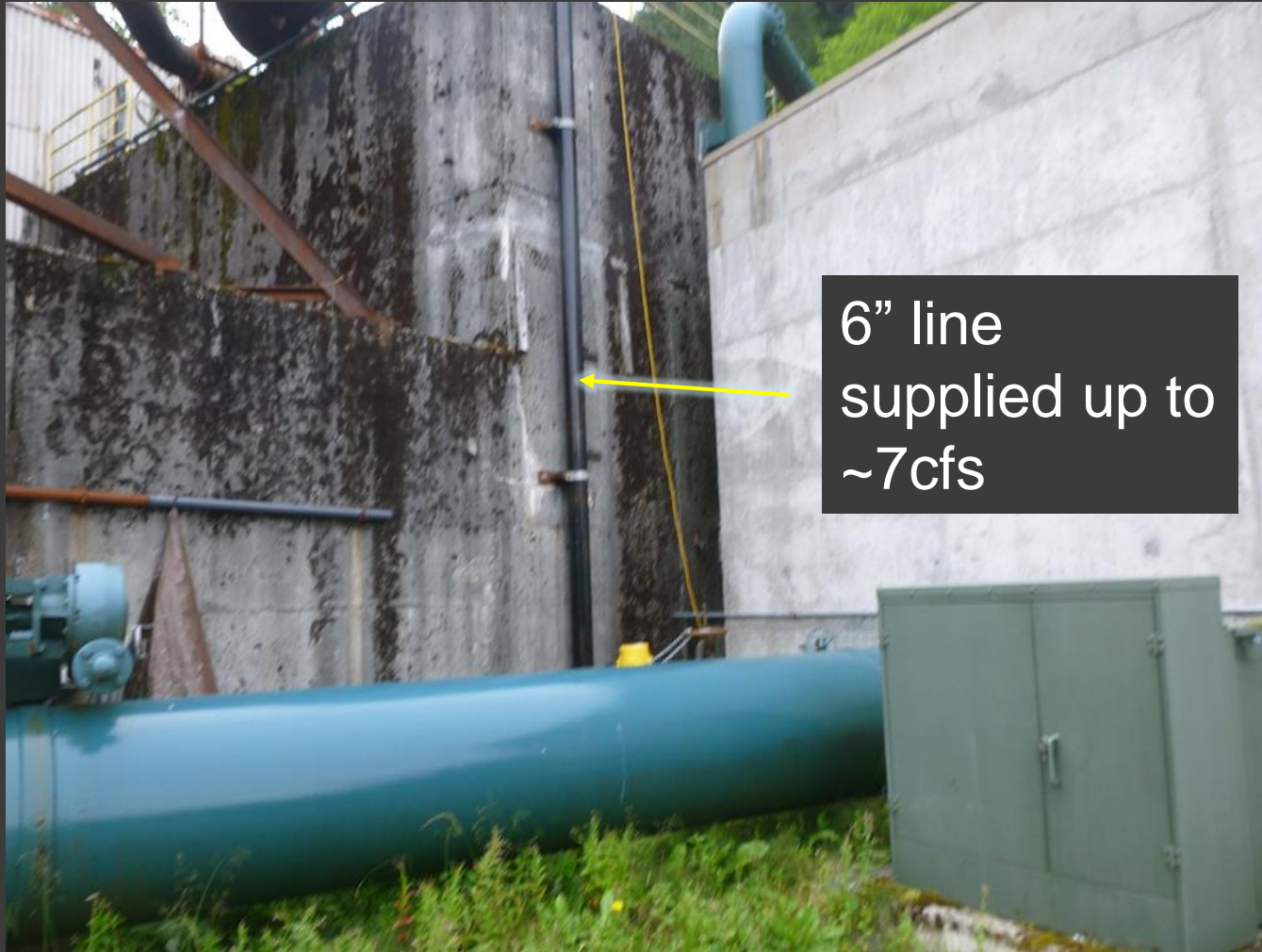
# Pre - Blue Lake Dam Expansion – High Pressure Hydro Raw Water Infrastructure



# Pre - Blue Lake Dam Expansion – High Pressure Hydro Raw Water Infrastructure



# Pre-Blue Lake Expansion non-turbine high pressure supply



6" line  
supplied up to  
~7cfs



# 2015 Modification to High Pressure Pipeline

CITY AND BOROUGH OF SITKA  
 Department of Electric  
 CONTRACT CHANGE ORDER

Date: 9-Nov-15  
 CBS Project: 90594

*Blue Lake Hyroelectric Expansion*  
*McMillen Jacobs Associates*

Change Order No: 3

The Following changes to the Contract Documents are issued:

Description	Change In Contract Price
<p>3.1 Additional scope to the contracted Scope of Work. See attached McMillen proposal for design engineering services dated October 23, 2015 for detailed backup.</p> <p>Task 1: Project Design Coordination/Management                      Task 2: New Piping &amp; Valve System Design (Contract Docs Prep)                      Task 3: Engineering Support Services During Construction</p> <p>The work to be completed on a time and materials basis for a not to exceed amount of \$47,757.00</p> <p><u>Reason for Change</u>                      To modify the existing 36" isolation butterfly valve actuators and deliver a maximum 7 cfs to the NSRAA facility.</p>	<p>9,416.00                      27,325.00                      11,016.00</p>
<p>3.2 Additional scope to the contracted Scope of Work. The work to be completed on a time and materials basis for a not to exceed amount of \$371,282.00</p> <p><u>Reason for Change</u>                      To provide additional support for on-site field construction, additional work items and design of reduction measurements.</p>	<p>371,282.00</p>
<p>3.3 Increase substantial completion from May 31, 2015 to June 1, 2016</p>	
<p><b>Total Change In Contract Price: \$ 419,039.00</b></p>	

**Replacement of Existing 36" 1959 Butterfly Valve at Tee.** The existing 36" butterfly valve located just above the 36" tee was installed in 1959 and has a small 6-inch diameter manual handwheel with an electric actuator that is reported by CBS not to work (likely due to over-torque during closure). This valve serves as a redundant backup to the lower 36" butterfly isolation valve located down at the main penstock pipeline. The staff reports that the valve is difficult to close by hand and can take 15 minutes with the undersized handwheel. The newer 1992 36" butterfly valve removed from the PMFU powerhouse appears to be the same AWWA valve with same laying length and same bolt hole pattern. Given its newer age and better condition, CBS has requested that McMillen design in for this valve to replace the existing 1959 valve and that a new handwheel and/or square nut drive be designed for its existing gear box – such that manual closure of this valve may be much easier for CBS staff.

**Inspection of Existing 36" Buried Steel Pipeline.** The existing buried steel pipeline is of 7/16" shell thickness, which is far more than adequate to resist the 150 psig anticipated maximum static pressures that the pipeline would experience when Blue Lake is at crest elevation of 425 ft. A new steel pipe installed in this type of application would likely have a wall thickness between 4/16" and 5/16", assuming a typical steel yield stress of 36 ksi. Thus the existing pipe would appear to have at least 1/8" of sacrificial steel thickness in its wall.

Nonetheless, given the age of the pipe, we do recommend that CBS at least consider trying to make some precursory investigations of the state of this pipe, and specifically its interior liner or surface oxide corrosion condition, and the condition of the exterior coating. The exterior coating might best be inspected by perhaps digging up and exposing at least two different small sections of the pipe exterior for a visual inspection. The interior liner might be inspected by accessing the top of the 36" pipe just below the existing 36" tee.

# Post - Blue Lake Dam Expansion – High Pressure Raw Water Infrastructure





# Post – Blue Lake Dam Expansion – High Pressure Raw Water Infrastructure



Hatchery primary supply not operated post dam raise



New infrastructure never operated due to concerns with older valve/pipe



August 16, 2016

Mr. Bryan Bertacchi, Electric Utility Director (907) 747-1870  
Mr. Andy Eggen, Electric Gen. System Mgr. (907) 747-1886  
City and Borough of Sitka  
Electric Department  
131 Jarvis Street  
Sitka, Alaska 99835

Subject: **City and Borough of Sitka, AK  
Blue Lake Project**

Amendment to Proposal for Design Engineering Services for

**Blue Lake – Bulk Water Supply System Piping Modifications – Phase II**  
(Safety Modifications to Existing 36” Isolation Butterfly Valve Actuators -  
and Delivery of new Maximum 7 cfs flow to NSRAA Facility)

Dear Mr. Bertacchi and Mr. Eggen:

McMillen Jacobs Associates is pleased to have completed the development of all of the system Record Drawing piping system schematics as well as preparation of the new Contract Documents for valve and actuator upgrades to the existing Blue Lake water distribution system, as discussed in our original proposal to the City and Borough of Sitka (CBS), dated October 23, 2015. We have



# Post - Blue Lake Dam Expansion – High Pressure Raw Water Infrastructure



Valve not rated to new pressures. Controls inoperable. Not replaced during dam raise.



# Post - Blue Lake Dam Expansion – High Pressure Raw Water Infrastructure



All infrastructure funded by NSRAA. Was intended to be hatchery back-up to CBS supply



# Post Blue Lake Expansion afterbay pump supply



Only 2 of the originally 4 designed pumps were installed. Was to be a secondary drinking water source for water dept.

Can supply up to 9cfs of the total 26.9cfs Industrial Water allocation to the park.

# Post Blue Lake Expansion afterbay pump supply



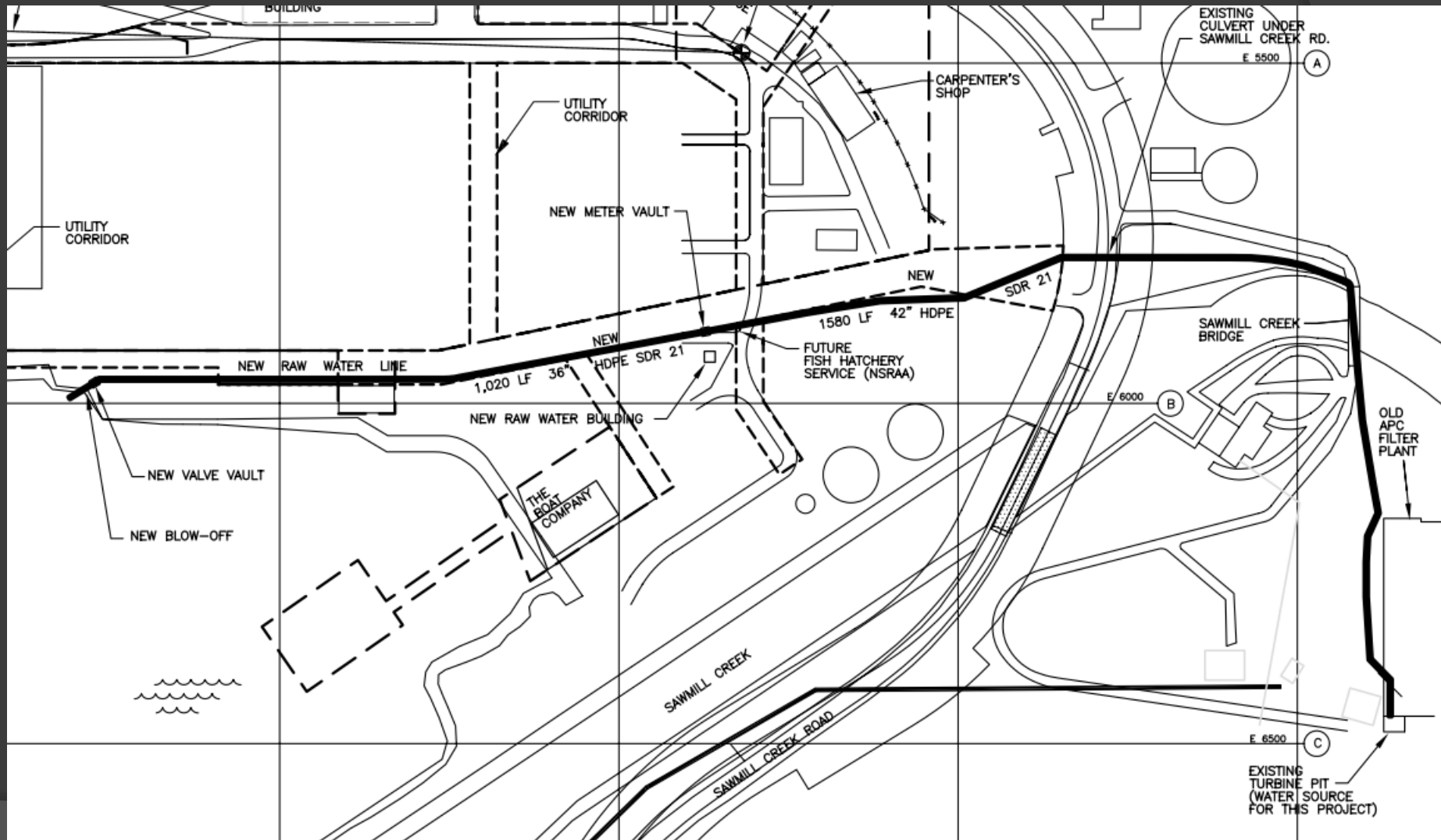
Pumped supply ties into 42" Raw Water line. Other concerns with pumped supply is not available when Blue Lake turbines offline, power out and potential saltwater intrusion on higher tides.





# Low Pressure Pipeline

Installed 2007 - ~\$1.5 million project



# Low Pressure Raw Water Infrastructure – 42” Pipeline





# Low Pressure Raw Water Infrastructure – 42” Pipeline





# Low Pressure Raw Water Infrastructure – 42” Pipeline and Meter Shack



# Bulk Water Pipeline Terminus and Privately Owned Floating Pipeline (Disassembled)





# Future Low Volume Water Delivery Location



# Recent Low Volume Water Customer



<https://raincanevodka.com/>

Pure Alaskan water, it's what truly sets us apart from all other beverages, not just vodkas. Our water is from a natural reservoir nestled on an island in Alaska's Alexander Archipelago and has been described by **National Geographic** as, "**...a distinctive cobalt jewel...fed by abundant rain, snow and glacial runoff**".

# Public Industrial Water users

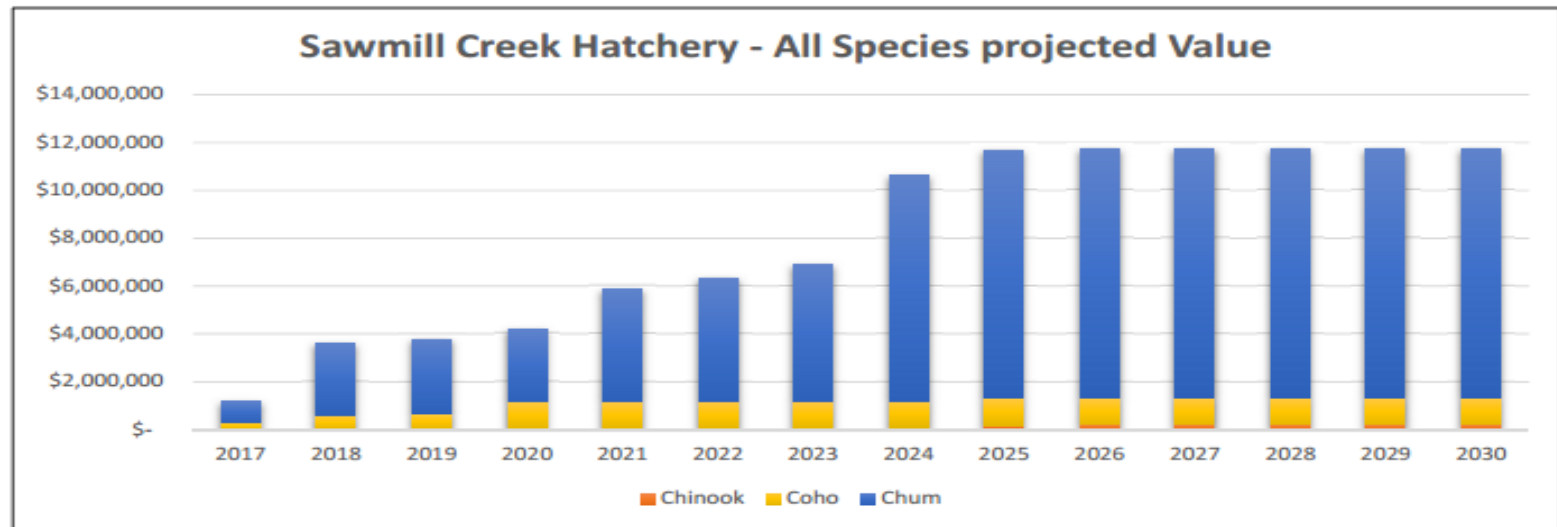
- NSRAA
- Silver Bay Seafoods-fire sprinkler system
- CBS water dept-fireline
- True Alaska Bottling-inactive, line in place



# NSRAA – Largest Public Industrial Water User



# Public Industrial Water Benefits to Community NSRAA – Current and Expansion Estimated Value



# OTHER REVENUES – BULK WATER

## Bulk Water Contracts

- ◎ 2009 – \$100,000
- ◎ 2010 – \$100,000
- ◎ 2011 – \$75,000
- ◎ 2012 – \$75,000
- ◎ 2013 – \$1,000,000
- ◎ 2015 – \$15,000
- ◎ 2017 – \$1,250
- ◎ 2018 – 16,500

**Total \$1,382,750**





# Bulk Water Export

The sale and shipment of bulk water has been “pending” for over a decade due to:

- High transportation costs
- Low cost of desalination
- Lack of infrastructure at receiving ports
- Speculative nature of the market



## Action Items:

- Develop infrastructure for delivery of bulk water to a ship (deep water dock, floating dock...)
- Continue to research worldwide market and water issues

# Recommended GPIIP and Assembly Actions/motion

- To be determined