Alberni-Clayoquot Regional District

BAMFIELD WATER COMMITTEE MEETING
MONDAY, OCTOBER 3, 2016, 5:00 PM

Bamfield Volunteer Fire Department Hall, 352 Pachena Road, Bamfield, BC

AGENDA

PAGE #

1. CALL TO ORDER

Recognition of Traditional Territories.

2. APPROVAL OF AGENDA

(motion to approve, including late items requires 2/3 majority vote)

3. ADOPTION OF MINUTES

a. **Bamfield Water Committee Meeting held August 16, 2016** **3-5**

THAT the minutes of the Bamfield Water Committee meeting held on August 16, 2016 be received.

4. REQUEST FOR DECISIONS & BYLAWS

a. **ADMINISTRATIVE MEMORANDUM** **6-16**
Question and Answer Information for Assent Approval Process (Referendum)

THAT the Bamfield Water Committee receives this memo.

b. **REQUEST FOR DECISION** **17-18**
Completion of Preliminary Design of Base Plan & Develop Site Layout

THAT the Bamfield Water Committee support the expenditure of the engineering fees for Koers and Associates to enable them to proceed with the Base Plan & Develop Site Layout for the estimated cost $18,365 for Phase 1 & 2 of the Water Treatment Plant fee schedule.

c. **REQUEST FOR DECISION** **19-21**
Ultra Violet Treatment – Bamfield Water System

THAT the Bamfield Water Committee support the inclusion of Ultra Violet Treatment as a component of the Dissolved Air Floatation Water Treatment Plant project as designed in the Request for Proposals.

5. LATE BUSINESS
(requires 2/3 majority vote)

6. ADJOURN

Alberni-Clayoquot Regional District

MINUTES OF THE BAMFIELD WATER COMMITTEE
MEETING HELD ON TUESDAY, AUGUST 16, 2016, 5:00 PM

Regional District Board Room, 3008 Fifth Avenue, Port Alberni, BC

MEMBERS PRESENT: Keith Wyton, Chairperson, Director, Electoral Area "A" (Bamfield) (By Teleconference)
John Mass, Advisory Planning Committee Chair (By Teleconference)
Mark Kelly, Bamfield Fire Chief (By Teleconference)
Lisa Herbig, Member at Large
J.P. Hastey, Bamfield Marine Science Centre
Brad Anolt, Bamfield Marine Science Centre (By Teleconference)

STAFF PRESENT: Russell Dyson, Chief Administrative Officer
Teri Fong, Manager of Finance
Andrew McGifford, Manager of Environmental Services
Les Butler, Bamfield Water System Contractor (By Teleconference)

OTHER: Chris Downey, Koers & Associates (By Teleconference)

1. CALL TO ORDER

The Chairperson called the meeting to order at 5:00 pm

The Chairperson recognized the meeting is being held in the Huu-ay-aht, Hupacasath and Tseshaht First Nations Traditional Territories.

2. APPROVAL OF AGENDA

MOVED: J. Mass
SECONDED: L. Herbig

THAT the agenda be approved as circulated.

CARRIED

3. ADOPTION OF MINUTES

a. Bamfield Water Committee Meeting – April 21, 2016

MOVED: J. Mass
SECONDED: L. Herbig

THAT the minutes of the Bamfield Water Committee Meeting April 21, 2016 be adopted.

CARRIED

Brad Anholt and J.P. Hastey entered the meeting at 5:05 pm.

4. CORRESPONDENCE FOR ACTION/INFORMATION

a. **ISLAND HEALTH**
Island Health, July 14, 2016 regarding Bamfield Water System Upgrades

b. **ISLAND HEALTH**
Island Health, July 29, 2016 regarding Proposed Terms and Conditions for the Bamfield Community Water System Operating Permit.

MOVED: B. Anholt
SECONDED: J. Mass

THAT the correspondence a-b be received.

CARRIED

5. REPORTS

a. Bamfield Water System – YTD Capital Plan and Leak Update
b. Bamfield Water System - Financial Plan
c. Bamfield Water System – Status Report – Water Treatment Facility
d. Loan Authorization Bylaw

Andrew McGifford shared the preliminary results of the treatment works request for proposal. A full report is to be provided by Chris Downey assessing the proposals.

The committee reviewed the reports pertaining to the proposed Water Treatment Facility. Various questions related to the treatment plant and it's capital operating costs were answered by staff and Chris Downey – engineer.

Teri Fong advised that the loan authorization bylaw should be for a maximum of $600,000.00 based on the preliminary results at the request for proposal.

In response to the question of J.P. Hastey, Russell Dyson proposed that information pertaining to the treatment plant will be available on the website including questions and answers. It is proposed that staff, the engineer and an Island Health representative hold a meeting in Bamfield in advance of the referendum.

MOVED: J. Mass
SECONDED: B. Anholt

THAT the Bamfield Water Advisory Committee support the proposed loan authorization Bylaw for a maximum of $600,000.00 to provide for capital funding for the Dissolved Air Flotation Water Treatment Plant.

CARRIED

MOVED: B. Anholt
SECONDED: J. Mass

THAT the Bamfield Water Advisory Committee recieve reports a-d.

CARRIED

6. <u>ADJOURN</u>

MOVED: B. Anholt
SECONDED: L. Herbig

THAT this meeting be adjourned at 6:10 pm.

CARRIED

Certified Correct:

_____ _____

Keith Wyton, Chairperson

Russell Dyson, CAO

ALBERNI-CLAYOQUOT
REGIONAL DISTRICT

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MEMORANDUM

To: Bamfield Water Advisory Committee

From: Andrew McGifford, CPA, CGA, Manager of Environmental Services

Meeting Date: October 3, 2016

Subject: **Question and Answer information for Assent Approval Process (Referendum)**

The attached information is provided for the Bamfield Water Advisory Committee for review. The information is a rough summary of the questions and answers that the committee and staff will review and refine in advance of the communication sent out to the public and shared at the public engagement meeting on October 17th. The information once refine will be provide for the public on the website.

Submitted by: _____
Andrew McGifford, CPA, CGA, Manager of Environmental Services

Approved by: _____
Russell Dyson, Chief Administrative Officer

August 16th BWAC meeting questions

1. Q- What would happen if a "No" vote is the result?

   A-*Will be addressed in mail out, and both the YES & NO result will be addressed*. A No result means the ACRD cannot borrow the monies for 1/3 of the costs of the required treatment works and the project could not proceed. The Island Health terms and conditions on the operating permit require that the works be in place by xxx. Alternatives would have to be sought at additional cost for consultation and engineering. A minimum 6 months is required before consideration of another borrowing bylaw.

2. Q-Package laying out the history of how we came to this point. Consultation process, pilot project, Q&A from Committee to provide public?

   A-All the information will be on our website, the information will be based on the many question that were presented and also how other local governments handled this process. Meeting October 17th at 5:00, Koers, staff and hopefully Island Health will be present.

3. Q-Referendum (Assent Vote) – how will it be conducted?

   A-Advance polls, mail in vote and then the referendum date of November 5th. More details to follow, ACRD website & Mail out with water billing.

4. Q-Island health letter dated July 29th, wondering what is the rational for redundancy.

   A-Best practice for many DAF systems in the province, although in this design UV treatment is not required to meet log credits. Salt Spring uses the same combination for it's water treatment plants.

5. Q-Concern over the cost of the bulbs operating annually, can we get costs?

   A-Chris responded that the bulbs low pressure as flow rate, cost would be modest. We would report back (it is within UV memo as followed up by Koers in email). Retro fit would be much costlier in the future. Provided in memo attached to this agenda. A more detail costing for the annual operation cost is included in the UV memo attached to this agenda.

6. Q-Would this be written into the operating permit?

   A-Yes, the system as designed and install would become the operational permit to operate.

7. Q-Could there be a partial treatment to reduce costs?

   A-No, this would not be allowed, must treat all water all the time.

8. Q-Cost of the waste disposal?

   A-Disposal options – liquid waste, transport, will be in the estimated cost, tweak system to minimize, and hope to have better options in the future to minimize costs, bags??

9. Q-KW-Aluminum content in finished water?

A-Already contains and the DAF process should not add to the content, must meet tolerances for water quality. Testing is done regularly to monitor such levels on the finished product. These results will be reported publicly.

10. Q-Request PH requirements?

    A-Caustic added to bring PH to finished water to 7.0 to meet VIHA standards. Chris to follow up with further information.

11. Q-Fire Flows will still be met?

    A-Volume for fire flows will be provided by the volume in the reservoirs.

12. Q-Chlorine contact time?

    A-Will be achieved through configuring the new site plan and processing.

13. Q-Why was DAF chosen over other methods? What were the other methods?

    A-Membrane (still has floc and the waste disposal coasts) or activated Carbon filter (higher O&M costs). There was a response from the engineer and is included below, with table for analysis. Further analysis is included in this document in the technical section.

14. Q-Why was the sizing of the designed plant selected?

    A-Sizing for modest population increase if reduced estimate of $80,000 savings, to install in future ball park amount could be $320,000.

15. Q-Borrowing costs and impacts?

    Will be provide at meeting/or shortly after in the mail out and on our website.

Further questions from emails

1. Q-Ask Koers and IH where the system design would rank on the island?

   A-Koers - This is a difficult to assess, each water system has specific challenges and treatment methods would match what is required to accomplish meeting the water drinking standards. Reviewing Salt Springs issues at St Mary's Lake – algae bloom at source water. IH- discussed and would try to get back to ACRD regarding – have not had.

2. Q - Design build option?

   A– the design build process is something that has potential to provide cost savings if a large project (8 million plus). Essentially the owner (ACRD) would ask the possible contractors to team up with an engineer to provide the design to achieve intended results of the project. In this case,

most of the work has been completed by Koers, the process is well on its way. This should be contemplated at the outset of the project.

It should be mentioned that we do not have the resources on staff to oversee this project in a design build format, that would need to be contracted out, this would then reduce much of the cost savings within that model. These are points taken from a conversation with Engineer

Additional Questions for Island Health

1. Q-In the letters from Island Health of July 14 and 29 there is no direct reference to a requirement for UV. The DAF and filtration plus chlorination is adequate to meet the 4-3-2-1 requirement. If UV is installed will it be an operating permit requirement to use it at all times? Would it be possible to have it as a standby system to be used as required if there should be a need for it?

   A-The expectation would be that if equipment is designed and part of the install it would be operational all the times.

2. Q-The test records for the Bamfield water system treatment pilot study show that turbidity of incoming raw water met the standard of less than 1 NTU. This was in the fall rainy period which is a time for highest risk of elevated turbidity levels.?

   A-The treatment objectives of the Drinking Water Treatment Objectives for Surface Water Supplies in British Columbia are minimum performance targets for water suppliers; section 4.4 addresses the turbidity requirements in more detail. The 0.1 -0.3 NTU turbidity target that Keith is referencing is the requirement of the Guidelines for Canadian Drinking Water Quality: Guideline Technical Document - Turbidity for a system that uses conventional filtration. If the incoming turbidity is less than 1 NTU and the water is being filtered, it would be expected that the filtered water has a lower target for turbidity; if the turbidity is not being lowered through the process, I would be concerned that the filtration system is not performing as designed. Please see the following information for more detail:

   Drinking Water Treatment Objectives (attached) Section 4.4 (last paragraph).

   It is recommended that turbidity of treated surface water should be maintained at less than 1 NTU. Where filtration is part of the treatment process, the turbidity levels should comply with the Canadian guideline on turbidity, entitled Guidelines for Canadian Drinking Water Quality: Guideline Technical Document - Turbidity (Health Canada, 2003) (expected turbidity reduction depends on the filtration methods). Continuous monitoring of turbidity should be required for water systems with filtration to verify compliance with system performance objectives. Systems that meet the criteria for exclusion from the requirement for filtration should be monitored to verify that the system continues to meet the exclusion criteria. Guidelines for Canadian Drinking Water Quality: Turbidity

   1.0 Guideline

Turbidity levels are an important consideration for the effective design and operation of a variety of treatment processes and as an indicator of water quality changes in drinking water systems. For filtration systems that use conventional, direct, slow sand, diatomaceous earth or membrane technologies, the turbidity from individual filters or units should meet the following treatment limits in order to achieve health-based pathogen removal goals:
1. For conventional and direct filtration, less than or equal to 0.3 nephelometric turbidity units (NTU) in at least 95% of measurements either per filter cycle or per month and never to exceed 1.0 NTU; 2. For slow sand or diatomaceous earth filtration, less than or equal to 1.0 NTU in at least 95% of measurements either per filter cycle or per month and never to exceed 3.0 NTU ; and 3. For membrane filtration, less than or equal to 0.1 NTU in at least 99% of measurements per operational filter period or per month. Measurements greater than 0.1 NTU for a period of greater than 15 minutes from an individual membrane unit should immediately trigger an investigation of the membrane unit integrity.

Other considerations:

The aforementioned filtration systems should be designed and operated to reduce turbidity levels as low as reasonably achievable and strive to achieve a treated water turbidity target from individual filters of less than 0.1 NTU.

To ensure effectiveness of disinfection and for good operation of the distribution system, it is recommended that water entering the distribution system have turbidity levels of 1.0 NTU or less. For systems that are not required to filter by the appropriate authority, a higher turbidity level may be considered acceptable, provided that it does not hinder disinfection.

http://healthycanadians.gc.ca/publications/healthy-living-vie-saine/water-turbidity-turbidite-eau/index-eng.php

Other Question and Answers

Q- What water quality can we expect from a new plant? Will the DAF process improve my household water quality?

A-The new DAF facility will deliver high quality drinking water. Users will experience a significant improvement in taste and odour with this updated treatment process. Not only will the ‘earthy’ taste and odour be gone but that of chlorine will also be reduced.

Q-Do you have to upgrade the delivery system infrastructure as well?

A-No major upgrades are needed, but some upgrades will be required for the effective operation of the new plant and will be part of the new plant cost. Other works will be ongoing as part of the ACRD’s ongoing infrastructure upgrades and future asset management plan to ensure fiscal management over all of the ACRD assets.

Q-I heard that DAF is a new technology, so is it proven?

A-Yes. The Dissolved Air Floatation process has been widely used for water clarification for the last 40 years and, in the last 20 years, DAF has become the main alternative to sedimentation. In the case of Bamfield, the use of floatation makes more sense than other methods as listed by the engineer because of the costs.

Q-Do you have any experience with DAF technology?

A-No, the ACRD Staff are not, but there are commissioned facilities and have been operating the Salt Spring and in Port Hardy. Local resources for our operators in issue should arise.

Q- How will waste products be handled?

A-We are currently examining all options for disposal of the liquid waste or "float" from the DAF process. The operational costs are conservative and will be approximately $20,000 per year. As new technology occurs and the improvements are made to operation in the system we would hope to see this cost reduced. The liquid waste would be trucked from Bamfield to a facility for disposal.

Q-Who's going to build the new plant? Will it go to tender?

A-The builder has not been chosen. When the Detailed Design is complete and the borrowing bylaw approved, we will issue a RFP and qualified contractors who have experience with similar projects, especially water treatment plants, and are bondable and insurable.

Q- How long will it take to build?

Once construction starts, it is expected to take between 8-12 months to build.

Q- When will it open?

A-The time line has the completion scheduled for November 2017 and Island Health requires the plant to be built

Q- Why does Bamfield have to build a new Dissolved Air Floatation (DAF) Water Treatment Plant?

History and answers

1. In 2013, the Island Health (VIHA) issued the water advisory for THM's and HAA's. The water advisory has been in place for the last three years being in November 2013.

2. Since November of 2013 the ACRD Board of Directors, staff, engineer, consultants and the Bamfield Water Advisory committee (BWS committee) have been working to find the most

economical and efficient solution to address the water advisory. The Dissolved Air Floatation pilot test in late 2014 was undertaken to confirm the method of treatment. The cost estimated of a Dissolved Air Floatation water treatment plant was estimated to be $1.5 million. The Board of Directors have allocated $1,026,672 Gas Tax funds towards the treatment plant.

3. Without the Dissolved Air Floatation (DAF) Water Treatment Plant process we cannot remove organics that combine with chlorine to form potentially carcinogenic by-products in our treated water. Current levels of Trihalomethane (THM) and Haloacetic acids (HAA) are always above Canadian Drinking Water Standards. THM & HAA are a group of chemical compounds that are made when chlorine reacts with organic matter in water. Sugsaw Lake (Bamfield's water source) water is very high in organic materials.

4. The current water system design cannot meet the terms and conditions of the Island Health operating permit, as set on July 29, 2016. The Bamfield Water Systems (BWS) operating permit requires that the ACRD undertake the planned DAF water treatment plant by January 2018 to comply with current and future drinking water standards as per their 4-3-2-1 Policy.

5. The water system needs to meet the terms and conditions (as set by Island Health) on the operating permit and a DAF treatment plant will provide an economical and efficient solution for the water quality issues Bamfield is faced with. Island Health, staff and the ACRD's engineer have met on several occasions with the BWS committee to review the issues and the options available to the Bamfield water system. The reasoning for the DAF water treatment plant is provided below, the BWS committee has been diligent in ensuring that the selected method is the best option for Bamfield.

6. In order for the ACRD to borrow for this project it must obtain electoral approval. ACRD staff will bring the options available to obtain electoral approval to the BWS committee and the board in late July. The referendum will occur on November 5, 2016.

Q-Why is Island Health directing the District to build a water treatment plant?

History and answers

1. Island Health's mandate is to ensure the Canadian Drinking Water standards are being met. It is actually up the owner of the water system to come up with a solution to meet these standards. The ACRD and engineer (in consultation with the BWS committee) has evaluate and came to a solution to BWS adherence to the Canadian Drinking water standards. The fact is that Island Health has not directed the ACRD to build a treatment plant it is a solution that was approved by Island Health.

2. Regulation of drinking water quality is a provincial responsibility. Each province and territory has developed legislation and/or policies to protect the quality of drinking water from source to tap. All jurisdictions base their requirements on the Canadian Guidelines for Drinking Water Quality and enforce them through legislation, regulation or permitting.

3. In BC, the authority for regulating drinking water quality rests with the Ministry of Health. In most Canadian communities, drinking water is treated, stored and delivered to homes and businesses by an incorporated Local Government, such as a Municipality, Regional District or an Improvement District. The ACRD manages the day-to-day operation, maintenance and monitoring of the drinking water treatment and distribution to ensure the water delivered to consumers meets the required drinking water quality standards.

4. Water quality standards for all of BC are established by the BC Drinking Water Protection Regulation. Island Health has the authority to enforce the regulation through treatment standards (the 4-3-2-1 Policy) and by attaching conditions to water system operating permits. In the case of the BWS permit for the water system, Island Health has included a condition to comply with the 4-3-2-1 Policy through the use of DAF water treatment technology. On Vancouver Island all surface water systems serving over 500 people have had their operating permits modified to meet this treatment standard. The purpose of the policy is to add additional barriers in the multi-barrier approach to safe drinking water.

5. To comply with Island Health's treatment standard, the ACRD, as the water system owner, is required to provide two treatment processes including filtration. The permit also includes a condition to meet a schedule for the design, construction and start-up of a DAF water treatment plant. The District must construct the plant because the terms and conditions on the Operating Permit are legally binding.

Q-Technology Related

History and answers

1. Why was DAF technology selected?

Dissolved Air Floatation (DAF) was selected based on Pilot Study which confirmed that this was the best available technology for Bamfield's water quality. Island Health has confirmed this is a selected technology to be used.

2) The other item we would like to drive home is the reason why the DAF method was selected vs. membrane or the activated carbon filter, again thank you for the explanation on this item. As you mentioned the DAF has been proven to be successful in water quality issues on the West Coast, we have seen successful operation of DAF plants in the region at Salt Spring and Tofino, these local operators can assist the ACRD if issues arise, and Island Health is confident in the selected treatment hence their strong support. Also you pointed out with the alternatives higher O&M costs, if you could list the a few other examples for membrane and carbon filter not being selected it would help.

Understanding the capabilities of the various treatment processes to effectively deal with water quality issues, makes it possible to conceptualize potential treatment processes. For Bamfield, the following processes were considered viable options.

Conventional Treatment (Coagulation, Flocculation, Sedimentation/Floatation)

For municipal systems, the conventional treatment process for reducing turbidity and naturally occurring organic matter is coagulation, flocculation and sedimentation (floatation) typically followed by filtration. A chemical agent (coagulant) is added to the water to encourage suspended solids to bind together to form larger particles (flocculation). These larger particles are then removed after they sink (sedimentation). For low density particles, the process of Dissolved Air Floatation (DAF) can be used in place of sedimentation. DAF introduces a cloud of very fine air bubbles which attach to the floc particles causing them to rise to the surface where they are skimmed off. Following either of these two processes the water is typically filtered to remove the remaining particulate matter. Bench scale tests and pilot studies are completed to assess the effectiveness of various treatment processes and coagulants.

Ozonation

Ozone is a strong oxidizing gas that reacts with most organic and many inorganic molecules. It is more reactive than chlorine. The reaction is rapid in inactivating microorganisms and oxidizing metals such as iron and manganese. Unlike chlorine, it does not leave a residual after being added to the water. Since ozone does not produce a disinfecting residual, chlorine is normally added afterwards to provide a protective residual throughout the distribution system.

Gravity Filtration (GF)

Water enters a gravity filtration system above the media and passes downward through the granular media and supporting gravel bed. Filters are cleaned by backwashing upward through the bed with wash troughs suspended above the filter to collect the backwash water for disposal. Gravity filters can be used effectively for source water with lower turbidity levels.

Additionally, different types of adsorptive filter media are available, such as activated carbon. Carbon's particles have a large surface area with high adsorptive qualities. Activated carbon can be used to remove dissolved organic carbon compounds that are generated by decaying vegetation in the watershed, which is the main cause of high colour events and disinfection by-product formation.

Biological filtration processes typically follow ozone disinfection and can be one of the most difficult to operate and maintain filtration system.

Membrane Filtration (MF)

Membrane filtration involves passing water through microscopic pores causing the suspended and/or dissolved solids to be physically strained out of the water. There are different types of membranes, which are classified by pore size. From largest to smallest, they are; microfiltration (10 to 0.1 um), ultrafiltration (0.1 to 0.01um), nanofiltration (0.01 to 0.001 um), and reverse osmosis with pour sizes as small as 0.001 um. Micro and ultrafiltration membranes have limited ability to remove dissolved organics and the addition of a coagulant may be necessary. Inappropriate use of a coagulant can shorten the life of membranes. Pilot testing is typically required to verify whether or not particle removal can be improved with coagulant addition.

Membrane treatment systems are more technically complex, have higher Capital and O&M costs.

WASTE GENERATION

Typically, the treatment processes associated with the removal of organics and turbidity all generate significant waste streams that need to be discharged into a municipal sewer, holding tanks or an onsite disposal system. Other products such as Geobags can be reviewed after construction to determine if pumping and hauling can be replaced with dewatering and solid waste disposal.

PILOT TESTING

Prior to pilot testing it is important to select a couple of viable treatment processes that are currently available from reputable suppliers. Each process requires pilot testing to confirm the treatment effectiveness. Renting a pilot plant can cost anywhere from $25,000 to $50,000 each. This does not include water quality testing, operations, installation and engineering costs which can add an additional $25,000 to $50,000.

CONCEPTUAL TREATMENT PROCESSES RELATIVE COSTS

See below for a list summarising some of the relative costs of the conceptual treatment processes.

	Relative Capital Costs	**Relative O&M Costs**
Option 1:		
DAF GF Chlorination	Moderate Moderate Low	Moderate Low Low
Option 2:		
Ozone GF (Biological) Chlorination	Moderate High Low	Moderate High Low
Option 3:		
GF (Activated Carbon) UV Disinfection Chlorination	High Moderate Low	High Moderate Low
Option 4:		
Conventional Treatment MF Chlorination	Moderate High Low	Moderate High Low

CONCLUSIONS

Based on the results of the pilot test, Option 1 is an effective treatment process for removing disinfection by-product precursors while reducing turbidity levels in the Sugsaw Lake raw water source. Also, based on the proposals received during the RFP process, it is a cost effective treatment process considering both Capital and O&M costs.

There are several DAF plants that are currently operating on Vancouver Island. We are not aware of any Municipal Water Treatment Plants on Vancouver Island Utilizing Ozone or Activated Carbon media.

2. What is DAF?

Dissolved Air Floatation (DAF) is the process of floating the particulate and organic material to the surface of a tank instead of trying to settle them out before removal.

3. What are the benefits of DAF technology?

• The DAF process can accommodate facilities needing a small “footprint”.

• The DAF process will physically organics that are contained within the water. Toxins that are outside the cells will be destroyed by chemical oxidation.

• The DAF process can help to remove microscopic parasites from treated water by physically removing their cells.

• The DAF process is very effective at reducing turbidity and removing organics. Coupled with filtration, the DAF process will provide extremely clear water that is suitable for disinfection by UV light.

Once these substances have been removed, less chlorine will be required for disinfection and the taste and odour of the finished water will be significantly improved.

ALBERNI-CLAYOQUOT
REGIONAL DISTRICT

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REQUEST FOR DECISION

To: Bamfield Water Advisory Committee

From: Russell Dyson, Chief Administrative Officer
Andrew McGifford, CPA, CGA, Manager of Environmental Services

Meeting Date: October 3, 2016

Subject: Completion of Preliminary Design of Base Plan & Develop Site Layout

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Recommendation:

THAT the Bamfield Water Advisory Committee support the expenditure of the engineering fees for Koers and Associates to enable them to proceed with the Base Plan & Develop Site Layout for the estimated cost $18,365 for Phase 1 & 2 of the Water Treatment Plant fee schedule.

Desired Outcome:

Provide Koers and Associates with the direction to proceed in order to maintain timeline set out in the in the Dissolved Air Floatation (DAF) Water Treatment Plant dated July 22, 2016 as approved by Island Health in the terms and conditions of the water permit.

Summary:

On April 21, 2016 at the Bamfield Water Advisory Committee meeting, staff were asked to have the project design treatment plant documents prepared and also to provide a higher accuracy of estimates for DAF water treatment plant components. The ACRD staff and Koers and Associates undertook the request and prepared the request for proposals, this has provided a clearer cost estimate for this project as the equipment supply is from the United States and purchased in US dollars. The results from a bid from ADI Water Solutions for $551,250.

The next step is to prepare the site design and preparation in in order to construct the building to house the treatment plant and to have a Site Survey & Base Plan Development (complete the site survey and develop a base plan). Then the Water Treatment Plant Site Layout (water treatment plant site layout, identify suitable locations for the water treatment plant and tanks, develop conceptual layouts of the water treatment plant and tanks, develop preliminary building size based on ADI proposal, and develop preliminary watermain layout drawings). This work is set to occur October 4, 2016, if delayed until the result of the referendum it could set the project back 3-4 weeks.

The information that is prepared will assist in in order to have a visual drawing completed for the public consultation meeting on October 17th.

Time Requirements – Staff & Elected Officials:

Minimum staff time to approve and coordinate the Base Plan & Develop Site Layout.

Financial:

The costs incurred would be part of the DAF water treatment plant project capital expenditures and has been included in the estimates associated with the project for engineering services. These funds will be supplied by Gas Tax and borrowing if the "Yes" is the result of the referendum. Gas tax funding requires a tangible capital asset to be built (as mentioned at past committee meetings), if the referendum results in a "No" the funding would be required to come from the Bamfield Water Capital Reserve.

The Bamfield Water Treatment Plant - Preliminary Design total fee schedule for the design and award of RFP is $44,130.

Submitted by: _____
Andrew McGifford, CPA, CGA, Manager of Environmental Services

Approved by: _____
Russell Dyson, Chief Administrative Officer

ALBERNI-CLAYOQUOT
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REQUEST FOR DECISION

To: Bamfield Water Advisory Committee

From: Russell Dyson, Chief Administrative Officer
Andrew McGifford, CPA, CGA, Manager of Environmental Services

Meeting Date: October 3, 2016

Subject: Ultra Violet Treatment – Bamfield Water System

Recommendation:

THAT the Bamfield Water Advisory Committee support the inclusion of Ultra Violet Treatment as a component of the Dissolved Air Floatation Water Treatment Plant project as designed in the Request for Proposals.

Summary:

At August 16th, 2016 Bamfield Water Advisory committee meeting, the committee requested a follow up regarding the inclusion of the Ultra Violet (UV) Treatment within the proposed Dissolved Air Floatation (DAF) Water Treatment Plant. The requirement to include the UV Treatment when the log credits were attained through filtration and chlorine alone was discussed. Further there was a request to estimate the annual Operations and Maintenance (O&M) costs to provide a better understanding of the impact of the treatment method moving forward.

The Bamfield Water System Contractor and the ACRD Water Lead Hand were consulted on their position for UV Treatment in a water treatment system. Both water professionals support the inclusion of the UV Treatment as a component of a multi barrier water treatment system. The Bamfield Water system contractors position is that the multi-barrier treatment method provides more comfort knowing that the water source is a surface source and the bacterial and viral exposures that could occur with the Sugsaw Lake. Each individual barrier may not be able to completely remove or prevent contamination, but together the multi-barrier approach provides greater assurance that water will be safe to drink.

Both Bamfield Water System Contractor and the ACRD Water Lead Hand stated UV treatment is an effective method for disabling protozoa, and when used in combination with chlorination it is a very effective treatment process. Being non-chemical in nature the maintenance work and handling is safe, causes no disinfection by-product and UV treatment is the only type of disinfection that has a 5 out of 5 rating for disabling giardia and cryptosporidium.

The engineer has provided their comments to inclusion of UV Treatment within the proposed Dissolved Air Floatation Water Treatment Plant, as follows:

UV Disinfection

The inclusion of UV disinfection provides an additional barrier of protection to the Bamfield Water System at a relatively low cost.

Disinfection by UV radiation works by inactivation of microorganisms. The UV light penetrates the DNA of a microorganism altering it such that the microorganism is unable to reproduce. When required as part of the overall treatment process, a validated UV device is typically a minimum requirement of the Health Authorities.

Advantages: UV is capable of providing disinfection without the addition of chemicals, avoiding the potential of generating DBPs such as THMs. UV is most effective against cysts such as Cryptosporidium and Giardia. The units are compact and relatively easy to maintain and do not change the taste, odour, or colour of water.

Disadvantages: UV does not maintain a residual within the distribution system. Some double stranded viruses may be able to withstand doses of 40 mJ/cm2. UV treatment on its own can be ineffective when turbidity spikes and/or high colour events occur in the raw water supply. Therefore, pre-treatment such as DAF and Filtration is required.

UV Treatment is an effective, non-chemical, low cost and environmentally friendly water disinfection technology. Some microbiological agents of concern are more resistant to certain forms of treatment than others. Ultimately, the best approach to ensure complete disinfection of water intended for human use is a multi-barrier one.

As most disinfection systems require clear water to ensure maximum efficiency, it may be necessary to combine multiple specific treatment technologies. The DAF water treatment, UV treatment and chlorine will provide the multi-barrier process to ensure public safety is built into the Bamfield Water system. To provide the most effective protection and apply best practices in water treatment.

Financial:

The UV treatment component from the RFP is listed as $46,500 and the annual Operations and Maintenance (O&M) costs moving forward would be estimated as follows:

ESTIMATED ANNUAL O&M COSTS

ITEM	DESCRIPTION	ESTIMATED ANNUAL O&M COSTS
1.0	Chemical Consumption (Chlorine, Coagulant, etc.)	$11,000
2.0	Power Consumption	$2,500
3.0	Waste Handling (DAF Float)	$20,500*
4.0	Maintenance	$11,000
5.0	Operator Hours	$15,000

** The value is closely related to the amount of water used during trough clean up and spray bar usage. If water usage can be minimized (as seen during pilot testing) then the pumping and hauling volumes should remain low.*

The deletion of the UV Treatment equipment could potentially result in a 5% savings in the total estimated annual O&M costs. The deletion of the UV disinfection equipment may also reduce the construction cost by approximately 3% and the reduction in building size may result in another 2.5% in savings. It is important to note that a new lower price will need to be negotiated with the supply contractor.

In response to various questions the engineer provides the following additional information:

I still will need a little more clarity around the UV O&M costs, when you state the reduction in the operating costs would be 5%, would that be on the whole $60,000 = $3,000, or just the components that drive cost if UV is in palace such as power, maintenance and labour ($28,500)?

Yes, approximately 5% of the estimated annual O&M costs ($60,000). The 5% was estimated based on the following. Approximately $250 in energy consumption, approximately $1,750 for maintenance and $1,200 for labour (totaling $3,000).

Then the 3% reduction in the construction cost would be 3%, which is the $46,500 listed, correct? 3% is related to the entire project – please confirm.

Yes, the 3% was based on $46,5000 divided by the total estimated cost of $1,180,000 plus 15% contingency.

2.5% of the construction of the facility – once again the complete project?

The UV equipment requires approximately 10% of the building space and the building accounts for approximately 20-25% of the overall cost. Therefore, one could assume (10% x 25%) 2.5% savings. Alternatively, you could assume 10% x 20% = 2%

In your opinion would the possibility of receiving those savings be likely given the bargaining position that the company has knowing we would select them as the lowest bid?

You are correct, once the competitive pricing environment has been removed it can be difficult to negotiate a new lower price with a supplier. We would start by clearly defining and explaining what is being deleted from the RFP documents.

Also, please keep in mind that the estimated percentages noted above are less than the accuracy of our Class C estimate. Projects such as these are very specific to the communities needs and therefore can be challenging to estimate at a high level of accuracy.

Submitted by: _____
Andrew McGifford, CPA, CGA, Manager of Environmental Services

Approved by: _____
Russell Dyson, Chief Administrative Officer