



THE MUNICIPALITY OF THE VILLAGE OF LIONS BAY

INFRASTRUCTURE COMMITTEE MEETING

OF THE VILLAGE OF LIONS BAY

HELD ON THURSDAY, FEBRUARY 18, 2021 AT 7:00 PM

COUNCIL CHAMBERS, 400 CENTRE ROAD, LIONS BAY

AND VIA ZOOM VIDEO CONFERENCE

To join the meeting, click on the following link: <https://us02web.zoom.us/j/89731375388>

To join by phone, dial 778-907-2071 and enter meeting ID 897 3137 5388

AGENDA

- 1. Call to Order**
- 2. Appointment of Recorder**
- 3. Approval of the Agenda**
THAT the February 18, 2021 Infrastructure Committee agenda be approved, as circulated.
- 4. Public Questions & Comments**
- 5. Approval of Minutes (Page 3)**
THAT the November 19, 2021 Infrastructure Committee Meeting minutes be approved, as circulated.
- 6. Business Arising from the Minutes**
- 7. Unfinished Business**
- 8. New Business**
 - A. Staff report on the investigation of infrastructure communications – deferred to March meeting
 - B. 3-PRV Project Update
 - C. KG WWTP Update
 - D. Water Treatment / Filtration Avoidance
 - E. Roads and Stormwater Management.
Develop a plan for increased preventative maintenance of Roads and Drainage that relies on small scale projects using PWY or service agreements with contractors.
Comment: Engage Infrastructure Committee and report to Council for April RCM.
- 9. Public Questions & Comments**
- 10. Adjournment**
- 11. Next Meeting - TBD**

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**INFRASTRUCTURE COMMITTEE MEETING
OF THE VILLAGE OF LIONS BAY
HELD ON THURSDAY, NOVEMBER 19, 2020 at 7:00 PM
COUNCIL CHAMBERS, 400 CENTRE ROAD, LIONS BAY
AND ELECTRONICALLY VIA ZOOM**

DRAFT MINUTES

In Attendance (all via video conference):

Committee: Fred Bain (Chair/Councillor)
Ron McLaughlin (Mayor)
Neville Abbott (Councillor)
Karl Buhr (Resident Member)
Tony Greville (Resident Member)
Brian Ulrich (Resident Member)
Norm Barmeier (Councillor)

Regrets: None

Staff: Public Works Manager Nai Jaffer
Chief Administrative Officer Peter DeJong

Delegations: (Invited guest) Dr. Steven Weijs – Presentation of Hydrology Study Findings in 2020

Public: 4

1. Call to Order

The meeting was called to order at 1903 Hrs

2. Appointment of Recorder

Norm Barmeier

3. Approval of the Agenda

Approved as with the addition of 8. D - Update on EVAFIDI grant

4. Public Questions & Comments

None

5. Delegations

Dr. Steven Weijs.

Delegation started:

Steven started a presentation:

- Overview of activity to date. Monitoring two catchments above drinking water intakes to get a picture on a seasonal basis of how the water in the stream will change; with specific focus on summer low flow events. Seasonal variability is monitored.
- Not a lot of data available on streams and monitoring program started 3 years ago. Recently funding approved, still looking to make progress on spending that grant and installing equipment. So far 3 summers of manual measurements, collecting moments in time, but no

continuous measurement.

- Collected mineral samples to see if the water is stored in the rocks or snow melt to understand source.
- Flow is measured by throwing salt in stream and monitor conductivity. Accurate to within about 5% or as good as 2%.
- Improvements could include water level measurements as well as instream turbine.
- Recent results from Sophia focusing on regional analysis, using nearby streamflow catchment to model LB catchments. Don't have enough data with only 3 years of summer data. Not enough to base any infrastructure development plans.
- Use relationship from regional data to extrapolate to 20 years and predict for LB situation.
- List of regional streams that could be used to predict for our watersheds; however they are much larger catchments/river.
- Sophia found a very high correlation with the regional flows which means that extrapolation to LB flows is more reliable.
- Karl asked question; how confident are you that this isn't some mysterious coincidence? Dr. Weijs explained that there is some science and math behind the correlation. Correlation graph between Seymour and Harvey was presented. Strong correlation shown on melt periods in the spring and summer. Next year more data can be collected with automated system during high rainfall periods. Coquitlam and Harvey comparison also showed strong correlation. Continuous data will confirm correlation further.
- Tony weighed in to suggest that summer flows are really the only concern, Dr. Weijs argued this may not actually be the case. A true model that emulates a hydrological system properly requires continuous data to better understand stored water that accumulates via infiltration.
- Next effort is looking into details at low flow. Continuous data at Harvey will give better data over time. No continuous monitoring at Magnesia yet, but on the horizon soon.
- Karl suggests bottom line is that mid to late summer flows are already predictable. Dr. Weijs suggests that elevations at which measurements are taken factor in and is not fully understood yet. Elevation distribution and south versus west facing aspects also factor in.
- Tony asked about 0m/s implications. Dr. Weijs confirmed no 0m/s flow was ever observed. Dr. Weijs can provide more resolution on the data for detailed analysis by the IFC. 0 and negative flows would typically not make sense, probably erroneous data.
- Dr. Weijs introduced the AutoSalt device as a measurement tool to replace manual measurements, and downstream loggers that measure conductivity. The Autosalt has a pump, flow meter, and water level measurement, the downstream loggers measure conductivity downstream of the Harvey intake. This is the method used to estimate flow. Autosalt is also located downstream of the intake.
- Neville raised the concern around taking measurement downstream of intake, how do we account for Village consumption. Dr. Weijs says they correct for this.
- Norm confirmed salt injected is food grade, but misunderstood placement of salt injector. Injector is also placed downstream of intake, none of the salt gets into drinking water.
- Data loggers are roughly 100m downstream of injector.
- Karl raised some concerns about groundwater infiltration between injector and loggers. Dr. Weijs suggested there are bigger confounding variables, not concerned about groundwater infiltration.
- Dr. Weijs presented flow data and saw as high as 15CMS in the last month. Detailed discussion around continuous flow data and salt injection correlation between September and first week of November.
- Karl asked how level is measured. Dr. Weijs confirmed its measure by pressure.
- Dr. Weijs presented schematic of salt system. Harvey has notably low conductivity by nature. There is a natural small salty waterfall downstream of the Harvey intake which has confounded some of the salt injection data.

- Dr. Weijs introduced cell router as a means of communication with field devices. This enables monitoring of things like salt level in the injector, also allow for remote control. The cell service is only 3G at this location. Cell modem is very power hungry which is a limiting factor. So limitation is only periodic data downloads. Files are 2-3MB and download speeds are limited.
- Norm raised the question of whether there is any potential to get power for field devices from stream. Dr. Weijs suggested a pico power generator is a possibility. Battery gets swapped every 3 weeks, because even in summer solar power is not enough to regenerate. Cell modem is a big power draw. Dr. Weijs asked if there was any permitting requirements for a small pico generator (follow up action by staff).
- Data download interruption results in the need to renew data set download from beginning. The power limitation is a hassle. Dr. Weijs introduced wifi gun, but ultimately used a large antenna to improve cell service. 3G is too slow. Tower we see there is on Gibsons. Discussed need to better data transfer speeds.
- Cell towers are not ideal, would rather see LORAWAN. Dr. Weijs introduced the communication triangle paradigm. Dr. Weijs needs low power and long distance, compromise is speed which is ok, because data to be sent is simple. Need a gateway near the Village which has power supply and internet connection, and from there low powered signals could be received periodically. There is a big “do it yourself” in this area of communication. There are currently 16,000 gateways that are part of this “do it yourself” network. The cheaper ones cost around \$300. Karl confirmed this is the “mesh” network that has been referred to in the past. Signal is emitted and the gateway catches the signal and transmits. Free line of site helps a lot. Dr. Weijs introduced a balloon type concept. Having the gateway on a high location on a tower would improve transmission success. Line of sight could be modelled.
- Nai suggested that two smaller towers could provide more line of sight opportunities.
- Proposal included 20 gauges and gateway, funding supports this equipment.
- For 2021 plans are to get Autosalt for Magnesia Creek. Equipment is almost ready to go. Considering placing it at intake, but may not be ideal. Dr. W may reconsider location of the Autosalter. Considering wooden bridge at Crystal Falls road. Previous equipment at the bridge had been vandalized. Karl’s son may have observed the vandalized equipment?
- Dr. Weijs is also considering monitoring of Alberta Creek. VOLB has some water licences here. We used to take water from Alberta Creek, but don’t anymore. Nai pointed out there is a water intake there as well as potential power. There is a road there also. Dr. Weijs says monitoring Alberta could provide valuable insight into how the complex water system works as Alberta is a much lower catchment than the other two.
- Dr. Weijs introduced grid placement concept using satellite data to best locate field devices.
- Currently using cellular modem, and limiting factor is power then connectivity. There are times when there is no connection at all. The comms connection is unreliable and can trip up data collection. Cellular signal up at Magnesia is potentially worse.
- Some discussion around comms improvement ensued. Messages are roughly 52 bytes each. Dr. Weijs will need both cellular modems and LORAWAN. Karl asked if satellite link had been investigated. Dr. Weijs had not looked at this option fully. Carl suggested it could be around \$100 per month. Limiting factor really is power. Cellular can quickly become cost prohibitive as each cellular modem incurs monthly fees.
- What’s the next stages for 2021 and beyond. Collect more data on how flows relate to aquifer storage, and how that correlates with rainfall, radiation, melts, evaporation, soil moisture etc. Dr. Weijs is developing a prototype to collect all this data.
- Dr. Weijs would also like to install cameras to map snow extent over time. Dr. Weijs would like to make a smart camera that can process data on site and summarize data and present in a usable format instead of data intense photo streams.

- Dr. Weijs is grateful to the opportunity to work with VOLB to further his research, because of the scale it allows of data collection in a concentrated area. Valuable data for both Village and research in general.
- Ideally the two cell towers become a reality soon. Has a big grant for equipment, but has a struggle to find grant funding for students. Has been talking to Environment Canada. If other research can be integrated and support grant applications as well as some cash (around \$2000 per annum (Council to follow up on this request) and also staff time to support work. Can count staff time as in-kind contribution. Would like to continue as we have been in terms of this kind of cooperation. There could be synergies between Env Canada research and deployment of new measurement techniques to the benefit of VOLB.
- Karl sought clarification around lack of cell tower. Dr. Weijs suggested that it will complicate things, but a high vantage point to install LORAWAN could work. Dr. Weijs suggested a spot along Howe Sound Crest trail could work, but it would be power limited and Crown Land authorization is tricky.
- Tall trees could potentially house a repeater.
- Presentation will be fleshed out and circulated in the near future.
- Tony asked how he could contribute to his efforts. How could that be managed and coordinated with in-kind contributions. Are there liability or union issues. Access to intakes is main contribution, and that falls under Public Works umbrella. PW could also check salt levels. Grantors like to see in-kind contributions, helps grants. Nai is looking at what other help can be offered. Can IC contribute in any way? Nai will see what other help Steven could use.
- This is a very valuable opportunity; we are having ground-breaking research being done in our backyard. Limiting factor is number of data collection units and communication infrastructure. Discussion ensued on communication options. 1 tall tower, 2 small towers, line of site from islands, other line of site locations. Not entirely clear where best location for line of site would be; seems understanding best location for comms link is next order of business (action to be considered by staff and council).

6. Approval of Minutes

October 29, 2020 Minutes approved as with a clarification of “Connectivity and redundancy are also gained with cellular” to “Connectivity and redundancy cannot be achieved without cellular” on page 4, top sentence of that page.

7. Business Arising from the Minutes

- Minutes from last meeting were reviewed and discussed. Brian had a few clarification items. Page 5 of 7, Nai’s answer to one of the questions was we had given up on cellular at the intakes. Clarified that sensors or data loggers would not go there because no cell was up there. Intakes cannot be monitored without cellular. Devices would be powered with large batteries; possible pico turbine?
- Tony asked if Fred went back to Council regarding SBA re-engagement at the last meeting.
- Brian had a comment at last meeting regarding height of tower on page 6. Brian clarified that an accurate representation was not made available at that time and request that an accurate graphic be provided for original 60m tower. Brian wanted to clarify that original tower graphic and aesthetic be presented properly.
- A study looking into an optimal location needs to be commissioned.

- Norm pressed for a formal narrative documenting the specific communication needs and how those can be met; whether that is a tower or not.
- Fred would propose a recommendation:
 - **1. Material investigation of what is covered and not covered by existing comms**
 - **2. Substantiate best comms method to meet all Village comms needs**
 - Norm to circulate starting table to populate for #1, need an inventory of all field devices and comms needs.

8. Unfinished Business

- A. Treatment plant is starting to work, gear box was defective, new gear box is shipping, plant working on repaired gear box.
- B. PVR project, no update
- C. Upper Bayview, Bayview Place, Centre Road - on hold
- D. Ev grant – we were not successful with EVAFIDI, but will propose to pursue ZEVIP and Clean BC DCFC grants.

9. New Business

None

10. Public Questions & Comments

None

11. Next Meeting: January 21, 2021, then every 3rd Thursday thereafter.

12. Adjournment: The meeting was adjourned at 2128Hrs.