# Memorandum

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| Project Name: Pond Inlet Truck Fill Intake | Project #: FRE-00257777-A0 | /File No: 50.2 |
| To: Megan Lusty, Paul Clow, Bhabesh Roy | From: Eric Bell | |
| Date: January 20, 2020 | | |
| Subject: Truck Intake Preliminary Plan for Upgrade | | |
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The Pump Intake in Pond Inlet needs replacement. The following is the summary of recommended actions and method of correction that is being undertaken by the EXP design team.

**Overall Work Methodology**

A new intake structure is to be placed in parallel to the existing malfunctioning intake. The new intake will be 300mm in diameter. This is to facilitate the installation of 150mm diameter pump to achieve 1000 litres per minute flow.

The new raw water intake would be installed at 18° relative to the existing raw water intake, which will allow for both the submersible pump and piping to be removed through the existing facility door if maintenance is required. Avoiding the berm used to support the existing raw water intake will reduce the amount of site grading required. The new raw water intake will be 100mm HDPE housed within a 300mm heat traced carrier pipe.

The total length of carrier pipe from the plant to the submerged intake is 50m (165'). The intent is to have the inlet submerged at 5m below the water surface, suspended 0.5m above the bottom of the reservoir. We propose a 150mm submersible pump capable of providing 1000 L/m at 72 feet (22m) of hydraulic head be used to meet community requirements. The internal components in the building (Existing flowmeter, butterfly valve and chlorine dosing) will remain unchanged.

**Screen Intake Concept**

A preliminary screen design was made based on information from Fisheries and Ocean's Canada, The Interim Code of Practice: End-of-pipe fish protection screens for small water intakes in freshwater (Aug.28, 2019). Their End-of-pipe Screen Size Tool was used to generate an effective screen area of 0.49 $m^2$ for a maximum intake flow rate of 17 L/s (1000 L/min) and unknown fish species. To meet the area requirements the intake is a 400 mm x 400 mm x 350 mm square box with a flanged pipe end. The screen mesh is to have 2.5 mm openings. It is to be constructed of stainless-steel components.

**Pipe Weight and Buoyancy Concept**

Preliminary buoyancy calculations were done for the 300 mm carrier pipe based on the following assumptions:

- Density of polyurethane insulation = 35 $Kg/m^3$, thickness = 50.8 mm
- Casing weight = 6.25 Kg/m,
- Casing OD = 456 mm,
- Density of water = 1000 $kg/m^3$,
- Density of air = 1.2 $kg/m^3$,
- HDPE DR 17 (PE 4710, IPS) pipe with ID = 283 mm, weight = 18.48 Kg/m.

These values will differ somewhat at time of placement depending on temperature and selected product.

The displaced weights for the insulated and uninsulated pipe sections are 163.3 Kg/m and 82.4 Kg/m, respectively. For the float and sink at 50 % full installation approach, the insulated sections of pipe would need about 105 Kg/m of additional weights and the uninsulated sections about 32 Kg/m. At this time it is anticipated that concrete weights will not be used, and the use of iron ballast will examined.

**Insulation Concept and Installation Method**

The pipe will require insulation above grade and for an additional 3 m (vertical depth) where the potential for ice conditions exist. The total amount of insulated carrier pipe will be 35m and a submerged tail piece (not insulated or heat traced) for the intake will be 15m.

The installation will be done in winter conditions that will make difficult the use of fused or welded joints. We would like to use supplied flanged sections for ease of install during winter conditions. The pipe and intake screen will need to be sunk into place through an opening cut in the ice.

We plan to use 300 mm HDPE DR 17 (PE 4710, IPS) with 50 mm of insulation for the new carrier pipe. It will require significant weighting, particularly along the insulated sections at 105 Kg/m. The uninsulated sections are expected to be weighted at 32 Kg/m.

The installation of the new intake will be subject to the methods of the contractor; however the install must be done when ice cover is still present on the reservoir so that spring ice breakup will not interfere with the supply of water.

We welcome a discussion to review this method once all parties have had time to review. Please contact the undersigned for any questions and to coordinate a follow-up conference call.

Submitted by:

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