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CITY OF IQALUIT
LAKE GERALDINE DAM
VALVE CHAMBER REPLACEMENTS

DRAFT REPORT

Iqaluit, NU

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Prepared For:

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1. General

1.1 Project Summary

Vanderwesten & Rutherford Associates (VR) was retained by Concentric Associates Inc. to review site conditions of the existing piping and components within the valve chamber at the Dam at Lake Geraldine. This report will outline the recommended mechanical and electrical replacements and configuration of new intake water piping running to the water treatment plant.

It should be noted that VR was unable to enter the valve chamber, as confined space training is required to do so. Trained personnel were engaged to sketch out the piping configuration and mechanical/electrical services within the chamber.

1.2 Building Summary

Lake Geraldine Dam was constructed in the late 1950s and has been expanded to accommodate reservoir depths over the years. The valve chamber construction is unknown but is estimated to have taken place between the 1950s and 1995.

1.3 Project Documentation

- Technical Analysis & Risk Assessment, July 16, 2020 (MECO)
- Appendix A Heating System P&ID and Boiler Room Layout, June 2021 (WSP)

1.4 Codes and Standards

The system descriptions contained in this brief reflect the state of the installation at the present stage. This assessment is based on basic proven design principles and applicable codes and standards including:

National Building Code of Canada 2015
CSA 64.10-11 Selection and Installation of Backflow Preventers

2. Existing Conditions

2.1 Mechanical

The existing piping within the valve chamber is heavily corroded and it appears as though the valves have not been regularly exercised. Redundant piping has been left in place from previous work in the chamber. There appears to be some sort of sensor, either temperature or flow, installed on the piping prior to it leaving the chamber and

heading towards the water treatment plant. Given the condition of the services, it is assumed unlikely to be functioning properly.

Photo 2.1.1: Example of heavily corroded piping and valves.

Photo 2.1.2: Example of heavily corroded piping and valves

Photo 2.1.3: top stem of assumed sensor

There are pieces of scrap material wedged between piping and the piping is resting on wooden blocks and rocks. No proper pipe supports were used.

Photo 2.1.4: example of scrap metal propping up piping

There is a pit within the valve chamber for what appears to be a pump. It is in a state of disrepair and no piping was noted as being connected to the system.

Photo 2.1.5: Sump pump and pit

2.2 Electrical

Electrical services, including switches and disconnects are mounted on the wall of the chamber and are also heavily damaged by corrosion. There is an electric heater mounted on the wall. It is not known whether this unit still functions.

Photo 2.2.1: existing electrical radiant heater

Photo 2.1.2: overall view of existing electrical services

Photo 2.1.3: motor starter, assumed to be wired to sump pump

3. Recommendations

The conditions of the mechanical and electrical services within the valve chamber are in very poor condition and beyond simple repair. Given that the system is critical for the supply of drinking water, it is recommended that a temporary set of lines be installed to bypass the valve chamber, allowing water to be supplied to the water treatment plant while replacement of the valve chamber components is underway.

Installation of the temporary bypass will require a short shutdown of water supply to carry out tie-ins to the main lines. A specialized contractor may be able to use hot-tapping to perform tie-ins without disrupting the supply, but this would require ensuring there is a way to trap any filings and debris created by the procedure. It is recommended that a planned shutdown be scheduled instead.

Once the temporary bypass is in place, the piping within the valve chamber can be removed. Electrical equipment should also be removed at this time, leaving feeds to serve new equipment. The valve chamber should be cleared of all loose rubble and scrap material and the ground should be levelled so that proper pipe supports can be installed.

Since water treatment plants are considered a severe hazard application under CSA B64.10, a reduced pressure (RP) zone assembly backflow preventer should be installed on the intake piping; however, CSA indicated that RP assemblies cannot be installed in a vault. Backflow prevention should be installed within the water treatment plant.

Photo 3.1: Proposed location for new RP backflow preventer

A new sump pump system should be installed in the valve chamber to prevent excessive water levels within the structure.

New lighting is recommended to meet minimum lighting levels for maintenance staff. Fixtures shall be rated for outdoor/industrial conditions.

A new electrical radiant heater is recommended to maintain above freezing temperatures within the chamber.

Refer to Section 4 for sketches.

Opinion of Probable Cost: TBD

4. Sketches