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## **REPORT TO CORE AREA LIQUID WASTE MANAGEMENT COMMITTEE MEETING OF WEDNESDAY, JULY 27, 2022**

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**SUBJECT**     **Core Area Wastewater System Commissioning and Operations Update and Capital Program Status Report**

### **ISSUE SUMMARY**

To provide the Core Area Liquid Waste Management Committee (Committee) a Core Area Wastewater System commissioning and operations update and a capital program status report.

### **BACKGROUND**

On January 13, 2021, the Capital Regional District (CRD) accepted operational responsibility for the McLoughlin Point Wastewater Treatment Plant (MPWWTP). The CRD accepted operational responsibility for the other conveyance system components, including pump stations, pipelines, and the Arbutus Attenuation Tank between September 2020 and December 2021. Although the new conveyance and treatment infrastructure constructed under the project was tested and deemed ready for service commencement, as it was handed over to the CRD for operation, the commissioning period of the MPWWTP, and the system as a whole, continues to extend into the two-year performance period for the MPWWTP (ending December 2022). During this time, the commissioning activities at the MPWWTP and conveyance infrastructure facilities are expected to periodically impact plant performance and effluent quality, and some plant and conveyance facility systems, including odour management. While the following summary of ongoing commissioning activities and detailed information about regulatory compliance and deficiencies are provided to update the Committee on the status of the operation 18 months into the two-year performance period, staff are confident that the issues identified will be addressed and that the MPWWTP will achieve performance expectations.

### **IMPLICATIONS**

#### **Ongoing Commissioning Activities**

Operational documentation – Documentation provided by the contractors and documentation prepared by the CRD during the first year of operation including, standard operating procedures, safety procedures, and preventative maintenance routines, are being continually updated to reflect changes resulting from actual operating experience. Many maintenance procedures developed at the design and start-up phases of the project, had not been carried-out in the field, so various documents have required revisions.

Equipment adjustments/failures – The MPWWTP and the Conveyance Pump Stations contain many components, including process mechanical equipment (treatment process equipment, screens, pumps, motors, valves, chemical feed systems), electrical, instrumentation and control equipment (motor controls, switchgear, generators, SCADA controls), that can require adjustment or fail once under normal operating conditions. Resolution of these equipment issues has had some impact on plant performance. At the MPWWTP, as expected with a newly constructed, large, complex facility, during the initial operating period some components and equipment failed or have not performed as expected. CRD staff continue to work with Harbour Resource Partners (HRP) at MPWWTP to identify and address these issues through the

warranty management process. Since January 2021 to date there have been 308 warranty or deficiency items identified, 236 of which have been addressed, 40 remain unresolved and 32 are being disputed.

MPWWTP optimization – CRD staff have been working closely with the HRP’s commissioning and performance period representatives (one representative is stationed at MPWWTP until December 2022), the Owner’s engineer, Stantec, as well as a plant optimization engineer (who was previously under contract with HRP and has since been retained by the CRD) to monitor plant process performance and make on-going recommendations to the CRD regarding plant operations.

#### Effluent Compliance and Reporting

The CRD manages its Core Area liquid waste in accordance with the Core Area Liquid Waste Management Plan (up to and including Amendment 12), and the Municipal Wastewater Regulation Registration (Registration) for the MPWWTP, issued on June 9, 2020 and revised on February 22, 2021 by the BC Ministry of Environment and Climate Change Strategy (ENV) under the *Environmental Management Act*. The Registration sets out the wastewater treatment and performance criteria for the MPWWTP and authorizes the CRD to discharge treated effluent to the receiving waters. The MPWWTP discharge must also meet the Federal Wastewater Systems Effluent Regulations (WSER), which fall under the *Fisheries Act*. The provincial Registration is the more stringent regulatory requirement; the MPWWTP is designed to achieve the criteria set out in the Registration, which were detailed in the July 28, 2021 report to the Committee.

Regular compliance reporting under federal and provincial legislation is carried out in accordance with requirements. The Province is notified immediately when effluent quality criteria are not met (e.g. exceedance of maximum suspended solids limits), and compliance reports for all seven of the CRD’s wastewater facilities are submitted on a monthly basis. Reporting to the Federal government is completed via online submission on a quarterly basis. Staff have submitted the required regulatory reporting and continue to meet with representatives of ENV regularly to discuss compliance related issues.

The Federal WSER effluent quality criteria have been met each month, with the exception of total suspended solids (TSS) on single days in April 2021 and June 2022. The provincial Registration requirements for both carbonaceous five-day biochemical oxygen demand (cBOD<sub>5</sub>) and TSS are monthly averages of 10 mg/L. The January 2021 – June 2022 monthly average TSS figures reported have ranged from 5.0 mg/L to 14.6 mg/L not including the exceedances noted above; TSS has been in compliance 8 of 18 months. The January 2021 – June 2022 monthly average cBOD<sub>5</sub> figures reported have ranged from 7.1 mg/L to 17.4 mg/L; cBOD<sub>5</sub> has been in compliance 8 of 18 months.

In addition, as per the Registration and WSER requirements, the CRD reports all treatment process interruptions or bypasses to ENV and/or Fisheries and Oceans Canada (DFO). This year to date there have been 15 reports to the regulators, including 9 related to plant bypasses or other unauthorized discharges resulting from commissioning, and 6 related to TSS or cBOD<sub>5</sub> discharge loadings above the maximum effluent quality limits. It is important to note that despite the observed instances of non-compliance with the Registration, there are no anticipated adverse impacts to health or the environment. These events have no significant environmental impact due to the generally low level of exceedances and discharge location. However, the goal continues to

be to operate MPWWTP consistently in full compliance as soon as possible, so each event that potentially contributes to non-compliance is carefully reviewed and an incident summary/probable cause and mitigation measures/corrective actions are documented.

The MPWWTP is a complex plant that involves complex treatment processes. In most cases a single cause and effect reason is unidentifiable for each non-compliance result, but rather a number of often compounding factors. The critical issues contributing to plant performance and reduced effluent quality, which are also the focus of the on-going plant optimization work are summarized as follows:

1. Fluctuating influent flow rates – Flows from the Trent and Clover Pump Station have fluctuated significantly which have resulted in higher flow velocities through the primary and initial secondary treatment processes resulting in solids carryover to downstream secondary and tertiary treatment processes. In March 2022, the CRD modified the operation of the Trent Pump Station to reduce the pump rate fluctuations.
2. Biological Aerated Filter (BAF) optimization – The CRD’s plant optimization engineer is working closely with SUEZ, the BAF designer/manufacturer for HRP, to optimize the flow velocity through the 12 BAF cells and backwash process to achieve effective removal of solids.
3. Tertiary Disk Filters – Filter fouling is resulting in the need for filter cleaning at a frequency that exceeds the specified Operation and Maintenance (O&M) manual frequency which impacts available treatment capacity during maintenance.
4. Organic and fibrous material screening – At the Clover and Macaulay Pump Stations and MPWWTP, fine screening equipment continue to be adjusted and optimized to maximize solids capture and improve automated washing processes in order to maintain operational effectiveness and reduce solids entering the treatment processes.
5. Influent solids reduction – High influent solids levels related to the Residuals Treatment Facility (RTF) operation are being evaluated. The CRD is trialing Chemically Enhanced Primary Treatment to determine the potential benefits of removing more solids through the primary treatment process.

#### Residuals Treatment Facility and Biosolids Plan

The RTF has been receiving sludge from the MPWWTP and producing Class A biosolids during 2022. Unfortunately, due to unplanned shutdowns at the cement kilns at the Lafarge cement manufacturing facility (which is under contract with the CRD to receive Class A biosolids for use as an alternative fuel at the facility), the CRD has only been able to ship 422 tonnes of biosolids to the facility as of the end of June 2022. This has resulted in the need to landfill approximately 603 tonnes so far this year.

Harbour Resource Management Group (HRMG) and the CRD continue to resolve service failures related to the quality of effluent discharged from the RTF into the centrate return line.

The Long Term Biosolids Beneficial Use Strategy is expected to be presented to the Committee by the fourth quarter of 2023, with the finalized biosolids strategy to be submitted for provincial approval no later than June 18, 2024.

#### Communications and Community Engagement

CRD staff continue to communicate and engage regularly with various stakeholders typically on commissioning and construction related matters. Questions or concerns are received via email ([wastewater@crd.bc.ca](mailto:wastewater@crd.bc.ca)) or phone (250-940-7400). In addition, commissioning and maintenance activity information is posted bi-weekly on the CRD website and public advisories are issued for specific activities that are likely to cause odour or noise impacts in localized areas.

The majority of the concerns received have been related to odour from the MPWWTP. CRD staff continue to respond to every complaint and are logging and mapping every complaint to try to correlate the occurrence with operational activities and other potential contributing factors.

The CRD continues to closely monitor the potential sources of odour at the MPWWTP. The following major improvements or tasks have recently or will be completed in relation to the odour treatment systems:

1. Replacement of odour treatment system activated carbon media – there are three cells containing activated carbon to ‘scrub’ the foul air exhausted from the treatment processes. The carbon was expected to have a five-year service life but was determined to be ineffective after approximately 15 months due to high moisture content. CRD replaced the carbon in one cell in June and will be replacing the carbon in the two remaining cells in July. However, the CRD is working with HRP to determine the cause of the high moisture content before bringing the two cells on-line and damaging the carbon.
2. A vent on a sludge holding tank was found to be exhausting odour laden air. An activated carbon odour filtration system has been added to the vent, eliminating the odour laden air discharge.
3. The MPWWTP odour treatment system was not designed to extract air from the tertiary treatment process tanks. The secondary odour treatment system will be modified to treat this potential source of odour laden air. The system is expected to be operational by October. Similar issues are arising at the Macaulay Point Pumpstation and there may be a need to modify the odour treatment system to include areas of the pumpstation that are not connected to the system.
4. The CRD will be undertaking an ‘audit’ of the design and performance of the MPWWTP odour treatment system and conveyance infrastructure with the owner’s engineer (Stantec). This work is expected to begin in September.
5. The CRD has undertaken some initial odour investigation work with Vancouver Island University (VIU), who has done similar work with the Regional District of Nanaimo. With VIU, the CRD is hoping to ‘fingerprint’ the chemical odour profiles from different sources and associate these profiles with odour present in different locations. This work is expected to occur this Fall.

As noted, staff are still refining the plant operation and working through plant maintenance routines which staff are discovering can generate some odour depending on the type of maintenance activity, due to open tank hatches and exhaust fans not maintaining negative air pressure. In addition, through neighborhood odour surveys staff have identified other sources of odour in some areas and continue to work closely with the City of Victoria to identify potential sources along the City sewer system and Esquimalt sewer systems. We are also conducting work to ensure the underground chambers and odour control systems along the residuals conveyance pipeline are functioning properly and that other manholes along the gravity pipelines are sealed.

However, as per the Core Area Wastewater Project Agreement between the CRD and HRP, the plant is to have been designed such that odour laden air at the plant will be captured and treated prior to discharge such that all air exhausted from the plant will contain a maximum odour concentration at and beyond the plant site boundary of less than five odour units per cubic metre (not perceptible). In addition, the odour treatment systems are designed with sufficient redundancy in place to allow for all normal maintenance activities to occur without interruption or reduction in the level of odour treatment and without exceeding the plant site boundary concentration limit. The CRD remains committed to achieving the requirements of the Project Agreement.

#### Core Area Capital Program Status Report

There are 32 active projects under the current Core Area Wastewater Service capital program. Most of the projects are related to trunk sewer improvements. The projects have approved budgets totaling \$21.9 million, of which approximately \$16.5 million is currently committed to in-stream projects (including the Bowker Sewer Rehabilitation Project).

### **CONCLUSION**

The CRD accepted operational responsibility for the various facilities constructed under the Core Area Wastewater Treatment Project between September 2020 and December 2021. The CRD has not accepted operational responsibility for the Arbutus Attenuation Tank yet. Although the new conveyance and treatment infrastructure constructed under the project was tested and deemed ready for service commencement as it was handed over to the CRD for operation, the commissioning period of the MPWWTP and the system as a whole continues to extend into the two-year performance period for the MPWWTP (ending December 2022). During this time, the commissioning activities at the MPWWTP and conveyance infrastructure facilities are expected to periodically impact plant performance and effluent quality, and some plant and conveyance facility systems, including odour management. Regular compliance reporting under federal and provincial legislation has been carried out in accordance with requirements.

### **RECOMMENDATION**

There is no recommendation, this report is for information only.

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