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EEP 17-20

REPORT TO ELECTORAL AREA SERVICES COMMITTEE
MEETING OF WEDNESDAY, MAY 17, 2017

SUBJECT **Reuse of Salt Spring Island Ganges Wastewater Treatment Plant Effluent to Supplement St. Mary Lake Water Levels**

ISSUE

To consider the potential reuse of treated wastewater effluent to supplement existing drinking and irrigation water sources on Salt Spring Island (SSI).

BACKGROUND

Water quantity and quality sustainability issues are leading to volume-use restrictions and limiting future development potential on SSI and the outer Gulf Islands. St. Mary Lake is the largest source of freshwater on SSI. There are also smaller surface water bodies, as well as individual groundwater wells to supplement water supplies on the island. The SSI Director requested information related to the reuse of effluent from the Capital Regional District's (CRD) wastewater treatment plant (WTP) at Ganges Harbour to address the on-island water quantity concerns. This facility currently discharges high quality ultraviolet-disinfected secondary-treated effluent to the ocean. The prime question is whether Ganges Harbour WTP effluent could be diverted and used to supplement St. Mary Lake water levels, thereby increasing the volume of water available for use.

There are several regulatory, ecological and logistical issues to consider. In BC, wastewater reuse is regulated under the Municipal Wastewater Regulation (MWR). There are four classes of water reuse possible in the MWR: indirect potable reuse; greater exposure potential (to humans or aquatic life); moderate exposure potential; and, lower exposure potential (see Appendix A). Direct potable reuse is not allowed in BC.

Potential uses for lower to greater exposure reclaimed water include discharge to groundwater to replenish aquifers, discharge to surface waters to augment natural flows, agricultural or landscape irrigation, flushing toilets (e.g., purple pipe systems), supplying fire hydrants, vehicle and street washing, filling decorative water features and many other purposes. Lower and moderate exposure potential effluent quality can be achieved with secondary wastewater treatment and disinfection. Disinfection is required to reduce the concentrations of various pathogens. Greater exposure potential effluent quality can typically be achieved with advanced secondary treatment and disinfection, as is currently achieved by the Ganges Harbour WTP.

Two previous water reclamation studies undertaken for the Ganges Harbour WTP (in 2004 and 2009) identified that Ganges Harbour WTP effluent is suitable for irrigation and other greater exposure potential non-potable reuses. However, due to capital costs to install the necessary distribution system(s), these reuse options were never initiated. In addition, staff are currently investigating the potential to reuse Ganges Harbour WTP effluent as wash water for the CRD SSI Waste Disposal Facility at Burgoyne Bay and the SSI Maliview Estates WTP. An application for these reuse options is currently in preparation for submission under the MWR.

Discharging treated wastewater effluent into St. Mary Lake would fall under the indirect potable reuse category. Indirect potable reuse typically requires secondary treatment and a number of tertiary treatment steps, depending on the environmental sensitivity of the receiving waterbody, followed by disinfection. Ganges Harbour WTP effluent has never been formally assessed with respect to indirect potable reuse. An Environmental Impact Study (EIS) under the MWR would be required to confirm the feasibility of indirect potable reuse of Ganges Harbour WTP effluent, and whether additional wastewater treatment steps would be required. Ultimately, an EIS must demonstrate that the indirect potable reuse does not negatively alter the ecosystem or species composition of the receiving waterbody.

ENVIRONMENTAL IMPLICATIONS

The Ganges Harbour WTP effluent is of relatively high quality due to the use of membrane bioreactor treatment technology and disinfection. These treatment steps lead to the effluent quality being suitable for lower to greater exposure potential reuse options under the MWR, as has been confirmed by the two previous water reclamation studies.

However, in addition to water quantity issues, St. Mary Lake also experiences water quality issues. These issues are primarily driven by excess nutrients driving seasonal algae blooms. The existing Integrated Watershed Management Plan for St. Mary Lake recommends that external nutrient sources into the lake be reduced and that internal nutrient sources either be reduced or managed in some manner.

There are two aspects of Ganges Harbour WTP effluent quality that make it problematic for indirect potable reuse in St. Mary Lake: 1) nutrients and 2) contaminants. Phosphorous and other nutrient concentrations in the Ganges Harbour WTP effluent are currently substantially higher (by 1-3 orders of magnitude) than those in St. Mary Lake (see Appendix B). As such, the discharge of Ganges Harbour WTP effluent into the lake would exacerbate the existing nutrient and algal bloom issues. As well, sewage treatment does not completely eliminate wastewater contaminants. While the Ganges Harbour WTP substantially reduces many contaminants, it does not eliminate them all (see Appendix C). Therefore, the discharge of Ganges Harbour WTP effluent into the lake would introduce contaminants into the lake that are not presently there. The risks associated with wastewater contaminants include potential toxicity to aquatic life and limited risk to human health via consumption in drinking water (which would be addressed in an Environmental Impact Study (EIS)).

ECONOMIC IMPLICATIONS

The Province requires an EIS to confirm whether indirect potable reuse of Ganges Harbour WTP in St. Mary Lake is actually feasible with respect to protection of aquatic life and human health. This study would need to be undertaken by a Qualified Environmental Professional at costs on the order of $40,000 to $50,000.

The EIS would likely confirm existing Ganges Harbour WTP effluent quality is not sufficient to allow for indirect potable discharge into the lake and that additional treatment technologies would be required to eliminate the risks associated with nutrients and contaminants contained in the WTP effluent. Some of these additional treatment technologies can be quite expensive

depending on the final effluent quality requirements. In addition, there would be costs associated with installing conveyance infrastructure between the Ganges Harbour WTP and St. Mary Lake.

Costs of an EIS, additional treatment technologies and conveyance infrastructure have not been determined, nor have the costs associated with other alternatives. For example, rain water may be collected in large cisterns and redirected for irrigation purposes.

CONCLUSIONS

Ganges Harbour Wastewater Treatment Plant effluent is currently not suitable for indirect potable reuse into St. Mary Lake due to nutrient and contaminant concerns. An EIS would be required to confirm feasibility of such reuse and what additional wastewater treatment steps would be required to eliminate nutrient and contaminant risk. Additional wastewater treatment steps would likely come at significant cost, in addition to costs associated with conveyance infrastructure. Alternative rainwater harvesting and reuse projects could also be explored.

RECOMMENDATION

That the Electoral Area Services Committee recommend to the Capital Regional District Board:

That this report be received for information.

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CL:cam

Attachments: Appendix A – BC Municipal Effluent Quality Requirements for Reclaimed Water
Appendix B – Comparison of nutrient levels in Ganges Harbour WTP effluent and St. Mary Lake
Appendix C – Concentrations of contaminants in Ganges Harbour WTP influent and effluent from 2015