THE MUNICIPALITY OF THE VILLAGE OF LIONS BAY

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| **Type** | **Request for Decision** | | |
| **Title** | **Kelvin Grove Wastewater Treatment Plant Replacement** | | |
| **Author** | **Nai Jaffer** | **Reviewed By:** | **Peter DeJong** |
| **Date** | **May 29, 2019** | **Version** | |
| **Issued for** | **June 4, 2019 Council Meeting** | | |

**Recommendation:**

A. THAT staff be directed to draft an RFP for engineering services in pursuit of replacement of the existing Rotating Batch Contactor (RBC) plant with a new RBC plant within the confines of the existing concrete structure subject to:

i. Review of the existing concrete structure to determine if remediation or protective coatings are required to enhance longevity;
ii. Review of the specifications for a proposed new RBC and verification of flows, and discharge volumes;
iii. Determination of the maximum loading (number of connections) possible with the proposed system, including any enhancements which could further increase the number of connections possible within the confines of the existing concrete structure while keeping within the maximum daily discharge allowance under our current permit;
iv. Review of the electrical and controls specifications of the new RBC;
v. Determination of SCADA connectivity of the new RBC and whether it can be retrofitted; and, most importantly,
vi. Working with the Ministry of the Environment (MOE) to facilitate the replacement of the RBC within our existing permit allowances.

B. THAT, if MOE agrees to allow the Municipality to proceed with a replacement RBC plant, then staff be directed to proceed with a competitive bid process for the RBC plant, with the engineer to provide any engineering/project management requirements associated with construction/installation by the winning RBC bidder.

C. THAT, if the MOE cannot be persuaded to extend the current discharge permit terms under a replacement RBC plant, then staff to proceed with an RFP for an engineering study to determine the best option to meet regulatory requirements and the

Municipality's own key goals and objectives (e.g.: cost effective, scalable technology, operationally efficient, etc.).

**Attachments:**

(1) Direction Request Council Report from February 5, 2019 Council Meeting

**Key Information:**

Further to the February 5, 2019 Direction Request Council Report titled Kelvin Grove Wastewater Treatment Plant Replacement:

- The Sewer Fund has an accumulated surplus of $211,600 as at December 31, 2018.

- The cost to replace the first axle with its two media bundles is about $76,000. Replacement of the second axle and its two media bundles will likely be required in approximately five years, likely at a similar cost.

- Staff received a cost-effective quote (see Closed Agenda materials) to replace the treatment plant internal workings with a new Rotating Biological Contactor (RBC) with a 30-year lifespan. This new RBC would have a maximum treatment capacity of about 181 $m^3$/day which is well below our permit allowance of 340 $m^3$/day. Based upon figures provided by the RBC manufacturer, an average single-family household produces 750 L/day or 0.75 $m^3$/day of wastewater. Based on these figures, a new RBC plant would be able to service approximately 240 homes. The current system was designed to service about 95 homes and currently services 86 homes.

- However, based upon our flow meter readings over the last three years, the average daily flow at the Kelvin Grove WWTP is approximately 85 $m^3$/day for 86 homes resulting in an average discharge of 0.988 $m^3$/day. Even using this figure, the proposed new RBC would be able to service about 183 homes. (181$m^3$/.988)

- To proceed with the installation of a new RBC system within the confines of the existing concrete structure, we would need an engineer to:

i. Review the existing concrete structure to determine if remediation or protective coatings are required to enhance longevity;
ii. Review the proposed RBC and verify flows, and discharge volumes;
iii. Determine the maximum loading (number of connections) possible with the proposed system;
iv. Alternatively, propose a system that could further increase the number of connections possible within the confines of the existing concrete structure and keeping within the maximum daily discharge allowance under our current permit;
v. Review the electrical and controls specifications;
vi. Determine if SCADA connectivity can be retrofitted; and, most importantly,
vii. Work with the Ministry of the Environment (MOE) to facilitate the replacement of the RBC within our existing permit allowances.

Possible Negative Outcomes

- Depending upon the capacity calculations determined by an engineer, the installation of a new RBC would limit the number of potential connections and thereby limit the development potential in upper and lower Kelvin Grove (including the Public Works Yard site) to about 100 new dwelling units.
- The replacement of the RBC would defer any possibility of expansion to a Village-wide sewerage system to beyond 2050 unless a potential developer were willing to foot the costs for a complete upgrade, although finding sufficient space would then be an issue.
- Depending upon the response from the Ministry of the Environment, replacement of the RBC may trigger a higher level of treatment in the form of the Municipal Wastewater Regulations that the proposed RBC replacement could not meet due to limitations in treatment capabilities of the RBC method. This would then result in having to embark on the previously proposed study to determine the best option to meet regulatory requirements and the Municipality's own key goals and objectives (e.g.: cost effective, scalable technology, operationally efficient, etc.)
- If forced to meet the higher regulatory requirements, the first axle with its two media bundles would have to be replaced in the interim at the approximate $76,000

cost as the time needed to do the study and then tender the work and build the new plant would be too long.

**Options**:

1. Draft an RFP for engineering services in pursuit of replacement of the existing Rotating Batch Contactor (RBC) plant with a new RBC plant within the confines of the existing concrete structure as set out above.

    (a) If MOE agrees to allow the Municipality to proceed with a replacement RBC plant, then proceed with a competitive bid process for the RBC plant, with the engineer to provide any engineering/project management requirements associated with construction/installation by the winning RBC bidder.

    (b) If the MOE cannot be persuaded to extend the current discharge permit terms under a replacement RBC plant, then staff to proceed with an RFP for an engineering study to determine the best option to meet regulatory requirements and the Municipality's own key goals and objectives (eg: cost effective, scalable technology, operationally efficient, etc.) As this work will take up to a year or more to complete, the Municipality will need to ensure MOE approval to replace the first axle and its two media bundles.

2. Spend the $76,000 now on replacement of the first axle and two discs and put out the RFP for the full engineering report on treatment options for a plant that complies with the regulations.

**Preferred Option:**
Option 1(a) is the preferred option as it would result in the best financial result for the residents of Kelvin Grove while still providing a reasonable result in terms of providing additional development capacity. Option 1(b) would only be pursued if 1(a) is not successful. Option 2 essentially is the pursuit of Option 1(b) without first pursuing Option 1(a).

**Financial Considerations:**
It is recommended that the sewer surplus be used for all engineering costs associated with either Option A or B (less any grant funding available). If Option A results in successful replacement of the RBC, it is recommended that the actual capital costs of the plant be funded through a loan from reserves and repaid through a parcel tax as this would enable taxing of all Kelvin Grove properties capable of connection (as opposed to only those currently connected), with tax deferment options available to residents of Kelvin Grove.

**Legal Considerations:**
Staff will check on any legal issues attached to the recommended course of action.

**Follow Up Action:**
In accordance with direction from Council.

**Communication Plan:**
If approved by Council, it is recommended that staff provide a synopsis of the foregoing in the Village Update with the next scheduled news update to come when we have a determination from MOE on whether we can replace the RBC with like treatment facilities or if we have to meet the higher requirements.

THE MUNICIPALITY OF THE VILLAGE OF LIONS BAY

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| **Type** | **Direction Request** | | |
| **Title** | **Kelvin Grove Wastewater Treatment Plant Replacement** | | |
| **Author** | **Peter DeJong** | **Reviewed By:** | **Nai Jaffer and Pam Rooke** |
| **Date** | **January 30, 2019** | **Version** | |
| **Issued for** | **February 5, 2019 Council Meeting** | | |

**Recommendation:**

THAT Council provide direction to staff with respect to the issue(s) outlined in this report.

**Attachments:**

None, but see:

(a) Kelvin Grove Wastewater Treatment Plant 2018 Annual Report; and

(b) Water, Solid Waste and Sewer Budget; presented elsewhere in this Agenda and

(c) Infrastructure Master Plan here: Village of Lions Bay Infrastructure Master Plan (pp.51-64 of PDF)

**Key Information:**

- The upper and lower Kelvin Grove neighbourhoods were developed in 1981. A Wastewater Treatment Plant (WWTP) was constructed adjacent to the Kelvin Grove Beach Park to service the development.
- The WWTP is 38 years old and has mechanical issues that need repair now and may well have more as it meets and exceeds its stated 40-year life expectancy over the next few years. Staff will continue to monitor and maintain/repair the Plant to extend its lifespan as much as possible, but 5-10 years is likely the limit.
- There are 94 lots in Kelvin Grove. Currently 85 lots are connected to the WWTP and pay the annual sewer utility fees. For 2019, the draft Sewer budget contemplates a 5% tax increase. This equates to an increase in revenue of about $3,400 or approximately $40 per household. The reason for the increase is to cover the cost of required repairs to the WWTP. The Sewer Fund currently has accumulated reserves of approximately $200,000.

- The 2016 Infrastructure Master Plan (IMP) estimated a new WWTP to be in the range of $1.3 to $4.0 million depending upon the required environmental treatment values, the treatment methodology, and treatment capacity (eg: just Kelvin Grove vs. all of Lions Bay). The IMP estimated the cost of an engineering study to address these and other design considerations to be in the order of $70,000.

**Current Condition Assessment:**

The major pieces of mechanical equipment for the RBC WWTP are the ROTORdisks Disks (4), the motor, the chain, the bearings and the shaft. In 2002, an overhaul of the plant consisted of the following fixes:

- The motor driving the ROTORdisks was replaced due to excessive strain and wear.
- The spherical roller bearings were replaced due to excessive wear.
- ROTORdisks one and two were replaced due to mechanical wear and excessive loading.

In 2010, a second overhaul of the plant consisted of the following fixes:

- The motor driving the ROTORdisks was replaced due to excessive wear.
- The spherical roller bearings were replaced due to excessive wear.
- The gear drive, chain, and bearings were replaced due to mechanical wear and excessive loading.
- ROTORdisks three and four were replaced due to mechanical wear and excessive loading.

The total cost of the 2002 overhaul is unknown; however, the cost of the 2010 overhaul was $136,429.34.

The latest inspection of the plant indicates that the ROTORdisks are functioning normally but are evidencing signs of wear and loading. The motor appears to be in fair condition, the gear drive and chain including the motor sprocket requires replacement (estimated at $12,000). The shaft appears to be functioning as designed. Continual immersion in wastewater accelerates the degradation of the galvanized metal shell housing the ROTORdisks as well as the concrete chamber itself. Staff have documented signs of this deterioration.

Staff estimate the remaining life of the plant to be in the range of 5 to 10 years with the potential requirement of a motor and shaft replacement before the unit's end of service life.

Oil bath for chain / safety issues are still there – tie offs and anchor points for harnesses / lifting points for the lid showing signs of wear and required maintenance.

**Desired Result:**

A well-planned, sufficiently funded replacement of the WWTP which provides short, medium and long-term service capacity options for Kelvin Grove and, ultimately, all of Lions Bay.

**Options to Pursue Desired Result:**

(1) First and foremost, there is a need for a thorough engineering study of the potential options and design considerations for replacement of the WWTP. At a high level, the IMP touches on some of the design objectives (eg: low odour and visual impact, high standard of treatment, simple to operate) and constraints (proximity to residences, outfall near recreational area, limited space, small Municipal staff) for a future WWTP, but notes the desirability of an incrementally expandable model which would enable medium and longer term planning to gradually include more and more of the whole Village. This study needs to be done soon and, in fact, was scheduled for 2019 in the IMP.

(2) As noted in the Key Information section above, the Sewer Reserve presently sits around $200,000. The draft budget could be amended to include a draw from reserves to cover the cost of the required WWTP study, which may be offset slightly by a small Infrastructure Planning Grant (max: $10,000), or a FCM Green Municipal Fund grant (up to 50% if still available) if staff are instructed to apply and are successful.

(3) Another option for consideration to fund not only the engineering study but also all or a portion of a new WWTP, is to negotiate for such funding with a developer interested in adding the necessary capacity required to implement more than 10 household connections. At present, the WWTP is estimated to be operating at about 90% of capacity and is only

capable of adding about 10 more connections. Staff had discussions along these lines with the owners of 175 and 185 Kelvin Grove Way, but after the presentation of their concept plan was not well received by some residents of that neighbourhood, they have taken a step back to reconsider their options.

(4) Option 3 may also be a consideration as well in terms of the current Public Works Yard, slated to move to Brunswick Hill if the Municipality's pending Crown Lease application is approved. However, from a timing perspective, while this may assist in terms of paying some of the costs of a WWTP replacement, it would come too late to contribute to the funding of the prerequisite study. Similar considerations would apply to any potential redevelopment of the central condominium lands, a subject which has been raised several times by numerous interested parties over the past year.

(5) Alternatively, funding for replacement of the WWTP could be financed through a parcel tax, which would be eligible for deferral under current provincial rules, although staff would have to confirm that such a tax can be levied prior to construction of the facility. Due to the short time frame required for replacement, this would result in a very high parcel tax (eg: a Phase 1 cost of $2 million divided by 94 lots over 5 years would be over $4,000/year, in addition to the regular utility billing amount). Debt financing is currently not an option as the Municipality has very limited borrowing capacity and this project was not included in the list of eligible projects under Infrastructure Master Plan Financing Loan Authorization Bylaw No. 508, 2016.

(6) If one were to look at the prospect of sewering the entire Municipality and begin to sock away a parcel tax levied against each and every parcel in the Village, over 30 years, one might get close to $1,000 per parcel per year, taking into account inflation on the estimated $15 million in the IMP and compounding interest on the parcel taxes, with sufficient funds accumulated in about 5 years to build a new, modular WWTP and then add to the system in accordance with a phased plan. Any development opportunities that are approved could help to reduce such costs as they come on-stream, whether through amenity agreements or implementation of a Development Cost Charges (DCC) bylaw, or simply additional contributing parcels.

(7) Staff could also be directed to apply for any grant opportunities to offset the capital costs of replacing the WWTP. This too has complicating factors including that such grant

opportunities tend to be under the same grant umbrella as those for water and other infrastructure for which the Municipality has borrowing capacity under Bylaw No. 508, but not borrowing capacity for sewer, making it difficult for the community to provide its required share of any sewer grant without a dedicated reserve.

**Legal Considerations:** Staff will need to explore all legal aspects of a potential parcel tax, whether for Kelvin Grove alone or for the whole Village, including the ability to charge it prior to construction, based on estimates of cost. Sharing of costs fronted by a developer may also be addressed through "Latecomer Agreements" under the *Local Government Act.* In this way, developers may be reimbursed for bearing the initial costs of infrastructure which may have far greater capacity than the development itself requires.

**Financial Considerations:** Many of the financial considerations associated with the foregoing options can be fine-tuned upon completion of the engineering study to be commissioned. This study needs to be funded in the 2019 budget. As well, Council may wish to consider increasing the utility rates in the sewer budget for 2019.

**Follow Up Action:** Upon confirmation of funding for the required engineering study, staff will apply for an Infrastructure Planning Grant and the FCM wastewater study grant, if available, and begin to prepare a Request for Proposals (RFP) which will address all of the necessary components of the study to be commissioned.

**Communication Plan:** Invite all residents to take an interest in budget considerations related to sewer matters, as well as the rest of the 2019 budget items up for discussion, via the Village Update and other communications opportunities (eg: at the Council Strategy Committee meeting on February 7th for presentation of the Asset Management Plan).