

# STAFF REPORT

**Department: Environmental Services and Special Projects.**

**Date: May 26, 2025**

**Item: Recommendation regarding Baffle Factor**

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**Recommendation:** Be It Resolved That: The Corporate Services Committee Recommend to Council that the design work for the Baffles Project proceed immediately and be undertaken by RV Anderson for \$102,000 to be funded from either the Water and Sewer Reserve or Tax Stabilization Reserve in whole or in part depending on the result of a grant application to the Health and Safety Water Stream under the Municipal Housing Infrastructure Program of the Province; and Be It Further Resolved That: The Baffles Project be approved in principle with an estimated total project cost of \$1,000,000 and that staff will return to Council for final approval of the total project once the design has been completed and dependent upon our success in applying for the Health and Safety Water Stream Grant Program, to establish the timeline and budget for the project with the understanding that if the grant application is successful, the project will proceed in 2025 and 2026 with an estimated total municipal contribution of \$298,000 inclusive of the mentioned design costs for RV Anderson.

**Background:**

- In Ontario, there has been a change in requirements to extend Contact Time (CT) of chemicals into the water. In other words, chemicals added to the water at the entry point of the water treatment plant need a certain amount of time to be in contact with the raw water to effectively neutralize pathogens, enhance contaminant removal, and achieve optimal disinfection levels before reaching distribution.
  - Contact Time (CT) is the period during which chemicals like chlorine are in contact with water before it leaves the treatment plant.
  - Purpose of Extended CT is to ensure maximum disinfection efficacy, reducing pathogen survival, and assists in minimizing the formation of harmful disinfection by-products.
  - Compliance Requirements standards are set based on microbial risk assessments factoring in variables such as water flow rates, chemical concentration, and plant design.

- 2020 OCWA completed a Contact Time (CT) study of the facility operating under different conditions. To complete the study, a baffle factor was assumed on the typical baffle factors outlined in the Procedures for Disinfection of Drinking Water in Ontario.
- 2022 the Ministry of Environment, conservation and Parks (MECP) requested an additional study to confirm the baffle factor used in the CT calculations meets the minimum disinfection requirements under all operating conditions.

The study revealed that CT requirements could not be met under all operating scenarios and recommended disinfection upgrades. Staff wish to note that there is no immediate cause for alarm of the Water Treatment Plant not meeting the CT requirements. There were only a few extreme scenarios where CT could not be met. The instances where CT time could not be met were when the plant was operating under the worst possible of conditions. For example, water was at the coldest temperature, PH was at the highest recorded history and the water plant operating at peak capacity this scenario is not likely to occur however, the municipality needs to prepare for it.

For most scenarios adequate disinfection can be achieved at non-peak capacity. This simply means that the operators have to manage the flow rate of the water through the treatment process to ensure adequate disinfection. While also monitoring consumption in the distribution via water tower levels.

- There are few options available to upgrade the Water Treatment Plant to improve CT. One option would be to add an Ultraviolet system (UV). The Second option would be to add a baffle system to lengthen the flow time of the treatment process to achieve adequate disinfection.
  - A UV (Ultraviolet) system disinfects water by using ultraviolet light to inactivate microorganisms such as bacteria and viruses. As water flows through a chamber, it's exposed to UV light, which penetrates and disrupts the DNA of pathogens, preventing them from reproducing and rendering them inactive.
  - A Baffle System is a system of walls/curtains installed in the clear wells and reservoir to direct the water in a specific pathway to increase the time it takes for the water molecule to pass through the treatment process. It is essentially creating an intricate path or 'maze' for the water to travel through. The system ensures that no water particle follows a straight-line path

from entry to exit, thereby promoting uniform exposure to treatment processes and preventing any particles from bypassing treatment while others stagnate. This method optimizes contact time with disinfection agents, enhancing overall treatment efficacy and ensuring consistent water quality.

- Senior Staff meet to decide on the preferred option (if any).
  - A UV system is a highly effective system that would enhance the plants' ability to meet the disinfection requirements. However, from an asset management perspective it has many disadvantages, it has a higher initial project cost, will increase year energy costs, yearly maintenance from cleaning to bulb replacement and will the UV system likely be need to replaced in 15 years.
  - The baffle system's advantages are, from an asset management perspective, are lower initial project costs than UV, no additional energy costs or maintenance and a longer asset life cycle. Depending on the type of baffle system used we could have and asset life of 25-50 years depending on material type.
  - It should be noted that the completion of this project is not a legislated requirement, and Council could choose not to complete the work at all. However, should there be a requirement to take a clear well or reservoir offline for maintenance or repairs the treatment plant may not meet the Adequate Disinfection Requirements and release inadequately treated water into the distribution system. Consequences:
    - requirement to report this type of event to MECP and the Health Unit.
    - likely be directed need to implement a boil water advisory and or possible drinking water advisory.
    - likely investigation by the MECP Enforcement Branch with a possible outcome of a fine or fines.

## **Analysis:**

As detailed in the background, there are 3 known options to move forward.

1. UV system
2. Baffle system
3. No improvements

Staff recommend a baffle system as the suitable option to move forward regardless of funding availability.

- The construction cost is estimated to be between \$500,000 and \$1,000,000. This is a high-level estimate and will need to be refined after the detailed design is complete. The cost variance in the high-level estimate is based on an unknown number of baffles required and the material type.
- RVA proposal includes:
  - \$18,000 for preliminary design for potential funding application.
  - \$71,000 for detailed baffle design, Drawings, Specifications.
  - \$31,000 for tender assistance and Contract Administration.
- For a total project management cost of \$120,000

In mid-April a new funding Stream became available, the Health and Safety Water Stream grants opened for applications for projects. The goal of the funding is to expand or rehabilitate aging water, wastewater, stormwater, flood and erosion infrastructure. These projects will help preserve the current housing supply and protect communities during extreme weather events.

- Staff felt that the implementation of Baffles at the Water Treatment Plant project would best meet the funding criteria. This project is identified in the Asset Management Plan and was proposed for completion in 2027 with engineering commencing in 2026.
- This project could receive up to 73% funding. Staff and RVA are currently working on Funding application. Assuming a high level in project cost of \$1,000,000 and the project management from RVA of \$102,000 the municipal portion is estimated at \$297,540 (HST not included in these values)
  - The grant does permit other federal, municipal, funding for their 27% minimum contribution. Provincial Stacking will not be



permitted except for funding received from the building Faster Fund (BFF) and the Ontario Community Infrastructure Fund (OCIF)

- To qualify for the grant the project must be in the process of the design phase. Staff is recommending approval of the design of the project in 2025 as opposed to 2026. The application deadline for the Grant is June 26<sup>th</sup>, 2025. Planning and design work are considered eligible cost.

**Existing Policy:** seek council approval

**Strategic Goal:** Infrastructure

**Financial Commitment:**

In 2025, a cost of \$18,000 was approved to contract RVA to assist in preliminary design and preparation of grant application.

The report seeks approval for using the \$18,000 previously committed, along with an additional \$71,000, to fully fund the design initially internally from reserves. The intention is to reimburse these reserves through project debt which would include total project costs of design, engineering, construction and project management.

Once response from the grant is obtained, Staff will be bringing forward a follow up report with funding options that may include debt.

RVA being recommended as single source engineering firm to complete this design. RVA is quite knowledgeable with our treatment plant as it was the firm that originally designed the plant, the plant upgrades and was the author of the Baffle and CT study.

**Budgeted:**    **Yes** ☐    **No** ☒

**Implementation:** commence upon council approval, assuming a June 10th start  
RVA's milestones suggested a design completion by the end of November 2025

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**CAO/Clerk:** Julie Bouthillette, acting CAO

**Approval of Recommendation:**    **Yes** ☒    **No** ☐

**Comments:**