Date: **April 28, 2025**

To: **Mayor and Council**

Author: **Shaun Martinho, Director of Public Operations**

RE: **Wastewater Treatment Plant Pilot Project**

RECOMMENDED ACTION

That Council **authorizes** the completion of a pilot test of Algae Forest, with project partners Ontario Clean Water Agency and AlgaFilm Technologies Ltd., at the Lakeshore West Wastewater Pollution Control Plant, whereby the Algae Forest unit is constructed to aid the treatment of wastewater at the facility;

And that Council **authorizes** AlgaFilm Technologies as a municipal partner to apply for the Net-Zero Transformation Pilot Stream of the Green Municipal Fund program under the Federation of Canadian Municipalities and to apply this grant funding towards the pilot program.

BACKGROUND

Wastewater treatment plants in Ontario typically use compressed air to supply oxygen to drive aerobic reactions that remove carbon and ammonia contaminants. However, supplying air is very energy intensive, which results in significant energy cost and carbon emissions. Iron or aluminum-based chemicals are typically used to remove phosphorus; however, it can be costly to use these chemicals as high amounts are needed to achieve low effluent phosphorus concentrations or remove significant phosphorus, they produce substantial amounts of chemical sludge that needs to be trucked and disposed off-site, and they can consume alkalinity needed in the treatment process.

Sewage treatment capacity in the Town of Kingsville is limited. The Lakeshore West Wastewater Pollution Control Plant (Treatment Plant) operated at 90% of its rated capacity in 2024, while Kingsville Lagoons is operating at about 40% of its rated capacity. The wastewater treatment capacity in Kingsville is 75% in use, and plant expansion typically occurs when average flows reach 80% of the rated capacity. The Treatment Plant consistently meets its effluent compliance limits, though expansion to accommodate growth will be necessary. The expansion must consider the phosphorus loading impacts from the surrounding greenhouses discharging to the plant and provide an economical and environmental solution.

The Green Municipal Fund program of the Federation of Canadian Municipalities provides funding to aid municipalities with investing in climate resilient and low emission infrastructure. The Net-Zero Transformation stream within the Green Municipal Fund program specifically awards grants to municipalities for funding projects that demonstrate innovative greenhouse gas reduction technologies.

DISCUSSION

The proposed technology to improve treatment conditions is the Algae Forest developed by AlgaFilm Technologies Ltd. This innovative system irrigates sewage over an algae biofilm to facilitate nutrient removal. By utilizing oxygen produced through algal photosynthesis powered by solar energy, this method significantly reduces energy consumption, eliminating the need for compressed air in biological reactions.

Moreover, the algae process is expected to lower both chemical costs and the costs associated with hauling solids. The algae effectively consume more nitrogen and phosphorus compared to current processes at the Treatment Plant, which will decrease the chemicals required for phosphorus removal and result in less chemical sludge that needs to be transported offsite.

The pilot project is set to operate for 12 months and will be designed to treat between 150 to 200 cubic meters per day of sewage—approximately 3% to 4% of the Treatment Plant's rated capacity. If successful, this technology could benefit the town by increasing treatment capacity, lowering operating costs, and reducing greenhouse gas emissions at the Treatment Plant.

Additionally, this technology can be scaled down and potentially implemented as an onsite treatment option for greenhouse operations to effectively remove nitrogen and phosphorus from greenhouse nutrient feedwater.

FINANCIAL CONSIDERATIONS

The pilot project is eligible for funding under the Net-Zero Transformation Pilot Stream of the Green Municipal Fund program. This grant can cover up to 50% of eligible costs, with a maximum amount of $500,000. With the Council's approval, AlgaFilm Technologies Ltd. can apply for this funding as a municipal partner with the Town of Kingsville.

AlgaFilm will contribute funding for this pilot, which will be used to cover the remaining eligible costs once the Net-Zero Transformation Pilot funding is applied. The total estimated project costs range from $600,000 to $990,000. The Ontario Clean Water Agency will provide in-kind operational contributions as needed.

It is not expected that the Town of Kingsville will provide any funding for this pilot as a municipal partner with AlgaFilm.

ENVIRONMENTAL CONSIDERATIONS

The Algae Forest technology reduces greenhouse gas emissions and energy use at the facility, reducing the carbon footprint of the Town of Kingsville.

The Algae Forest is not expected to increase odour release from the facility. The unit will be enclosed in a greenhouse and sewage will be well-aerated from the irrigation systems and algal photosynthesis.

CONSULTATIONS

Ontario Clean Water Agency
AlgaFilm Technologies
Ministry of the Environment, Conservation and Parks

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