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Council-In-Committee Meeting – June 12, 2025

Subject:	Simcoe Wastewater Treatment Plant – Capital Status Update
Report Number:	EIS-25-009
Division:	Environmental and Infrastructure Services
Department:	Engineering
Ward:	Multiple Wards
Purpose:	For Decision

Recommendation(s):

That report EIS-25-009 Simcoe Wastewater Treatment Plant – Capital Status Update be received; and

That Council direct staff to complete the Class Environmental Assessment addendum and Public Consultation process; and

Further that staff report back with the outcome of the Class Environmental Assessment addendum and the associated capital and procurement strategy.

Executive Summary:

The purpose of this report is to inform Council on the project status and obtain approval to proceed with the Class Environmental Assessment (EA) addendum and stakeholder engagement for the Simcoe Wastewater Treatment Plant Upgrades.

The scope of the 2017 proposed upgrades required updates and changes to address capacity and operational performance gaps through cost-effective and innovative technologies. To effectively address current challenges and recommendations of the 2007 Biosolids management and Storage Options Report, the upgrades will be implemented in two phases, namely liquid and solids train upgrades. These two projects will address the operational performance, electrical safety, obsolete technology, compliance issues and capacity/redundancy bottlenecks. While both projects are of high importance, the solids train upgrades were prioritized due to the urgency of the electrical safety compliance orders and potential for digester failure risk at the Simcoe and Port Dover WWTPs.

The EA addendum is the County's due diligence step to ensure community engagement and public consultation on the updated upgrades at the Simcoe Wastewater Treatment Plant (WWTP) as part of Phase 1 - Solids Train Upgrades. Upon thorough review and analysis of previous design solution and several technology alternatives, the project

team recommend a county-wide centralized biosolids processing facility and thermal hydrolysis process instead of anaerobic digestion. Phase 2 – Liquid Train Upgrades (former Headworks) will address the capacity bottlenecks, improve preliminary and primary treatment, upgrade the conventional biological treatment stage to advanced aeration with proper controls and ensure operational flexibility, process performance and safety compliance.

A class environmental assessment is highly recommended given the gap between the 2007 and 2016 planning, 2025 state of good repair and 2051 projected needs. The cost of this effort is estimated by the County's current consultant at $185,027 exclusive HST and inclusive of archaeological assessments.

Discussions:

The Simcoe Wastewater Treatment Plant (WWTP) is a 75-year-old facility that treats sewage collected from Simcoe. Additionally, the WWTP accepts hauled septage, leachate and raw sewage generated at other locations that have no sewage collection and treatment infrastructure.

The Simcoe WWTP is rated at 15,400 m3/d average daily flow and has sufficient capacity to meet the County's growth needs beyond 2051. However, despite ongoing maintenance and rehabilitation, many of the treatment processes are beyond their operating life and require replacement and / or upgrades.

The 2016 Integrated Sustainable Management Plan (ISMP) identified limited upgrades to headworks and digester facilities which aligned to recommendations from the 2007 Biosolids Treatment and Storage Options Plan. At a high level the approach called for a Municipal Class Environmental Assessment (Schedule C) and implementation of aerobic digesters, 240-days storage volumes, and incorporating sludge from the Port Rowan and Delhi WWTP's.

<u>Simcoe Wastewater Treatment Plant – Process and 2017 Capital Upgrades:</u>

The Simcoe WWTP is a conventional aeration facility with tertiary filtration resulting in a high level of treatment before effluent is discharged to the Lynn River. The solids (sludge) created through the wastewater treatment process are subsequently treated in anaerobic digesters to produce a Class B biosolids. The biosolids are then to be stored on site for 240 days and / or land applied following the Non-Agricultural Source Material (NASM) regulations outlined by O. Reg. 267/03 (Nutrient Management Act).

While the overall WWTP's rated capacity is more than adequate for future needs, deterioration and state of good repair of some process elements (i.e digesters) have resulted in the plant operating at reduced capacity and efficiency. The original secondary digester is currently used as storage / thickening facility to handle the solids resulted from the more recent upgraded liquid train, and digester shut down and

cleaning cannot be performed regularly resulting in inefficiencies and poor quality biosolids. No other upgrades or modifications were completed on the solids train.

Liquid Treatment Challenges:

One of the main performance objectives for a wastewater treatment plant is phosphorus and ammonia removal. At various times of the year staff struggle to maintain compliance for these parameters due to inefficient conventional biological treatment (aeration tanks and secondary clarifiers).

The preliminary treatment processes (headworks screening and grit removal) are an operational bottleneck due to a lack of redundancy. For example, the WWTP has only one duty screen and one duty grit separator impacting the ability to rotate equipment for proper maintenance and handling increased peak wet weather flows in the absence of redundancy and bypass, which is not an option at this plant. These impacts are felt further downstream in the treatment train where other downstream processes such must treat influent with higher solids content. In a worst-case operational scenario, the final effluent quality will not meet compliance targets. A facility optimization assessment is underway to identify process capacity and performance gaps and recommend more robust and sustainable capital upgrades.

Solids Treatment Challenges:

The existing solids treatment train consists of primary digesters (1970's era) and secondary digesters (1950's era) both of which are past their service life. The condition of these assets has created challenges maintaining compliance with the Electrical Safety Authority (ESA) and the Technical Standards and Safety Authority (TSSA).

The major concern flagged by the ESA inspectors is the poor condition of the existing flare as well as the electrical panels, and heating equipment (boilers and pipelines) that is accelerated in the corrosive environment. The required internal temperature (35^0 C) cannot be maintained due to increased volume of feed sludge, insufficient digester mixing and increased digester fouling due to poor screening in the headworks. These process limitations result in a larger quantity of biosolids and when they cannot be land applied are hauled to the Townsend Lagoons.

Elsewhere in Norfolk County, the Delhi and Port Rowan WWTP's generate stabilized sludge that is hauled to the Townsend lagoons for further processing prior to land application. At the Port Dover WWTP the technology is of a similar age to the Simcoe WWTP and has similar performance and safety issues. The Port Dover biosolids are stored at the plant and hauled to land application. At the Waterford WWTP there is no process to treat sludge, and the onsite lagoons are monitored and cleaned out frequently. As the community of Waterford continues to grow a more robust biosolids management program will be needed.

2017 Capital Project Plan:

A capital project was initiated in 2017 with the design spanning over a number of years. The design included the replacement of major treatment process areas such as the preliminary treatment (headworks), anaerobic digesters, 240-days biosolids storage, associated service upgrades and a new administration / control building. The project was tendered in 2022 with the lowest compliant bid of approximately $70M, nearly doubling the approved capital budget. The project was not awarded, and staff took the opportunity to review the dated design and estimates to develop a phasing plan and explore other project opportunities.

2025 Simcoe WWTP Project Delivery Options:

Phase 1 – Solids Treatment Upgrades

The project team has worked with stakeholders (Engineering, Environmental Services, OCWA, and consultants) to review the previous design to ensure it meets current and future needs. The team identified an opportunity to centralize biosolids management for all five county-owned WWTP's and help alleviate some of the process and treatment challenges identified previously in the report. This approach would benefit from economies of scale, operational flexibility and potential energy generation (biogas).

The project team has reviewed the current state of infrastructure at our five WWTP's. The Port Dover WWTP requires a full replacement of the existing digester (not included in the ongoing capital project), the Waterford WWTP is producing more solids since the capital upgrades a few years ago, and the Delhi and Port Rowan WWTP's have limited space for expansion. Based on this information, it became evident that a new biosolids management facility at the Simcoe WWTP is the most viable solution.

A centralized biosolids management program aligns with the 2007 Biosolids Plan and the 2016 Integrated Sustainable Master Plan. However, given the age of these studies and the expansion to include additional WWTP's, staff are recommending an amendment to the Class Environmental Assessment and further public consultation.

The general approach to the centralized biosolids management program will include:

- Thermal Hydrolysis Process (THP) leveraging technology such as that patented by Lystek
- Odour mitigation, bio-gas capture for internal heating and process needs
- A potential Design – Build – Operate contract model to expedite delivery and ongoing operations

A Class D Estimate was completed (with a healthy contingency) and has been valued at $56.3M. The approved capital budget contains $53.4M for the Simcoe WWTP upgrades resulting in a potential budget shortfall of $2.9M. However, it is important to note that a centralized biosolids management approach incorporates material from all of the County WWTP's and eliminates future investment in asset renewal at these sites.

Truck routes and accessibility will be evaluated as part of the EA addendum. These efforts may also be coordinated with active development files to ensure proper movement through the corridor.

There are many benefits associated with the proposed centralized biosolids management solution, including the following:

- Compact design and operation allowing for future upgrades beyond 2051 without land expansion
- THP produces a drier product and is more efficient than traditional anerobic digestion which reduces greenhouse gas emissions
- THP produces a higher quality biosolid (Class A) that is easier to market, is subject to less restrictions, and can generate revenue
- Eliminates reliance on Haldimand County lagoons for biosolids management
- The Simcoe WWTP has excess rated capacity, meaning that additional solids treatment will not inhibit the plant functionality
- Eliminates future capital upgrades at the other WWTP's (Port Dover, Delhi, Waterford and Port Rowan)
- Reduced on-site storage requirements
- Lystek is a Canadian founded company with corporate headquarters located in Cambridge

<u>Phase 2 – Liquid Train Upgrades (Former Headworks)</u>

Upgrades to the Simcoe WWTP are a significant undertaking and to ensure success staff are recommending they be delivered in two distinct phases. Many elements of the liquid treatment train pre-date 1950 and require replacement.

Similar to the Phase 1 (Solids) the project team worked with the stakeholders to develop a feasible scope of work. At a high level, the scope of work includes:

- Demolition of existing raw sewage pumping station and construction of a new raw sewage pumping station
- Construction of new septage and leachate receiving station
- Installation of two mechanical bar screens (duty / standby) for operational compliance
- Installation of two new grit removal systems
- Installation of new aeration blowers for increased ammonia and phosphorus removal
- Rehabilitation of the tertiary filter system
- Upgraded power supply for the entire WWTP complete with dedicated generator for the liquid treatment train
- The construction of a new administration building has been removed from the scope of work to help reduce the overall capital cost

Leveraging information from the 2022 Simcoe WWTP Request For Tender that was not awarded and incorporating new project elements a high-level cost estimate of $45M has been established for the Phase 2 project. This estimate will be further evaluated and adjusted for the 2026 Capital Budget.

Current Status and Next Steps:

Norfolk County staff have completed a technical review to ensure the approach would achieve operational compliance and achieve long term sustainability of the WWTP.

Staff have also visited similar WWTP's that are in various stages of implementing THP process provided by Lystek. These visits allow staff to interact with other municipalities and operators to gain a full understanding of the technology from an operational perspective.

Pending Council approval staff will initiate the Class Environmental Assessment Amendment and public consultation. Upon completion, staff will report back to Council with the preferred path forward and associated procurement strategy.

Financial Services Comments:

Solids Train – Simcoe WWTP Phase 1 Upgrades (Project 5831711):

The Approved Capital Budget includes an allocation of $58,262,000 for the Simcoe WWTP Phase 1 Upgrades, consisting of $3,900,000 for Engineering and $54,362,000 for Construction. Funding for this project is to be provided from the Wastewater Reserve ($2,400,000) and the issuance of debentures ($55,862,000). Although this report is just being received as information, it does signal an increase in the Construction Budget to proceed with the planned solution. At Class D Estimates provided (which can vary by up to 50% in accuracy), it should be expected that a budget amendment of $3,000,000 may be required to proceed in the future. Conversely, a budget reduction (5 to 10%) is slightly possible provided the market volatility stabilizes within the next few years.

Consistent with the messaging of prior reports to Council, ratepayers are becoming overly burdened with debt requirements due to the lack of available infrastructure funding to support projects. As engineering progresses, and a follow-up report is brought forward to Council with any required budget amendments, a fulsome analysis of impacts will be provided. This could increase the need to review other large-scale projects as the County's corporate debt pressures, more specifically rate-related debt requirements, are approaching burdensome levels.

Liquids Train – Simcoe WWTP Phase 2 Upgrades (Project 5832422):

The 2025 Approved Capital Budget includes an allocation of $2,627,000 for Engineering for the Simcoe WWTP Phase 2 Upgrades, with funding provided from the Wastewater Reserve. The allocation for Construction is currently included in the Approved Capital

Plan in 2027 at $33,550,000, with funding to be provided from the issuance of debentures. Any costing revisions identified by the department will be integrated into future iterations of the 10-Year Rate Budget. The timelines for completion identified may be subject to change based on financial capacity.

Simcoe WWTP Roof & Envelope Repairs:

The 2025 Approved Capital Budget also includes an allocation of $564,000 for repairs to the structure of the Simcoe WWTP, with funding provided from the Wastewater Reserve. Given the other work occurring at the facility, this project will be included in the scope of the future tender to ensure efficiencies from a bidding and scheduling perspective.

Change in Project Plans – Development Charge Investigation:

The upgrades being proposed at the Simcoe WWTP Phase 1 appear to have some benefit to the development potential in areas outside of Simcoe, due to the cancellation of required upgrades at other WWTP's. Staff have started discussions on how this may be captured in the upcoming Development Charges Background Study update, but have not determined whether potential changes to the funding share for the proposed Phase 1 solution can be made yet. This project will have to be thoroughly analyzed in consultation with growth forecasts, plant demands, and capital requirements to verify whether a portion of the planned upgrades can be funded through Development Charges. This will be reviewed in detail through the completion of the Integrated Sustainable Master Plan and upcoming Development Charges Background Study.

If the Simcoe WWTP Phase 1 upgrades cause the deferral or change in project plans at other wastewater treatment plant facilities in the County, those projects will also be updated accordingly in the Proposed 2026-2035 Rate Capital Plan.

Interdepartmental Implications:

At this stage of the project there are no interdepartmental implications. The project team will continue to work with Corporate Services and Procurement on the delivery of this project.

Consultation(s):

Corporate Services, Environmental Services and Engineering Services were consulted in the development of this report.

Strategic Plan Linkage:

This report aligns with the 2022-2026 Council Strategic Priority Building Norfolk - Develop the infrastructure and supports needed to ensure complete communities.

Explanation:
The proposed class environmental amendment and stakeholders' engagement will allow for community input, and ultimately ensure community awareness and support throughout the proposed upgrades project life cycle.

Attachment(s):

- None.

Approval:

Approved By:
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