



Utilities Kingston
Report to Environment, Infrastructure & Transportation Policies Committee
Report Number EITP-24-010

To: Chair and Members of the Environment, Infrastructure & Transportation Policies Committee

From: David Fell, President & CEO, Utilities Kingston

Resource Staff: Heather Roberts, Director, Water & Wastewater, Utilities Kingston

Date of Meeting: February 13, 2024

Subject: Update on the Municipal Class Environmental Assessment for the Kingston Regional Biosolids & Biogas Facility

Council Strategic Plan Alignment:

Theme: 2. Lead Environmental Stewardship and Climate Action

Goal: 2.1 Reduce carbon footprint of City operations.

Goal: 2.2 Support climate action and sustainability for residents, businesses and partners.

Executive Summary:

A Master Plan for Enhanced Biosolids Management and Biogas Utilization ([Master Plan](#)) was completed in July 2020 identifying a recommendation and preferred solution to “develop an integrated biosolids and source separated organics processing facility at a greenfield development site. The opportunity site for consideration would be located within the property boundary of Knox Farm”. Knox Farm is a vacant City-owned property located just north of Highway 401 with access from Perth Road. The option of incorporating organic waste processing to produce a biogas was considered beneficial due to the potential reductions in greenhouse gas emissions if biogas can be used as a replacement for petroleum natural gas or other fossil fuels.

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The Environment, Infrastructure, & Transportation Policies (EITP) committee endorsed proceeding with further assessing Knox Farm for this project on October 12, 2021, which was later approved by City of Kingston Council on November 2, 2021. Refer to [Report Number EITP-21-019](#) for additional project context and background. It is noted that Council's consent was not final approval to use Knox Farm; consent was limited to the purposes of completing the Municipal Class Environmental Assessment (Class EA).

Dillon Consulting Limited (Dillon) was later retained in July 2022 to review the environmental, technical, and financial feasibility of constructing the facility at Knox Farm through the completion of a Class EA. At a high-level, the scope of work for the Class EA project consists of the following steps:

- Step 1: Review the Master Plan and complete a suitability assessment of the Knox Farm property prior to formally initiating a Schedule C Class EA.
- Step 2: Proceed with public consultation and vendor engagement as it relates to the facility and considerations identified for the Knox Farm property.
- Step 3: Formally initiate the Class EA process to develop and evaluate alternative design concepts for the facility. Complete final Environmental Study Report (ESR).

Steps 1 and 2 were completed between August 2022 and June 2023, noting the following:

- The 2020 Master Plan was reviewed and the suitability of the Knox Farm property for the proposed facility was assessed. No major barriers were identified.
- Utilities Kingston provided an [information report to EITP](#) on February 14, 2023, to provide an update on Step 1 ahead of a public information session and to provide details on the next steps of the project. The report contains background information for the project, dating back to 2017.
- A public information session to inform the public of the results of the Knox Farm suitability assessment took place in March 2023. Refer to these [display boards](#) for more information.
- A request for information was issued by Dillon to solicit information from key vendors. Responses were received and reviewed.

Step 3 was initiated in September 2023 when the Class EA process was publicly announced by issuing the following [Notice of Commencement](#).

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The purpose of this report is to provide the EITP Committee with an update on the project as UK is proceeding through the stages of Step 3 and is preparing to conduct another public information session at the end of March 2024.

Recommendation:

This report is for information only.

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Authorizing Signatures:



**David Fell, President & CEO,
Utilities Kingston**

p.p.

ORIGINAL SIGNED BY CHIEF ADMINISTRATIVE OFFICER

**Lanie Hurdle, Chief
Administrative Officer**

Consultation with the following Members of the Corporate Management Team:

Paige Agnew, Commissioner, Growth & Development Services	<input checked="" type="checkbox"/>
Jennifer Campbell, Commissioner, Community Services	Not required
Neil Carbone, Commissioner, Corporate Services	Not required
Peter Huigenbos, Commissioner, Major Projects & Strategic Initiatives	Not required
Brad Joyce, Commissioner, Infrastructure, Transportation & Emergency Services	Not required
Desirée Kennedy, Chief Financial Officer & City Treasurer	Not required

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Options/Discussion:

The purpose of this report is to provide the EITP Committee with an update on the Kingston Regional Biosolids & Biogas Facility Municipal Class Environmental Assessment (Class EA) project prior to the second public information session at the end of March 2024. Information on the alternative design concepts will be shared with the public at the session. The release of project information often generates questions and public interest and so, staff are being proactive to relay project information to keep Council members and the public informed.

This report provides current project details, events and next steps. As noted in the executive summary, background information for the project, dating back to 2017 was provided to the EITP committee in February 2023 and can be reviewed [here](#).

Project Work Plan and Current Status

Dillon's project work plan generally consists of the following steps:

- Step 1: Review the Master Plan and complete a suitability assessment of the Knox Farm property prior to formally initiating a Schedule C Class EA.
- Step 2: Proceed with public consultation and potential vendor engagement as it relates to the facility and considerations identified for the Knox Farm property.
- Step 3: Formally initiate the Class EA process to develop and evaluate alternative design concepts for the facility. Complete final Environmental Study Report (ESR).

Steps 1 and 2 are complete and Utilities Kingston (UK) is progressing through Step 3. The project is on track to be completed by June 2024.

Alternative Design Concepts

UK is progressing through Step 3 of the Class EA project which includes the development of two design concepts for the preferred solution and comparing them using a comprehensive set of evaluation criteria that addresses:

- **Technical Factors**, such as, construction, process and maintenance complexities, biogas production, expandability, servicing, wastewater treatment, residual volume and nutrient content, proven technology.
- **Financial Factors**, such as, capital, operating and maintenance costs, lifecycle costs and revenue.

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- **Cultural Environment**, such as, potential impacts to heritage and archaeological resources and indigenous communities and resources.
- **Socio-economic Environment**, such as, land-use, consistency and conformance with local, provincial, and federal policies and nuisance to community.
- **Physical Environment**, such as, potential impacts to groundwater, surface water, climate change (i.e., greenhouse gas emissions), noise, vibration, air quality and odour.
- **Natural Environment**, such as, potential impacts to vegetation/trees, terrestrial habitat and wildlife, fisheries/aquatic habitat and wildlife and species at risk (SAR).

Two alternative design concepts have been developed that consider the overall goals of the project, including the need to meet future servicing needs (i.e., sufficient solids capacity at wastewater treatment plants), enhance biogas generation and management of biosolids, with the aim to reduce greenhouse gas emissions.

Technical performance features have been derived from materials obtained through a vendor engagement process (Step 2) and have been used as the main distinguishing factors between the concepts. Key technical process features which may differ between alternatives were first identified to guide the development of alternative design concepts. These features include:

1. Type of feedstock preparation required.
2. Presence or absence of pre-conditioning steps, such as thermal hydrolysis prior to digestion.
3. Core digestion process type.
4. Biogas treatment and utilization.
5. Form of biosolids product (i.e., liquid, semi-solid, dry powder, pellets).

Based on the above features it was determined that features 2 and 5 were meaningful differentiating factors that could be evaluated and compared.

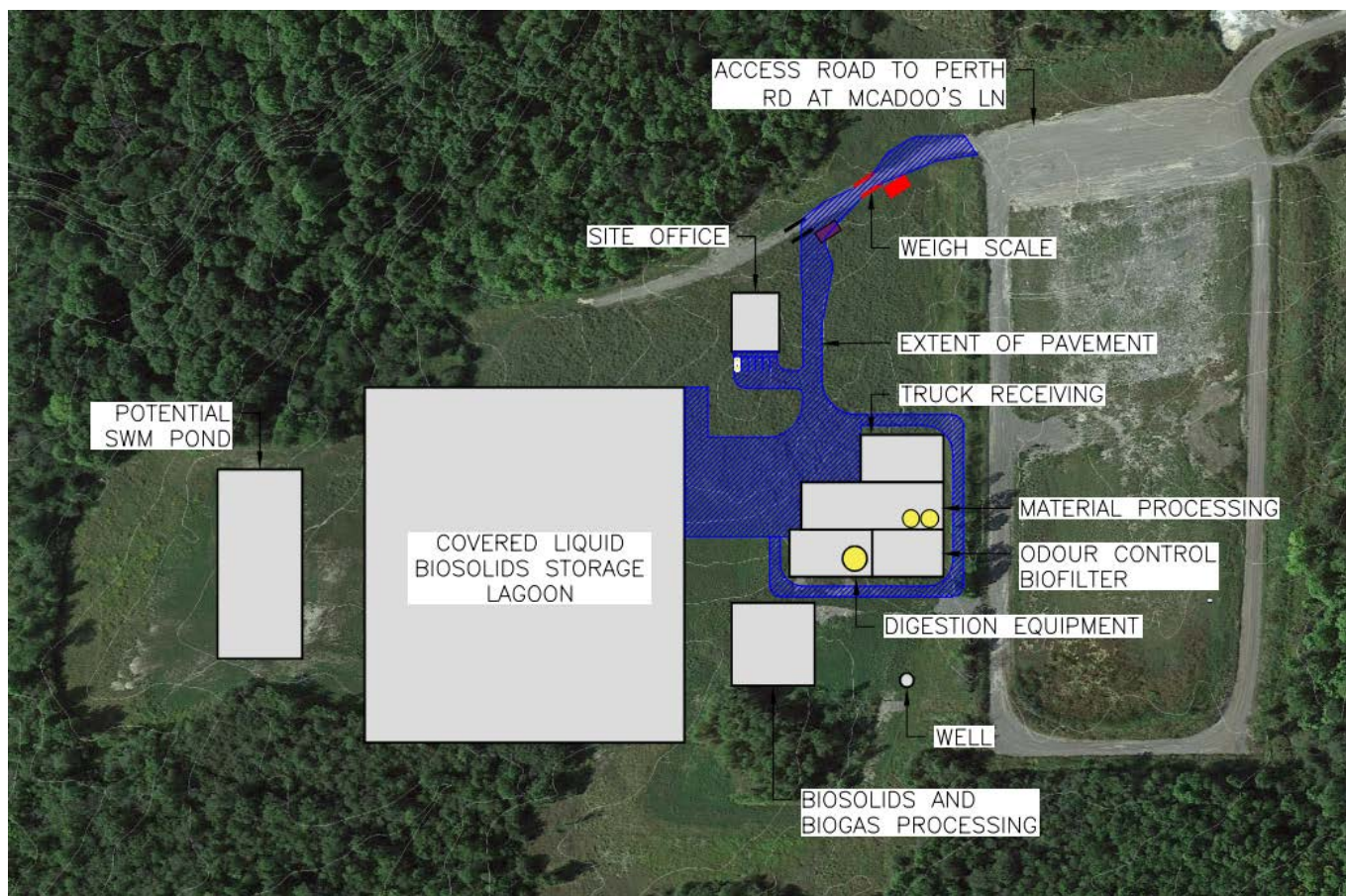
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Focusing on technical distinctions between features 2 (pre-conditioning) and 5 (final biosolids product), at a high level, the following two design concepts were selected:

- 1. Alternative Design Concept 1: Focus on maximizing resource recovery.
 - a. Concept 1 is based on prioritizing the generation of energy (i.e., biogas) and biosolids residuals with an emphasis on retaining nutrient value for beneficial reuse. This alternative will likely require additional utility use for processing, compared to simpler alternatives without pre-conditioning. Key features:
 - i. Pre-conditioning of feedstock to maximize biogas generation.
 - ii. Production of a liquid biosolids end-product, which minimizes wastewater treatment demands and provides maximum nutrient for beneficial reuse.

Figure 1: Conceptual Layout for Concept 1

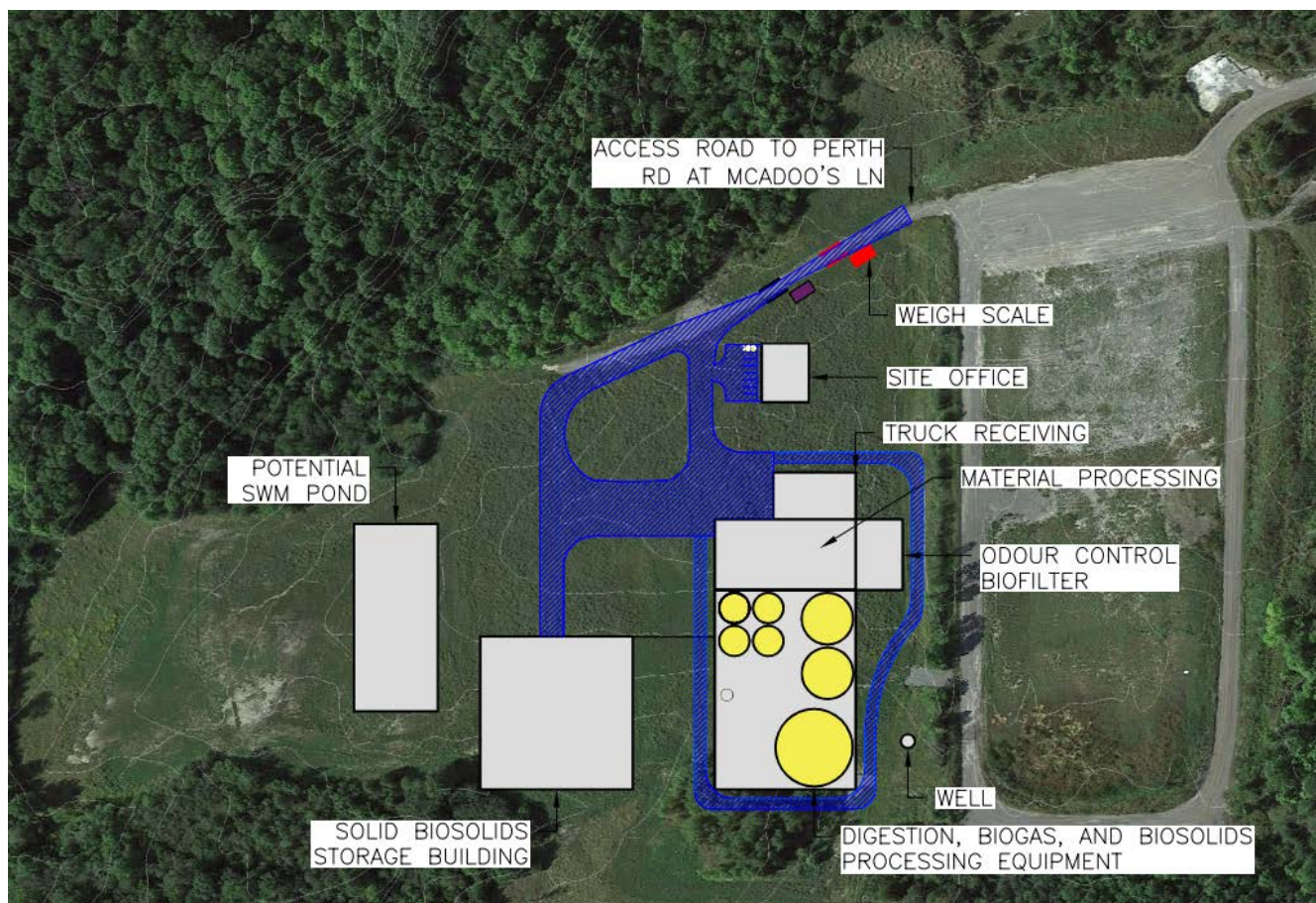


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- 2. Alternative design Concept 2: Focus on minimizing utility demands and residuals volume.
 - a. Concept 2 is based on prioritizing simplicity of operation, reduced utility usage (i.e., no energy requirements to pre-condition) and the production of a lower volume biosolids product requiring less storage space and fewer trucks to transport to end-use. Key features:
 - i. No feedstock pre-conditioning, which minimizes energy requirements.
 - ii. Production of dewatered biosolids end-product, minimizes onsite storage and trucking. This alternative would generate centrate liquids (liquids created when residuals are centrifuged) that cannot be treated on-site and would have to be trucked to a WWTP for treatment. Some centrate may be reused onsite for blending with incoming feedstock.

Figure 2: Conceptual Layout for Concept 2



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At this stage in the project, based on site location, availability of supporting infrastructure (adjacent City-owned natural gas pipeline) and other preliminary analyses, both alternative design concepts include upgrading biogas to RNG and injection into the natural gas pipeline as the preferred beneficial reuse for the biogas produced.

Preliminary Evaluation Details

At the time of writing this report, the assessment and evaluation of these concepts using the criteria as listed above was still underway, and a preliminary preferred concept was not available, but will be selected before the public information session in March 2024. The information below is subject to change as work continues; however, the following provides a brief, preliminary snapshot of some evaluation criteria results separated by similarities and differences between the concepts.

Similarities between Concepts 1 and 2:

- Both have similar potential impacts to groundwater and surface water, in terms of the potential risk of spills from digestion tanks and/or biosolids storage that could result in contamination. These potential impacts can be mitigated through design and operational considerations.
- Both are anticipated to meet applicable noise limits to prevent impacts to neighbours.
- Both have minimal potential for negative impacts to archaeological and cultural heritage resources.
- Both concepts are consistent with provincial and local policies, and both would likely require land-use planning approvals.
- Both concepts include anaerobic digestion of wastewater biosolids and source separated organic (SSO) wastes which is a proven technology with a long design life and well-established vendors to supply.
- Both concepts include odour mitigation strategies that are expected to be effective in mitigating odour impacts to nearby properties.
- Both concepts require trucking of feedstock to the facility and trucking to remove and beneficially reuse residual materials.

Differences Between Concepts 1 and 2:

- Due primarily to storage of liquid biosolid feedstock, Concept 1 has a larger footprint and larger scope of civil works that will result in higher requirements for tree and vegetation removal and corresponding loss of terrestrial habitat.

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- Concept 1 is expected to be a more energy intensive operation due to the feedstock pre-conditioning requirement with corresponding impact on operating costs and emissions..
- Concept 1 is expected to yield a significantly higher biogas production resulting in a larger net reduction in greenhouse gas emissions downstream through substitution of RNG for petroleum natural gas or other fossil fuels.
- Concept 1 includes a concentrated liquid biosolids residual that is expected to retain a higher nutrient value and be a more favourable product for agricultural applications.
- Concept 2 is expected to have comparatively higher odour generation potential from the storage of biosolids in a solid form, compared to liquid biosolids in concept 1 that would be contained within a covered lagoon.

Criteria of Concern

No major barriers have been identified for Knox Farm as the potential location for either of the alternative design concepts. However, the following areas still require significant assessment and evaluation and have the potential to be barriers to the project moving forward:

1. Physical Environment and potential to reduce and impact emission of greenhouse gases. An expected objective for the project is to produce a net reduction in GHG emissions that is commensurate with the investment required. This would primarily be achieved through the production and use of RNG in place of petroleum natural gas or other fossil fuels but also in changes to how existing wastewater treatment plants operate and the utility and transportation features of the considered design concepts.
2. Financial Factors and viability of a revenue positive business model. Understanding capital, operating, maintenance and lifecycle costs, as well as expected revenues from feedstock tipping fees and sale of biogas and residual biosolids.

The above is not meant to be exclusive. All criteria for the alternative concepts continue to be evaluated in order to support a future go or no-go recommendation to Council.

Dedicated Consultations

In late 2023 and early 2024, focused information sessions and discussions took place with the Ministry of the Environment, Conservation and Parks (MECP), Cataraqui Region Conservation Authority (CRCA), Alderville First Nations and the Ministry of Transportation. The purpose of these sessions was to provide an overview of the project, share preliminary technical results and details on the alternative design concepts, and facilitate discussion.

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Feedback will be considered and summarized in the consultation summary report which forms part of the final Environmental Study Report (ESR).

Public Information Session

A public information session will take place at the end of March 2024. The objective of the information session is to seek feedback on the evaluation results and the preliminary preferred alternative design concept.

A survey will be available to attendees and will also be available on UK's website and social media.

Feedback will be considered and summarized in the consultation summary report which forms part of the final ESR.

Next Steps and Class EA Completion

Next stages for Step 3 include further analysis and refinement of the alternative design concepts including refinement of GHG emission assessments, selection of the preliminary preferred option, hosting a public information session, review feedback and summarize into a report, refine preferred option, prepare final ESR and post for 30-day public review period.

The Class EA is expected to be completed by June 2024.

Business Case

Recognizing the need to assess the complexities of owning, managing, operating and maintaining a business of this nature (i.e., buying and processing organic waste feedstocks, selling renewable natural gas and residual biosolids), UK issued a Request for Proposal in November 2023 to retain a firm to undertake a detailed business case to review ownership, operating and financing strategies, procurement delivery options and complete a market sounding exercise, risk assessment and a robust financial analysis. The final deliverable is a business case report that will assist staff in providing further recommendations to UK and the City.

Award of this project is pending. The intent is that the Business Case will be completed by the end of Q3 2024.

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Go/No-Go Recommendation to Council

The Class EA and Business Case are expected to be completed by June 2024 and end of Q3 2024, respectively. It is anticipated that the results of these two studies will provide UK and City staff with the required information to provide a go or no-go recommendation to Council by the end of the year.

Existing Policy/By-Law

In accordance with provisions for conducting Municipal Class Environmental Assessments, a [Notice of Commencement](#) was announced in September 2023.

Financial Considerations

Sufficient capital funds have been approved and allocated to complete the Class EA and Business Case projects.

Contacts:

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Other City of Kingston Staff Consulted:

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Paul MacLatchy, Environment Director, Business, Real Estate & Environment

Exhibits Attached:

None