

SCHEDULE F – PROJECT COMPLETION REPORT TEMPLATE

VERY IMPORTANT:

Timing: You need to email a report, to your GMF project officer (contact info is in Schedule C), on the dates indicated in Schedule C or whenever FCM asks for such a report.

Copyright: Before you submit a report to FCM, make sure you hold the copyright for the report. If you're hiring a consultant to prepare the report, please make sure to get the copyright (see FCM's copyright tips document), or else FCM will not be able to disburse the Grant Amount.

Accessibility for people with disabilities: Please do not change the format, font, layout, etc. of this report. This template has been specially designed, following FCM's Accessibility Guidelines, in order to be accessible to people with disabilities.

Confidentiality: If your report contains any Confidential Information that you would prefer not be made available to the public (e.g. through a case study or other materials produced by FCM that relate to your Project), please submit two versions of the report:

- 1. Complete report including Confidential Information:** Please clearly label this report with the word "**Confidential**" or similar wording and FCM will treat it as confidential.
- 2. Abridged report excluding Confidential Information:** This report may be posted on the FCM website and otherwise made available to interested third parties, to help FCM meet its knowledge sharing objectives.

Please contact your project officer to receive an electronic copy of the Completion Report Template.

Upon completion of the project, a copy of the Final Deliverable must be submitted along with this Completion Report.

FCM will post your report on the [Green Municipal Fund™ \(GMF\) website](#). This is because one of FCM's mandates is to help municipal governments share their knowledge and expertise regarding municipal environmental projects, plans and studies.

How to complete the Completion Report

The purpose of the Completion Report is to share the story of your community's experience in undertaking your project with others seeking to address similar issues in their own communities.

Please write the report in plain language that can be understood by people who are not specialists on the subject. A Completion Report is typically in the range of 5–10 pages, but may be longer or shorter, depending on the complexity of the project.

GMF grant recipients must enclose **final** copies of the Completion Report and the Final Deliverable with their final Request for Contribution. The reports, including all attachments and appendices, must be submitted in PDF format with searchable text functionality. Reports that are not clearly identifiable as final reports, such as those displaying headers, footers, titles or watermarks containing terms like "draft" or "for internal use only," will not be accepted by GMF. Additionally, reports must be dated. If you have questions about completing this report, please consult GMF staff.

GMF number	16718
Name of lead applicant (municipality or other partner)	City of Cornwall
Name, title, full address, phone, fax and e-mail address of lead technical contact for this study	Indra Maharjan, Director 2850 Hurontario Rd., Mississauga, Ontario. 416-775-0056 imaharjan@ocwa.com
Date of the report	2021-02-05

1. Introduction

- a) Who was involved in doing the Feasibility Study, and what are their affiliations? Please include name, title and contact information. Those involved could include municipal staff, engineers and other consultants, a representative from a non-governmental organization, and others.

Name, Title	Contact information	Role
Carl Goodwin Division Manager, Environmental Services City of Cornwall	861 Second Street West Cornwall, ON K6H 5T9 (613)930-2787 ext 2582	Carl was the project lead for the Town.
Patrick Carriere Supervisor, Waste Water Treatment Plant Department of Infrastructure & Municipal Works City of Cornwall	2800 Montreal Road, Cornwall Ont. K6H-1G2 (613) 930-2787 ext. 2000 or (613) 933-5157 Fax: (613) 933-3701 email: pcarriere@cornwall.ca	Patrick and his team at the wastewater treatment plant provided site and process-specific knowledge, and contributed to criteria-setting.
Indra Maharjan, Director of Innovation, Technology, and Alternative Delivery, OCWA	2850 Hurontario Rd., Mississauga, Ontario. 416-775-0056 imaharjan@ocwa.com	Indra was the overall Project Sponsor for this work and was responsible for communicating with the Town council.
Jane Ho, Project Engineer, OCWA	2085 Hurontario Street, 5th Floor Mississauga, Ontario L5A 4G1 647-522-6634 jho@ocwa.com	Jane was project manager and technical reviewer for OCWA.
Etienne Bordeleau, Business Group Leader, GHD	179 Colonnade Road South Suite 400 Ottawa Ontario K2E 7J4 Canada D 613 288 1709 M 343 543 4799 E etienne.bordeleau@ghd.com	Etienne managed the project from consultant's end, co-author of report.
Tanya Bogolowski, Waste Management Engineer	455 Phillip Street, Waterloo Ontario N2L 3X2 Canada D 519 340 3938 M 519 574 2208 tanya.bogoslowski@ghd.com	Tanya acted as senior reviewer and co-author of the report.
Dilshad Mondegarian, Engineer	455 Phillip Street Unit #100A Waterloo Ontario N2L 3X2 Canada D +1 519 340 4202 M +1 519 729 0932 E dilshad.mondegarian@ghd.com	Dilshad conducted the analysis and wrote the report.

2. The Feasibility Study

- a) Describe the process that you undertook to make this feasibility study a reality, from concept, to council approval, to RFP, to final deliverable.

The City of Cornwall has been exploring options to extend its landfill life in the recent years and seeking to plan forward for the provincial circular economy vision, especially regarding organic waste diversion. As part of this effort, it wanted to explore the potential opportunity of bringing organic wastes such as Source Separated Organics (SSO) to its existing Cornwall Wastewater Treatment Plant (WWTP). Also anticipated is the replacement or retrofitting of existing digester technology with more efficient and innovative Anaerobic Digester (AD) technology that will increase and enhance the existing methane gas production through co-digestion. The methane produced will be converted to electricity or Renewable Natural Gas (RNG) through necessary cleaning and upgrading. This initiative will transform the existing Cornwall WWTP to a Net Zero Energy WW Plant through Resource Recovery and divert waste from landfill. OCWA applied for funding under FCM on behalf of the City for this purpose and entered into to an agreement when the funding application was successful.

OCWA then assisted in creating the scope on behalf of the City and issued a Request for Quotation (RFQ) for the Cornwall Co-Digestion and Beneficial Usage of Biogas Biodolids Feasibility Study ITAG-01-2020 which was issued in March 2020. A contract was then established with the successful responding sub consultant to the RFQ. As established in the RFQ, OCWA and Cornwall received periodic technical deliverables from the consultant for review. At the same time, OCWA and Cornwall conducted the stakeholder outreach to collect feedstock availability information for this study.

OCWA then prepared the executive summary and will present recommendations for next steps to the City council in May 2021.

- b) What were the objectives of the Feasibility Study (what was it seeking to determine)?

The objective of the feasibility study is identify, assess and establish the feedstock availability, evaluate the best anaerobic digestion processing & product (biogas and digestate) usage scenarios at the existing municipal WWTP. Achieving net zero energy performance and enhanced organic waste recovery is the overall long-term objective and the feasibility study is the first step in reaching that goal.

The feasibility study will assist the City to formulate its strategy around achieving Net zero facilities, organics management, waste to energy, clean fuel, climate change action plan. The City is looking forward to transform its existing WWTP into Net Zero Resource Recovery facility through this feasibility study.

- c) What approach (or methodology) was used in the Feasibility Study to meet these objectives?

The OCWA and GHD team undertook the following tasks:

- Task #1: Background Information and analysis
- Task #2: Workshop and Site Visit
- Task #3: Feedstock, Technology Evaluation & Beneficial Use Options
- Task #4: Technical Memorandum #1 submission
- Task #5: Draft Report for Review
- Task #6: Completion of Draft Report
- Task #7: Delivery of the Final Report

- d) Please describe any public consultations conducted as part of the Feasibility Study and their impact on the Study.

- e)

Stakeholders were identified by City and the project partners and contacted by OCWA to determine their interest. Follow-up was handled by OCWA, primarily to determine feedstock availability and potential competition for feedstocks. In addition to these tasks, stakeholder engagement was carried out with external stakeholders. These stakeholders included neighbouring and regional municipalities, organics suppliers, electric and gas utility, technology providers, potential project investors and proponents, bio gas users, bio solids management companies etc.

Multiple internal workshop and council presentations were carried out too.

A complementary study (outside of feasibility/FCM funding) on SSO quantity, collection and public participation was conducted in the same period. A citizen panel was formed, which completed two feedback surveys on current SSO practices and future barriers. A virtual coffee house open to all residents, with the purpose of providing high-level information on SSO collection and processing options the City is exploring and soliciting feedback, was conducted in January 2021.

3. Feasibility Study Findings and Recommendations

- a) What were the environmental findings related to the options explored in the Feasibility Study? Please provide quantitative results and summary tables of these results (or the page numbers from the Feasibility Study report).

Please see Sections 4.2.5, 4.3.5, 4.4.5, Tables 4.2 & 4.5, and Appendix D & E of the Study.

- b) What were the financial findings related to the options explored in the Feasibility Study (for example, results of a cost-benefit analysis, financial savings identified, and so on)? Please provide quantitative results and summary tables of these results (or the page numbers from the Feasibility Study report).

Please see Sections 4.2.4, 4.3.4, 4.4.4, Table 4.5, and Appendix F of the Study

- c) Based on the environmental and financial findings above, what does the Feasibility Study recommend? Based on assessment of the environmental and financial findings above against the evaluation criteria used in the Study, the Study recommends:

- *Organic waste feedstocks considered as being available for a co-digestion arrangement include the following, with SSO being the only 'guaranteed' material: SSO from Cornwall 3,000 tpy, FOG 200 to 400 tpy, I C&I organics 1,000 to 2,000 tpy, Hauled septage 100 to 200 tpy, SSO from other municipalities 13,500 tpy. (Scenario C)*
- *Pre-processing technologies are available for all scenarios assessed and their selection and applicability would somewhat vary depending on the level of throughput (due to economies of scale).*
- *Co-digestion is feasible at the City's WWTP with either the City's SSO once a program is implemented, or a combination of SSO, FOG, IC&I organics, and hauled septage as feedstocks.*
- *For biogas utilization, combined heat & power is feasible and applicable for Scenarios A and B due to relatively lower biogas generation rates, and RNG upgrading for injection is feasible and applicable for Scenario C due to relatively higher biogas generation rates (only if feedstocks can be secured at the level assessed in the Project).*
- *Digestate management via the Lystek system is feasible and applicable to produce a material with increased benefit as compared with the current landfilling of biosolids.*
- *Centrate management may require pre-treatment to manage the additional ammonia (or phosphorus) loading from a co-digestion arrangement. Separately, additional peripheral infrastructure upgrades may be needed for implementation of a co-digestion arrangement. Related considerations should be made as part of conceptual design for such an arrangement.*
- *Consider the findings of the municipal organic waste collection and processing feasibility study (pending to date), to further refine a potential organic waste management project within the City, including a potential co-digestion arrangement.*
- *Continue discussions with neighbouring municipalities and the IC&I sector/private waste haulers to further understand the potential for securing additional feedstocks, as the overall quantities being managed (and related biogas being generated for utilization) are a vital component of a sustainable co-digestion arrangement. An organic waste broker could further assist the City with this step (e.g., Cornerstone).*
- *Discuss with the City of Toronto their approach to socializing the cost of carbon via distributing the costs of their produced and consumed RNG across all of their natural gas utilization bills.*

*Accordingly, there may be the opportunity for the City of Cornwall to produce RNG for its consumption, socialize the costs, and own the related GHG emissions reductions.
(GHD, 2021)*

4. Lead Applicant's Next Steps

- a) Taking the Feasibility Study's recommendations into account, what next steps do you as the municipality plan to take? What potential benefits or internal municipal improvements would result from these next steps?

The City plans to take the recommendations of this study to council presentation with OCWA and get approval for next steps as follows;

- 1) Secure funding to complete 30% design engineering for recommended options
- 2) Engage and form potential partnerships with project proponents namely OCWA, technology providers, investors, organics suppliers and gas off-takers
- 3) Integrate these recommendations into other strategic policies
- 4) Increase education and awareness around the topics of organics management, waste to energy, resource recovery and climate change

5. Lessons Learned

In answering the questions in this section, please consider all aspects of undertaking the Study — from the initial planning through each essential task until the Final Study was prepared.

- a) What would you recommend to other municipalities interested in doing a similar Feasibility Study? What would you do differently if you were to do this again?

Stakeholder engagement is a key activity and can be time consuming requiring multiple follow-up calls. Ensure your schedule and budget have allocated enough time for this activity.

Plant operators should be consulted early in the process as they are the experts on the facility and can provide essential input to the project and valuable guidance.

Having a key study partner with solid experience on subject topic is must to get great linkages between various sub sectors that is essential for success of these projects. In our case OCWA has brought in regulatory, technical, operational and project delivery knowledge to the table for City.

- b) What barriers or challenges (if any) did you encounter in doing this Feasibility Study? How did you overcome them?

The project team did not encounter any significant barriers or challenges during this study. The public health situation necessitated the site visit be done partially virtually (to limit numbers of persons at the facility) there was good participation from all parties involved. Stakeholders were more engaged than typical in other projects and more time was spent on connecting with them.

Availability of infrastructure and design engineering funding to further this opportunity is identified as key barrier for project implementation.

6. Knowledge Sharing

- a) Is there a website where more information about the Feasibility Study can be found? If so, please provide the relevant URL.

For FCM to access at (Note version R1 is the final version, with minor figure naming revisions made after the original February submittal deadline; the February submittal is also uploaded for reference) :

<https://www.dropbox.com/sh/1a8tcz6dlaoonaa/AAB2lr3tRvD7674vzJ34zV8Aa?dl=0>

There is a City website about a separate study which looks into collection options and confirms the likely residential organic wastes quantities used by the feasibility study at <https://www.cornwall.ca/en/live-here/municipal-organics-collection.aspx>

- b) In addition to the Feasibility Study results, has your Feasibility Study led to other activities that could be of interest to another municipality (for example, a new policy for sustainable community development, a series of model by-laws, the design of a new operating practice, a manual on public consultation or a measurement tool to assess progress in moving toward greater sustainability)? If so, please list these outcomes, and include copies of the relevant documents (or website links).

The codigestion study led the City to undertake and complete Organics processing feasibility study that reviewed various options to process organics collected by its residents. In addition to this the City recently initiated Climate Change Action Plan for environmental services to tie in all the initiatives that would support overall climate change and GHG reduction goals.

The City is also planning to demonstrate first Hydrogen pilot project in Cornwall WWTP in May of 2021. This project will demonstrate production of hydrogen from WW biogas for first time in Ontario and in line with Federal hydrogen roadmap.

The City also participates in Ontario Water Consortium Municipal codigestion working group that promotes codigestion, food organics diversion and clean fuel generation. OWC and OCWA hosted Net Zero workshop attended by 70 plus participants and presented this study in 2020. It also released codigestion handbook and made available to general public.

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