RECOMMENDATION

That, on the recommendation of the Managing Director, Environmental and Engineering Services and City Engineer, the following actions BE TAKEN with respect to purchase of an Organic Rankine Cycle (ORC) System Power Unit and Heat Exchanger:

a) ORC System Power Unit
i) The proposal submitted by Turboden, S.r.l., for the purchase of an ORC Power Unit at a quoted price of $2.8 M, including contingency (excluding H.S.T.) BE APPROVED in accordance with Section 12.2 b) and 12.4 of the City of London’s Procurement of Goods and Services Policy;
ii) The financing for this purchase BE APPROVED in accordance with the “Sources of Financing Report” attached as Appendix “A”;
iii) the approval given herein BE CONDITIONAL upon the Corporation negotiating prices, terms and conditions to the satisfaction of the Managing Director, Environmental and Engineering Services and City Engineer,
iv) the Mayor and City Clerk BE AUTHORIZED to execute any contract or other documents, if required, to give effect to these recommendations.

b) ORC System Heat Exchanger
i) the price submitted by Arvos Schmidtsche Schack LLC for the single source purchase of an ORC system Heat Exchanger and ancillary components at a total price of $1.1M, including contingency (excluding H.S.T.) BE APPROVED in accordance with section 7.4 and 14.4 e) of the City of London’s Procurement of Goods and Services Policy;
ii) The financing for this purchase BE APPROVED in accordance with the “Sources of Financing Report” attached as Appendix “A”;
iii) the Civic Administration BE AUTHORIZED to undertake all administrative acts that are necessary in connection with this project;
iv) the Mayor and City Clerk BE AUTHORIZED to execute any contract or other documents, if required, to give effect to these recommendations.

PREVIOUS REPORTS PERTINENT TO THIS MATTER

CWC report 2106-11-29, Item 10, Appointment of Consultants-Clean Water and Wastewater Fund Projects
This project supports the Strategic Plan with respect to Building a Sustainable City—Robust Infrastructure, through investments in the Wastewater Business Plan and renewable energy production.

BACKGROUND

Purpose

This report requests Council approval for the purchase of an ORC power unit based on the results of an Expression of Interest (EOI) and Request for Proposal (RFP) process and the single source purchase of an ORC heat exchanger under section 7.4 and 14.4 e) of the Procurement of Goods and Services Policy.

Context

The City is pursuing the installation of an ORC system capable of generating between 460 and 800 kW of electricity using waste heat from the Greenway biosolids incinerator. The two main system components, the power unit and heat exchanger, have delivery times of 12 and 10 months respectively; the system design will be completed around these two components once the suppliers are finalized.

DISCUSSION

Clean Water and Wastewater Fund

The first phase of funding for the Clean Water and Wastewater Fund (CWWF) is a 2 year - $2 Billion Government of Canada investment to meet immediate priorities for clean water and wastewater to support a cleaner and healthier environment for communities. CWWF focuses on investing in projects that:

- Rehabilitate and optimize water, storm water and wastewater related infrastructure;
- Improve asset management approaches including pilots and studies;
- Plan for future upgrades to wastewater treatment and collection infrastructure;
- Include new construction projects like naturalized systems.

Project Description

Recent reports to Municipal Council have outlined the potential to generate renewable electricity from biosolids incineration at the Greenway plant. An ORC system will
generate electricity worth between $0.65 M and $1.0 M annually dependent mainly on
the biosolids generated within the City and the resultant loading rate to the incinerator;
all electricity generated will be used within the Greenway plant. The overall system cost
is estimated at $7.7 M with $5.7 M in funding applied for under Phase 1 of the CWWF,
the City’s portion of the $5.7 M is $1.42M. The remaining $2.0 M is associated with the
system installation and will be submitted for funding under Phase 2 of the CWWF
provided it meets the funding criteria and timelines.

ORC Power Unit Pre-Purchase

A formal EOI was issued for the ORC power unit in accordance with Section 12.2 b) and
12.4 of the City of London’s Procurement of Goods and Services Policy. Three
manufacturers responded and all three were carried forward to the RFP stage. Two of
the suppliers were from Italy and one was from the United States. The RFP closed on
January 31, 2017 with two suppliers submitting Proposals: Turboden S.r.l and Exergy,
both based in Italy. Upon evaluation by staff in Wastewater Operations and Purchasing,
as well as two Engineering Consulting firms with expertise in waste heat recovery
systems, the proposal from Turboden S.r.l. was determined to offer the highest value to
the City. Turboden has been carried forward as the recommended manufacturer.

Heat Exchanger

The City recently installed a new preheater and re heater for the Greenway incinerator
under a single source contract with Arvos Schmidtsche Schack LLC. The Arvos units
were selected due to their proven reliability in municipal biosolids applications. A
warranty inspection of the Arvos Units was undertaken in May 2017 and the inspection
revealed no issues with either unit. Arvos has also installed a thermal fluid heat
exchanger similar to that required by the proposed Greenway ORC unit which has run
trouble free and without a loss of efficiency since 2003. Due to the proven performance
of these units, it is recommended that the ORC system heat exchanger and ancillary
components be purchased as a single source procurement in accordance with section
7.4 and 14.4 e) of the City of London’s Procurement of Goods and Services Policy.

CONCLUSIONS

The installation of an ORC system using waste heat from the Greenway Incinerator will
generate from $650,000 to $1,000,000 in electricity annually over the 20 year life
expectancy of the system. Purchasing the main equipment as described herein will
enable the completion of the system design and the timely commissioning of the
system. Installation is expected to occur in 2018.

Acknowledgements

This report was prepared with the help of Kirby Oudekerk, P.Eng. Environmental
Services Engineer and Mark Elliott CET. Senior Technologist, both of the Wastewater
Treatment Operations Division.
Attach: Appendix “A”- Sources of Financing

cc:
- Turboden s.r.l., via Cernia, 10 25124 Brescia IT
- Arvos Schmidtsche Schack LLC; 6500 Brooktree Road, Ste 300 Wexford Pennsylvania, 15090, USA