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<b>TO:</b>	<b>CHAIR AND MEMBERS CIVIC WORKS COMMITTEE MEETING ON FEBRUARY 2, 2016</b>
<b>FROM:</b>	<b>JOHN BRAAM, P.ENG. MANAGING DIRECTOR – ENVIRONMENTAL &amp; ENGINEERING SERVICES AND CITY ENGINEER</b>
<b>SUBJECT:</b>	<b>ELECTRICITY GENERATION FROM WASTE HEAT AT THE GREENWAY WASTEWATER TREATMENT PLANT – UPDATE</b>

<b>RECOMMENDATION</b>
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That, on the recommendation of the Managing Director, Environmental and Engineering Services & City Engineer, with respect to the generation of electricity from waste heat at the Greenway Wastewater Treatment Plant, the following report **BE RECEIVED** and reported to Municipal Council for their information.

<b>PREVIOUS REPORTS PERTINENT TO THIS MATTER</b>
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- CWC Report of 20 13-09-09, Item 11, Biosolids Disposal Assessment.
- CWC Report of 2013-02-25, Item 3, Timeline for major Environmental and Engineering Reports.
- CWC Report of 2012-05-14, Item 14, Renewable Energy Production from the Greenway Fluidized Bed Incinerator.

<b>PURPOSE OF REPORT</b>
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This report reviews the status of a project to generate electricity using waste heat from the Greenway biosolids incinerator and outlines next steps.

<b>2015-19 STRATEGIC PLAN</b>
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This project supports the Strategic Plan with respect to Building a Sustainable City - Robust Infrastructure through investments in renewable energy production.

<b>BACKGROUND</b>
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Previous reports to the Municipal Council have outlined the opportunity for the City to generate electricity utilizing waste heat at the Greenway Wastewater Treatment Plant through the installation of an Organic Rankine Cycle (ORC) engine. While the project is technically feasible with an estimated payback of 10 years, current Technical Standards and Safety Authority (TSSA) regulations have required additional licensed staff thus compromising the project's financial viability. TSSA is now proposing to review the regulations as they relate to recognizing new equipment and the associated staffing requirements which may benefit an installation at Greenway.

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**DISCUSSION**

The City of London incinerates 17,000 dry tonnes of biosolids annually at the Greenway plant. The process produces a low grade heat that has not been utilized for purposes other than plant heating due to the lack of a suitable heat recovery technology. London's biosolids disposal already compares favourably to other Canadian Cities and the generation of electrical energy from the waste heat will further improve the system's efficiency while reducing the City's carbon footprint.

A preliminary report prepared in 2012 indicated that the City's biosolids disposal system may be able to produce over 600 kilowatts (kW) of electricity through the addition of an ORC engine. ORC engines are similar to a conventional steam system but operate more efficiently on lower grade waste heat. At that time, the capital cost estimate for an ORC engine was \$7.5 Million with a 10 year payback. Incentives including those offered by the Ontario Power Authority (OPA) through London Hydro may provide funds to further study and construct the project.

London Hydro has been working with City staff from the outset and indicate there is a capital incentive available of \$0.20 per kW-hr of electricity produced in 1 year, or \$1 million, for this installation. Funding for this project is not included in the Wastewater 20 year budget forecast; it will require a business case once a proposal is articulated.

The TSSA currently applies the steam turbine regulations to ORC engines even though they operate at lower temperatures and pressures than steam systems. The regulations would require a licensed Operating Engineer to attend the ORC engine 24/7 meaning an additional 5-6 staff which would offset any revenue generated. This approach has deterred ORC engine installations in Ontario while their use has become more common in other countries and Canadian provinces. TSSA has recently identified the need to revisit the licensing requirements for new technologies and has proposed doing some pilot projects to help evaluate the ORC engines in Ontario; Greenway could potentially be one of these pilots.

**CONCLUSION**

Given the potential to generate over 600 kilowatts of electricity from the Greenway biosolids system, the availability of incentives through the Ontario Power Authority and the willingness of the TSSA to revisit the licensing requirements for ORC engine installations in Ontario, City and London Hydro staff will update and finalize a report and business case on the economic viability of an ORC engine installation at the Greenway Wastewater Treatment Plant. The target date for the business case is the third quarter of 2016.

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**Acknowledgements**

This report was prepared by Geordie Gauld, Division Manager, Wastewater and Treatment Operations.

<b>SUBMITTED BY:</b>	<b>RECOMMENDED BY:</b>
<b>JOHN LUCAS, P.ENG. DIRECTOR – WATER, WASTEWATER &amp; TREATMENT</b>	<b>JOHN BRAAM, P.ENG. MANAGING DIRECTOR – ENVIRONMENTAL &amp; ENGINEERING SERVICES AND CITY ENGINEER</b>