Committee of the Whole
Revised Meeting Agenda

Monday, January 13, 2020, 2:00 p.m.
Council Chambers, Guelph City Hall, 1 Carden Street

Changes to the original agenda are noted with an asterisk "*".

Pages

1. **Call to Order - Councillor Gibson**

   1.1 **Disclosure of Pecuniary Interest**

2. **Presentations**

   2.1 **Future-proofing Our Buildings Through Energy Efficiency Retrofits: Report to Guelph City Council in January 2020** 1

   Alex Chapman, Executive Director, Our Energy Guelph

3. **Consent Agenda - Infrastructure, Development and Enterprise Services**

   The following resolutions have been prepared to facilitate Council's consideration of various matters and are suggested for consideration. If Council wishes to address a specific report in isolation of the Consent Agenda, please identify the item. It will be extracted and dealt with separately as part of the Items for Discussion.

   3.1 **IDE-2020-03 Non-decorative LED Streetlight Upgrade Project Update** 14

   Recommendation:

   1. That Council authorize an increase in the approved project funding to be drawn from the Wastewater Capital Reserve Fund for the non-decorative LED streetlight upgrade project from $8 million to $9 million to ensure adequate contingency is available to address the observed high rate of existing inadequate electrical infrastructure to be rectified.
   2. That Council direct Staff to provide Wastewater Capital Reserve Fund repayment details prior to completion of the 2021 budget.

4. Items for Discussion - Infrastructure, Development and Enterprise Services

The following items have been extracted from Consent Agenda and will be considered separately. These items have been extracted either at the request of a member of Council or because they include a presentation and/or delegations.

*4.1 IDE-2019-128 Solid Waste Management Master Plan Update

This item has been removed from the agenda as requested by Mayor Guthrie.

5. Service Area Chair and Staff Announcements

6. Adjournment

Status update and PACE financing report

City of Guelph Committee of the Whole
January 13, 2019

Coming up...

- Meet the Board of Our Energy Guelph
- Governance and general operations
- Guelph Energy Managers
- Education, Communications, Outreach, and Awareness
- PACE

Meet the Board of Our Energy Guelph

Jonathan Knowles (President), Energy efficiency entrepreneur	**Kirby Calvert** (Chair), University of Guelph Dept. of Geography	**Mark Colvin** (Treasurer), eMerge Guelph Sustainability
Kristen Tilley (Secretary), Chamber of Commerce	**Alex Ciccone**, Attorney	**Mike Darmon**, Guelph Coalition for Active Transportation
Ceana Fan, Guelph Youth Council	**Vicki Gagnon**, Independent Electricity System Operator	**Sara Ganowski**, Alectra GRE&T Centre
Mike Kazmaier, Sub-metering entrepreneur	**Indigo Kim**, Guelph Youth Council	**[Vacant]**, City of Guelph Business Development & Enterprise
Anne Toner Fung, Innovation Guelph	**Brandon Raco**, University of Guelph Sustainability Office	**Dave Sabela**, Energy manager

OUR ENERGY GUELPH
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Guelph Energy Managers

- Community of practice of energy and environment managers with Guelph's largest employers
- Each quarterly meeting is hosted by a member
- Owens Corning hosted in December
- Prior hosts include UofG, Polycon, Wastewater Treatment Plant, and (at the time) Guelph Hydro
- Member survey in September provided helpful guidance to improve the program
- In discussions to create a Green Economy Canada hub

Education, Communication, Outreach and Awareness

Youth Action on Climate Change

- Led survey and participatory mapping on active transportation to align with Transportation Master Plan

Random Acts of Green

- Mobile device app that uses rewards to encourage sustainable behaviours
- Working on revenue sharing model

My World, My Choice

- UofG students mentoring high school students on sustainability
- Alectra has provided funding support

Planet Protector Academy

- Superhero-themed multimedia program with “missions” for students to complete

OEG’s first order of business:

PACE (Property Assessed Clean Energy)

PACE (Property Assessed Clean Energy)

- Innovative financing method for energy efficiency retrofits
- Based on successful PACE program in the US, which has over $6.7B in aggregate investment to date
- Attaches the “loan” to the property, rather than the property owner
- Principal and interest paid via the tax roll
- On sale of the property, the “loan” transfers to the new owner unless paid out
    - 50% transfer, 50% liquidate
- Energy bill savings offset repayment
- Effectively, the municipality acts as the billing and collections provider
    - Similar to the role that our electric utility plays for Water Services
- Removes initial capital outlay as the primary barrier to projects
- Enabler for eight of the 25 technical actions in the Pathway to Net Zero Carbon (and ~1.5% of emissions reductions)

Initial focus of PACE:

Multi-Unit Residential Buildings (MURBS)

Addresses four key needs:

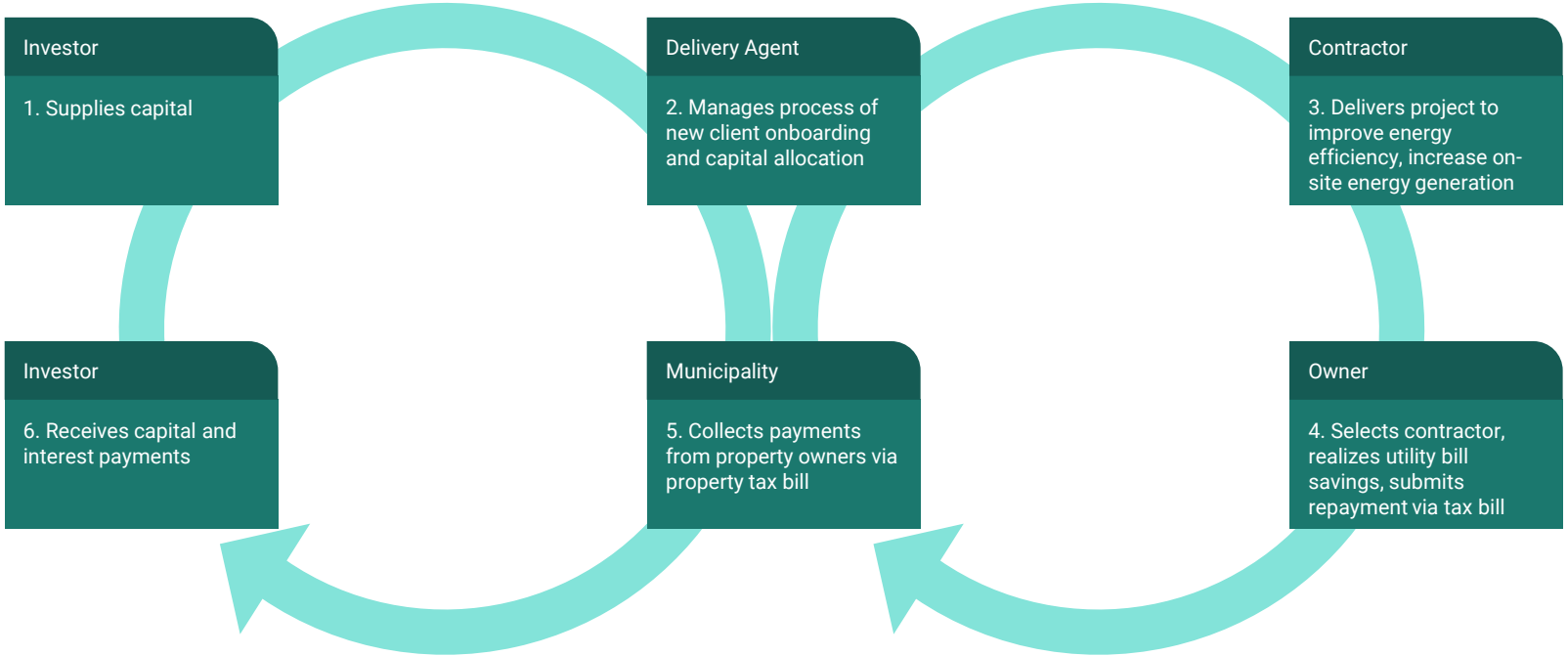
1. More likely to have lower-income residents vulnerable to energy poverty (Wellington County Social Housing is a prime candidate)

1. Shorter sales cycle, driven by business motivations rather than the owner-occupier debate of aesthetics vs. economics

1. Smaller number of transactions to mobilize the same amount of capital

1. Large dollar value better able to absorb “growing pains” of new City LIC administration process

PACE business process



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Why PACE?

- **It works.** $6.7B has been invested to date in the US. Other options (Home Equity Line of Credit, On-Bill Financing, EcoEnergy for Homes grant program) failed to achieve scale.

- **We are ready; other options aren't.** The IESO OBF proposal in 2014 Long-Term Energy Plan shows that we shouldn't depend on "vapourware".

- **Lower default, higher resale.** PACE homes fetch a premium above the loan value and default less frequently than the average.

- **Others are watching.** Toronto is not a realistic model to most municipalities; Guelph is.

- **To delay is to store up trouble.** The number of buildings to retrofit is fixed, but delay means less time and more expense to attain the 2050 target date.

- **We cannot move forward without it.** PACE enables eight of the 25 actions in the Pathway to Net Zero Carbon.

- **We've made it simple.** The role of the City is just billing and collections.

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Next steps for OEG

- Summit: Capital finance for the Pathway to Net Zero Carbon
- Develop detailed PACE program design and approach for staged implementation
- Make “build vs. buy” decision for PACE delivery agent
- Identify suitable MURB owner(s) for initial tranche of PACE projects

The ask:

Please direct staff to proceed with developing the processes to administer the City component of a PACE program (disbursement, billing, and collections)

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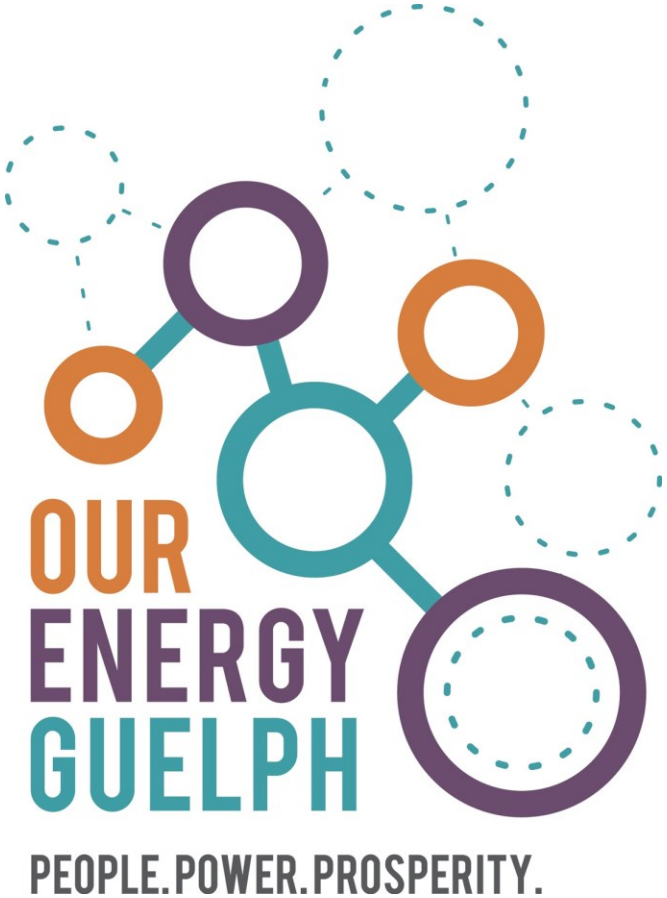
The Pathway to Net Zero Carbon

Building a clean, healthy, prosperous, and resilient city for everyone



Staff Report

To	**Committee of the Whole**
Service Area	Infrastructure, Development and Enterprise Services
Date	Monday, January 13, 2020
Subject	**Non-decorative LED Streetlight Upgrade Project Update**
Report Number	IDE-2020-03

Recommendation

1. That Council authorize an increase in the approved project funding to be drawn from the Wastewater Capital Reserve Fund for the non-decorative LED streetlight upgrade project from $8 million to $9 million to ensure adequate contingency is available to address the observed high rate of existing inadequate electrical infrastructure to be rectified.
2. That Council direct Staff to provide Wastewater Capital Reserve Fund repayment details prior to completion of the 2021 budget.

Executive Summary

Purpose of Report

This report provides an update on the non-decorative LED streetlight upgrade project including the early identification of a potential funding gap due to observations of existing inadequate electrical infrastructure.

Key Findings

The non-decorative LED streetlight upgrade project is an initiative to convert all high pressure sodium (HPS) non-decorative streetlights to energy efficient LED streetlights. The project is funded through internal borrowing from the Wastewater Capital Reserve Fund and is to have operating savings repay the borrowed funds over time.

The project results in significant energy savings and greenhouse gas emissions reduction and supports the Corporate 100% Renewable Energy Target (100RE) and the Community Net Zero Carbon goal.

A strong foundation has been established through the initial inventory and data gathering stage. Data has been used to enable accurate photometric design, installation progress tracking, public communication, and asset management.

Monitoring indicates that nearly all of the existing electrical wiring for the "top-hat" style streetlights will require replacement. Consequently, the existing project budget contingencies may be exceeded.

Additional budget is required to ensure adequate contingency is available to address the observed high rate of existing inadequate electrical infrastructure to be rectified.

Financial Implications

The non-decorative LED streetlight upgrade project will result in significant annual energy and maintenance cost savings as follows:

- Anticipated energy cost savings - $946,036 per year
- Anticipated maintenance cost savings - $287,391 per year.

Project budget forecasts have been revised to address the rewiring issues and the potential of other issues that may arise. The project budget has been revised from $8 million to $9 million.

The revised project budget maintains a strong financial business case with a simple payback changing from 6 years to 8 years. Non-financial co-benefits include improved light quality for roadway safety, extended streetlight fixture life, electrical infrastructure upgrades and enhanced streetlight control and network communication.

Cost control measures are in place to manage cost and mitigate project risk:

- Weekly project team progress calls to proactively identify issues and develop mitigation strategies.
- Early stage request for additional contingency budget to allow for project continuity and to avoid future delays which will result in inefficient installation and escalated costs.
- Rewiring change orders to be authorized in a portioned or tranche format.
- Quality assurance checks are being conducted with third-party field investigations to ensure high quality workmanship and validate the veracity of issues and associated resolutions.
- Extend the reserve funding payback schedule to match the revised business case.

Report

The non-decorative LED streetlight upgrade project is an initiative to convert all high pressure sodium (HPS) non-decorative streetlights to energy efficient LED streetlights. The project is funded via internal borrowing from the Wastewater Capital Reserve Fund and is to have operating savings repay the borrowed funds over time.

Project Status Update

Inventory

Although only non-decorative streetlights are being upgraded, a detailed review has been completed of all streetlights (non-decorative and decorative) to develop a comprehensive database of the streetlight inventory. This was conducted in coordination with Alectra Guelph Hydro and harmonized with their records. The inventory phase involved site visits to each streetlight and the recording of relevant parameters for each streetlight such as coordinates, wattage, proximity to power

lines, roadway classification, roadway setbacks, etc. A GIS-based database was developed and will enable follow-on stages in the project (design, installation coordination and progress management, budget management, public communication, etc.). All 12,892 non-decorative streetlights and 1,161 decorative streetlights (totalling14,053 streetlights) were inventoried.

Design – Non-Decorative LED Streetlights

Inventory information was used to establish baseline roadway lighting conditions and utilized for the non-decorative LED streetlight design. The primary design constraint was roadway lighting conditions to ensure safety by meeting or improving on the existing roadway lighting conditions and striving for best of class RP-8 roadway lighting guidelines. Other key design parameters included managing light pollution, energy efficiency and greenhouse gas emissions reduction, lifecycle cost (operating and capital cost) management, maintainability, inventory management and ease of install. Photometric designs and 3-dimensional lighting models (refer to Figure 1 and Figure 2, respectively) were completed for locations throughout the City.

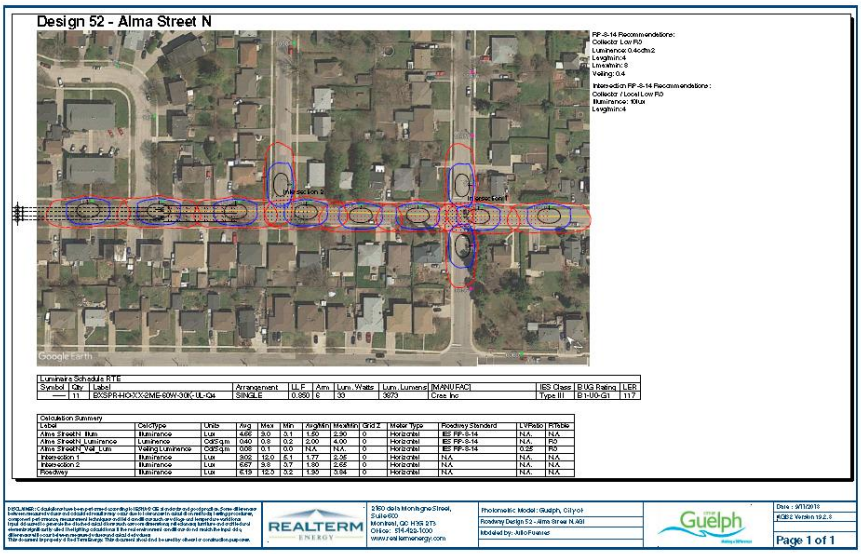


Figure 1: Sample photometric LED streetlight design

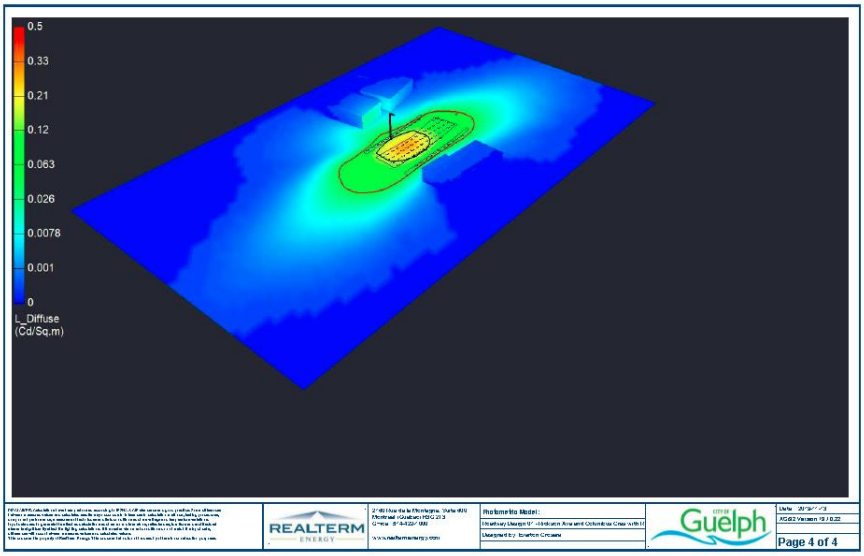


Figure 2: Sample 3D lighting model

In addition to the photometric design, electrical upgrades for the streetlight system were also designed. For over 8,000 streetlights, the existing wiring does not have an electrical demarcation that separates the Alectra Guelph Hydro owned utility grid and the City owned streetlights. The electrical designs specified new fuse holders for these locations. For all streetlights, electrical designs specified new fuses to match the new LED streetlight electrical load characteristics. The electrical upgrades are to improve the electrical infrastructure of the streetlight network, enhance safety throughout the streetlight system, and meet Electrical Safety Authority (ESA) requirements.

Designs have been loaded into the GIS database.

Non-Decorative LED Streetlight Fixtures

12,892 LED streetlight fixtures have been purchased and delivered. 3 different models are utilized to appropriately match photometric designs while keeping maintenance and spares inventory manageable.

The LED streetlight fixtures are warrantied for 10 years and have a rated life of over 100,000 hours without light output degrading to 70% of original output. City of Guelph streetlights operate approximately 4,300 hours per year, resulting in an expected life of greater than 23 years. This far exceeds the 5 year replacement schedule of the old high pressure sodium lighting.

All selected LED streetlights output light at 3000K correlated colour temperature (CCT) and are approved by the International Dark Sky Association.

Networked Photocontrols

Alectra Guelph Hydro with Silver Spring Networks (SSN), has developed a wireless communications network for Advanced Metering Infrastructure (AMI) and Smartgrid applications. Alectra Guelph Hydro uses this infrastructure for mission-critical daily business operations, including daily smart meter interrogation, and real-time monitoring and control of the electric distribution system. Through collaboration and review with Alectra Guelph Hydro, it was established that the SSN communications network had additional capacity to support the LED streetlight

networked photocontrols. By leveraging the SSN communications network, additional capital expenditure for separate communication network infrastructure is avoided.

Network access and maintenance costs, based on internal estimates, are in the range of $150,000 to $250,000 per year.

By investing in networked photocontrols and building on the SSN communications network, the City is investing in an asset that will improve services through greater use of technology and enable future city building initiatives.

Installation

Alectra Power Services was selected as the prime contractors for the LED streetlight upgrade project. This was to leverage existing knowledge and expertise of the City of Guelph streetlight and utility network and also experience working on other municipal LED streetlight upgrade projects. Over 5,000 streetlights are mounted on Alectra Guelph Hydro poles and are in close proximity to high voltage power lines. Streetlight upgrades at these locations require specially trained linesman to ensure worker safety and avoid damage to the utility grid.

As part of the installation, the contractors use tablets that are loaded with an application (refer to Figure 3) that is connected to the inventory/design database. The installers are informed, in real time, of the required installation work for each location. In addition, as the install work is being completed, the tablets are used to scan barcodes of the LED streetlight fixture and networked photocontrol nodes for immediate upload to the GIS database. This is for project progress tracking and quality assurance procedures. The public can follow installation progress by visiting the City website at the following link. The information will also be used for future commissioning and asset management purposes.

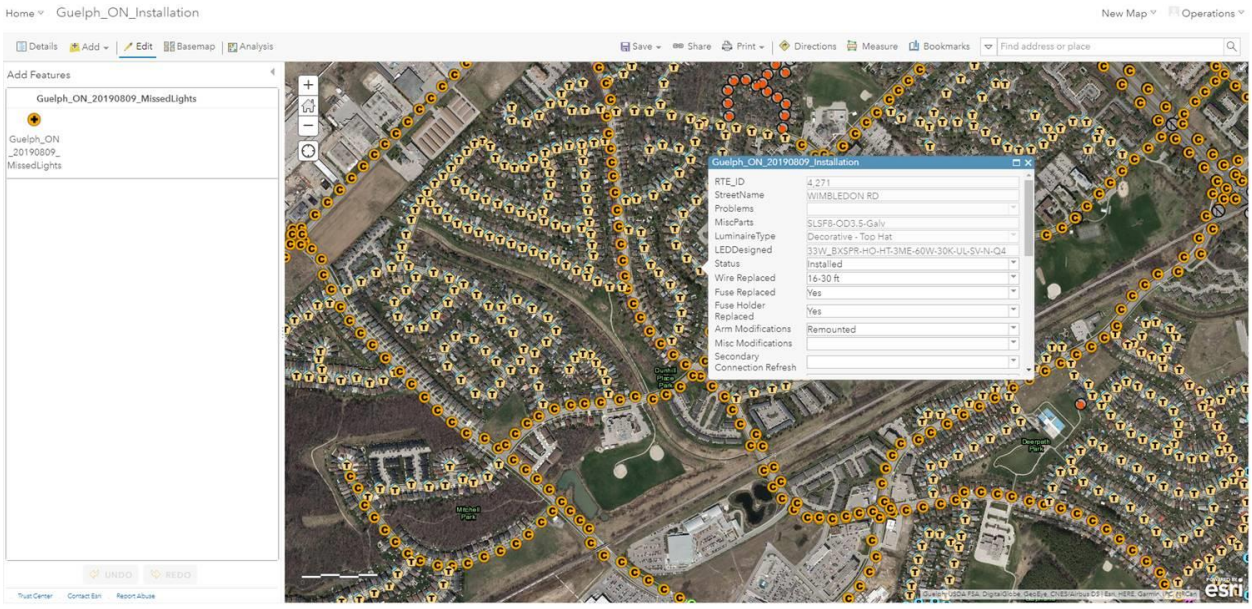


Figure 3: Installation application with design information and data gathering

The installation phase began October 15, 2019 with one crew and will grow to five crews by the end of 2019. Additional crews will be added in 2020. The progressive increase in crew numbers is to ensure proper training of the installation and data

collection process. Approximately 2,000 lights are to be installed by the end of 2019. Weekly progress calls are held and are for project team members to discuss team coordination items and report potential project issues in a proactive manner.

Rewiring

At the beginning of the installation phase, it was observed that inadequate wiring (wire-size too small and no electrical ground connection) was previously installed in the existing "top-hat" style streetlights. The wiring does not meet the streetlight installation specifications and does not meet ESA requirements, and therefore rewiring is required in these cases.

Budgeting for the installation phase of work anticipated the need for full length rewiring. A conservative approach was taken by applying a higher-than-typical estimate to include budget allowance for over 1,000, or 25%, of the "top-hat" style streetlights to be rewired. During the November 22, 2019 progress call, an update was provided that the inadequate wiring issue persisted with close to 100% of the "top-hat" installations to date. This is a strong indication that nearly all of the existing electrical wiring for these "top-hat" style streetlights will require replacement.

Financial Implications

Cost Savings Estimates

Using the existing inventory and the LED streetlight design, as well as historical electrical utility bills and maintenance records, a detailed assessment was completed to develop an accurate forecast of lifecycle cost savings, as well as energy savings and greenhouse gas emissions reductions.

The following Table 1 is a summary of the estimated non-decorative LED streetlight upgrade project savings:

	Before Upgrade	After Upgrade	Estimated Savings	Percent Savings
Annual Electricity Consumption (kWh)	9,464,874	2,749,655	6,715,219	71%
Annual Greenhous Gas Emissions (kgCO2e)	189,297	54,993	134,304	71%
Annual Electricity Costs	$1,675,615	$729,579	$946,036	56%
Annual Streetlight Maintenance Costs	$359,239	$71,848	$287,391	80%
Annual Networked Photocontrols Network Access and Maintenance	$0	$250,000 (based on internal estimates)	-$250,000	n/a
Total Streetlight Operating Expenditure	$2,034,854	$1,051,427	$983,427	48%
Average Annual Operating Cost per Fixture	$157.84	$81.56	$76.28	48%

Table 1: Estimated project energy savings, greenhouse gas emissions reductions and cost savings

The project results in significant energy savings and greenhouse gas emissions reduction and supports the Corporate 100% Renewable Energy Target (100RE) and the Community Net Zero Carbon goal.

Save on Energy Incentive

The provincial Independent Electricity System Operator (IESO) provides energy conservation incentives under the Save on Energy program. The Non-decorative LED Streetlight Upgrade project has been pre-approved for an upper incentive amount of $726,750. The incentive will be paid upon completion of the upgrade project with the incentive amount finalized based on the energy savings results.

Project Budget Update

In the July 4, 2017 Staff Report (IDE 17-59), a total project budget of $8 million was requested and to be funded via internal borrowing from the Wastewater Capital Reserve Fund. At the time, this was based on a preliminary review including a relatively smaller scope of 12,655 non-decorative streetlights and limited knowledge of other project elements related to streetlighting, network photocontrols and electrical infrastructure.

Although the project budget was limited, effective coordination and design with the project stakeholders allowed for the overall project to fit within the $8 million budget while accommodating the upgrade of all 12,892 non-decorative streetlights and without sacrificing quality. However, this left little room for contingency.

Observations of higher than expected inadequate wiring issues indicate that project costs will exceed existing budget and contingencies. Project budget forecasts have been revised to address the rewiring issues and the potential of other issues that may arise. The following Table 2 is a summary of the revised project costs, utility incentives and business case.

	Original	Revised
Project Budget	$8,000,000	$9,000,000
IESO Incentive	$750,000	$726,750
Project Cost after IESO Incentive	$7,250,000	$8,273,250
Annual Cost Savings	$1,263,000	$983,427
Simple Payback	6	8

Table 2: Revised project cost, utility incentive and business case

Cost Control Measures and Risk Mitigation

Several measures are currently in place and will be added to further manage cost and mitigate project risk:

- Weekly project team progress calls to proactively identify issues and develop mitigation strategies
- Early stage request for additional contingency budget to allow for project continuity and to avoid future delays which will result in inefficient installation and escalated costs
- Rewiring change orders to be authorized in a portioned or tranche format. This is a balanced approach to provide sufficient room for the installation team to continue working in an efficient manner while actively monitoring the rewiring issues.
- Quality assurance checks are being conducted with third-party field investigations to ensure high quality workmanship and validate the veracity of issues and associated resolutions

- Extend the reserve funding payback schedule to match the revised business case.

Consultations

Members of staff that were consulted and provided information, review and insight include:

- Patricia Zukowski – Senior Corporate Analyst Financial Strategy; Finance
- Brent Andreychuk – Corporate Analyst; Finance

Strategic Plan Alignment

This report recommends further investment into City infrastructure and assets while maintaining a strong business case and significantly reducing energy consumption and greenhouse gas emissions. The recommendations within this report align well with the "Building Our Future" and "Sustaining Our Future" priorities.

Attachments

None

Departmental Approval

- Greg Clark – Manager Financial Strategy Long Term Planning; Finance

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