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Sam Goldberg
Program/Project Manager, Demand Response
Energy Efficiency Office
City of Toronto
Metro Hall, 55 John Street, RM 206
Toronto, Ontario M5V 3C6

10 November 2012

Re: Contract **# FA517400 (Vendor 3091749)** – Work Assignment **File 101 - Exhibition Place LED Pathway Lighting**
Review of Energy Use Performance – Exhibition Place, 210 Princes' Blvd Toronto, ON

Dear Mr. Goldberg:

This report was prepared by LeapFrog Energy Technologies Inc. (LeapFrog) and summarizes the results of our 8 August 2012 assessment of the retrofit of 70 pathway lights with LED fixtures for the above-named client. Contacting the customer, obtaining and reviewing available project and energy billing (production) data, attending a site visit, calculating energy impact and preparing the report was completed to the reasonable extent within the average five hours of effort per project for the assigned portfolio of projects.

Our investigation was commissioned by the City of Toronto Better Buildings Partnership (Toronto BBP) with the intention of assessing the reduction in energy use and greenhouse gas emissions achieved by the implementation of the above-mentioned project under the Toronto BBP program. Our investigation did not include other energy efficiency projects that were implemented prior to or after the above-mentioned project.

Energy Retrofits

The scope of work required by the loan agreement provided to LeapFrog by Toronto BBP is shown below:

- *Replacement of 70 HID pathway light fixtures with 33 W LED fixtures*

According to the information provided to LeapFrog by the client, all of the above work was completed by June 2012.

Site Visit

LeapFrog conducted a brief site visit to the client site on 8 August 2012 to examine the system installed according to the loan agreement. Mr. Noel Mationg representing the client accompanied us during the site visit. This review was cursory in nature, and was not intended to be an assessment of the quality of the work performed. Because a site visit was not conducted prior to installation, LeapFrog cannot comment on what work actual was undertaken in response to the loan agreement with Toronto BBP. Subject to the limitations described above, LeapFrog is of the opinion that the conditions observed on site generally correspond to those described in the project description. Exhibition Place is supplied with four (4) separate electricity service lines from Toronto Hydro.

The magnitude of the expected energy savings in the context of total electricity demand is insignificant, and the dispersion of the LED lights over the large grounds complex is attributed to at least 2 separate electric service supply lines.

Energy Use

For specific measure (IPMVP Retrofit Isolation Option A) where the energy savings were insignificant in the context of the site's overall energy consumption, or in the case were the project was installed but not commissioned, hand calculations were done and appear in Appendix A.

Summary of Results

Expected Annual Energy Savings (as per Application Documentation) kWh	38,000 kWh
Actual Verified Energy Savings (from site visit and RETScreen Modeling or Calculations) kWh	38,020 kWh
Variance (Expected – Actual) kWh Note a positive variance means that verified energy savings were greater than expected energy savings	20 kWh Variance Percent -0.1 %

Estimated Greenhouse Gas Reduction Assumptions

The overall emissions factor for electricity generated within the Province of Ontario has been estimated at 80g CO2 eq/kWh. This is based on a standard emission factors for coal, natural gas and other fossil generation sources reported by Environment Canada in Canada's National Inventory Report. The standard emission factors were then applied to the weighted average generation mix for 2011 as reported by the Independent Electricity System Operator (IESO).

Based on the above-indicated energy impact and emissions factor, the project's estimated annual greenhouse gas impact is 3.0 tonnes of CO2 per year.

Closing

We trust that this meets your project reporting requirements. If we can be of any further assistance, please do not hesitate to contact our office.

Ivor F. da Cunha CMVP
Managing Director

Appendix A

Hand calculations for Retrofit Isolation

Appendix B

Site Visit Photographs

Appendix A

157	Wattage of old fixtures provided by Exhibition Place (could not be verified at site visit or from project documentation provided to LeapFrog) (watts)
33	Wattage of new light fixtures (watts)
124	A - Energy savings per fixture (watts)
4,380	B - Operating hours per year (average of 12 per day X 365 days per year)
70	C – Number of fixtures
38,020	Annual Energy savings (A x B X C)/1000 (kWh)

Appendix B

Example of one row of new 33 W LED pathway lights

Closeup of 33W LED Light fixture with ballast