

NO: R018

COUNCIL DATE: February 1, 2016

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## REGULAR COUNCIL

TO: **Mayor & Council**

DATE: **January 28, 2016**

FROM: **General Manager, Engineering**

FILE: **5420-01**

SUBJECT: **Roadway Lighting Upgrade Program to LED (Light Emitting Diode) Technology**

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## RECOMMENDATION

The Engineering Department recommends that Council:

1. Endorse a five year implementation strategy for the replacement of 28,000 existing roadway lighting fixtures with LED roadway lighting technology, starting in City Centre; and
2. Endorse the Engineering Department bringing forward a separate Corporate Report for the procurement of product and labour for the LED Roadway Lighting Upgrade program.

## INTENT

The purpose of this report is to provide background information about the operational benefits of LED roadway lighting, and provide details about upgrading the City's roadway lighting infrastructure to LED lighting, starting in City Centre.

## BACKGROUND

Since the early 1970's, the City has installed high pressure sodium (HPS) roadway lighting fixtures mounted on freestanding steel poles as part of road widening and land development projects. The City currently has an inventory of approximately 28,000 lighting fixtures. LED roadway lighting fixtures have been readily available for the past 10 years. However, the implementation of LED lighting technology has been delayed due to poor light output, questionable reliability, negligible power savings and high purchase costs when compared to HPS lighting fixtures.

Over the past year, the Engineering Department has expended considerable effort to evaluate the latest advancements in LED roadway lighting technology. Recent studies have determined that the latest LED roadway lighting fixtures outperform existing HPS lighting fixtures and can be directly retrofitted on existing freestanding steel poles, without pole modifications.

On March 30, 2015, the Transportation and Infrastructure Committee endorsed an Engineering Department pilot project initiative to proceed with LED lighting in Newton Town Centre. The first project, the installation of 8 LED lights near the Newton Recreation Centre, received very positive feedback from the Newton Town Centre business owners. Based on this feedback, the Engineering Department has just completed the replacement of the existing ornamental roadway lighting fixtures in Newton Town Centre on 72 Avenue between King George Boulevard and 138 Street with LED roadway lighting.

## **DISCUSSION**

The Engineering Department's recent review of LED roadway lighting consisted of evaluating:

- Light quality/control/uniformity;
- Maintenance requirements/life expectancy; and
- Power savings.

### **Light Quality/Control/Uniformity**

Compared to HPS roadway lighting, LED roadway lighting offers superior lighting colour, making it easier for road users to see pedestrians and signs. Control of light concentration and improved lighting uniformity is also achievable with LED's, leading to reduced road user eyestrain and fatigue.

### **Maintenance Requirements/Life Expectancy**

HPS roadway lighting fixtures require re-lamping (bulb replacement) and cleaning every five years. LED fixtures have a life expectancy approaching 20 years and do not require bulb replacements at 5 year intervals, thereby significantly reducing maintenance frequency. In addition, with LED fixtures, cleaning intervals can be increased from 5 year intervals to 10 year intervals. As a result, with LED lighting installed throughout the City, maintenance cost savings of approximately 75% are expected, with maintenance costs reduced by approximately \$300,000 annually.

### **Power Savings**

The replacement of existing HPS roadway lighting with LED roadway lighting throughout the City will result in power consumption cost savings of approximately 30%, with power consumption costs reduced by approximately \$700,000 annually. Thus, upon full replacement of the roadway lighting, there will be a total annual savings of \$1,000,000 per year (savings from maintenance and reduced power consumption).

## **JUSTIFICATION**

Using the B.C. Hydro Power Smart financial evaluation tool provided to municipalities in B.C. (as part of the "LED Street Lights Across B.C." initiative), the change to LED roadway lighting for the entire City has a return on investment (ROI) payback period of between 8 and 10 years. The calculated ROI takes into account the capital cost of the LED lighting fixtures, installation costs, power savings and maintenance savings over a 15 year period, as compared to the alternative "business as usual" model of maintaining existing HPS roadway lighting over the same 15 year period.

As noted within this report, LED roadway lighting outperforms existing HPS lighting in all respects: light quality/control/uniformity, maintenance requirements, life expectancy and power savings. Furthermore, pilot tests have shown that residents and business owners have a very positive opinion of LED lighting.

## **IMPLEMENTATION STRATEGY**

Currently, re-lamping of 1/5 of the City's HPS roadway lighting inventory is completed annually in 5 predefined areas (i.e., Newton, South Surrey, North Surrey, Cloverdale, and Guildford). This area specific mass re-lamping program has ensured that every HPS light (with a typical useful bulb lifespan of 5 years) is changed every 5 years, significantly reducing the City's maintenance costs by reducing the number of "call-outs" to change individual burned out street lights.

To minimize the costs associated with converting HPS lighting to LED lighting, the Engineering Department recommends eliminating the HPS lighting re-lamping program and replacing it with a LED Roadway Lighting Upgrade program, starting in 2016 in the Guildford sector and the City Centre area within the North Surrey zone. The boundaries of these areas are shown in Appendix "I" as Zone B and the City Centre area within Zone A.

While the remainder of Zone A was re-lamped in 2015, the City Centre area was not re-lamped as it was considered an ideal location to initiate the LED Roadway Lighting Upgrade program on the basis of the high percentage of pedestrians in City Centre and the safety benefits of the higher quality of light inherent to LED lighting fixtures.

Immediately following the conversion of the roadway lights in City Centre, we will establish a process for public feedback on the new LED lighting which should provide valuable insight for the remainder of the conversion program.

From 2017 to 2020, the LED replacement would occur in each of the Zones according to the original re-lamping schedule.

In addition to the 28,000 streetlight poles in Surrey, there are 9,000 roadway lights that BC Hydro has installed on their power poles for the City. These are owned and maintained by BC Hydro with the City paying an annual lease rate. BC Hydro is currently reviewing conversion of their roadway lights to LED and we expect that they will initiate conversion in 2017.

On streets that have City streetlight poles on one side of the road and BC Hydro lights on the other side of the road, the City will coordinate conversion of the roadway lights with BC Hydro to ensure that we maintain appropriate and uniform lighting levels.

## **Product Procurement**

The Engineering Department recommends the purchase of product for the LED Roadway Lighting Upgrade program through the Corporate Supply Arrangement (CSA) organized by the Provincial Government as part of the B.C. Hydro "LED Street Lights Across B.C." initiative. This initiative offers rebates of approximately 30% (applied to the LED fixture purchase price) and is offered to all municipal governments in B.C. The initiative has been endorsed by the City's Purchasing Section. A competitive process for purchasing product will not be required, since identical product pricing is offered to all B.C. Hydro customers.

## **FUNDING**

### **City Wide Project**

The estimated cost of a city-wide replacement of roadway lighting fixtures is \$11,000,000. Of the \$11,000,000 estimated cost, approximately \$10,300,000 is dedicated to purchasing product.

The remaining \$700,000 of the \$11,000,000 estimated cost is dedicated to the labour component of replacing 28,000 HPS roadway lighting fixtures with LED fixtures on existing freestanding steel poles.

### **Zone B and City Centre Component**

The estimated cost of replacing approximately 1,100 roadway lighting fixtures in City Centre and 6,000 roadway lighting fixtures in Zone B (product cost and labour) is \$2,600,000 (excluding applicable taxes). The cost for the City Centre roadway lighting replacement is higher than elsewhere in the City as there is a large number of decorative post top style street lights that have a higher cost for replacement. The Engineering Department has funding available within the Traffic Operations budget for the City's portion of this cost.

Details of the product purchase and labour procurement recommendations for both the city-wide project and the Zone B and City Centre component will be submitted for Council's consideration in a separate report.

## **SUSTAINABILITY CONSIDERATIONS**

The adoption of LED roadway lighting will assist in achieving the objectives of the City's Sustainability Charter, more particularly the following action items:

- SC11: Public Safety and Security;
- EC3: Sustainable Infrastructure Maintenance and Replacement;
- EC5: "Green" Infrastructure & Sustainability Grants; and
- EN1: Energy Efficiency.

## **CONCLUSION**

The proposed LED roadway upgrading program would make the City of Surrey one of the first cities in Canada to undertake a full conversion of roadway lighting to LED.

LED roadway lighting offers superior light quality, lower maintenance requirements, increased life expectancy, substantial power savings and favourable public opinion when compared to existing HPS lighting. These characteristics, combined with the rebates presented by B.C. Hydro, offer a ROI payback period estimated to be less than 10 years.

It is expected that the majority of the City's existing inventory of HPS roadway lighting can be changed to LED roadway lighting within the next 5 years by replacing the current HPS lighting re-lamping program with the LED Roadway Lighting Upgrade program. This proposed infrastructure replacement program is consistent with several of the City's key objectives in the Sustainability Charter.

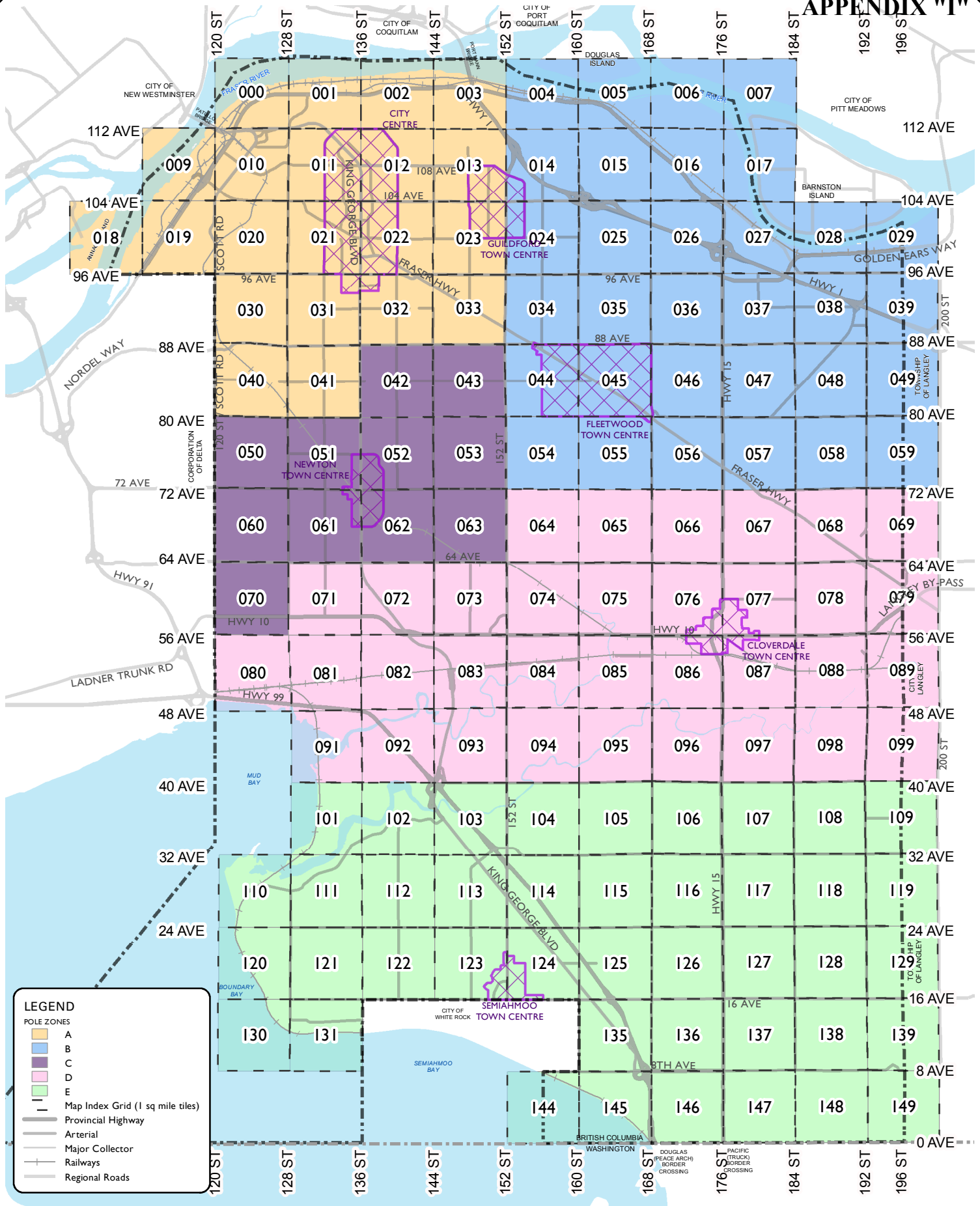
The Engineering Department recommends that Council endorse the proposed LED roadway lighting upgrade program. A separate report will be submitted to Council regarding product and labour procurement subject to endorsement of the proposed LED roadway lighting upgrade program.

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Appendix "I" – Re-lamping Zones

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# RELAMP ZONES

