



ADMINISTRATIVE REPORT

Report Date: May 30, 2012
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Meeting Date: June 12, 2012

TO: Vancouver City Council
FROM: General Manager of Engineering Services
SUBJECT: Southeast False Creek Neighbourhood Energy Utility - Extension of Service Area to the Great Northern Way Campus Lands

RECOMMENDATION

THAT Council approve the amendments to the Energy Utility System By-law ("the Bylaw"), generally as set out in Appendix A, including amending the definition of the "service area" to include the area shown as the "Service Area Extension" in Figure 1, which extends the service area of the Neighbourhood Energy Utility to the Great Northern Way Campus Lands and the Adjacent Lands (both as defined in this report) and obligates connection to the system for new buildings within the service area when practical and economically viable;

FURTHER THAT Council instruct the Director of Legal Services to bring the By-law amendment, generally as set out in Appendix A, forward for enactment.

REPORT SUMMARY

This report recommends amendments to the Energy Utility System By-law to extend the service area of the Neighbourhood Energy Utility ("NEU") to include the Great Northern Way Campus Lands and Adjacent Lands in the False Creek Flats South Area (in this report, the consortium of four post-secondary institutions is referred to as the Great Northern Way Campus or ("GNWC"); Lots O, P and Q in Figure 1 are referred to as the "GNWC Lands"; all lands outside Lots O, P and Q within the Service Area Extension in Figure 1 are referred to as "Adjacent Lands"). This recommendation is based on a positive business case and the NEU's demonstrated success in delivering low-carbon energy services that support Vancouver's Greenest City 2020 Action Plan (GCAP) energy targets. The bylaw amendment is considered time sensitive due to pending residential development located on the eastern edge of the GNWC Lands.

COUNCIL AUTHORITY/PREVIOUS DECISIONS

In March 2006, Council approved in principle the creation of the Southeast False Creek NEU, to provide space heating and domestic hot water to multi-family residential, commercial, institutional and industrial buildings in the Southeast False Creek Official Development Plan Area (“SEFC”).

In December 2006, Council approved a set of governance and rate-setting principles for the SEFC NEU, including direction that the City will consider and evaluate the potential to expand the NEU to other neighbourhoods and developments, with the merits and feasibility of each expansion phase to be determined separately. At this time, Council also provided direction that the merits of continued ownership be reviewed within three years of commencement of commercial operations.

On November 15, 2007, Council approved the creation of the *Energy Utility System Bylaw*, including provisions for compulsory connection for all new buildings located within SEFC.

On July 12, 2011, Council adopted the Greenest City 2020 Action Plan, and directed staff to begin implementation of the highest priority actions. These actions include the development of economically viable opportunities for the large scale deployment of sustainable energy systems for high-density, mixed-use neighbourhoods.

On December 13, 2011 Council directed staff to report back to Council in the second quarter of 2013 with recommendations concerning whether the City should continue to own and operate the NEU, based upon a comprehensive evaluation and analysis.

On April 18, 2012, Council endorsed a modified Millennium Line Extension rapid transit alignment on the GNWC Lands, amended the existing Structure Plan to support an office project on Lot Q of the GNWC Lands, and directed staff to amend the existing Services and Open Space Agreement associated with the GNWC Lands.

REPORT

Background/Context

Energy used by buildings generates 55% of Vancouver’s total greenhouse gas emissions. To address this, a high priority strategy of the Greenest City 2020 Action Plan is to pursue low carbon energy systems for high-density mixed-use neighbourhoods.

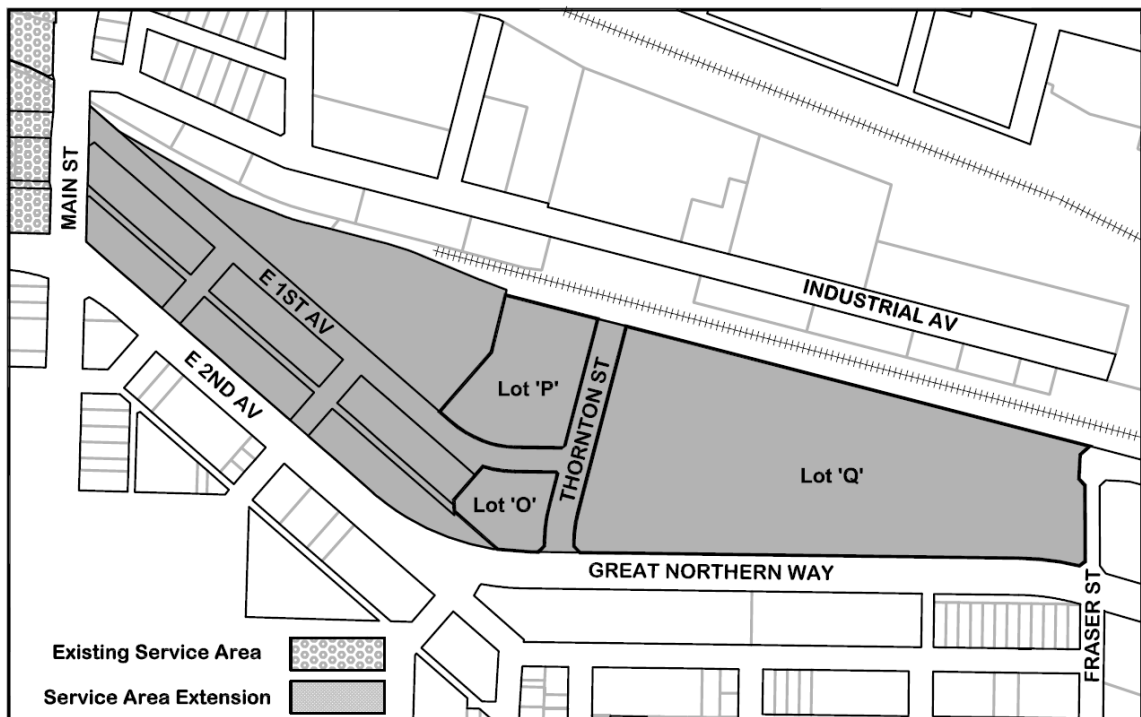
Low-carbon district energy systems like the NEU provide the economies of scale and the utility business model necessary to utilize a wide variety of waste and renewable energy sources that would otherwise not be available to individual buildings. These systems are also capable of serving both new development and existing gas-heated buildings. By way of example, the SEFC NEU has reduced greenhouse gas emissions from building and water heating in its service area by 74% in the first four months of 2012 with cost competitive rates.

The fundamental goal of the NEU is to minimise GHG emissions via a financially self-sustaining, commercially operated utility that delivers competitively priced energy services. Through its system efficiencies and by using sewage heat recovery as its renewable energy source, the NEU provides substantial greenhouse gas emission reduction relative to traditional forms of providing heat and hot water. Since the establishment of the NEU, the False Creek Flats has been viewed as a strong candidate area for extension of the system, due to its close proximity to SEFC and the high density development that is forecast for the area. Provision of NEU service to this area will help achieve greenhouse gas emission reduction targets and provide a simple solution for building owners to achieve low carbon heating in their facilities.

Development of the GNWC Lands which encompasses Lots O, P and Q on Figure 1, is now proceeding. GNWC has secured a partner (the Onni Group) to begin development of artist studio housing to be located on Lot O (see Figure 1 below). GNWC is also currently seeking expressions of interest for a development partner or partners for projects on Lot P. These projects include live/work housing, a rental student housing/hotel project and a studio residential project associated with Emily Carr University which are all supported by the existing CD-1 zoning. In total, approximately 55,000 square meters of residential, live/work and commercial floor area is forecast to be developed on Lots O and P. These developments will serve as catalyst projects for the campus and support the development of new institutional buildings, infrastructure and public amenities on the GNWC Lands.

On March 20, 2012, the Emily Carr University of Art and Design also received a \$1.7 million grant from the Province of BC to develop a business plan for the relocation of Emily Carr University to Lot Q of the GNWC Lands (east of Thornton Street).

FIGURE 1. LANDS INCLUDED IN THE NEU SERVICE AREA EXTENSION



Strategic Analysis

The pending development of the GNWC Lands will generate sufficient heat and hot water demand to make the extension of the NEU into the False Creek Flats economically viable. This enables substantial greenhouse gas emission reductions for the GNWC Lands, and also positions the NEU to supply cost-competitive low-carbon energy to adjacent areas of the False Creek Flats.

This administrative report makes recommendations to amend the Energy Utility System Bylaw to extend the service area of the NEU to the GNWC Lands and the Adjacent Lands in the False Creek Flats South area. Under this amendment, all future building development in lands within the Service Area Extension (see Figure 1) will connect to the NEU. However, this proposed Bylaw amendment does not obligate NEU connection of developments in cases where NEU service is not practical or economically viable. Examples of developments that are not practical or economically viable include buildings smaller than 2,000 square metres in floor area and types of uses that may not be compatible with the NEU (e.g. a high temperature industrial process load).

This amendment is considered time sensitive because GNWC's development partner (Onni Group) is anticipated to apply for a development permit for Lot O in late June, and they need certainty regarding the NEU service to proceed with building designs and sales marketing materials. This report does not seek approval for Capital funding, which may be requested in a future report following completion of the pending NEU ownership review.

This extension of the NEU service area is recommended because:

1. It will reduce greenhouse gas emissions for the initial GNWC residential development on Lots O and P by approximately 62%, or 630 tonnes carbon dioxide annually, supporting the City's and the GNWC educational consortium's sustainability goals.
2. Financial analysis has demonstrated that the proposed extension will not require any external subsidy and all associated capital and operating costs will be recovered through NEU customer rates charged to the new buildings connected to the NEU.
3. It will support the financial viability of low carbon NEU service to the remainder of the GNWC Lands and other areas of the False Creek Flats.
4. It is not anticipated to negatively impact the financial viability of the planned student housing or other building development on the GNWC Lands.

Based on GNWC's development plans, it is expected that NEU distribution infrastructure associated with the extension will need to be constructed in 2014 to be ready in time for the new buildings.

Implications/Related Issues/Risk

Financial

To determine the long term financial implications of providing NEU services to GNWC Lots O and P, the 30-year detailed cash flow projection was updated with forecast capital costs, operating costs and revenues associated with the NEU extension. Table 1 summarizes the changes to the key financial metrics associated with the extension.

TABLE 1. CHANGES TO LONG TERM NEU FINANCIAL METRICS ASSOCIATED WITH SERVICE TO GNWC LANDS LOTS O AND P

FORECAST	INTERNAL RATE OF RETURN (IRR) ¹	FIRST YEAR REVENUES > EXPENSES ²	PEAK DRAW ON RATE STABILIZATION RESERVE ³	NET PRESENT VALUE OF RATE STABILIZATION RESERVE ⁴
Current Forecast, without GNWC Lands	5.8 %	2020	(\$8.0 M)	\$1.1 M
Current Forecast, with NEU service to GNWC Lands Lots O and P	5.9 %	2020	(\$7.9 M)	\$1.6 M
Change	0.1%	0	(0.1 M)	\$0.5 M

NOTES TO TABLE

1. Internal Rate of Return: the projected internal rate of return for all NEU cash flows over a 25 year period, beginning in 2010.
2. First Year Revenues Exceed Expenses: includes all costs including all internal transfers, debt service and return on equity.
3. Peak Draw on Rate Stabilization Reserve: includes all costs including internal transfers, debt service and return on equity. In March 2009 Council authorized financing of up to \$8 M to cover the maximum peak draw anticipated at that time.
4. Net Present Value of Rate Stabilization Reserve: includes all projected yearly deficits and surpluses, calculated over a 25 year period beginning in 2010 (with all costs including internal transfers, debt service and return on equity).

As summarized in Table 1, extension of the NEU to serve GNWC Lands Lots O and P results in a small increase to the internal rate of return, a small reduction to the peak draw of the Rate Stabilization Reserve and an improvement to the net present value of the Rate Stabilization Reserve. This financial analysis does not include the NEU service to a relocated Emily Carr University or connection of other properties outside of Lots O and P due to uncertainty regarding scale and timing of future developments. Addition of such properties would likely improve the business case and provide further opportunity to reduce NEU rates in the long-term.

This report does not seek capital funding for the GNWC extension. This is because the City has not committed to the long term ownership of the NEU (pending

ownership review will be reported on in the second quarter of 2013). Capital funding request for this work will be in the 2014 Capital Budget if the NEU remains in the City's ownership.

Table 2 summarizes the forecast capital costs associated with the NEU extension, factoring in costs of distribution infrastructure and long-term False Creek Energy Centre capacity improvements.

TABLE 2. CAPITAL EXPENDITURES FORECAST TO SERVE GNWC LANDS LOTS O AND P

INFRASTRUCTURE TYPE	TIMING	AMOUNT ³
NEU distribution infrastructure to serve GNWC Lands Lots O and P ¹	2014	\$2.4 M
Additional sewage heat recovery capacity for the False Creek Energy Centre ²	2019	\$0.7 M
Additional natural gas boiler capacity for the False Creek Energy Centre ²	2021	\$0.5M
TOTAL		\$3.6M

NOTES TO TABLE

1. NEU extension pipe and energy transfer stations will be constructed prior to occupancy of new buildings on the GNWC Lands.
2. Additional sewage heat recovery and natural gas boiler capacity will likely be phased to take place at same time as planned False Creek Energy Centre upgrades to serve pending SEFC developments.
3. Capital amounts are expressed in 2012 dollars, and will change if additional properties to GNWC Lands Lots O and P are connected to the future NEU extension.

Environmental

The greenhouse gas emission target for low carbon energy systems is a 50% reduction compared to business as usual¹. The NEU extension to the GNWC Lands is anticipated to achieve that by reducing greenhouse gas emissions of Lots O and P by 62%, or 630 tonnes carbon dioxide annually. The forecast GHG reduction is greater than for a typical residential development connected to the NEU because it incorporates student housing, which has a high occupant load and domestic hot water use.

Further reductions will likely be possible through service to future buildings on Lot Q and the Adjacent Lands, but are not quantifiable at this time.

¹ Business as usual is defined as the type of heating and domestic hot water system that would be installed in typical local construction in the absence of the NEU. It assumes electric baseboard heat for residential units and natural gas for ventilation air, domestic hot water and commercial/institutional spaces.

GNWC Considerations

In the absence of the NEU, GNWC has indicated that they might otherwise use electric baseboards for heating of suites, with natural gas heating for ventilation air and domestic hot water. Electric baseboard heat is GNWC’s lowest capital cost option, but may not deliver adequate energy performance to achieve GNWC’s LEED™ Gold target. Alternative options GNWC were considering include the use of a geo-exchange energy supply for domestic hot water. Table 3 describes the differences between a building that is served by the NEU and a typical residential building that generates its own heat and domestic hot water supply.

TABLE 3. DIFFERENCES BETWEEN A CONVENTIONAL AND NEU-SERVED RESIDENTIAL BUILDING

AREA OF KEY DIFFERENCE	NEU SERVED RESIDENTIAL BUILDING	CONVENTIONAL RESIDENTIAL BUILDING	NEU IMPLICATION
SPACE HEATING FOR RESIDENTIAL SUITES	Hydronic heat distribution	Electric baseboard heaters	Hydronic heating system has a higher capital cost than electric baseboards, but provides higher comfort to occupants
VENTILATION AIR HEATING	Hydronic ventilation air heater	Natural gas-fired ventilation air heater	No significant capital or maintenance cost difference
DOMESTIC HOT WATER HEATING	NEU-supplied heat exchanger	Natural gas boilers and hot water storage tanks.	Building owner avoids installation, maintenance and replacement costs of boilers and hot water storage tanks
SPACE REQUIREMENTS	Small space for heat exchangers	Substantial space for natural gas boilers and storage tanks.	NEU reduces space requirements for water heating equipment
UTILITY SERVICING REQUIREMENTS	NEU	Natural gas and large BC Hydro service	NEU eliminates need for natural gas supply and reduces BC Hydro servicing costs

For the GNWC student housing, the cost implications are as follows:

GNWC Capital Costs

The GNWC capital implication for integrating with the NEU is estimated to range between a \$40,000 cost to a savings greater than \$1,000,000, depending on what type of heating system would otherwise be used in the absence of the NEU. This estimate includes the cost premium of the hydronic heating system and avoided costs of boiler equipment that would no longer be needed with

connection to the NEU. A higher performing on-site low-carbon energy supply option (such as on-site geo-exchange) would have the highest capital costs for the developer.

GNWC Operating Costs

For the proposed student housing on Lot P, analysis indicates that, based on 2012 rates, NEU service is approximately 2% more expensive than a conventional combination of electric baseboard and gas for heating and domestic hot water. This cost premium is not significant, in consideration that natural gas prices are currently at a historical low, and that the NEU has predictable and stable rates year to year.

Staff have provided this cost information to GNWC representatives, and GNWC has communicated that they have no objections to NEU service based on the information exchanged to date.

CONCLUSION

This report recommends amendment of the Energy Utility Systems Bylaw to extend the NEU service area to include Great Northern Way Campus Lands and the Adjacent Lands of the False Creek Flats. This extension will substantially reduce greenhouse gas emissions associated with the heating of the new Great Northern Way Campus Lands, and enable the expansion of cost competitive low-carbon energy supply to other areas of the False Creek Flats.

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APPENDIX A
ENERGY UTILITY SYSTEM BY-LAW DRAFT AMENDMENT

BY-LAW NO. _____

**A By-law to amend Energy Utility System By-law No. 9552
to extend the service area to the Great Northern Way Campus Lands**

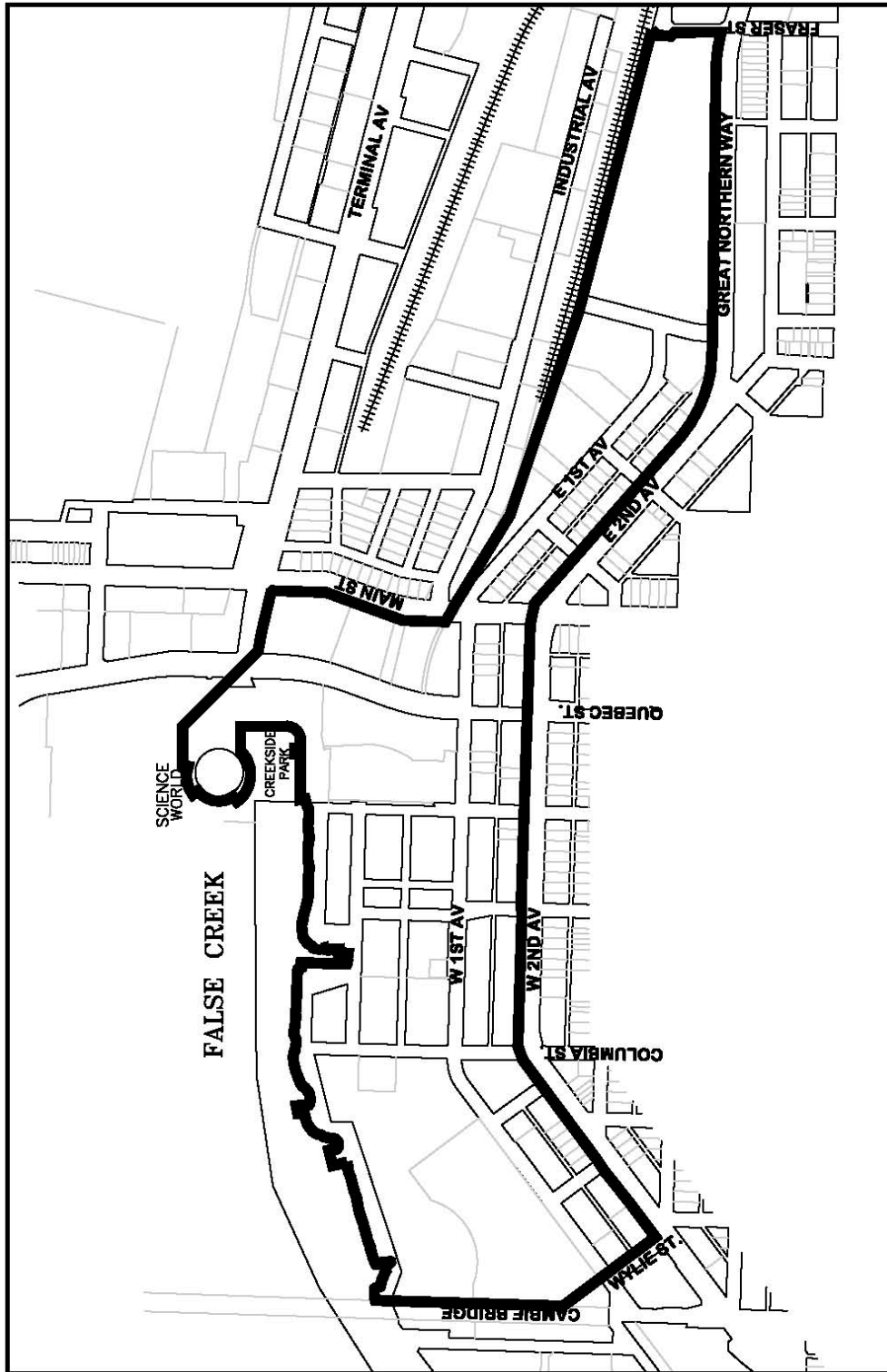
THE COUNCIL OF THE CITY OF VANCOUVER, in public meeting, enacts as follows:

1. This By-law amends the indicated provisions and schedule of the Energy Utility System By-law.
2. In the Table of Contents, in the list of Schedules, Council strikes out "Boundaries of Southeast False Creek", and substitutes "Boundaries of Service Area".
3. In Section 1.2, Council:
 - (a) at the end of the definition of "service", strikes out "and";
 - (b) in the definition of "Southeast False Creek", strikes out the words "marked in bold black on Schedule A, and", and, at the end, strikes out "." and adds ", to which the Southeast False Creek Official Development Plan applies."; and
 - (c) adds the following definition, in the appropriate alphabetical order:

" "service area" means the area marked in bold black on Schedule A and includes Southeast False Creek and the area bounded to the north by the southern boundary of the portion of railroad right of way which extends from Main Street to Fraser Street, to the east by Fraser Street, to the south by East 2nd Avenue and Great Northern Way, and to the west by Main Street;" .
4. In section 2.1, Council:
 - (a) strikes out "Southeast False Creek", and substitutes "the service area"; and
 - (b) at the end of the section, strikes out "." and adds: ", unless the City Engineer is of the opinion that providing the service to a building is not practical or economical."
5. In section 2.2, Council strikes out "Southeast False Creek", and substitutes "the service area".
6. In section 7.1, Council strikes out "for Southeast False Creek".
7. Council repeals Schedule A, and substitutes:

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SCHEDULE A BOUNDARIES OF SERVICE AREA



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8. A decision by a court that any part of this By-law is illegal, void, or unenforceable severs that part from this By-law, and is not to affect the balance of this By-law.

9. This By-law is to come into force and take effect on the date of enactment.

ENACTED by Council this _____ day of _____, 2012

Mayor

City Clerk

EXPLANATION**A By-law to amend the Energy Utility System By-law
Re: Service area**

On June 12, 2012, Council resolved to amend the Energy Utility System By-law to extend the service area to include Great Northern Way Campus. Enactment of the attached By-law will implement Council's resolution.

Director of Legal Services
June 12, 2012