



To: Public Works and Transportation Committee

Date: May 7, 2015

From: John Irving, P.Eng. MPA
Director, Engineering

File: 10-6600-10-02/2015-
Vol 01

Re: Alexandra District Energy Utility Expansion Phase 4

Staff Recommendation

That funding of up to \$7.6 million through borrowing from the Utility General Surplus be approved for capital expenditure for design, construction and commissioning of the Phase 4 expansion of the Alexandra District Energy Utility and that the Five Year Financial Plan (2015-2019) be amended accordingly.

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REPORT CONCURRENCE		
ROUTED TO:	CONCURRENCE	CONCURRENCE OF GENERAL MANAGER
Finance	<input checked="" type="checkbox"/>	
Development Applications	<input checked="" type="checkbox"/>	
REVIEWED BY STAFF REPORT / AGENDA REVIEW SUBCOMMITTEE	INITIALS: 	APPROVED BY CAO

Staff Report

Origin

In January 2011, Council endorsed the Alexandra District Energy Utility Bylaw No. 8641 Amendment Bylaw No. 8688. The adoption of Amendment Bylaw No. 8688 established the ADEU service area over the majority of the Alexandra Neighbourhood.

At the Regular Council Meeting of July 28, 2014, Council endorsed that the funding for the ADEU Phase 3 expansion be borrowed from the Water Utility General Surplus. All borrowed amounts will be repaid with interest, and are incorporated into the financial model.

At the Regular Council Meeting of February 10, 2015, Council approved, as a part of the 2015 Capital Budget, a \$12.1M capital expenditure for the ADEU Expansion Phase 3 (2015), of which \$10.5M is funded from the Water Utility General Surplus.

The purpose of this report is to seek Council approval for the funding of the ADEU Phase 4 expansion through borrowing from the Utility General Surplus, in order to allow servicing of new developments in the Alexandra District Energy Utility (ADEU) Service Area.

This initiative aligns with Council's Term Goal #8 Sustainability:

8.1 Continued implementation and significant progress towards achieving the City's Sustainability Framework, and associated targets.

Background

Phases 1 and 2 of the ADEU were established in partnership with Oris Geo Energy Ltd. The partnering agreement was limited to providing heating and cooling services to Oris Developments' projects, Alexandra Gate and Remy.

Council subsequently adopted the Alexandra District Energy Utility Bylaw No. 8641 and Amendment Bylaw No. 8688 on January 24, 2011, which expanded the service area to include the western portion of the Alexandra neighbourhood. This gave the ADEU the potential to encompass 3100 units and 1.1 million sq. ft. of commercial space at build out, over an estimated 10 to 15 year period.

In 2010, Council approved \$6M of borrowing from the City's Water Utility Reserve to fund the design and construction of ADEU Phases 1 and 2. ADEU Phases 1 and 2 were commissioned in July 2012; the system currently provides energy to three developments (Mayfair Place, Remy and Omega) with over 860 residential units.

In 2014, Council approved \$12.3M of borrowing from the City's Water Utility General Surplus to fund design and construction of the ADEU Phase 3 expansion. The 2015 portion of the project is currently under construction and scheduled to connect next two customers Alexandra Court by Polygon and Jamatkhana Temple in May and June respectively. Connection of five more developments under Phase 3 expansion will follow. The 2015 portion of Phase 3 expansion construction is scheduled to be completed in November 2015.

Analysis

SmartCentres and New Developments

ADEU was established on the concept that all capital and operating costs would be recovered through revenues from user fees. Council adopted an objective to provide end users with annual energy costs that are competitive with conventional system energy costs based on the same level of service. The primary strategy for phasing construction of the ADEU is to match service capacity closely with demand at any given stage. In this way, capital expenditures that don't immediately generate revenue are minimized and payback periods are reduced.

The 2015 scope of the Phase 3 expansion includes:

- expansion of the energy centre to accommodate equipment requirements for the full build out;
- extension of the distribution piping to service new customers south of Odlin Rd up to the Alexandra Court;
- increasing the heating and cooling capacity to service new customers in the north and south loop via geo-exchange field along the eastern edge of the West Cambie Neighbourhood Park; and
- increasing the heating and cooling capacity to service new customers in the north and south loop via boilers and cooling towers.

Based on the most current construction schedule provided by SmartCentres, the construction of an on-site energy plant for servicing the SmartCentres, a concept adopted by Council last year, needs to start immediately in order to meet the accelerated schedule.

Furthermore, since the approval of the Phase 3 expansion in July 2014, timing for some of the developments has been revised by developers and two new developments will need to be connected as early as January 2016 - Oxford Lane Townhomes by Townline and Fire Hall No. 3. The current timelines and building sizes are summarized in Table 1 and mapped in Attachment 1. To service these developments, an extension of the distribution piping is required.

Table 1: Development Timing in the ADEU Service Area (read in conjunction with Att. 1)

	Floor Area (ft²)	Use	Occupancy Date*
Alexandra Court	503,000	Residential	May 2015
Jamatkhana Temple	26,500	Institutional	June 2015
Oxford Lane	64,000	Residential	January 2016
Fire Hall No. 3	23,000	Municipal	2016
9500 Cambie	108,000	Residential	2016
Alexandra Gate	194,000	Residential	2016
SmartCentres	286,000	Commercial	2016
Jingon	132,000	Residential	2017
Polygon East	262,000	Residential	2018

* Note: Occupancy typically occurs over the course of several months after occupancy is issued.

Funding

It is estimated that \$7.6 million (inclusive of design, project management and contingency) would be required for the ADEU Phase 4 expansion, which will include:

- installation of the satellite energy plant, including air source heat pumps, natural gas boilers and distribution piping to service SmartCentres;
- extension of distribution piping to service Oxford Lane Townhomes development;
- extension of distribution piping to service Fire Hall No. 3;
- replacement of water based fluid with glycol propylene fluid in the distribution piping;
- upgrade energy metering;
- SCADA system upgrade.

The full amount of funding will be required in 2015, since the construction is expected to be implemented over the next two years.

Development Projections and Business Case

Staff have reviewed the development projections with the Phase 3 design consultant as part of the Phase 3 expansion detailed design. The projections are based on prospective results based on assumptions about future conditions and courses of action. The development schedule in the ADEU area is relatively well-defined to 2018. Developers have provided the City with preliminary drawings and modeling reports which include calculations of gross floor area and peak and annual energy demands. After 2018, the forecast is less certain: there are five parcels in the Northwest corner of the neighbourhood that are expected to be developed into residential buildings between 2019 and 2023, however, there is no other information available about these properties. Furthermore, the rate of development is subject to market conditions. After the connectable area for these parcels was calculated based on the lot area multiplied with the floor area ratio as per the 2041 OCP, the total floor area connected to the ADEU at the full build out is now estimated to be 4.65 million square feet.

The business case was updated with the new estimated connected floor areas and related capital costs estimates for the full build out. The comparison of the business cases is summarized in the Table 2 below. Financial calculations for the payback periods are detailed in Attachment 2.

Table 2: Financial Summary

	Business Case as reported to Council Dec 10, 2012	Business Case as reported to Council July 28, 2014	Most current Business Case
Capital Cost (Phase 4)	N/A	N/A	\$7.6M
Full Build Out Area	3.18M sq.ft.	3.44M sq.ft.	4.65M sq.ft.
Capital Cost (full build-out)	\$24.3M	\$23.3M	\$31.1M
NPV (discounted at 6.0%)	\$1.35M	\$4.76M	\$15.5M
IRR	6.54%	8.01%	10.17%
Payback	21 years	19 years	17 years
Estimated GHG Savings		9500 tonnes over 12 years	9500 tonnes over 12 years

Note: No land costs have been attributed to the costs of the project since it is located on City owned park land or as part of private developments.

This initiative also aligns with Council's sustainability goal of making progress towards achieving the City's Sustainability Framework and associated targets. On average, ADEU is expected to save more than 800 tonnes of CO₂ every year, the equivalent of taking 170 passenger vehicles permanently off the road. Cumulative GHG emissions reductions are detailed in Attachment 3.

Financing Strategy

The ADEU was approved on the basis that it would be financially self-sustaining. At the current size of the system, the incremental cost to connect a new customer is high due to the need for new energy generation and distribution facilities. Over time, capital costs on a per building basis will decrease as the same infrastructure can be used to connect new buildings. The City has the option to fund capital costs internally or externally. Over the course of the full build out of the ADEU, the City will have numerous decision points for optimizing financing strategies in order to achieve its objectives.

For the Phase 4 expansion capital costs, staff recommend that up to \$7.6M in funding be approved from the Utility General Surplus. Internal borrowing is recommended due to many variables including the timespan of construction, servicing requirements, and the availability of funding. All borrowed amounts will be repaid with interest and are incorporated into the financial model.

Financial Impact

Staff recommend that \$7.6 million in funding be approved through borrowing from the Utility General Surplus for capital expenditure of design, construction and commissioning for the Phase 4 expansion of Alexandra District Energy Utility. The cash flows scheduled for this borrowing and payback are detailed in Attachment 2.

Conclusion

Construction in the Alexandra District Energy Utility service area is continuing at a fast pace with a number of developments pursuing aggressive construction schedules. Based on the current information provided by the developers, the ADEU Phase 4 expansion is needed to provide service to new customers. Operational improvements are also needed, in order to provide the level of service expected.

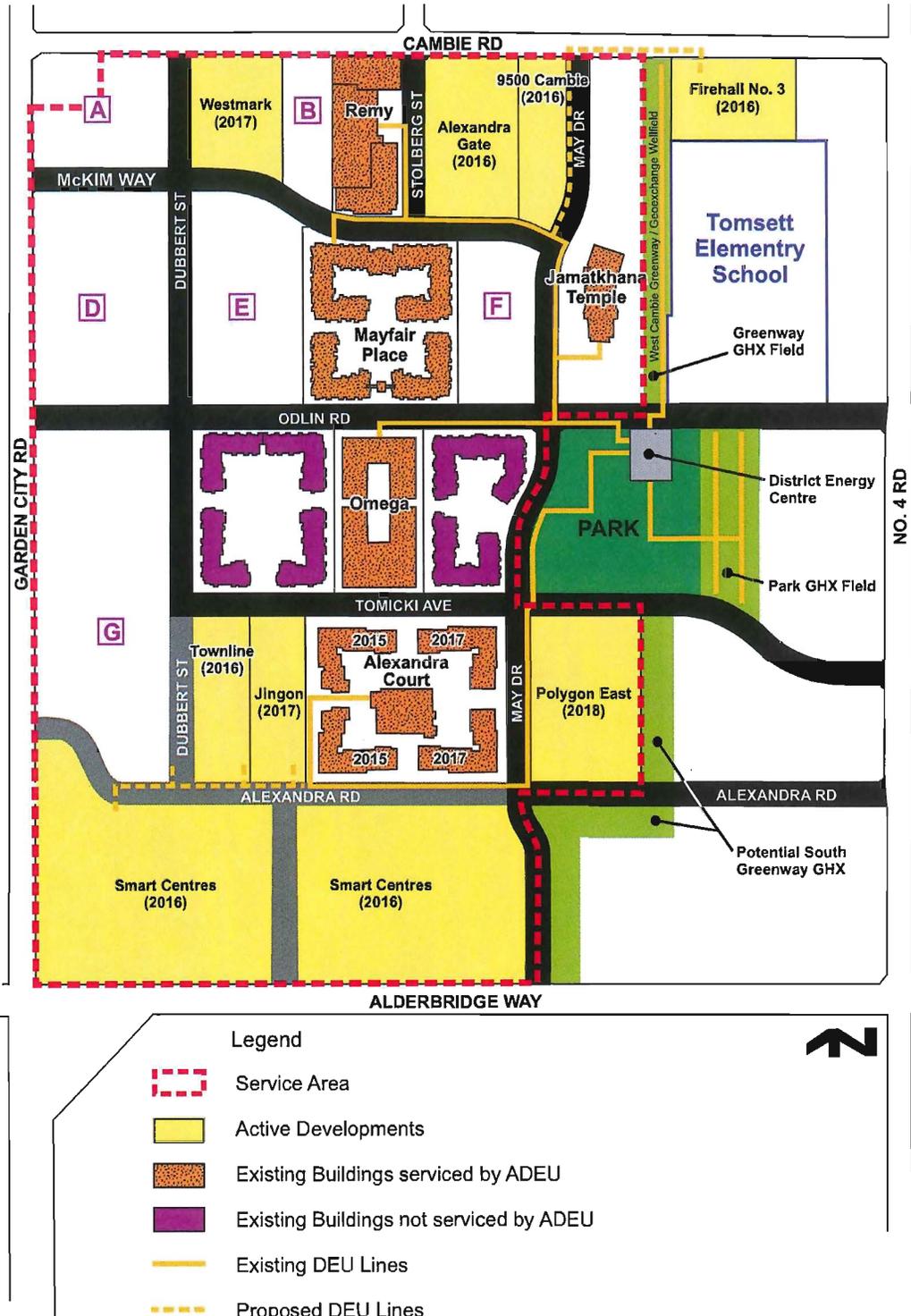


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Attachment # 1- Alexandra Neighbourhood and ADEU Service Area Development



Attachment # 3- ADEU Cumulative GHG Emissions Reductions

