Meeting September 11, 2023
File: 33200-02
COUNCIL REPORT

TO: MAYOR & COUNCIL

FROM: GENERAL MANAGER PLANNING AND DEVELOPMENT AND GENERAL MANAGER LANDS AND FACILITIES

SUBJECT: **BURNABY DISTRICT ENERGY (DE) POLICY**

PURPOSE: To seek Council adoption for the Burnaby District Energy Policy.

RECOMMENDATION

THAT the "Burnaby District Energy (DE) Policy", as outlined in *Attachment 1* of the report titled "Burnaby DE Policy" dated September 11, 2023, effective January 1, 2024, be approved;

THAT staff continue to advance work on the implementation of the Burnaby District Energy Policy, as outlined in the report titled "Burnaby DE Policy" dated September 11, 2023;

THAT a copy of the report titled "Burnaby DE Policy" dated September 11, 2023, be shared with the other partner agencies participating in the regional district energy project - Metro Vancouver, the City of Vancouver, and River District Energy; and

THAT a copy of the report titled "Burnaby DE Policy" dated September 11, 2023, be shared with interested parties: BC Association of Community Organizations for Reform Now (ACORN), BC Co-op Association (BCCA), Burnaby Board of Trade (BBOT), Burnaby Schools – School District 41, Condominium Home Owner Association (CHOA), Landlords BC, and the Urban Development Institute (UDI).

CHIEF ADMINISTRATIVE OFFICER'S COMMENTS

I concur with the recommendations of the General Manager Planning and Development and the General Manager Lands and Facilities.

EXECUTIVE SUMMARY

This report summarizes the communications and engagement undertaken for the Draft Burnaby DE Policy, seeks adoption of the policy and outlines the recommended next steps for implementing the policy. The City is developing the Burnaby District Energy Utility (DEU) to take climate action to complement the City's Green Building Policy to reduce citywide emissions from buildings and help Burnaby reach its greenhouse gas (GHG) emission reduction targets. Approval of the DE Policy will provide the City with

the policy framework to secure building requirements for future DE system readiness and system connections for both existing and new buildings in south Burnaby.

1.0 POLICY SECTION

The proposed Burnaby DEU aligns with the following City plans and policies:

- Climate Action Framework (2020),
- Corporate Strategic Plan (2022),
- Green Building Policy (2018),
- Environmental Sustainability Strategy (2016),
- Community Energy and Emissions Plan (2016),
- Metrotown District Energy Prefeasibility Study (2013), and
- Economic Development Strategy (2007).

As outlined in Section 3 of the Burnaby DE Policy (see *Attachment 1*), the requirements contained within the policy are based on authority provided by the Province of British Columbia to the local governments, like the City of Burnaby, by acts of provincial legislation including the Community Charter, Land Title Act, and BC Building Code.

2.0 BACKGROUND

The City of Burnaby is committed to climate action and is currently developing a district energy utility (DEU) to serve space heating[1] and domestic hot water needs of buildings in south Burnaby. Burnaby's DEU is a City-led project that will help meet Burnaby's greenhouse gas (GHG) emissions reduction targets and will integrate with the City's Green Building Policy for reducing building emissions.

On July 29, 2019 Council endorsed a series of six guiding principles for the district energy system (DES), and authorized staff to work with Metro Vancouver on the business case and ownership model using heat from Metro Vancouver's Waste to Energy Facility (WTEF) for the DES based on the guiding principles.

City staff have continued to advance work on a proposed Burnaby DEU that would connect to Metro Vancouver's WTEF DES project. As part of this work, the DE Policy was brought forward to support the proposed future implementation of a Burnaby DEU and to ensure that future buildings being reviewed through the rezoning process will be designed and built to be compatible with a Burnaby DEU and will be able to connect to a Burnaby DEU in future.

On March 27, 2023, Council adopted the Draft Burnaby DE Policy and authorized staff to continue advancing this policy including undertaking communications and engagement for the Draft Burnaby DE Policy.

The public engagement period for the Draft DE Policy took place between March 27, 2023 and July 31, 2023.

[1] The City is investigating cooling, but cooling is not currently part of the DEU service concept.

The purpose of this report is to report back on what we heard, to seek Council approval of the Burnaby District Energy (DE) Policy and approval to continue staff work on policy implementation.

3.0 GENERAL INFORMATION

3.1 Burnaby DE Policy

The DE Policy outlines building requirements for future DE system readiness and connections in south Burnaby. Although it is anticipated that most of the heat from the Burnaby DEU will be supplied to new buildings, the DE Policy outlines both future opportunities for existing buildings to connect to the Burnaby DEU, and future requirements for new buildings to connect to the Burnaby DEU.

Key aspects of the DE Policy include:

- a policy framework that will serve as a key implementation tool and establish qualifying buildings based on service areas, land use zone, and building size;
- DEU compatibility requirements, which will be sought through the rezoning process, with building design based on DEU service availability; and
- process and procedures for connecting existing buildings and new buildings.

4.0 COMMUNICATION AND COMMUNITY ENGAGEMENT

The purpose of the “What We Heard Report” contained within *Attachment 2* is to provide a summary of public input collected following the release of the Draft DE Policy for public engagement from March to July 2023. It provides information on the purpose, key highlights (some are repeated below), background, approach, methods, input, and a copy of the website content.

4.1 Key Highlights

Some of the key highlights from the “What We Heard Report” are:

- The communications and engagement approach used for the Draft DE Policy provided community-facing information in combination with follow-up meetings with interested parties.
- The public engagement for the Draft DE Policy was a little over 4 months long running from March 27, 2023 to July 31, 2023.
- There was exposure to well over 16,700 potential points of contact with the public.
- There were also more than 60 points of direct contact and over 3,000 points of potential indirect contact with interested parties.
- Over 50 people sought information on the project.
- Public comment was minimal with only three members of the public reaching out to the project team with questions and concerns.

- Input from interested parties was stronger, but modest. The exception was the Urban Development Institute (UDI) who expressed considerable interest and participated in three meetings on the District Energy Utility (DEU).
- During the course of the dialogue with UDI many questions were answered directly. However some critical issues identified by UDI remain that are still being considered and addressed. The City has committed to continue to work with UDI on these remaining outstanding issues, which generally relate to communications, lead time for policy implementation, and clarity on policy and program elements.
- Some 80 questions and comments were received, primarily relating to the overall District Energy Utility project, rather than the Draft DE Policy itself.

5.0 NEXT STEPS

5.1 Effective Date

Based on feedback received during the engagement period, the recommended effective date for the Burnaby DE Policy is January 1, 2024.

Any rezoning applications that have not yet reached second reading at the effective date would be subject to the DE Policy.[2]

5.2 Implementation

The next steps for the ongoing implementation and refinement of the DE Policy are proposed to include:

System Creation

- Staff continuing to work with Metro Vancouver to increase the effectiveness of the use of the heat from the WTEF by three times by using it as the primary heat source for the Burnaby DEU.
- Staff continuing to work with interested parties, including UDI, to resolve outstanding issues during the creation of the DEU and its related implementation tools.

Business Plan

- Staff continuing to work with Metro Vancouver to achieve cost competitive rates that facilitate the use of the heat from the WTEF as the primary heat source for the Burnaby DEU.
- Staff reporting back on the feasibility of using the DES to provide cooling and the assessment of its potential addition to the DEU service concept.

[2] As of July 2023, there were about 47 major projects in the rezoning process south of the Trans Canada Highway that have yet to reach second reading – 13 in Metrotown (service area A1 – core/mandatory connection), nine in Edmonds (service area A2 – core/mandatory connection), nine in Royal Oak (service area B2 – expansion/DE Ready) and 16 in other locations (service area C – optional or opt in).

- Staff reviewing the options and strategy for temporary pre-DEU connection heat source(s).
- Staff developing a rate structure and connection fees for the DEU.

Approach to the Energy Step Code and Zero Carbon Step Code

- Staff developing a consistent and coordinated approach and practices to assigning greenhouse gas intensity (GHGI) for all Metro Vancouver's regional DES, the River District Energy system, and the Burnaby DEU based on the actual emissions factors for the existing WTEF, the DES and Burnaby DEU as outlined in Section 3.3 of the DE Policy (see *Attachment 1*).
- Staff working to develop and adopt an emissions factor for the system that takes the long-term view of system performance, as opposed to adopting a higher emissions factor for the system in the early days of operation to reflect the increased interim natural gas use as the system is built out.
- Staff updating the Green Building Policy to ensure compliance with Zero Carbon Step Code for the whole city (both DE service areas and non-DE service areas).

Integration of DE System and Step Code Approach

- In addition to participating in the regional local government peer network cohort interested in advancing Zero Carbon Step Code more broadly, creating a sub-group with other local governments with DE systems to see how they are approaching Zero Carbon Step Code in the context of their DE Service Areas (e.g., Surrey, Richmond, City of North Vancouver).

Development Approvals

- Staff continuing to work with the City of Vancouver to harmonize their respective District Energy policies and activities along both sides of Boundary Road.
- Staff developing a district energy application form.
- Staff working with developers on individual rezoning bylaw requirements and associated covenants.

The successful implementation of the Burnaby DEU project will also require coordinated work on a series of policies, bylaws, and other implementation tools. *Attachment 3* summarizes the proposed sequence of the policy, bylaw, program and guideline work to come and how this anticipated work will be advanced for Council's consideration as either a Committee or a Council report.

6.0 FINANCIAL CONSIDERATIONS

The application and use of the Burnaby DE Policy will be part of the City's development approvals process and as such there are no anticipated implications to the City's operating budget.

Respectively submitted,

E.W. Kozak, General Manager Planning and Development and James Lota, General Manager Lands and Facilities

ATTACHMENTS

Attachment 1 - Burnaby DE Policy
Attachment 2 - Burnaby District Energy – What We Heard Report – March to July 2023
Attachment 3 - Burnaby DEU Related Implementation Tools

REPORT CONTRIBUTORS

This report was reviewed by Richard Mester, Manager Business Process and Reporting, and May Leung, City Solicitor, and Mark Sloat, Environmental Planner, and Erica Lay, Manager Climate Action and Energy, and Karin Hung, Director Strategic Initiatives, and Lee-Ann Garnett, Deputy General Manager Planning and Development.

Burnaby District Energy (DE) Policy

Version: August 24, 2023 @ 5:48 pm
Effective Date: January 1, 2024

1. BACKGROUND

The City of Burnaby (City) is committed to climate action and is currently developing a District Energy Utility (DEU) to serve space heating[1] and domestic hot water needs of buildings in Burnaby south of the Trans Canada Highway. Burnaby's DEU is a City-led project that will help meet Burnaby's GHG emissions reduction targets and will integrate with the City's green building strategy for reducing emissions in the building sector.

2. PURPOSE

The purpose of the proposed District Energy (DE) Policy is to outline building requirements for future DE system readiness and connections in Burnaby. Although it is anticipated that most of the heat from the Burnaby DEU will be supplied to new buildings, the DE Policy outlines both:

- future opportunities for existing buildings to connect to the Burnaby DEU, and
- future requirements for new buildings to connect to the Burnaby DEU.

Connection Guidelines located in **Attachment 1.1** have been created to support the DE Policy by providing high-level technical information to developers, building owners, engineers, and architects to tailor their designs to DEU requirements, to optimize the benefits of the Burnaby DEU. The City will work closely with developers of new buildings and their mechanical designers to ensure good compatibility and integration between buildings' mechanical systems and the Burnaby DEU. The information in the Connection Guidelines apply to all qualifying building types and uses listed in the DE Policy.

3. LEGISLATIVE AUTHORITY

The requirements outlined in the DE Policy are based on authority provided by the Province of British Columbia to the City of Burnaby by acts of provincial legislation, including those listed below.

3.1 Community Charter

Section 8(2) of the Community Charter, allows a municipality to provide any service that Council considers necessary or desirable, including providing district energy services and requiring buildings to connect to the district energy service.

A service bylaw is typically used to require connection to a district energy system that is already operating or is under construction. A bylaw would follow the DE Policy as one of the proposed supporting implementation tools for the DEU.

[1] The City is investigating cooling, but cooling is not currently part of the DEU service concept.

3.2 Section 219 Covenant

The DE Policy, as Council-adopted policy, establishes building requirements for certain types of existing buildings and new building construction. DE Policy requirements for new buildings will be established as rezoning requirements and they will be secured through a Covenant under Section 219 of the Land Title Act (Section 219 Covenant).

3.3 BC Building Code

The BC Building Code (BCBC) outlines provincial requirements for both energy efficiency and carbon pollution standards for new buildings. The province's latest BCBC changes came into effect on May 1, 2023. These changes enable 20% better energy efficiency as the minimum step of the Energy Step Code and provide an opt-in Zero Carbon Step Code (formerly known as the Carbon Pollution Standard)[2]. These changes in building energy efficiency and a new carbon pollution standard provide new tools for local governments, like the City of Burnaby, to develop zero emission pathways for new buildings.

These recent changes to the BCBC, and the introduction of the Burnaby DEU, will require update(s) to Burnaby's Green Building Policy. The objective is to ensure that Burnaby's Step Code adoption strategy for reducing emissions in the building sector aligns with these BCBC changes, that Burnaby's Green Building Policy continues to accelerate the adoption of building energy efficiency and carbon pollution standards, and that Burnaby's Step Code adoption strategy, Green Building Policy, and DE Policy all align and complement each other.

4. QUALIFYING BUILDINGS

This section outlines the Service Areas and characteristics of buildings that will be required to connect to and/or be compatible with the Burnaby DEU.

4.1 Service Areas

The DEU Service Area is divided into a number of areas as shown in **Figure 1***,* attached and **Table 1**, below and described in more detail below.

4.1.1 Service Area A – Core Area/Mandatory Connection

Service Area A is the core service area for the DEU and includes the two Burnaby town centres that are located in south Burnaby;

- A1 - Metrotown, Burnaby's downtown
  The limits of the Service Area A1 are shown in **Figure 2** attached and are the same as the limits of the Metrotown Downtown Plan, less Central Park.
- A2 - Edmonds Town Centre
  The limits of the Service Area A2 are shown in **Figure 3** attached and are the same as the limits of the Edmonds Town Centre Plan.

[2] https://us15.campaign-archive.com/?u=6394fa7be6bf69bb22890b08e&id=ac626dfe4a

Table 1: *DE Policy Framework*

Service Areas	A	B	C	D
Type	Core	Expansion	Optional	No Service
System Status[3]	Feasibility	Concept	Concept	Not applicable
Location(s)	• Metrotown • Edmonds	• Willingdon from Trans Canada Highway to Metrotown • Kingsway from Metrotown to Edmonds	• South of Trans Canada Highway excluding service areas A and B	• North of the Trans Canada Highway
DE Connection: Existing Buildings	Optional (Opt In)[4]			No Service
DE Connection: New Buildings	Mandatory DE Connection	DE Ready	Optional (Opt In)	No Service
DE Connection: Expected Service	2026	TBD	TBD	No Service
DE Connection: Timing	When and where service is available.			Not applicable
Building Use Categories[5] [6]	• Multiple Family Residential (RM) – RM3, RM4, RM5 • Commercial (C) – C2, C3, C4, C8, C9 • Industrial and Business Centre (M and B) – M1-5, M8, B1, B2 • Public and Institutional (P) – P2, P3, P5, P6, P7, P11 • Comprehensive Development (CD) – CD			Not applicable
Building Size	≥ 100,000 sq. ft. Smaller buildings will be reviewed and connected on a case-by-case basis using an extension test.			Not applicable
Procedures	*Existing Buildings:* • DE Application Form • Review for Burnaby DEU system compatibility *New Buildings (part of the rezoning process):* • DE Application Form • Suitable Plan of Development (SPOD) • Rezoning requirements • Tentative Approval Letter • Conditions of DE readiness[8] • Covenant (commitment to connect to the DEU in future)			Not applicable

[3] Current stage of design and implementation for this portion of the project.
[4] Existing buildings will need to be practical to connect based on compatibility and cost to convert the building's heating system in order to connect to the Burnaby DEU.
[5] As defined by the Burnaby Zoning Bylaw: https://www.burnaby.ca/our-city/bylaws/zoning-bylaw
[6] Most of these zones have a FAR greater than one.
[8] Including a Burnaby DEU system compatibility review prior to building permit.

These two town centres are expected to host about 47% of the city's new residential units[9] and about 22% of the city's employment growth[10] over the 20 years from 2021 to 2041.

The City is developing a new community plan for the Edmonds Town Centre in southeast Burnaby that may include changes to its boundaries that may in turn require future changes to the boundary of Service Area A2.

Connection to the DEU within Service Area A is:

- optional (opt in) for existing buildings of certain types and sizes (see **Table 1**), and
- mandatory for new buildings of certain types and sizes (see **Table 1**).

Within Service Area A, the Burnaby DEU will make every effort to serve all feasible buildings within the service area, even if piping from the DEU's central system(s) is not yet in place. This could involve consideration of alternative strategies, such as containerized interim energy centres, that can be used to connect to remote buildings or groups of buildings until the piping from the DEU's central system(s) is in place[11].

4.1.2 Service Area B – Expansion Area/DE Ready

Service Area B covers areas where there is significant potential to expand the DEU. As the system further develops and expands, the City will consider adding additional connections in Service Area B in the future. Service Area B, includes:

- B1 - the Willingdon Avenue corridor south of the Trans-Canada Highway; and
- B2 - the Kingsway corridor between Metrotown and Edmonds.

The limits of Service Area B are shown in **Figure 4** and **Figure 5**.

The City is developing a new community plan for the Royal Oak Urban Village in southwest Burnaby that may include changes to its boundaries that may in turn require future changes to the boundary of Service Area B2.

Connection to the DEU within Service Area B is **optional** (opt in) for **existing buildings**. This will leave the decision to each individual building and their situation. If the owners of an existing building are interested in connecting to the DEU the City will explore if and when it would be cost effective to extend connections to the building. All DEU connections to eligible existing buildings in Area B will be subject to approval by the General Manager Engineering.

Within Service Area B, **new buildings** of certain types and sizes (see **Table 1**) must be **DE Ready** for future connection to the DEU when it is available. These buildings may have to provide their own temporary boilers or other temporary heat sources if the DEU is not available in their area

[9] https://www.burnaby.ca/our-city/about-burnaby/town-centres
[10] Table A and Table C, Appendix 1 of Burnaby OCP (page 133 of PDF) https://www.burnaby.ca/sites/default/files/acquiadam/2021-05/OCP%201998%20%28full%20version%29.pdf
[11] This strategy has been used extensively at other DEUs in the region like the City of Vancouver's NEU, River District, Richmond's LIEC, Burnaby Mountain, and UBC's NDES.

when they are being designed and constructed. Once the DEU service is available, connection to the DEU will be mandatory. The City is exploring putting a boiler buy-back program in place. If available at the time of connection, the City will offer to purchase the building's boiler.

4.1.3 Service Area C – Optional/Opt In

Service Area C covers all of Burnaby south of the Trans-Canada Highway, excluding Service Area A and Service Area B. The limits of Service Area C are shown in **Figure 4** and **Figure 5**.

Connection to the DEU within Service Area C is **optional** (opt in) for both **existing buildings** and **new buildings.** If the owners of a building are interested in connecting to the DEU the City will explore if and when it would be cost effective to extend connections to the building or not.

- If the building meets the criteria shown in **Table 1** and is determined to be a good candidate for DE connection, the City will commit to taking the steps needed to assess DE service provision to the building. In some cases this would require the installation of a temporary boiler or other temporary heat source until the DE system is able to be connected to the building. The City is exploring putting a boiler buy-back program in place. If available at the time of connection, the City will offer to purchase the building's boiler.
- If the building is determined to be unsuitable for DE connection, the building will be subject to Burnaby's Green Building Policy (e.g., low carbon building systems).

All DEU connections to eligible buildings in Area C will be subject to approval by the General Manager Engineering.

4.1.4 Service Area D – No Service

Service Area D is located north of the Trans Canada Highway (see **Figure 4**). There is no Burnaby DEU service anticipated in Service Area D.

The recent amendments to the BC Building Code (discussed in Section 3.3 of this policy) give local government new regulatory authority to require a low carbon energy system at a specific carbon performance standard.

New buildings in Service Area D will be subject to Burnaby's Green Building Policy, which is in the process of being updated to include reference to the Energy Step Code and new Zero Carbon Step Code.

4.2 Building Use Categories

Buildings in Service Areas A, B and C that fall under certain building use categories (listed in **Table 1,** above) are expected to meet the connection requirement for their service area (listed in **Table 1**, above and in **Section 5**, below) if they are also larger than the minimum size requirement, unless it can be demonstrated that it is not cost-effective to do so. The General Manager Engineering will have the final decision on requests for exemption. The Green Building Policy would still apply to all cases where exemption to the DE Policy have been granted.

The building use categories listed are subject to revision as further Zoning Bylaw amendments and updates are adopted by Council.

4.3 Building Size

Buildings in Service Areas A, B and C that are larger than the minimum size for their service area (listed in **Table 1**, above) are expected to meet the connection requirement for their service area (listed in **Table 1**, above and in **Section 5**, below) if they also fall under certain building use categories, unless it can be demonstrated that it is not cost-effective to do so. The General Manager Engineering will have the final decision on requests for exemption. The Green Building Policy would still apply to all cases where exemption to the DE Policy have been granted.

5. DEU COMPATIBILITY REQUIREMENTS

DEU connection and/or compatibility shall be a requirement of rezoning for qualified buildings in Service Areas A, B, and C (see **Table 1**).

This section provides additional background on the building requirements for district energy as part of the rezoning process.

5.1 Rezoning

5.1.1 Building Design

All new buildings that fall under the DEU service requirements listed within the DE Policy shall be required to provide:

- full hydronic space heating systems, designed to accept heat from the Burnaby DEU including, but not limited to:
    - hot water space heating (hydronic) piping[12]
    - hot water terminal units (e.g., make-up air units and air handling units' coils, in-floor heating, perimeter radiators, fan coils, VAV reheat coils, unit heaters, and more)
    - variable flow and variable temperature control.
- domestic hot water system designed to accept heat from the DEU
- full hydronic space cooling system with connection to cooling, where district cooling systems are available[13]
- space for the energy transfer station (ETS) room at or below grade
- electrical service for the energy transfer station room and equipment
- future connection to DEU, to be secured by means of a Section 219 Covenant and Statutory Right of Way

As previously stated in the purpose section of the DE Policy, the Connections Guidelines located in **Attachment 1.1** have been created to support the DE Policy by providing high-level technical

[12] For DE Ready buildings where the temporary boilers are installed in a different location than the future ETS, hydronic mains and risers shall be sized to accommodate flow from both the boiler and ETS locations.
[13] Similar to space heating described above.

information to developers, building owners, engineers, and architects to tailor their designs to DEU requirements, to optimize the benefits of the Burnaby DEU to both the building and the Burnaby DEU.

5.1.2 DEU Service Is Available

When and where the DEU service is available, buildings will be immediately connected to the DEU by the Burnaby DEU. New buildings will be connected to the DEU by the Burnaby DEU prior to occupancy and as a condition of occupancy.

5.1.3 DEU Service Is Not Available

This section applies to qualified buildings within Service Areas A, B, and C (see **Table 1**).

The City will explore extending connections on a case-by-case basis for both existing and new buildings. This review may involve the Burnaby DEU undertaking a system expansion study to review and confirm whether the business case is there or not to expand the DE system to the building in question. For new buildings this review will be completed during the early stages of the rezoning process.

The City will work to establish a maximum Burnaby DEU connection timeframe for suitable buildings to avoid the long term use of temporary gas based boilers, since there will be limited ability to make mechanical system changes after occupancy. Once established, this connection timeframe can be refined within this policy and supporting District Energy Utility Bylaw at a later date as the system grows and evolves.

Where DEU service is not available, buildings will not be immediately connected to the DEU, but must still be compatible with the system. These “DE-Ready” buildings require their own hot water boilers to serve space heating and domestic hot water (DHW) requirements and will be “ready” for future connection to the Burnaby DEU when it is available.

5.2 Process and Procedures

5.2.1 Existing Buildings

Existing buildings interested in connecting to the DEU within Service Areas A, B, and C will need to complete a district energy application form. This form will be developed once the cooling feasibility for the Burnaby DEU been completed. By completing this form the applicant acknowledges the building is seeking to connect to the DEU and that the mechanical system within the building will be modified to accommodate connection to the DEU. The design of the building mechanical system will be subject to the approval of the Chief Building Inspector.

5.2.2 New Buildings

All applicants seeking rezoning to develop qualifying buildings will need to complete the following steps during the rezoning process to ensure that the mechanical systems of their building will be designed to accommodate both DEU compatibility and future connection to the DEU.

- Developer completes a district energy application form.
- Developer prepares a suitable plan of development in accordance with the DE Policy and Connection Guidelines.
- City lists DE readiness as a rezoning requirement in the rezoning Public Hearing report and Tentative Approval letter.
- Developer submits a letter of undertaking agreeing to DE readiness and future connection by means of Section 219 Covenant after Second Reading.
- City and Developer execute the covenant prior to Final Adoption of the Rezoning Bylaw.

District Energy System

Design Guidelines for Connection to District Energy

Version 1.0 – 2023/08/23

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Definitions

BAS	Building Automation System
DE	District Energy
Delta T; ΔT	Temperature Difference
RE-Ready	New buildings that are designed and constructed to be compatible with DE, but do not initially receive DE service.
DCW	Domestic Cold Water
DES	District Energy System
DEU	District Energy Utility, the entity that designs, builds, owns, and operates the DES, i.e. the City of Burnaby or subsidiary
DHW	Domestic Hot Water
DHWR	Domestic Hot Water Recirculation
DPS	Distribution Piping System
ETS	Energy Transfer Station
HVAC	Heating, Ventilation & Air-Conditioning
MAU	Makeup Air Unit
NEC	Neighbourhood Energy Centre
OAT	Outdoor Air Temperature
Primary	Refers to systems, equipment, or water on the DES-side of the ETS's heat exchanger(s).
Secondary	Refers to systems, equipment, or water on the customer building-side of the ETS's heat exchanger(s).
WTEF	Waste to Energy Facility

1 Document Purpose

This document provides preliminary technical information to developers, building owners, engineers, and architects to tailor their designs to DE conditions, thereby optimizing the benefits of the District Energy System (DES) to all users of the system. The City of Burnaby or its subsidiary operator, collectively referred to as the District Energy Utility (the DEU), will work closely with developers of new buildings and their mechanical designers to ensure acceptable design integration between buildings and the DES. The information in this document applies to all building types and uses, including residential and commercial.

In accordance with the City of Burnaby's District Energy Policy, it is essential that the developer collaborate with the DEU on the HVAC and plumbing design of connected buildings, in accordance with this document, prior to issuance of the Building Permit.

2 The District Energy System

The DES in Burnaby is a community-based thermal network developed by the City of Burnaby. The system is designed, built, owned, and operated by the DEU. The customer rates are set using a transparent cost of service model.

The DEU provides its customers with thermal energy generated and distributed by the DES and transferred to the building heating system via heat exchangers located in each building. The DES provides all space heating and domestic hot water heating requirements. A detailed description of all DES components is provided in the following sections.

The DES will be supplied with low-carbon energy from the Metro Vancouver Waste to Energy Facility (WTEF) via Metro Vancouver's Regional District Energy System.

2.1 DES Description

The District Energy System (DES) is a system that distributes thermal energy in the form of hot water from one or more central Neighbourhood Energy Centre(s) (NECs) through a network of buried piping to individual customer buildings. The DES interfaces indirectly via heat exchangers with each building's space heating and domestic hot water systems. No other heat sources are required in buildings served by the DES.

The DES consist of three main components:

- Neighbourhood Energy Centre – the thermal energy generation
- Distribution Piping System – the heat distribution network
- Energy Transfer Stations – the building interfaces

Each of these components has its specific function and design requirements as described below.

2.2 Neighbourhood Energy Centre

The Neighbourhood Energy Centre (NEC) is a key component of the DES where thermal energy (heat) is generated. Thermal energy can be produced using traditional, fossil-fuel based energy sources such as high-efficiency natural gas boilers, or by utilizing alternative, low-carbon energy sources such as heat pumps or waste heat recovery. The NECs are planned to incorporate a connection to the Metro Vancouver Regional DES to make use of waste heat generated at the WTEF. The NECs will use this waste heat as the baseload energy source to supply the majority of the DES annual energy requirements. Peaking and back-up heat will be provided initially by natural gas boilers. Other peaking and back-up technologies may be implemented as the DES evolves.

Production equipment and controls being implemented are state-of-the-art, based on the best of today's commercially proven technology. The DE infrastructure is designed to facilitate the future use of new renewable energy sources for thermal energy. The DEU will have the ability to switch fuel and energy sources over time as the system and regulations require.

Prior to final commissioning of any new building connected to the system, the DES will be capable of serving 100% of its thermal energy requirements from either temporary or permanent energy centre facilities.

The DES will have a higher level of reliability than is generally found in standalone heating systems in individual homes or commercial and multi-use residential buildings.

2.3 Thermal Distribution Piping System

Thermal energy is delivered to customers with a closed loop two-pipe (supply and return) hot water Distribution Piping System (DPS): the same water is heated in the NECs, distributed to the buildings, through the Energy Transfer Station (ETS), and returned back to the NECs to be reheated and redistributed. No water is drained or lost in the system, and no additional water is required during normal operation.

The DPS is composed of an all-welded, pre-insulated direct bury piping system in public streets and/or private corridors. The DPS is designed based on the size and location of customer buildings and NECs. Distribution network modelling is completed to optimize system performance and efficiency, and to ensure that all customers will always receive sufficient thermal energy.

Variable speed pumps located at the NEC control flow through the DPS to maintain sufficient pressure and flow at every ETS. The DE supply temperature is automatically adjusted based on the outdoor air temperature (OAT), but is never less than 65°C, such that it can always serve all domestic hot water (DHW) loads directly[1].

[1] i.e., without requiring other heat sources to supplement or elevate the temperature to meet the building's requirements.

In hot water-based heating systems, low Secondary return temperatures from the customer buildings allow for large temperature differentials (delta T; ΔT) to be achieved in the DPS, resulting in low pumping requirements and high efficiency, smaller diameter pipes, minimized capital costs, reduced thermal losses, and the optimal use of renewable and low-grade heat sources. District heating Primary return temperature is a function of the HVAC and DHW systems in customer buildings; hence, it is essential for the DEU to ensure that buildings connected to the system meet performance requirements, and it is imperative that building designers are conscious of and adhere to the DES temperature requirements, specifically the Secondary return temperatures.

2.4 Energy Transfer Stations

Each customer building houses an Energy Transfer Station (ETS) that is owned by the DEU. The key components of an ETS include:

- DE supply and return pipes from the building penetration (interface with the DPS);
- Heat exchangers for heat transfer between the DEU and the building's hydronic heating and DHW systems;
- Controls to regulate the Primary flow required to meet the building's energy demand and maintain DES return temperatures; and,
- Energy meters to monitor the demand and energy used by each customer for billing and system optimization purposes.

As shown in Figure 1 below, flow through the Primary side of the ETS is controlled to achieve the building's Secondary supply temperature set point.

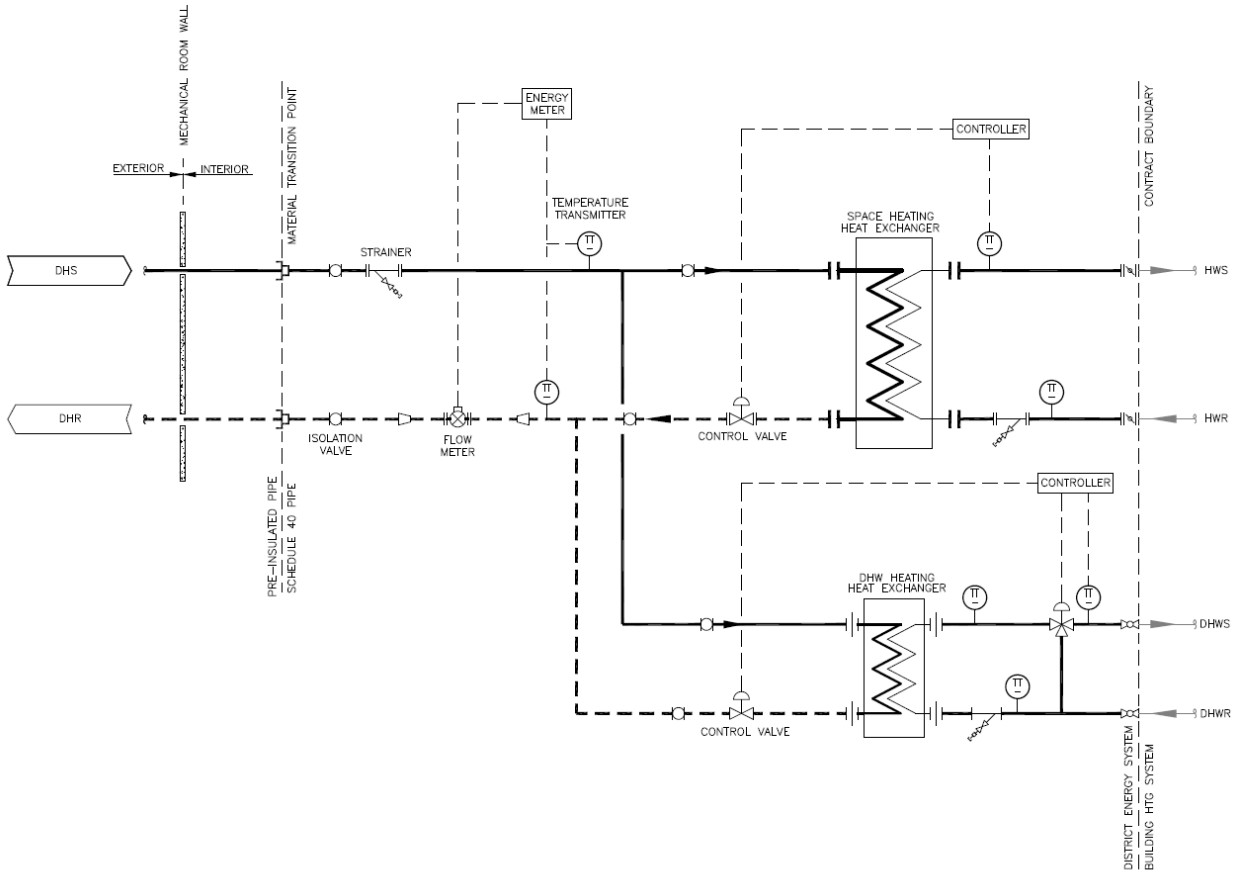

FIGURE 1: TYPICAL HEATING ETS FLOW SCHEMATIC

Heating ETSs generally have two heat exchangers: one for space heating, and a second to serve DHW. This is good industry practice for hot water DE in North America and around the world. There is a vast amount of experience and data regarding DE performance and reliability with this configuration. Heat exchangers are very reliable (with no moving parts); hence, it is not necessary to have redundant units in an ETS. Additional heat exchangers may be required where capacity or system configurations dictate.

Though very unlikely, the DEU will be able to repair or replace a faulty heat exchanger quickly and on short notice. It is important to note that a leaking or faulty heat exchanger can often continue to supply heat, and the repair/replacement can be scheduled for a convenient, low demand period.

2.5 DE-Ready Buildings

DE-Ready buildings may not be immediately connected to the DEU. In this case, they will not house an ETS initially, though are required to provide space for future installation of an ETS. Provisions must be made for future installation of an ETS and DPS service lines.

DE-Ready buildings provide their own thermal energy for space heating and DHW through direct ownership of the equipment. This equipment is the sole responsibility of the building. The DEU

will provide guidance and support to ensure that DE-Ready buildings meet all DE compatibility requirements including location of future connection points for integration into the established DES.

No building equipment shall be installed in the space allocated for the future ETS, including natural gas boilers or other thermal energy generating equipment if it obstructs access to the installation of the future service connection or ETS. Building designers shall consider how district heating lines will connect in the future without disruption to the Secondary system's operation. Provision of tees and valves in the Secondary system for seamless integration of the future ETS is required. Future connection for these buildings may occur when DEU services are available at the site and/or at the time of Secondary equipment replacement.

3 Responsibilities of Customers and the DEU

The following section outlines the responsibilities of the developer and the DEU to ensure efficient and seamless integration of DE service, and to ensure full compatibility for DE-Ready buildings.

3.1 Developer's Responsibility

3.1.1 HVAC System

The building developer is responsible for designing and installing the building HVAC and plumbing systems. There are some differences and similarities with conventional, standalone systems, as explained below.

The following conventional building elements are not required for HVAC systems in DE customer buildings[2]:

- Boilers, furnaces, heat pumps, domestic hot water heaters, electric baseboards, or any other heat production equipment.
- Auxiliaries to heating systems such as stacks and breeching.
- Natural gas service for space heating and DHW purposes[3].

The building will require internal thermal distribution systems, including:

- Internal distribution pumps and piping (i.e., hydronic space heating distribution loops and DHW distribution piping)
- Heating elements such as fan-coil units, air handling units, and/or perimeter (baseboard) or in-floor radiant heating systems.
- Normal building controls and control systems.
- Make-up water, pressure regulation, thermal expansion compensation (e.g., expansion tanks), over-pressurization protection (e.g., relief valves), scald protection.
- Dielectric connections to the ETS's secondary DHW piping.

[2] DE-Ready buildings will require boilers or other thermal production equipment to serve space heating and DHW requirements.

[3] Natural gas service within buildings may exist, if allowed by other City of Burnaby requirements, for other uses, such as cooking.

The following are some design conditions that are specific to DE:

- Customer buildings host service connection lines from the DPS. The DES branch lines enter the building, similar to other utilities, and transfer energy through the ETS.
- The building owner and the DEU agree on a suitable location for the ETS. The ETS invariably requires less space than comparable thermal production equipment (e.g., boilers) that it replaces. To reduce DES piping inside the building, the ETS shall be located on an exterior wall on the basement or ground floor[4], as close as possible to the DES branch pipeline entering the building.
- The DES operates most effectively and efficiently with the use of low temperatures in the building heating systems.

The DES will provide thermal energy for heating and domestic hot water only. Section 4 discusses specific requirements of the hydronic space heating and DHW systems for compatibility with hot water district energy.

The DEU reviews the HVAC and plumbing design of each building for compatibility with the DES, but is not responsible for the design of the building system (which is executed by the developer). The DEU may make suggestions as necessary to ensure appropriate integration with the DES.

3.1.2 Installation and Operation Contract Boundary

The customer is responsible for all piping and other components necessary to connect the hydronic heating and DHW systems to the ETS at the stipulated demarcation point for the service boundary on the Secondary side of the heat exchangers. This demarcation point will be clearly marked on the DEU engineering drawings for the ETS, downstream of the main isolation valves on the Secondary side of the ETS, as shown in Figure 1.

3.1.3 Sub-Metering

Customers may install energy meters on individual units, suites, or sub-systems within the heating and/or DHW systems in their building. These sub-meters are the sole responsibility of the customer, and will not affect the obligation of the customer to pay the DEU bill based on the DEU's thermal energy meter (part of the ETS) for the whole building. DEU billing to the customer will be based on the ETS meter only. Sub-meters are generally not utility grade and therefore less accurate. If a customer decides to use sub-meters, it is recommended that they be used for allocation of total building thermal energy only.

3.1.4 Preparation of Building for DE Service

All customers will provide suitable space for the installation of the ETS, including space for service lines and interconnecting piping, in a mechanical room in an agreed-upon location with sufficient access for the ETS. The ETS shall be located at an exterior wall facing the street with the DPS, as close as possible to the DPS branch pipeline entering the building, in the basement or ground

[4] Or as required by any applicable flood plain restrictions.

level. If the building is located in an area with a flood plain restriction, the ETS shall be located in the lowest level allowed by the applicable bylaw.

The ETS room shall be ventilated per applicable Code and maintained at a temperature between 10°C and 35°C. The ETS room will require a double wide door and clear access from a delivery point to allow for installation of the ETS. Minimum access clearance of 2032mm high x 1800mm wide shall be maintained to the ETS room. A floor drain connected to the sanitary sewer system shall be provided in the ETS room within 1.0m of the proposed ETS location, but not underneath the ETS. A domestic water source and hose bibb shall be provided within the ETS room. A dedicated 15A 120V electrical service, with a lockable breaker, is required to power the ETS control panel.

The DES will directly monitor heating pump on/off status via a hardwire connection to current sensors or VFD contacts, to be provided by the building; the building shall provide conduit, pull string, and wire from any applicable heating pumps or VFD contacts to the ETS location, and current sensors and wiring terminations shall be by the DEU. Quantity, size, and locations shall be coordinated in design. As well, one 20mm electrical metallic tubing (EMT) conduit from the ETS room to a north facing exterior wall is required for the outdoor air temperature (OAT) sensor wiring; the building shall provide the conduit, pull string, and wire, while the DEU shall provide the OAT sensor and wiring terminations. The ETS controls are standalone, and shall not have any connection to the customer building control system.

The footprint of an ETS depends on a number of factors, including customer load, number of heat exchangers, configuration of the hydronic heating and DHW systems, and specific restrictions within the customer building. Generally, a typical ETS requires between 4 and 10 m^2 of floor space, with a minimum ceiling height of 2.7 m. A minimum 1.0m of clearance is required in front of the control and electrical panel of the ETS and 300mm around all other sides when it is placed in its final location. The exact size and location of the ETS will be coordinated during the design process. Figure 2 below shows a typical ETS located near the DPS mains in the street.

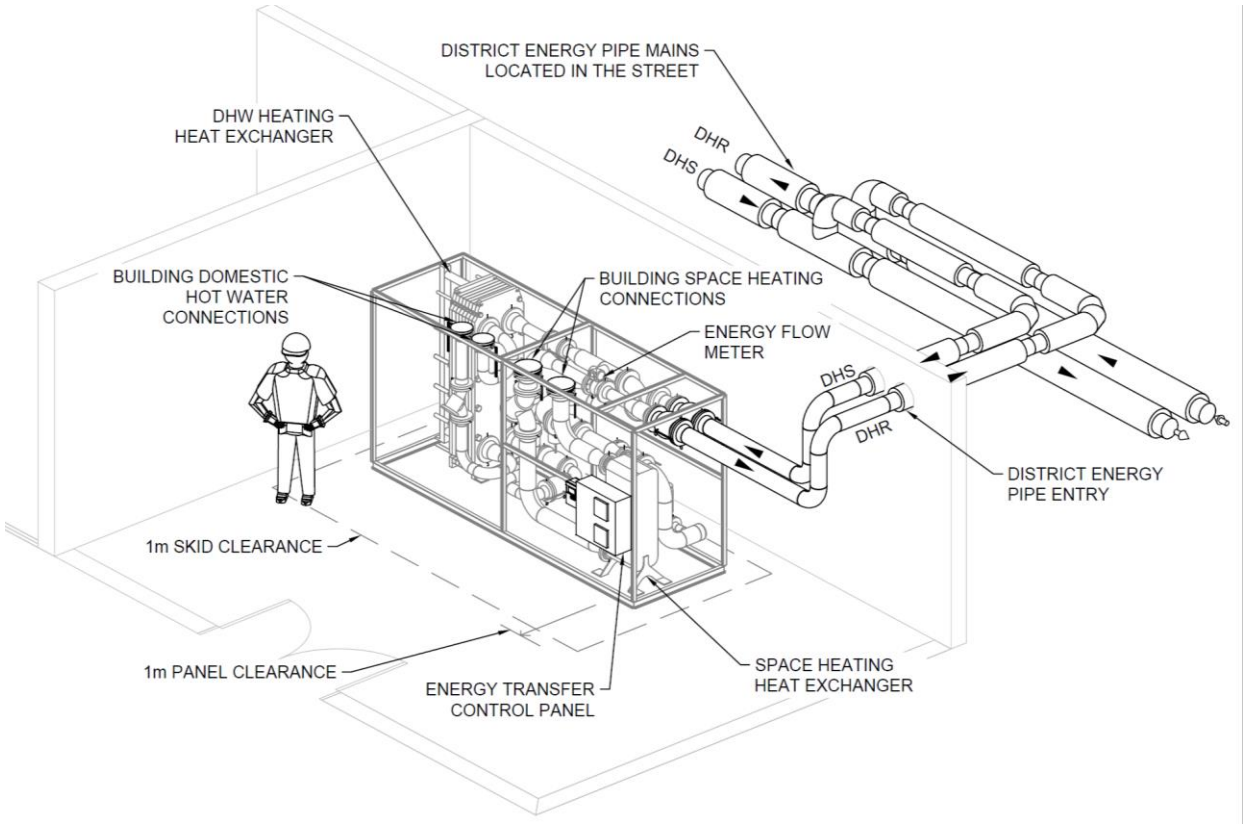

FIGURE 2: TYPICAL HEATING ETS INSTALLATION IN BUILDING BASEMENT

The building shall be responsible for concrete coring or pipe sleeves for all DE service lines' and communication conduits' penetrations through building and foundation walls, as well as sealing of penetrations after DEU installation, including building envelope waterproofing. The DEU will produce a penetration drawing during the detailed design stage. Penetrations may be core drilled (after foundation construction) or sleeved (during foundation construction). The DEU will install the DE service lines; however, as with other utilities, the customer is responsible for providing and maintaining the penetration. Final location and size of DPS core holes or sleeves to be confirmed with the DEU prior to installation. Timing of sealing and waterproofing after DE installation is to be coordinated with the DEU.

The DEU may also install one or more plastic (PVC or HDPE) conduits into the customer building to facilitate remote communication with the ETS. Communication allows for remote monitoring of the ETS, as well as remote reading of the energy meter. The customer is also responsible for providing and maintaining the penetration for communication conduit(s).

The DEU will require uninterrupted access to the ETS and service line within a customer's building for installation, regular maintenance and repairs, without confined space constraints. This is defined by a DES service agreement with the DEU and Statutory Rights of Way document.

3.1.5 Hydronic Heating Water Quality & Expansion

Building owners are responsible for filling and managing their own building hydronic space heating system. The DEU requires that water treatment for the building system meet the minimum criteria set forth below:

Chloride:	< 30 ppm
Corrosion Inhibitor	
Hardness:	< 2 ppm
pH Level:	9.5-10
Iron	< 1 ppm

The customer shall employ the services of a qualified water treatment contractor to provide the necessary chemicals, materials and supervision for a complete cleaning and flushing of all piping to the ETS demarcation point. ETS start-up and commissioning will occur only after acceptable water quality analysis results have been obtained. Certification from the water treatment contractor verifying that the water quality is adequate is required before the customer can flow water through the ETS. Cleaning and flushing test reports shall be provided to the DEU for review and acceptance prior to DEU connection and commissioning. No cleaning or flushing water shall be allowed through the ETS. The building is responsible for including necessary temporary bypasses to facilitate the cleaning and flushing process.

The cleaning and flushing process shall be completed by the building, but shall generally consist of a chemical clean, followed by a clean water flush to drain, then fill and treatment of the system service water. Flushing velocity shall be adequate to ensure removal of debris from the system; recommended values are:

- Pipe sizes NPS 6 and smaller: 1.5 meters per second (4.9 ft/s).
- Pipe sizes NPS 8 and larger: 0.9 meters per second (3.0 ft/s).

The building is responsible for continuously employing the services of a qualified water treatment specialist and maintaining acceptable water quality throughout the life of the building.

3.1.6 Commissioning

The ETS secondary isolation valves shall be opened to the building piping systems and commissioned only after the DEU is satisfied with the building's cleaning and flushing process and results. The customer is responsible for commissioning all equipment and systems on the building side of the demarcation point prior to requesting ETS commissioning by the DEU. During ETS commissioning, the building operator is responsible for the building's internal hot water hydronic and DHW systems.

3.1.7 Changes to the Building System

The Customer shall not materially change the design or substitute any pertinent equipment during installation without the DEU's approval. After commissioning, any changes to the building's hydronic or DHW system that may impact DES performance shall be reported to the DEU.

The ETS is owned and maintained by the DEU. Under no circumstances is the customer or any of its contractors permitted to adjust, modify or otherwise tamper with any ETS equipment. This includes adjusting or changing the position of any valves, gauges or instruments and altering the controls and control panel.

3.1.8 DE-Ready Buildings

DE-Ready building owners are responsible for design, installation, commissioning, operation, and maintenance of all systems within their building, including all boilers and chillers/cooling towers. The DEU has no responsibilities within DE-Ready buildings until DEU service branches and ETS are installed in the future.

3.2 DES Responsibility

3.2.1 DES Equipment within Customer Buildings

The DEU designs, installs, operates and maintains the ETS at the agreed-upon location, as well as the Primary (DE) distribution pipes to the ETS. Pre-insulated branch pipelines are generally direct buried from the mainline to the building penetration. From that point, DE piping runs inside the building to the ETS.

The DEU provides strainers on the Primary (DE) and Secondary (building) side at each heat exchanger in the ETS, which are cleaned as necessary. The DEU services the energy metering equipment and verifies accuracy at regular intervals per manufacturer recommendations.

The DEU provides temperature transmitters, pressure gauges, temperature gauges, thermowells, control valves, energy meters, and a control panel for the ETS. Temperature transmitters for the Secondary side of the heat exchangers are also provided to facilitate monitoring and control of the building side heating and DHW systems. The ETS controls are standalone, and do not require any connection to the customer building control system. The ETS controls regulate Primary water flow rates to maintain Secondary supply water temperatures; the ETS does not control any other aspects of the buildings hydronic space heating and DHW systems.

The DEU provides pressure relief valves on the Secondary side of the ETS heat exchangers, within the bounds of the ETS. These relief valves are solely to protect the ETS heat exchangers, piping, and components from over-pressurization from thermal expansion if the ETS isolation valves are closed. Pressurization and over-pressure protection of the building's hydronic and domestic hot water systems remain the responsibility of the customer building. The building developer shall communicate the building systems' design and maximum operating pressures at the inlet of the ETS, in order for the DEU to coordinate relief valve selections.

3.2.2 District Energy Side Water

The DES provides the make-up water requirements for the Primary system side. All necessary water treatment and thermal expansion of water in the DES is accomplished at the NEC(s).

3.2.3 ETS Commissioning

The DEU will start and commission the ETS and all components up to the DE-service demarcation point. Commissioning includes verifying measurement points and testing the controls under various operating modes. The building operator is required to support this process as the

building’s internal hydronic space heating and DHW systems must be ready to accept heat from the DES.

3.2.4 Energy Metering

Thermal energy meters consist of high quality and accurate components installed in the ETS: a flow meter, temperature sensors on both supply and return pipes, and an integrator/calculator. The energy meter collects data on water flow, cumulative energy, peak demand, and temperatures. Data from each meter is transmitted to a central DEU computer for utility billing purposes and to monitor and optimize performance of the DEU and customer buildings. The meters are utility-grade integrated thermal energy meters that achieve high accuracy and performance, conforming with existing international (OIML R75 and EN1434) standards, meeting Canadian (CSA C900) standard, and approved by Measurement Canada for thermal energy metering.

4 Requirements for Building HVAC and DHW Systems

This section summarizes technical requirements for hydronic heating and domestic hot water systems for new developments to be served by the DES, including DE-Ready buildings. The information provided in this document should be regarded as a general guideline only, and the developer's Engineer shall be responsible for the final building-specific design. The DEU will provide technical assistance to developers to improve integration of the customer building with the DES. Heating system schematics, layouts, equipment schedules and sequence of operation or control strategies are required to assist in the DES review process.

4.1 Design Strategies

The following table identifies the key elements or strategies that should be followed when designing the building hydronic systems.

Strategy:	**Rationale:**
Centralized hydronic system	• Water has four times the specific heating capacity of air. • Benefits from system load diversification. • Reduces utility interconnect costs. • Minimizes noise from mechanical systems.
Low[5] hot water supply temperatures	• Improves efficiency. • Allows use of lower grade energy sources.
Large temperature differentials	• Reduce piping capital cost. • Reduce pumping capital & operating costs.
Avoid conventional water-source heat pumps	• Fan-coil units and hybrid heat pumps reduce power consumption and noise when in heating mode, and have longer life than conventional heat pumps. • Improves energy efficiency and reduces cost for residents
Instantaneous or semi-instantaneous DHW systems	• Reduces cost and space required for storage tanks • Smaller storage volumes decrease risk of bacteria growth • Improves energy efficiency

[5] "Low" relative to traditional building HVAC design, which historically had >80°C on the building side of the ETS. The DEU is referred to as a "medium" temperature water system since it supplies water from 65°C up to 95°C and needs to be higher than the building side temperature.

Strategy:	Rationale:
Appropriate sizing of DHW pumps	• Reduce capital and operating costs • Improved DHW return temperatures improves energy efficiency • Reduced DHW volume decreases risk of bacteria growth
Variable flow with variable frequency drives	• Reduces pumping operating costs. • Improves system control.
Two-way control valves	• Necessary to achieve variable flow and a large temperature differential.
Seasonal reset of supply temperatures	• Improves energy efficiency. • Improves system control.
Return temperature limiting	• Improves energy efficiency. • Ensures large Primary temperature differentials.
Direct Digital Control System	• Allows more accurate control and greater control flexibility. • Potential opportunities for energy savings.
Night setback settings & recovery times	• Minimize equipment sizes by allowing reasonable recovery times. • Maximize recovery times from unoccupied to occupied mode.

4.2 Pumping and Control Strategy

The building hydronic heating system shall be designed to minimize Secondary hot water return temperatures across all operating conditions.

The building heating system shall be designed for variable hydronic flow (with variable speed pumps to minimize pumping energy), using 2-way modulating (or on/off) control valves at terminal units (radiators, fan coil units, etc.). Alternatively, 3-way mixing valves at sub-systems and terminal units may be used.

Bypass valves (e.g., 3-way bypass valves at terminal units) are not permitted. One allowable exception to the bypass valve restriction is the use of a controlled bypass flow path to ensure minimum pump speeds can be maintained without deadheading the pumps; in this case, the bypass valves must be programmed to remain closed at all times that circulating pumps are operating above minimum speed settings. Bypass valves shall be sized to minimize the rate of bypassed flow, only providing that as sufficient to maintain minimum pump speeds.

Pumps shall be selected for the diversified demand (with a reasonable margin) in order to avoid oversizing and consequential impacts to the ETS heat exchanger sizing. The allowable pressure drop between ETS tie-in points from the Secondary side return piping tie-in to the secondary side supply piping tie-in, including the pressure drop through the Secondary side of the ETS heat exchanger, needs to be carefully considered so as to not affect pumping and flows to Secondary side end devices. Table 1 shall be followed when sizing the hydronic system and DHW pumps:

TABLE 1: ETS MAXIMUM ALLOWABLE SECONDARY SIDE PRESSURE DROP

System	ETS total pressure drop[6]	HX pressure drop
Space Heating	Maximum 70 kPa	Maximum 50 kPa
Domestic Hot Water	Maximum 70 kPa	Maximum 50 kPa

See Figure 3 below for typical hydronic heating system configurations.

[6] Certain configurations may require higher overall secondary side pressure drop, e.g., if three-way mixing valves are included. Such configurations will be discussed with the building developers if required.

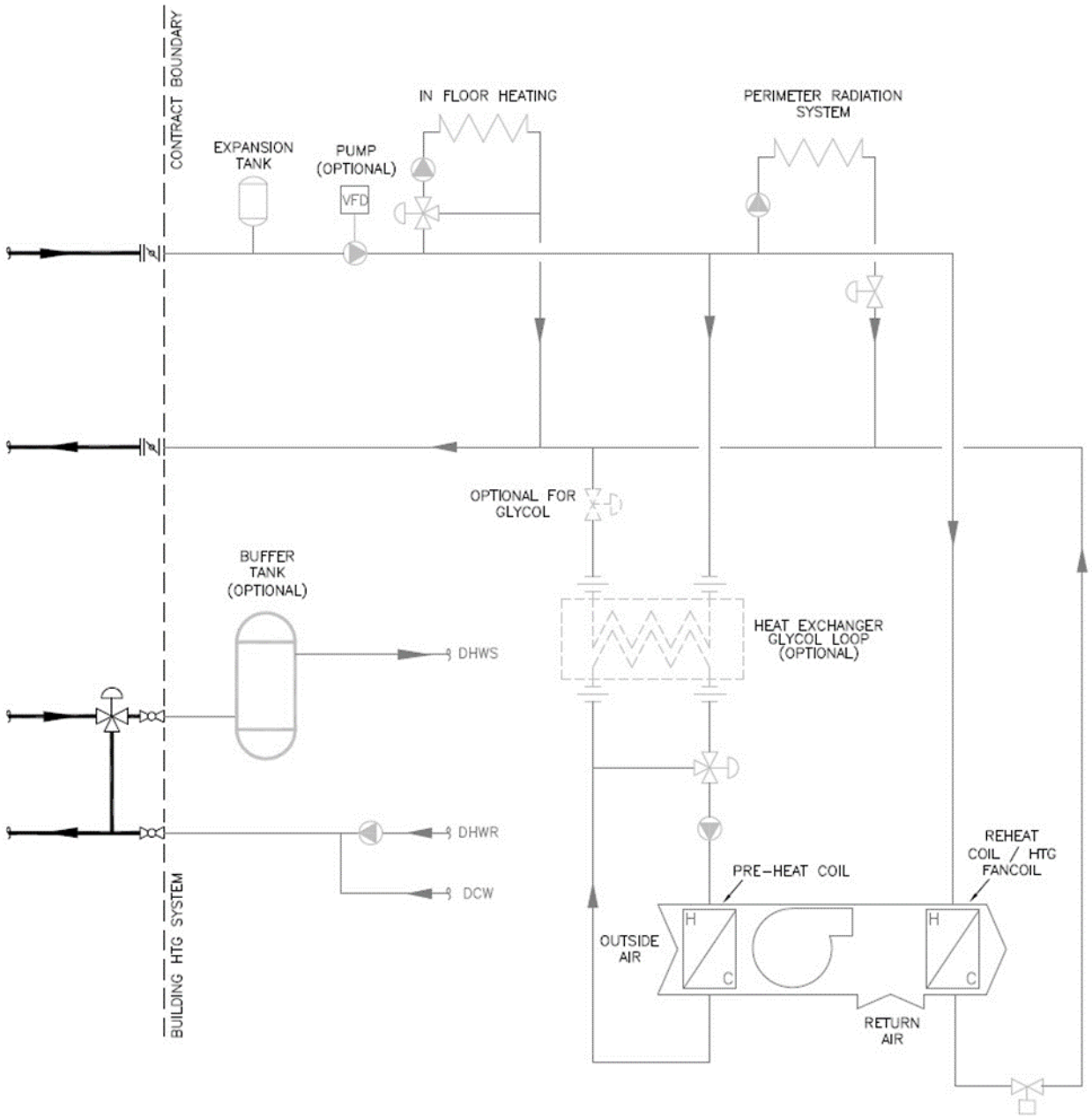

FIGURE 3: EXAMPLES OF TYPICAL SECONDARY (BUILDING) HEATING SYSTEMS

4.3 Hydronic Heating and DHW System Requirements

4.3.1 Hydronic Space Heating

Optimization of the hydronic heating system return temperature is critical to the successful operation of the DEU. The ETS controls the supply water temperature to the hydronic circuit (i.e., the temperature of the water leaving the space heating piping of the ETS) based on an outside air temperature reset schedule. This is the maximum temperature available to the building hydronic space heating circuit. A sample hydronic space heating circuit supply and return temperature reset curve is shown in Figure 4 below.

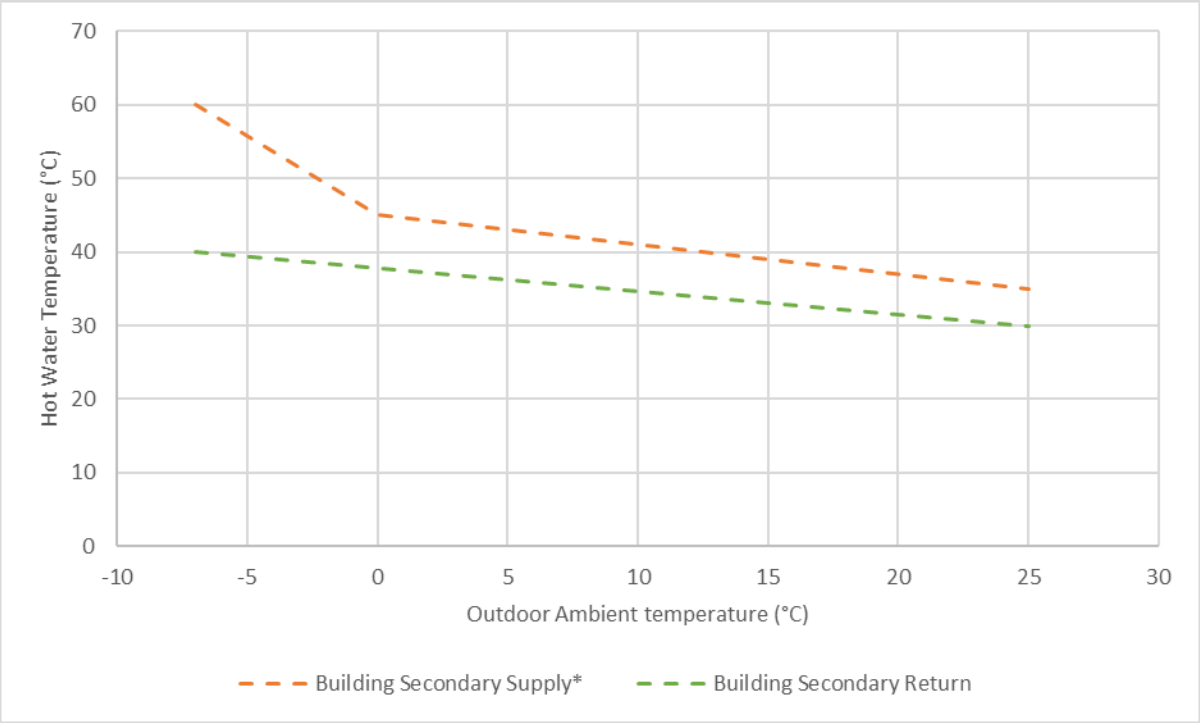

FIGURE 4: TYPICAL SECONDARY SPACE HEATING TEMPERATURE RESET CURVE
*SPACE HEATING ONLY. DHW SUPPLIED SEPARATELY FROM ETS, HEATED TO MAX. 60°C

The hydronic space heating system shall be designed to provide **all** space heating and ventilation air heating requirements for the whole building, supplied from a central ETS. Gas-fired or electric-resistance heating or ventilation equipment (roof top units, air handling units, electric coils, electric baseboards, etc.) are not permitted, unless approved by the DEU when hydronic heating is not deemed feasible or is prohibited by a building code.

Heating water generated by the ETS is distributed via a 2-pipe system to the various heating elements (terminal units) throughout the building. The building Secondary heating system **must** be designed for temperatures and pressures no greater than those specified in Table 2 below.

TABLE 2: MAXIMUM HYDRONIC SPACE HEATING SYSTEM TEMPERATURES

	Peak Winter	*Summer*
Supply Temperature, **Max.**	60°C	35°C
Return Temperature, **Max.**	40°C	30°C
Design Pressure[7]	≤1600 kPa	≤1600 kPa

Specific types of heating systems (i.e., terminal units) can operate at lower temperatures. The terminal units must be selected based on temperatures as low as can be reasonably expected.

The specified temperatures shall be regarded as maximum requirements; lower temperatures are desirable. The building return temperatures should be minimized to allow the DES to take advantage of alternative energy technologies.

4.3.2 Domestic Hot Water

The Domestic Hot Water (DHW) system shall be designed to provide all DHW requirements for the building, supplied from a dedicated DHW heat exchanger from the ETS. It is understood that DHW systems require supply temperatures as high as 60°C; the DES is able to supply this temperature to all buildings at all times, as illustrated in Table 3.

TABLE 3: DOMESTIC HOT WATER SYSTEM TEMPERATURES (BUILDING SIDE)

	Winter	*Summer*
Supply Temperature (with storage), **Max.**	60°C	60°C
Supply Temperature (no storage), **Max.**	55°C	55°C

The building is responsible for ensuring their system design meets all maximum and minimum temperature and anti-scaling requirements per the latest editions of the local Plumbing Code and ASHRAE Standard 188 and Guideline 12, depending on the DHW configuration chosen.

DHW systems may be designed in various configurations, each with their own benefits and draw backs. The allowable configurations are:

- Instantaneous
- Semi-Instantaneous

[7] So as not to exceed standard design pressure. If building specifics (e.g., building height) imposes a higher pressure requirement at the ETS, the building designer shall communicate this to the DEU.

- Charging

Instantaneous and semi-instantaneous systems are encouraged to reduce DHW storage size and cost if peak demands are not excessive.

Instantaneous

A fully Instantaneous DHW system has no storage tanks; domestic water is heated on demand. This results in the smallest footprint and lower maintenance and capital costs. Additionally, the ETS experiences the lowest return temperature, benefiting the DEU. However, as the heating is on demand, the ETS heat exchanger must be sized for the peak DHW draw flow, resulting in the largest capacity heat exchanger of the three options. Instantaneous DHW systems are configured with DHW recirculation lines connected in parallel to the DCW supply line, to the inlet of the ETS heat exchanger. Refer to Figure 5 for a typical Instantaneous schematic.

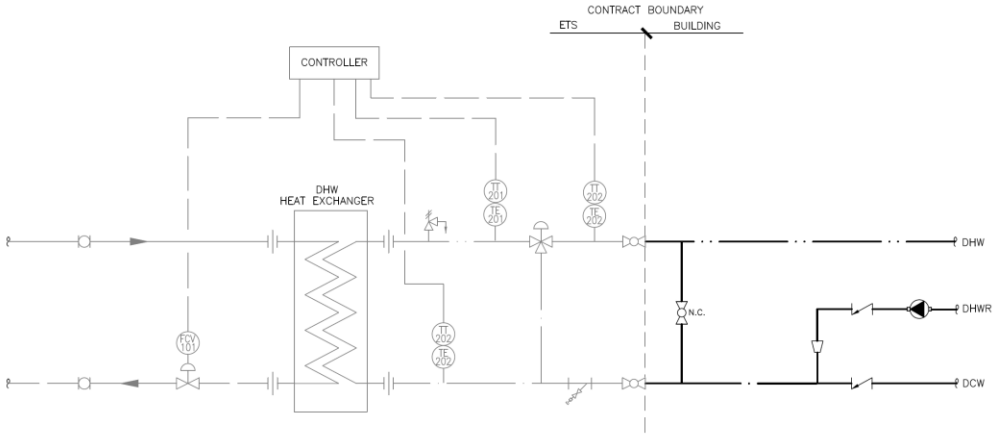

FIGURE 5: TYPICAL INSTANTANEOUS DHW CONFIGURATION

Semi-Instantaneous

A Semi-Instantaneous DHW system has a small amount of storage capacity, where storage tanks act as “buffer tanks” only; there is no recirculation from the DHW storage tanks directly back to the ETS heat exchanger. The buffer volume allows for a drain down of DHW during atypical or critical demand periods, while potentially reducing the heat exchanger capacity. Semi-Instantaneous DHW systems are configured with DHW recirculation lines connected in parallel to the DCW supply line, to the inlet of the ETS heat exchanger, and the buffer tank(s) connected off the supply from the heat exchanger. Refer to Figure 6 for a typical Semi-Instantaneous schematic.

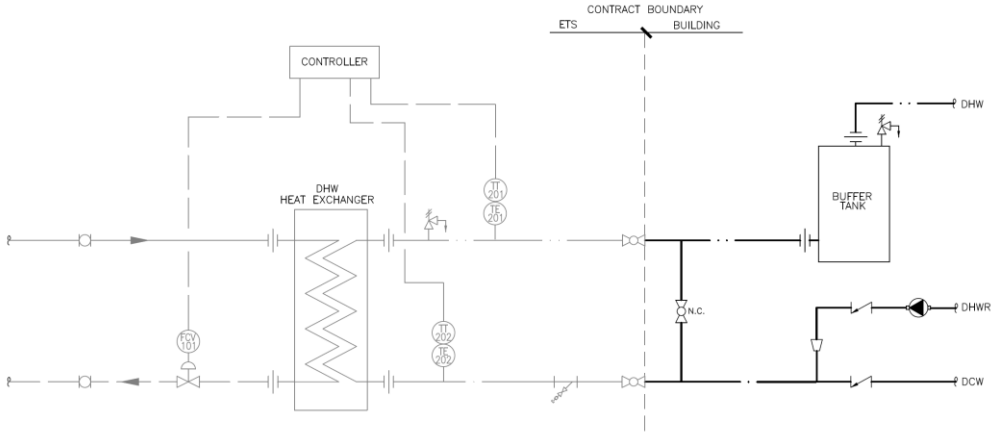

FIGURE 6: TYPICAL SEMI-INSTANTANEOUS DHW CONFIGURATION

Charging

A Charging DHW system can have a significantly reduced heat exchanger capacity compared to Instantaneous or Semi-Instantaneous, but requires the addition of charging pumps and ample storage volume to suit the DHW demands. Due to the presence of larger storage volumes and increased residence times, the risk of Legionella growth is higher than for the other configurations, and must be prevented appropriately. Additionally, Charging configurations require careful consideration of piping connections, charging flow rates, and DHW recirculation flow rates in order to return acceptable temperatures to the ETS. Charging configurations must meet the following requirements:

- Charging circulation connection on the storage tank(s) returning to the ETS shall be as low as possible on the tank(s).
- DCW make-up connection must connect to the charging piping returning to the ETS.
- DHW supply piping from the ETS shall connect to the storage tank(s) as high as possible.
- DHW supply to the building shall connect to the storage tank(s) as high as possible.
- DHW recirculation piping from the building shall connect either to the mid- or upper-section of the storage tank(s) or to the charging circulation piping returning to the ETS.
    - If connected to the charging circulation piping returning to the ETS, the charging pump capacity must be larger than the recirculation pumps from the building, or

proper charging of the tank(s) will not be possible when both pumps are running simultaneously.

- Charging pump flow rates shall be less than the peak DHW draw flow rate, and shall be sized to provide reasonable recovery time of the storage tank(s) to suit the application. Unreasonably high flow and recovery rates impacts the ETS heat exchanger capacity. The ASHRAE HVAC Applications Handbook[8] provides guidance on recovery vs input rate for different applications.

Tanks and pumps must be selected and installed to meet the above requirements. While these items are checked during the DEU compatibility review of the building system, it is common for tanks to be supplied with incorrect connections during the construction phase of a project; therefore, the DEU shall be provided with the proposed tank shop drawing and piping isometrics/spool drawings submittals for comment prior to purchase and delivery.

Refer to Figure 7 for a typical Charging system schematic.

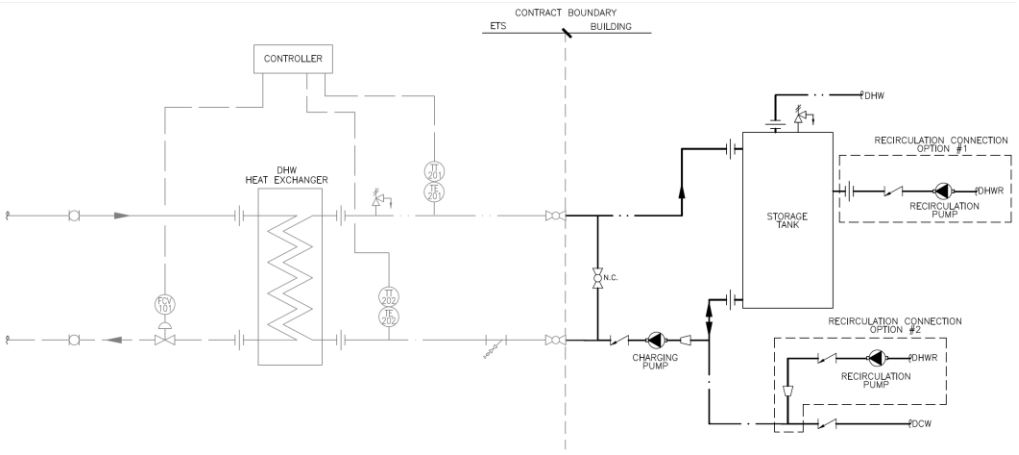

FIGURE 7: TYPICAL CHARGING DHW CONFIGURATION

DE-Ready Buildings

DE-Ready buildings may employ alternate DHW configurations. However, provisions shall be made for conversion to District Energy, including but not limited to full-size tees and isolation valves in the ETS room for future connection to the ETS, to facilitate one of the above configurations.

[8] 2019 version, Chapter 51.

4.4 Supplemental Energy Sources in Customer Buildings

At the discretion of the DEU, some heating energy can be served by supplemental energy sources within the building. Solar heating systems are typically acceptable, as are other waste heat sources. Use of a supplemental energy source does not change the hydronic heating return water temperature requirements outlined in Section 4.3.1.

Gas-fired or electric-resistance heating or ventilation equipment (boilers, roof top units, air handling units, electric coils, electric baseboards, etc.), air or water source heat pumps to provide heating are not acceptable. All thermal energy for space heating and DHW shall be supplied by the DEU. Exceptions can be made for remote spaces within the building not practical to be serviced by the hydronic system, and/or electrical rooms, and are reviewed and approved by the DEU on a case-by-case basis.

The following exemptions to the supplemental heat sources restrictions are permitted:

- Electric baseboard heaters for freeze protection only, at stairwells, egress vestibules, electrical rooms, and isolated mechanical rooms only.
- Electrical heat tracing of piping in areas subject to freezing.
- Exterior heating (e.g., gas-fired radiators or fireplaces) where hydronic heating is impractical.

Any alternative and/or supplemental energy sources must be reviewed approved by the DEU, and shall be implemented by the Customer are the sole responsibility of the Customer.

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FIGURE 1 – BURNABY DISTRICT ENERGY UTILITY, SERVICE AREAS AND TOWN CENTRES

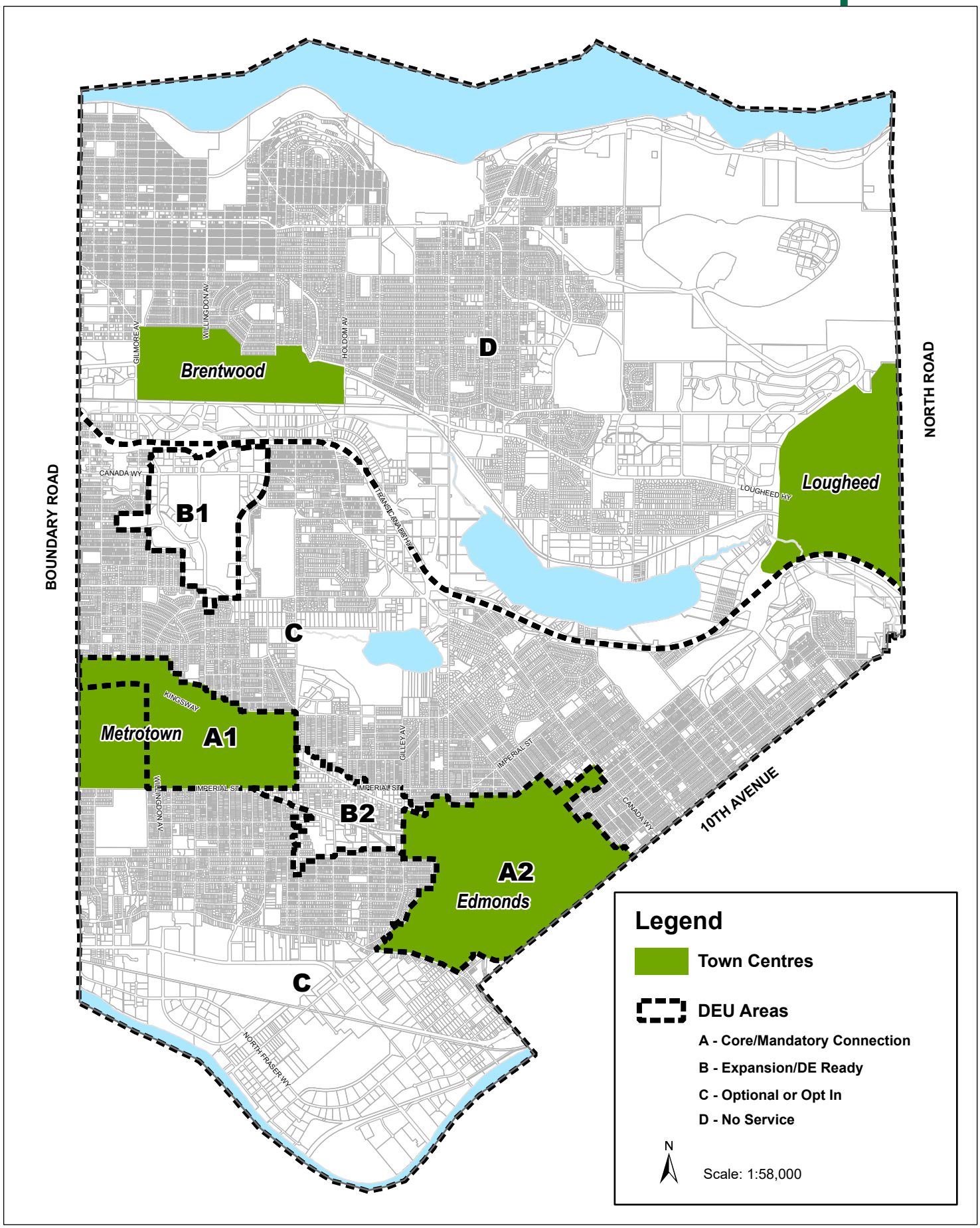


FIGURE 2 – SERVICE AREA A1 – METROTOWN

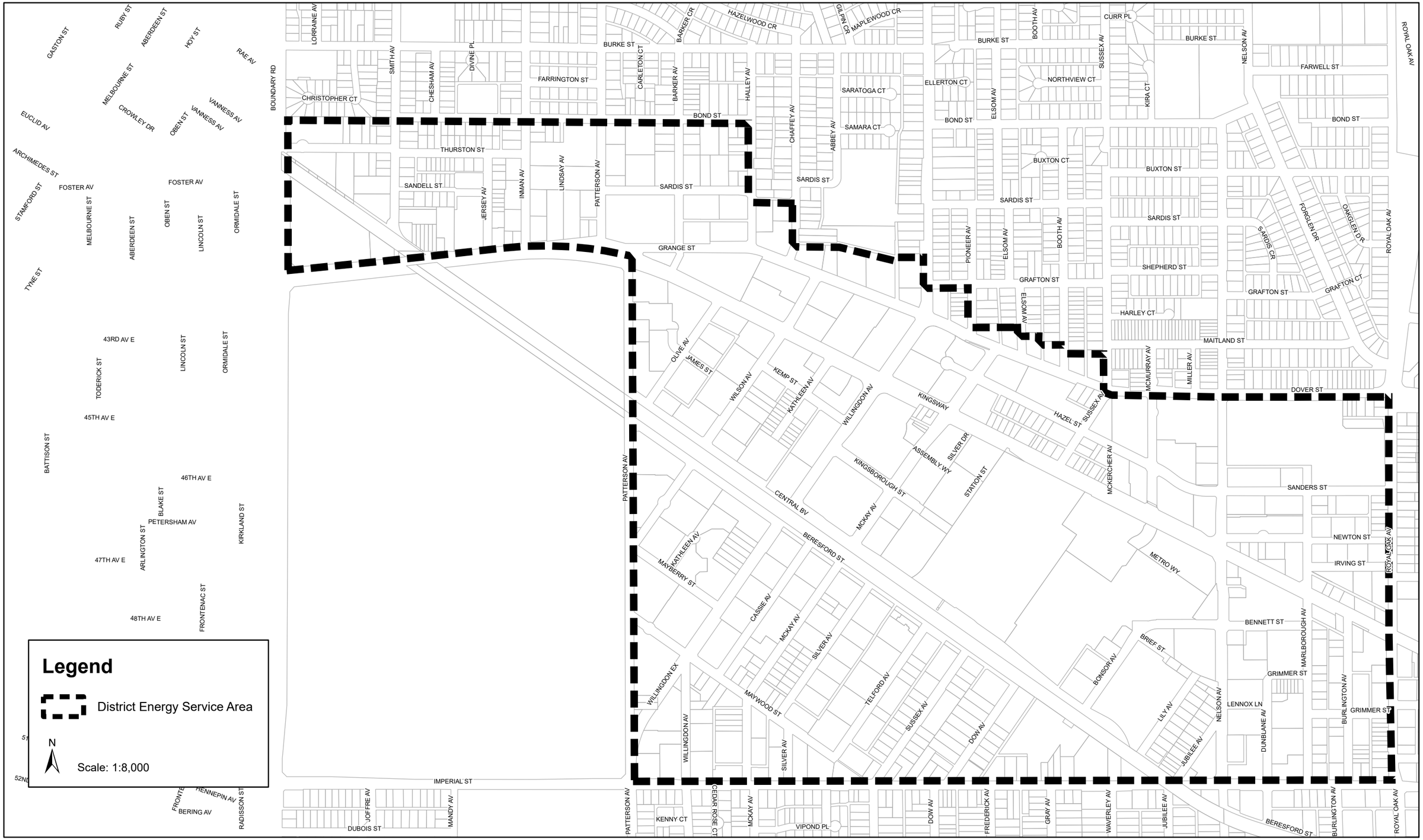


FIGURE 3 – SERVICE AREA A2 – EDMONDS

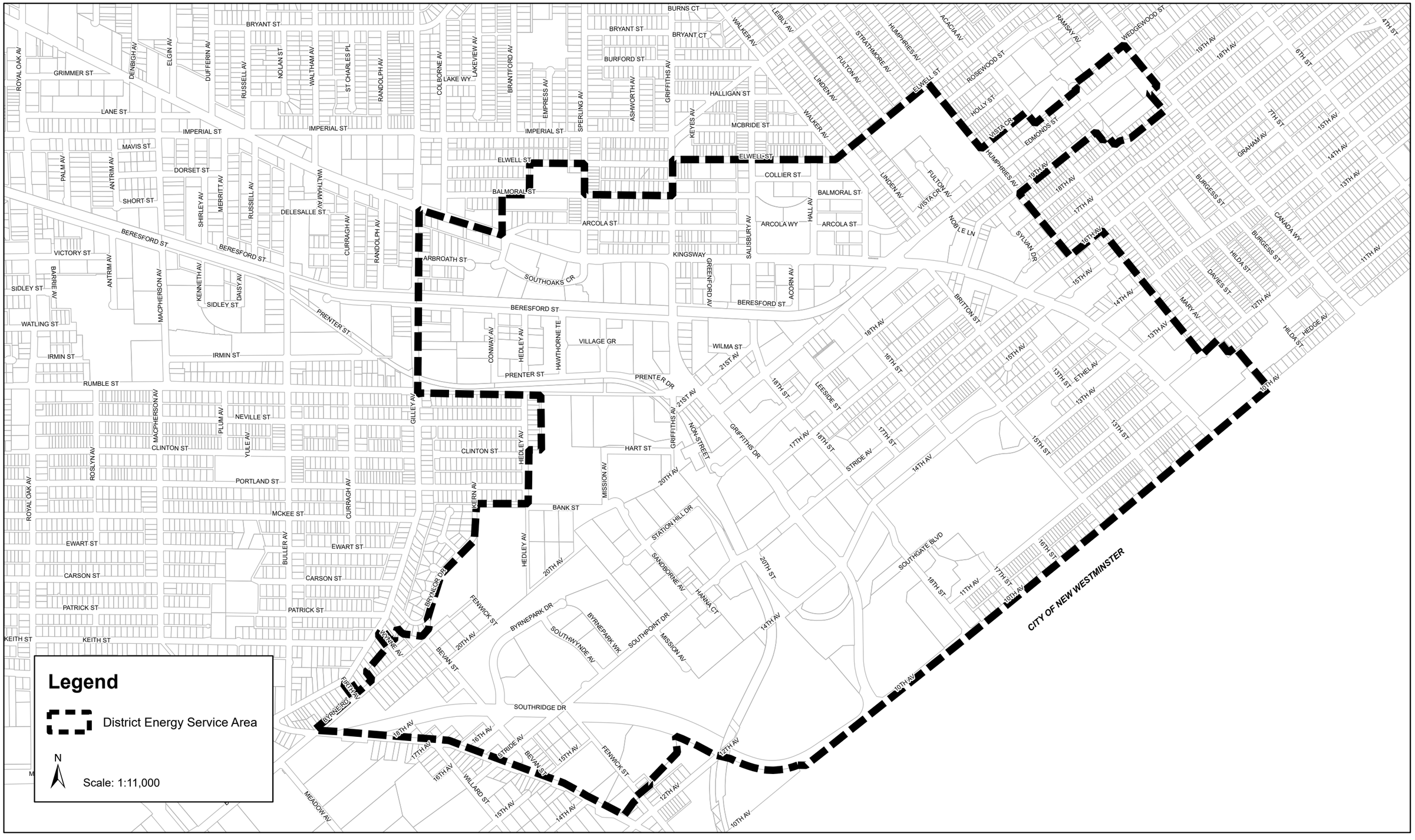


FIGURE 4 - DISTRICT ENERGY SERVICE AREAS AND GENERAL ZONING

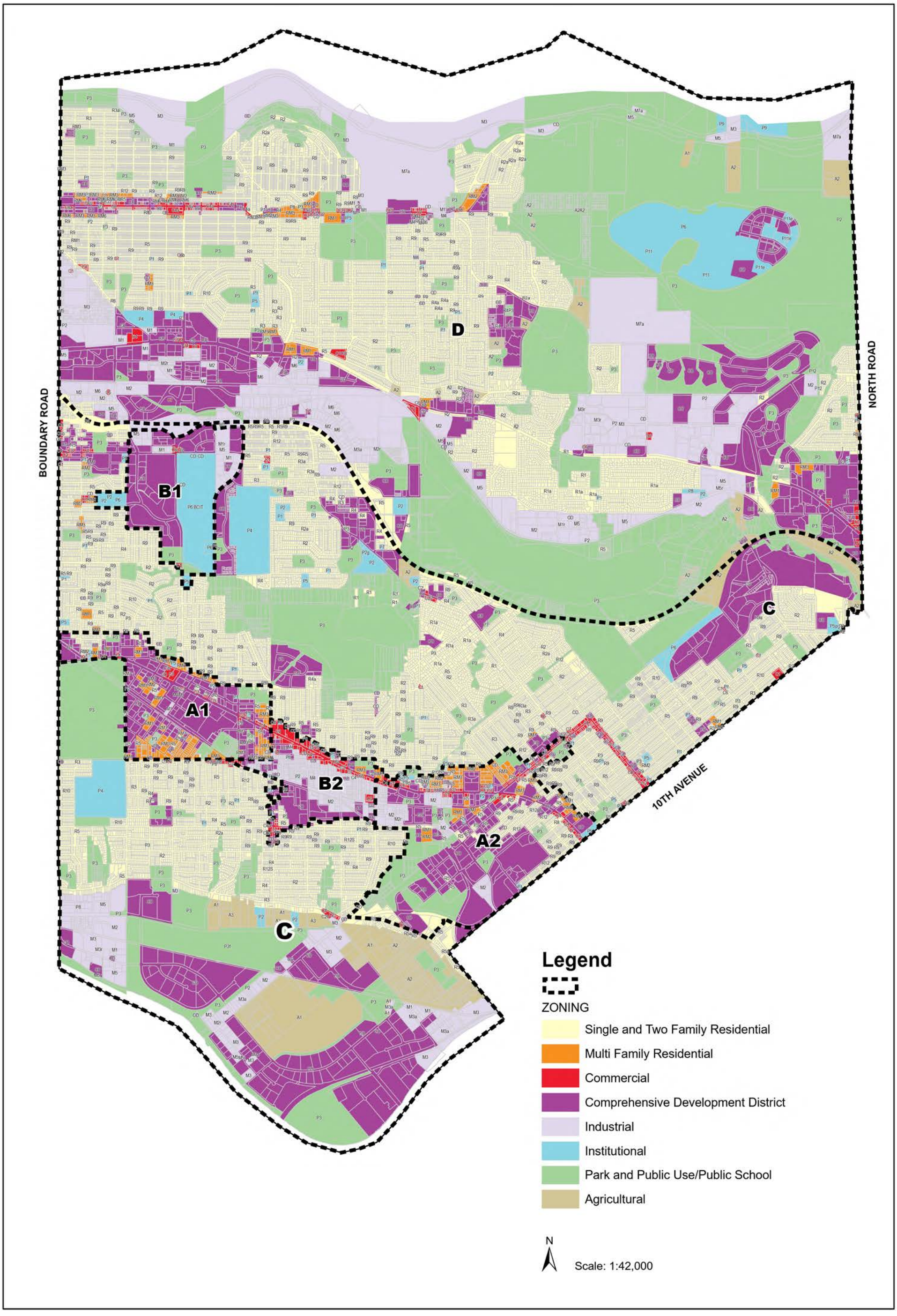
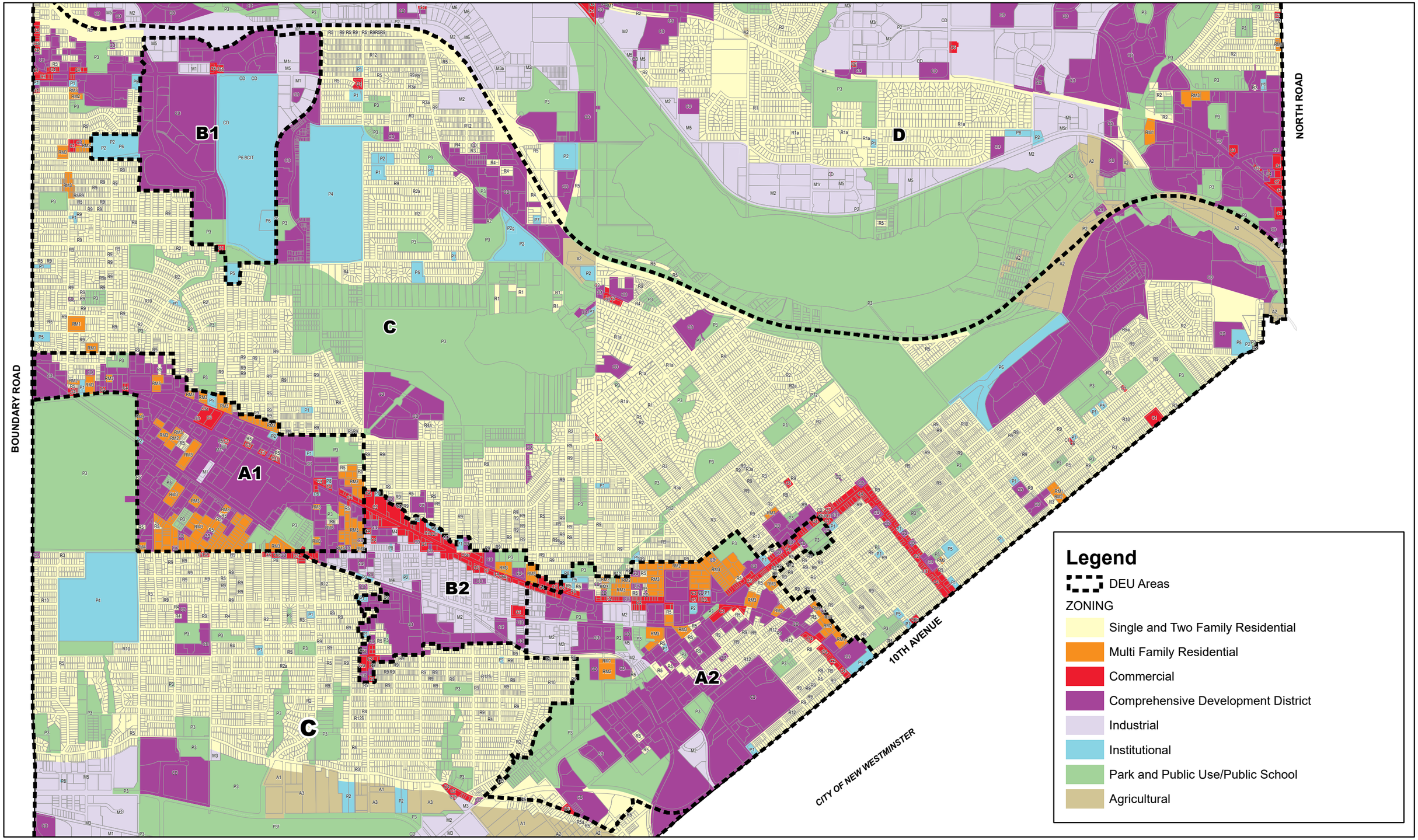


FIGURE 5 - DISTRICT ENERGY SERVICE AREAS AND GENERAL ZONING



Attachment 2

BURNABY DISTRICT ENERGY UTILITY

Draft District Energy Policy

WHAT WE HEARD REPORT

March to July 2023

Version: August 22, 2023, 12:10 pm

City of Burnaby

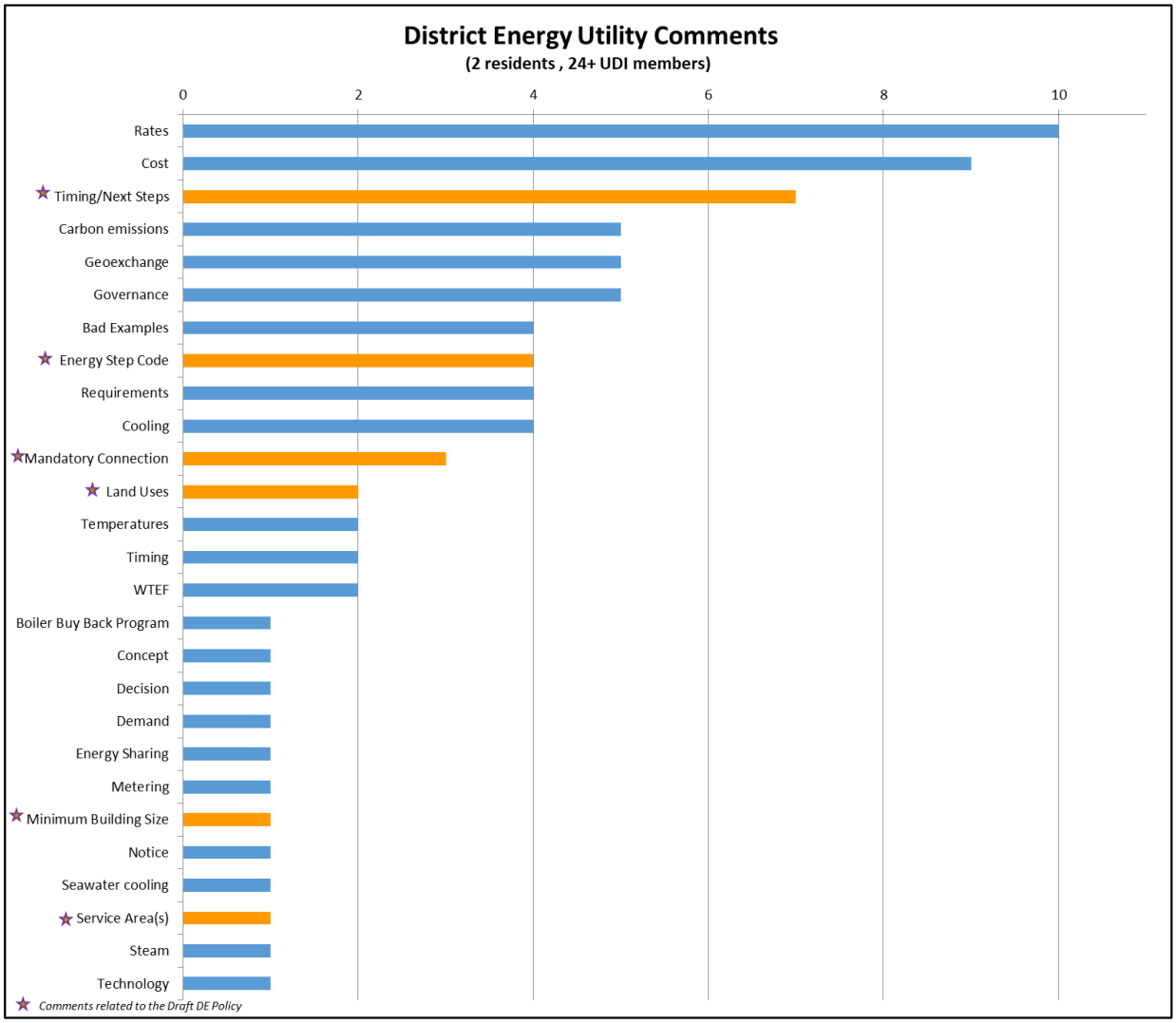
TABLE OF CONTENTS

PURPOSE

The purpose of this document is to provide a summary of public input collected following the release of the Draft District Energy (DE) Policy for public engagement from March to July 2023.

KEY HIGHLIGHTS

- The communications and engagement approach used for the Draft DE Policy provided community-facing information in combination with follow-up meetings with interested parties.
- The public engagement for the Draft DE Policy was a little over 4 months long running from March 27, 2023 to July 31, 2023.
- There was exposure to over 16,700 potential points of contact with the public.
- There were also more than 60 points of direct contact and over 3,000 potential points of indirect contact with interested parties.
- Over 50 people sought information on the project.
- Public comment was minimal with only three members of the public reaching out to the project team with questions and concerns.
- Input from interested parties was stronger, but modest. The exception was the Urban Development Institute (UDI) who participated in three meetings on the District Energy Utility (DEU):
    - A question and answer session.
    - A presentation.
    - A follow-up discussion on outstanding issues.
- There was considerable interest from and information sharing with UDI.
- In total, as shown in the graph on the next page, some 80 questions and comments were received.
    - 62 (or 78%) being related to the overall District Energy Utility project and only 18 (or 23%) being related to the Draft DE Policy itself.
    - The top three comments (“rates”, “cost”, and “timing/next steps”) represent about one third (or 33%) of the total comments.
    - Only one DE Policy related issue of “timing/next steps” landed in the top half of total comments in the third most popular issue with 7 references behind “rates” (with 10) and “cost” (with 9).
- During the course of the dialogue with UDI many questions were answered directly. However some critical issues identified by UDI remain that are still being considered and addressed and the City has committed to continue to work with UDI on these remaining outstanding issues.



- These outstanding issues are listed below grouped by the themes of communication, lead time and clarity.

  Communication
  - Coordination (continue to meet and work on outstanding issues)
  - Resolving concerns (early decision point in the rezoning process)
  - Concerns with other, existing DE systems (return temperatures, bond release, timing of installation and hook-up, additional equipment in mechanical rooms, high cost of meeting design requirements, peer review process)

  Lead Time
  - Effective date/grandparenting (the more time, the better)
  - Active rezonings (direct notification)

Clarity

- Cooling (benefits, more future need/requirements, high cost of building retrofits)
- Zero Carbon Step Code (interim boiler requirements)
- Energy Step Code (Green Building Policy applicability to ESC, reduced heat demand, connection fees, regional DE working group)
- Expansion areas - B1 and B2 (Royal Oak Urban Village Community Plan review process, connection distance, clarify expectation from both sides – City and developers)
- Boiler buy back program (temporary external boilers)
- Rate structure and connection fees (same rates for non-residential and residential)

BACKGROUND

The City of Burnaby is committed to climate action and is currently developing a district energy utility (DEU) to serve space heating[1] and domestic hot water needs of buildings in south Burnaby. Burnaby's DEU is a City-led project that will help meet Burnaby's greenhouse gas (GHG) emissions reduction targets and will integrate with the City's Green Building Policy for reducing building emissions.

The Draft DE Policy outlines building requirements for future DE system connections and readiness in Burnaby. Although it is anticipated that most of the heat from the Burnaby DEU will be supplied to new buildings, the Draft DE Policy outlines both:

- future opportunities for existing buildings to connect to the Burnaby DEU, and
- future requirements for new buildings to connect to the Burnaby DEU.

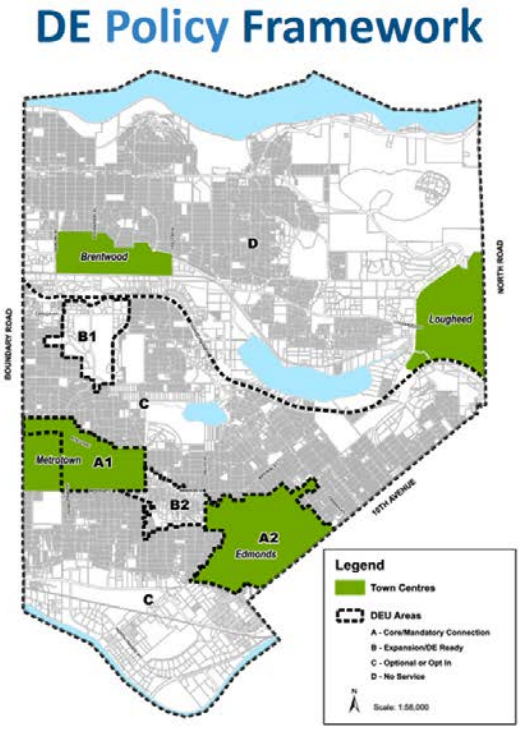
The policy framework contained within the Draft DE policy is a key implementation tool that was developed to support the proposed future implementation of a Burnaby DEU.

The Draft DE Policy described:

- Background information for context
- The purpose of the policy
- The legislative authority on which the policy was created
- Qualifying buildings
  - DE policy framework
    - Four service areas
    - 23 land use zones within five land use districts
    - Building size
- DEU compatibility requirements
  - Rezoning
    - Building design
    - DEU service is available
    - DEU service is not available
  - Process and procedures

[1] The City is investigating cooling, but cooling is not currently part of the DEU service concept.

- For connecting existing buildings
- For connecting new buildings



Service Areas	A	B	C	D
Type	Core	Expansion	Optional	No Service
System Status[5]	Feasibility	Concept	Concept	Not applicable
Location(s)	• Metrotown • Edmonds	• Willingdon from Trans Canada Highway to Metrotown • Kingsway from Metrotown to Edmonds	• South of Trans Canada Highway excluding service areas A and B	• North of the Trans Canada Highway
DE Connection: Existing Buildings	Optional (Opt In)[6]			No Service
DE Connection: New Buildings	Mandatory DE Connection	DE Ready	Optional (Opt In)	No Service
DE Connection: Expected Service	2026	TBD	TBD	No Service
DE Connection: Timing	When and where service is available.			Not applicable
Building Use Categories[7 8]	• Multiple Family Residential (RM) – RM3, RM4, RM5 • Commercial (C) – C2, C3, C4, C8, C9 • Industrial and Business Centre (M and B) – M1-5, M8, B1, B2 • Public and Institutional (P) – P2, P3, P5, P6, P7, P11 • Comprehensive Development (CD) – CD			Not applicable
Building Size	≥ 100,000 sq. ft.[9]			Not applicable
Process	*Existing Buildings:* • DE Application Form • Review for Burnaby DEU system compatibility *New Buildings (part of the rezoning process):* • DE Application Form • Suitable Plan of Development (SPOD) • Rezoning requirements • Tentative Approval Letter • Conditions of DE readiness[10] • Covenant (commitment to connect to the DEU in future)			Not applicable

City of Burnaby

APPROACH

The communications and engagement approach used for the Draft DE Policy was providing community-facing information in combination with follow-up meetings with interested parties.

METHODS

The following is a summary of the methods used.

Community-Facing Information

Table 1: *Community Facing Information – Methods and Results*

Method	Results
Burnaby DEU project website and infographic • www.burnaby.ca/districtenergy[2]	571 page views 368 unique visitors
Link to Council report on the draft Burnaby DE Policy	52 views

[2] Please see Appendix A for the website content.

Method	Results
Social media posts • FaceBook (March 29, 2023) • Twitter (March 29, 2023)	 15,000+ followers, 6 likes 776 views, 3 likes, 1 retweet
Media release	2 media articles[3], 4 comments[4]
Project contact information • 604-297-4518 • districtenergy@burnaby.ca	1 phone call 2 emails 1 follow-up phone call
TOTAL POINTS OF CONTACT	**16,700+ points of contact**

Interested Parties

Table 2 : *Outreach to Interested Parties – Methods and Points of Contact*

Method	Direct Contact	Indirect Contact
Shared copies of March 27, 2023 Council Report, Draft DE Policy and Draft Connection Guidelines.	7 organizations • Association of Community Organizations for Reform Now (ACORN) • BC Co-op Association (BCCA) • Burnaby Board of Trade (BBOT) • Burnaby Schools – School District 41 • Condominium Home Owner Association (CHOA) • Landlords BC • Urban Development Institute (UDI)	
Follow-up emails	8 emails to 7 organizations	
BBOT member email newsletter (June 27, 2023) • Introduction to the project • Link to www.burnaby.ca/districtenergy		3,000+ BBOT members
Follow-up phone calls	4 phone calls to 4 organizations	
Meetings	3 meetings with UDI • Question and answer session (17+ UDI members) • Presentation (24 UDI members) • Follow-up discussion on outstanding issues (2 UDI staff)	
TOTAL POINTS OF CONTACT	**60+** points of direct contact	**3000+** points of indirect contact

[3] https://burnabybeacon.com/p/burnaby-district-energy-utility-metrotown-edmonds
[4] https://www.burnabynow.com/local-news/burnaby-moves-closer-to-garbage-powered-hot-water-heating-6779828?itm_source=parsely-api

INPUT

Interested Parties

Four of the eight organizations contacted provided specific responses. The following section is a high-level summary of their comments.

ACORN

- Appreciated being notified.
- This isn't an issue we're focusing on.
- We don't have any questions or comments.

Burnaby Schools – School District 41

- Received and have reviewed the Council Report, Draft DE Policy, and Draft Connection Guidelines.
- We do not have any questions or require a follow-up meeting at this time.
- We are excited to see this draft policy develop!

Landlord BC

- Landlord BC will support whatever position UDI takes in relation to the Burnaby District Energy Utility.

Concerns

- Additional requirements of District Energy need to be sensitive to the demands on our sector and the delivery of affordable housing.
- Highlighted the need for significant financial supports/incentives for the rental housing sector.

UDI

- November 15, 2022 meeting (questions and answers)
  - 24 questions posed at meeting (these are included in **Table 3** below).
- May 2, 2023 presentation
  - 11 questions posed (these are included in **Table 3** below).
- August 10, 2023 discussion.
  - Follow-up with UDI staff on outstanding issues in the three theme areas of communications, lead time for policy implementation, and clarity on policy and program elements.

Draft DE Policy

Table 3: *Issues Summary (Public and Interested Parties)*

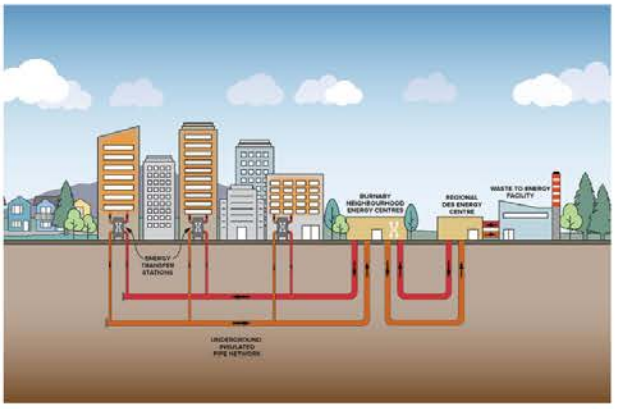
version: 2023 August 16 @12:48 pm

Project or Policy?	No.	Rolling Total	% of Total	Issues (2 residents, 24+ UDI members+*)	Response
project	10	10	13%	**Rates** - higher rates, overhead or upcharge, unfair pricing, affordable energy is a good thing, revenue source for the City, financing, additional fees, cost/benefit for buildings, fixed or variable rates, insurance costs for water risk	Energy provided by Metro Vancouver would be low-cost. Rates will be at or below market rates.
project	9	19	24%	**Cost** - building capital costs (water-based heating systems are more expensive), high cost of infrastructure, serious financial risk, piping long distances, capital costs can't be sustained by rate payers, others (like north Burnaby) will also have to pay, affordability (capital costs), connection fees	The District Energy Utility (DEU) would generate revenue for the City like other City services to recover capital costs. The City will seek grants from other levels of government. Financial benefits for all - users, developers, City.
policy	7	26	33%	**Timing/Next Steps** - proposal, what are the next steps, policy effective date, timing of building tie-in, designing for one or two buildings, building connectable before the system is in place, temporary boilers, impact to in-stream projects	The project will be going to Council soon to seek capital funding. Agreements with MV are being finalized. Lead time will be provided in advance of the policy effective date. Buildings will need to be hydronic. There may be a temporary period where interim boilers will be required. The City sees benefit to starting the system early to serve the existing base load in Metrotown.
project	5	31	39%	**Carbon emissions** - burning garbage, carbon trade-off, electric heat is already low-carbon, will DEU be zero carbon	The project aims to meet climate action goals at both the regional and city level. The DEU would use surplus waste heat from the Waste to Energy Facility (WTEF). Industrial waste heat is considered low-carbon. Space heating is a more effective use of waste heat. It would also displace other heat sources including natural gas. About 80% of heat will come from WTEF. 20% will be natural gas. We are looking for other low-carbon options.
project	5	36	45%	**Geoexchange** - more sustainable local options (geoexchange), can be used for cooling too, city has huge land mass - huge potential for geoexchange, summer cooling heat recharges the ground, system at Burnaby Mountain Secondary meets 60-70% of base heating load	Other low-carbon heat sources could be added in future.
project	5	41	51%	**Governance** - who will manage/deliver the heat (MV, City, third party), bypass strata corporations, BCUC regulation, ownership	Metro Vancouver would own and operate the transmission pipes. The City would then distribute the heat using neighbourhood district energy systems. Burnaby's DEU will deliver energy to the customer. The ownership of Burnaby DEU is still to be determined. The City is exploring the role of the DEU with the BCUC. Rates likely regulated by the City.
project	4	45	56%	**Bad examples** - fixed loop systems (hard to mange and meet heat demand), False Creek and Lonsdale (high rates), UBC and YVR have trouble regulating heat, Creative Heat has lost their condensate (steam return) line, Burrard Thermal could not compete with hydro-electric power generation	The project team has reviewed and considered these concerns.
policy	4	49	61%	**Energy Step Code** - reduced requirements for buildings connected to DEU future step code requirements, province-wide DE exemption, coordinate with the City of Vancouver, new building in future will require less heat	The City will be coordinating Energy Step Code with the DEU.
project	4	53	66%	**Requirements** - smaller building energy systems, FAR exemptions, two layers of requirements, reduced costs for BC Hydro upgrades	Less building mechanical equipment will be required. Space and statutory rights of way would be required so the DEU piping could connect to and serve the buildings. The City wants to avoid using natural gas for top-up and will seek low carbon energy sources wherever possible.
project	4	57	71%	**Cooling** - more heat events in future, heat inversions too, multi-family buildings offer limited natural cross-ventilation (single wall of windows) and many do not have cooling systems, incremental costs of adding cooling to hydronic systems is low, will DEU also provide cooling	There is a large heat supply available. Absorption chilling is being looked at.
policy	3	60	75%	**Mandatory Connection** - connection optional or mandatory, new buildings, existing buildings, common space, unit space	Mandatory for new buildings. Looking to incent existing buildings.
policy	2	62	78%	**Land Uses** - which land uses, commercial in mixed use	In town centres, mostly high-density development. High temp, high quality heat could also connect to industrial customers along the way. Residential connection would likely be mandatory.
project	2	64	80%	**Temperatures** - what are the inbound and outbound temperatures, Lonsdale return temp is hard to achieve	The draft connection guidelines provide outbound and inbound target temperatures.
project	2	66	83%	**Timing** - why now, long-term energy solution	
project	2	68	85%	**WTEF** - emission exempted, use waste heat to serve industrial customers	
project	1	69	86%	**Boiler Buy Back Program** - benefits stratas not developers	
project	1	70	88%	**Concept** - hard to follow (scale and cost)	
project	1	71	89%	**Decision** - referendum	Agreements are being negotiated between Metro Vancouver and the City of Burnaby. Burnaby DEU project approval will be decided by Council. The regional distribution system would be approved by Metro Vancouver's Board. There will not be a referendum.
project	1	72	90%	**Demand** - space heat demands hard to predict and difficult to serve, DEU's need load (demand) to make the business case work, current or future plan area boundaries	The biggest customers are existing customers. About half the future load exists today. Demand estimates are based on current plan area boundaries. Additional future demand could be meet from other sources, if needed.
project	1	73	91%	**Energy Sharing** - sharing heat between uses	Energy sharing will be encouraged. The City's intention is conservation.
project	1	74	93%	**Metering** - individual units	
policy	1	75	94%	**Minimum Building Size**	Mininimum building size would be 100,000 sq. ft. and the City will consider providing service to smaller buildings on a case-by-case basis.
project	1	76	95%	**Notice** - buyer-beware clause	
project	1	77	96%	**Seawater cooling** - Canada Place cooled with seawater	
policy	1	78	98%	**Service Area(s)** - what areas	The DEU will start serving Metrotown and Edmonds. There are plans to expand beyond these two service areas.
project	1	79	99%	**Steam** - steam is more efficient to use than hot water	
project	1	80	100%	**Technology** - outdated	

*Input collected from the November 15, 2022 question and answer meeting with UDI is also included.

project	62	78%
policy	18	23%
TOTAL	**80**	100%

Burnaby District Energy Utility



THIS IS CLIMATE ACTION

The City of Burnaby is committed to strengthening our commitment to climate action and resilience, and the Burnaby District Energy Utility (BDEU) project is an important part of this commitment. The BDEU will provide Burnaby with safe, reliable, sustainable, resilient and cost-competitive thermal energy. This project will help the City meet our greenhouse gas (GHG) emissions reduction targets and integrate with the City's Green Building strategy for reducing building emissions.

Contact

districtenergy@burnaby.ca
604-297-4518

About this project

The City is planning to develop a district energy utility that would receive thermal energy from Metro Vancouver's district energy system and supply it to high density residential, commercial, industrial, healthcare and institutional buildings in Burnaby neighbourhoods.

Thermal energy will be captured from heat from Metro Vancouver's waste-to-energy facility in south Burnaby. In the future, additional low-carbon sources could be integrated into the system as district energy systems are more flexible to changes and developments in energy sources. This energy will be used by Metro Vancouver's district energy system for regional distribution, and by the Burnaby District Energy Utility for neighbourhood distribution. The heat will be distributed through a network of connected underground pipes that will deliver heat to buildings for space heating and domestic hot water heating.

District energy is a versatile, proven technology used in cities across the world and is at the forefront of efforts to transition buildings to a low carbon, sustainable future. Rather than each building having its own furnaces or boilers, a district energy system can provide thermal energy to multiple buildings–or even entire neighbourhoods–through a central energy plant. Hot water produced at the plant is transmitted 24/7 through highly insulated underground network of thermal piping. The thermal energy is transferred directly to the building's heating system, simplifying building operations.

What are benefits of Burnaby's District Energy Utility?

Benefits to the community

- **Climate action:** significant reduction in the amount of Green House Gas (GHG) emissions—estimate 82% reduction or 22,400 tonnes of CO_2e (annually) when compared to business as usual.
- **A low-carbon energy source:** multiple buildings can connect to a system that uses a more sustainable energy source—the heat from an existing waste-to-energy facility. This provides a long-term, consistent, and low-carbon energy supply for the community.
- **Flexibility:** different heat sources can be used to supply heat to the district energy system (DES), allowing the City to consider the use of many different heat sources both now and in the future.
- **Local economic development:** the development and operation of a local DEU supports local 'green' job creation.
- **Resilience and adaptation benefits:** when designed correctly, the building-scale mechanical equipment required to connect to DEU are less prone to encountering issues such as flooding associated damage.
- **Reduced demand on Power Grid:** the electrical power grid faces the challenge of meeting increased demands. The DEU will reduce demand on the power grid.

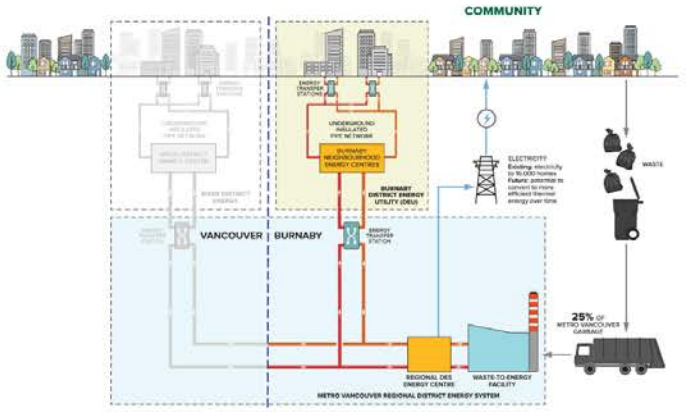
Benefits to customers

- **Affordable energy:** DEU can deliver energy at competitive rates to connected buildings.
- **Competitive or reduced life-cycle costs:** because thermal energy is delivered to buildings in a ready-to-use form, buildings connected to a DEU need to invest less in equipment such as boilers.
- **Fuel flexibility and adaptability:** DES can switch to different fuel systems, taking advantage of future opportunities for affordable fuel and lower costs.

- **Simplified building operations:** connected buildings have simplified building operations, allowing customers precise control over heating and providing flexibility to adapt as occupant needs change or building efficiency improves.

Benefits for developers

- **Free up roof tops:** mechanical equipment may be relocated from the roof to the building's basement. This can free up space for other high demand uses like community rooms or penthouse apartments, amenity space, or additional residential units. In addition, the energy transfer stations (ETSs) located in each building require less space than boilers freeing up space in the basement.
- **Reduce capital costs:** removing the need for building components like a heat source and domestic hot water storage tanks can save up front design and capital costs.
- **Expand marketing opportunities:** a reliable, stable and resilient energy system can be marketed as insurance against future climate impacts, while a low-carbon system can be promoted to people looking to reduce their environmental footprint without impacting their lifestyle.



What is happening now?

At the March 27, 2023 Council meeting, City Council supported the draft DEU policy and directed staff to proceed with the next steps to advancing the DEU policy.

Questions and answers

Collapse all

What is a district energy system (DES)? —

District energy systems are efficient and cost-effective ways of distributing thermal energy to high density residential, commercial and institutional buildings in a neighbourhood using clean, renewable energy sources.

By connecting many buildings into a single network, district energy systems have the advantage of being able to provide low carbon thermal energy across an entire neighbourhood. This results in reduced greenhouse gas emissions for all buildings connected to the system, faster and with less cost than if each building had to accomplish this on its own.

What is Thermal energy and how is it transported? —

Thermal energy is usable heat than can be produced from various sources, and is transferred by a medium (e.g., water) through a change in temperature. In the case of the DES, the thermal energy produced by the waste to energy process will be used to increase the temperature of the water contained within the DES, which will then flow through the distribution piping system to the connected buildings, in turn transferring this energy to the buildings' space and domestic water heating systems.

Are there existing district energy systems in Burnaby? —

There are already district energy systems in operation in Burnaby including the Burnaby Mountain District Energy Utility at Simon Fraser University, British Columbia Institute of Technology (BCIT), Solo District and Burnaby Central Secondary School.

Where will energy come for the Burnaby District Energy Utility (BDEU) come from and how will it be used? —

BDEU will provide space and domestic hot water heating for connected buildings. The main heat source is clean, thermal energy captured from Metro Vancouver's existing waste-to-energy facility, which is planned to service buildings in south Burnaby, with capacity to expand into additional service areas.

How are the environmental impacts being reduced? How is burning waste considered low carbon? —

Metro Vancouver's waste-to-energy facility in south Burnaby is an industrial waste heat source that exists regardless of the BDEU and the BDEU will take advantage of the available waste heat from the facility. The BDEU will displace other heat sources, including natural gas, and will provide additional efficiencies due to economies of scale resulting in GHG reductions.

Why this project? Why now?

Recognizing the dangers posed by climate change, Burnaby City Council declared a Climate Emergency in 2019. This emergency declaration set new carbon reduction targets for the City with carbon neutrality in 2050.

The BDEU will provide safe, reliable thermal energy that ensures resiliency, and will provide space heat that is three times more energy efficient than the current use of the facility (current is electricity).

Does the City consider the DEU as a long-term solution for energy supply?

Yes. The City of Burnaby is committed to strengthening our commitment to climate action and resilience, and the District Energy Utility (DEU) project is an important part of this commitment. The City is making policy changes to support our climate action objectives.

What is the energy currently being used for?

Currently, the thermal energy is used to produce electricity that powers nearly 16,000 homes, with significant waste heat still available. Furthermore, using additional waste-to-energy heat directly for heating purposes is three times more efficient than converting it to electricity.

Would the BDEU only provide heating, or would it also provide cooling?

There is a large heat supply from the waste-to-energy facility available which is currently planned for district heating and domestic hot water. District cooling is currently being explored.

What will this do to our heating rates?

The BDEU will provide energy at or below market rates. The rates will be determined in a similar manner as sewer and water rates—the City will provide the capital funding to develop the distribution and connections and will recover costs through rates.

Would connecting to the BDEU be mandatory or optional?

Existing buildings would have the option to connect to the BDEU within areas served by the BDEU where it is feasible and cost effective to do so. If new buildings are within the designated service areas:

- there will be mandatory connection in the core service areas of Metrotown and Edmonds
- they will have to be DE ready in the expansion service areas along Willingdon Avenue south of the Trans Canada Highway and Kingsway between Metrotown and Edmonds
- connection will be optional in other areas south of the Trans Canada Highway

For more information, please see the Draft DE Policy.

With a new DEU, would builders be able to downsize their conventional building energy systems?

Yes, there would be less equipment required in the buildings due to energy transfer stations requiring less space than conventional building energy systems.

Will the City be consulting with the Urban Development Institute (UDI) and other stakeholders?

Yes. We have already begun consultation with UDI and we will continue outreach with impacted stakeholders, including UDI.

When will the DEU be completed?

Plans are currently underway for the DEU to be operational in 2026 with potential for further expansion to additional service areas.

Ask a question

Project

Burnaby District Energy Utility (https://www.burnaby.ca/node/5896)

Full name *

First *

Last *

Ask a question *

I would like to get a response by *

○ Phone ○ Email

Your privacy

Your personal information is being collected and used for the purpose of contacting you regarding your comments, feedback or questions and will be managed in accordance with s. 26 (c) of the Freedom of Information and Protection of Privacy Act. For questions regarding the collection your personal information and receipt of electronic messages, please contact Marketing and Corporate Communications at communications@burnaby.ca.

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Table 3.1: *Burnaby DEU Related Implementation Tools*

Program Roll Out

Agreements	Policies	Programs	Bylaws	Guidelines	Future Committee/ Council Reports
• District Energy Infrastructure Agreement[1]					Council Report
• Thermal Energy Sale and Purchase Agreement[2]					Council Report
• Encroachment and Licence Agreement for the Heat Recovery Centre					Council Report
	• DE Policy			• Connection Guidelines	Council Report
	• Green Building Policy Updates	• District Energy Application Form			Environment Committee Report
	• Boiler Buy Back Policy	• Boiler Buy Back Program			Council Report
		• Update Boiler Replacement Permit			Council Report
			• Individual Rezoning Bylaws and Associated Covenants		Rezoning Reports
			• Burnaby DEU Bylaw		Planning and Development Committee Report

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[1] An agreement between Metro Vancouver and the City of Burnaby.
[2] An agreement between Metro Vancouver and the City of Burnaby.