



**NEIGHBOURHOOD ENERGY UTILITY  
CONNECTIVITY GUIDELINES &  
REQUIREMENTS**

ENGINEERING SERVICES  
Neighbourhood Energy Utility  
May 2026  
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Revision	Date	Description of Revision	Approval
0	March, 2020	Initial version	
1	May, 2026	Various amendments	Alex Charpentier, P.Eng, Snr Technical Manager, Neighbourhood Energy Utility

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## 1.0 GENERAL

### 1.1 INTENT

This document provides information to assist developers and building design professionals to facilitate and optimize connection to the City of Vancouver's Neighbourhood Energy Utility (NEU). Designers are to adopt these technical guidelines and make appropriate provisions in building mechanical, electrical, and controls design to enable the building to take full advantage of the benefits offered through NEU connection. Requirements for connection to the NEU are outlined.

This document supersedes *Connectivity Guidelines & Requirements, March 2020*.

### 1.2 DISCLAIMERS

The following information is provided for general use, and the user assumes all responsibility. The information contained within is general in nature and does not substitute for the execution of detailed engineering relative to specific projects or problems. The City nor any of their consultants, contractors or employees give any warranty expressed or implied or assume any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, product application, or process disclosed within this document. Nor are they liable for consequential damage whatever (including, without limitation, damages for loss of business profits, business interruption, loss of business information, or other losses) arising from the use or inability to use this document.

### 1.3 ABBREVIATIONS

For the purpose of these guidelines, the following abbreviations apply:

CAD: Computer Aided Design  
Delta T ( $\Delta T$ ): Temperature Differential  
DHW: Domestic Hot Water  
DHWR: Domestic Hot Water Recirculation  
DPS: Distribution Piping System  
EGBC: Engineers and Geoscientists British Columbia  
ETS: Energy Transfer Station  
FCEC: False Creek Energy Centre  
GHG: Greenhouse Gas  
HVAC: Heating, Ventilation, and Air Conditioning  
HWS: Hot Water Supply  
HWR: Hot Water Return  
LEED: Leadership in Energy & Environmental Design  
NES: Neighbourhood Energy System  
NEU: Neighbourhood Energy Utility  
PDF: Portable Document Format

## 2.0 INTRODUCTION TO THE NEIGHBOURHOOD ENERGY UTILITY

### 2.1 WHAT IS NEIGHBOURHOOD ENERGY

Neighbourhood Energy Systems (NES), otherwise known as district energy or community energy, are a form of urban infrastructure that supplies energy (heating, cooling, or a combination of both) to buildings connected to a network within a designated service area. Such systems typically consist of one or several centralized energy generation facilities, a distribution piping network, and energy transfer equipment located at the serviced buildings. These systems are particularly well-suited to dense urban settings with a mix of building uses, such as multi-unit residential, commercial, and institutional uses, as there are opportunities for energy sharing between buildings that require energy at different times of the day and the year.

Depending on the local context, NES providing centralized heating can significantly displace the use of fossil fuels for heat and hot water production in buildings. NES are highly adaptable platforms that leverage economies of scale to cost-effectively incorporate renewable energy sources such as sewage heat recovery, geo-exchange, solar thermal, biomass, or waste heat recovery, and are professionally operated and maintained for greater energy efficiency and reliability. The result is resilient systems which can effectively alleviate local electric grid constraints and directly reduce greenhouse gas (GHG) emissions associated with generating heat and hot water for buildings.

Around the world, NES are continuing to gain momentum as an important urban energy strategy that can effectively address growing concerns about climate protection, energy security, and economic resiliency at the urban scale. The City of Vancouver owns and operates an NES: the False Creek Neighbourhood Energy Utility, known as the NEU.

### 2.2 BENEFITS TO NEIGHBOURHOOD ENERGY

There are many benefits to connecting to an NES.

Environmental Benefits: NES provide economies of scale and flexible infrastructure that can integrate a wide variety of renewable and waste energy options that would otherwise not be available to an individual building heating system. The heating of buildings generates more than half of our City's greenhouse gas emissions, and the use of renewable energy-based NES results in substantial emission reductions.

Economic Benefits: NES are often self-funded utilities that provide substantial GHG reductions. Through NES use of local and renewable energy sources and flexibility to adapt to future energy technologies, it is anticipated that NES customers enjoy rate stability and predictability that outperforms conventional options. In addition, NES can help building owners meet energy efficiency and green building targets more cost-effectively as compared to the use of distributed stand-alone green energy options.

Social Benefits: NES utilize hydronic heating which provides customers with consistent, reliable, high-quality thermal comfort and higher efficiency compared to traditional space heating options. By centralizing the transition to renewable sources, these systems enhance urban liveability and advance energy equity—reducing local pollutants and noise while helping to shield vulnerable customers from energy price volatility and to provide a reliable path to access clean energy.

Developer Benefits: Connecting to an NES means reduced capital costs associated with designing and constructing a heat generation system for a building as no on-site heat production equipment (boilers, heat pumps, etc.) is required. This also reduces the space requirement dedicated to heating equipment and the associated construction cost, as the Energy Transfer Stations (ETS) are much more compact

compared to conventional heating plants, helping to free up subgrade areas and enable activation of valuable rooftop spaces.

Customer Benefits: Connecting to an NES removes the need for building strata corporations or building managers to run the heating equipment efficiently, stay on schedule with important maintenance activities, or budget for maintenance and replacement costs. NES are professionally managed and operated to provide cost-effective and stable rates to their customer base through a regulated rate-setting process. Further, the scale of NES operations creates opportunities to use locally available energy sources that are otherwise not economically feasible for individual buildings. This has the benefit of reducing ratepayers' exposure to fluctuations in electricity and natural gas prices.

### 2.3 THE FALSE CREEK NEIGHBOURHOOD ENERGY UTILITY

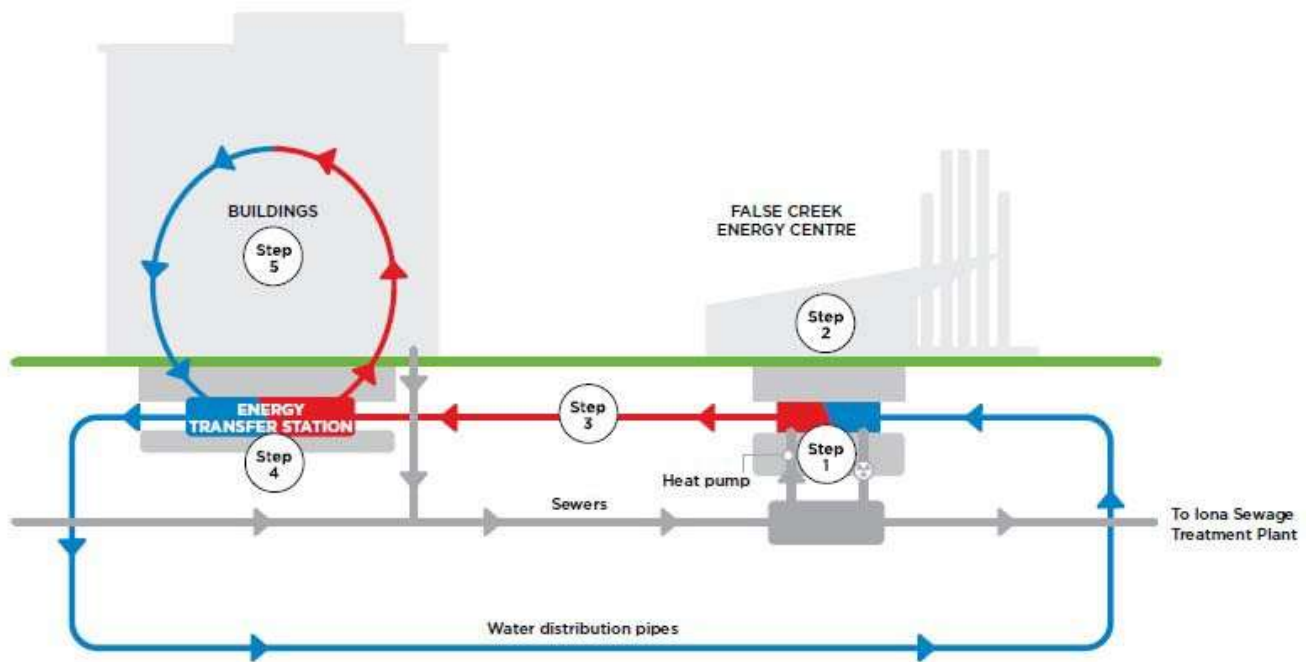
The NEU began operation in 2010 to provide low-carbon space heating and hot water to the Olympic Village and its surrounding area. The False Creek Energy Centre (FCEC), located at 1890 Spyglass Place in Vancouver, is a thermal energy generation and distribution plant that feeds the NEU network. The primary source of energy is waste heat recovered from sewage using large-scale heat pumps. The average efficiency of the sewage heat recovery system exceeds 300%. High efficiency natural gas boilers using a blend of renewable natural gas and conventional natural gas are used as a secondary energy source for peaking and back-up conditions. To support system growth and enhance resiliency, a small peaking plant using high efficiency gas boilers was commissioned in 2020 and operates to meet peak loads during cold snaps.

As of 2026, the NEU serves Southeast False Creek as well as parts of Mount Pleasant, the Great Northern Way Campus lands, and False Creek Flats. Refer to the [NEU website](#) for the current utility service area.

The NEU currently does not provide cooling as an energy service to individual buildings. However, as some buildings may have significant mechanical cooling requirements, there may be opportunity for the NEU to accept waste heat from building cooling loads. If the Developer is considering this option, please discuss with the NEU Engineer at the earliest opportunity.

### 2.4 UTILITY OPERATION

The NEU generates heat at the False Creek Energy Centre (see Figure 1) and distributes the energy to buildings within the service area through the following steps described below. Refer to Section 3.0 for the detailed technical description of the system.



**Figure 1: Current NEU System Components**

**Step 1:**

The False Creek Energy Centre is co-located with a City of Vancouver sewage pump station. Thermal energy (heat) is captured from sewage and upgraded using heat pump technology. The warm wastewater in the City's sewage system provides a reliable source of heat intended to supply ~70% of the utility's annual energy needs.

**Step 2:**

The Energy Center is also equipped with high efficiency natural gas boilers, which provides the remaining ~30% of the heat required on colder days of the year.

**Step 3:**

A Distribution Piping System (DPS) conveys thermal energy – in the form of heated water – from the False Creek Energy Centre through underground piping to the buildings that it services.

**Step 4:**

Each building has an Energy Transfer Station (ETS) that transfers the thermal energy (heat) to the building's mechanical system. The NEU charges its customers based on the amount of energy exchanged at the ETS.

**Step 5:**

The building's mechanical system then distributes heat and hot water to building occupants at the point of use.

## 2.5 UTILITY OWNERSHIP

The NEU is a self-funded utility that operates on a commercial utility model. It provides a return on investment to the City while providing cost-competitive rates to its customers.

The City owns and operates the NEU with direct control over investment decision making, rate setting, and GHG performance targets. Given the City's dual role as owner and regulator of the utility, Council established the Neighbourhood Energy Expert Panel to provide advice and input on issues including customer rate setting, policy, and expansion opportunities. To ensure fair and appropriate rates, all annual rate changes are reviewed by the independent Expert Panel and approved by Council.

## 2.6 UTILITY RATES

### 2.6.1 Customer Rates

NEU customers are billed according to a tariff established for different customer classes based on building type, location, and renewable energy content. A utility bill from the NEU to a customer building typically consists of two line items or charges, eventually three:

- Monthly Capacity Levy
- Monthly Energy Charge
- OPTIONAL: Monthly Rate Rider

The Monthly Capacity Levy is a fixed monthly fee related to the customer building's capacity requirements. The Monthly Capacity Levy is intended to cover NEU fixed costs such as fixed capital and operating costs. There are two forms of this levy:

- Floor Area Levy – This rate is applied to Class 1 customers, which are residential and mixed-use buildings within Southeast False Creek whose construction was permitted prior to July 1, 2023. This levy is based on the connected floor area.
- Peak Capacity Levy – This rate is applied to Class 2 (residential and mixed used buildings outside of Southeast False Creek) whose construction was permitted on or after July 1, 2023 and to Class 3 (non-residential buildings). This levy is based on an estimate of the energy capacity required and subscribed by the customer building (based on the building's design) and subject to approval by the NEU Engineer.

The Monthly Energy Charge is a variable fee based on the amount of metered heat energy used in the customer building each month. The Energy Charge is intended to cover variable costs, which are mainly fuel costs for the NEU and some variable operating costs.

An optional Monthly Rate Rider is applied in addition to the Monthly Energy Charge for customer buildings serviced under the Enhanced Green Heat and 100% Renewable Energy classes. This additional charge covers the cost of offsetting a greater portion of natural gas use with renewable energy compared to the Standard Green Heat service class, thereby reducing greenhouse gas emissions intensity for subscribers. It does not apply to Standard Green Heat customers.

For connected buildings that contribute building-generated waste heat to the NEU distribution system, a credit to the utility bill is provided based on the amount of thermal energy sent back to the NEU.

Refer to the *Energy Utility System By-Law No. 9552, Schedule C* for current energy rates.

### 2.6.2 Initial Connection Levy

Developers connecting to the NEU are required to pay an Initial Connection Levy for the NEU to recover part of the cost of connecting new buildings. This is similar to the use of connection fees for waterworks and sewer utilities and is also a standard practice in the energy utility sector. Most new buildings in Vancouver are required to meet strict GHG performance limits through the Zero Emissions Building Plan. By connecting to the NEU, developers can reduce costs related to the building's mechanical system while meeting the obligations of the Zero Emissions Building Plan. This Levy helps distribute these cost savings between the developer and the long-term NEU customer, by lowering the capital funding requirements for the NEU connection which leads to lower long-term energy costs for NEU customers.

The Initial Connection Levy consists of two parts:

- A Fixed Portion – this is intended to recover the cost of the connection pipe, which is influenced by physical factors such as distance from the NEU distribution network, road type adjacent to the building, etc.
- A Variable Portion – this is intended to recover the incremental cost of the energy transfer interface, which is directly impacted by the amount of peak energy demand requested by the developer for the building.

Refer to the *Energy Utility System By-Law No. 9552, Schedule C* for the most current energy rates.

### 2.6.3 Energy Sub-metering by Third-Parties

The rates mentioned in Section 2.6.1 are invoiced by the NEU based on the customer building's monthly metered energy consumption measured at the ETS, plus the applicable monthly capacity levy. Depending on the building, a strata corporation or management company may opt to engage third-party companies to install additional sub-metering equipment and to manage suite-level billing. The City of Vancouver does not have influence, control, or oversight on any additional service fees that may be levied by these third parties or on how NEU fees are represented by third parties.

For sub-metered buildings, it is advised that the NEU Monthly Capacity Levy be accounted for as part of the base building operational budget and not reallocated proportionally to end-user consumption. This levy is analogous to the fixed costs associated with operating, maintaining and replacement of heating and domestic hot water (DHW) systems in buildings not connected to the NEU. Sub-metered energy charges to individual building suites are recommended to be a flow through of the NEU Monthly Energy Charge and Monthly Rate Rider (if applicable) proportional to the energy consumption by each suite. Additional charges and fees associated with third-party sub-metering companies shall be displayed separately from NEU charges.

### **3.0 TECHNICAL DESCRIPTION OF THE NEU**

#### **3.1 ENERGY CENTRE**

The False Creek Energy Centre (FCEC) hosts the major heat production equipment for the NEU, including sewage heat recovery heat pumps, high efficiency natural gas boilers, and associated pumping and controls equipment. As of 2024, the base heating load for the NEU system is met by 9.8 MW of waste heat recovery from sewage. Peak loads are met with boilers using a blend of renewable and conventional natural gas. The current renewable energy target for the NEU system is 70% from renewable energy.

As the NEU expands, both renewable energy and natural gas capacity may be added at new satellite energy production centres. In 2020, a small high-efficiency natural gas boiler peaking plant was commissioned to enhance system resilience and help meet peak loads during cold snaps. As part of Vancouver's Climate Emergency Response, the NEU is evaluating opportunities to achieve 100% of its energy from renewable sources.

#### **3.2 DISTRIBUTION PIPING SYSTEM (DPS)**

The NEU DPS is a closed loop two-pipe hot water distribution network providing separate supply and return hot water. The water is primarily heated at the False Creek Energy Center and circulated to the buildings within the NEU service area. The DPS is comprised of pre-insulated steel piping buried in City streets which connects to the Energy Transfer Station within each customer building.

#### **3.3 ENERGY TRANSFER STATION (ETS)**

Each customer building will house an ETS that is owned by the NEU. The ETS acts as the point of thermal energy transfer from the NEU hot water loop to the building. It is typically mounted on a skid and includes the following key components (see Figure 2):

- NEU supply and return piping from the building penetration
- Heat exchangers to transfer heat to the building's hydronic heating and DHW systems
- Controls and a Control Panel to regulate the flow required to meet the building's energy demand and to maintain NEU return temperatures
- An energy meter to monitor, compute, and log the energy consumed by each building for billing and system optimization purposes.

There are typically two heat exchangers in each ETS, one for space heating and one for domestic water heating. Figure 3 shows the schematic of a typical ETS.

The ETS will be located in a dedicated ETS Room within the customer building.

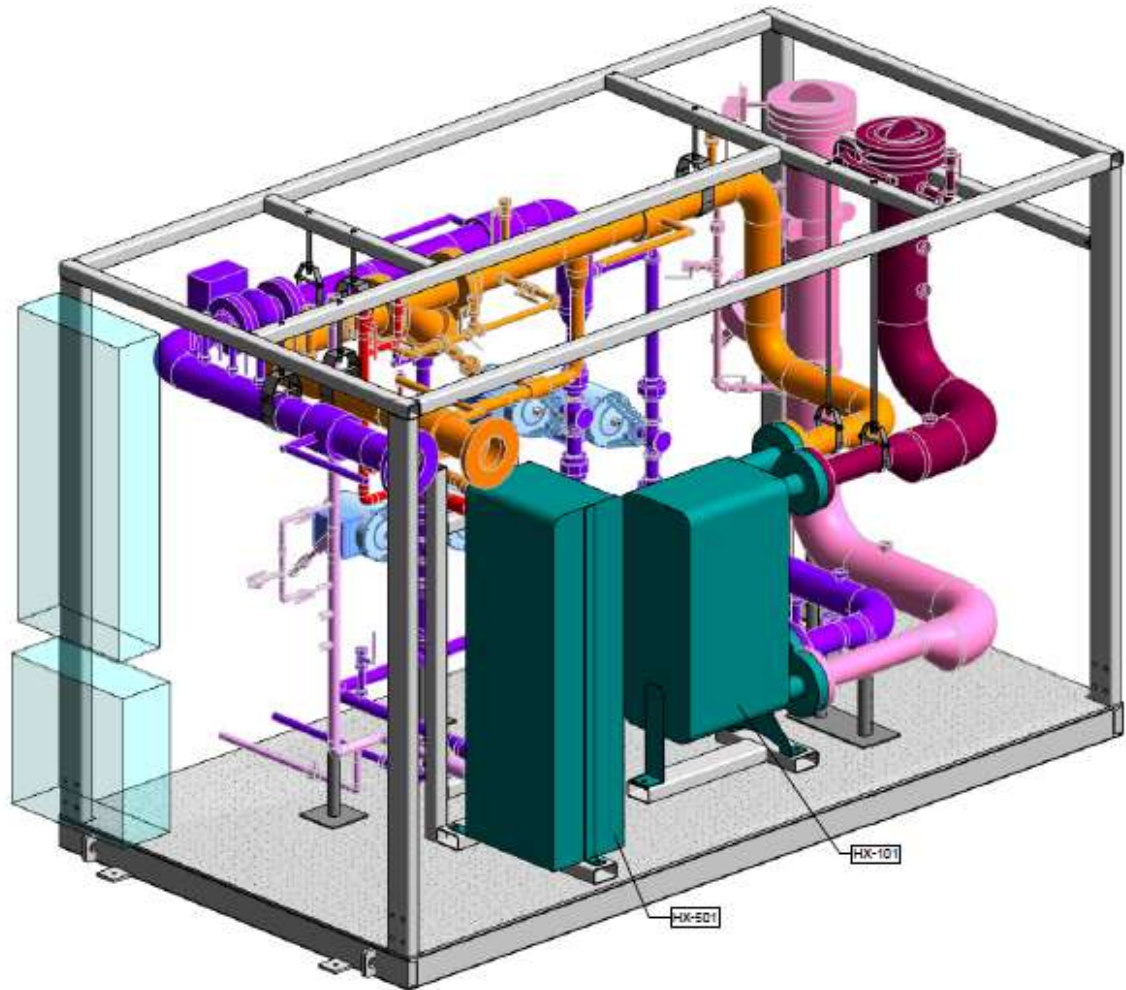


Figure 2: Typical ETS Layout

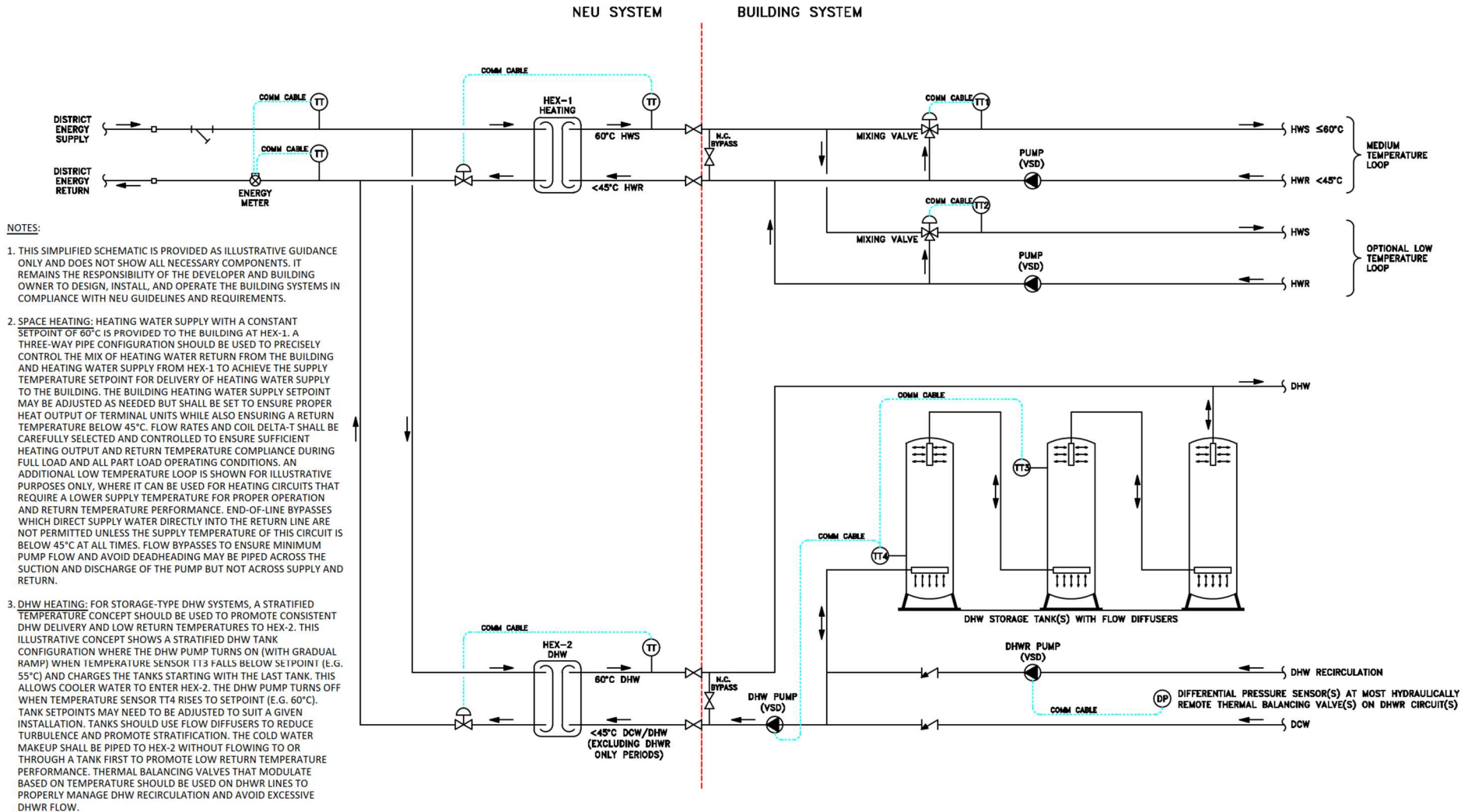


Figure 3: Typical ETS Schematic and Building Connection

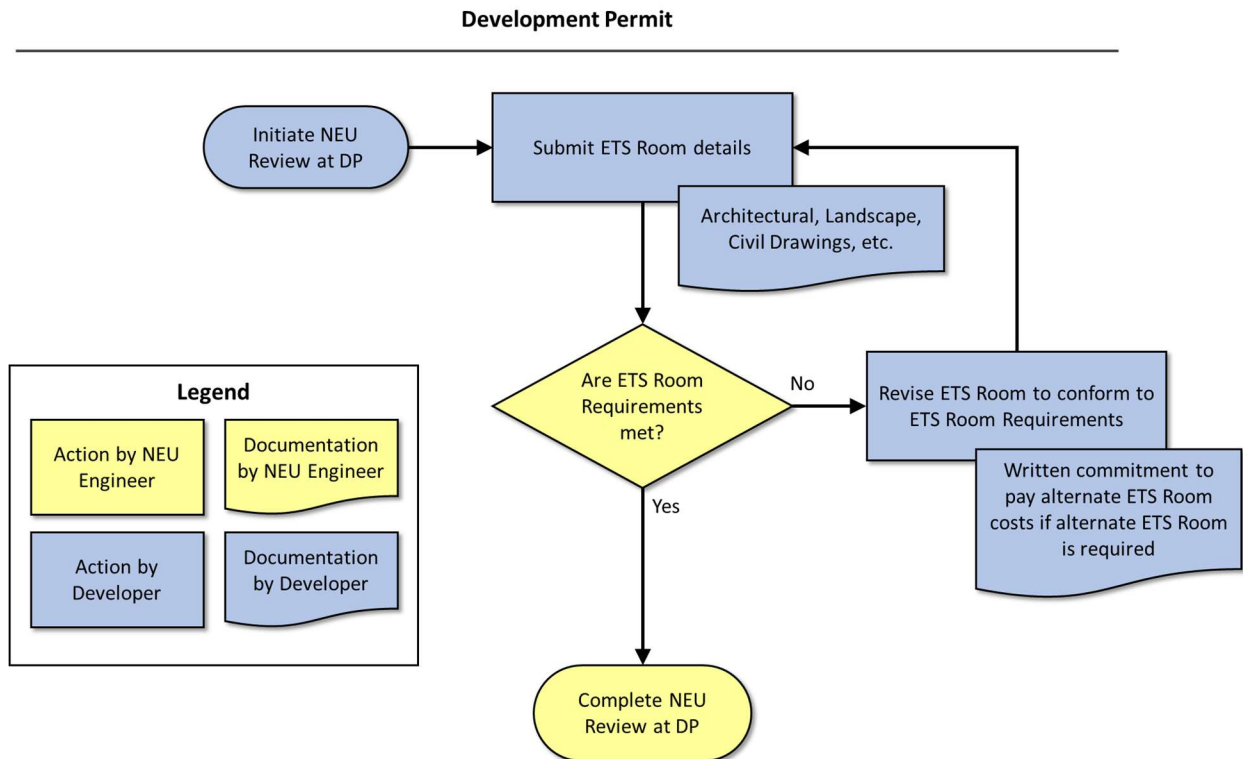
#### 4.0 NEU CONNECTIVITY PROCESS

For buildings connecting to the NEU, the Developer must obtain NEU approvals through the City's regular Development and Building Permitting processes to establish NEU service.

##### 4.1 DEVELOPMENT PERMIT

The NEU Review Process at Development Permit is presented in Figure 4 below. Prior to issuance of Development Permit, the ETS Room Requirements (Section 6.1) must be confirmed as met by the NEU Engineer.

- If site constraints prevent the Developer from locating the ETS Room in accordance with the requirements, the Developer may propose an alternate location. This proposal must be reviewed and accepted by the NEU Engineer, and the Developer must agree to cover any additional connection costs (for example, additional interior piping) associated with the alternate location.



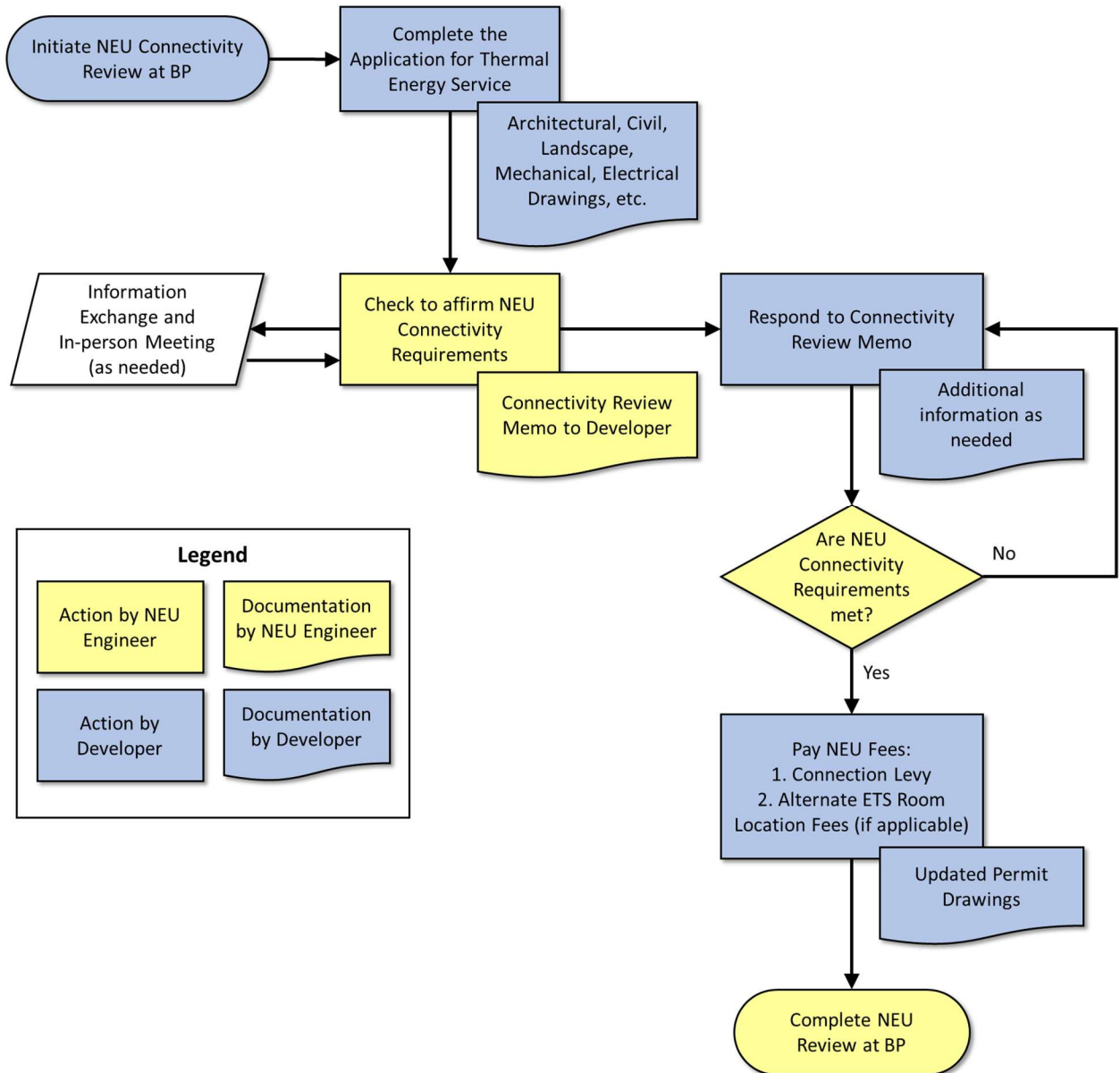
**Figure 4: NEU Review Process at Development Permit**

## 4.2 BUILDING PERMIT

The NEU Review Process at Building Permit is presented in Figure 5 below. Prior to issuance of the Building Permit, the NEU Engineer must facilitate and complete a Connectivity Review of the building design to confirm the NEU Connectivity Requirements (Section 7.2) are met.

- Upon receipt of the Application for Thermal Energy Service from the Developer and all necessary design documents (Section 7.2), the NEU Engineer will initiate the Connectivity Review. This review typically takes a minimum of two months to complete.
- For phased building permits, completion of the Connectivity Review may be deferred but must be completed prior to issuance of the full Building Permit, to allow excavation and foundation works to commence, subject to approval by the NEU Engineer.
- During the Connectivity Review process, coordination meetings between the NEU and the Development team will be conducted as required for information exchange and clarification. The NEU Engineer will provide a Connectivity Review Memo to the Developer for confirmation of the review.
- Permit holds by NEU will be placed accordingly. Prior to release of the NEU Building Permit hold, the Developer must pay the Initial Connection Levy (see Section 0) and, if applicable, any alternate ETS Room estimated costs.

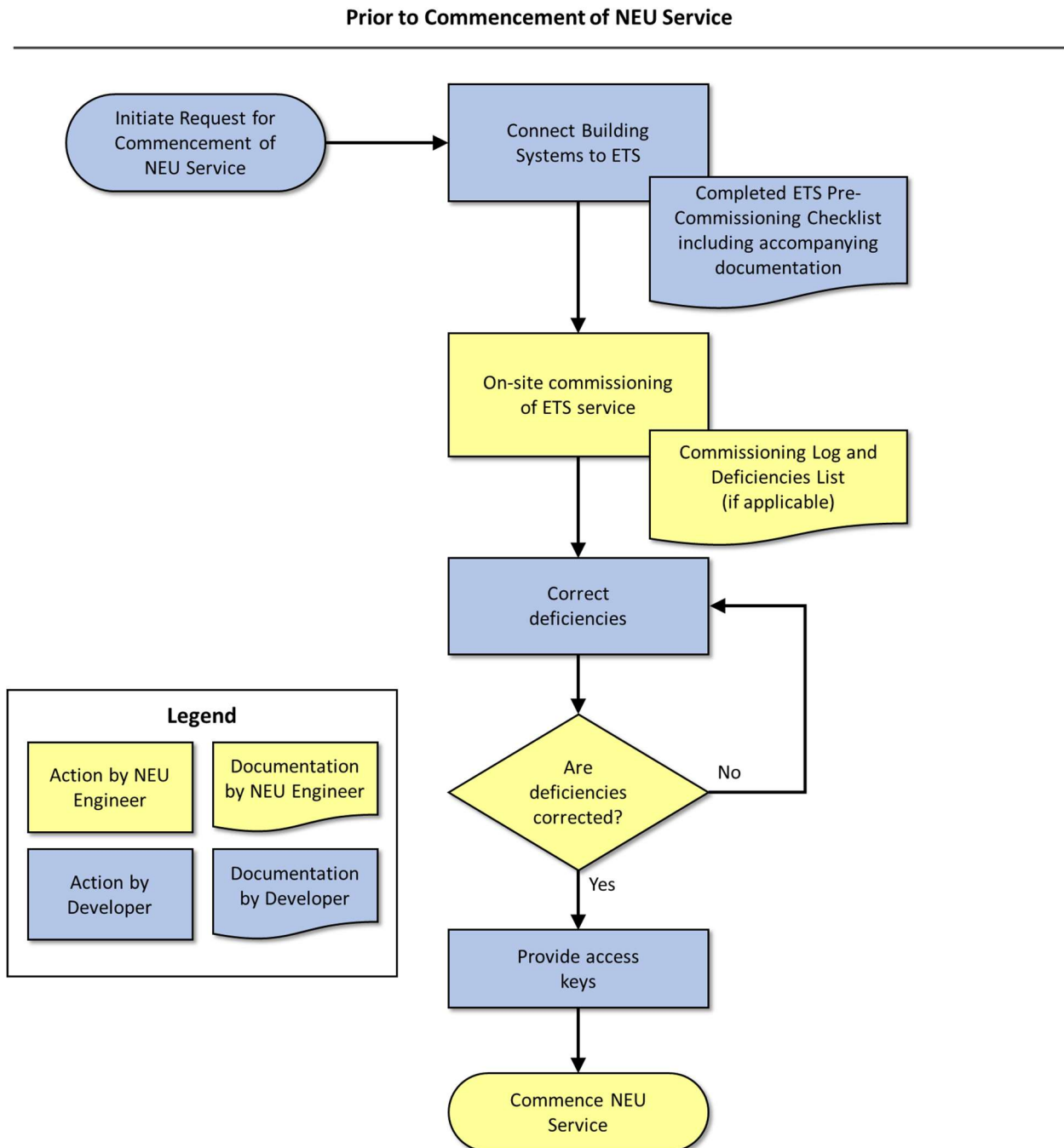
**Building Permit**



**Figure 5: NEU Review Process at Building Permit**

### 4.3 PRIOR TO COMMENCEMENT OF NEU SERVICE

The NEU Review Process prior to commencement of NEU service is presented in Figure 6 below. Prior to start-up of the NEU service to the building, the NEU Service Requirements (Section 6.4) must be confirmed as met by the NEU Engineer. To initiate this, the Developer must submit the Commencement of NEU Service checklist (Section 7.3) with all supporting documents.



**Figure 6: NEU Review Process prior to Commencement of NEU Service**

#### 4.4 OCCUPANCY PERMIT

There is no specific flowchart or checklist for the NEU Review Process at the Occupancy Permit stage, but the NEU reserves the right to place a hold on the issuance of any occupancy permit for unresolved deficiencies, missing documents, and/or unpaid fees.

## 5.0 DIVISION OF RESPONSIBILITY

This section provides information on the delineation of responsibilities between the Developer and the NEU to ensure coordination and seamless integration between the customer building and the NEU.

### 5.1 DEVELOPER'S RESPONSIBILITY

#### 5.1.1 Building HVAC and Domestic Hot Water Systems

The Developer is responsible for designing, installing, commissioning, and initially operating the customer building's HVAC and domestic hot water (DHW) systems. The Developer is responsible for designing the building systems to operate efficiently with the NEU system by following the NEU connectivity requirements (Section 6.0).

The building space heating system shall be designed with hydronic thermal distribution systems, including components such as:

- Internal distribution pumps
- Internal distribution piping
- Heating elements, e.g. fan-coil units, air handling units, etc.

All of the building space heating and DHW demand must be supplied by the NEU, except as permitted by the *Energy Utility System By-Law No. 9552, Section 5.2*.

The Developer shall provide a dedicated ETS Room for the location of the ETS and for the penetration of the branch lines from the exterior NEU distribution piping.

The Developer shall provide the building design information required by the NEU to conduct a Connectivity Review of the design to confirm the NEU Connectivity Requirements as part of the Building Permit review process.

It is the responsibility of the Developer to ensure that all commercial or retail units are configured so that any future tenant improvement can easily integrate into the building's space heating and DHW systems serviced by the NEU.

#### 5.1.2 Installation and Operational Boundaries

The Developer is responsible for all piping and other components necessary to connect the hydronic heating and DHW systems to the building side of the ETS at the demarcation point (see Figure 3). The demarcation point is typically at the first valve on the building side of the ETS heat exchangers.

#### 5.1.3 Preparation for NEU service

The Developer shall work closely with the NEU Engineer to determine the optimal location of building foundation penetration necessary for the NEU supply and return piping. The preferred method for new construction is to core holes for the supply and return pipes at the time of service connection. The Developer is responsible for coring and proper sealing of the building envelope, and for the surface restoration of the service connection.

The Developer shall ensure that the NEU distribution piping route, both inside and outside the building, is accessible and free of obstacles to facilitate piping installation, inspections, and maintenance.

The Developer shall provide the NEU with access to the ETS Room as described in the *Energy Utility System By-Law No. 9552, Section 6*.

The Developer is responsible for facilitating controls and communication from the building management system (if applicable) to the NEU Panel, and from the NEU Panel to the NEU operations system via internet or fibre optic communications, as determined by the NEU Engineer.

#### 5.1.4 ETS Commissioning

The Developer is responsible for flushing and cleaning the building's HVAC and DHW systems prior to the commissioning of the ETS by the NEU Engineer and NEU Operators. Note that flushing through the ETS heat exchangers is not permitted; the ETS must be bypassed with a piped bypass or temporary spool pieces during the flush. The Developer is responsible for coordinating the on-site commissioning of the ETS with the NEU Engineer and all relevant trades. The Developer shall provide a completed ETS pre-commissioning checklist to the NEU Engineer (Appendix A), including accompanying documentation such as flushing certificates.

After the commissioning of the ETS and prior to the commencement of NEU service, the Developer is responsible for delivering a copy of the final commissioning reports of the building's HVAC and DHW systems to the NEU Engineer and for correcting any deficiencies noted by the NEU Engineer. Any changes made to the building's systems after commissioning that may impact NEU performance shall be reported to the NEU Engineer. The Developer shall provide the NEU Engineer with all necessary keys or access fobs to the ETS Room prior to commencement of NEU service.

#### 5.1.5 System Operation

The Developer shall provide appropriate ventilation and maintain the ETS Room at a temperature between 10°C and 35°C.

The Developer is responsible for ensuring the building's heating water system quality is properly maintained and treated to prevent damage, contamination, or corrosion to the NEU ETS and to the building systems.

After occupancy, should the Developer not be involved with the operation of the building, the aforementioned responsibilities shall be transitioned to and carried out by the entity owning/operating the building.

## 5.2 NEU'S RESPONSIBILITY

### 5.2.1 NEU Equipment

The NEU is responsible for the design, installation, operation, and maintenance of the ETS at the ETS Room. The location of the ETS Room is agreed upon between the NEU Engineer and the Developer at the Development Permit Stage.

The NEU is responsible for the design, installation, operation, and maintenance of the primary distribution pipes inside the building up to the supply side of the ETS. The NEU will provide the branch connections necessary from the NEU main trunk lines into the building.

The NEU retains ownership and responsibility of the ETS equipment and primary distribution piping.

The NEU provides temperature transmitters, pressure and temperature gauges, thermowells, control valves, energy meters, and a control panel as part of the ETS package. Temperature transmitters for the secondary side of the ETS heat exchangers are also provided by the NEU. This allows the NEU Engineer to remotely monitor the ETS and control the building side of the heating and DHW systems, and it allows alarms to be transmitted to NEU staff on a 24-hour basis.

The NEU is responsible for servicing the energy metering equipment.

#### 5.2.2 NEU Connectivity Review

The NEU Engineer will provide a Connectivity Review of the customer building's HVAC and DHW design during the Building Permit review stage to confirm that NEU Connectivity Requirements have been met. The NEU is not responsible for the design of the customer building's mechanical systems; this is the responsibility of the Developer's Mechanical Engineer of Record. During the Connectivity Review, the NEU Engineer will provide suggestions as necessary for optimizing the building's connection to the NEU.

As per guidance provided by Engineers and Geoscientists BC "[Practice Note 16: Professional Design and Field Review by Supporting Registered Professionals, February 2017](#)", the NEU Engineer can provide (upon request) the Registered Professional of Record (typically the Mechanical Engineer of Record) with the following schedules to affirm Code compliance for the Energy Transfer Station installed within the building:

- Schedule S-B Assurance of Professional Design and Commitment for Field Review by Support Registered Professional; and
- Schedule S-C: Assurance of Professional Field Review and Compliance by Supporting Professional.

#### 5.2.3 ETS Commissioning

The NEU Engineer and the NEU Operators, together with the Developer's team, will commission the ETS at the agreed-upon time to be arranged by the Developer. The NEU Engineer will provide a Commissioning Log with a list of any deficiencies that need to be corrected prior to commencement of NEU service.

## **6.0 NEU TECHNICAL REQUIREMENTS AND GUIDANCE**

This section provides the technical requirements and best practices to optimize the NEU and building system efficiency, and to provide seamless connection and integration with the NEU. Developers are required to make provisions in building design to take full advantage of the benefits provided by the NEU.

### **6.1 ETS ROOM REQUIREMENTS**

The following requirements are to be verified prior to the release of the Development Permit and re-confirmed prior to the release of the Building Permit.

#### **Room Location**

- The ETS Room shall be located on the building first sub-level (generally used as parkade level P1), unless the first sub-level is below the Flood Construction Level (FCL) as defined by the City of Vancouver. In that case, the ETS Room shall be either flood-proofed or located on the lowest building level fully above the FCL. The proposed ETS Room must be reviewed and approved by the NEU Engineer.
- The ETS Room shall be directly adjoining the building perimeter, in a secure location convenient for NEU distribution pipes to enter the building as approved by the NEU Engineer. The Developer shall contact the NEU for guidance on site servicing location.
- If an alternate location for the ETS Room is necessary and acceptable to the NEU, the Developer shall be responsible to pay the City the estimated increased costs determined by the NEU Engineer.

#### **Room Dimensions**

- The ETS Room shall be rectangular and sized according to Table 1.
- The ETS Room shall be designated solely for the placement of NEU equipment except for the building side piping connections to the ETS. In the event that any building equipment or services are approved by the NEU Engineer for co-location within the ETS room, it must be adequately protected against damage from water, moisture, steam, and dust exposure.
- Access to the ETS Room shall be designed so that an ETS skid can be navigated through any hallways, doors, and/or turns leading to the ETS Room. Typical skid dimensions are approximately 2 m x 3 m (6 ft. x 10 ft), however, skid size is dependent on the building loads and will be reviewed and confirmed during the Connectivity Review.

#### **Room Access**

- The ETS Room requires a minimum 1.83 m (6 ft.) wide standard height access double-door with zero clearance (no step) entry.
- If the door opens directly into the parkade area, ensure the door is protected from moving and parked vehicles.
- Doors should swing outwards wherever possible to preserve usable space in the ETS Room. If the doors must swing into the ETS Room, the door swing area shall not be counted as usable space within the ETS Room Dimensions.
- The ETS Room is to be free of stairs and floors should be sloped to floor drain(s).

#### **Height**

- The ETS Room requires typical headroom for a mechanical room, minimum 2.7 m (9 ft.), to accommodate the ETS skid and piping.

#### **Structural**

- The ETS Room and access pathways thereto shall be structurally rated to accommodate the installation and placement of the ETS skid and ancillary piping/services. The typical wet weight of

an ETS skid is approximately 2,000 kg (4,400 lb), however the building’s structural engineer shall verify the ETS weight with the NEU Engineer.

**Electrical**

- The ETS Room shall be equipped with a single dedicated 120V, 15A circuit with lockable breaker for connection to the NEU Panel.

**HVAC**

- The ETS Room shall have adequate ventilation to maintain room temperatures between 10°C and 35°C.

**Plumbing**

- The ETS Room shall contain one or more floor drains to accommodate general cleaning and ETS maintenance as well as emergency drainage (e.g. pressure relief valve discharge). The floor drain shall not be located near the centre of the room to avoid being located underneath the ETS skid; consider locating the floor drain near the doorway, which should remain unobstructed.

**Table 1: ETS Room Dimensions**

<b>Building Net Floor Area</b>	<b>Minimum ETS Room Dimensions</b>
< 13,940 m <sup>2</sup> (<150,000 ft <sup>2</sup> )	6 m x 3 m (20 ft x 10 ft)
Between 13,940 m <sup>2</sup> and 23,230 m <sup>2</sup> (Between 150,000 ft <sup>2</sup> and 250,000 ft <sup>2</sup> )	6 m x 4 m (20 ft x 13 ft)
> 23,230 m <sup>2</sup> (>250,000 ft <sup>2</sup> )	To be determined by NEU Engineer

**6.2 PROHIBITED EQUIPMENT**

The building mechanical system must not incorporate any heat production equipment as outlined in the *Energy Utility System By-Law No. 9552, Section 5.2*. The By-law also describes the exemptions that apply.

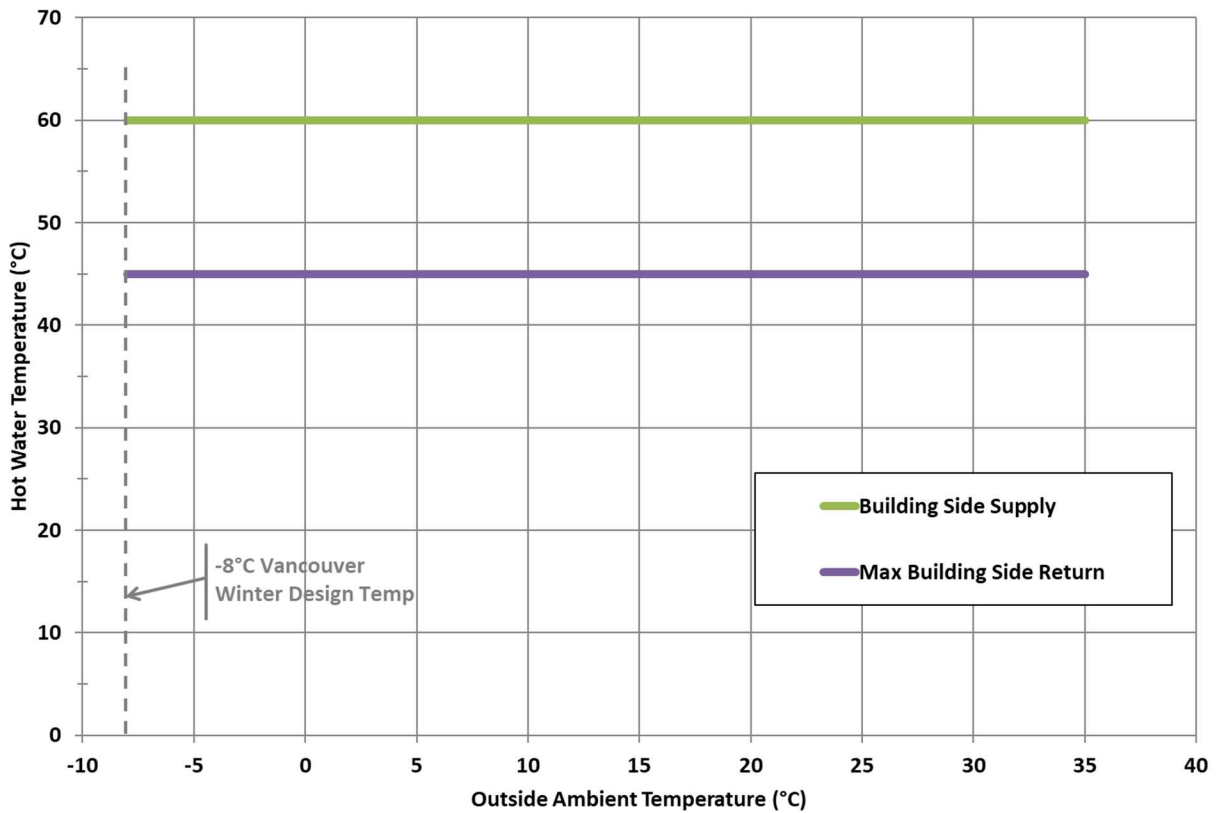
**6.3 HYDRONIC HEATING AND DHW SYSTEMS REQUIREMENTS**

The NEU distribution network temperature is minimum 65°C. It varies from time to time to optimize operations against demand and external conditions. With minimum 65°C on the NEU side of the ETS, space heating and domestic hot water supply temperatures of 60°C on the building side of the ETS can always be achieved.

To make efficient use of the NEU, it is crucial that the building mechanical systems are carefully designed and operated in accordance with the temperatures specified in Table 2 (also depicted in Figure 7). Designers are encouraged to design heating systems that require lower temperatures to maximize building and system efficiency, and that minimize building return water temperature where possible, though supply temperature decreases in the building mechanical system due to pipe heat losses must also be considered to ensure heating loads can be appropriately satisfied while complying with temperature requirements.

**Table 2: Operating Temperatures on ETS Building Side**

	<b>Building Side Space Heating System Design Condition</b>	<b>Building Side Domestic Hot Water System Design Condition</b>
Supply Temperature	60°C	60°C
Minimum Supply and Return Temperature Differential	15°C	15°C



**Figure 7: Building Side System Temperature: Operational Performance Requirements**

The building's space heating and DHW heating systems shall be designed and operated to ensure a minimum temperature differential of 15°C under all heating load conditions (excluding DHWR heating). This effectively means a maximum return water temperature of 45°C must be achieved under all conditions regardless of time of year except for periods when DHWR heating is the only load. To promote low return temperatures, hydraulic configurations that enable bypass flow directly from supply to return are not permitted (e.g. bypass configurations for end-of-line recirculation, sidestream filters, chemical pot feeders), unless the supply temperature of the applicable circuit is below 45°C. Further, to promote the lowest return temperatures for the DHW heating connection, the domestic cold water make-up connection shall be plumbed directly to the DHW heat exchanger inlet and not into or through a DHW storage tank first where it would mix with hotter water and increase the return temperature to the DHW heat exchanger.

The building system shall be designed for a maximum of 35 kPa (5 PSI) pressure drop at peak design flow across the building side of the ETS (including the heat exchangers). Note the building side of the ETS heat exchangers are typically designed for a maximum operating pressure of 1,551 kPa (225 PSI). It is the responsibility of the building's Engineer of Record to ensure that building side space heating and DHW systems meet local Code requirements for the pressure piping and include any required pressure relief and scale protection measures. It is also the responsibility of the building's Engineer of Record to notify and seek variances from the NEU Engineer should they be required (e.g. heat exchangers with higher operating pressure ratings). Interruptions in heating service delivery or any damages resulting from improperly specified NEU or building side equipment due to lack of information or notification from the building's Engineer of Record shall be the responsibility of the building owner.

### 6.3.1 HVAC System Requirements

The building shall be designed to be heated using a hydronic heating system compatible with the NEU using energy supplied from the ETS at the temperatures specified in Table 2.

Hot water generated by the ETS shall be distributed, via a 2-pipe (direct return) piping system, to the various heating elements throughout the building. The building heating system components shall be designed so that the resulting temperatures in the combined headers connected to the building side of the ETS comply with the temperatures specified in Table 2.

The building side supply temperature is 60°C year-round per Table 2. In the past, the building side supply temperature fluctuated with outdoor air temperature, however the update to the current design condition was made to better align with modern, low temperature building heating systems, simplify NEU equipment design and operations, and increase the overall system performance. If lower space heating supply temperatures to building side heating equipment is required, the building mechanical system shall provide the necessary configurations to facilitate this requirement (e.g. 3-way mixing valve configuration to target appropriate supply temperature). It should be noted that many heating terminal units operate without modulating flow control and rely on automatic flow control valves to target a fixed flow rate when commanded on. This type of configuration can result in excessively high return water temperatures if the supply temperature to a terminal unit is too high and/or the heating load served by the terminal unit is below the unit's selected peak load operating condition.

### 6.3.2 DHW System Requirements

The building systems shall be designed to meet all DHW requirements using energy supplied from the ETS at the temperatures specified in Table 2.

The building's DHW system shall be designed to ensure DHW supply at 60°C regardless of the City make-up cold water temperature.

It is recommended that the DHW system be designed to provide sufficient storage to minimize the building's DHW peak demand. A larger storage volume generally correlates to a smaller DHW peak demand, which allows for a smaller ETS and lower utility costs. Storage tanks shall be located in close proximity to the ETS to minimize temperature and heat loss, and to avoid temperature control problems.

The cold water make-up connection shall be introduced directly to the ETS, rather than to the storage tanks (see Figure 3), to promote low return water temperature and support compliance with the temperature requirements in Table 2. The pressure of the cold water make-up connection to the ETS shall be regulated appropriately.

If domestic hot water recirculation (DHWR) systems are used, careful attention shall be paid to the design and control of the piping configuration as well as the flow and temperature control of recirculated circuits to achieve the minimum temperature differential stated in Table 2. Manual balancing valves and automatic flow control valves have conventionally been used in an attempt to regulate flow in DHWR lines; however, this generally results in excessively high return water temperatures at the building side connection to the ETS since the recirculation line temperature remains uncontrolled. It is recommended that thermal balancing valves (not thermostatic mixing valves), selected for (or field-adjusted to) an appropriate temperature setting, are used instead of manual balancing or automatic flow control valves to ensure good temperature control, combined with a variable speed DHWR circulation pump with time clock control such that it only operates periodically and not continuously. Thermal balancing valves use a self-actuating mechanism to continuously adjust the flow through the valve to maintain the valve temperature setting.

Note that the building system is to include anti-scalding best practices to ensure DHW being distributed to plumbing fixtures does not exceed temperature limits per the relevant Code requirements.

### 6.3.3 Electrical, Controls and Communications Requirements

The following shall be provided to facilitate communications from the building to the NEU:

- Dedicated 120V/15A circuit with dedicated neutral connection to the NEU control panel in the ETS Room, complete with circuit breaker lockout device to secure ON position.
- Internet connection via Ethernet with a dedicated Static IP and a unique port to the NEU panel in the ETS Room. All outbound ports shall be open for communication.

Note that fibre optic connection may be suitable for some buildings; the NEU Engineer may request a fibre optic connection in lieu of the Internet connection via Ethernet provision. This will be evaluated on a case-by-case basis.

## 6.4 NEU SERVICE REQUIREMENTS

The Developer shall confirm completion of the requirements listed in Appendix A – Pre-Commissioning Checklist prior to the commissioning of the ETS and commencement of NEU Service. The NEU Engineer will confirm the requirements are met through the on-site commissioning and start-up meeting, to be coordinated by the Developer and involving all relevant trades.

## 6.5 ADDITIONAL GUIDANCE ON ENERGY MODELLING

For energy modelling of buildings connecting to the NEU, refer to the City of Vancouver's [Energy Modelling Guidelines](#).

For energy modelling of buildings connecting to the NEU and pursuing LEED or Zero Carbon Building (ZCB) Standard certification, refer to the [Canada Green Building Council](#) for more guidance on how to account for the performance of the NEU to demonstrate energy performance improvements. The LEED or ZCB energy model may require additional data about the NEU's inputs, efficiencies, and various system parameters. Please contact [neighbourhood.energy@vancouver.ca](mailto:neighbourhood.energy@vancouver.ca) to request this data as needed.

## **7.0 SUBMITTAL CHECKLIST**

### **7.1 NEU REQUIREMENTS AT DEVELOPMENT PERMIT**

Provide the following documentation, at minimum, to support the Development Permit review. At this stage the NEU Engineer is checking for ETS Room Requirements (Section 6.1).

- Architectural drawings in PDF format
- Landscape drawings in PDF format, if available
- Civil and utility servicing key plans, including BC Hydro, natural gas, etc.

If an alternate location for the ETS Room has been agreed upon with the NEU Engineer, the Developer must provide a written commitment to the NEU Engineer to pay for all costs associated with facilitating the alternate location.

### **7.2 NEU REQUIREMENTS AT BUILDING PERMIT**

Provide the following documentation, at minimum, to support the Building Permit review. At this stage the NEU Engineer is reaffirming ETS Room Requirements (Section 6.1) and performing the NEU Connectivity Review.

To initiate the Connectivity Review process:

- Completed and signed Application for Thermal Energy Service
- Sealed building drawings, which shall include the following:
  - Full set of Mechanical drawings, including DHW, HVAC, riser diagrams, and Mechanical and Plumbing equipment schedules
  - Architectural drawings showing approved ETS Room location, NEU pipe penetration location, and NEU pipe routing
  - Electrical drawings including Electrical equipment schedules and panel schedules, controls schematics, and controls narrative
  - Civil drawings showing utility key plans
  - Landscape drawings

To complete the Connectivity Review:

- Written response and acceptance of the Connectivity Review Memo
- Updated, signed and sealed Application for Thermal Energy Service
- Latest revision of complete drawing set
- CAD files for floor plan of ETS Room
- Pay Connection Levy and (if applicable) Alternate ETS Room Location fees

### **7.3 NEU REQUIREMENTS PRIOR TO COMMENCEMENT OF NEU SERVICE**

Provide required documentation prior to the commencement of NEU service. At this stage the NEU Engineer is checking for NEU Service Requirements (Section 6.4 and Appendix A) prior to the on-site commissioning of the ETS.

### **7.4 NEU REQUIREMENTS AFTER COMMENCEMENT OF NEU SERVICE**

Provide completed balancing documents and authenticated commissioning documents after commencement of NEU service.

**APPENDIX A – PRE-COMMISSIONING CHECKLIST**



**Developer Provided ETS Requirements - Pre-Commissioning Checklist**

Date:

Building Name:

Building Number:

Address:

**Prior to commissioning the NEU Energy Transfer Station (ETS), the developer is required to confirm the completion of the following:**

No.	Description
1.0	<p>Piping Tie-ins:</p> <ul style="list-style-type: none"> <li>- The building's piping shall be tied into the NEU provided Energy Transfer Station (ETS)</li> <li>- The developer is responsible for the concrete coring, sealing and waterproofing of the building envelope.</li> <li>- The developer is responsible for all internal coring and fireproofing.</li> </ul>
2.0	<p>Flushing Certificate:</p> <ul style="list-style-type: none"> <li>- The building hydronic system shall be flushed prior to the commissioning of the ETS. Provide written proof of flushing (flushing certificate and water quality test report) directly to NEU Engineer. Presence of a corrosion inhibitor that is compatible with the copper brazing of the NEU heat exchanger is required.</li> <li>- Note that flushing through the heat exchangers is not permitted, and that the ETS must be bypassed with spool pieces during the flush.</li> </ul>
3.0	<p>Electrical:</p> <ul style="list-style-type: none"> <li>- Permanent 120V, 15A single electrical service shall be installed and activated to the NEU Panel.</li> </ul>
4.0	<p>Controls:</p> <ul style="list-style-type: none"> <li>- Building control system (DDC) is to be fully operational.</li> </ul>
5.0	<p>Communication:</p> <ul style="list-style-type: none"> <li>- Provide an Internet connection with static IP and all the outbound ports open, or a conduit from the building penetration to the NEU panel for City fiber connection if the network is locally available.</li> </ul>
6.0	<p>Other:</p> <ul style="list-style-type: none"> <li>- ETS clearance requirements – minimum 1m clearance is required on the front side and panel side of the ETS.</li> <li>- Floor drains are to be located in front or adjacent to but not underneath the ETS skid.</li> <li>- Ensure the building is ready to receive heat. Mechanical system and pumps are installed and ready to operate.</li> <li>- Engineering letter of assurance that the building mechanical system has been built to the design reviewed as part of the compatibility review.</li> </ul>



Developer Provided ETS Requirements - Pre-Commissioning Checklist

On completion of this checklist, the NEU will schedule a commissioning date. Commissioning will require the building mechanical/electrical teams to start up the building side heating and domestic hot water systems.

After installation of the permanent locksets, the development will supply the appropriate combination of keys, cards, or fobs to the NEU Operators to allow their access to the NEU ETS room at any time.