



# **RIVER DISTRICT ENERGY**

District Energy Utility (DEU)

## Information Package for Developers

# How to Read this Document

The purpose of this document is to provide a clear process for developers with projects required to connect to River District Energy (RDE) for thermal energy supply.

Furthermore, this information package is intended to assist developers as they liaise with consultants and end-customers throughout the lifespan of the project. The package is comprised of the following:

**Section I.** Process for connecting to the RDE system

**Section II.** Technical Guidelines for Building Designers

NOTE: Developers are responsible for fulfilling the outlined requirements to ensure successful connection to the district energy system. RDE staff are available to guide and assist this process.

# Section I. Process for Connecting to the RDE System



# Process for Building Connection

## RIVER DISTRICT ENERGY

Table 1

Building Development Phase	Developer's Responsibility	Purpose / RDE's Responsibility	Timing
<b>1.1) Preliminary Design / Planning</b>	Submission to <a href="mailto:service@rdenergy.ca">service@rdenergy.ca</a> : <ul style="list-style-type: none"> <li><input type="checkbox"/> Site plan and preliminary architectural plans showing location of proposed RDE equipment</li> </ul>	General review of preliminary building program as well as proposed location and size of DEU equipment space  Deliverables: <ul style="list-style-type: none"> <li><input type="checkbox"/> Advice on building-specific design considerations</li> </ul>	<u>Allow 2 weeks</u> for review
<b>1.2) Development Permit (DP)</b>	Submission of: <ul style="list-style-type: none"> <li><input type="checkbox"/> DP application submission drawings</li> <li><input type="checkbox"/> "Prior-to" issued drawings</li> </ul>	General review – formal confirmation of final DEU location and size  Deliverables: <ul style="list-style-type: none"> <li><input type="checkbox"/> RDE Letter confirming size and location of DEU space (City requires as a <b>condition of DP issuance</b>)</li> </ul>	<u>Allow 2 weeks</u> for each review
<b>1.3) Working Drawings / Building Permit (BP)</b>	Submission of: <ul style="list-style-type: none"> <li><input type="checkbox"/> 50% A, M, E drawings</li> <li><input type="checkbox"/> Mechanical specifications: <b>Attachment A</b></li> </ul>	Technical review – Final coordination  Deliverables: <ul style="list-style-type: none"> <li><input type="checkbox"/> Peer review memo, stating comments and conditions of building design and details</li> </ul>	<u>Allow 3 weeks</u> for each iteration of review (# of iterations dependent on response sufficiency)
<b>1.4) BP (leading up to)</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> New Service Application (NSA – Form 1)</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> RDE Letter confirming BP drawings meet RDE requirements (City requires as a <b>condition of BP issuance</b>)</li> </ul>	<u>Allow 2 weeks</u> to process BP Letter (technical review process must complete prior to requesting BP letter)
<b>1.5) Construction</b>	Submission of: <ul style="list-style-type: none"> <li><input type="checkbox"/> Commissioning (approx.) date</li> <li><input type="checkbox"/> Equipment Change Request: <b>Attachment B</b> (if applicable)</li> <li><input type="checkbox"/> Energization Request: <b>Attachment C</b></li> </ul>	Deliverables: <ul style="list-style-type: none"> <li><input type="checkbox"/> Confirmation of approx. commissioning date</li> <li><input type="checkbox"/> Approval of equipment changes (if applicable)</li> <li><input type="checkbox"/> Confirmation of Energization date</li> </ul>	Submit approx. commissioning date at least <u>9 months in advance</u> Submit Energization Request at <u>least 3 weeks</u> before desired energization date Allow 3 weeks for equipment changes reviews
<b>1.6) Occupancy (leading up to)</b>	Submission of: <ul style="list-style-type: none"> <li><input type="checkbox"/> Draft SRW plans for DEU equipment access</li> <li><input type="checkbox"/> Latest set of Arch &amp; Mech drawings</li> <li><input checked="" type="checkbox"/> Professional Attestation Form <b>Attachment D</b></li> <li><input type="checkbox"/> Transfer Service Form (TSA – Form 2)</li> </ul>	Deliverables: <ul style="list-style-type: none"> <li><input type="checkbox"/> RDE Letter confirming SRW registered and building built and as per RDE requirements (City requires as a <b>condition of OP issuance</b>)</li> </ul>	<u>Allow 3 weeks</u> for each iteration of review (# of iterations dependent on response sufficiency)

## RIVER DISTRICT ENERGY

- 1.1) **Preliminary Design / Planning.** Building Designer teams must be familiar with Section 2 of this document, which contains all technical requirements for projects that will be designed to connect to the RDE system. It is important to discuss DEU room location early in the design stage as it will expedite RDE's turnaround leading to DP Application Letter.

*Contact RDE with tentative DEU Locations as soon as Pre-Design discussions begin*
- 1.2) **Development Permit (DP).** City of Vancouver (CoV) requires a letter from RDE confirming size and location of DEU space are acceptable to the utility. Ensure RDE is included in early discussions regarding location of this room to minimize delays to DP.
- 1.3) **Working Drawings / Building Permit (BP).** RDE will require all items in the Technical review process are addressed in writing by the designing team prior to issuing CoV's required acknowledgement letter. The best way to avoid delays is to ensure a conversation between designers and RDE is flowing as the design progresses.
- 1.4) **BP (leading up to).** At this stage technical review with designers is approaching completion, all concerns must be resolved. Development Managers must also submit a Service Application Form. RDE uses the building's technical review to design the Energy Transfer Station (ETS).
- 1.5) **Construction.** RDE must be notified of any changes in relevant mechanical equipment. It is critical that replacement equipment is compatible with our system to ensure all residents have access to thermal energy as designed. Once the project site is ready for ETS installation, submit Attachment C to request energization.
- 1.6) **Occupancy (Leading Up to).** RDE will review the project's volumetric survey related to RDE's Statutory Right of Way. At this stage, Mechanical designers must submit a professional attestation stating the building mechanical design complies with RDE's requirements. Also submit latest set of architectural and mechanical drawings alongside a Transfer Service Form.

## RIVER DISTRICT ENERGY

### General Requirements and Restrictions:

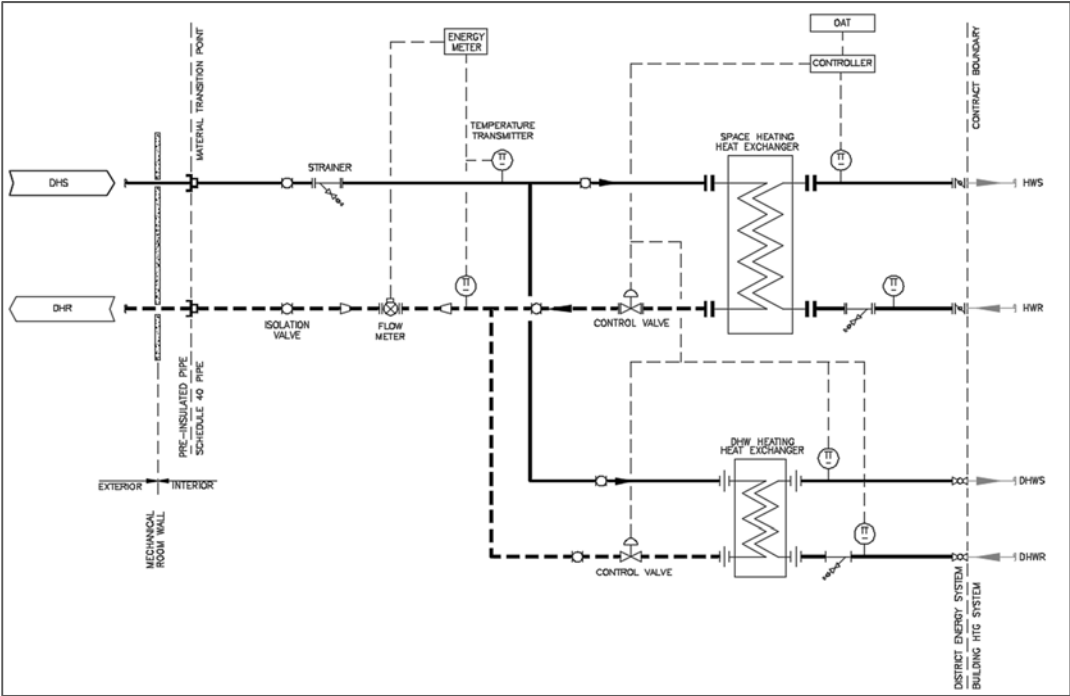
1. Systems are to be designed such that the RDE provides 100% of domestic hot water (DHW) and space heating thermal energy. Provision of cooling is the responsibility of the building.
2. Boilers and any electrical or gas-fired heat sources are not allowed.
3. The building heating systems must be designed for temperatures compatible with the RDE system.
4. RDE will be responsible for the installation, maintenance and reliable operation of the DE equipment up to the contract boundary as defined in the figure below.
5. The developer is responsible for the design and installation of the building hydronic heating and DHW systems up to the agreed service boundary demarcation point (refer to Figure 1) on the building side of the heat exchangers.
6. An ETS room is to be provided meeting the specifications outlined below in Section 1.1. The ETS room has minimum accessibility requirements including double door entry.

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*An ETS requires an area of 3m x 6m x 2.7m. Double doors access should be at least 6' in width.*

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7. The ETS should be located in the basement or ground floor at an exterior wall near the DE piping branch in the street.
8. The developer will provide a floor drain and electrical service in the ETS room. The developer will provide a housekeeping pad for the ETS as necessary.
9. The developer is responsible for the RDE service line building penetration. The location is to be coordinated with RDE.
10. RDE requires uninterrupted access to the ETS and service line within a customer's building for installation, regular maintenance and repairs. This will be defined by an easement.
11. Material changes to design after technical review process are to be reviewed and approved by RDE prior to implementation.

Figure 1 – Service Contract Boundary Identification



**Section II.** Technical Requirements for Building Designers



# 1. Preliminary Design & DP Phases

## 1.1 General Access and Space Requirements

### Building requirements for DE Service

The customer will provide suitable space for the installation of the DEU ETS, including space for service lines and interconnecting piping, in a mechanical room in an agreed upon location. General requirements include:

- The ETS room is to be located as close as possible to the DEU branch pipeline entering the building – generally on an exterior wall in the basement or ground floor of the building. The DEU will provide a drawing showing the location of the branch line for coordination purposes.
- The ETS room shall be ventilated and maintained at a temperature between 15°C and 35°C.
- A floor drain connected to the sanitary sewer system shall be provided in the ETS room, as well as a domestic water source.
- A dedicated 15A 120V electrical service, with a lockable breaker, is required to power the ETS control panel; connected to emergency power service, if available.
- Double doors access into the mechanical room must be maintained at a minimum of 1.5 metres (5 feet) wide to allow entry of the ETS equipment and piping.
- Access for ETS equipment must be allowed for through corridors to the double doors of the mechanical room.
- 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. An ETS sized to serve the typical range of multi-unit residential buildings expected in RD requires between 6 and 12 m<sup>2</sup> of floor space, with a minimum ceiling height of 2.7 m (~9 ft). This area includes access and maintenance space. The size, number of heat exchangers and general configuration impact the overall footprint of the ETS.
- A concrete housekeeping pad of the required size, on which the ETS heat exchangers will be installed. DEU will provide a housekeeping pad layout drawing with locations and dimensions during the detailed design stage. The DEU has the option of prefabricating the ETS off site on a skid. In this case, the housekeeping pad would not be required. This will be determined at the detail design stage on a building-by-building basis.
- Allowance should be made in the customer building automation system (BAS), if applicable, to provide heating pump on/off status to the ETS control panel. If a BAS is not planned for the building then the DEU will directly monitor the heating pump on/off status via a hardwire connection. As well, one 20 mm (3/4") electrical metallic tubing (EMT) conduit from the ETS room to a north facing exterior wall may be required for the outdoor air temperature sensor wiring, to be determined at the detail design stage.
- The customer is responsible for the DEU service line building or foundation penetration, which meets the requirements of the DEU (size of opening, etc), in a mutually agreeable location. The DEU will produce the required penetration drawing during the detailed design stage. The penetration may be a core drill (after the foundation is poured) or a sleeve installed prior to foundation pouring. The DEU will install and maintain the service line and seal the opening

between the pipe and the core drill or sleeve. If a sleeve is installed the customer is responsible for maintaining the seal between the building structure and the sleeve.

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

The DEU requires uninterrupted access to the ETS and service line within a customer’s building for installation, regular maintenance and repairs. This will be defined by an easement.

## 1.2 Heating Systems – Strategies and Requirements

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

Strategy
Centralized Hydronic System
Low <sup>1</sup> Supply Temperatures
Large Temperature Differentials
Variable Flow with Variable Frequency Drives
Two-Way Control Valves
Seasonal Reset of Supply Temperatures
Return Temperature Limiting
Hybrid heat pumps

### 1.2.1 Pumping and Control Strategy

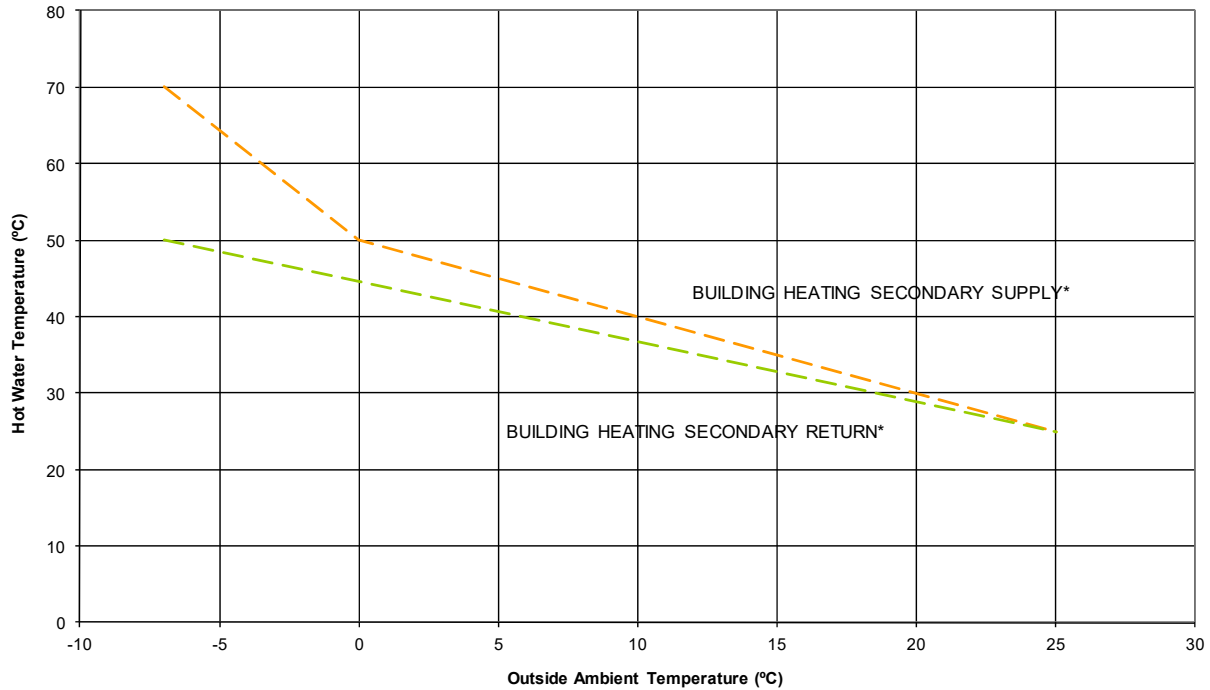
The building hydronic heating system shall be designed to maximize  $\Delta T$  and minimize hot water return temperatures over all load conditions.

The building heating system shall be designed for variable hydronic flow, using 2-way control valves at all terminal units. When necessary 3-way mixing valves at terminal units may be used strategically. Bypass valves (e.g. 3-way diverting valves) are not permitted.

### 1.2.2 Hydronic Heating & DHW Systems (Minimum) Requirements

The ETS controls the supply water temperature to the building heating circuit based on an outside air temperature reset schedule. This is the maximum temperature available to the building. A sample hydronic heating circuit supply and return temperature reset curve is shown in Figure 2.

**Figure 2: Typical Building Space Heating Temperature Reset Curve for Vancouver**



\* - Space heating only, direct primary DHW heating with Max. 60°C DHWS.

#### Hydronic Space Heating

The hydronic heating system will be designed to provide **all** space heating and ventilation air heating requirements (as applicable) 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. The use of vapour compressors (or conventional heat pumps) or VRFs to provide heating are not acceptable. Alternatives such as hybrid heat pumps, four-pipe radiators, four-pipe fan-coils, or VAV are preferred.

Hot water generated by the ETS shall be distributed, via a 2-pipe system, to the various heating elements (terminal units) throughout the building. The building heating system **must** be designed as specified below.

Table 1 - Hydronic Space Heating System (Building Side) Design Criteria

Description	Peak Winter	Summer
Supply Temperature, <b>Max.</b>	70°C (158°F)	45°C (113°F)
Return Temperature, <b>Max.</b>	50°C (122°F)	40°C (104°F)
Min. Difference ( $\Delta T$ )	20°C (36°F)	5°C (9°F)
Design Pressure (Max)	1,600 kPag (232 psig)	

The specified differential temperature ( $\Delta T$ ) shall be regarded as a minimum requirement, and larger  $\Delta T$  or lower return temperatures are desirable. The building return temperatures shall be as low as possible to allow the DEU to take advantage of alternate technologies.

Specific types of heating systems (i.e. terminal units) can operate at lower temperatures. The terminal units shall be selected based on temperatures as low as can be reasonably expected for commercially available products.

The table below outlines the **maximum** hot water supply (HWS) & hot water return (HWR) temperatures, for which terminal units shall be designed and selected.

Table 2 – Terminal Unit Design Criteria

Type of Terminal Unit	Maximum HWS	Maximum HWR
Radiant in-floor heating	49°C (120°F)	38°C (100°F)
Perimeter radiation system	70°C (158°F)	50°C (122°F)
Fan coil units & reheat coils <sup>2</sup>	70°C (158°F)	50°C (122°F)
Air handling pre-heat coils <sup>3</sup>	65°C (149°F)	45°C (113°F)

### 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 in the building. It is understood that DHW systems configured with storage must operate at 60°C (140°F) to minimize potential bacteria growth, and the utility is able to supply this temperature to all buildings at all times.

The building domestic hot water heating system **must** be designed as specified below.

Table 3 – Domestic Hot Water Heating System (Building Side) Design Temperatures

Description	Winter	Summer
Supply Temperature (with storage), <b>Max.</b>	60°C (140°F)	60°C (140°F)
Supply Temperature (no storage), <b>Max.</b>	55°C (131°F)	55°C (131°F)

DHW systems shall be designed in a fully instantaneous, or if required, semi-instantaneous configuration. **All** domestic cold water (DCW) for the DHW system should enter immediately before the DEU heat exchanger.

In a semi-instantaneous system, the storage capacity is small. In such a system, storage tanks act as “buffer tanks” only; and there is no recirculation from DHW storage tanks directly back to the heat exchanger. This configuration requires 60°C (140°F) supply temperature.

### *1.2.3 Cooling in Customer Buildings*

The DEU will provide heating only (i.e. district heating); customers are responsible for any cooling systems they choose to employ.

### *1.2.4 Supplemental Heat Sources*

Some customers may prefer to supplement the DEU with alternative energy sources. These will be reviewed on a case by case basis. Generally, solar heating systems are acceptable, as is heat recovery from cooling or other waste heat sources in the building.

## 2. Working Drawings / BP Phase

Following guidelines above, submit **Attachment A** alongside 50% architectural and mechanical drawings (Submission timing: as soon as 50% drawings are available).

## 3. Construction Phase

### *3.1 Hydronic Heating Water Quality & Expansion*

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

- Chloride: < 30 ppm
- Nitrate: < 5%
- Hardness: < 2 ppm
- pH Level: 9.5 – 10
- Iron < 1 ppm

The customer will employ the services of a water treatment sub-contractor to provide the necessary chemicals, materials and supervision for a complete cleaning and flushing of all piping to the ETS demarcation point.

Upon request by the customer, and with suitable compensation, the ongoing water quality may be maintained by the DEU.

Building owners will manage the expansion of the water in their own hot water system.

### 3.2 *Commissioning*

RDE will require one (9) months' notice, before system start-up and heating is required by the customer building to complete the DE commissioning process.

System start-up and commissioning will only occur 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.**

The DEU personnel, together with the building operator, will start and commission the ETS. Commissioning includes verifying measurement points and testing the controls under various operating modes. During commissioning, the building operator is responsible for the building's internal hot water system.

### 3.3 *Changes to the Building System*

The Customer shall not materially change the design or substitute any pertinent equipment during the installation without approval from the DEU. Use **Attachment B** to request approval for changes affecting the district energy system. (Submission timing: as soon as a deviation from the technical review approval is contemplated)

The ETS is owned and maintained by the DEU. Under no circumstances can the customer, or any of its contractors, 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.

When the project site is ready for ETS installation, submit **Attachment C** to request an energization date. In order to avoid installation delays, ensure all items in the checklist are complete. Allow 2 weeks to process request and confirm energization date.

## 4. (Leading up to) Occupancy Phase

As a condition to release occupancy holds, RDE requires building designers to Sign off the attached Professional Assurance Letter **(Attachment D)**.

# ATTACHMENTS

**Attachment A**

Building Side System Design Summary: Submit this form as soon as 50% Arch, Mech and Elec drawings are available.

Basic Building Information		
Customer Building Name:		
Address:		
Heated Building Area [in sq. metres]:	Residential:  Commercial:  Amenities:  Parkade:	
Number of suites	Residential:  Commercial:	
Building Side Mechanical Statistics	Space Heating	Domestic Hot Water
Design Supply Temperature (°C)		
Design Return Temperature (°C)		
Design Pressure		
Peak Thermal Demand (kW)	Residential:	Residential:
	Commercial:	Commercial:
	Other:	Other:



Thermal Energy Expected (kWh/m <sup>2</sup> )	Residential:	Residential:
	Commercial:	Commercial:
	Other:	Other:

## Attachment B

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Equipment Change Review: Submit this form if relevant equipment approved in the Peer Review process is changing. RDE reserves its right to reject changes that might materially affect the district energy system's performance.

This form should be submitted for proposed changes to **any** of the following. Check the relevant items to be considered for changes:

- Overall System Configuration (Mechanical Schematic) including changes in control strategy, pumping, and piping.
- Building domestic hot water or space heating Pumps
- Terminal Units (Fan-coils, heat pumps, AHUs, etc. identify changes in unit type, or design temperatures or pressures)
- DHW Storage Tanks (addition or deletion, modification of connections, change in size)
- Other: \_\_\_\_\_ - This includes any other changes from the information reviewed and accepted in the peer review.

Description of change:

Attach to this form the following:

1. Revised system schematics
2. Equipment specification/selection

# □ Attachment C

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**Energization Request:** Submit this Checklist to request energization.

Energization Checklist	PM Initial	Comments
Supply of one dedicated 15 amp 120V, 60 Hz, single-phase electrical service from local panel (c/w lockable breaker switch) inside the ETS room has been provided.		
All building side pipework, valves, strainers, hangers, supports and pumps are correctly installed and complete.		
Pressure tests have been carried out and results recorded.		
Cleaning and flushing completed and letters of completion shared with RDE. (Attach to energization request)		
Space heating and domestic hot water systems are signed off for start-up by Engineer. (Attach sign off to energization request)		
Space heating and domestic hot water systems are full of water and ready for start-up.		
Pumps are ready for operation.		
Terminal heating units are ready to accept heat.		

Request to Energize **the week of\*** \_\_\_\_\_ (dd-mm-yyyy).

Per Project Manager or Authorized signatory:

\_\_\_\_\_ (Signature)

\_\_\_\_\_ (Name, Title)

\_\_\_\_\_ (Date)

**\*Note:** Submit this form at least 3 weeks prior to desired energization date.

# □ Attachment D

Professional Assurance Letter: Submit this document prior to Occupancy Letter Request

Compatibility Checklist	Eng. Initial	Comments
Heating system is fully hydronic.		
Heating loads are 100% served by hydronic system.		
Is there any gas-fired or electric heat generation equipment installed within building.		
Does the thermal energy provided by this equipment represent less than 1% of the building total thermal energy.		
Types of heating terminal units align with those reviewed in the peer review or have been submitted and approved via an equipment change review.		Describe types of terminal units:
Space provided for Energy Transfer Station is as per the peer review.		Outline location and sq. meters:
Heating system is compatible with district energy supply/return temperatures (Max 70°C supply and max 50°C return).		
Heating system is designed to minimize return temperatures.		
DHW configuration aligns with the peer review or an approved equipment change request.		DHW configured as: _____ Choose from instantaneous, semi-instantaneous, or charging.
Heating system is designed for fully variable flow with 2-way control.		
Heating system is designed with outdoor air temperature reset strategy that is approved by RDE. Describe reset curve temperatures under comments.		

**Certification:**

I certify that I am a registered professional as defined in the BC Building Code.

\_\_\_\_\_  
Registered Professional of Record's Name (Print)

\_\_\_\_\_

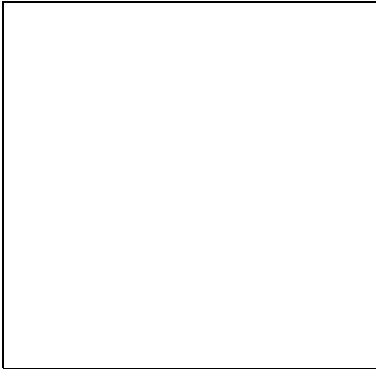
\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
Address

\_\_\_\_\_  
Phone No.

\_\_\_\_\_  
Date



Professional's Seal,  
Signature & Date

DE Utility review by: \_\_\_\_\_

Date: \_\_\_\_\_



E-mail application to: [service@rdenergy.ca](mailto:service@rdenergy.ca)

or mail to:  
Suite 910, 1055 Dunsmuir St  
Vancouver, BC  
V7X 1L3

## River District Energy - New Service Application (NSA)

### Development Information

Applicant Legal Name (Company name)

Contact name

Contact e-mail address

Contact phone number

Estimated construction completion date (mm-yyyy)

Service Address

Building Use type (check both if applicable)

- Residential  
 Commercial

### Billing information

Billing Address (if different from Service address)

Attention to (if different than Contact name)

Email address

Phone number

Invoice distribution

- E-mail  
 Mail

Attachment:

- Copy of City Issued Development Permit

I have read the attached Tariff as approved by the BC Utilities Commission and understand and agree to the terms contained in it.

\_\_\_\_\_  
Applicant Authorized Signatory

\_\_\_\_\_  
Print name and Title

\_\_\_\_\_  
Application Date (mm-dd-yyyy)



E-mail this form to: [service@rdenergy.ca](mailto:service@rdenergy.ca)

or mail to:  
Suite 910, 1055 Dunsmuir St  
Vancouver, BC  
V7X 1L3

## River District Energy - Transfer Service Application (TSA)

Service address

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Transfer applicant name (Strata legal name)

Applicant mailing address

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Contact name

Contact e-mail address

Contact phone number

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### Billing information

Billing Address (if different from applicant mailing address)

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Attention to (if different than Contact name)

Email address

Phone number

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Invoice distribution

- E-mail  
 Mail

Transfer effective date (dd-mm-yyyy)\*

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\* Where effective dates are other than the first of the month, initial invoice may be prorated per day

I have read the attached Tariff as approved by the BC Utilities Commission and understand and agree to the terms contained in it.

\_\_\_\_\_  
Applicant Authorized Signatory

\_\_\_\_\_  
Print name and Title

\_\_\_\_\_  
Application Date (mm-dd-yyyy)