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BLATCHFORD RENEWABLE ENERGY

District Energy Sharing System Service
Requirements for Condo Lots
(Townhouses, Apartment Style Buildings and Mixed-Use Buildings)



Edmonton

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Abbreviations:

- DESS: District Energy Sharing System
- DHW: Domestic Hot Water
- DPS: Distribution Piping System
- ETS: Energy Transfer Station
- HDPE: High Density Polyethylene
- RPVC: Rigid Polyvinyl Chloride

1. Installation by the City

A. Service Connections

The City will provide DESS supply and return piping connections and one communications conduit to the property line of each building lot.

- HDPE DR17 DESS supply and return service connections are provided at the property line of each building and are isolated with curb cock shutoff valves on the city side of the property line and with an invert depth of approximately 2.75m below finished grade.
 - Service connections are colored red for DESS supply and blue for DESS return.

B. Thermal Energy Meter

The City will provide the following:

- One 53mm Schedule 40 RPVC conduit to the property line of each block adjacent to the DESS service connections.

2. Installation by the Owners

A. Building Mechanical System - HVAC

Heating

- All heating for conditioned spaces and semi-heated spaces must be provided by an HVAC system that receives all thermal energy from the building's ETS.
 - Exceptions may be permitted on a case-by-case basis for use of electric resistance heaters in certain semi-heated spaces, where hydronic heating is not feasible AND where the total floor area serviced by electric resistance heaters is less than 2% of the building's total conditioned floor area.
- All heating for driveway or sidewalk snow-melt systems must be provided by a hydronic system that receives all thermal energy from the building's ETS.

- All heating systems must be designed to operate with low-temperature heating water or low-temperature heat pump water loop.

Cooling

- All mechanical cooling for conditioned spaces (when provided) must be provided by an HVAC system that rejects all thermal energy to the building's ETS.
- Non-HVAC refrigeration equipment with combined cooling capacity greater than 10 kW (3 nominal tons) must reject their condenser heat to a hydronic loop connected to the ETS.

B. Building Mechanical System - Design Report

The owner's design team is required to provide initial and final design loads for space heating, space cooling, domestic hot water, and any other uses of heating or cooling. This information must be provided by completing and submitting to the City the Building Mechanical System Report, which includes:

1. A design report with the preliminary design loads must be submitted with the preliminary mechanical drawings.
2. Final design loads must be submitted to the City with the final mechanical drawings. The final design report must be signed and sealed by the engineer of record for the building systems.

C. Building Mechanical System - Domestic Hot Water

The design scope for the owner's engineer begins at the wall of the ETS room where the building piping connects to the ETS for domestic hot water (DHW), DHW recirculation, and domestic cold water (DCW).

- The ETS will store and supply DHW to the building DHW distribution system at 60°C. Mixing to prevent scalding should be provided at each floor, suite, or fixture as part of the DHW distribution system by the owner in accordance with the National Plumbing Code.
- DHW recirculation system must be provided to return non-mixed DHW from the building to the ETS for reheating. Return of mixed or tempered water to the ETS is prohibited.

D. Service Connections

The owner is responsible for extending the DESS supply and return piping service lines and the communications conduit from the property line into the ETS room. The owner will be also responsible for the following:

1. Provide a trench from the property line to the DESS service building entry location. Trench bedding and backfill as per City of Edmonton Design and Construction Standards – Volume 4.
 - 1.1. DESS Service entries are to be run below the slab for slab on grade ETS rooms or through the foundation wall for below grade ETS rooms.
 - 1.2. The invert of the service pipe must be a minimum of 2.75 m below finished grade at all points.
2. Extend the HDPE pipe of the DESS service connections from the property line to the building entry location as follows:
 - 2.1. Underground DESS service lines to be DR17 PE4710 HDPE pipe manufactured with coloured stripes co-extruded in the pipe outside surface (red for supply and blue for return).
 - 2.2. The pipe diameter must match the service connection stub diameter. [NOTE: Smaller pipe sizes may be approved by the City during design review based on expected building loads. Larger pipe sizes may be required where the length of the service pipe, the potential demand, or the supply pressure warrant a mandate increase.]
 - 2.3. Confirm curb stop valves are closed. Remove temporary U-bend from existing service connections at the curb stop valve.
 - 2.4. Use an electrofusion coupling or butt fusion machine for all new HDPE fusions. Follow all manufacturer installation instructions.
 - 2.5. Use a single continuous length of pipe where possible to extend the service from the property line to approximately 1.0m inside the building at the service entry location. Pipe penetrations through the foundation wall and ETS room wall are the responsibility of the owner.
 - 2.5.1. Observe minimum bending radius for HDPE pipe or use long radius or three-segment elbows where needed.
 - 2.5.2. Securely cover exposed ends of pipe at the end of every workday. Do not stow or store materials, tools, or accessories inside pipe.
 - 2.6. Flush, sweep, swab, or pig the service connection to ensure dirt, debris, and other materials are removed prior to backfilling. All construction must be carried out in clean and sanitary conditions.
 - 2.6.1. Do not backfill trench until final inspection and signoff by the City.
 - 2.7. Inside the building, provide shutoff valves for isolating the DPS service connection.
 - 2.7.1. Isolation valves to be lug-style, resilient seat butterfly type with stainless steel shaft; bronze or ductile iron chrome plated disc;

- stainless steel shaft; level lock handle operator for valves up to 150mm, heavy duty hand wheel operator for valves 200mm and over. Use DeZURIK model BOS or equivalent approved by the City.
- 2.8. Arrange for final inspection and pressure test witness by the City once flushing is complete and prior to final pressure test and backfill. Notify the City with 72 hours advance notice.
 - 2.9. Conduct a pressure test in the presence of a City representative as follows:
 - 2.9.1. With the curb cocks closed, pressurize pipe with water to 724 kPa (105 psi) and bleed off trapped air.
 - 2.9.2. Initial Expansion: Maintain 724 kPa (105 psi) for 4 hours and add water as needed. Do not measure this volume. Hydrostatic pressure expands pipe.
 - 2.9.3. Begin Test: With a City representative present, reduce pressure to 655 kPa (95 psi). Monitor pressure over 1 hour.
 - 2.9.4. The pipe installation is acceptable if there is no pressure drop over 1 hour.
 3. Extend the DESS services from the building entry location into the ETS room (IF REQUIRED).
 - 3.1. DPS services running through the parkade must be schedule 40 black steel pipe (ASTM A106 Grade B) with flanged, threaded, grooved, or welded joints. Joints and fittings to be designed for operation at a pressure and temperature rating of minimum 1034 kPa at 50 °C.
 - 3.2. Avoid creating high points in the pipe routing which may trap air.
 - 3.2.1. Where a high point is required and approved by the City, provide air vents with isolation ball valves.
 - 3.2.2. Air vents must be 20mm (3/4") threaded with 1034 kPa (150psi) pressure rating and piped to drain. Use APCO Willamette 50 series or equivalent approved by the City.
 - 3.3. All non-buried DESS pipe must be supported in accordance with local codes.
 - 3.4. All non-buried DESS pipe must be insulated and provided with vapour barrier designed to prevent condensation at a DESS operating temperature of 5°C.
 - 3.5. All non-buried DESS pipe passing through unconditioned spaces must be heat traced to prevent freezing.
 - 3.6. Provide isolation valves immediately inside the ETS room. Services must be extended into the ETS room by the owner.
 - 3.6.1. Isolation valves to be lug-style, resilient seat butterfly type with stainless steel shaft; bronze or ductile iron chrome plated disc; stainless steel shaft; lever lock handle operator for valves up to 150mm, heavy duty hand wheel operator for valves 200 mm and over. Use DeZURIK model BOS or equivalent approved by the City.

- 3.7. Slope DESS services at minimum 0.4% towards the street main or ETS room. Where a low point is created and approved by the City, provide a 40mm (1-1/2") blow off drain valve.
- 3.8. Flush each DESS service pipe extension by blowing off water from the DESS mains. Open the DESS supply line curb cock valve at the property line and flush the pipe to drain in the ETS. Close the valve and repeat for the DESS return line flushing to drain.
- 3.9. Arrange for pressure testing and final inspection by the City once flushing is complete.
 - 3.9.1. Notify the City with 72 hours advance notice to arrange for inspection of above grade DESS service pipes once flushing is complete and prior to final pressure test.
- 3.10. Pressure test the full DESS service pipes from the curb cock to the ETS room. Pressure testing of HDPE/steel service piping to be completed as follows:
 - 3.10.1. With the curb cocks closed, pressurize pipe with water to 724 kPa (105 psi) and bleed off trapped air.
 - 3.10.2. Initial Expansion: Maintain 724 kPa (105) psi for 4 hours and add water as needed. Do not measure this volume. Hydrostatic pressure expands HDPE pipe.
 - 3.10.3. Begin Test: Reduce pressure to 655 kPa (95psi). Monitor pressure over 1 hour.
 - 3.10.4. The pipe is acceptable if there is no pressure drop over 1 hour.
4. The owner is responsible for any temporary connections to facilitate flushing and pressure testing.
5. Provide means to prevent water freezing and damaging DESS service lines during construction.

E. Thermal Energy Meter

Metering Network Conduit:

- The owner will extend the metering network conduit from the property line into the ETS room with a pull string. Upon completion, the conduit will be subject to final inspection by a representative of the City and then ownership of the conduit will be transferred to the City.

F. Energy Transfer Station

Energy Transfer Station (ETS) requirements:

- The ETS room must have a 2-hour rated fire separation to the rest of the building. Where ductwork passes through a fire rated wall, a fire damper must be provided.
- Spray-on fiberglass or cellulose insulation is not permitted in the ETS room.
- The owner must provide exhaust and make up air ducts into the ETS room. The ducts must have a minimum free area of 1.25 cm² per m² of ETS floor area (0.18 in² per ft²) and a minimum total free area of 0.02 m² (0.2 ft²).
- Owner to provide one dedicated 208V or 600V, 60 Hz three-phase electrical panel (lockable) reserved for the ETS.
- The owner must provide electrical conduit from the main electrical panel, stubbed out into the ETS mechanical room.
- The ETS room should be located on ground level or on the first below-ground level of the parkade.
- The ETS room should be on an exterior wall and as near as possible to the DPS service connection location.
- The ETS room must have a minimum ceiling height of 2.44 m (8 feet) over at least 90% of the floor area.
- A double access door with dimensions at least 1.83 m x 2.03 m (72"x80") (WxH) opening to the outside or parkade should be provided. For ETS rooms smaller than 17 m², a single access door with dimensions at least 0.91 m x 2.03 m (36" x 80") may be provided.
- For a standard ETS design consisting of DHW and heat pump loop water services, the room must have a minimum interior floor area as per the table below. If the builder requests heating water or chilled water services, additional ETS floor area may be required by the City.

Building Type	# of Units	Minimum Floor Area Requirement	Minimum Wall Length
Condominium Townhouse	<15	12 m ²	3.0 m
	16-30	17 m ²	3.0 m
	30-50	27 m ²	4.5 m
Apartment Style Buildings and Mixed-use Buildings	<30	27 m ²	4.5 m
	30-60	40 m ²	4.5 m
	61-90	55 m ²	4.5 m
	91+	Coordinate with the City	

3. Maintenance by Customers

Customers must maintain and repair building mechanical systems for their premises including but not limited to the following:

- Taking necessary measures to prevent loss of fluid from the building mechanical system,
- Prevent contamination of the fluid within the building mechanical system, and
- Undertaking maintenance of the building mechanical system as per the equipment manufacturer's guidelines.

Customers are also responsible for all expenses, risk and liability for any loss or damage caused by or resulting from the failure of a customer to maintain its building mechanical system in accordance with the equipment manufacturer's guidelines.