APPENDIX 8C

ENERGY

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1. INTERPRETATION

1.1 Definitions

In this Appendix, in addition to the definitions set out in Schedule 1 of this Agreement:

"**Annual Energy Target**" for an Energy Year means the amount determined pursuant to Section 4.2 of this Appendix, as adjusted pursuant to Section 4.3 of this Appendix;

"**Average Unit Cost**" for an Energy Year means the average cost to Project Co or the Authority, as the case may be, of each Gj of Energy purchased by Project Co or the Authority for the New Facility during that Energy Year, calculated in accordance with Section 5.1 of this Appendix;

"**CaGBC Experienced Modellers List**" means the most recent version of the Canada Green Building Council's Experienced Modellers List;

"**Cooling Degree Days**" for a period means the figure obtained or calculated from the Site Weather Data setting out the extent to which the average outdoor temperature during that period at the Site was greater than a mean temperature of +18 degrees Celsius;

"**Core Hours**" means 24 hours per day, 7 days per week;

"**Design and Construction Energy Target**" means 25,240 Gj per year;

"**Energy**" means electrical and thermal energy and gas used within, by or for the Building portion of the New Facility;

"**Energy Analysis Report**" means the report referred to as the "Energy Analysis Report" in Section 6.1 of this Appendix;

"**Energy Consumption**" for a period means the total amount of Energy consumed at the New Facility during that period, expressed in Gj as reflected by the readings for the metered utilities and as calibrated by the Independent Energy Consultant;

"**Energy Dashboard**" means a password-protected web-accessible tool that can display real time (with up to 2 days lag time) energy consumption and weather data for a range of time increments (including hourly, daily, monthly and yearly) and broken down by energy type (electrical, thermal and gas at a minimum) and major end uses (exterior lighting, interior lighting, HVAC including heating, cooling, energy recovery, fans and pumps, domestic hot water generation, plug/receptacle loads, and vertical transportation at minimum) with comparison to the Annual Energy Target;

"**Energy Gainshare**" means the amount calculated in accordance with Section 5.2 of this Appendix;

"**Energy Management Tool**" means an interactive energy management tool that allows tracking and assessment of facility energy and water consumption in a secure online environment;

"**Energy Model**" means an hourly energy simulation produced using whole building energy modelling software;

"**Energy Monitoring Model**" means a tool or combination of tools (such as an Energy Model and a spreadsheet tool) designed to enable transparent adjustment of energy consumption data to reflect changes in weather, occupancy patterns, and other variables affecting energy consumption as set out in Section 4.1 of this Appendix;

"**Energy Painshare**" means the amount calculated in accordance with Section 5.3 of this Appendix;

"**Energy Utility**" means each different type of energy that is purchased or produced for use in the New Facility (and may include electricity from the City of Kamloops electrical utility, and natural gas from FortisBC);

"**Energy Year**" means:

(a) the 12 month period beginning on the day after the Monitoring Period;

(b) each subsequent period of 12 months during the Term; and

(c) the period of less than 12 months from the end of the previous Energy Year to the Termination Date;

"**Environmental Credit**" means any income, credit, right, benefit or advantage relating to environmental matters including type and level of emissions, means of production of Energy, input sources and compliance with any environmental laws, regulations, rules or orders;

"**Facility Operation Variances**" means any material variances between the actual occupancy and usage of the New Facility and the assumptions for occupancy and usage set out in the Design and Construction Specifications, the Reviewed Drawings and Specifications and the Proposal Extracts (Design and Construction) regarding the occupancy and usage of the New Facility;

"**Gigajoule**" or "**Gj**" means the international unit of energy being 1,000,000,000 Joules;

"**Heating Degree Days**" for a period means the figure obtained or calculated from the Site Weather Data setting out the extent to which the average outdoor temperature during that period at the Site was less than a mean temperature of +18 degrees Celsius;

"**Independent Energy Consultant**" means one or more individuals who are listed on the CaGBC Experienced Modellers List or an energy modeller that is Building Energy Modeling Professional (BEMP) certified and are engaged to complete the adjustments to the energy target, as described in Section 3.3 of this Appendix, to prepare an Energy Monitoring Model during the Monitoring Period, as described in Section 4.1 of this Appendix, and, if required, to determine whether and to what extent the Annual Energy Target should be adjusted to reflect the effect of non-compliance with the Energy Management Plan, as described in Section 4.3 of this Appendix;

"**Monitoring Period**" means the period commencing on the Service Commencement Date and ending on the last day of the calendar month in which the second anniversary of the Service Commencement Date occurs;

"**Non-Targeted Energy Consumption**" means Energy consumed by the New Facility for medical lighting, ice melting systems for the heliport and parkade ramp, domestic hot water generation, and areas of the Other Site Facilities and CSB served from the New Facility plant including MDR ventilation and PARR renovation;

"**Site Weather Data**" means the weather data for the location most applicable to this site (Kamloops Airport) obtained from (or calculated based on) Environment Canada's "National Climate Data and Information Archive";

"**Targeted Energy Consumption**" means Energy consumed by the New Facility for hard wired lighting, exterior lighting, heating, cooling, humidification, HVAC fans, and HVAC pumps minus Non-Targeted Energy Consumption, such consumption to be calculated from the applicable BMS and metering systems;

"**Test Period**" means the 12 month period commencing on the first day of the first complete calendar month that is at least 6 months but not more than 12 months after the Service Commencement Date, unless otherwise agreed by the Authority; and

"**Weather Data**" means the data obtained from Environment Canada's "National Climate Data and Information Archive" including daily mean, minimum and maximum temperatures.

1.2 Application of this Appendix

For clarity, the provisions of this Appendix will not apply to the CSB, notwithstanding that the CSB is deemed to be part of the New Facility for the purposes of the Services.

2. ENERGY SUPPLY AND CONSUMPTION

2.1 Energy Supply and Payment

During the Construction Period, Project Co will be responsible for the supply and delivery of electricity, natural gas and any other energy source as required for the Construction. Project Co will ensure that arrangements have been made with the Authority (and at the Authority's expense) for the filling of all diesel fuel oil tanks prior to Service Commencement.

The Authority will from time to time as required enter into contracts with Energy suppliers for the supply of Energy to the New Facility, and will be responsible for all payments related to such contracts. Without limiting Project Co's obligations in Appendix 4G [Utility Management Services], Project Co will administer such contracts, including dealing with suppliers to resolve issues from time to time, and will provide such other reasonable assistance related to such contracts as may be requested by the Authority.

2.2 Energy Incentive Programs

Project Co will, on behalf of the Authority, apply to the City of Kamloops electrical utility (and any other applicable energy incentive programs) and take all reasonable steps to obtain for the Authority the maximum benefits (funding, incentives and cost savings) offered by the City of Kamloops electrical utility and FortisBC under such program(s). Any such benefit obtained under an energy incentive program will be shared equally by the Authority and Project Co.

Without limitation, Project Co will:

(a) meet with the City of Kamloops electrical utility, the Authority's Energy Manager, and FortisBC (if necessary) at an early stage of the design of the New Facility;

(b) within 30 Business Days of the Effective Date, prepare and deliver to the City of Kamloops electrical utility and the Authority the proposal required by City of Kamloops electrical utility for the energy studies and building Energy Model described in Section 2.2(c) of this Appendix 8C;

(c) within no more than 30 Business Days of acceptance of the proposal by City of Kamloops electrical utility, carry out any required energy studies and prepare and deliver to the Authority and the City of Kamloops electrical utility a building Energy Model (developed in accordance ASHRAE Standard 90.1, 2010, Appendix G, or applicable codes at the time of application to the City of Kamloops electrical utility) to establish baseline energy use for the purpose of measuring electrical and natural gas savings achieved through the program;

(d) collaborate with the City of Kamloops electrical utility and FortisBC to identify potential improvements to the New Facility design that will achieve greater energy efficiency;

(e) revise the New Facility design as required to improve energy efficiency (to the extent possible without materially changing the Design and Construction Specifications or the intent of the Proposal Extracts (Design and Construction)), and use all reasonable efforts to obtain for the Authority the maximum funding or incentives offered by the City of Kamloops electrical utility and FortisBC and minimize the Authority's energy costs during the Operating Period; and

(f) provide to the Authority all invoices and other documentation reasonably required by the Authority to complete an incentive agreement with City of Kamloops electrical utility and for the Authority to receive incentive funds within the time frame agreed to in the incentive agreement.

2.3 Recording and Monitoring of Weather Data and Energy Consumption

Project Co will:

(a) install equipment to record and monitor consumption of each type of Energy in the New Facility. Such equipment must be suitable and properly calibrated to enable a detailed monitoring of Energy trends and consumption to allow analysis of the data collected to enable various matters, including:

(1) comparisons to be made with the declared energy targets;

(2) early warning of malfunctions and deviations from norms;

(3) provide an Energy Dashboard to the Authority; and

(4) energy end uses to be monitored and reported shall include: exterior lighting, interior lighting, heating, cooling, humidification, heat/energy recovery, HVAC fans, HVAC pumps, domestic hot water generation, plug/receptacle loads, and vertical transportation; and

(b) secure all such properly recorded information so that it is not lost or degraded as a result of any equipment or service malfunctions, and will secure such information from any adjustment, modification or loss from any source.

2.4 Energy Consumption Certificate

Promptly after the end of each month following the Service Commencement Date, Project Co will deliver to the Authority a certificate showing for the New Facility:

(a) the Energy Consumption for that month with respect to:

(1) Energy Consumption;

(2) Targeted Energy Consumption; and

(3) Non-Targeted Energy Consumption;

(b) the peak demand date and hour;

(c) the Weather Data for that month, including the number of Cooling Degree Days and Heating Degree Days;

(d) a complete set of data as required for monthly uploads to the Energy Management Tool;

(e) a record of the latest Energy Management Tool energy performance score (out of 100)

(f) building occupancy; and

(g) any other variable that affects the Energy Consumption relative to the energy model assumptions set out in Attachment 1 to this Appendix.

3. DESIGN AND CONSTRUCTION ENERGY GUARANTEE

3.1 New Facility to Meet or Beat Design and Construction Energy Target

Project Co warrants to the Authority that the New Facility will be designed and constructed so that the Targeted Energy Consumption per year will not exceed the Design and Construction Energy Target. The consequences to Project Co for breach of this warranty are limited to those set out in Section 3.4 of this Appendix.

3.2 Monitoring of Energy Consumption

During the Monitoring Period and the Test Period, Project Co will monitor Energy Consumption in order to determine the Energy Consumption and the Targeted Energy Consumption for the Monitoring Period and the Test Period and will provide all information about Energy Consumption to the Authority for the Authority's review.

3.3 Adjustment to Energy Consumption

At Service Commencement, Project Co will engage an Independent Energy Consultant acceptable to the Authority, acting reasonably, to determine whether and to what extent the Energy Consumption for the Test Period should be adjusted based on factors which, in the energy consultant's professional opinion, are applicable, including actual climate conditions, occupancy, equipment use and Authority controlled effects during the Test Period, and differ from the factors taken into account in the energy model assumptions set out in Attachment 1 to this Appendix and the Energy Model design temperatures and occupancy numbers referenced in Schedule 3 section 7.6.1.2. The parties acknowledge that assumptions are based on the operation of the New Facility within normal operating parameters expected for the Test Period and for the long-term continued operation of the New Facility after the Test Period.

A more detailed methodology for this adjustment will be developed to the satisfaction of the Authority, Project Co and the Independent Energy Consultant and may use the energy model used to develop the Design and Construction Energy Target and/or another analytical tool. The detailed methodology will include a simplified summary of inputs, assumptions, and changes reasonably required by each party for purposes of clearly explaining the adjustments.

Each of Project Co and the Authority will pay half of the fees and costs of the Independent Energy Consultant.

3.4 Failure to Achieve Design and Construction Energy Target

If the Targeted Energy Consumption in the Test Period (as may be adjusted pursuant to Section 3.3 of this Appendix) exceeds the Design and Construction Energy Target, then Project Co will do one of the following:

(a) modify the New Facility as required so that annual Targeted Energy Consumption does not exceed the Design and Construction Energy Target, subject to compliance with the Design and Construction Specifications and the approval of such modifications by the Authority, not to be unreasonably withheld or delayed; or

(b) if the New Facility has not been modified as required by (a) above within 12 months after the Test Period, pay to the Authority a lump sum amount that the Authority agrees, acting reasonably, represents the lesser of $8,200,000 and the net present value of the cost to the Authority during the expected life of the New Facility of the amount by which Targeted Energy Consumption will exceed the Design and Construction Energy Target, on the assumption that the excess in the Monitoring Period will continue for the balance of the expected life of the New Facility, and if this Section 3.4(b) is applied the provisions of Schedule 9 [Compensation on Termination] will be amended as necessary to ensure that the Authority will not, as a consequence of the application of this Section 3.4(b), face any additional liability upon early termination of this Agreement.

4. ANNUAL ENERGY TARGETS

4.1 Energy Monitoring Model

During the Monitoring Period, Project Co will engage an Independent Energy Consultant to prepare for the Authority's review and approval, not to be unreasonably withheld or delayed, a model (the "**Energy Monitoring Model**") that is able from time to time to be updated to determine:

(a) the expected annual Energy Consumption and Targeted Energy Consumption for the ensuing 5 year period based on a pre-determined set of inputs (including actual temperatures and consumption):

(1) for the first 5 year period after the Monitoring Period, the Monitoring Period; and

(2) for each subsequent 5 year period, the immediately preceding 5 year period; and

(b) the effect on annual Targeted Energy Consumption if actual annual average temperatures and the number of Cooling Degree Days and Heating Degree Days are higher or lower than during the previous year.

4.2 Annual Energy Target

The Annual Energy Target for the Energy Years after the Monitoring Period will be the expected annual Targeted Energy Consumption determined as follows:

(a) for the first five years after the Monitoring Period, the expected annual Targeted Energy Consumption will be as determined by the Energy Monitoring Model at the end of the Monitoring Period;

(b) at the end of each five Energy Year period after the Monitoring Period, Project Co will update the Energy Monitoring Model using the Weather Data and other applicable data that has been approved by the Authority from such five year period; and

(c) for each of the five Energy Years after the Energy Monitoring Model is updated the expected annual Targeted Energy Consumption will be as determined by the updated Energy Monitoring Model, as adjusted pursuant to Section 4.3.

4.3 Adjustment to Annual Energy Target

The Annual Energy Target for that Energy Year will be adjusted to reflect the Weather Data and Core Hours within that year. The methodology for adjusting the Annual Energy Target will be agreed upon by Project Co, the Authority, and the Independent Energy Consultant at the end of the Monitoring Period. The pre-determined process will involve updating specific inputs (including Weather Data and Core Hours) in the Energy Monitoring Model.

In addition, the parties will monitor compliance with the Energy Management Plan referred to in Section 4.6 of Schedule 4 [Services Protocols and Specifications] at each meeting of the Operating Period Joint Committee. Where either Project Co or the Authority does not comply with the Energy Management Plan, then the Annual Energy Target will be adjusted by an appropriate amount to reflect the effect of non-compliance. Where the parties are unable to agree on the appropriate amount of such adjustment, Project Co will engage an Independent Energy Consultant acceptable to Project Co and the Authority, acting reasonably, to determine, within 2 months after such engagement, whether and to what extent the Annual Energy Target should be adjusted.

5. SHARING GAIN AND PAIN

The Authority may, at any time during the Contract, elect to develop a revised mechanism for sharing gain and pain, acceptable to Project Co, to facilitate a streamlined approach to energy management and to foster an effective partnership between the Authority and Project Co. Project Co is encouraged to

submit a proposal to the Authority for any modification that would achieve the goal of minimizing energy consumption and the Authority's overall energy costs at the New Facility and the RIH Campus in accordance with Section 4 (Innovation Proposals) of Schedule 6 [Changes, Minor Works and Innovation Proposals].

5.1 Average Unit Cost

The Average Unit Cost for an Energy Year will be the amount obtained by dividing:

(a) all amounts paid or payable by Project Co or the Authority in respect of the supply of the Energy in that Energy Year for the Energy Consumption; by

(b) the Energy Consumption for that Energy Year.

5.2 Energy Gainshare

The Energy Gainshare for an Energy Year will be the lesser of:

(a) 50% of the product of:

(1) the amount, if any, by which the Targeted Energy Consumption in that Energy Year is less than 97% of the Annual Energy Target for that Energy Year; and

(2) the Average Unit Cost for that Energy Year; and

(b) $100,000.

5.3 Energy Painshare

The Energy Painshare for an Energy Year will be the lesser of:

(a) 50% of the product of:

(1) the amount, if any, by which the Targeted Energy Consumption in that Energy Year is greater than 103% of the Annual Energy Target for that Energy Year; and

(2) the Average Unit Cost for that Energy Year; and

(b) $100,000.

5.4 Calculation and Invoicing

Project Co will submit to the Authority for each Energy Year, Project Co's calculation of the Average Unit Cost and Energy Gainshare or Energy Painshare as soon as practicable, and in any event within 20 Business Days after the receipt of the last invoice containing information on all Energy use during that Energy Year. Any unresolved dispute about such calculations will be resolved in accordance with the Dispute Resolution Procedure.

6. CONTENT AND FORMAT OF THE ENERGY ANALYSIS REPORT

6.1 Energy Analysis Report

The Energy Analysis Report will present findings of actual consumption for each separate Energy Utility for the relevant Contract Year. The parties will agree upon the exact form of the Energy Analysis Report from time to time but as a minimum the Energy Analysis Report will include the following.

(a) For each Payment Period (within 10 Business Days of the end of the Payment Period):

(1) the Targeted Energy Consumption in Gj and the Targeted Energy Consumption in Gj for each Energy Utility and each major end use in that month (including lighting, heating, cooling, pumps, and fans, or a more detailed end use breakdown);

(2) the Non-Targeted Energy Consumption in Gj for each type of Energy in that month;

(3) the consumption data for all other Utilities;

(4) Weather Data for that month;

(5) a record of the latest period Energy Management Tool energy performance score (out of 100);

(6) a complete set of data as required for monthly uploads to the Energy Management Tool;

(7) Facility Operation Variances including:

(A) Facility/Service Changes; and

(B) major infrastructure or system maintenance or downtime; and

(8) any other variable that affects the Targeted Energy Consumption relative to the energy model assumptions.

(b) For each Contract Year (within 20 Business Days after the receipt of the last invoice containing information on all Energy use during that Contract Year):

(1) all of the items reported for each Payment Period in Section 6.1(a), but for the Contract Year;

(2) a record of the annual Energy Management Tool energy performance score (out of 100)

(3) a calculation showing Energy Painshare or Energy Gainshare (if applicable); and

(4) a revised Energy Monitoring Model showing the Annual Energy Target for the upcoming Contract Year.

7. ENVIRONMENTAL CREDITS

7.1 Entitlement to Environmental Credits

The Authority will be entitled to any and all Environmental Credits related to the New Facility and its operation and Project Co will use commercially reasonable efforts to assist the Authority in achieving the maximum Environmental Credits available.

ATTACHMENT 1

ENERGY MODEL ASSUMPTIONS

Project Co will use the following energy model assumptions to determine the Design and Construction Energy Target:

(a) model the building for LEED Canada NC 2009 EAp2 and EAc1 compliance using either the ASHRAE/IENSA 90.1-2007 or the MNECB compliance path;

(b) the Reference Case is the code baseline model to which the Proposed Case energy model will be compared;

(c) identify the energy consumption by fuel type, i.e., electricity, thermal (steam or hot water), fuel oil, on-site renewable;

(d) include a table of all assumptions and values utilized in both the Reference Case and Proposed Case energy models;

(e) modelling parameters for the Reference Case and Proposed Case will be in accordance with ASHRAE 90.1-2007 or MNECB compliance rules and requirements (depending on the compliance path chosen); and

(f) to ensure comparable simulations, use the following table to determine operating parameters for the various spaces.

Modelling Assumptions

Lighting	Determine lighting space functions for the Reference Case in accordance with ASHRAE 90.1-2007 or the MNECB, depending on the compliance path chosen.
Task Lighting	Considered as part of plug loads. Include all permanently installed fixtures in the Proposed Case lighting power.
Ventilation Rates	Determine in accordance with ASHRAE 62-2001 and CSA Z317.2-10. Use the more stringent requirement for each space type. Design outside air ventilation rates in the Reference Case and Proposed Case model shall be identical. Minimum supply air rates shall be identical in the Reference Case and Proposed Case, for spaces that fall under CSA Z317.2 requirements.
Infiltration	Assume an infiltration rate of 0.6 cfm/ft2 (@ 0.3 in. w.c.) of exterior above grade envelope surface area, which should be modelled as 0.067 cfm/ft2 of building envelope area. Air leakage by infiltration shall be modelled at 100% when the building fan system is off, and at 25% when the building fan system is on.
Elevators	As per the proposed design.
Server Room Loads	Server room loads shall modelled at 61 kW operating continuously.
Parkade	Fan power based upon design. Assume 4 hours daily exhaust fan operation controlled by CO sensors. Lighting is to be continuously available and consumption may be reduced by proposed application of appropriate occupancy controls.

Thermal Process Loads	Model kitchen and server loads as follows: Kitchen Process Electrical Load: 1.4 W/ft2 Servery Process Electrical Load: 0.42 W/ft2 Kitchen Process Gas Load: 23.2 btu/h/ft2 Servery Process Gas Load: 3.5 btu/h/ft2

Scheduled Space	**Peak Occupancy**	**Operating Schedule** As per MNECB Performance Compliance for Buildings Table 4.3.2.C	**Equipment Power (Plug Load), Service Water Heating** As per MNECB Performance Compliance for Buildings Table 4.3.2.B
Patient Clinical Areas	20 m^2 per person	Operating Schedule H	Health / Institutional: Patient Rooms
Nurses' Stations	10 m^2 per person	Operating Schedule H	Health / Institutional: Nurse Station
Waiting Rooms & Lounges	10 m^2 per person	Operating Schedule B	Assembly: Recreation / Lounge
Utility Rooms	0	(Note 1)	Storage / Warehouse: Active Storage, Fine
Electrical / Mechanical Rooms	0	(Note 1)	Service and Common: Mechanical / electrical room
Corridors	100 m^2 per person	(Note 1)	Service and Common: Corridors
Offices, & Admin. Areas	20 m^2 per person	Operating Schedule C	Office: Category 1 (Enclosed offices)
Meeting & Conference Rooms	5 m^2 per person	Operating Schedule C	Assembly: Lobby
Other Public Spaces, including Atria, Reception and Lobbies	10 m^2 per person	Operating Schedule C	Assembly: Lobby
Laboratory spaces	20 m^2 per person	Operating Schedule H	Health/Institutional: Laboratory
Exam, therapy rooms	10 m^2 per person	Operating Schedule C	Health/Institutional: Dental Suite/Exam
Lecture theatres & Videoconference Rooms	7.5 m^2 per person	Operating Schedule C	Education: Classroom
Other	All other space types not identified shall have occupancy, schedules, plug loads and service water loads determined in accordance with MNECB Performance Compliance for Buildings Table 4.3.2B and 4.3.2C.		

Note 1: Operating Schedule to be the same as the adjacent area in the most similar thermal zone.