

The specifications and drawings for

Daniel J. MacDonald Modernization

are amended as follows:

SPECIFICATIONS

1.1 REVISED SPECIFICATIONS

- .1 The following revised specifications issued with this addendum supersede previously issued specifications of the same title and number
 - .1 Section No. 00 01 10_R3, Table of Contents
 - .2 Section No. 23 07 19_R1, HVAC Piping Insulation
 - .3 Section No. 25 90 01_CS402_R1, Domestic Hot Water System
 - .4 Section No. 25 90 01_CS402_R1, Domestic Hot Water System – Control Points List

1.2 NEW SPECIFICATIONS

- .1 Add the following new specifications issued with this Addendum.
 - .1 Section No. 25 90 01_CS910, Miscellaneous Equipment
 - .2 Section No. 25 90 01_CS910, Miscellaneous Equipment – Control Points List
 - .3 Section No. 25 90 01_CS912, Lighting System
 - .4 Section No. 25 90 01_CS912, Lighting System – Control Points List
 - .5 Section No. 26 09 13, Power Monitoring

DRAWINGS

1.3 REVISED DRAWINGS

- .1 The following Drawings are revised and re-issued with this addendum. Revisions are shown in bubbled areas on drawings. The following descriptions of revisions are for convenience only and do not define or limit the extent of actual revisions indicated on drawings:
 - .1 Drawing M60-03 - PARKING LEVEL PART PLAN MECHANICAL ROOM HVAC PIPING
 - .1 Add valve V5.

- .2 Drawing M73-01 - HYDRONIC HEATING & COOLING SCHEMATIC
 - .1 Add valve V5 and control points.

End of NORR Addendum No. 3

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	26 52 13.13 Emergency Lighting	E	27 May 2022	3
	26 52 13.16 Exit Signs	E	27 May 2022	2
DIVISION 27	COMMUNICATIONS			
	27 05 00 Common Work Results for Communications	E	27 May 2022	9
	27 51 19 Sound Masking System	E	27 May 2022	8
DIVISION 28	ELECTRONIC SAFETY AND SECURITY			
	28 10 00 Access Control, Intrusion Detection and Video Surveillance Systems	E	27 May 2022	32
	28 31 00.02 Multiplex Fire Alarm and Voice Communication Systems	E	27 May 2022	14
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	31 00 00 Earthwork	C	27 May 2022	8

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DIVISION 32	EXTERIOR IMPROVEMENTS			
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	32 01 90.33 - Tree and Shrub Preservation	L	27 May 2022	4
	32 12 16 Asphalt Paving	C	27 May 2022	4
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APPENDIX 1	DESIGNATED SUBSTANCES AND HAZARDOUS BUILDING MATERIALS			
	Hazardous Materials Assessment Report, prepared by All-Tech Environmental Services Limited	Info	04 Jan 2021	68
	Data Gap Analysis & Intrusive Asbestos Survey, prepared by Englobe	Info	28 Jun 2019	37
	DRAFT - Identification, Quantification and Abatement Estimates for Asbestos-Containing Materials - Letter, prepared by Englobe	Info	22 Mar 2019	4
	Halocarbon Standard Operating Procedure, prepared by MCW Maricor	Info	Oct 2012	50
APPENDIX 2	BUILDING CONDITION REPORTS			
	Building Condition Report 2017	Info	26 Apr 2017	103
APPENDIX 3	GEOTECHNICAL INVESTIGATION			
	EastTech Geotechnical Report - Daniel J. MacDonald Building Charlottetown, PEI, prepared by EastTech Engineering Consultants Inc.	Info	21 May 2020	18
	Charlottetown - DJM Building Phase II Soil Investigation, prepared by Jacques, Whitford & Associated Ltd.	Info	15 Aug 1980	25

LEGEND TO DOCUMENTS RESPONSIBILITY

.1 A - Denotes documents prepared by Architect.

- .2 HS – Denotes documents prepared by Health & Safety Advisor, PSPC Human Resources Branch, Construction & Maintenance.
- .3 SC - Denotes documents prepared by Sustainability Consultant.
- .4 Cx – Denotes documents prepared by Commissioning Agent.
- .5 Env - Denotes documents prepared by PSPC Environmental Group.
- .6 S - Denotes documents prepared by Structural Engineer.
- .7 H - Denotes documents prepared by Architectural Hardware Consultant.
- .8 AV - Denotes documents prepared by Audio Visual Consultant
- .9 M - Denotes documents prepared by Mechanical Engineer.
- .10 E - Denotes documents prepared by Electrical Engineer.
- .11 C – Denotes documents prepared by Civil Engineer
- .12 L - Landscape documents prepared by PSPC
- .13 Info - Denotes Information Documents prepared by various entities.

END OF SECTION

Part 1 General**1.1 REFERENCE STANDARDS**

- .1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
 - .1 ASHRAE Standard 90.1-01, Energy Standard for Buildings Except Low-Rise Residential Buildings (IESNA co-sponsored; ANSI approved; Continuous Maintenance Standard).
- .2 ASTM International (ASTM)
 - .1 ASTM B209/B209M-21a, Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate.
 - .2 ASTM C335/C335M-17, Standard Test Method for Steady State Heat Transfer Properties of Pipe Insulation.
 - .3 ASTM C411-19, Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.
 - .4 ASTM C449-07(2019), Standard Specification for Mineral Fiber-Hydraulic-Setting Thermal Insulating and Finishing Cement.
 - .5 ASTM C533-17, Standard Specification for Calcium Silicate Block and Block and Pipe Thermal Insulation.
 - .6 ASTM C547-19, Standard Specification for Mineral Fiber Pipe Insulation.
 - .7 ASTM C795-08(2013), Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.
 - .8 ASTM C921-10, Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.
- .3 Canadian General Standards Board (CGSB)
 - .1 CGSB 51-GP-52Ma-89, Vapour Barrier, Jacket and Facing Material for Pipe, Duct and Equipment Thermal Insulation.
 - .2 CAN/CGSB-51.53-95, Poly (Vinyl Chloride) Jacketing Sheet, for Insulated Pipes, Vessels and Round Ducts
- .4 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Assessment Act (CEAA), 2012, c.19, s. 52.
 - .2 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
 - .3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.
- .5 Health Canada/Workplace Hazardous Materials Information System 2015 (WHMIS)
 - .1 Safety Data Sheets (SDS).
- .6 Manufacturer's Trade Associations
 - .1 Thermal Insulation Association of Canada (TIAC): National Insulation Standards (Revised 2004).

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- .7 GB Initiative Canada:
 - .1 GREEN GLOBES Canada Design for New Construction and Major Retrofits v.2, <http://www.greenglobes.com>
- .8 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102-18, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
 - .2 CAN/ULC-S701-17, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
 - .3 CAN/ULC-S702-2014, Standard for Mineral Fibre Thermal Insulation for Buildings
 - .4 CAN/ULC-S702.2-10, Standard for Mineral Fibre Thermal Insulation for Buildings Part 2: Installation

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures. Include product characteristics, performance criteria, and limitations.
 - .1 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Safety Data Sheets (SDS) in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .4 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures
 - .2 Submit for approval: complete assembly of each type of insulation system, insulation, coating, and adhesive proposed. Mount sample on 12 mm plywood board. Affix label beneath sample indicating service.
- .5 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .2 Instructions: submit manufacturer's installation instructions.
 - .1 Departmental Representative will make available 1 copy of systems supplier's installation instructions.
- .6 Sustainable Design Submittals:
 - .1 Adhere to the requirements of the Construction Waste Management plan as per Section 01 74 19 Construction Waste Management and Disposal.

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- .2 Provide the following documentation in accordance with Section 01 47 15 Sustainable Requirements: Construction:
 - .1 Environmental Product Declarations (EPDs): where available for products in this section provide compliant EPDs as per Section 01 47 15 Sustainable Requirements: Construction.
 - .1 Provide cost of materials excluding on-site labour and equipment.
 - .2 Low-emitting materials: Insulation
 - .1 Submit 3rd-party testing documentation for that clearly identifies the TVOC emissions for compliance with Green Globes. (e.g.: SCS Indoor Advantage Gold, Greenguard Gold, or the Collaborative for High Performance Schools (CHPS.)

1.3 QUALITY ASSURANCE

- .1 Qualifications:
- .2 Installer: specialist in performing work of this Section, and have at least 3 years successful experience in this size and type of project, qualified to standards/member of TIAC.
- .3 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle in accordance with manufacturer's written instructions and Section 01 61 00 - Common Product Requirements.
 - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
 - .3 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .2 Storage and Protection:
 - .1 Protect from weather, construction traffic.
 - .2 Protect against damage.
 - .3 Store at temperatures and conditions required by manufacturer.
- .3 Waste Management and Disposal: adhere to the requirements of the Construction Waste Management plan as per Section 01 74 19 Construction Waste Management and Disposal.

~~27 May~~ **07 Jul** 2022**Part 2 Products****2.1 SUSTAINABLE REQUIREMENTS**

- .1 Materials and products in accordance with Section 01 47 15 - Sustainable Requirements: Construction.

2.2 FIRE AND SMOKE RATING

- .1 In accordance with CAN/ULC-S102
 - .1 Maximum flame spread rating: 25.
 - .2 Maximum smoke developed rating: 50.

2.3 INSULATION

- .1 Mineral fibre specified includes glass fibre, rock wool, slag wool.
- .2 Thermal conductivity ("k" factor) not to exceed specified values at 24 degrees C mean temperature when tested in accordance with ASTM C335
- .3 TIAC Code A-1: rigid moulded mineral fibre without factory applied vapour retarder jacket.
 - .1 Mineral fibre: to CAN/ULC-S702, ASTM C547.
 - .2 Maximum "k" factor: to CAN/ULC-S702
- .4 TIAC Code A-3: rigid moulded mineral fibre with factory applied vapour retarder jacket.
 - .1 Mineral fibre: to CAN/ULC-S702, ASTM C547.
 - .2 Jacket: to CGSB 51-GP-52 Ma
 - .3 Maximum "k" factor: to CAN/ULC-S702, ASTM C547.
- .5 TIAC Code C-2: mineral fibre blanket faced with factory applied vapour retarder jacket (as scheduled in PART 3 of this section).
 - .1 Mineral fibre: to CAN/ULC-S702, ASTM C547.
 - .2 Jacket: to CGSB 51-GP-52 Ma
 - .3 Maximum "k" factor: to CAN/ULC-S702, ASTM C547.
- .6 TIAC Code A-6: flexible unicellular tubular elastomer
 - .1 Insulation: with vapour retarder jacket.
 - .2 Jacket: to CGSB 51-GP-52 Ma
 - .3 Maximum "k" factor: as per code requirements
 - .4 Certified by manufacturer: free of potential stress corrosion cracking corrodants.
- .7 TIAC Code A-2: rigid moulded calcium silicate in sections and blocks, and with special shapes to suit project requirements
 - .1 Insulation: to ASTM C533
 - .2 Maximum "k" factor: as per code requirements
 - .3 Design to permit periodic removal and re-installation.

~~27 May~~ **07 Jul** 2022**2.4 INSULATION SECUREMENT**

- .1 Tape: self-adhesive, aluminum, plain/ reinforced, 50 mm wide minimum.
- .2 Contact adhesive: quick setting.
- .3 Canvas adhesive: washable.
- .4 Tie wire: 1.5 mm diameter stainless steel.
- .5 Bands: stainless steel, 19mm wide, 0.5 mm thick.

2.5 CEMENT

- .1 Thermal insulating and finishing cement:
 - .1 Air drying on mineral wool, to ASTM C449/C449M

2.6 VAPOUR RETARDER LAP ADHESIVE

- .1 Water based, fire retardant type, compatible with insulation.

2.7 INDOOR VAPOUR RETARDER FINISH

- .1 Vinyl emulsion type acrylic, compatible with insulation.

2.8 OUTDOOR VAPOUR RETARDER FINISH

- .1 Vinyl emulsion type acrylic, compatible with insulation.
- .2 Reinforcing fabric: fibrous glass, untreated 305 g/m².

2.9 JACKETS

- .1 Polyvinyl Chloride (PVC):
 - .1 One-piece moulded type and sheet to CAN/CGSB-51.53 with pre-formed shapes as required
 - .2 Colours: to match adjacent finish paint by Departmental Representative.
 - .3 Minimum service temperatures: -20 degrees C.
 - .4 Maximum service temperature: 65 degrees C.
 - .5 Moisture vapour transmission: 0.02 perm.
 - .6 Thickness: as per code requirements
 - .7 Fastenings:
 - .1 Use solvent weld adhesive compatible with insulation to seal laps and joints.
 - .2 Tacks.
 - .3 Pressure sensitive vinyl tape of matching colour.
 - .8 Special requirements:
 - .1 Indoor: as per code requirements
 - .2 Outdoor: UV rated material at least 0.5 mm thick.
- .2 ABS Plastic:
 - .1 One-piece moulded type and sheet with pre-formed shapes as required.

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- .2 Colours: to match adjacent finish paint by Departmental Representative.
- .3 Minimum service temperatures: -40 degrees C.
- .4 Maximum service temperature: 82 degrees C.
- .5 Moisture vapour transmission: 0.012 perm.
- .6 Thickness: 0.75 mm.
- .7 Fastenings:
 - .1 Solvent weld adhesive compatible with insulation to seal laps and joints.
 - .2 Tacks.
 - .3 Pressure sensitive vinyl tape of matching colour.
- .8 Locations:
 - .1 For outdoor use ONLY.
- .3 Canvas:
 - .1 220 and 120 gm/m² cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C921
 - .2 Lagging adhesive: compatible with insulation.
- .4 Aluminum:
 - .1 To ASTM B209
 - .2 Thickness: 0.50 mm sheet.
 - .3 Finish: smooth
 - .4 Joining: longitudinal and circumferential slip joints with 50 mm laps.
 - .5 Fittings: 0.5 mm thick die-shaped fitting covers with factory-attached protective liner.
 - .6 Metal jacket banding and mechanical seals: stainless steel, 19 mm wide, 0.5mm thick at 300 mm spacing.
- .5 Stainless steel:
 - .1 Type: 316.
 - .2 Thickness: 0.25 mm.
 - .3 Finish: smooth
 - .4 Joining: longitudinal and circumferential slip joints with 50 mm laps.
 - .5 Fittings: 0.5 mm thick die-shaped fitting covers with factory-attached protective liner.
 - .6 Metal jacket banding and mechanical seals: stainless steel, 19 mm wide, 0.5mm thick at 300 mm spacing.

2.10 WEATHERPROOF CAULKING FOR JACKETS INSTALLED OUTDOORS

- .1 Caulking to: Section 07 92 00 - Joint Sealants.

2.11 REMOVABLE, PRE-FABRICATED, INSULATION AND ENCLOSURES

- .1 Design: to permit movement of expansion joint and to permit periodic removal and replacement without damage to adjacent insulation.

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- .2 Insulation, fastenings and finishes: same as system.
- .3 Jacket: aluminum, PVC , high temperature fabric.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 PRE-INSTALLATION REQUIREMENT

- .1 Pressure testing of piping systems and adjacent equipment to be complete, witnessed and certified.
- .2 Surfaces clean, dry, free from foreign material.

3.3 INSTALLATION

- .1 Install in accordance with TIAC National Standards
- .2 Apply materials in accordance with manufacturers instructions and this specification.
- .3 Use two layers with staggered joints when required nominal wall thickness exceeds 75 mm.
- .4 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.
 - .1 Install hangers, supports outside vapour retarder jacket.
- .5 Supports, Hangers:
 - .1 Apply high compressive strength insulation, suitable for service, at oversized saddles and shoes where insulation saddles have not been provided.

3.4 REMOVABLE, PRE-FABRICATED, INSULATION AND ENCLOSURES

- .1 Application: at expansion joints, valves, chilled water pumps, primary flow measuring elements flanges and unions at equipment.
- .2 Collar of pre-fabricated insulation to clear flanges.
- .3 Provide end cover and seal in outdoor installations.

3.5 INSTALLATION OF ELASTOMERIC INSULATION

- .1 Insulation to remain dry. Overlaps to manufacturers instructions. Ensure tight joints.
- .2 Provide vapour retarder as recommended by manufacturer.

3.6 PIPING INSULATION SCHEDULES

- .1 Includes valves, valve bonnets, strainers, flanges and fittings unless otherwise specified.
- .2 TIAC Code: A-1.
 - .1 Securements: SS wire/bands Tape at 300 mm on centre.

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- .2 Seals: lap seal adhesive, lagging adhesive.
- .3 Installation: TIAC Code 1501-H.
- .3 TIAC Code: A-3.
 - .1 Securements: SS wire/bands Tape at 300 mm on centre.
 - .2 Seals: VR lap seal adhesive, VR lagging adhesive.
 - .3 Installation: TIAC Code: 1501-C.
- .4 TIAC Code: A-6.
 - .1 Insulation securements: as per code requirements
 - .2 Seals: lap seal adhesive, lagging adhesive.
 - .3 Installation: TIAC Code: as per code requirements
- .5 TIAC Code: C-2 with without vapour retarder jacket.
 - .1 Insulation securements: as per code requirements
 - .2 Seals: lap seal adhesive, lagging adhesive.
 - .3 Installation: TIAC Code: 1501-C.
- .6 TIAC Code: A-2.
 - .1 Insulation securements: as per code requirements
 - .2 Seals: lap seal adhesive, lagging adhesive.
 - .3 Installation: TIAC Code: 1501-H.
- .7 Thickness of insulation as listed in following table.
 - .1 Run-outs to individual units and equipment not exceeding 4000 mm long.
 - .2 Do not insulate exposed runouts to plumbing fixtures, chrome plated piping, valves, fittings.

Application	Temp degrees C	TIAC code	Pipe sizes (NPS) and insulation thickness (mm)					
			Run out	to 1	1 1/4 to 2	2 1/2 to 4	5 to 6	8 & over
Steam	up to 175	A-1	38	50	65	75	90	90
Condensate Return	60 - 94	A-1	25	38	38	38	38	38
Pumped Condensate return	up to 94	A-1	25	38	38	38	38	38
Hot Water Heating	60 - 94	A-1	25	38	38	38	38	38
Hot Water Heating	up to 59	A-1	25	25	25	25	38	38
Glycol Heating	60 - 94	A-1	25	38	38	38	38	38
Glycol Heating	up to 59	A-1	25	25	25	25	38	38
Domestic HWS		A-1	25	25	25	38	38	38
Chilled Water	4 - 13	A-3	25	25	25	25	25	25
Chilled Water or Glycol	below 4	A-3	25	25	38	38	38	38
Chilled Water Pump Casing		A-3	25	25	25	25	25	25

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Condenser Water Outdoors			_____	_____	_____	_____	_____	_____
Condenser Water Indoors								
Refrigerated Drinking Water		A-3	25	25	25	25	25	25
Domestic CWS		A-3	25	25	25	25	25	25
Domestic CWS with vapour retarder		C-2	25	25	25	25	25	25
Refrigerant hot gas liquid suction	4 - 13	A-6	25	25	25	25	25	25
Refrigerant hot gas liquid suction	below 4	A-6	25	25	38	38	38	38
RWL and RWP		C-2	25	25	25	25	25	25
Cooling Coil cond. drain		C-2	25	25	25	25	25	25
Domestic hot and recirculating water	40.5 to 82	A1	25	25	25	38	38	38
Hot water and cold water supply to sanitary drain from barrier free use lavatories and sinks	4.4 to 82	A1	12	12	12	12	12	12
Storm and sanitary drainage Equipment condensate drains	38	A1	25	25	25	25	25	25
Pure water, RO water, de-Ionized water	4.4 to 93	A1	25	25	25	38	38	38

- .8 Finishes:
- .1 Exposed indoors: PVC jacket.
 - .2 Exposed in mechanical rooms: PVC jacket.
 - .3 Concealed, indoors: canvas on valves, fittings. No further finish.
 - .4 Use vapour retarder jacket on TIAC code A-3 insulation compatible with insulation
 - .5 Outdoors: water-proof aluminum/ jacket.
 - .6 Finish attachments: SS screws at 150 mm on centre. Seals: closed.
 - .7 Installation: to appropriate TIAC code CRF/1 through CPF/5
 - .8 Self-adhesive aluminum jacket membrane.

3.7 FIELD QUALITY CONTROL

- .1 Verification requirements in accordance with Section 01 33 29 - Sustainable Design Reporting, include:
 - .1 Materials and resources.
 - .2 Storage and collection of recyclables.
 - .3 Construction waste management.
 - .4 Resource reuse.

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- .5 Recycled content.
- .6 Local/regional materials.
- .7 Certified wood.
- .8 Low-emitting materials.

3.8 CLEANING

- .1 Proceed in accordance with Section 01 74 00 - Cleaning.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment: Adhere to the requirements of the Construction Waste Management plan as per Section 01 74 19 Construction Waste Management and Disposal.

END OF SECTION

CS 402 Domestic Hot Water System**Control Diagram**

Drawing: M73-01

System Description

The domestic hot water system consists of 2 domestic water heat pumps (DWHP - 1,2) (duty and standby), as well as the buffer tank (BT-03) backup electric, , domestic water heater tank DWH-1 and the domestic hot water recirculation pump P-16.

System Start

Always Enabled.

Normal Operation*Domestic Hot Water Temperature Control*

DWHP-1,2 will be controlled on their own controls to supply 71 degrees C water temperature to BT-03. When the domestic hot water temperature in BT-03 drops to 60 degrees C, valve V3 (V4) opens and ground loop pump P12 A or B will start **at minimum speed**, if not in operation. The EMCS will turn on pump P-15A (B), and heat pump DWHP-1 (DWHP-2). The EMCS to ensure lead/lag operation of the heat pumps DWHP-1,2 to even runtime. V3(V4) will modulate to maintain the required flow through the heat pump when P12A(B) modulates (refer to CS601 for details).

When P-12A(B) modulates, the pressure drop through HE-1, 2 might be lower than the pressure drop through DWHP-1 (DWHP-2). In this case, even with V3 (4) fully open, the required flow cannot be achieved. V5 is normally fully open. If V3 (4) is fully open and flow cannot be achieved, V5 will start to close until the required flow through DWHP-1 (DWHP-2) is reached. If P-12A(B) further modulates and V3 (4) start to close, V5 will start to open, while maintaining flow through DWHP-1 (DWHP-2).

BT-03 is connected in series with DWH-1, which will act as the second stage of heating. DWH-1 will operate under its own controls to maintain 71C hot water temperature. Setpoint and differential (initially set at 11C) can be adjusted through the BACnet connection.

Domestic Hot Water Recirculation Loop Temperature Control

Domestic hot water recirculation pump P13 will be controlled ON/OFF to maintain DHWR T setpoint of 49C with a differential of 11C (adjustable)..

System Stop

Always Enabled.

Schedule

Always Enabled.

Fire Alarm

N/A

Emergency Power

No

Control Points

Refer to Control Points List appended at the end of this section.

End of Section

Project Number		R.056687.005			Consultant			NORR Architects and Engineers			System Reference			Domestic Hot Water System										
Identifier		DJM			MCU Number			By EMCS subcontractor			EMCS System Identifier			DHWP-1/2										
Descriptor		DJM Building			Location of MCU			B-20, MEP Room 2			EMCS System Descriptor			Domestic Water Heatpumps										
1	2	3			4	5	6			7	8	9	10	11				12	13	14		15	16	17
POINT IDENTIFICATION																								
AUXILIARY DEVICES																								
Point Number	Point Identifier	Point descriptor	Type	Eng Units	Auxiliary device or sensing signal	Supplied	Installed	Wired	Sensor or Output Device Signal	Active Sensor Range	Primary Point	CR CA MA	ALARMS				Set Point	Contact	Action	Heavy Motor	Applicable programs or notes			
													L2	L1	H1	H2						NO NC	CR OR	Delay
1	DHWP-1/2 S/S	Domestic Hot water heat pump command	DO	on/off	BACnet DWHP controller	22	22	25	X	X	N	X	X	X	X	X	X	X	X	X	X	X	N	P4
2	DHWP-1/2 ST	Domestic Hot water heat pump status	DI	on/off	BACnet DWHP controller	22	22	25	X	X	N	CR/ MA	X	X	X	X	X	X	X	X	X	X	X	P2
3	O_IN	GLS temperature to heat pump	AI	°C	BACnet DWHP controller	22	22	25	X	X	N	X	X	X	X	X	X	X	X	X	X	X	X	X
4	O_OUT	GLR temperature from heat pump	AI	°C	BACnet DWHP controller	22	22	25	X	X	N	X	X	X	X	X	X	X	X	X	X	X	X	X
5	I_IN	DHW temperature to heat pump	AI	°C	BACnet DWHP controller	22	22	25	X	X	N	X	X	X	X	X	X	X	X	X	X	X	X	X
6	I_OUT	DHW temperature from heat pump	AI	°C	BACnet DWHP controller	22	22	25	X	X	N	X	X	X	X	X	X	X	X	X	X	X	X	X
7	P-13 S/S	Pump Run Command	DO	on/off	relay contact	22	22	25	Output Device	X	Y	X	X	X	X	X	X	X	NO	X	N	X	P4	
8	P-13 ST	Pump Status	DI	on/off	relay contact	22	22	25	Output Device	X	Y	CR/ MA	X	X	X	X	X	X	X	X	X	X	X	P2
9	P-15A/B S/S	Pump Run Command	DO	on/off	relay contact	22	22	25	Output Device	X	Y	X	X	X	X	X	X	X	NO	X	N	X	P4	
10	P-15A/B ST	Pump Status	DI	on/off	relay contact	22	22	25	Output Device	X	Y	CR/ MA	X	X	X	X	X	X	X	X	X	X	X	P2
11	V 3/4 POS	Valve Command	AO	%	Valve actuator	25	22	25	Output Device	X	Y	X	X	X	X	X	X	X	NC	X	X	X	X	
12	V 3/4 ST	Valve Status	AI	%	Valve actuator	25	22	25	Output Device	X	Y	CR/ MA	X	X	X	X	X	X	X	X	X	X	X	
13	BT-03 T	Domestic hot water temp inside BT-03	AI	°C	Temp sensor	25	22	25	Sensor	-40 to 100	Y	CA	50	55	80	85	71	X	X	X	X	X	X	
14	DHW T	Domestic hot water supply temp	AI	°C	Temp sensor	25	22	25	Sensor	-40 to 100	Y	CA	50	55	80	85	71	X	X	X	X	X	X	
15	DHW BT03 T	Domestic hot water temp from BT-03	AI	°C	Temp sensor	25	22	25	Sensor	-40 to 100	Y	CA	50	55	80	85	71	X	X	X	X	X	X	
16	DHWR T	Domestic hot water recirc temp	AI	°C	Temp sensor	25	22	25	Sensor	-40 to 100	Y	CA	30	35	X	X	49	X	X	X	X	X	X	
17	DHW-1 S/S	Domestic water heater command	AI	°C	BACnet DWH-1 controller	22	22	25	X	X	N	X	X	X	X	X	X	X	X	X	X	X	X	P4
18	DHW-1 ST	Domestic water heater status	AI	°C	BACnet DWH-1 controller	22	22	25	X	X	N	CR/ MA	X	X	X	X	X	X	X	X	X	X	X	P2
19	DHW-1 T	Domestic water heater temp setpoint	AI	°C	BACnet DWH-1 controller	22	22	25	X	X	N	X	50	55	80	85	71	X	X	X	X	X	X	
20	DHW-1 DT	Domestic water heater temp diferential	AI	°C	BACnet DWH-1 controller	22	22	25	X	X	N	X	X	X	X	X	11	X	X	X	X	X	X	
21	DHW-1 TMV T	Domestic hot water supply temp from TMV	AI	°C	Temp sensor	25	22	25	Sensor	-40 to 100	Y	CR/ MA	X	48	52	X	50	X	X	X	X	X	X	
22	DHWP-1/2 FLOW	Domestic hot water heat pump flow	AI	L/s	Flow meter	25	23	25	Output Device	0 to 6	Y	CR/ MA	X	0.9	1.2	X	1.07	X	X	X	X	X	X	
23	V 5 POS	Valve Command	AO	%	Valve actuator	25	22	25	Output Device	X	Y	X	X	X	X	X	X	X	NO	X	X	X	X	
24	V 5 ST	Valve Status	AI	%	Valve actuator	25	22	25	Output Device	X	Y	CR/ MA	X	X	X	X	X	X	X	X	X	X	X	

Remarks: Provide equipment failure alarm, if status doesn't match command, on all equipment status points.

CS 910	Miscellaneous Equipment
Control Diagram	Drawing: N/A.
System Description	The following miscellaneous equipment needs monitoring: <ol style="list-style-type: none">1. Emergency Diesel Generator: - Status (Running/Available) - Alarm2. Fire Pump: - Status3. Jockey Pump: - Status4. Automatic Transfer Switches ATS-1E, ATS-1X: - Status (Emergency/Normal Power Supply)
System Start	Always Enabled
Normal Operation	Monitor equipment status.
System Stop	Always Enabled
Fire Alarm	No
Emergency Power	Yes
Control Points	Refer to Control Points List appended at the end of this section.

End of Section

Project Number		R.056687.005			Consultant			NORR Architects and Engineers			System Reference				Miscellaneous Equipment													
Identifier		DJM			MCU Number			By EMCS subcontractor			EMCS System Identifier				EMGEN, FP-1, JP-1, ATS-1E, ATS-1X													
Descriptor		DJM Building			Location of MCU			B-20, MEP Room 2			EMCS System Descriptor				Emergency Generator, Fire Pump, Jockey Pump, Automatic Transfer Switches													
1	2	3			4	5			6			7			8	9	10	11		12				13	14	15	16	17
POINT IDENTIFICATION					AUXILLIARY DEVICES					TYPE	AI	AI/DI		ALARMS				AI	AO/DO	DI/DO								
Point Number	Point Identifier	Point descriptor	Type	Eng Units	Auxilliary device or sensing signal	Supplied	Installed	Wired	Sensor or Output Device Signal	Active Sensor Range	Primary Point	CR CA MA	Analog Limits				Set Point	Contact	Action	Heavy Motor	Applicable programs or notes							
						Division							L2	L1	H1	H2						NO NC	CR OR	Delay				
1	EMGEN-ST	Emergency Generator Status	DI	open/close	EMGEN controller	26	26	25	Output Device	X	Y	CR	X	X	X	X	X	NC	X	X								
2	EMGEN-AL	Emergency Generator Alarm	DI	open/close	EMGEN controller	26	26	25	Output Device	X	Y	CR	X	X	X	X	X	NO	X	X								
3	FP-1	Fire Pump Status	DI	open/close	FP-1 controller	21	21	25	Output Device	X	Y	CR	X	X	X	X	X	NC	X	X								
4	JP-1	Jockey Pump Status	DI	open/close	JP-1 controller	21	21	25	Output Device	X	Y	CR	X	X	X	X	X	NC	X	X								
5	ATS-1E, ATS-1X	Automatic Transfer Switch Status	DI	open/close	ATS-1E, ATS-1X controller	26	26	25	Output Device	X	Y	CR	X	X	X	X	X	NC	X	X								
Remarks:		Refer to CS910 for description of equipment status and alarms.																										

CS 912

Lighting System

**Control
Diagram**

Drawing: N/A.

**System
Description**

Refer to specifications section 26 09 43 Network Lighting Controls, paragraph 2.12.

System Start

EMCS initiated based on schedule.

**Normal
Operation**

The lighting system will operate on its own controller.

System Stop

EMCS initiated based on schedule.

Fire Alarm

Yes

**Emergency
Power**

Yes

**Control
Points**

Refer to Control Points List appended at the end of this section.

End of Section

Project Number		R.056687.005		Consultant		NORR Architects and Engineers		System Reference				Lighting System									
Identifier		DJM		MCU Number		By EMCS subcontractor		EMCS System Identifier				LGHTSYS									
Descriptor		DJM Building		Location of MCU		B-20, MEP Room 2		EMCS System Descriptor				Lighting System									
1	2	3	4	5	6	7		8	9	10	11	12				13	14	15	16	17	
POINT IDENTIFICATION					AUXILLIARY DEVICES			TYPE	AI	AI/DI		ALARMS				AI	AO/DO	DI/DO			
Point Number	Point Identifier	Point descriptor	Type	Eng Units	Auxilliary device or sensing signal	Supplied	Installed	Wired	Sensor or Output Device Signal	Active Sensor Range	Primary Point	CR CA MA	Analog Limits				Set Point	Contact	Action	Heavy Motor	Applicable programs or notes
						Division							L2	L1	H1	H2					
1	LGHTZN-ST	Lighting Zone Status	DI	open/close	Lighting Controller	26	26	25	Output Device	X	N	CR/ MA	X	X	X	X	X	X	X	X	
2	LGHTZN-DIM	Lighting Zone Dimming	AI	%	Lighting Controller	26	26	25	Output Device	X	N	CR/ MA	X	X	X	X	X	X	X	X	
3	LGHT CMD	Lighting Command	AO	%	Lighting Controller	26	26	25	Output Device	X	N	X	X	X	X	X	X	X	X	X	
4	PHSENS	Photo Sensor Daylight	AI	Lux	Lighting Controller	26	26	25	Output Device	X	N	X	X	X	X	X	X	X	X	X	
5	LGHT FA	Lighting System Fire Alarm	DI	open/close	Lighting Controller	26	26	25	Output Device	X	N	CR	X	X	X	X	X	X	X	X	
6	OCC-ST	Occupancy State	DO	open/close	Occupancy Sensor	26	26	25	Output Device	X	Y	X	X	X	X	X	X	X	X	X	
Remarks:																					

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Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 26 05 00 – Common Work Results for Electrical.
- .2 Section 26 08 02 – Field Testing and Commissioning – Low Voltage Installations
- .3 Section 26 24 13 – Switchboards
- .4 Section 26 24 16.01 – Panelboards Breaker Type

1.2 REFERENCES

- .1 Except as noted by governing codes and by the Contract Documents, comply with the applicable provisions and recommendations of the Canadian Electrical Manufacturer's Association CSA and Measurement Canada.
- .2 Approved by Consumer and Corporate Affairs Canada (CCAC) and certification for legal sub-metering.
- .3 Listed by the Underwriters Laboratory Inc., Standard (UNUCNL file E124377), 1 and FCC Part 15, Subpart. J. FCC Class A is required for commercial installations. The system shall be approved by Industry and Science Canada of Measurement Canada AE0763, AE0763 Rev 1, AE019AE-97-0028, AE0818.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 26 05 00 Common Work Results for Electrical.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for DMS components including but not limited to digital meters, pulse data logger, network controller, meter enclosure. Include product characteristics, performance criteria, physical size, mounting requirements, interconnecting wiring diagram, finishes and limitations.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 26 05 00 Common Work Results for Electrical.
- .2 Operation and Maintenance Data: submit operation and maintenance data for complete DMS and their components for incorporation into manual.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 26 05 00 Common Work Results for Electrical and with manufacturer's written instructions.

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Part 2 Products**2.1 SYSTEM DESCRIPTION**

- .1 Provide complete, working, computer based digital metering system (DMS) to break down and track electricity measurements of the building.
- .2 The digital metering system shall be revenue-grade meter as certified by Measurement Canada and in compliance with the requirements outlined in ANSI Standard C-12.1-2008.
- .3 The DMS price will include all costs associated with the co-ordination of system installation, material supply, commissioning, installation, verification, and customer training during the entire period of construction and system start-up.
- .4 The total number of electrical meters to be monitored by the DMS shall be as shown on the electrical single line drawing.
- .5 Provide all labour, equipment, materials and services and install all interconnecting wire and conduit required for DMS.
- .6 Provide current transformers (CTs) and potential transformers (PTs) as required by meters.

2.2 ELECTRONIC POWER METERING

- .1 The meters shall be manually readable using local digital display (LCD or LED) via push-button and automatically readable utilizing Frequency Hopping Spread Spectrum Power Line Carrier Communication ("PLC").
- .2 Meter shall be configured for commercial application and applied on 120/208V, 347/600V and 600V delta 3P3W nominal systems and as indicated on the drawings. Commercial/Industrial Use (kWh and Demand): 120/208V and 347/600V, 3 phase/4 wire, and 600V Delta, 3 phase/3 wire
- .3 kW Demand shall be measured and recorded every 15 minutes. Demand is factory configured in block intervals. Rolling (overlapping) time interval demand shall also be configurable as an option. Demand shall be recorded along with the time and date at which it occurs. The meter shall be classed as a mass memory interval meter (meters which record and store the energy use by time). The demand interval and optional time-of-use schedules shall be factory programmed and stored in each meter. Daily peak demands shall be capable of being read by a remote computer.
- .4 The Meter shall have the following Testing and Certification:
 - .1 UL/CUL recognized
 - .2 Meets or exceeds requirements of ANSI C12.1, ANSI/IEE
 - .3 C37.90.2. ANSI/IEEE C37.90.1, and Measurement Canada.

- .5 Each meter shall interface to the electrical load being measured with a direct voltage tap, up to 600 VAC, and with 0.1Amp or 5.0A secondary for split and solid core current transformers.
- .6 Monitoring
 - .1 Provide true RMS measurement of current, volts, %THD, kW, kVA, kVAR, kWh, power factor.
 - .2 The Meter shall have an accuracy of $\pm 0.5\%$ or better.
- .7 User Interface
 - .1 Reading shall be accessible on a local digital display. The display shall consist of two rows of 16 characters on each row. The consumption reading shall be up to six (6) digits.
 - .2 Provide an IEC type optical port capable of direct connection to a laptop.
- .8 The system shall be a fully automated, microprocessor-based electric utility measurement system. The system shall be capable of measuring and recording the usage of electricity and shall be capable of communicating the reading to an optional on-site or remote computer (i.e. the billing computer) via modem or other means of communications.
- .9 The meter shall not depend on battery power for maintaining functionality. Meter shall monitor all metering parameters and perform communication tasks using a non-volatile flash memory. On-board battery shall only be used in power failure to maintain time, log incoming pulses (if applicable) and to store the data acquired within the incomplete interval at the time of the power failure.
- .10 Each meter shall be equipped with a clock/calendar that automatically accommodates leap years. The clock/calendar shall be backed up by battery and continue operating during power outages. The time and date shall be automatically synchronized by the Scan Transponder(s) and capable of being reset by a remote computer.
- .11 Each meter shall be complete with internal CT termination and shorting and fuse block.
- .12 Revenue related metering parameters (i.e. demand intervals) shall be permanent and stored in each individual meter. It shall not be possible to change metering parameters through unauthorized access to the system.
- .13 Provide Phase Diagnostic Registers that include multipliers for amperage, voltage, watts, and line frequency. On a per-phase basis Phase Diagnostics shall include voltage, VAR phase shift, accumulated kWh and kVARh and instantaneous amps, watts, VAR's, VA's, phase angle (degrees displacement between current and voltage waveforms), and Power Factor.
- .14 Provide Event Diagnostic Registers that include time and date and the number of times the time has been changed, number of power downs, power ups and start ups with time and date of last occurrence, and the number of times the accumulated peak demand has been reset, also with the time and date of the last occurrence. Meters that communicate by Power Line Carrier Communications shall also include counts of received messages, rejected messages and the numbers of transmissions without replay.

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- .15 On-board Memory Storage
 - .1 The meter shall maintain a minimum of 60-day log of daily Time-of-Use consumption, interval data and peak demand readings along with the time and date at which the daily peak demands occur. The consumptions recorded shall be the reading at the end of the Time-of-Use period of the end of the day. The peak demand recorded in the log shall be the peak demand for the Time-of-Use period for that day.
 - .2 Each meter shall maintain a minimum of 60-day date logging capacity consisting of fifteen (15) minute or hourly demands with time and date stamp.
 - .3 Memory shall be non-volatile.
- .16 Control power for the meter shall be obtained via the monitored voltage connections. A separate control power input is not allowed.
- .17 Communications Interface
 - .1 The system shall communicate with a remote computer using one or more of the methods noted below:
 - .1 To The meter shall communicate over the electrical power wiring to a Scan Transponder via bi-directional, frequency hopping, spread spectrum power line carrier communications. These signals shall be capable of passing through a single 600/120V transformer. The Scan Transponder and each meter shall select the best available combination of phase, frequency range and baud rate for communication at any given time.
 - .2 Install per manufacture's guidelines and recommended wire specification.
 - .3 All meters shall have as an option a local RS-485 serial port for direct connection to the PC.
 - .4 Individual meters shall be capable of being equipped with a modem for direct connection to a telephone line if necessary.

2.3 SCAN TRANSPONDER

- .1 Scan Transponders shall be installed to collect data from meters on a daily basis and provide a centralized data access point.
- .2 All communication shall be direct between a Scan Transponder and each meter, and under the control of the Scan Transponder. Meters will not repeat messages from other meters nor will message routing be determined by meters.
- .3 A Scan Transponder shall be provided for every 240 electric metering points and one Scan Transponder shall be provided per utility transformer or electrical service. Contractor shall provide required location, quantities and voltage connections for Transponders based on manufacture's specifications and instructions.
- .4 Scan Transponder shall begin each communication with a meter with verification of clock and meter ID to ensure date integrity.
- .5 The Scan Transponder shall download meter values in flash memory and shall hold at least 365 days worth of records.

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- .6 All communication shall be direct between a Scan Transponder and each meter, and under the control of the Scan Transponder.
- .7 Multiple Scan Transponders shall be connected by Data Link (RS-485).
- .8 Where indicated on manufacturer's shop drawings, meter shall be connected to the Scan Transponder by Data Link (RS-485).
- .9 Provide a modem on the Scan Transponder for phone line connection to remote computer.
- .10 Scan Transponder locations shall be approved by manufacture and installed per manufactures' guidelines. Upon request, manufacture shall provide a project specific design for Scan Transponder system.
- .11 Owner shall provide a dedicated telephone line for remote access to the Transponder.

2.4 SOFTWARE

- .1 The software shall be capable of reading the system and downloading the metered data, and generating energy bills for electricity.
- .2 The software shall be capable of producing graphs and charts for load profiling including intervals ranging from 5 through 60-minute time periods.
- .3 Data collected through software must be able to be uploaded to spreadsheet programs for analysis such as Microsoft Excel.

Part 3 Execution

3.1 INSTALLATION

- .1 A circuit breaker shall be provided at the metering location to allow safe access to metering components without powering down the entire panel. Where utilized, S-20 200A meters require tenant disconnect to be on the line side of the electric meter.
- .2 All meters shall be installed to manufacture's installation instructions.
- .3 The installation of the metering equipment shall be performed by licensed electricians, under the direct supervision of factory trained personnel.
- .4 Install meters as indicated on drawings.
- .5 Division 26 is responsible for installing electric meters equipped with a pulse output and visual readout.
- .6 All wiring shall be completed by Division 26 as per specifications. All wiring will be done in accordance with the Canadian Electrical Code.

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- .7 Size and colour code wiring according to manufacturer's recommendations. All wiring shall be CSA approved and rated for 600V for low voltage conditions and 300V for extra low voltage conditions. Communication wiring shall be installed in twisted pairs to prevent interference from outside sources.
- .8 All current transformers will be installed with shorting switches so meters can be removed without high voltage electrical hazard.

3.2 CLEANING

- .1 Progress Cleaning, Final Cleaning and Waste Management as per Section 26 05 00 Common Work Results for Electrical.

3.3 CALIBRATION AND MAINTENANCE SERVICE

- .1 Setup meters according to manufacturer's instructions.
- .2 Commission the system and demonstrate the proper functioning of the system.
- .3 Provide a 3-hour training session to the operational personal.

3.4 WARRANTY

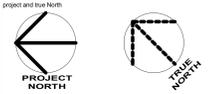
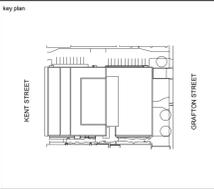
- .1 All equipment shall be free from defect in materials and workmanship under normal use and service for the period of twelve (12) months from the date of substantial completion.
- .2 All equipment will be verified by a factory-trained technician and certified for its Revenue Class accuracy.
- .3 A certificate shall be issued on final completion to confirm that the system is operating according to specifications.

3.5 SYSTEM COMMISSIONING AND START-UP

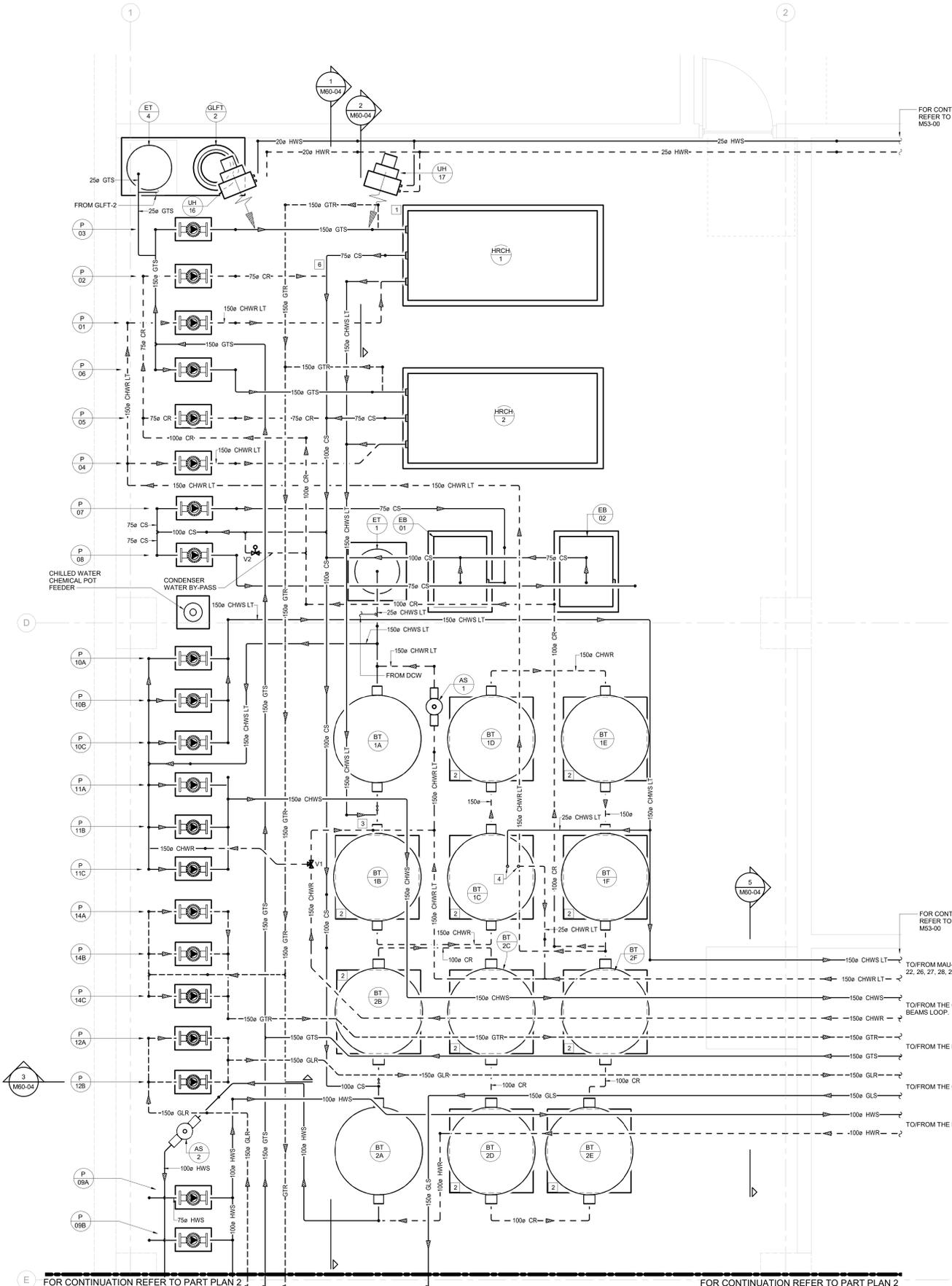
- .1 Provide third party testing of power metering system. The manufacturer's qualified service organization can provide third party testing. Testing shall be performed prior to occupancy through the following process:
 - .1 Record the "cross reference" or the meter serial number (unique ID), meter point, to unit/panel relationship.
 - .2 Check for power to the meter.
 - .3 Check the serial number inside the meter.
 - .4 Open the panel so that all CT's are visible.
 - .5 Verify the CT ratio and write up the cross reference information for the meter.
 - .6 Submit two draft copies of test results to the Department Representative for review and approval.
 - .7 After approval submit the test results in two final printed copies and one computer readable copy.

- .2 Third party testing shall include testing of Power Line Carrier Communications between power meters and Transponders referred to as “start up”. Testing shall confirm that all power meters included in cross reference are properly communicating with the Transponders.

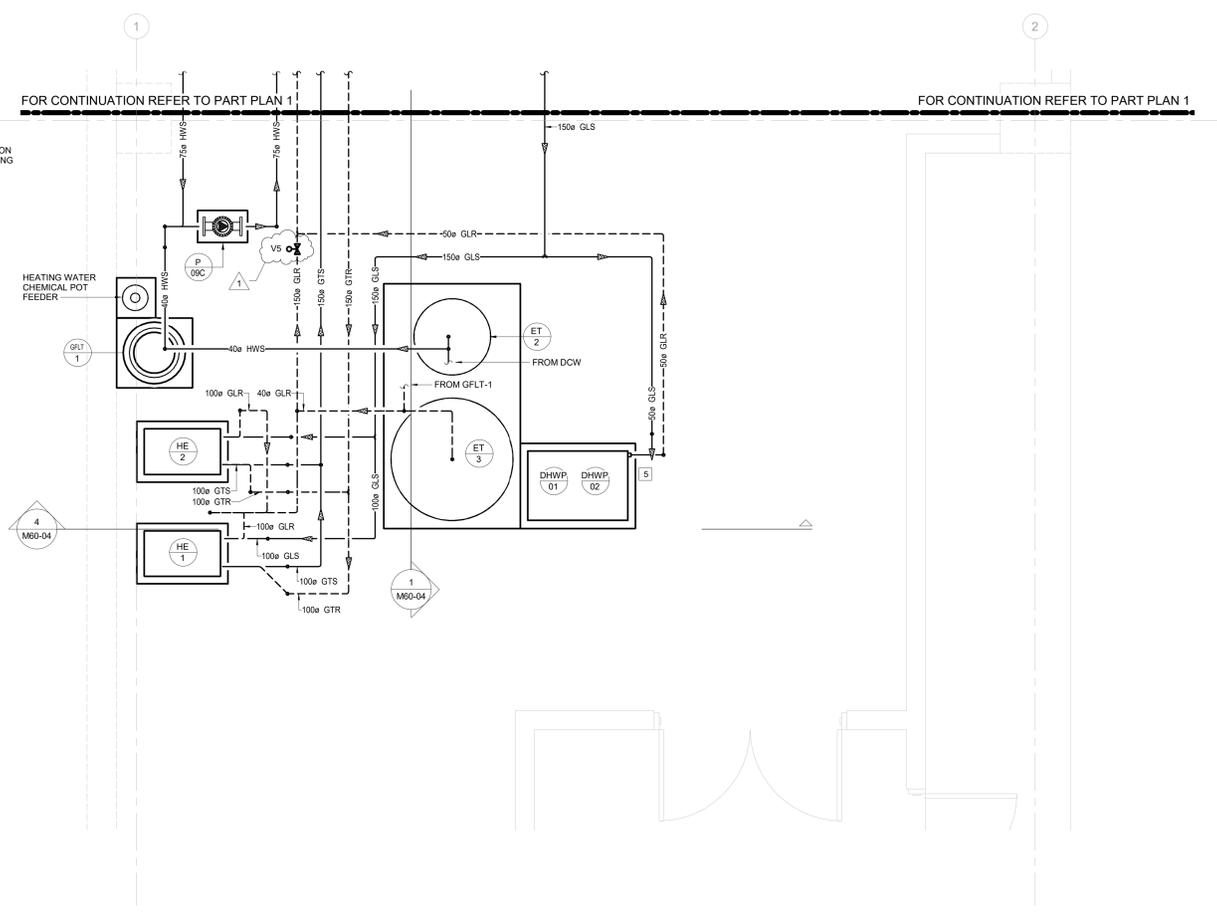
END OF SECTION



project legend



1 PARKING LEVEL MECHANICAL ROOM PART 1 HVAC PIPING
 SCALE: 1:25
 0mm 500mm 1000mm 1500mm 2000mm 2500mm



2 PARKING LEVEL MECHANICAL ROOM PART 2 HVAC PIPING
 SCALE: 1:25
 0mm 500mm 1000mm 1500mm 2000mm 2500mm

FOR CONTINUATION REFER TO PART PLAN 2

FOR CONTINUATION REFER TO PART PLAN 1

- GENERAL NOTES:**
- FOR PLUMBING AND DRAINAGE LAYOUT FOR MECHANICAL ROOM REFER TO DRAWING M60-06.
 - CONTRACTOR TO PROPOSE SOLUTIONS FOR REVIEW TO THE CONSULTANT IF ANY INTERFERENCES OCCUR DUE TO SITE CONDITIONS.

- DRAWING NOTES:**
- REFER TO SECTION 2 ON DWG. M60-04 FOR HRCH-01/02 PIPING CONNECTIONS.
 - PROVIDE HOUSE KEEPING PADS FOR THE BUFFER TANKS AS REQUIRED TO ENSURE ALL BUFFER TANKS CONNECTIONS ARE LEVELLED.
 - REFER TO SECTION 1 ON DWG. M60-04 AND SCHEMATIC IN DWG. M73-01 FOR BUFFER TANKS PIPING CONNECTIONS.
 - 25# CHWS/CHWR LT CROSS ABOVE 150# CHWR LT AND PENETRATE THROUGH THE SLAB TO LEVEL ABOVE. REFER TO DWG. M53-01 FOR CONTINUATION.
 - DWHP-1 INSTALLED ABOVE DWHP-2 (STACKED) CW VIBRATION ISOLATION PAD. PROVIDE REVERSE RETURN PIPING ARRANGEMENT.
 - 75# CR PIPE RUNS BELOW 75# CS.

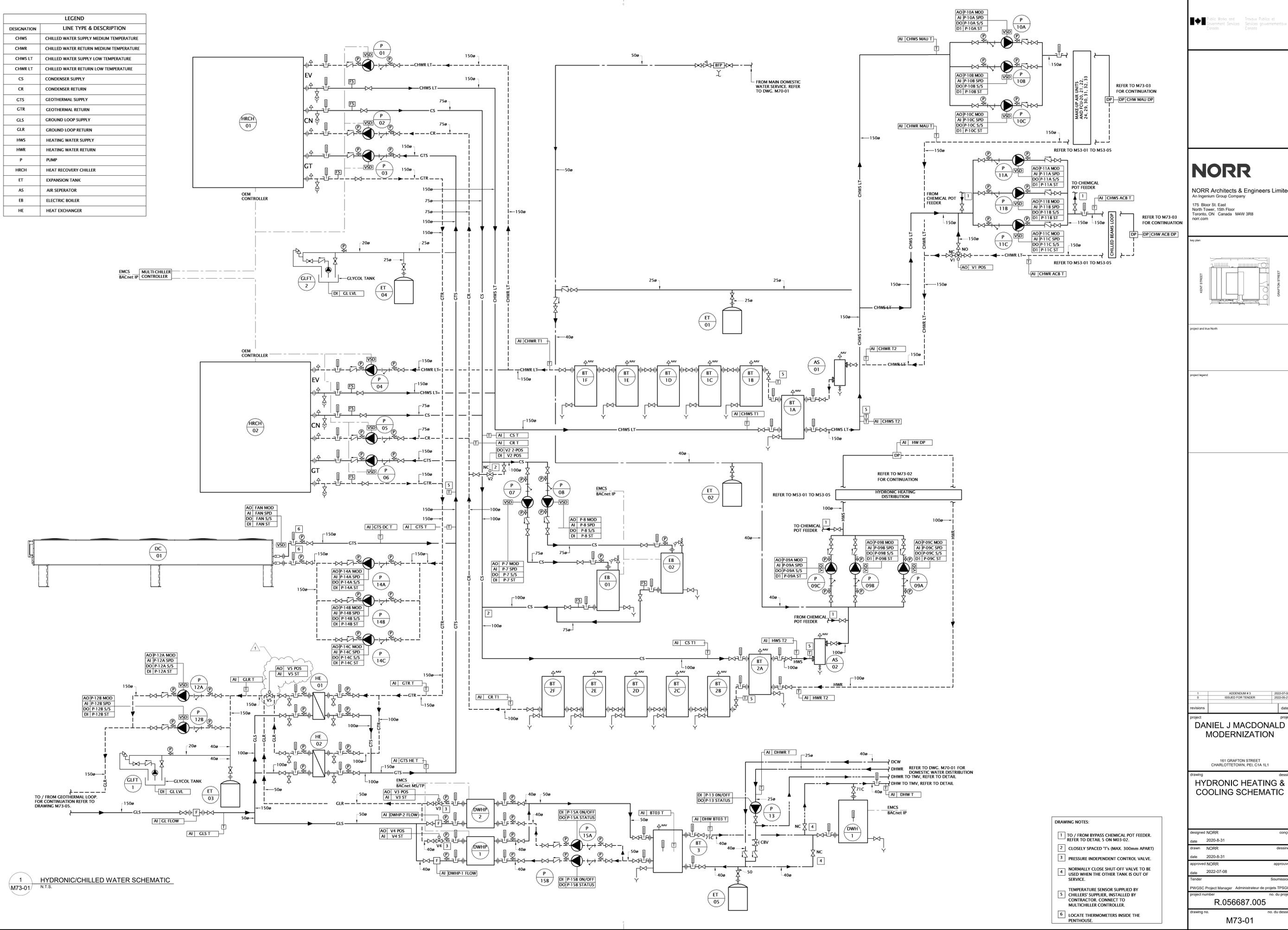
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2		2022-06-27

project
DANIEL J MACDONALD MODERNIZATION
 161 GRAFTON STREET
 CHARLOTTETOWN, PEI C1A 1L1

design
PARKING LEVEL PART PLAN MECHANICAL ROOM HVAC PIPING

designed Designer
 date 2021-3-16
 drawn Author
 date 2021-3-16
 approved Checker
 date 2022-07-08
 Tender
 PWGSC Project Manager Administrateur de projets TPSCC
 project number
R.056687.005
 drawing no. no. du dessin
M60-03

LEGEND	
DESIGNATION	LINE TYPE & DESCRIPTION
CHWS	CHILLED WATER SUPPLY MEDIUM TEMPERATURE
CHWR	CHILLED WATER RETURN MEDIUM TEMPERATURE
CHWS LT	CHILLED WATER SUPPLY LOW TEMPERATURE
CHWR LT	CHILLED WATER RETURN LOW TEMPERATURE
CS	CONDENSER SUPPLY
CR	CONDENSER RETURN
GTS	GEOTHERMAL SUPPLY
GTR	GEOTHERMAL RETURN
GLS	GROUND LOOP SUPPLY
GLR	GROUND LOOP RETURN
HWS	HEATING WATER SUPPLY
HWR	HEATING WATER RETURN
P	PUMP
HRCH	HEAT RECOVERY CHILLER
ET	EXPANSION TANK
AS	AIR SEPARATOR
EB	ELECTRIC BOILER
HE	HEAT EXCHANGER

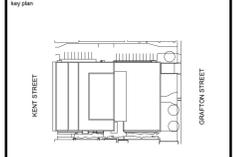


1 HYDRONIC/CHILLED WATER SCHEMATIC
M73-01 N.T.S.

- DRAWING NOTES:
- TO / FROM BYPASS CHEMICAL POT FEEDER. REFER TO DETAIL 5 ON M03-02.
 - CLOSELY SPACED T'S (MAX. 300mm APART)
 - PRESSURE INDEPENDENT CONTROL VALVE.
 - NORMALLY CLOSE SHUT-OFF VALVE TO BE USED WHEN THE OTHER TANK IS OUT OF SERVICE.
 - TEMPERATURE SENSOR SUPPLIED BY CHILLERS' SUPPLIER, INSTALLED BY CONTRACTOR. CONNECT TO MULTICHILLER CONTROLLER.
 - LOCATE THERMOMETERS INSIDE THE PENTHOUSE.

Public Works and Services Corporation
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project and true North

project legend

no.	description	date
1	ADDITIONAL P. 1	2022-07-08
2	ISSUED FOR TENDER	2022-06-27

PROJECT
DANIEL J MACDONALD MODERNIZATION

161 GRAFTON STREET
CHARLOTTETOWN, PEI C1A 1L1

design
HYDRONIC HEATING & COOLING SCHEMATIC

designed	compu
NORR	
date 2020-8-31	
drawn NORR	dessiné
date 2020-8-31	
approved NORR	approuvé
date 2022-07-08	
Tender	Submission
PWGSC Project Manager / Administrateur de projets TPSCG	no. du projet
R.056687.005	
drawing no.	no. du dessin
M73-01	