1 ADDENDUM #1

ALL CLAUSES SET FORTH IN THE BIDDING DOCUMENTS, CONTRACT DOCUMENTS AND GENERAL REQUIREMENTS OF THE ORIGINAL CONTRACT DOCUMENTS SHALL APPLY TO AND GOVERN THIS WORK. THE ADDENDUM REFERS TO CHANGES AND ADDITIONS TO THE ORIGINAL CONTRACT DOCUMENTS AND IS TO BE READ IN CONJUNCTION WITH THE SAME. ALL OTHER PARTS OF THE ORIGINAL CONTRACT DOCUMENTS ARE TO BE CONSIDERED AS APPLYING TO THE WORK OF THIS CONTRACT WITH THE EXCEPTIONS AND CHANGES AS NOTED BELOW.

1.1 SPECIFICATIONS

.1 Reference Section 00 01 15 - List of Drawings:

.1 Reference Paragraph 1.1.4:

Add the following new Paragraphs (.10 to .28 inclusive) to the Mechanical Drawing List:

".10 M6-200 – First Floor Demolition Plans – Heating Plans
.11 M6-201 – Second Floor Heating Demolition, South Penthouse Heating Demolition and New Works
.12 M6-202 – Third Floor Demolition Plans – Heating
.13 M6-203 – First Floor New Works: Heating Plans
.14 M6-204 – Second Floor New Works: Heating Plan
.15 M6-205 – Third Floor New Works – Heating
.16 M6-206 – Heating System Schematics and Details
.17 M6-207 – Heating Details and Schedules
.18 M6-300 – First Floor Demolition Plan – Ventilation
.19 M6-301 – Second Floor, Gym Area, & Penthouse Demolition Plans – Ventilation
.20 M6-302 – Third Floor Demolition Plan – Ventilation
.21 M6-303 – First Floor New Works – Ventilation
.22 M6-304 – Second Floor & Penthouse New Works – Ventilation
.23 M6-305 – Third Floor New Works: Ventilation
.24 M6-306 – Ventilation Details and Schedules
.25 M6-500 – Control Diagrams
.26 M6-501 – Control Diagrams
.27 M6-502 – Control Diagrams
.28 M6-503 – Kiosk Application Description, Control Legend, and Acronyms".

1.2 DRAWINGS

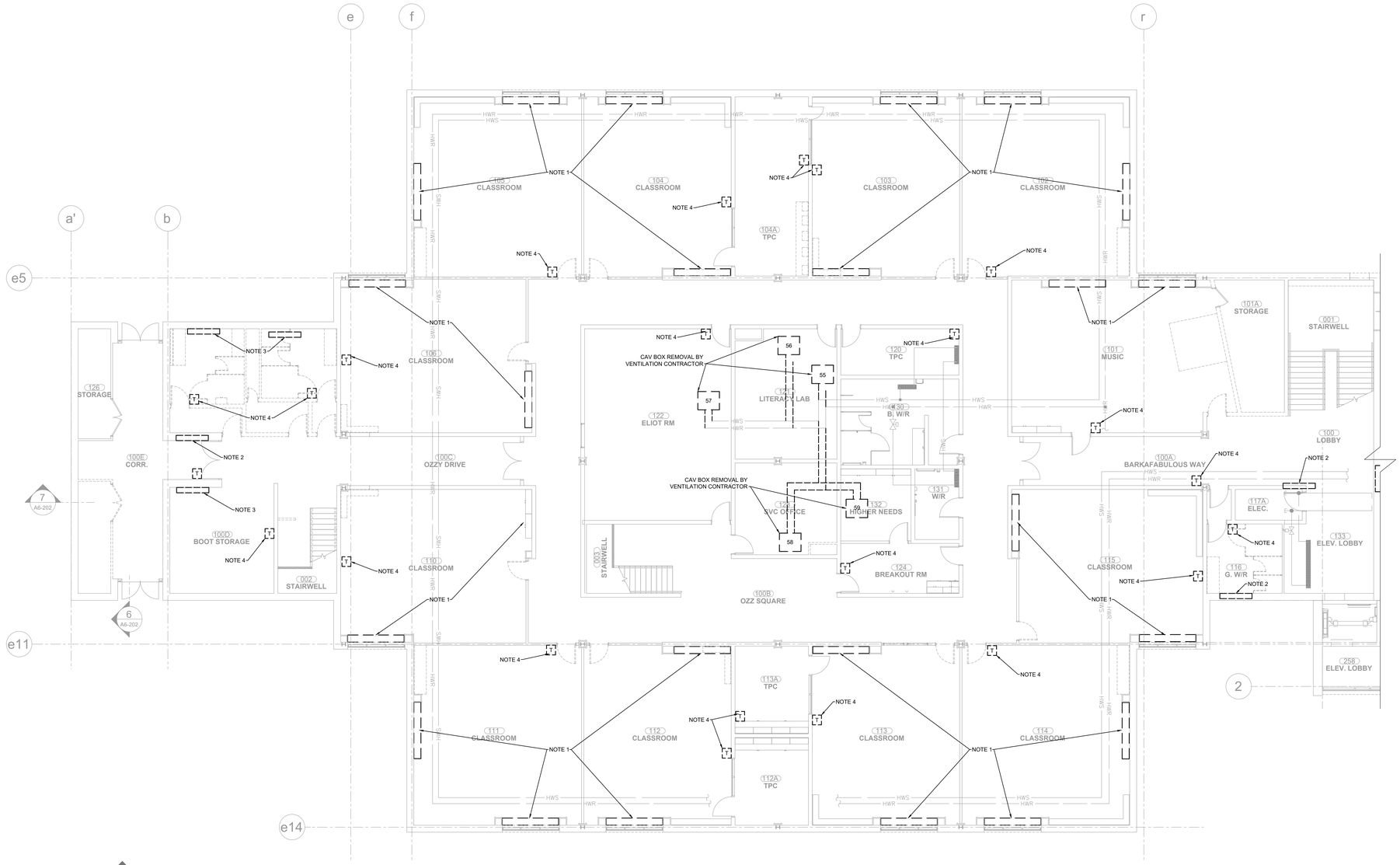
.1 Reference Drawing Set:

The following Drawings are being added to the Drawing Set, and are attached and forming part of this addendum:

.1 M6-200 – First Floor Demolition Plans – Heating Plans
.2 M6-201 – Second Floor Heating Demolition, South Penthouse Heating Demolition and New Works
.3 M6-202 – Third Floor Demolition Plans – Heating
.4 M6-203 – First Floor New Works: Heating Plans
.5 M6-204 – Second Floor New Works: Heating Plan

.6 M6-205 – Third Floor New Works – Heating
.7 M6-206 – Heating System Schematics and Details
.8 M6-207 – Heating Details and Schedules
.9 M6-300 – First Floor Demolition Plan – Ventilation
.10 M6-301 – Second Floor, Gym Area, & Penthouse Demolition Plans – Ventilation
.11 M6-302 – Third Floor Demolition Plan – Ventilation
.12 M6-303 – First Floor New Works – Ventilation
.13 M6-304 – Second Floor & Penthouse New Works – Ventilation
.14 M6-305 – Third Floor New Works: Ventilation
.15 M6-306 – Ventilation Details and Schedules
.16 M6-500 – Control Diagrams
.17 M6-501 – Control Diagrams
.18 M6-502 – Control Diagrams
.19 M6-503 – Kiosk Application Description, Control Legend, and Acronyms

END OF SECTION



HEATING LEGEND:

- BALL VALVE
- ISOLATION VALVE
- BUTTERFLY VALVE
- GATE VALVE
- CHECK VALVE
- REDUCED PRESSURE PRINCIPAL BACKFLOW PREVENTER
- AUTOMATIC AIR VENT
- PRESSURE REDUCING VALVE
- PRESSURE RELIEF VALVE
- 3 WAY CONTROL VALVE
- 2 WAY CONTROL VALVE
- ANGLE GLOBE VALVE
- PIPE TO DRAIN
- PIPE TEE
- PUMP
- UNION
- F.F.D. FUNNEL FLOOR DRAIN
- FD FLOOR DRAIN
- INSULATION
- CONCENTRIC REDUCER
- T.I.P. TIE IN POINT
- PIPE CONTINUATION
- PERMANENT CAP
- WATER METER
- FUEL METER
- STRAINER
- TEMPERATURE GAUGE
- FLEX CONNECTION
- PRESSURE GAUGE
- TEMPERATURE SENSOR
- THERMOWELL
- THERMOSTAT
- HWS — HOT WATER SUPPLY (HWS)
- HWR — HOT WATER RETURN (HWR)
- GLY — GLYCOL SUPPLY (GLYS)
- GLY — GLYCOL RETURN (GLYR)
- LOW-VOLTAGE CONTROL WIRING

NOTES:

1. PROVIDE FOR THE DEMOLITION OF HWS AND HWR CONNECTIONS TO ALL INDUCTION CAV BOXES (TO BE DEMOLISHED BY VENTILATION CONTRACTOR). CAP LINES IN FIRST FLOOR ACCESSIBLE CEILING SPACE.
2. PROVIDE FOR THE REMOVAL OF EXISTING WALL MOUNTED CABINET HEATER. DEMOLISH EXISTING HWS/HWR LINES AND CAP IN FIRST FLOOR ACCESSIBLE CEILING SPACE. MODIFY WALL OPENING TO ACCOMMODATE A REPLACEMENT CABINET HEATER INSTALLATION. SEE NEW WORKS HEATING PLANS FOR MORE INFORMATION.
3. DISCONNECT AND REMOVE EXISTING ZONE CONVECTOR.
4. DEMOLISH EXISTING PNEUMATIC THERMOSTATS, AND ALL ACCESSIBLE CONTROL WIRING/TUBING.

N TRUE NORTH

N PROJECT NORTH

1 / M6-200 FIRST FLOOR DEMOLITIONS - HEATING
1:100

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PROFESSIONAL ENGINEER — Province of Prince Edward Island — Ryan L. Cooke 1475 — 2022-02-07 — Province of Prince Edward Island

Client: Department of Transportation and Infrastructure.

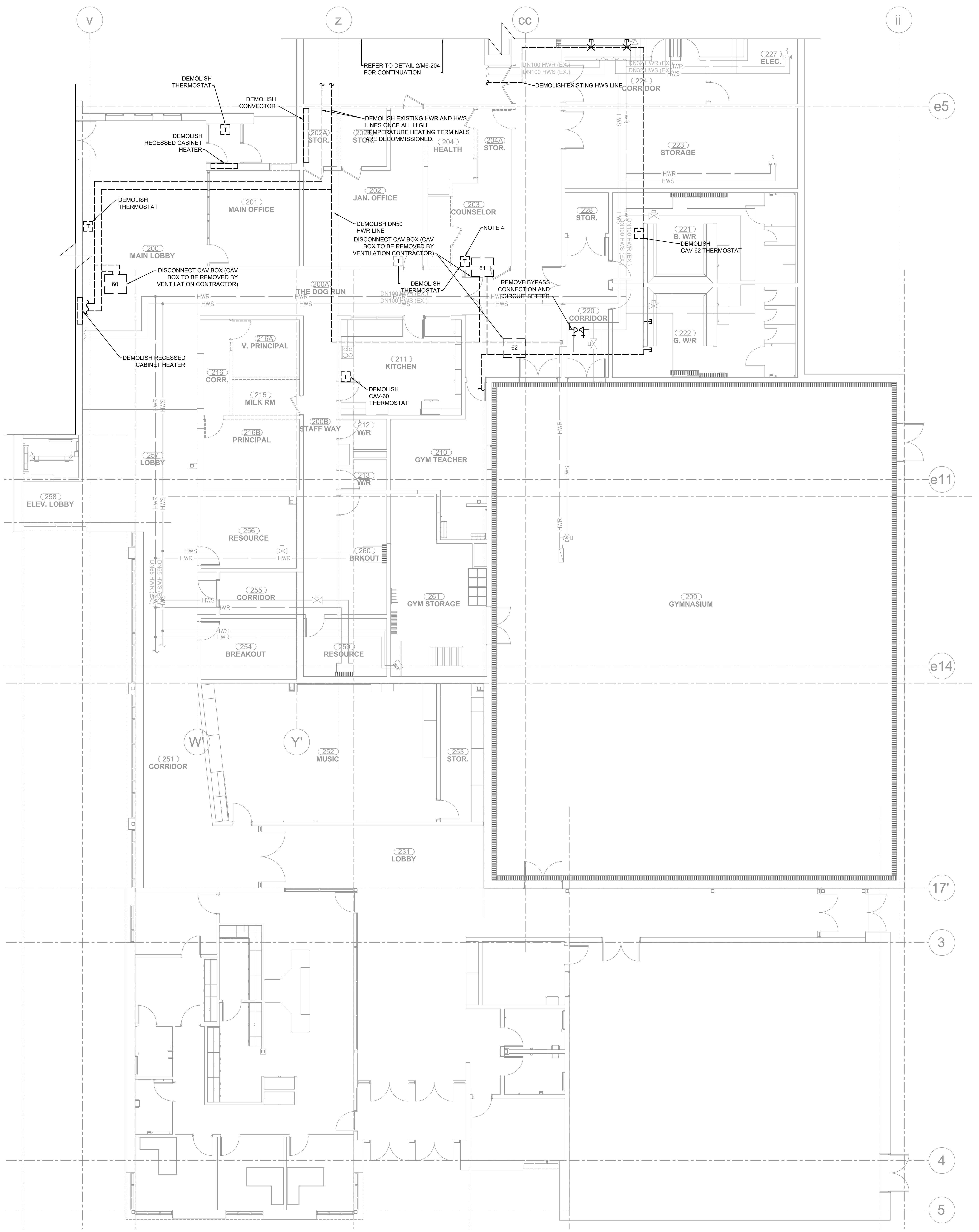
Project Title: Eliot River Elementary School
28 Terry Fox Place,
Cornwall, PEI
C0A 1H0
DTI Project No.: 170-20031

Sheet Title: First Floor Demolition Plans: Heating Plans

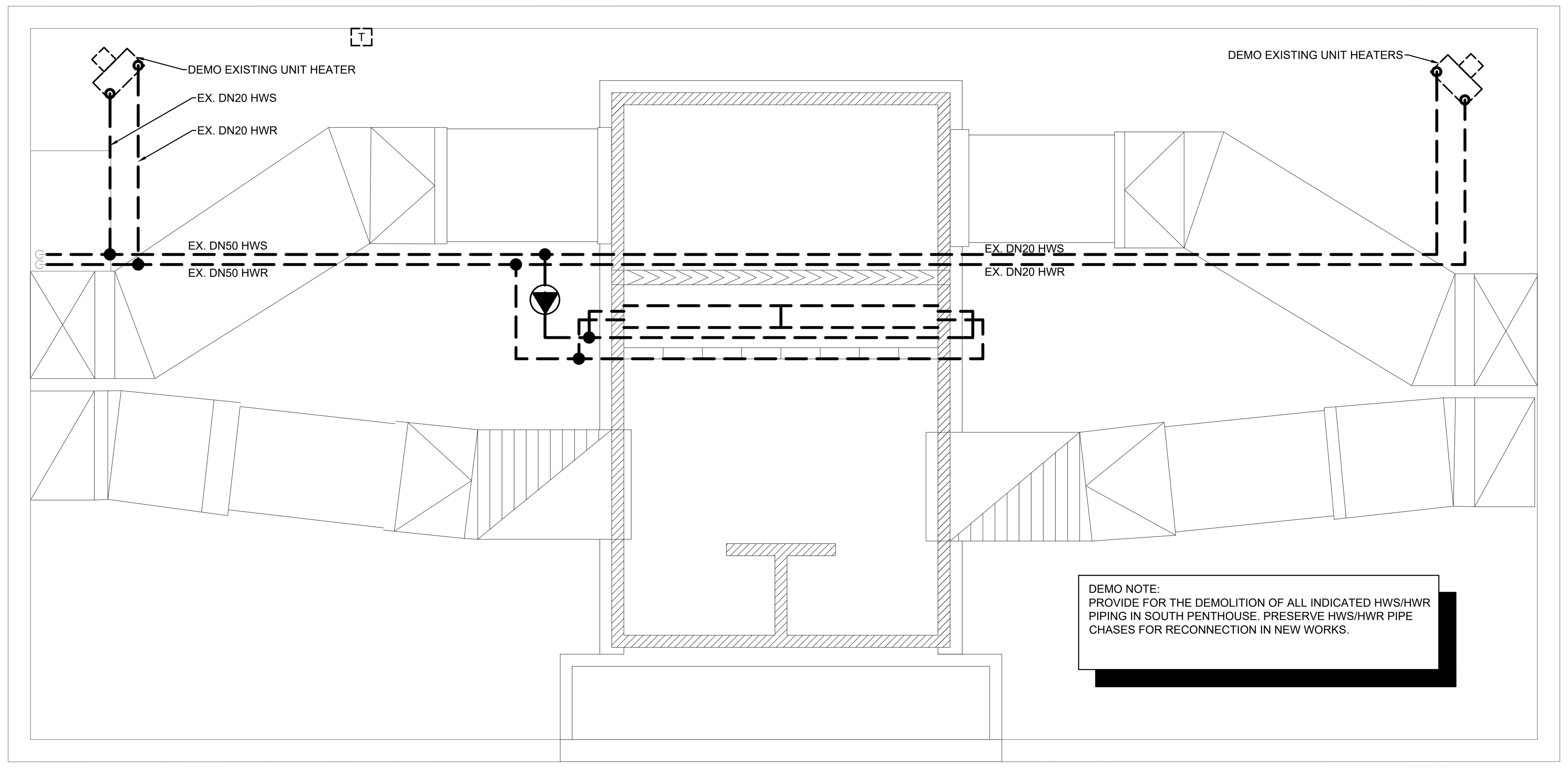
No.	Description	Date
0	Issued For Addendum #1	2022-02-07

Revision: -

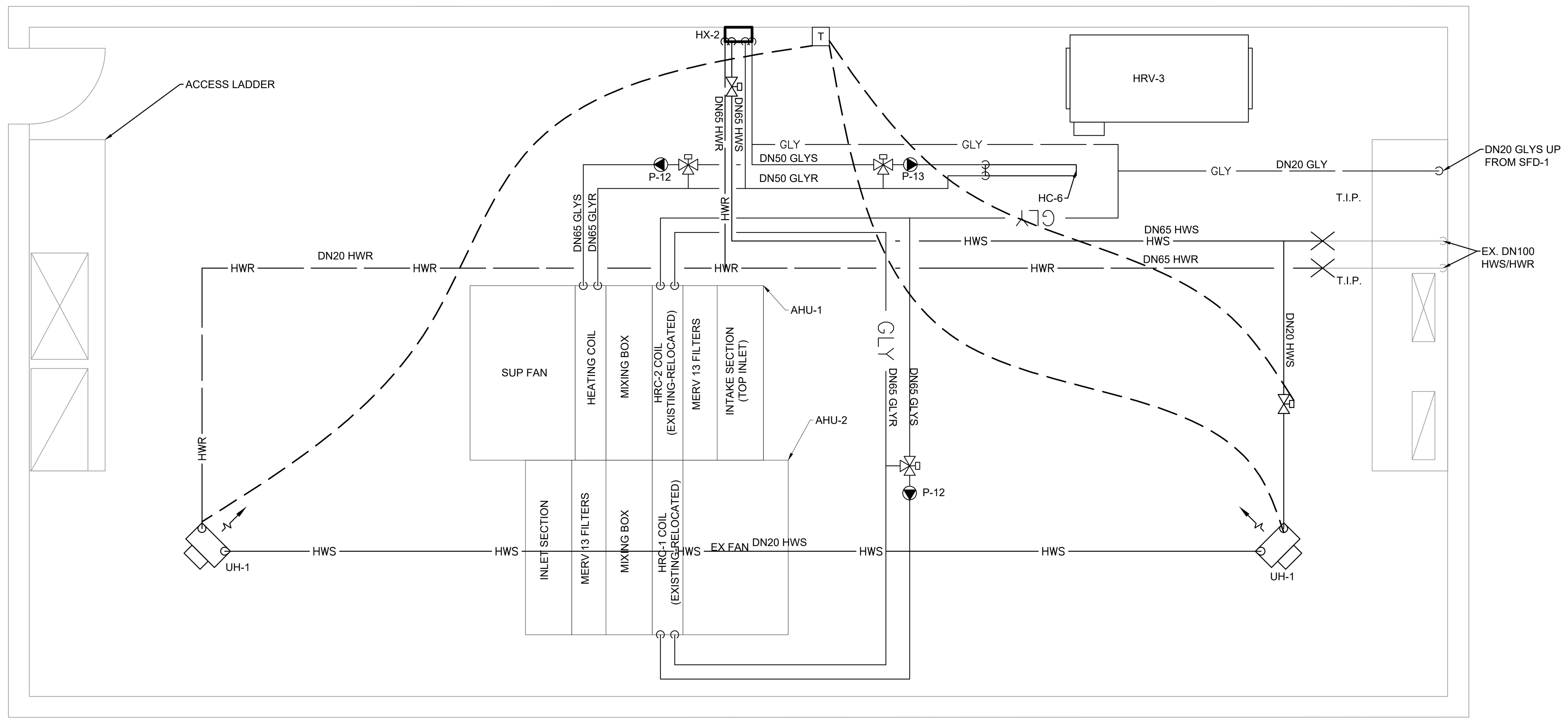
Date: 2022-02-07
Drn By: K.M.L., E.I.T. / N.L.V.
Chk By: R.L.C., P. ENG.
Project Number: 201103
Drawing Number: M6-200



1 SECOND FLOOR DEMOLITION PLANS - HEATING
M6-201 1:100



2 SOUTH PENTHOUSE HEATING DEMOLITION PLAN
M6-201 1:50



3 SOUTH PENTHOUSE - HEATING NEW WORKS
M6-201 1:50

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PROFESSIONAL ENGINEER — Ryan L. Cooke 1476 — 2022-02-07 — PROVINCE OF PRINCE EDWARD ISLAND

Client
Department of Transportation and Infrastructure.

Project Title
Eliot River Elementary School

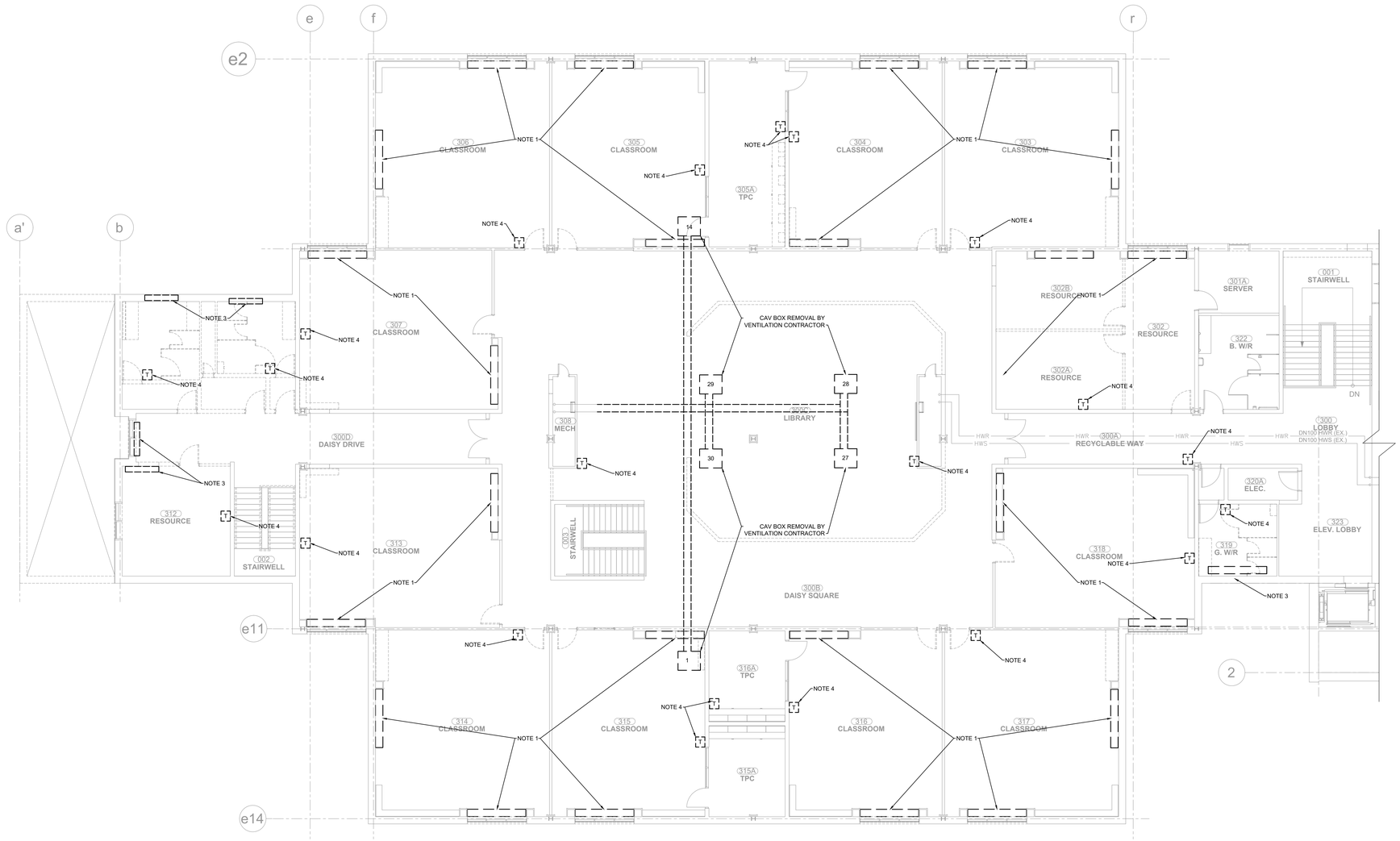
28 Terry Fox Place,
Cornwall, PEI
C0A 1H0

DTI Project No.: 170-20031

Sheet Title
Second Floor Heating Demolition, South Penthouse Heating Demolition and New Works Plans

No.	Description	Date
0	Issued For Addendum #1	2022-02-07

Date: 2022-02-07
Drn By: K.M.L., E.I.T. / N.L.V.
Chk By: R.L.C., P. ENG.
Project Number: 201103
Drawing Number: M6-201
Revision: -



NOTES:

1. PROVIDE FOR THE DEMOLITION OF HWS AND HWR CONNECTIONS TO ALL INDUCTION CAV BOXES (TO BE DEMOLISHED BY VENTILATION CONTRACTOR). CAP LINES IN FIRST FLOOR ACCESSIBLE CEILING SPACE.
2. PROVIDE FOR THE REMOVAL OF EXISTING WALL MOUNTED CABINET HEATER. DEMOLISH EXISTING HWS/HWR LINES AND CAP IN FIRST FLOOR ACCESSIBLE CEILING SPACE. MODIFY WALL OPENING TO ACCOMMODATE A REPLACEMENT CABINET HEATER INSTALLATION. SEE NEW WORKS HEATING PLANS FOR MORE INFORMATION.
3. DISCONNECT AND REMOVE EXISTING ZONE CONVECTOR.
4. DEMOLISH EXISTING PNEUMATIC THERMOSTATS, AND ALL ACCESSIBLE CONTROL WIRING/TUBING.

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1 / M6-202 THIRD FLOOR DEMO PLANS - HEATING
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2022-02-07
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Client
Department of Transportation and Infrastructure.

Project Title
Eliot River Elementary School

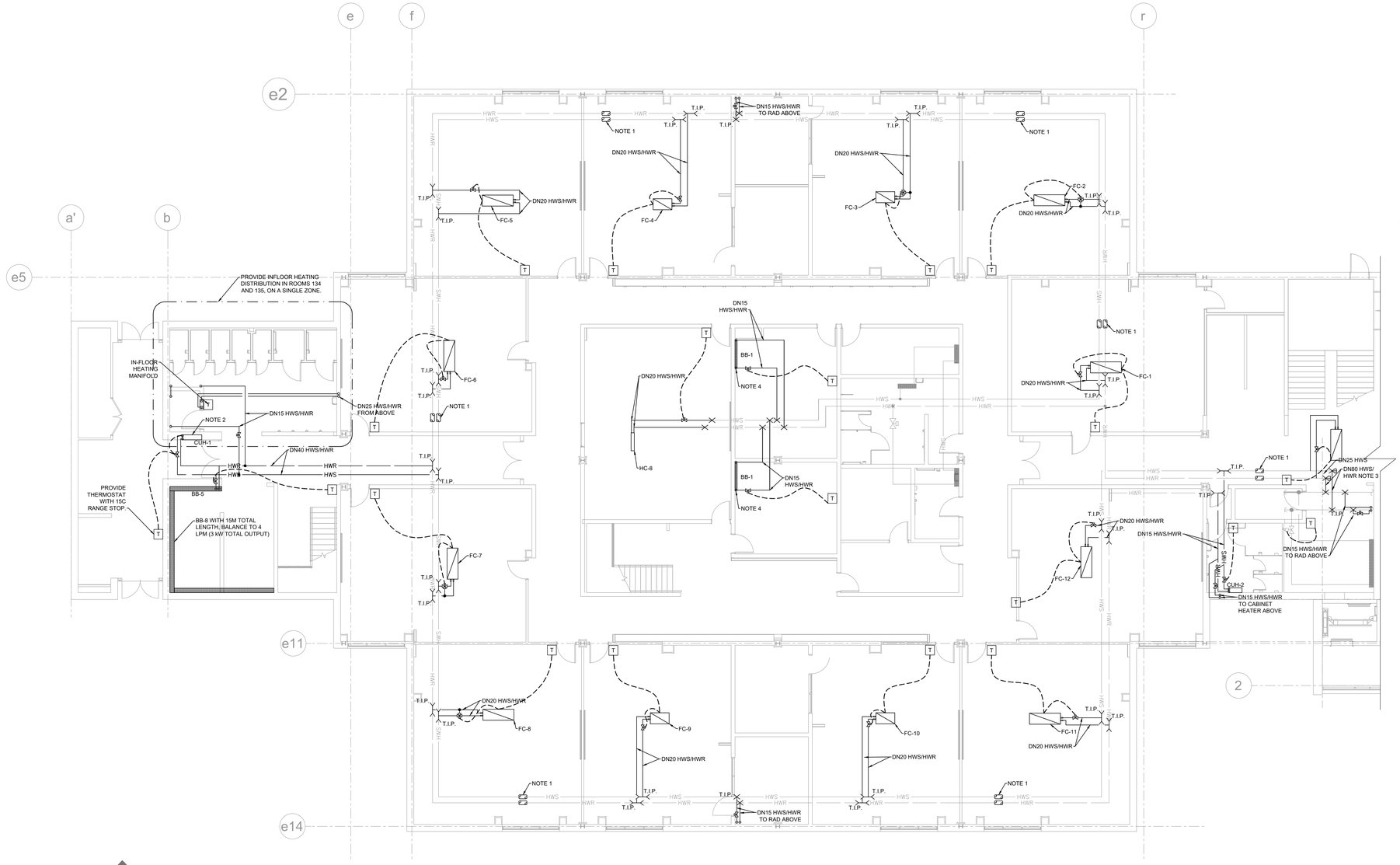
28 Terry Fox Place,
Cornwall, PEI
C0A 1H0

DTI Project No.: 170-20031

Sheet Title
Third Floor Demolition Plans: Heating

No.	Description	Date
0	Issued For Addendum #1	2022-02-07

Date: 2022-02-07
Drn By: K.M.L., E.I.T. / N.L.V.
Chk By: R.L.C., P. Eng.
Revision: -
Project Number: 201103
Drawing Number: M6-202



NOTES:

1. PROVIDE FOR THE REPLACEMENT OF EXISTING INSULATION ON HEATING DISTRIBUTION WITH NEW INSULATION.
2. COORDINATE WITH GC TO MODIFY ROUGH OPENING FOR CABINET HEATER, CHASE HEATING LINES THROUGH WALL OR PROVIDE BULKHEAD FOR LINES AND TO FULLY ENCLOSE HEATER AS REQUIRED.
3. PROVIDE DN80 INTERCONNECTION BETWEEN NEW AND EXISTING HEATING DISTRIBUTION LINES WITHIN FIRST FLOOR CEILING SPACE ONCE ALL EXISTING HIGH TEMPERATURE HEATING TERMINALS HAVE BEEN REPLACED WITH NEW UNITS AND DECOMMISSIONED.
4. COORDINATE WITH GC TO OBTAIN A GWB BULKHEAD TO CONCEAL HEATING LINES FROM ACCESSIBLE CEILING SPACE TO CONVECTOR.

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1 / M6-203 FIRST FLOOR NEW WORKS - HEATING PLAN

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PROFESSIONAL ENGINEER
Ryan L. Cooke
1475
Date
PROVINCE OF PRINCE EDWARD ISLAND

Client
Department of Transportation and Infrastructure.

Project Title
Eliot River Elementary School

28 Terry Fox Place,
Cornwall, PEI
C0A 1H0

DTI Project No.: 170-20031

Sheet Title
First Floor New Works: Heating Plan

No.	Description	Date
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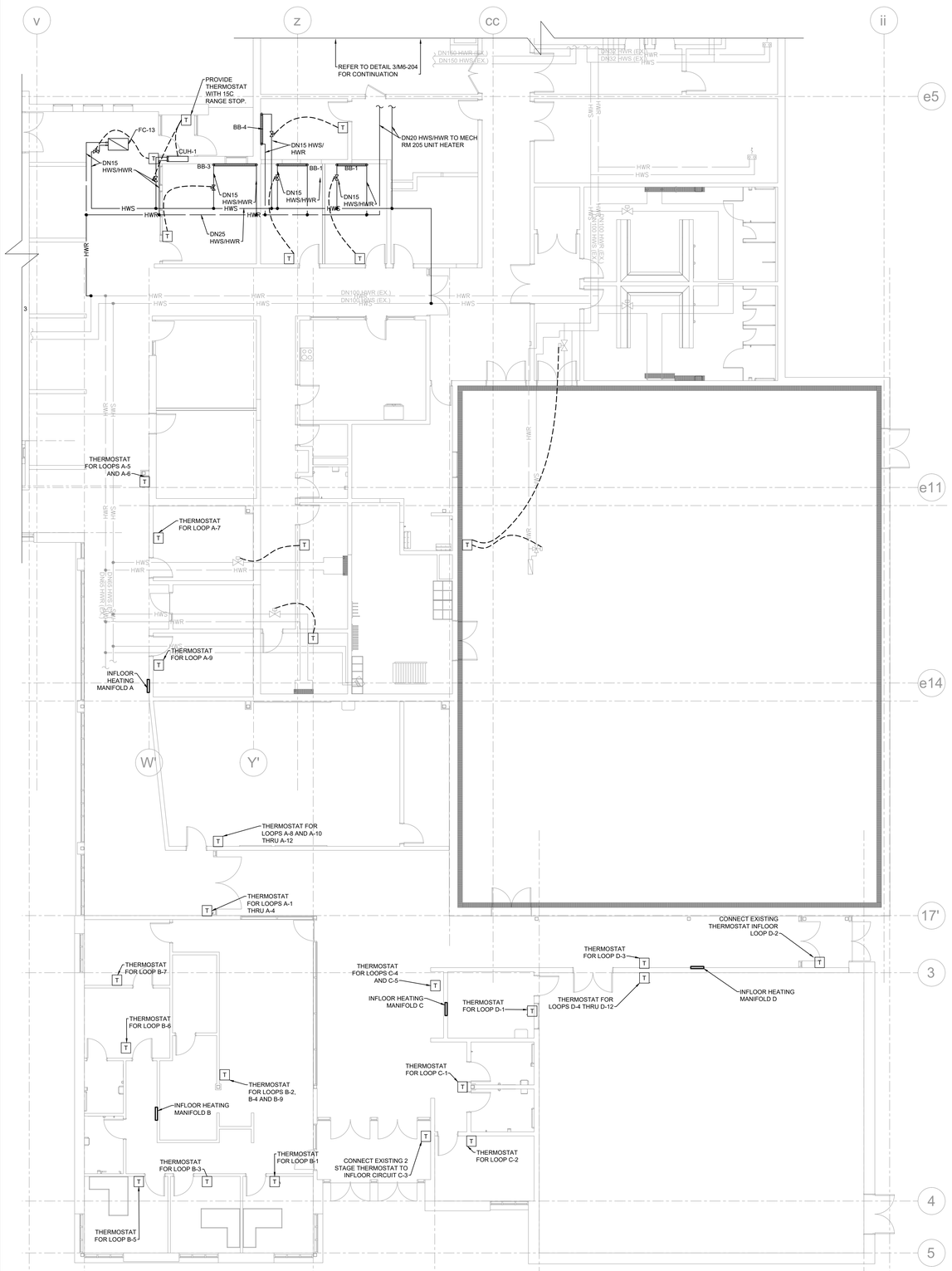
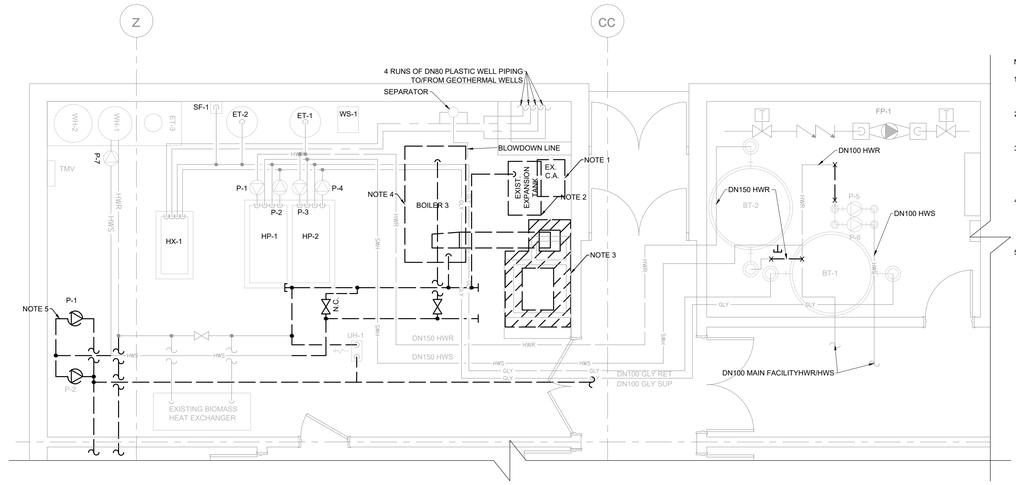
Date: 2022-02-07
Drn By: K.M.L., E.I.T. / N.L.V.
Chk By: R.L.C., P. ENG.
Revision: -
Project Number: 201103
Drawing Number: M6-203



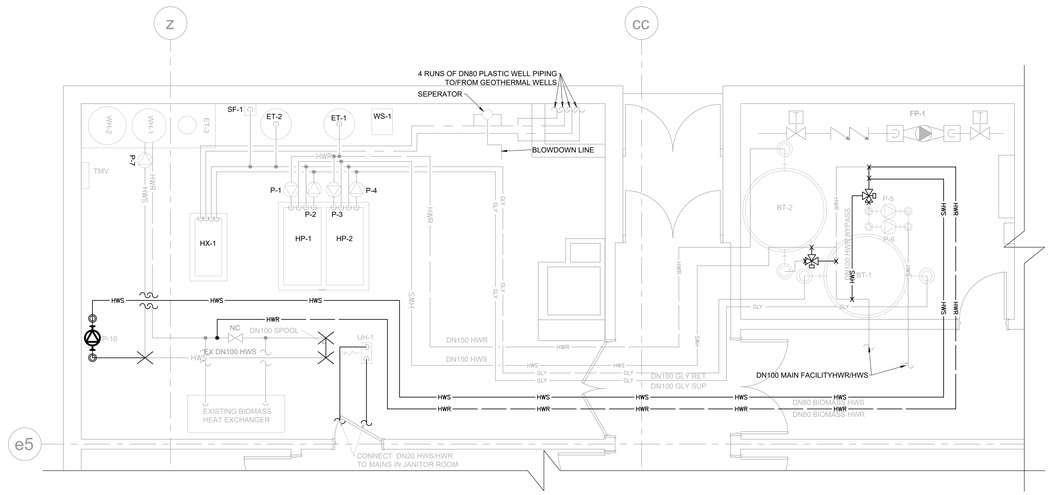
1 M6-204 SECOND FLOOR NEW WORKS - HEATING PLAN 1:100



2 M6-204 HEATING DEMOLITION PLAN - MECHANICAL ROOMS 205 AND 225 1:50

NOTES

1. DEMOLISH CONTROL AIR COMPRESSOR AFTER ALL PNEUMATIC CONTROLS HAVE BEEN FULLY DECOMMISSIONED.
2. DEMOLISH HYDRONIC EXPANSION TANK AND ALL ASSOCIATED PIPING ONCE BOILER DEMOLITION IS COMPLETE.
3. CHIMNEY TO BE DEMOLISHED DOWN TO THE LINE OF FINISHED FLOOR IN COORDINATION WITH GC ONCE BOILER IS DECOMMISSIONED. ROOF TO BE PATCHED AND WEATHERSEALED, FLOOR FINISH TO MATCH SURROUNDINGS.
4. BOILER 3 TO BE DECOMMISSIONED AND REMOVED ONCE ALL HIGH TEMPERATURE HEATING DEVICES IN THE FACILITY ARE DECOMMISSIONED IN COORDINATION WITH THE OWNER.
5. REMOVE CENTRAL CIRCULATION PUMPS ONCE THE ALL EXISTING HIGH-TEMPERATURE HEATING DEVICES ARE DECOMMISSIONED AND REMOVED.



2 M6-204 HEATING NEW WORKS PLAN - MECHANICAL ROOMS 205 AND 225 1:50

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PROFESSIONAL ENGINEER
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Ryan L. Cooke
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2022-02-07
Date

Client
Department of Transportation and Infrastructure.

Project Title
Eliot River Elementary School

28 Terry Fox Place,
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C0A 1H0

DTI Project No.: 170-20031

Sheet Title
Second Floor New Works: Heating Plan

No.	Description	Date
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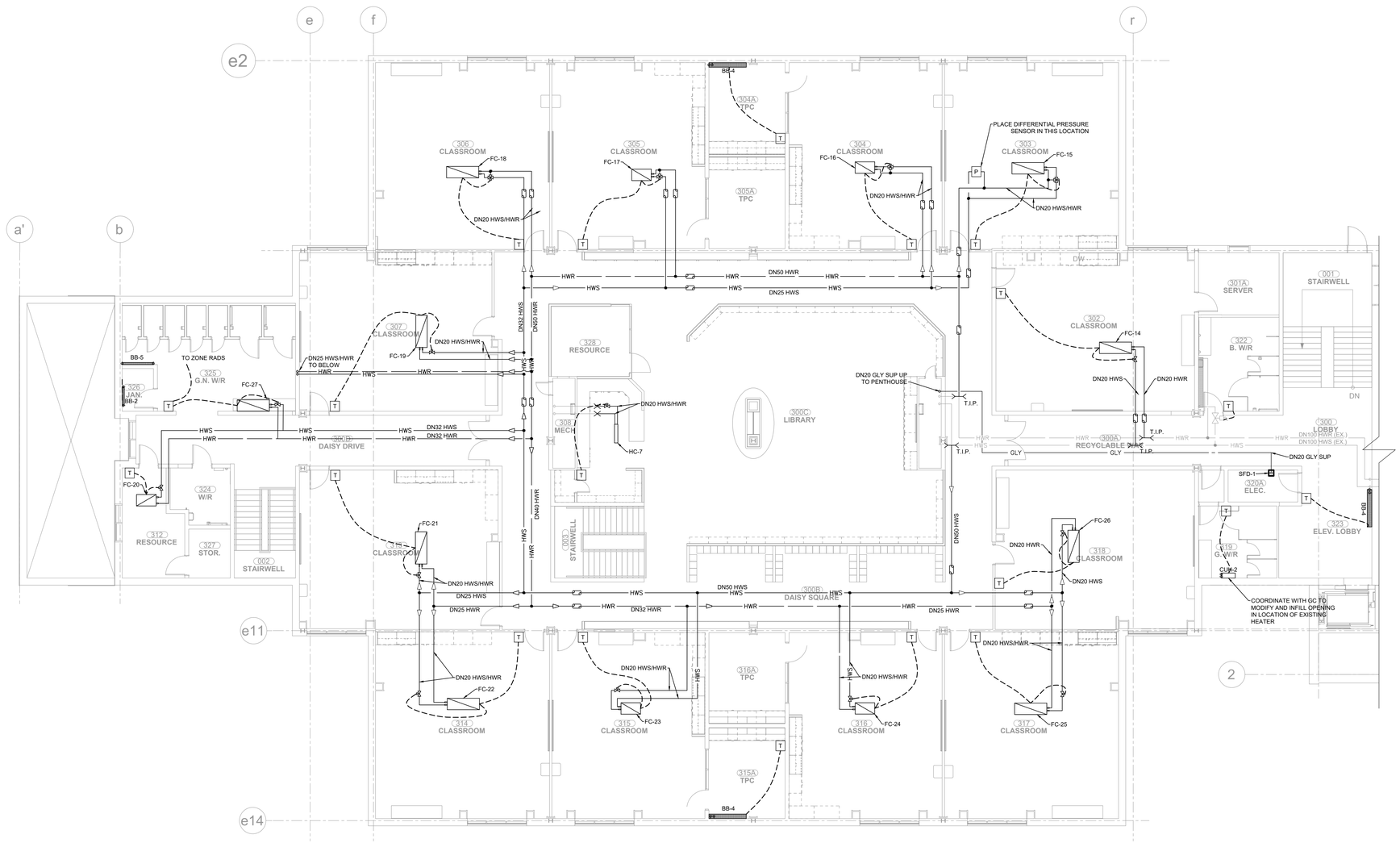
Drn By: K.M.L., E.I.T. / N.L.V.
Chk By: R.L.C., P. ENG.
Revision: -
Project Number: 201103
Drawing Number: M6-204



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1 / M6-205 THIRD FLOOR NEW WORKS - HEATING PLAN

1:100

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Client
Department of Transportation and Infrastructure.

Project Title
Eliot River Elementary School

28 Terry Fox Place,
Cornwall, PEI
C0A 1H0

DTI Project No.: 170-20031

Sheet Title
Third Floor New Works: Heating

No.	Description	Date
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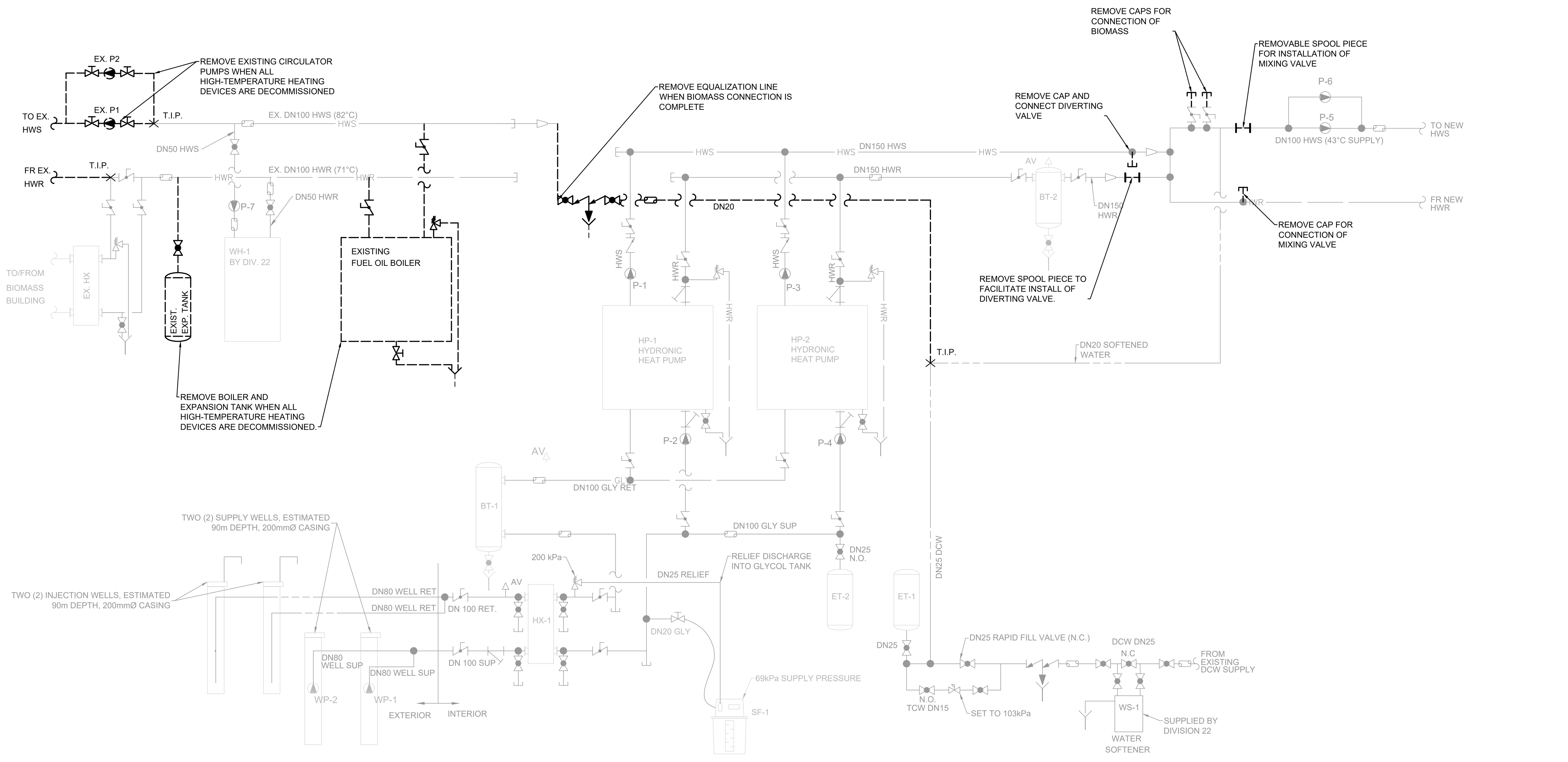
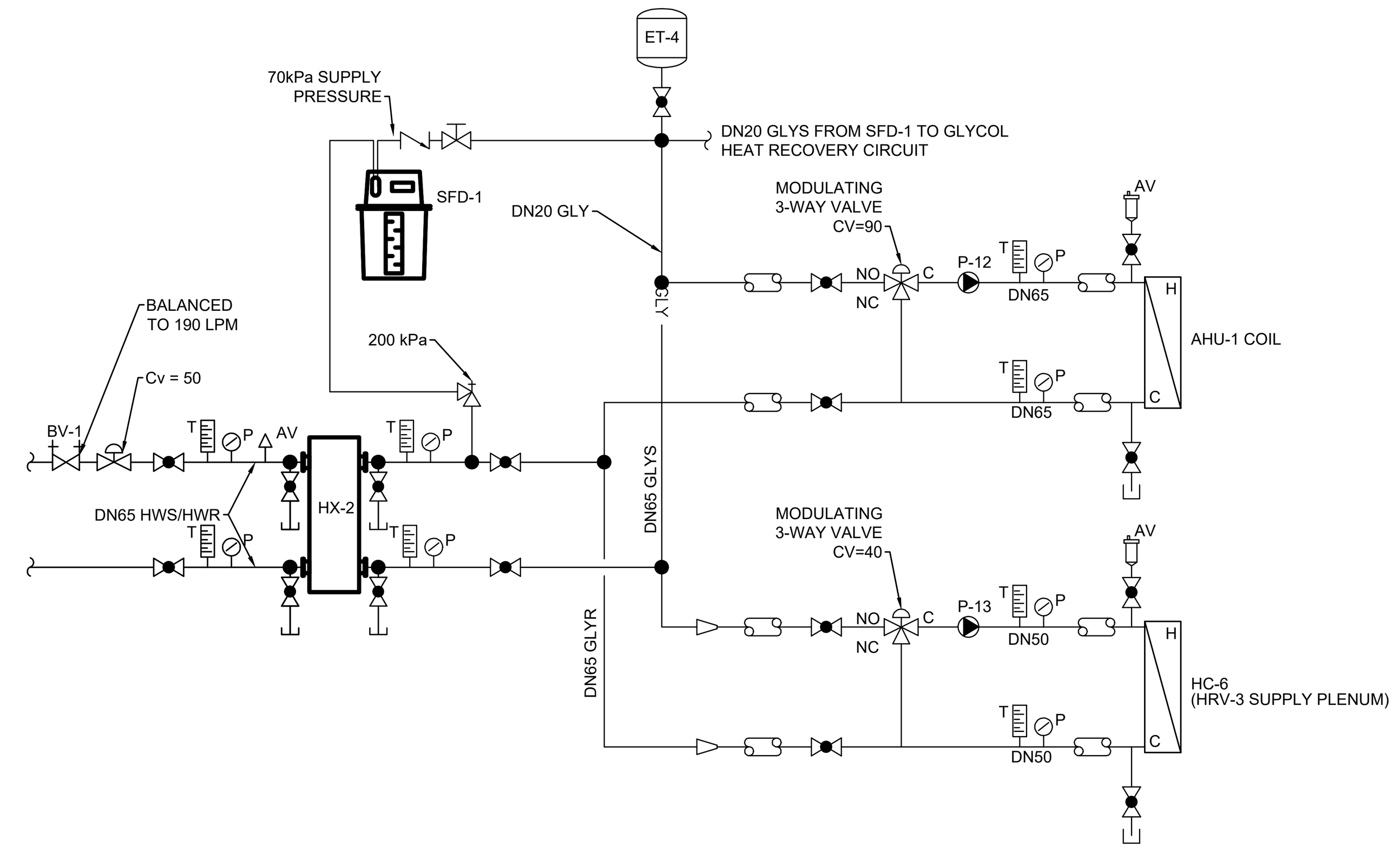
Date: 2022-02-07
Drn By: K.M.L., E.I.T. / N.L.V.
Chk By: R.L.C., P. Eng.
Revision: -
Project Number: 201103
Drawing Number: M6-205



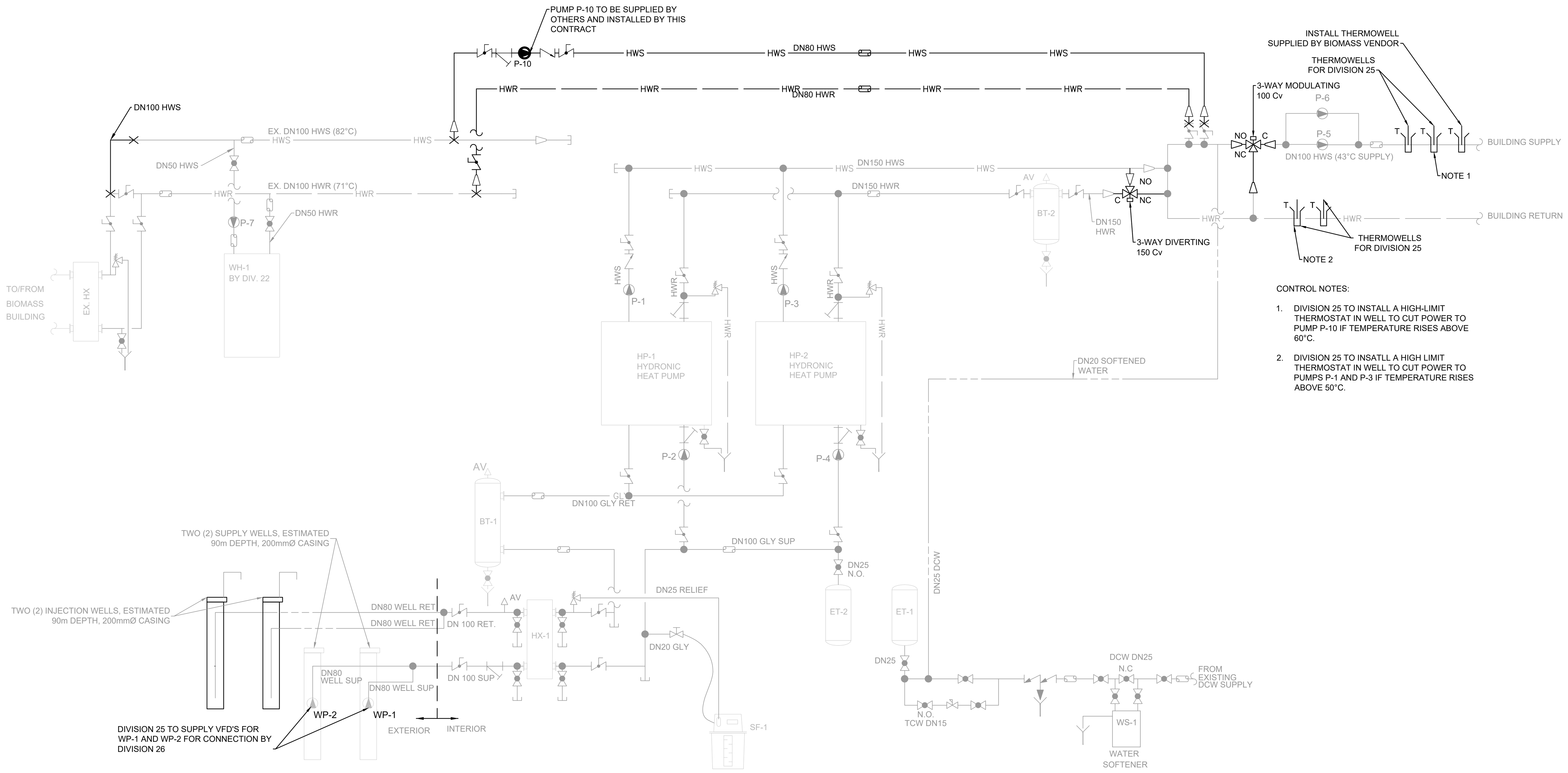
EX. P2
EX. P1
REMOVE EXISTING CIRCULATOR PUMPS WHEN ALL HIGH-TEMPERATURE HEATING DEVICES ARE DECOMMISSIONED
TO EX HWS
FR EX HWR
T.I.P.
EX. DN100 HWS (82°C)
EX. DN100 HWR (71°C)
DN50 HWS
DN50 HWR
P-7
WH-1 BY DIV. 22
TO/FROM BIOMASS BUILDING
EX. HX
EXIST. EXP. TANK
EXISTING FUEL OIL BOILER
REMOVE BOILER AND EXPANSION TANK WHEN ALL HIGH-TEMPERATURE HEATING DEVICES ARE DECOMMISSIONED.
REMOVE EQUALIZATION LINE WHEN BIOMASS CONNECTION IS COMPLETE
DN150 HWS
DN150 HWR
DN20
P-1
P-2
P-3
P-4
HP-1 HYDRONIC HEAT PUMP
HP-2 HYDRONIC HEAT PUMP
REMOVE CAPS FOR CONNECTION OF BIOMASS
REMOVABLE SPOOL PIECE FOR INSTALLATION OF MIXING VALVE
REMOVE CAP AND CONNECT DIVERTING VALVE
REMOVE SPOOL PIECE TO FACILITATE INSTALL OF DIVERTING VALVE.
REMOVE CAP FOR CONNECTION OF MIXING VALVE
P-6
P-5
DN100 HWS (43°C SUPPLY)
TO NEW HWS
FR NEW HWR
BT-2
DN150 HWR
DN20 SOFTENED WATER
BT-1
DN100 GLY RET
DN100 GLY SUP
200 kPa
DN25 RELIEF
RELIEF DISCHARGE INTO GLYCOL TANK
DN25 N.O.
ET-2
ET-1
DN25 DCW
TWO (2) SUPPLY WELLS, ESTIMATED 90m DEPTH, 200mmØ CASING
TWO (2) INJECTION WELLS, ESTIMATED 90m DEPTH, 200mmØ CASING
DN80 WELL RET
DN 100 RET.
DN80 WELL SUP
DN 100 SUP
HX-1
DN20 GLY
WP-2
WP-1
EXTERIOR
INTERIOR
69kPa SUPPLY PRESSURE
SF-1
DN25 RAPID FILL VALVE (N.C.)
DCW DN25 N.C
FROM EXISTING DCW SUPPLY
N.O. TCW DN15
SET TO 103kPa
WS-1
WATER SOFTENER
SUPPLIED BY DIVISION 22

1 HEATING SYSTEM DEMOLITION SCHEMATIC
M6-206 NTS



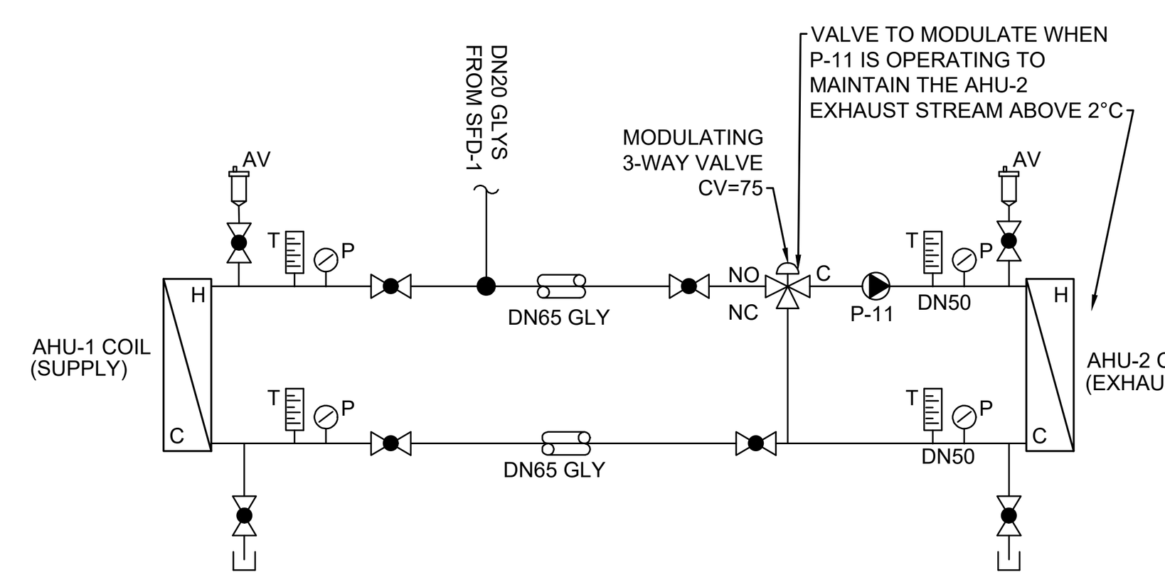
ET-4
70kPa SUPPLY PRESSURE
DN20 GLYS FROM SFD-1 TO GLYCOL HEAT RECOVERY CIRCUIT
SFD-1
DN20 GLY
MODULATING 3-WAY VALVE CV=90
P-12
DN65
AHU-1 COIL
200 kPa
BALANCED TO 190 LPM
Cv = 50
BV-1
HX-2
DN65 HWS/HWR
DN65 GLYS
DN65 GLYR
MODULATING 3-WAY VALVE CV=40
P-13
DN50
HC-6 (HRV-3 SUPPLY PLENUM)

2 SOUTH PENTHOUSE GLYCOL HEATING CIRCUIT
M6-206 NTS



PUMP P-10 TO BE SUPPLIED BY OTHERS AND INSTALLED BY THIS CONTRACT
P-10
DN80 HWS
DN80 HWR
DN100 HWS
INSTALL THERMOWELL SUPPLIED BY BIOMASS VENDOR
THERMOWELLS FOR DIVISION 25
3-WAY MODULATING 100 Cv
BUILDING SUPPLY
NOTE 1
BUILDING RETURN
3-WAY DIVERTING 150 Cv
THERMOWELLS FOR DIVISION 25
NOTE 2
CONTROL NOTES:
1. DIVISION 25 TO INSTALL A HIGH-LIMIT THERMOSTAT IN WELL TO CUT POWER TO PUMP P-10 IF TEMPERATURE RISES ABOVE 60°C.
2. DIVISION 25 TO INSATLL A HIGH LIMIT THERMOSTAT IN WELL TO CUT POWER TO PUMPS P-1 AND P-3 IF TEMPERATURE RISES ABOVE 50°C.
DIVISION 25 TO SUPPLY VFD'S FOR WP-1 AND WP-2 FOR CONNECTION BY DIVISION 26

3 HEATING SYSTEM NEW WORKS SCHEMATIC
M6-206 NTS



4 AHU-1 GLYCOL RUN-AROUND HEAT RECLAIM CIRCUIT SCHEMATIC
M6-206 NTS

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PROFESSIONAL ENGINEER — Ryan L. Cooke 1476 — 2022-02-07 — PROVINCE OF PRINCE EDWARD ISLAND

Client: Department of Transportation and Infrastructure.

Project Title: Eliot River Elementary School

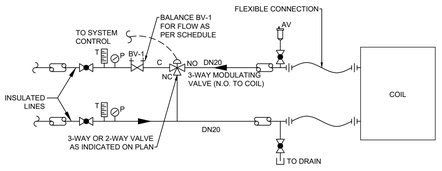
28 Terry Fox Place,
Cornwall, PEI
C0A 1H0

DTI Project No.: 170-20031

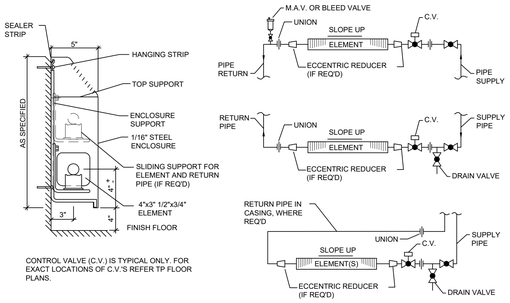
Sheet Title: Heating System Schematics and Details

No.	Description	Date
0	Issued For Addendum #1	2022-02-07

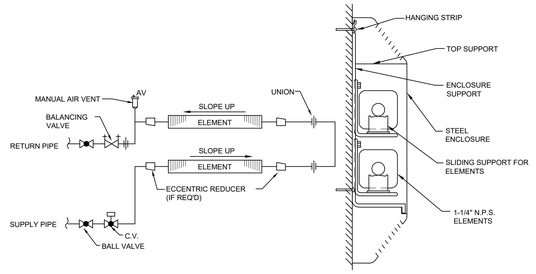
Date: 2022-02-07
Drn By: K.M.L., E.I.T. / N.L.V.
Chk By: R.L.C., P. ENG.
Project Number: 201103
Drawing Number: M6-206
Revision: -



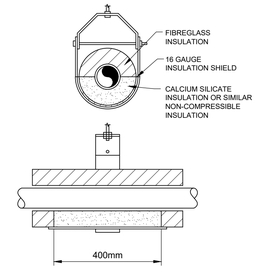
1 M6-207 FAN COIL PIPING DETAIL
NTS



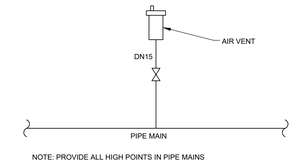
2 M6-207 LOW-WALL CONVECTOR DETAILS
NTS



3 M6-207 MID-WALL CONVECTOR DETAILS
NTS

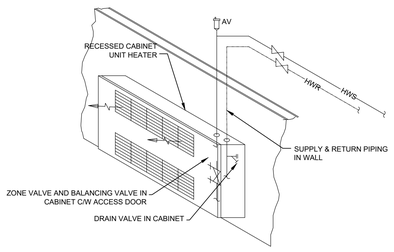


4 M6-207 INSULATION AT HANGERS
NTS

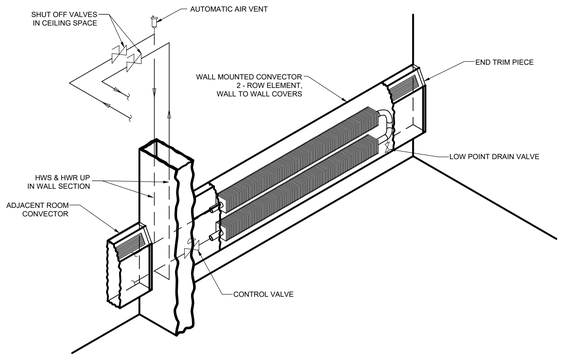


NOTE: PROVIDE ALL HIGH POINTS IN PIPE MAINS

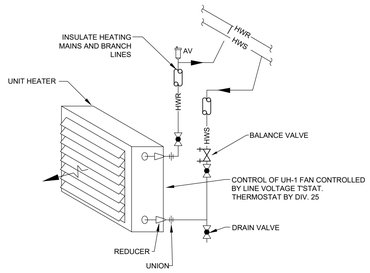
5 M6-207 PIPE AIR VENTING
NTS



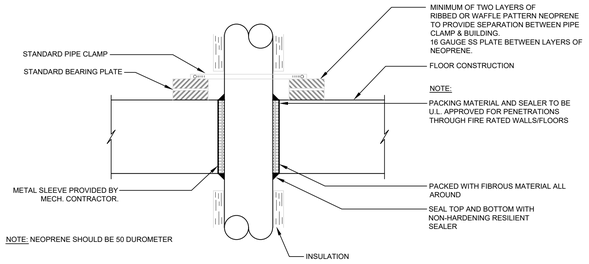
7 M6-207 RECESSED CABINET HEATER PIPING
NTS

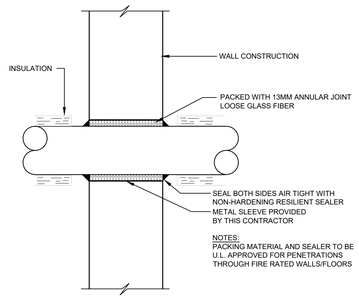


8 M6-207 CONVECTOR PIPING ARRANGMENT
NTS



9 M6-207 UNIT HEATER PIPING
NTS





3 M6-207 PIPE WALL AND FLOOR PENETRATION DETAILS
NTS

CIRCULATOR PUMP SCHEDULE

TAG	END USE	TYPE	MODEL	PERFORMANCE		ELECTRICAL	
				FLOW (LPM)	HEAD (kPa)	MOTOR kW	POWER TYPE
P-10	BIOMASS INJECTION	SUPPLIED BY OTHERS					
P-11	HEAT RECLAIM GLYCOL	INLINE CIRCULATOR	ARMSTRONG 2x2x6x1.5HP	285	100	1.1	575/3/60
P-12	AHU-1 COIL PUMP	INLINE CIRCULATOR	ARMSTRONG 2x2x6x2HP	350	100	1.5	575/3/60
P-13	HRV-3 COIL PUMP	INLINE CIRCULATOR	ARMSTRONG 1.25Bx1.5HP	160	150	1.1	575/3/60

BASEBOARD HEATER SCHEDULE

TAG	TYPE	CAPACITY (W)	CAPACITY (W/m)	LENGTH (mm)	HEIGHT (mm)	FLOW (LPM)	EWT (°C)	LWT (°C)	BASIS OF DESIGN
BB-1	BASEBOARD CONVECTOR	400	285	1400	500	0.5	43	32	JAGA STRADA STRW.05014010
BB-2	BASEBOARD CONVECTOR	250	280	900	500	0.5	43	32	JAGA STRADA STCA.05009010
BB-3	LOW WALL CONVECTOR	1250	625	2000	650	2	43	32	JAGA CONTINUA STCA.06520020
BB-4	BASEBOARD CONVECTOR	1300	720	1800	650	2	43	32	JAGA STRADA STRW.06518021
BB-5	MID WALL CONVECTOR	-	210	-	430	-	43	32	SLANT/FIN TBG-17, C440 ELEMENT

CABINET UNIT HEATER SCHEDULE

TAG	TYPE	CAPACITY (kW)	EAT (°C)	FLOW (LPM)	EWT (°C)	LWT (°C)	ELEC. CONS.	POWER TYPE	BASIS OF DESIGN
CUH-1	FULLY RECESSED CABINET TYPE, WITH VENTED FACEPLATE	2.8	12	5	43	32	150 W	120/1/60	ROSEMEX FORCE FLOW F-300C
CUH-2	CABINET TYPE, SURFACE MOUNT	2.8	18	42	43	32	150 W	120/1/60	ROSEMEX FORCE FLOW F-300C

UNIT HEATER SCHEDULE

TAG	TYPE	CAPACITY (kW)	EAT (°C)	FLOW (LPM)	EWT (°C)	LWT (°C)	ELEC. CONS.	POWER TYPE	BASIS OF DESIGN
UH-1	HORIZONTAL UNIT HEATER	6.4	15	23.1	43	32	264 W	120/1/60	BEACON MORRIS HB-84

SYSTEM FEEDER SCHEDULE

TAG	TYPE	MODEL	PERFORMANCE			ELECTRICAL		NOTES
			FLOW (LPM)	PRESSURE SETPOINT (kPa)	TANK VOLUME (L)	FLA	POWER TYPE	
SFD-1	WALL MOUNTED GLYCOL SYSTEM FEEDER	AXIOM DMF150	3.79	140	17	0.5	120/1/60	PROVIDE FOR 24VDC CONTROL WIRING FROM LOW-LEVEL DRY CONTACTS TO BMS

EXPANSION TANK SCHEDULE

TAG.	APPLICATION	TYPE	ACCEPTANCE VOLUME (L)	MAX. PRESS. (kPa)	MAX. TEMP (°C)	TANK HEIGHT (mm)	TANK DIA (mm)	CONN. SIZE	WEIGHT (kg)	BASIS OF DESIGN
ET-4	GLYCOL CIRCUIT EXPANSION	PARTIAL ACCEPTANCE ELASTOMERIC BLADDER	12	860	115	460	305	DN20	4	AMTROL AX-10DD

HYDRONIC HEAT EXCHANGER SCHEDULE

TAG	TYPE	CAPACITY (kW)	SOURCE FLUID DATA					SINK FLUID DATA					DIMENSIONS				NOTES
			FLUID	FLOW (LPM)	E.W.T. (°C)	L.W.T. (°C)	P.D. (kPa)	FLUID	FLOW (LPM)	E.W.T. (°C)	L.W.T. (°C)	P.D. (kPa)	LENGTH (mm)	WIDTH (mm)	HEIGHT (mm)	WEIGHT (kg)	
HX-2	BRAZED PLATE	140	WATER	190	43.3	32.2	7.4	40% E.GLY.	400	29.4	35	35	350	190	600	80	WALL MOUNTED, INSULATED

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PROFESSIONAL ENGINEER
Province of Prince Edward Island
Ryan L. Cooke
1475
2022-02-07
Date

Client
Department of Transportation and Infrastructure.

Project Title
Eliot River Elementary School

28 Terry Fox Place,
Cornwall, PEI
C0A 1H0

DTI Project No.: 170-20031

Sheet Title
Heating Details and Schedules

No.	Description	Date
0	Issued For Addendum #1	2022-02-07

Date: 2022-02-07
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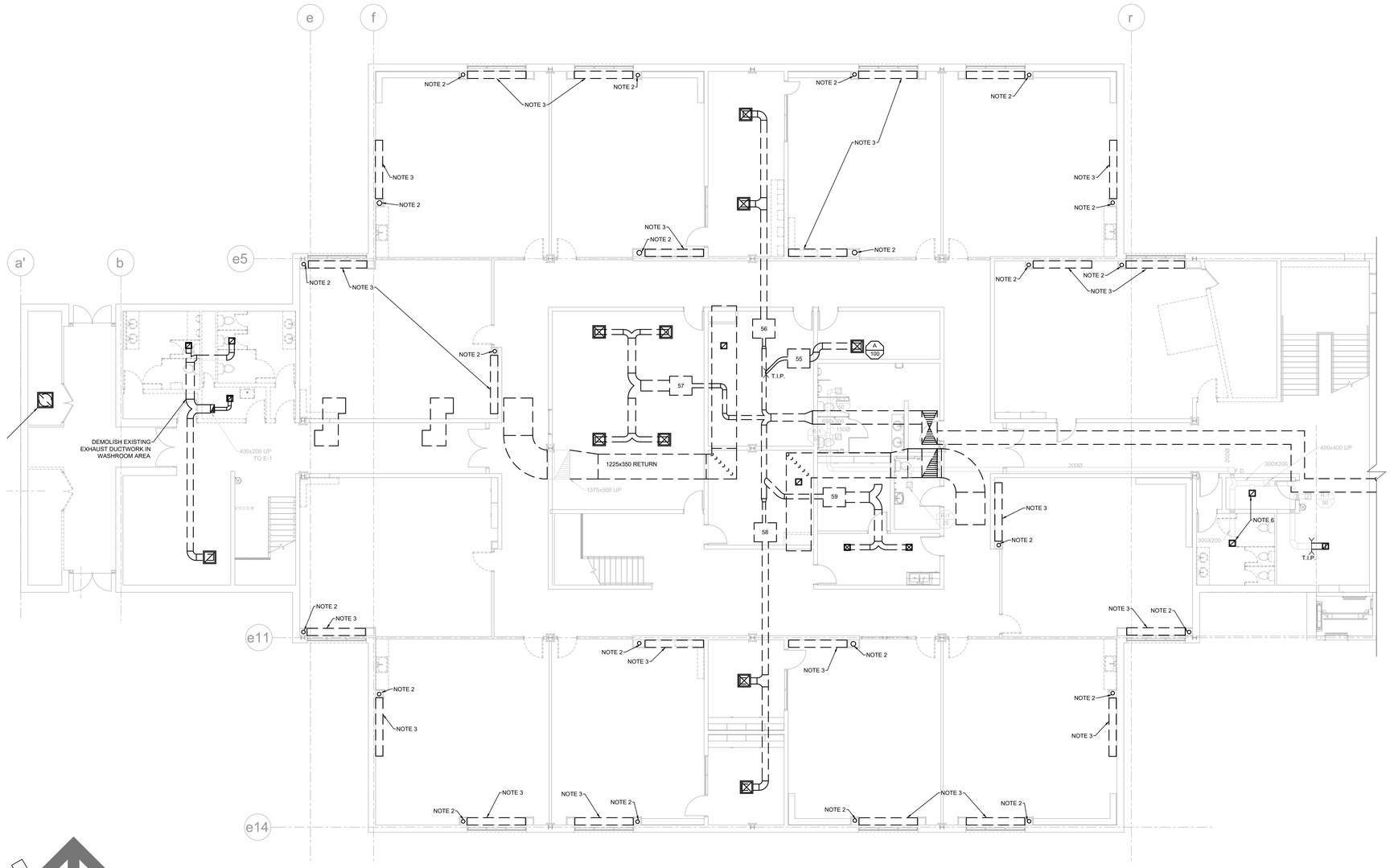
Project Number: 201103
Drawing Number: M6-207



TRUE NORTH

PROJECT NORTH

1 / M6-300 FIRST FLOOR DEMOLITION PLAN - VENTILATION

1:100

VENTILATION LEGEND

- SUPPLY AIR DIFFUSER
- RETURN AIR GRILLE
- 90-DEGREE CORNER WITH TURNING VANES
- FIRE DAMPER (DAMPER WITH SHUTTER AND FUSIBLE LINK)
- SQUARE TO ROUND TRANSITION ADAPTOR
- BALANCE DAMPER
- LOUVRE (L-1)
- MOTORIZED DAMPER (MD)
- DIFFUSER ID TAG. S-2: SUPPLY DIFFUSER TYPE 2 BALANCED TO X LPS
- ACCESS HATCH - SIZE AS NOTED (AH)
- ROUND DUCT ACCESS HATCH (HANDHOLE)
- CARBON DIOXIDE ZONE SENSOR
- ITEMS TO BE REMOVED
- THERMOSTAT (T)

ACRONYMS:

EA	- EXHAUST
OA	- OUTDOOR AIR
RA	- RETURN AIR
SA	- SUPPLY AIR
BD	- BALANCE DAMPER
EF	- EXHAUST FAN
ERV	- ENERGY RECOVERY VENTILATOR
H	- HOOD (FOR KITCHEN EXHAUST)
L	- LOUVRE
MAU	- MAKEUP AIR UNIT
MD	- MOTORIZED DAMPER

NOTES:

1. CAP OFF DUCT AT EXISTING WALL BOX LOCATION (TO BE REMOVED).
2. TRIM DUCT FROM THE LINE OF THE FLOOR TO THE LINE OF THE CEILING.
3. DEMOLISH WALL INDUCTION CAV BOX UNIT.
4. DEMOLISH CONCEALED CAV BOX UNIT, INFILL WITH INSULATED GALVANIZED DUCT SPOOL.
5. PROVIDE OF THE DEMOLITION OF EXISTING EXHAUST FAN AND CORRESPONDING DUCTWORK. COORDINATE EXACT LOCATION OF BOTH EXHAUST FAN AND DUCTWORK ON-SITE PRIOR TO BEGINNING DEMOLITION. PATCH ROOF AS NEEDED.
6. PROVIDE FOR THE DEMOLITION OF EXISTING EXHAUST DIFFUSERS/GRILLE.

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PROFESSIONAL ENGINEER — Ryan L. Cooke 1475 — Date — Province of Prince Edward Island

Client: Department of Transportation and Infrastructure.

Project Title: Eliot River Elementary School
28 Terry Fox Place,
Cornwall, PEI
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DTI Project No.: 170-20031

Sheet Title: First Floor Demoltion Plan: Ventilation

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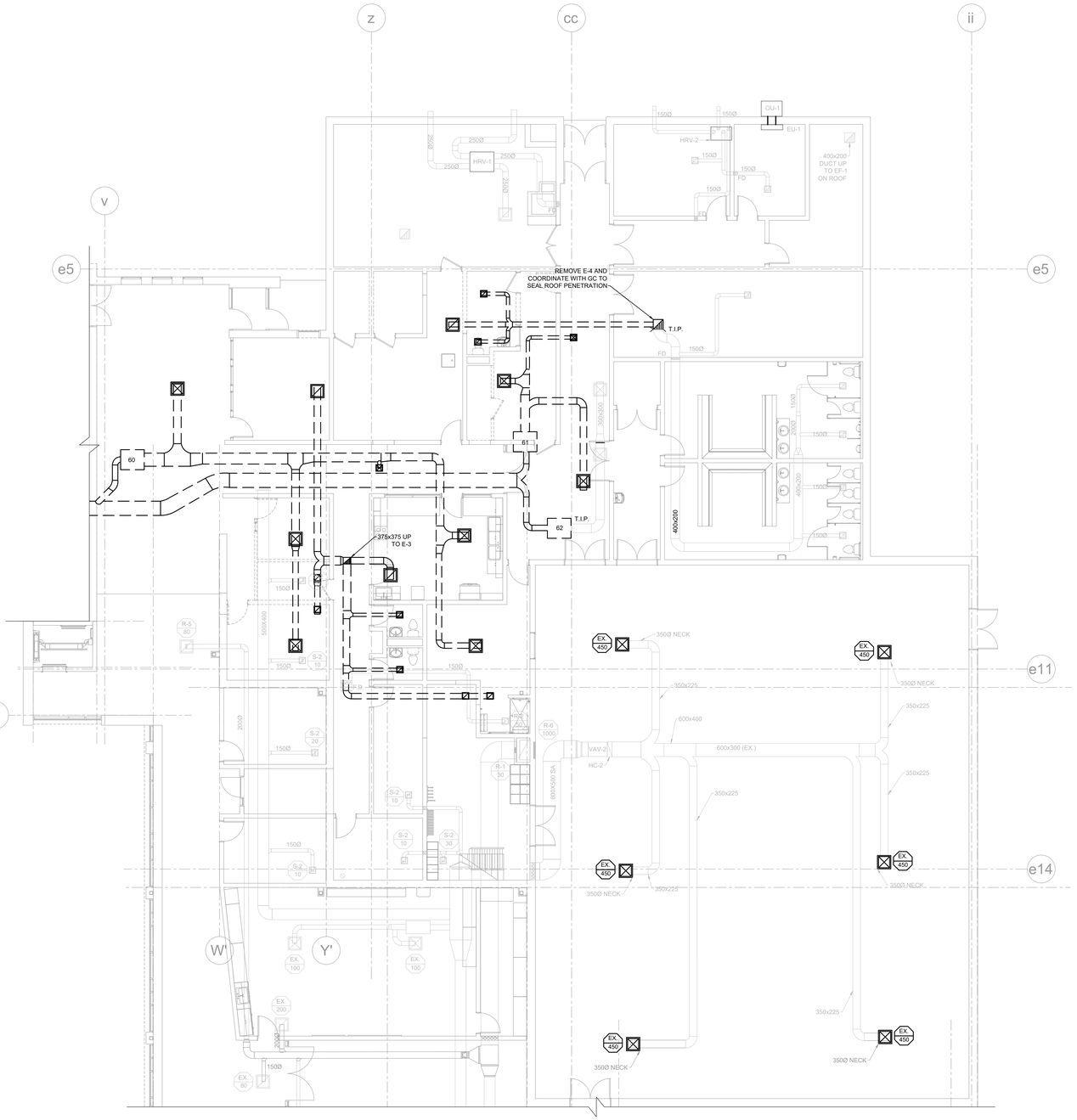
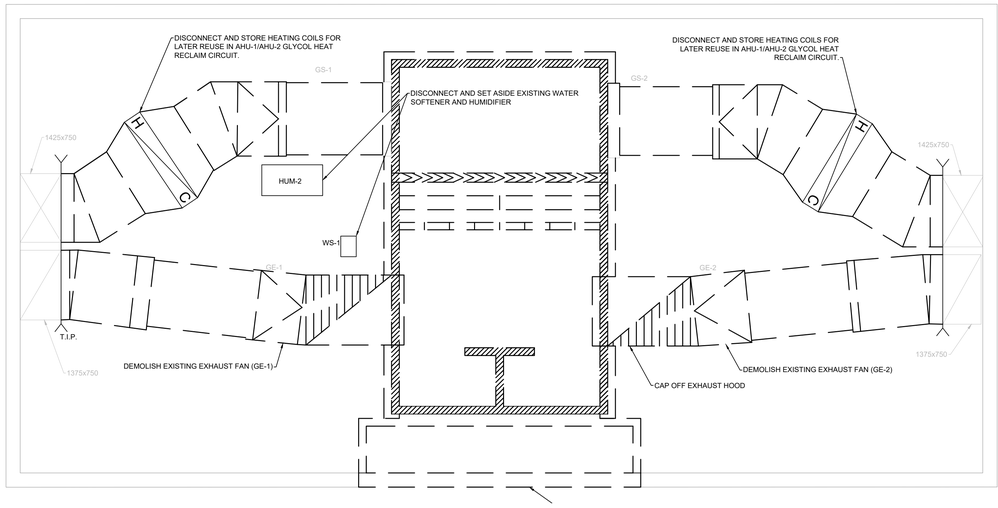
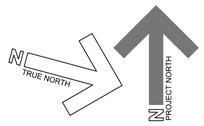


NOTES:

1. CAP OFF DUCT AT EXISTING WALL BOX LOCATION (TO BE REMOVED).
2. TRIM DUCT FROM THE LINE OF THE FLOOR TO THE LINE OF THE CEILING.
3. DEMOLISH WALL INDUCTION CAV BOX UNIT.
4. DEMOLISH CONCEALED CAV BOX UNIT, INFILL WITH INSULATED GALVANIZED DUCT SPOOL.
5. PROVIDE OF THE DEMOLITION OF EXISTING EXHAUST FAN AND CORRESPONDING DUCTWORK. COORDINATE EXACT LOCATION OF BOTH EXHAUST FAN AND DUCTWORK ON-SITE PRIOR TO BEGINNING DEMOLITION. PATCH ROOF AS NEEDED.
6. PROVIDE FOR THE DEMOLITION OF EXISTING EXHAUST DIFFUSERS/GRILLE.





1 M6-301 SECOND FLOOR & GYM AREA DEMOLITION PLAN - VENTILATION
1:100

2 M6-301 SOUTH PENTHOUSE - DEMOLITION PLANS
1:50

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PROVINCE OF PRINCE EDWARD ISLAND
Date

Client
Department of Transportation and Infrastructure.

Project Title
Eliot River Elementary School

28 Terry Fox Place,
Cornwall, PEI
C0A 1H0

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Sheet Title
Second Floor, Gym Area & Penthouse Demolition Plans - Ventilation

No.	Description	Date
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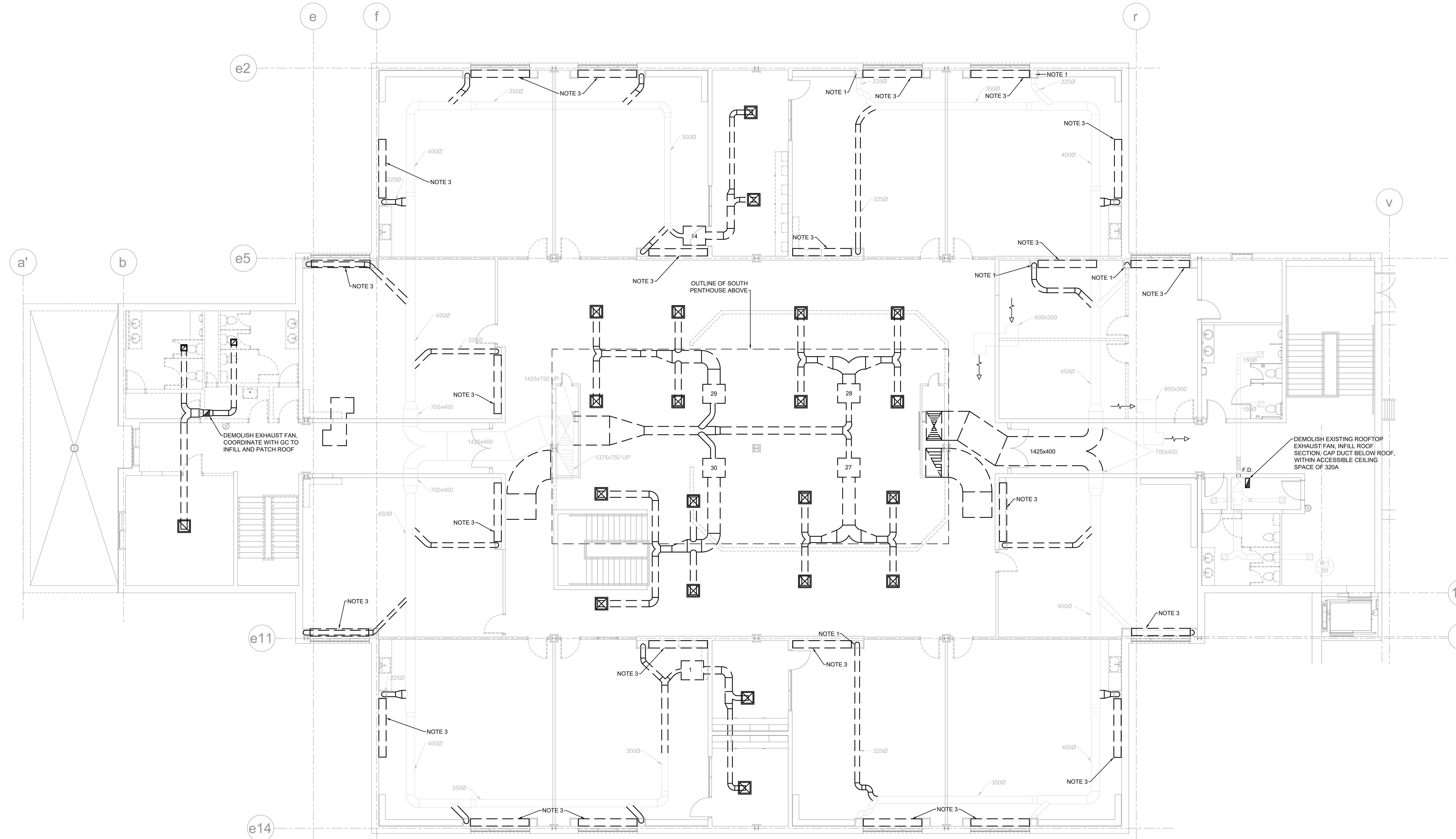
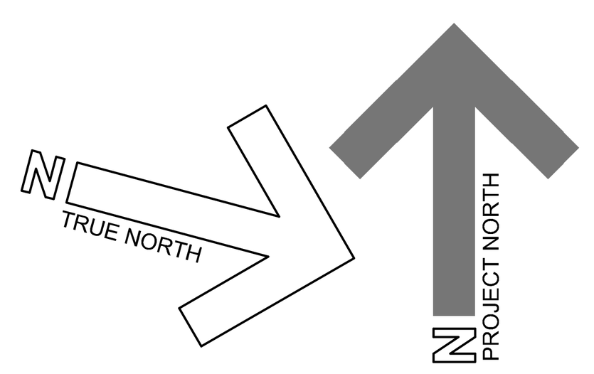
Drawing Number: M6-301





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M6-302

THIRD FLOOR DEMOLITION PLAN - VENTILATION

1:100

NOTES:

1. CAP OFF DUCT AT EXISTING WALL BOX LOCATION (TO BE REMOVED).
2. TRIM DUCT FROM THE LINE OF THE FLOOR TO THE LINE OF THE CEILING.
3. DEMOLISH WALL INDUCTION CAV BOX, INFILL CONNECTION WITH INSULATED GALVANIZED SPOOL TO PRESERVE VENTILATION SHAFT TO LOWER FLOOR.
4. DEMOLISH CONCEALED CAV BOX UNIT WITHIN ACCESSIBLE CEILING SPACE, REPLACE WITH INSULATED GALVANIZED DUCT SPOOL.

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2022-02-07
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Project Title
Eliot River Elementary School

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DTI Project No.: 170-20031

Sheet Title
Third Floor Demoltion Plan: Ventilation

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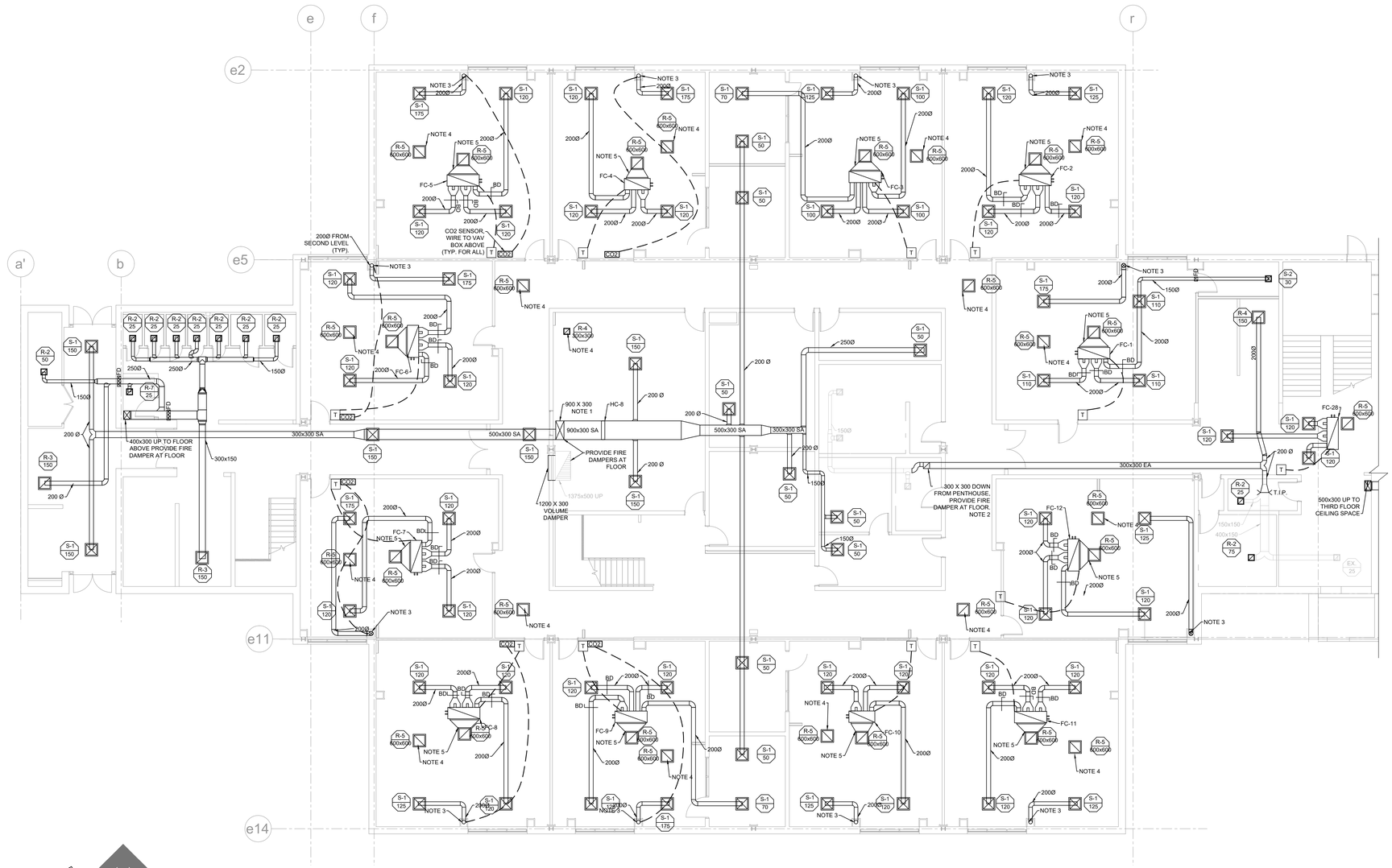
Revision
-

Project Number:
201103

Drawing Number:
M6-302



NOTES:

1. COORDINATE WITH GC TO OBTAIN ROUGH OPENING FOR VENTILATION SHAFT, PROVIDE FIRE DAMPER AT LINE OF FLOOR.
2. COORDINATE WITH GC TO INFILL OPENINGS FROM EXISTING DUCT CHASES, PROVIDE FIRE DAMPER AT LINE OF FLOOR FOR NEW EXHAUST SHAFT.
3. PROVIDE FOR THE INSTALLATION OF FIRE AND SMOKE DAMPERS AT FLOOR LINE FOR THE INDICATED VERTICAL DUCT FLOOR PENETRATIONS.
4. PROVIDE PLENUM RETURN GRILLE PER SCHEDULE LAID WITHIN T-BAR CEILING GRID.
5. PROVIDE DUCTED RETURN TO FANCOIL WITH A MINIMUM 600X200

N TRUE NORTH

N PROJECT NORTH

1 M6-303 FIRST FLOOR NEW WORKS PLAN - VENTILATION

1:100

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Project Title
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28 Terry Fox Place,
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First Floor New Works: Ventilation

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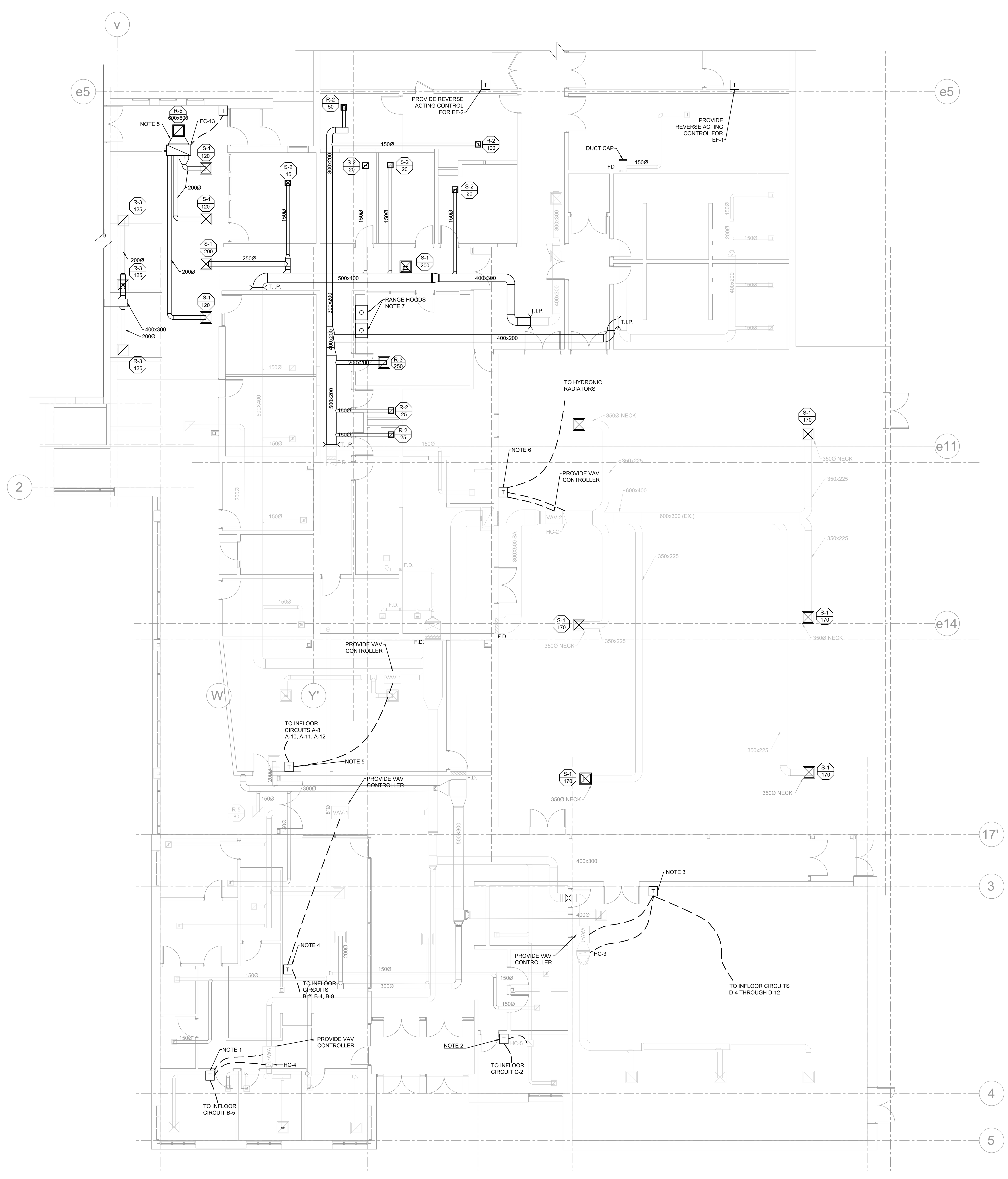
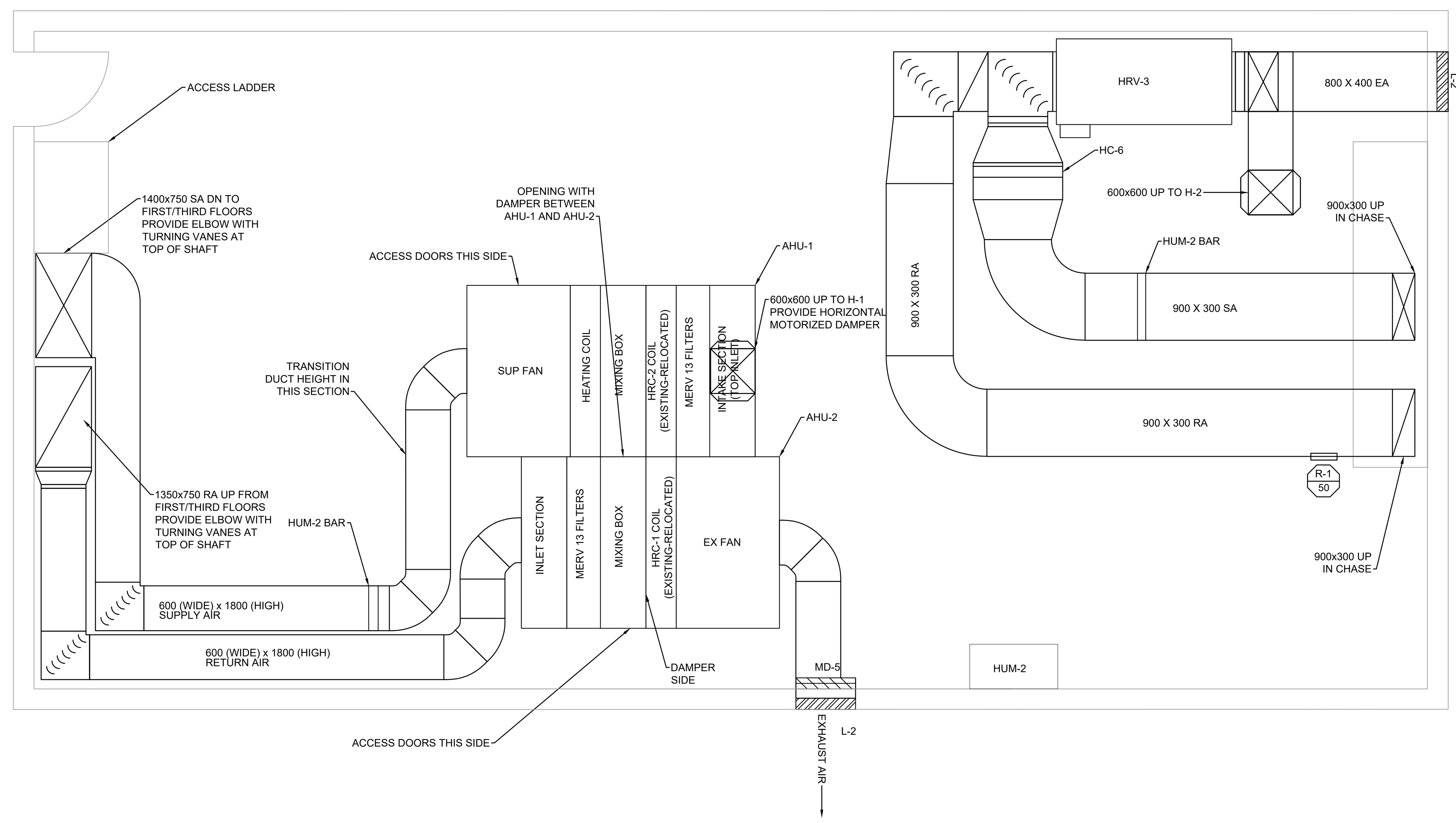
Project Number: 201103
Drawing Number: M6-303



1 M6-304 SECOND FLOOR NEW WORKS PLAN - VENTILATION
1:100

NOTES:

1. DIVISION 25 TO SUPPLY AND INSTALL A COMBINATION ZONE TEMPERATURE AND CO2 SENSOR IN THIS LOCATION. THE UNIT SHALL PROVIDE VENTILATION CONTROL FOR THE VAV BOX INDICATED, FIRST STAGE HEAT CALL TO INFLOOR CIRCUIT B-5, AND SECOND STAGE HEAT CALL TO HC-4.
2. DIVISION 25 TO SUPPLY AND INSTALL ZONE TEMPERATURE SENSOR, TO PROVIDE FIRST STAGE HEAT CALL TO INFLOOR ZONE C-2, SECOND STAGE HEAT CALL TO HC-5.
3. DIVISION 25 TO SUPPLY AND INSTALL A COMBINATION ZONE TEMPERATURE AND CO2 SENSOR IN THIS LOCATION. THE UNIT SHALL PROVIDE VENTILATION CONTROL FOR THE VAV BOX INDICATED. FIRST STAGE HEAT CALL TO INFLOOR CIRCUITS D-4 THROUGH D-12, SECOND STAGE HEAT CALL TO HC-3.
4. DIVISION 25 TO SUPPLY AND INSTALL A COMBINATION ZONE TEMPERATURE AND CO2 SENSOR IN THIS LOCATION. THE UNIT SHALL PROVIDE VENTILATION CONTROL FOR THE VAV BOX INDICATED. HEATING CONTROL FROM THIS SENSOR TO INFLOOR CIRCUITS B-2, B-4, AND B-9.
5. DIVISION 25 TO SUPPLY AND INSTALL A COMBINATION ZONE TEMPERATURE AND CO2 SENSOR IN THIS LOCATION. THE UNIT SHALL PROVIDE VENTILATION CONTROL FOR THE VAV BOX INDICATED. HEATING CONTROL FROM THIS SENSOR TO INFLOOR CIRCUITS A-8, A-10, A-11, AND A-12.
6. DIVISION 25 TO SUPPLY AND INSTALL A COMBINATION ZONE TEMPERATURE AND CO2 SENSOR IN THIS LOCATION. THE UNIT SHALL PROVIDE VENTILATION CONTROL FOR THE VAV BOX INDICATED. HEATING CONTROL FROM THIS SENSOR TO THE SOLENOID CONTROLLING THE GYM ZONE RADIATORS.
7. PROVIDE DOMESTIC KITCHEN RANGE HOODS OVER THE EXISTING KITCHEN RANGE AND CONVECTION OVEN, PROVIDE INSULATED EXHAUST VENT THROUGH ROOF WITH GOOSENECK, PROVIDE GRAVITY BACKDRAFT DAMPERS. COORDINATE WITH GC TO WEATHERSEAL ROOF PENETRATIONS.



2 M6-304 SOUTH PENTHOUSE NEW WORKS PLAN
1:50

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Project Title
Eliot River Elementary School

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Sheet Title
Second Floor & Penthouse New Works - Ventilation

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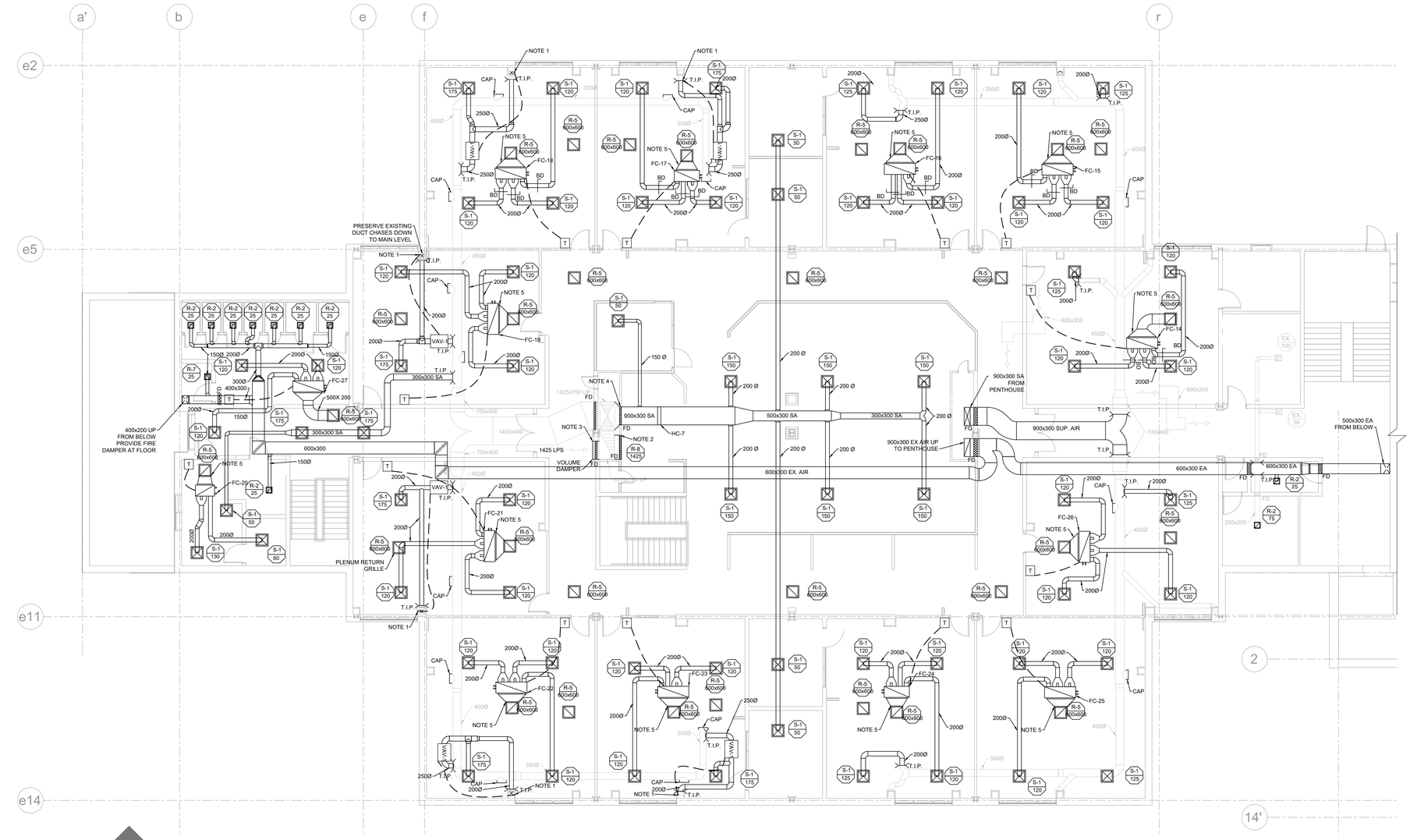
Drawing Number: M6-304



NOTES:

1. CARBON DIOXIDE SENSOR WIRING CHASED DOWN EXISTING DUCT CHASE TO BE CONNECTED TO THE WALL MOUNTED CARBON DIOXIDE SENSORS LOCATING ON FIRST FLOOR.
2. INSTALL SIDEWALL GRILLE IN LOCATION INDICATED TO REPLACE EXISTING GRILLE, COORDINATE WITH GC TO INFILL ROUGH OPENING WITH BLOCK. PROVIDE VOLUME DAMPER IN CHASE BEHIND GRILLE, AND FIRE DAMPER IN CHASE WALL.
3. INSTALL A FIRE DAMPER IN THE CHASE WALL WHERE INDICATED, EXTEND A 900 X 350 RETURN DUCT FROM VENTILATION SHAFT INTO HALLWAY CEILING SPACE, PROVIDE VOLUME DAMPER, BALANCING CONTRACTOR TO SET RETURN VOLUME TO 1425LPS. COORDINATE WITH GC TO INFILL REMAINING ROUGH OPENING WITH BLOCK AND FIRESTOP OPENING.
4. COORDINATE WITH GC TO PARTIALLY INFILL OPENING AND FIRESTOP AROUND DUCT, PROVIDE FIRE DAMPER AT SHAFT WALL.
5. PROVIDE DUCTED RETURN TO FANCOIL WITH A MINIMUM 600x200 DUCT AND TRANSITION ADAPTER TO FANCOIL CONNECTION.

TRUE NORTH

PROJECT NORTH

1 M6-305 THIRD FLOOR NEW WORKS PLAN - VENTILATION
1:100

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PROFESSIONAL ENGINEER
Province of Prince Edward Island
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2022-02-07
DATE

Client
Department of Transportation and Infrastructure.

Project Title
Eliot River Elementary School

28 Terry Fox Place,
Cornwall, PEI
C0A 1H0

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Sheet Title
Third Floor New Works: Ventilation

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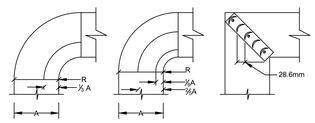
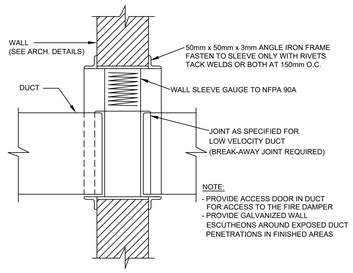
Drawing Number: M6-305



NOTE:
IN GENERAL, ELBOWS TO HAVE FULL TURNING RADIUS (R=A). WHERE "R" IS LESS THAN "A" BUT NOT LESS THAN 1/3"A", USE ONE VANE SPACED AS SHOWN. WHERE "R" IS LESS THAN 1/3 "A", USE TWO VANES SPACED AS SHOWN. MINIMUM RADIUS (R) = 100mm.

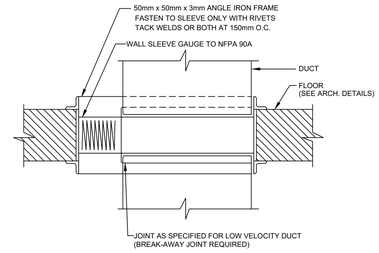
NOTE:
AIRFOIL BLADES TO BE USED WHERE NORMAL RADIUS ELBOW IS IMPRACTICAL & WHERE ELBOW IS WITHIN 1524mm OF A BRANCH TAKE-OFF OR BOOSTER HEATER (TO ASSURE STRAIGHT FLOW).

1 M6-306 TURNING VANE DETAILS
N.T.S.

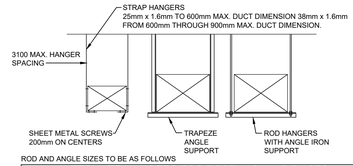


NOTE:
- PROVIDE ACCESS DOOR IN DUCT FOR ACCESS TO THE FIRE DAMPER
- PROVIDE GALVANIZED WALL ESCUTHEONS AROUND EXPOSED DUCT PENETRATIONS IN FINISHED AREAS

2 M6-306 TYPICAL VERTICAL PENETRATION WITH FIRE DAMPER
N.T.S.



3 M6-306 TYPICAL HORIZONTAL PENETRATION WITH FIRE DAMPER
N.T.S.

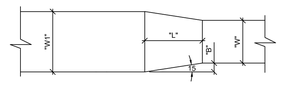


ROD AND ANGLE SIZES TO BE AS FOLLOWS

ALTERNATE HANGERS FOR RECTANGULAR DUCTS

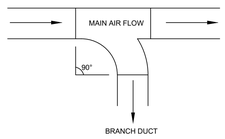
MAX. DUCT DIMENSION (mm)	MIN. ATTACH RATING (kg)	ROD HANGER SIZE (mm)	NO. OF HANGERS	TRAPEZE ANGLE (mm)	MAX. SPACING (mm)
UP THRU. 450	340	6	2	38 x 38 x 3	3000
475 TO 900	450	6	2	38 x 38 x 3	3000
925 TO 1550	900	9	2	50 x 50 x 6	2350

4 M6-306 ALTERNATE HANGERS FOR RECTANGULAR DUCTS
N.T.S.



L = 3.7 X B = LENGTH OF TRANSITION
B = OFFSET

5 M6-306 TYPICAL DUCT TRANSITION
N.T.S.



6 M6-306 PLAN VIEW BRANCH DUCT DIVERGING WYE
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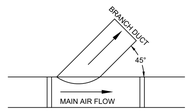

7 M6-306 PLAN VIEW BRANCH DUCT DIVERGING 45° CONICAL WYE
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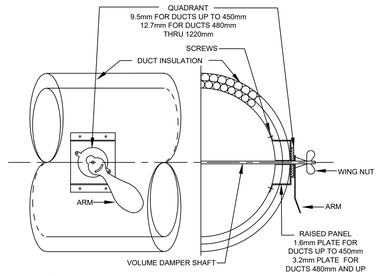


8 M6-306 VOLUME DAMPER DETAIL
N.T.S.

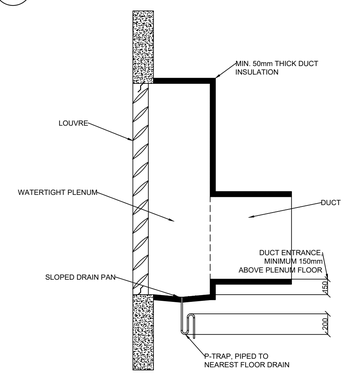
9 M6-306 TYPICAL CEILING DIFFUSER CONNECTION DETAIL
N.T.S.

10 M6-306 ELBOW AND SPLITTER CONSTRUCTION DETAILS
N.T.S.

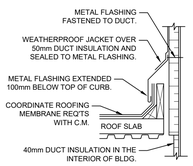
OFFSET TYPE 1
(MITERED)

OFFSET TYPE 2
(RADIUSED)

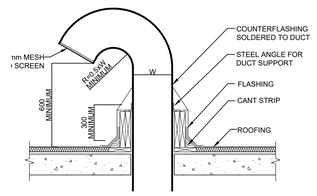
11 M6-306 ACCEPTABLE OFFSET TYPES
N.T.S.



12 M6-306 LOUVRE AND PLENUM CONSTRUCTION NOTES
N.T.S.



13 M6-306 DUCT ROOF PENETRATION
N.T.S.



14 M6-306 GOOSENECK DUCT THROUGH ROOF
N.T.S.

VAV BOX SCHEDULE

TAG	BASIS OF DESIGN	NECK SIZE (mm)	MIN AIRFLOW (LPS)	MAX AIRFLOW (LPS)	COMMENTS
VAV-1	CARRIER 35EN	175	60	330	UNIT SUPPLIED WITHOUT OPERATOR (OPERATOR TO PROVIDED BY DIVISION 25). COMPLETE WITH PRESSURE WELLS FOR DIFFERENTIAL SENSOR MEASURING DEVICE

DIFFUSER AND GRILLE SCHEDULE

TAG	TYPE	MANFACTURER	MODEL	SIZE (mm x mm)	COMMENTS
S-1	4-WAY CEILING DIFFUSER, PLAQUE FACE	TITUS	TDJ	600 x 600	NECK SIZE TO SUIT AIRFLOW NOTE ON DRAWING, DIFFUSERS TO BE EQUIPPED WITH BALANCE DAMPERS
S-2	4-WAY CEILING DIFFUSER, PLAQUE FACE	TITUS	TDJ	300 x 300	
R-1	SINGLE DEFLECTION SIDEWALL GRILLE	TITUS	23 RS	300 x 150	SINGLE DEFLECTION TYPE, VERTICAL GRILLE, WITH INTEGRATED BALANCE DAMPER
R-2	PERFORATED FACE DIFFUSER FOR T-BAR MOUNTING	TITUS	PAR	300 x 300	NECK SIZE TO SUIT AIRFLOW NOTE ON DRAWING, DIFFUSERS TO BE EQUIPPED WITH BALANCE DAMPERS
R-3	PERFORATED FACE DIFFUSER FOR T-BAR MOUNTING	TITUS	PAR	600 x 600	
R-4	EGGCRATE GRILLE FOR PLENUM RETURN FOR T-BAR MOUNTING	TITUS	50 R	300 x 300	STEEL FIN EGGCRATE CORE WITH BORDER FOR DROP-IN T-BAR MOUNTING
R-5	EGGCRATE GRILLE FOR PLENUM RETURN FOR T-BAR MOUNTING	TITUS	50 R	600 x 600	
R-6	SINGLE DEFLECTION SIDEWALL GRILLE, IMPACT RESISTANT	TITUS	30RS	750 x 450	SINGLE DEFLECTION TYPE, BLADES PARALLEL TO SHORT DIMENSION, DESIGNED FOR IMPACT, BALANCE DAMPER MOUNTED ON BACK SUPPORT BARS 6" O/C, 3/8" BLADE SPACING
R-7	PERFORATED FACE DIFFUSER FOR T-BAR MOUNTING, FIRE RATED ASSEMBLY	TITUS	PAR-FR	300 x 300	FIRE RATED RETURN DIFFUSER, NECK SIZE TO SUIT AIRFLOW NOTE ON DRAWING.
R-8	STRAIGHT BLADE SIDEWALL GRILLE	TITUS	355ZRS	1200 X 300	UNIT SIZED PER DRAWING, INSTALL WITH VOLUME DAMPER AND FIRE SHUTTER

LOUVER AND HOOD SCHEDULE

TAG	TYPE	MANFACTURER	MODEL	SIZE (mm x mm)	COMMENTS
L-1	STORMPROOF LOUVER	VENTEX	2620/2625	1500 x 600	6" DEEP LOUVER, EXTRUDED ALUMINUM (6062-T5 ALLOY), WITH BIRDSCREEN
L-2	STORMPROOF LOUVER	VENTEX	2620/2625	1200 x 600	6" DEEP LOUVER, EXTRUDED ALUMINUM (6062-T5 ALLOY), WITH BIRDSCREEN
H-1	GRAVITY VENTILATOR	VENTEX	GV-I	600 x 900	18 GAUGE GALVANIZED STEEL, ANTI-CONDENSATE COATING, WITH BIRDSCREEN
H-2	GRAVITY VENTILATOR	VENTEX	GV-I	600 x 600	18 GAUGE GALVANIZED STEEL, ANTI-CONDENSATE COATING, WITH BIRDSCREEN

HEAT RECOVERY COIL SCHEDULE (SPECIFICATIONS FOR INFORMATION ONLY)

TAG	TYPE	AIR FLOW (LPS)	S.P.D. (Pa)	FLOW (LPM)	EWT (°C)	LWT (°C)	EAT (°C)	LAT (°C)	HEAT TRANSFER (kW)	EFF. (%)	COIL SIZE (LxHxD) (mm)	NOTES
HRC-1	GLYCOL HEAT RECOVERY COIL	2240	15	285	-1.2	1.3	18.3	4.4	42.7	40.6	1800 x 1200 x150	REUSE THE HEATING COILS IN THE EXISTING AIR HANDLER AS THE TWO (2) HEAT RECOVERY COILS.
HRC-2	GLYCOL HEAT RECOVERY COIL				1.3	-1.2	-20.2	-4.4				

HEATING COIL SCHEDULE

TAG	SERVES	AIR FLOW (LPS)	S.P.D. (Pa)	LIQUID	LIQ. FLOW (LPM)	ELT (°C)	LLT (°C)	EAT (°C)	LAT (°C)	HEAT TRANS. (kW)	COIL SIZE (LxHxD) (mm)	NOTES
HC-6	HRV-3 TEMPERING	1650	115	40% E. GLY	160	35	29.4	-0.4	27	56	1200 x 500 x 250	5 ROW, 13 FPI, PROVIDE 40% E.GLYCOL AS THE FLUID MEDIUM.
HC-7	LIBRARY REHEAT	900	50	WATER	10	43	32	18	25	8	900 x 300 x150	2 ROW, 10 FPI
HC-8	GROUND FLOOR CORE REHEAT	750	50	WATER	8	43	32	18	25	7	900 x 300 x150	2 ROW, 10 FPI

HEAT RECOVERY VENTILATOR SCHEDULE

TAG	LOCATION	SERVES	AIR SIDE		ELECTRICAL		HEATING MODE EFFECTIVENESS			DIMENSIONS				BASIS OF DESIGN	NOTES
			AIRFLOW (LPS)	ESP (Pa)	UNIT MCA	POWER TYPE	OA (°C DB/WB)	RA (°C DB/WB)	SA (°C DB/WB)	% EFF. (TOTAL)	LENGTH (mm)	WIDTH (mm)	HEIGHT (mm)	WEIGHT (kg)		
HRV-3	SOUTH PENTHOUSE	LEVEL 1 & 3 WASHROOMS	1650	500	8	575/3/60	-20.2/-20.9	21.0/13.1	-0.4/-6.0	48	2515	1143	1295	-	NUAIRE 2035	SINGLE POINT ELECTRICAL CONNECTION. FACTORY WIRING HARNESS WITH MOTOR STARTERS, MERV 13 FILTERS ON BOTH AIRSTREAMS, PROVIDE MOTORIZED DAMPERS.

FAN COIL SCHEDULE

TAG	TYPE	AIRFLOW (LPS)	LAT (°C)	EAT (°C)	HEAT OUTPUT (kW)	MAX LENGTH (mm)	CONN. SIZE	POWER TYPE	BASIS OF DESIGN	COMMENTS
FC-1-19; FC 21-28	LOW TEMP HYDRONIC	370	35.7	18.3	8.0	1550	DN20	115/1/60	JAGA BRIZA 22	BUILD IN CEILING, 220MM TALL, 2 PIPE C/W OPTIONAL FILTER FRAME, AND EXHAUST PLENUM ATTACHEMENT. PROVIDE WASHABLE FILTER.
FC-20	LOW TEMP HYDRONIC	190	35.5	18.3	2.3	950	DN20	115/1/60	JAGA BRIZA 22	BUILD IN CEILING, 220MM TALL, 2 PIPE C/W OPTIONAL FILTER FRAME, AND EXHAUST PLENUM ATTACHEMENT. PROVIDE WASHABLE FILTER.

PACKAGED SECTIONAL AIR HANDLER SCHEDULE

TAG	SERVES	LOCATION	FAN SECTION					HEATING COIL SECTION							HEAT RECOVERY COIL SECTION		BASIS OF DESIGN	NOTES
			FLOW STREAM	POWER TYPE	MOTOR (kW)	AIR FLOW (LPS)	E.S.P. (Pa)	LIQUID	LIQ. FLOW (LPM)	LIQ. P.D (kPa)	ELT (°C)	LLT (°C)	EAT (°C)	LAT (°C)	HEAT TRANS. (kW)	COIL DIMENSIONS (LxWxH)	NOTES	
AHU-1	CLASSROOM BLOCK SUPPLY/RECIRC AIR	SOUTH PENTHOUSE	SUPPLY AIR	575/3/60	11.1	5650	450	40% E. GLY	350	50	35	30	12	26	95	83.25" x 6" x 51"	EXISTING HEATING COIL - TO BE REUSED	YORK SOLUTIONS	SINGLE POINT ELECTRICAL CONNECTION, VFD DRIVE ON SUPPLY FAN, FACTORY WIRING HARNESS, INTAKE SECTION WITH TOP OPENING, MERV 13 FILTER HOUSING, PROVIDE OPENING FOR FIELD SUPPLIED GLYCOL HEAT RECLAIM COIL, PROVIDE MIXING SECTION WITH SIDE OPENING FOR CONNECTION TO RETURN MODULE, PROVIDE INSULATED CABINET AND ACCESS DOORS INSPECTION WINDOWS AND LIGHTS
AHU-2	CLASSROOM BLOCK RETURN/EXHAUST AIR	SOUTH PENTHOUSE	POWER EXHAUST	575/3/60	3.7	2250	80	NO HEATING COIL								83.25" x 6" x 51"	EXISTING HEATING COIL - TO BE REUSED	YORK SOLUTIONS	SINGLE POINT ELECTRICAL CONNECTION, FACTORY WIRING HARNESS, EXHAUST SECTION WITH WITH END DISCHARGE OPENING, MERV 13 FILTER HOUSING, PROVIDE OPENING FOR FIELD SUPPLIED GLYCOL HEAT RECLAIM COIL, PROVIDE MIXING SECTION WITH SIDE OPENING FOR CONNECTION TO SUPPLY MODULE, PROVIDE INSULATED CABINET AND ACCESS DOORS INSPECTION WINDOWS AND LIGHTS

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PROFESSIONAL ENGINEER
REGISTERED
Ryan L. Cooke
1475
Date
PROVINCE OF PRINCE EDWARD ISLAND

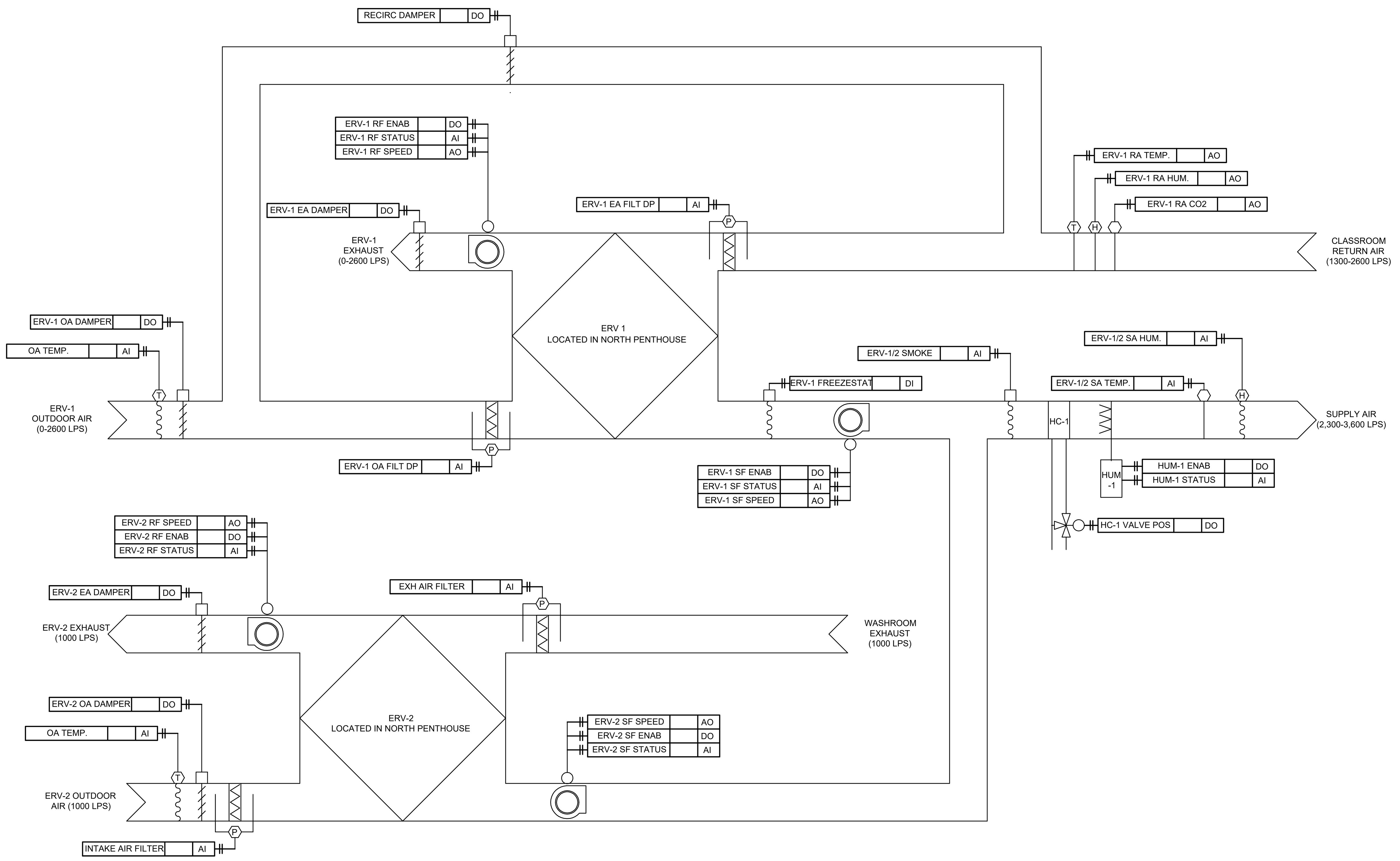
Client
Department of Transportation and Infrastructure.

Project Title
Eliot River Elementary School
28 Terry Fox Place,
Cornwall, PEI
C0A 1H0
DTI Project No.: 170-20031

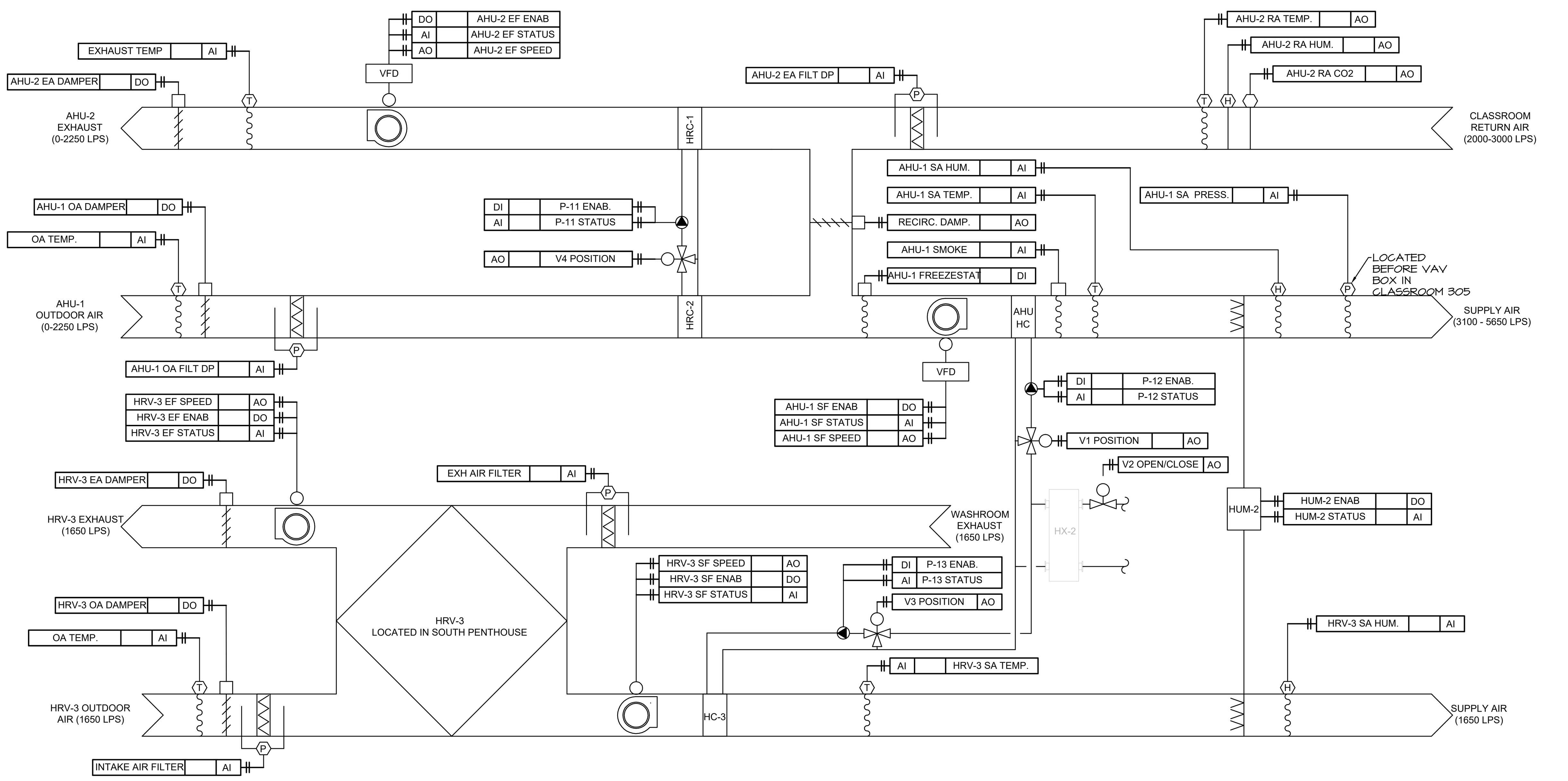
Sheet Title
Ventilation Details & Schedules

No.	Description	Date
0	Issued For Addendum #1	2022-02-07

Date: 2022-02-07
Drn By: K.M.L., E.I.T. / N.L.V.
Chk By: R.L.C., P.Eng.
Revision: -
Project Number: 201103
Drawing Number: M6-306



1 / M500 ERV-1 & ERV-2 (NORTH PENTHOUSE) CONTROL SCHEMATIC AND SEQUENCE
NTS



2 / M500 AHU-1 AND HRV-3 (SOUTH PENTHOUSE) CONTROL SCHEMATIC AND SEQUENCE
NTS

SEQUENCE OF OPERATIONS: ERV-1 AND ERV-2 (NORTH PENTHOUSE VENTILATION - LEVEL 2)

1. ANY VALUES PRESENTED IN THIS SEQUENCE FOLLOWED BY (ADJ.) ARE TO BE USER ADJUSTABLE FROM THE BUILDING MANAGEMENT SYSTEM (BMS).

2. THE BMS SHALL HAVE A CUSTOM GRAPHIC FOR THE AHU-1 / HRV-3 SYSTEM ON A WEB-ACCESSIBLE PLATFORM.

3. THESE UNITS ARE TO OPERATE IN TANDEM, WHENEVER THE FACILITY IS SET TO OCCUPIED MODE AS DETERMINED BY A USER-ADJUSTABLE SCHEDULE THROUGH THE BMS, OR AS DETECTED BY ROOM SENSORS. THE SCHEDULE SHALL ALLOW FOR OCCUPANCY TO BE SET IN 15 MINUTE INCREMENTS OVER A 24/7 CALENDAR.
3.1. NOMINALLY THE OCCUPIED HOURS SHALL BE SET AS FOLLOWS:
3.1.1. BETWEEN SEPT 1ST AND JUNE 30TH, MONDAY THROUGH FRIDAY: 6:30AM THROUGH 6:00PM
3.2. IF OCCUPANCY IS DETECTED DURING SCHEDULED UNOCCUPIED HOURS VIA ROOM SENSORS, THE UNITS SHALL REVERT TO OCCUPIED MODE FOR THE DURATION OF DETECTED OCCUPANCY + 1 HOUR (ADJ.).
3.3. THE UNIT SHALL CYCLE ON EVERY 6 HOURS (ADJ.) DURING UNOCCUPIED HOURS FOR A MINIMUM PERIOD OF 15 MINS (ADJ.) TO SAMPLE RETURN AIR HUMIDITY, AND RETURN AIR CO2 LEVELS. DURING THIS TIME, THE SUPPLY AIR TEMPERING SHALL BE TREATED AS 'VENTILATION MODE', AND THE UNIT SHALL REMAIN IN OPERATION UNTIL THE FACILITY CO2 AND HUMIDITY LEVELS FALL WITHIN AN ACCEPTABLE RANGE (VENTILATION AND DEHUMIDIFICATION).

4. ERV 1 AND 2 ARE TO OPERATE IN UNISON, AND FOR THE PURPOSES OF THIS SEQUENCE THE SYSTEM IS TO CONSIST OF THE FOLLOWING CONTROLLED EQUIPMENT:
4.1. ERV-1 OUTDOOR, RECIRCULATION, AND EXHAUST DAMPERS
4.2. ERV-2 OUTDOOR AND EXHAUST DAMPERS
4.3. ERV-1 VARIABLE SPEED SUPPLY FAN
4.4. ERV-1 VARIABLE SPEED EXHAUST FAN
4.5. ERV-2 VARIABLE SPEED SUPPLY FAN
4.6. ERV-2 VARIABLE SPEED RETURN FAN
4.7. HUMIDIFIER - 1
4.8. HC-1 COIL VALVE (MODULATING)
4.9. ALL SENSORS PRESENTED IN THE CONTROL DIAGRAM

5. THE UNITS SHALL AUTOMATICALLY AND IMMEDIATELY SHUT DOWN IF THERE IS A SAFETY TRIP FROM EITHER OF THE FOLLOWING SIGNALS:
5.1. FREEZESTAT TRIP

6. FACILITY CONDITIONING MODE - THE UNIT RESPONSE WILL CHANGE BASED ON THE CONDITIONING MODE, WHICH ARE DEFINED BELOW. THE FACILITY SHALL ALWAYS BE IN ONE OF THE CONDITIONING MODE, AND MAY ONLY SHIFT BETWEEN MODES IF THE CONDITIONS ARE TRUE:

6.1. HEATING MODE:
6.1.1. HEATING MODE IS ACTIVE IF THE OUTDOOR AIR TEMPERATURE (OAT) IS BELOW 10°C (ADJ.) FOR 2 HOURS (ADJ.).

6.2. VENTILATION MODE:
6.2.1. VENTILATION MODE IS ACTIVE IF THE OUTDOOR AIR TEMPERATURE IS BETWEEN 10°C (ADJ.) AND 16°C (ADJ.) FOR 2 HOURS (ADJ.).

6.3. COOLING MODE:
6.3.1. COOLING MODE IS ACTIVE IF THE OUTDOOR AIR TEMPERATURE IS ABOVE 16°C (ADJ.) FOR 2 HOURS (ADJ.)

7. SUPPLY AIR TEMPERATURE CONTROL - THE BAS WILL VARY THE SUPPLY AIR TEMPERATURE DEPENDING ON UNIT MODE (IE. HEATING, VENTILATION, OR COOLING), AS DESCRIBED IN THIS SECTION.

7.1. HEATING MODE:

7.1.1. THE BMS WILL MODULATE THE SUPPLY AIR TEMPERATURE (SAT) TO MAINTAIN A DESIRED RETURN AIR TEMPERATURE SETPOINT RAT_SP.
7.1.1.1. THE INITIAL RAT_SP SHALL BE 20°C (ADJ.) WITH A ± 1°C DEADBAND.
7.1.2. SAT IS TO BE MODULATED IN A USER-ADJUSTABLE RANGE AS FOLLOWS:

7.1.2.1. WHEN RAT IS WITHIN THE SETPOINT DEADBAND (I.E. RAT IS BETWEEN 19°C AND 21°C)
7.1.2.1.1. SAT = RAT_SP (20°C)

7.1.2.2. WHEN RAT IS 5°C BELOW RAT_SP (I.E. RAT = 15°C)
7.1.2.2.1. SAT = RAT_SP + 5°C (ADJ.) (I.E. SAT = 25°C)

7.1.2.3. WHEN RAT IS 5°C ABOVE RAT_SP (I.E. RAT = 25°C)
7.1.2.3.1. SAT = RAT_SP - 2°C (ADJ.) (IE. SAT = 18°C)

7.1.2.4. THE SAT IS TO MODULATE INCREMENTALLY BETWEEN THE BANDS PRESENTED ABOVE, THE RATE OF CHANGE OF THE SUPPLY AIR TEMPERATURE IS TO BE LIMITED TO 1°C (ADJ.) PER 2 MINS (ADJ.)

7.2. COOLING MODE:

7.2.1. DURING COOLING MODE SUPPLY AIR HEATING IS DISABLED.
7.2.2. COOLING MODE SUPPLY AIR TEMPERATURE SETPOINTS ARE EQUAL TO VENTILATION MODE.

7.3. VENTILATION MODE:
7.3.1. THE BMS WILL MODULATE THE SAT TO MAINTAIN RAT_SP.
7.3.1.1. THE INITIAL RAT_SP SHALL BE 19°C (ADJ.) WITH A ± 1°C DEADBAND.

7.3.2. SAT IS TO BE MODULATED IN A USER-ADJUSTABLE RANGE AS FOLLOWS:

7.3.2.1. WHEN RAT IS WITHIN THE SETPOINT DEADBAND (I.E. RAT IS BETWEEN 18°C AND 20°C)
7.3.2.1.1. SAT = RAT_SP (19°C)

7.3.2.2. WHEN RAT IS 5°C BELOW RAT_SP (I.E. RAT = 14°C)
7.3.2.2.1. SAT = RAT_SP + 1°C (ADJ.) (I.E. SAT = 20°C)

7.3.2.3. WHEN RAT IS 5°C ABOVE RAT_SP (I.E. RAT = 25°C)
7.3.2.3.1. SAT = RAT_SP - 5°C (ADJ.) (IE. SAT = 14°C)

7.3.2.4. THE SAT IS TO MODULATE INCREMENTALLY BETWEEN THE BANDS PRESENTED ABOVE, THE RATE OF CHANGE OF THE SUPPLY AIR TEMPERATURE IS TO BE LIMITED TO 1°C (ADJ.) PER 2 MINS (ADJ.).

7.4. HEATING COIL RESPONSE.
7.4.1. WHEN IN COOLING MODE - THE HEATING COILS ARE TO BE DISABLED.
7.4.2. WHEN SUPPLY AIR HEATING IS REQUIRED THE BMS SHALL:
7.4.2.1. MODULATE HC-1 VALVE TO MAINTAIN SAT_SP

7.5. ECONOMIZER COOLING (AHU-1/2)
7.5.1. WHEN IN COOLING OR VENTILATION MODE IF SAT_SP IS LESS THAN RAT:
7.5.1.1. OPEN OUTDOOR AIR AND EXHAUST DAMPERS.
7.5.1.2. MODULATE RECIRCULATION DAMPER TO 50% CLOSED.
7.5.1.3. START ERV-1 EXHAUST FAN TO MINIMUM SPEED (60%), MODULATE AS REQUIRED TO MAINTAIN SAT_SP.

8. HUMIDIFICATION:

8.1. HUMIDIFICATION IS PERMITTED IF THE FACILITY IS IN HEATING MODE.
8.2. HUMIDIFICATION IS NOT PERMITTED IF THE FACILITY IS UNOCCUPIED.
8.3. THE OCCUPIED MINIMUM FACILITY HUMIDITY LEVEL IS TO BE 30% (ADJ.) ± 5% (ADJ.).
8.4. WHEN THE FACILITY IS OCCUPIED THE BMS SHALL MONITOR RETURN AIR HUMIDITY IF THE HUMIDITY LEVEL FALLS BELOW THE SETPOINT OF 30% (ADJ.), FOR MORE THAN 15 MINUTES (ADJ.) WHILE AHU-1/2 AND HRV-3 ARE IN OPERATION THE BMS SHALL RESPOND AS FOLLOWS:

8.4.1. THE HUMIDIFIER SHALL BE ENABLED, AND OPERATE ACCORDING TO ITS ONBOARD CONTROLS.
8.4.2. THE HUMIDIFIER SHALL BE DISABLED WHEN THE RETURN AIR HUMIDITY IS SETPOINT + DEADBAND (NOMINALLY 35% (ADJ.)) FOR MORE THAN 15 MINUTES (ADJ.).
8.4.3. THE HUMIDIFER SHALL BE DISABLED IF THE SUPPLY AIR HUMIDITY RISES ABOVE 75% (ADJ.)

9. DEHUMIDIFICATION

9.1. THE MAXIMUM FACILITY HUMIDITY LEVEL IS 60% (ADJ.) ± 5% (ADJ.).
9.2. DURING UNOCCUPIED HOURS, WHEN IN VENTILATION OR COOLING MODE, ERV'S 1 AND 2 SHALL BE STARTED EVERY 6 HOURS (ADJ.), FOR A MINIMUM OF 15 MINS (ADJ.);
9.2.1. IF THE RETURN AIR HUMIDITY IS AT THE MAXIMUM THRESHOLD FOR MORE THAN 5 MINS (ADJ.), THE BMS SHALL RESPOND AS FOLLOWS:
9.2.1.1. THE UNITS SHALL REMAIN IN OPERATION AT FULL VENTILATION RATE UNTIL THE HUMIDITY LEVEL IS AT THE MAXIMUM THRESHOLD MINUS THE DEADBAND (I.E. 55% (ADJ.)) FOR 15 MINUTES (ADJ.).

10. ERV-1 RECIRCULATION DAMPER OPERATION

10.1. ON A START OF ERV-1, THE UNIT IS TO HAVE THE RECIRCULATION DAMPER FULLY OPEN, AND THE OUTDOOR AIR/EXHAUST AIR DAMPERS FULLY CLOSED.
10.2. THE RECIRCULATION DAMPER IS TO CLOSE TO FULLY IF THE RETURN AIR CO2 LEVEL IS ABOVE 1200 PPM (ADJ.) FOR MORE THAN 5 MINS (ADJ.).
10.2.1. DURING THIS OPERATION THE OUTDOOR AND EXHAUST AIR DAMPERS SHALL OPEN FULLY, AND THE EXHAUST FAN SHALL START.

10.2.1. ONCE RETURN AIR CO2 LEVELS FALL BELOW 800 PPM (ADJ.) FOR 5 MINS (ADJ.), THE RECIRCULATION DAMPER SHOULD OPEN, AND THE OUTDOOR & EXHAUST DAMPER SHALL CLOSE.

11. ERV-1 SUPPLY FAN SPEED

11.1. ERV-1 SUPPLY FAN SPEED ADJUSTMENT RATE SHALL BE LIMITED TO 'RAMP' AT A MAXIMUM NORMAL (I.E. NON-SAFETY TRIP) ACCELERATION/DECELERATION OF 25% (ADJ.) PER MINUTE (ADJ.).

11.2. THE MINIMUM SUPPLY FAN SPEED SHALL BE 60% (ADJ.).
11.3. THE FAN SPEED SHALL MODULATE TO MAINTAIN A RETURN AIR CO2 LEVELS, THE UNIT SHALL BE AT MINIMUM SPEED IF CO2 LEVELS ARE BELOW 800PPM, AND SHALL RAMP PROPORTIONALLY TO MAXIMUM SPEED AT CO2 LEVELS AT OR ABOVE 1200 PPM.

12. ERV-1 EXHAUST FAN
12.1. ERV-1 EXHAUST FAN OPERATION IS PERMITTED ONLY IF THE UNIT IS NOT RECIRCULATING AIR.
12.2. THE MINIMUM EXHAUST FAN SPEED SHALL BE 60% (ADJ.)
12.3. DURING ECONOMIZER OPERATION THE EXHAUST FAN SPEED SHALL MODULATE TO MAINTAIN SAT_SP.
12.4. WHEN THE EXHAUST FAN IS STARTED TO VENTILATE (EXHAUST CO2) THE FAN SHALL MODULATE TO FULL SPEED, AND REMAIN IN THIS OPERATIONAL STATE UNTIL CO2 LEVELS DROP BELOW 800 PPM (ADJ.).

13. ERV-2 SUPPLY AND EXHAUST FAN SPEEDS

13.1. ERV-2 SUPPLY AND EXHAUST FAN SPEEDS SHALL BE SET TO A CONSTANT VALUE WHEN THE UNIT IS IN OPERATION.

13.1.1. THE SPEED IS TO BE COORDINATED BETWEEN THE BMS VENDOR AND THE AIR BALANCING CONTRACTOR DURING COMMISSIONING.
13.1.2. THE FAN SPEEDS SHALL BE INITIALLY SET TO 90% (ADJ.).

14. FILTER STATUS MONITORS

14.1. THE BMS SHALL MONITOR THE STATUS OF THE FILTERS USING A TRANSMITTING AIR DIFFERENTIAL PRESSURE SENSOR.
14.2. THE TRANSMITTER IS TO PROVIDE THE READINGS TO THE GRAPHIC IN PASCALS.
14.3. THE 'CLEAN' FILTER STATUS IS TO BE INITIALLY SET TO 40Pa (ADJ.) OF AIR PRESSURE DROP ACROSS THE FILTER (TO BE ADJUSTED BY THE BMS CONTRACTOR DURING COMMISSIONING).
14.4. ON INCREASING PRESSURE DROP, THE BMS GRAPHIC SHALL UPDATE THE STATUS TO 'DIRTY' ONCE A THRESHOLD PRESSURE IS REACHED, INITIALLY SET TO 120PA (ADJ.) (TO BE ADJUSTED DURING COMMISSIONING).

15. MORNING WARM UP OPERATION:

15.1. IF THE OUTDOOR AIR TEMPERATURE IS SUCH THAT THE UNIT IS IN HEATING MODE, AS DEFINED IN PART 7.1 OF THIS SEQUENCE.

15.1.1. THE BMS SHALL START ERV-1 & ERV-2 1 HOUR (ADJ.) PRIOR TO A SCHEDULED OCCUPIED PERIOD IN FULL RECIRCULATION. ALLOWING THE ZONE AIR TO BE HEATED PRIOR TO OCCUPANCY.

16. NIGHT PURGE OPERATION

16.1. THE BMS SHALL START THE ERV-1 & ERV-2 DURING OVERNIGHT HOURS FOR FREE COOLING IF THE FOLLOWING CONDITIONS ARE TRUE:

16.1.1. THE DATE IS BETWEEN MAY 15TH AND OCT 1ST.
16.1.2. THE TIME IS BETWEEN 2AM (ADJ.) AND 4AM (ADJ.).
16.1.3. THE FORECASTED* OUTDOOR AIR TEMPERATURE FOR THE FOLLOWING DAY IS EXPECTED TO BE IN EXCESS OF THE COOLING MODE ENABLING TEMPERATURE (I.E. 16°C (ADJ.))
16.1.4. THE CURRENT ACTIVE OUTDOOR AIR TEMPERATURE IS 16°C (ADJ.) OR LESS.
16.1.5. THE CURRENT ACTIVE OUTDOOR AIR TEMPERATURE IS NOT BELOW 7°C (ADJ.) OR LESS.

16.2. IF THE ABOVE STATED CONDITIONS ARE TRUE, THE BMS SHALL START THE UNITS AND MAINTAIN OPERATION OF THE UNIT UNTIL THE RETURN AIR TEMPERATURE IS 17°C (ADJ.) OR LESS FOR 15 MINS (ADJ.). USE OF THE HEATING COIL IS NOT TO BE PERMITTED.

*THE BMS VENDOR IS TO OBTAIN WEATHER FORECAST DATA FROM A NO-COST ONLINE WEATHER SERVICE (ENVIRONMENT CANADA OR SIMILAR)

SEQUENCE OF OPERATIONS: AHU-1/2 AND HRV-3 (SOUTH PENTHOUSE VENTILATION - LEVELS 1 AND 3)

1. ANY VALUES PRESENTED IN THIS SEQUENCE FOLLOWED BY (ADJ.) ARE TO BE USER ADJUSTABLE FROM THE BUILDING MANAGEMENT SYSTEM (BMS).

2. THE BMS SHALL HAVE A CUSTOM GRAPHIC FOR THE AHU-1 / HRV-3 SYSTEM ON A WEB-ACCESSIBLE PLATFORM.

3. THESE UNITS ARE TO OPERATE IN TANDEM, WHENEVER THE FACILITY IS SET TO OCCUPIED MODE AS DETERMINED BY A USER-ADJUSTABLE SCHEDULE THROUGH THE BMS, OR AS DETECTED BY ROOM SENSORS. THE SCHEDULE SHALL ALLOW FOR OCCUPANCY TO BE SET IN 15 MINUTE INCREMENTS OVER A 24/7 CALENDAR.
3.1. NOMINALLY THE OCCUPIED HOURS SHALL BE SET AS FOLLOWS:
3.1.1. BETWEEN SEPT 1ST AND JUNE 30TH, MONDAY THROUGH FRIDAY: 6:30AM THROUGH 6:00PM
3.2. IF OCCUPANCY IS DETECTED DURING SCHEDULED UNOCCUPIED HOURS VIA ROOM SENSORS, THE UNITS SHALL REVERT TO OCCUPIED MODE FOR THE DURATION OF DETECTED OCCUPANCY + 1 HOUR (ADJ.).
3.3. THE UNIT SHALL CYCLE ON EVERY 6 HOURS (ADJ.) DURING UNOCCUPIED HOURS FOR A MINIMUM PERIOD OF 15 MINS (ADJ.) TO SAMPLE RETURN AIR HUMIDITY, AND RETURN AIR CO2 LEVELS. DURING THIS TIME, THE SUPPLY AIR TEMPERING SHALL BE TREATED AS 'VENTILATION MODE', AND THE UNIT SHALL REMAIN IN OPERATION UNTIL THE FACILITY CO2 AND HUMIDITY LEVELS FALL WITHIN AN ACCEPTABLE RANGE (VENTILATION AND DEHUMIDIFICATION).

4. AHU-1/2 AND HRV-3 ARE TO OPERATE IN UNISON, AND FOR THE PURPOSES OF THIS SEQUENCE THE SYSTEM IS TO CONSIST OF THE FOLLOWING CONTROLLED EQUIPMENT:
4.1. AHU-1/2 OUTDOOR, RECIRCULATION, AND EXHAUST DAMPERS
4.2. HRV-3 OUTDOOR AND EXHAUST DAMPERS
4.3. AHU-1 VARIABLE SPEED SUPPLY FAN
4.4. AHU-2 VARIABLE SPEED EXHAUST FAN
4.5. HRV-3 VARIABLE SPEED SUPPLY FAN
4.6. HRV-3 VARIABLE SPEED RETURN FAN
4.7. HUMIDIFIER - 2
4.8. CONTROL VALVES 1-3 (MODULATING)
4.9. CONTROL VALVE 4 (OPEN/CLOSE)
4.10. PUMPS P-11, P-12, P-14 (ON/OFF)
4.11. ALL SENSORS PRESENTED IN THE CONTROL DIAGRAM

5. THE UNITS SHALL AUTOMATICALLY AND IMMEDIATELY SHUT DOWN IF THERE IS A SAFETY TRIP FROM EITHER OF THE FOLLOWING SIGNALS:
5.1. SUPPLY AIR SMOKE DETECTION
5.2. FREEZESTAT TRIP

6. FACILITY CONDITIONING MODE - THE UNIT RESPONSE WILL CHANGE BASED ON THE CONDITIONING MODE, WHICH ARE DEFINED BELOW. THE FACILITY SHALL ALWAYS BE IN ONE OF THE CONDITIONING MODE, AND MAY ONLY SHIFT BETWEEN MODES IF THE CONDITIONS ARE TRUE:

6.1. HEATING MODE:
6.1.1. HEATING MODE IS ACTIVE IF THE OUTDOOR AIR TEMPERATURE (OAT) IS BELOW 10°C (ADJ.) FOR 2 HOURS (ADJ.).

6.2. VENTILATION MODE:
6.2.1. VENTILATION MODE IS ACTIVE IF THE OUTDOOR AIR TEMPERATURE IS BETWEEN 10°C (ADJ.) AND 16°C (ADJ.) FOR 2 HOURS (ADJ.).

6.3. COOLING MODE:
6.3.1. COOLING MODE IS ACTIVE IF THE OUTDOOR AIR TEMPERATURE IS ABOVE 16°C (ADJ.) FOR 2 HOURS (ADJ.)

7. SUPPLY AIR TEMPERATURE CONTROL - THE BAS WILL VARY THE SUPPLY AIR TEMPERATURE DEPENDING ON UNIT MODE (IE. HEATING, VENTILATION, OR COOLING), AS DESCRIBED IN THIS SECTION.

7.1. HEATING MODE:

7.1.1. THE BMS WILL MODULATE THE SUPPLY AIR TEMPERATURE (SAT) TO MAINTAIN A DESIRED RETURN AIR TEMPERATURE SETPOINT RAT_SP.
7.1.1.1. THE INITIAL RAT_SP SHALL BE 20°C (ADJ.) WITH A ± 1°C DEADBAND.
7.1.2. SAT IS TO BE MODULATED IN A USER-ADJUSTABLE RANGE AS FOLLOWS:

7.1.2.1. WHEN RAT IS WITHIN THE SETPOINT DEADBAND (I.E. RAT IS BETWEEN 19°C AND 21°C)
7.1.2.1.1. SAT = RAT_SP (20°C)

7.1.2.2. WHEN RAT IS 5°C BELOW RAT_SP (I.E. RAT = 15°C)
7.1.2.2.1. SAT = RAT_SP + 5°C (ADJ.) (I.E. SAT = 25°C)

7.1.2.3. WHEN RAT IS 5°C ABOVE RAT_SP (I.E. RAT = 25°C)
7.1.2.3.1. SAT = RAT_SP - 2°C (ADJ.) (IE. SAT = 18°C)

7.1.2.4. THE SAT IS TO MODULATE INCREMENTALLY BETWEEN THE BANDS PRESENTED ABOVE, THE RATE OF CHANGE OF THE SUPPLY AIR TEMPERATURE IS TO BE LIMITED TO 1°C (ADJ.) PER 2 MINS (ADJ.)

7.2. COOLING MODE:

7.2.1. DURING COOLING MODE SUPPLY AIR HEATING IS DISABLED.
7.2.2. COOLING MODE SUPPLY AIR TEMPERATURE SETPOINTS ARE EQUAL TO VENTILATION MODE.
7.2.3. ECONOMIZER COOLING IS PERMITTED (APPLIES TO AHU-1/2)

7.3. VENTILATION MODE:

7.3.1. ECONOMIZER COOLING IS PERMITTED IN VENTILATION MODE (APPLIES TO AHU-1/2).

7.3.2. THE BMS WILL MODULATE THE SAT TO MAINTAIN RAT_SP.
7.3.2.1. THE INITIAL RAT_SP SHALL BE 19°C (ADJ.) WITH A ± 1°C DEADBAND.

7.3.3. SAT IS TO BE MODULATED IN A USER-ADJUSTABLE RANGE AS FOLLOWS:

7.3.3.1. WHEN RAT IS WITHIN THE SETPOINT DEADBAND (I.E. RAT IS BETWEEN 18°C AND 20°C)
7.3.3.1.1. SAT = RAT_SP (19°C)

7.3.3.2. WHEN RAT IS 5°C BELOW RAT_SP (I.E. RAT = 14°C)
7.3.3.2.1. SAT = RAT_SP + 1°C (ADJ.) (I.E. SAT = 20°C)

7.3.3.3. WHEN RAT IS 5°C ABOVE RAT_SP (I.E. RAT = 25°C)
7.3.3.3.1. SAT = RAT_SP - 5°C (ADJ.) (IE. SAT = 14°C)

7.3.3.4. THE SAT IS TO MODULATE INCREMENTALLY BETWEEN THE BANDS PRESENTED ABOVE, THE RATE OF CHANGE OF THE SUPPLY AIR TEMPERATURE IS TO BE LIMITED TO 1°C (ADJ.) PER 2 MINS (ADJ.).

7.4. HEATING COIL RESPONSE.
7.4.1. WHEN IN COOLING MODE - THE HEATING COILS ARE TO BE DISABLED.
7.4.2. AHU-1/2, WHEN SUPPLY AIR HEATING IS REQUIRED THE BMS SHALL:
7.4.2.1. START PUMP P-12
7.4.2.2. OPEN VALVE V2
7.4.2.3. MODULATE VALVE V1 TO MAINTAIN SAT_SP

7.4.3. HRV-3, WHEN SUPPLY AIR HEATING IS REQUIRED THE BMS SHALL:
7.4.3.1. START PUMP P-13
7.4.3.2. OPEN VALVE V2
7.4.3.3. MODULATE VALVE V3 TO MAINTAIN SAT_SP

7.5. ECONOMIZER COOLING (AHU-1/2)
7.5.1. WHEN IN COOLING OR VENTILATION MODE IF SAT_SP IS LESS THAN RAT:
7.5.1.1. OPEN OUTDOOR AIR AND EXHAUST DAMPERS.
7.5.1.2. MODULATE RECIRCULATION DAMPER TO 50% CLOSED.
7.5.1.3. START AHU-2 EXHAUST FAN TO MINIMUM SPEED (60%), MODULATE AS REQUIRED TO MAINTAIN SAT_SP.

7.6. GLYCOL HEAT RECOVERY CIRCUIT (AHU-1/2) - THE GLYCOL HEAT RECOVERY CIRCUIT SHALL BE ACTIVE UNDER THE FOLLOWING CONDITIONS:
7.6.1. HEATING MODE:
7.6.1.1. WHEN AHU-2 EXHAUST FAN STARTS, PUMP P-11 SHALL SHART
7.6.1.2. VALVE V4 WILL MODULATE TO MAINTAIN AHU-2 EXHAUST TEMPERATURE ABOVE 2°C (ADJ.).
7.6.2. VENTILATION MODE:
7.6.2.1. P-11 SHALL BE ENABED IF AHU-2 EXHAUST FAN IS ACTIVE, AND
7.6.2.2. ECONOMIZER COOLING IS NOT ACTIVE.
7.6.3. COOLING MODE
7.6.3.1. P-11 SHALL BE ENABLED IF AHU-2 EXHAUST FAN IS ACTIVE AND;
7.6.3.2. OAT>RAT

8. HUMIDIFICATION:

8.1. HUMIDIFICATION IS PERMITTED IF THE FACILITY IS IN HEATING MODE.
8.2. HUMIDIFICATION IS NOT PERMITTED IF THE FACILITY IS UNOCCUPIED.
8.3. THE OCCUPIED MINIMUM FACILITY HUMIDITY LEVEL IS TO BE 30% (ADJ.) ± 5% (ADJ.).
8.4. WHEN THE FACILITY IS OCCUPIED THE BMS SHALL MONITOR RETURN AIR HUMIDITY IF THE HUMIDITY LEVEL FALLS BELOW THE SETPOINT OF 30% (ADJ.), FOR MORE THAN 15 MINUTES (ADJ.) WHILE AHU-1/2 AND HRV-3 ARE IN OPERATION THE BMS SHALL RESPOND AS FOLLOWS:

8.4.1. THE HUMIDIFIER SHALL BE ENABLED, AND OPERATE ACCORDING TO ITS ONBOARD CONTROLS.
8.4.2. THE HUMIDIFIER SHALL BE DISABLED WHEN THE RETURN AIR HUMIDITY IS SETPOINT + DEADBAND (NOMINALLY 35% (ADJ.)) FOR MORE THAN 15 MINUTES (ADJ.).
8.4.3. THE HUMIDIFER SHALL BE DISABLED IF AHU-1 OR HRV-3 SUPPLY AIR HUMIDITY RISES ABOVE 75% (ADJ.)

9. DEHUMIDIFICATION

9.1. THE MAXIMUM FACILITY HUMIDITY LEVEL IS 60% (ADJ.) ± 5% (ADJ.).
9.2. DURING UNOCCUPIED HOURS, WHEN IN VENTILATION OR COOLING MODE, BOTH AHU-1/2 AND HRV-3 SHALL BE STARTED EVERY 6 HOURS (ADJ.), FOR A MINIMUM OF 15 MINS (ADJ.);
9.2.1. IF THE RETURN AIR HUMIDITY IS AT THE MAXIMUM THRESHOLD FOR MORE THAN 5 MINS (ADJ.), THE BMS SHALL RESPOND AS FOLLOWS:
9.2.1.1. THE UNITS SHALL REMAIN IN OPERATION AT FULL VENTILATION RATE UNTIL THE HUMIDITY LEVEL IS AT THE MAXIMUM THRESHOLD MINUS THE DEADBAND (I.E. 55% (ADJ.)) FOR 15 MINUTES (ADJ.).

10. AHU-1 RECIRCULATION DAMPER OPERATION

10.1. ON A START OF AHU-1, THE UNIT IS TO HAVE THE RECIRCULATION DAMPER FULLY OPEN, AND THE OUTDOOR AIR/EXHAUST AIR DAMPERS FULLY CLOSED.
10.2. THE RECIRCULATION DAMPER IS TO CLOSE TO 50% OPEN IF THE RETURN AIR CO2 LEVEL IS ABOVE 1200 PPM (ADJ.) FOR MORE THAN 5 MINS (ADJ.).
10.2.1. DURING THIS OPERATION THE OUTDOOR AND EXHAUST AIR DAMPERS SHALL OPEN, AND THE EXHAUST FAN SHALL START.

10.2.1. ONCE RETURN AIR CO2 LEVELS FALL BELOW 800 PPM (ADJ.) FOR 5 MINS (ADJ.), THE RECIRCULATION DAMPER SHOULD OPEN, AND THE OUTDOOR & EXHAUST DAMPER SHALL CLOSE.

11. AHU-1 SUPPLY FAN (SF-1) SPEED

11.1. AHU-1 SUPPLY FAN (SF-1) SPEED ADJUSTMENT RATE SHALL BE LIMITED TO 'RAMP' AT A MAXIMUM NORMAL (I.E. NON-SAFETY TRIP) ACCELERATION/DECELERATION OF 25% (ADJ.) PER MINUTE (ADJ.).

11.2. THE MINIMUM SUPPLY FAN SPEED SHALL BE 60% (ADJ.).
11.3. THE FAN SPEED SHALL MODULATE TO MAINTAIN A SUPPLY AIR PRESSURE SETPOINT INTIALLY SET TO 250Pa (ADJ.), AS MEASURED BY THE SUPPLY AIR PRESSURE SENSOR.

12. AHU-1 EXHAUST FAN (EF-1)
12.1. AHU-1 EXHAUST FAN (EF-1) OPERATION IS PERMITTED ONLY IF THE UNIT IS NOT RECIRCULATING AIR.
12.2. THE MINIMUM EXHAUST FAN SPEED SHALL BE 60% (ADJ.)
12.3. DURING ECONOMIZER OPERATION THE EXHAUST FAN SPEED SHALL MODULATE TO MAINTAIN SAT_SP.
12.4. WHEN THE EXHAUST FAN IS STARTED TO VENTILATE (EXHAUST CO2) THE FAN SHALL MODULATE TO FULL SPEED, AND REMAIN IN THIS OPERATIONAL STATE UNTIL CO2 LEVELS DROP BELOW 800 PPM (ADJ.).

13. HRV-3 SUPPLY AND EXHAUST FAN SPEEDS

13.1. HRV-3 SUPPLY AND EXHAUST FAN SPEEDS SHALL BE SET TO A CONSTANT VALUE WHEN THE UNIT IS IN OPERATION.

13.1.1. THE SPEED IS TO BE COORDINATED BETWEEN THE BMS VENDOR AND THE AIR BALANCING CONTRACTOR DURING COMMISSIONING.
13.1.2. THE FAN SPEEDS SHALL BE INITIALLY SET TO 90% (ADJ.).

14. FILTER STATUS MONITORS

14.1. THE BMS SHALL MONITOR THE STATUS OF THE FILTERS USING A TRANSMITTING AIR DIFFERENTIAL PRESSURE SENSOR.
14.2. THE TRANSMITTER IS TO PROVIDE THE READINGS TO THE GRAPHIC IN PASCALS.
14.3. THE 'CLEAN' FILTER STATUS IS TO BE INITIALLY SET TO 40Pa (ADJ.) OF AIR PRESSURE DROP ACROSS THE FILTER (TO BE ADJUSTED BY THE BMS CONTRACTOR DURING COMMISSIONING).
14.4. ON INCREASING PRESSURE DROP, THE BMS GRAPHIC SHALL UPDATE THE STATUS TO 'DIRTY' ONCE A THRESHOLD PRESSURE IS REACHED, INITIALLY SET TO 120PA (ADJ.) (TO BE ADJUSTED DURING COMMISSIONING).

15. MORNING WARM UP OPERATION:

15.1. IF THE OUTDOOR AIR TEMPERATURE IS SUCH THAT THE UNIT IS IN HEATING MODE, AS DEFINED IN PART 7.1 OF THIS SEQUENCE.

15.1.1. THE BMS SHALL START HRV-3 AND AHU-1/2 1 HOUR (ADJ.) PRIOR TO A SCHEDULED OCCUPIED PERIOD IN FULL RECIRCULATION. ALLOWING THE ZONE AIR TO BE HEATED PRIOR TO OCCUPANCY.

16. NIGHT PURGE OPERATION

16.1. THE BMS SHALL START THE HRV-3 AND AHU-1/2 DURING OVERNIGHT HOURS FOR FREE COOLING IF THE FOLLOWING CONDITIONS ARE TRUE:

16.1.1. THE DATE IS BETWEEN MAY 15TH AND OCT 1ST.
16.1.2. THE TIME IS BETWEEN 2AM (ADJ.) AND 4AM (ADJ.).
16.1.3. THE FORECASTED* OUTDOOR AIR TEMPERATURE FOR THE FOLLOWING DAY IS EXPECTED TO BE IN EXCESS OF THE COOLING MODE ENABLING TEMPERATURE (I.E. 16°C (ADJ.))
16.1.4. THE CURRENT ACTIVE OUTDOOR AIR TEMPERATURE IS 16°C (ADJ.) OR LESS.
16.1.5. THE CURRENT ACTIVE OUTDOOR AIR TEMPERATURE IS NOT BELOW 7°C (ADJ.) OR LESS.

16.2. IF THE ABOVE STATED CONDITIONS ARE TRUE, THE BMS SHALL START THE UNITS AND MAINTAIN OPERATION OF THE UNIT UNTIL THE RETURN AIR TEMPERATURE IS 17°C (ADJ.) OR LESS FOR 15 MINS (ADJ.). USE OF THE HEATING COIL IS NOT TO BE PERMITTED.

*THE BMS VENDOR IS TO OBTAIN WEATHER FORECAST DATA FROM A NO-COST ONLINE WEATHER SERVICE (ENVIRONMENT CANADA OR SIMILAR)

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PROFESSIONAL ENGINEER – Ryan L. Cooke – 1476 – 2022-02-07 – PROVINCE OF PRINCE EDWARD ISLAND

Client
Department of Transportation and Infrastructure

Project Title
Eliot River Elementary School
28 Terry Fox Place
Cornwall, PE
C0A 1H0
DTI Project No.: 170-20031

Sheet Title
Control Diagrams

No.	Description	Date
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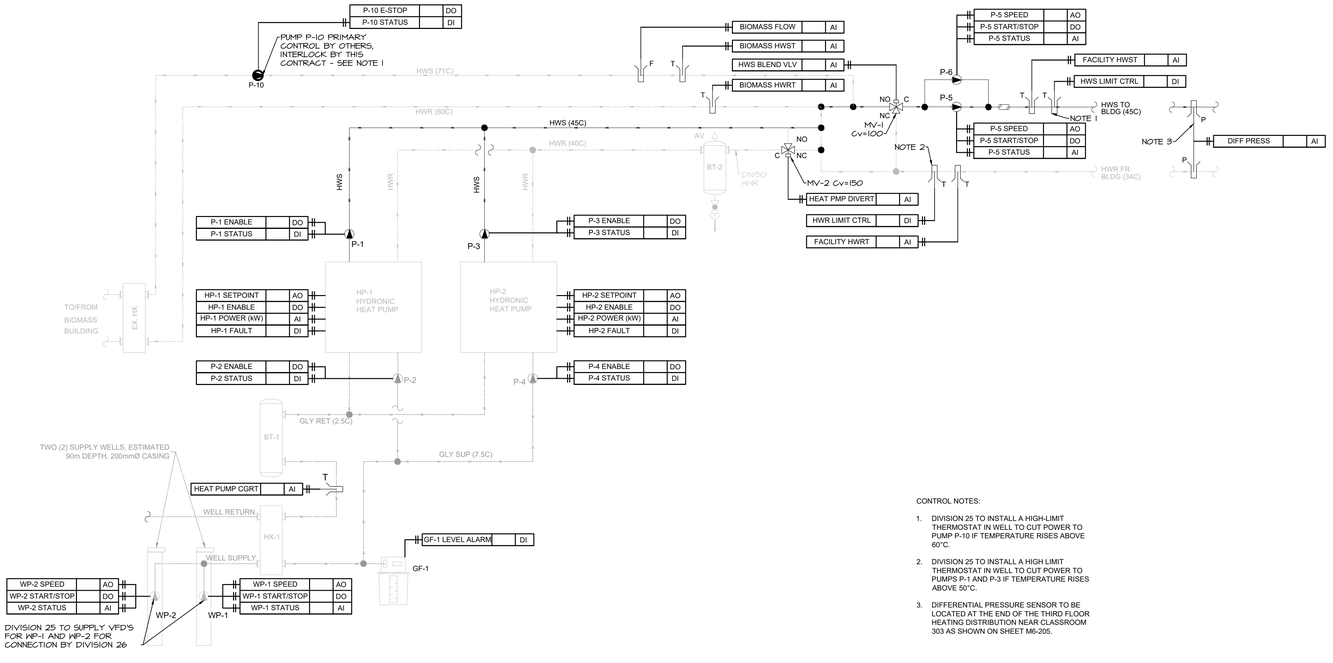


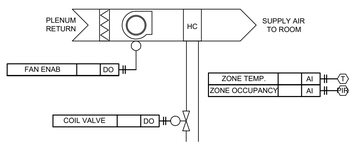
1 M501 THERMAL PLANT CONTROL DIAGRAM AND SEQUENCE
NTS

CONTROL NOTES:

1. DIVISION 25 TO INSTALL A HIGH-LIMIT THERMOSTAT IN WELL TO CUT POWER TO PUMP P-10 IF TEMPERATURE RISES ABOVE 60°C.
2. DIVISION 25 TO INSTALL A HIGH LIMIT THERMOSTAT IN WELL TO CUT POWER TO PUMPS P-1 AND P-3 IF TEMPERATURE RISES ABOVE 50°C.
3. DIFFERENTIAL PRESSURE SENSOR TO BE LOCATED AT THE END OF THE THIRD FLOOR HEATING DISTRIBUTION NEAR CLASSROOM 303 AS SHOWN ON SHEET M6-205.

SEQUENCE OF OPERATIONS: HYDRONIC THERMAL PLANT

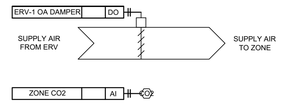
1. ANY VALUES PRESENTED IN THIS SEQUENCE FOLLOWED BY (ADJ.) ARE TO BE USER ADJUSTABLE FROM THE BUILDING MANAGEMENT SYSTEM (BMS).
2. THE BMS SHALL HAVE A CUSTOM GRAPHIC FOR THE SYSTEM ON A WEB-ACCESSIBLE PLATFORM.
3. FOR THE PURPOSES OF THIS SEQUENCE THE HYDRONIC THERMAL PLANT SYSTEM IS TO CONSIST OF THE FOLLOWING CONTROLLED EQUIPMENT:
   - 3.1. HYDRONIC HEAT PUMP GROUP 1:
     - 3.1.1. HYDRONIC HEAT PUMP 1 (HP-1)
     - 3.1.2. PUMP 1 (HP-1 BUILDING LOOP PUMP)
     - 3.1.3. PUMP 2 (HP-1 WELL LOOP PUMP)
   - 3.2. HYDRONIC HEAT PUMP GROUP 2:
     - 3.2.1. HYDRONIC HEAT PUMP 2 (HP-2)
     - 3.2.2. PUMP 3 (HP-2 BUILDING LOOP PUMP)
     - 3.2.3. PUMP 4 (HP-2 WELL LOOP PUMP)
   - 3.3. PUMP 5 (FACILITY HYDRONIC CIRCULATOR)
   - 3.4. PUMP 6 (FACILITY HYDRONIC CIRCULATOR)
   - 3.5. WP-1 (WELL 1 PUMP)
   - 3.6. WP-2 (WELL 2 PUMP)
   - 3.7. SYSTEM FEEDER ALARM
   - 3.8. ALL SENSORS PRESENTED IN THE CONTROL DIAGRAM
4. THE SYSTEM IS TO RESPOND TO THE THERMAL REQUIREMENTS OF THE BUILDING IN ACCORDANCE WITH THE OUTDOOR AIR TEMPERATURE MODE, AND OCCUPANCY SCHEDULE OF THE BUILDING, AS OUTLINE WITHIN THIS SEQUENCE.
   - 4.1. NOMINALLY THE OCCUPIED HOURS SHALL BE SET AS FOLLOWS:
     - 4.1.1. BETWEEN SEPT 1ST AND JUNE 30TH, MONDAY THROUGH FRIDAY: 6:30AM THROUGH 6:00PM
   - 4.2. IF OCCUPANCY IS DETECTED DURING SCHEDULED UNOCCUPIED HOURS VIA ROOM SENSORS, THE UNITS SHALL REVERT TO OCCUPIED MODE FOR THE DURATION OF DETECTED OCCUPANCY + 1 HOUR (ADJ.).
5. FACILITY HWS SETPOINT & MIXING CONTROL (MV-1):
   - 5.1. THE MIXING VALVE MV-1 IS TO MODULATE TO MAINTAIN A HOT WATER SUPPLY SETPOINT (HWST), THE HWSTIS TO BE DETERMINED BASED ON THE FACILITY CONDITIONING MODE (HEATING, COOLING, VENTILATION) AS FOLLOWS:
   - 5.2. FACILITY HEATING MODE:
     - 5.2.1. HEATING MODE IS ACTIVE WHEN THE OUTDOOR AIR TEMPERATURE (OAT) IS BELOW 10°C (ADJ.) FOR MORE THAN 2 HOURS (ADJ.).
     - 5.2.2. HEATING MODE HWST = 49°C (ADJ.), WHEN OCCUPIED
     - 5.2.3. HEATING MODE HWST = 44°C (ADJ.), WHEN UNOCCUPIED
   - 5.3. COOLING MODE:
     - 5.3.1. COOLING MODE IS ACTIVE WHEN THE OUTDOOR AIR TEMPERATURE IS ABOVE 16°C (ADJ.) FOR MORE THAN 2 HOURS (ADJ.).
     - 5.3.2. DURING COOLING MODE SUPPLY WATER TEMPERING IS TO BE DISABLED.
   - 5.4. VENTILATION MODE:
     - 5.4.1. VENTILATION MODE IS ACTIVE BETWEEN WHEN OUTDOOR AIR TEMPERATURE IS BETWEEN 10°C (ADJ.) AND 16°C (ADJ.) FOR MORE THAN 2 HOURS (ADJ.).
     - 5.4.2. VENTILATION MODE HWST = 44°C, WHEN OCCUPIED.
     - 5.4.3. VENTILATION MODE HWST = 39°C, WHEN UNOCCUPIED
   - 5.5. ALARMS TO BE PROVIDED AS FOLLOWS:
     - 5.5.1. IF HWS RISES ABOVE 60°C
     - 5.5.2. IF HWS FALLS BELOW 20°C, WHEN IN HEATING OR OCCUPIED VENTILATION MODE.
     - 5.5.3. IF HWR RISES ABOVE 50°C
     - 5.5.4. IF HWR FALLS BELOW 10°C, WHEN IN HEATING OR OCCUPIED MODE.
6. FACILITY CIRCULATION PUMPS (P-5 AND P-6)
   - 6.1. P-5 AND P-6 ARE TO OPERATE IN A LEAD-LAG FASHION, AND ARE TO ALTERNATE THE LEAD IN ACCORDANCE WITH A USER INPUT RUNHOUR ROTATION VALUE, INITIALLY SET TO 200 RUNHOURS (ADJ.)
     - 6.1.1. IF RUN STATUS IS NOT READ WITHIN 30 SEC (ADJ.) OF AN ENABLE COMMAND, DISABLE THE PUMP, ALARM THE OWS, AND ROTATE THE LEAD.
   - 6.2. THE PUMP SPEEDS SHALL MODULATE TO MAINTAIN A DIFFERENTIAL PRESSURE SETPOINT (DPS).
     - 6.2.1. THE MINIMUM SPEED FOR THE LEAD CIRCULATION PUMP IS 60%.
     - 6.2.2. THE MAXIMUM RATE OF MODULATION SHALL BE 25% PER MINUTE.
     - 6.2.3. IF THE LEAD PUMP OPERATES ABOVE 90% SPEED (ADJ.) FOR 2 MIN (ADJ.):
       - 6.2.3.1. START THE LAG PUMP, AND MODULATE BOTH PUMPS IN UNISON.
       - 6.2.3.2. INITIAL SPEED FOR BOTH PUMPS SHALL BE 75% (ADJ.)
       - 6.2.3.1. DISABLE LAG CIRCULATOR WHEN PUMP SPEEDS FALL BELOW 65% (ADJ.) FOR MORE THAN 2 MIN (ADJ.).
   - 6.3. THE PUMP RESPONSE ACCORDING TO CONDITIONING MODE SHALL BE AS FOLLOWS:
     - 6.3.1. HEATING MODE:
       - 6.3.1.1. WHEN OCCUPIED:
         - 6.3.1.1.1. DPS = 50 kPa (ADJ.)
         - 6.3.1.1.2. BOTH PUMPS CAN OPERATE IN UNISON
       - 6.3.1.2. WHEN UNOCCUPIED:
         - 6.3.1.2.1. DPS = 40 kPa (ADJ.)
         - 6.3.1.2.2. LEAD PUMP ONLY
     - 6.3.2. VENTILATION MODE:
       - 6.3.2.1. WHEN OCCUPIED:
         - 6.3.2.1.1. DPS = 30 kPa (ADJ.)
         - 6.3.2.1.2. LEAD PUMP ONLY
       - 6.3.2.2. WHEN UNOCCUPIED:
         - 6.3.2.2.1. P-5 AND P-6 DISABLED
     - 6.3.3. COOLING MODE:
       - 6.3.3.1. WHEN OCCUPIED:
         - 6.3.3.1.1. P-5 AND P-6 DISABLED
       - 6.3.3.2. WHEN UNOCCUPIED:
         - 6.3.3.2.1. P-5 AND P-6 DISABLED
7. HEAT PUMP RESPONSE:
   - 7.1. LEAD/LAG OPERATION:
     - 7.1.1. HEAT PUMP GROUP 1' AND 'HEAT PUMP GROUP 2' ARE TO OPERATE IN A LEAD/LAG FASHION, ROTATING THE LEAD GROUP ACCORDING TO CUMULATIVE RUNHOURS.
       - 7.1.1.1. THE ROTATION SETPOINT SHALL BE INITIALLY SET TO 100 RUNHOURS (ADJ.).
       - 7.1.1.2. IF THE LEAD GROUP IS COMMANDED TO OPERATE AND RUN STATUS IS NOT OBSERVED WITHIN 30 SEC (ADJ.), ALARM THE OWS, AND ROTATE THE LEAD TO THE LAG GROUP.
     - 7.1.2. SYSTEM RESPONSE:
       - 7.1.2.1. PERMITTED OPERATIONAL GROUPS BY MODE:
         - 7.1.2.1.1. HEATING MODE:
           - 7.1.2.1.1.1. WHEN OCCUPIED: BOTH HEAT PUMP GROUPS MAY OPERATE SIMULTANEOUSLY.
           - 7.1.2.1.1.2. WHEN UNOCCUPIED: ONLY THE LEAD HEAT PUMP GROUP MAY OPERATE.
         - 7.1.2.1.2. VENTILATION MODE:
           - 7.1.2.1.2.1. WHEN OCCUPIED: ONLY THE LEAD HEAT PUMP GROUP MAY OPERATE.
           - 7.1.2.1.2.2. WHEN UNOCCUPIED: BOTH HEAT PUMP GROUPS DISABLED.
         - 7.1.2.1.3. COOLING MODE:
           - 7.1.2.1.3.1. WHEN OCCUPIED: BOTH HEAT PUMP GROUPS DISABLED.
           - 7.1.2.1.3.2. WHEN UNOCCUPIED: BOTH HEAT PUMP GROUPS DISABLED.
       - 7.1.2.2. START CONDITIONS:
         - 7.1.2.2.1. IN ANY MODE THE LEAD HEAT PUMP GROUP (IF PERMITTED TO START) MAY ONLY ENABLE IF THE HWST IS BELOW SETPOINT BY 10°C (ADJ.) FOR 5 MIN (ADJ.), WHILE BIOMASS P-10 IS IN OPERATION.
           - 7.1.2.2.1.1. THE LEAD GROUP SHALL DISABLE WHEN THE FACILITY HWST AT SETPOINT FOR 2MIN (ADJ.).
         - 7.1.2.2.2. THE LAG HEAT PUMP GROUP (IF PERMITTED TO OPERATE) SHALL START IF THE HWST IS 5°C (ADJ.) BELOW SETPOINT FOR 5 MIN (ADJ.) WHILE THE LEAD GROUP IS IN OPERATION.
           - 7.1.2.2.2.1. THE LAG GROUP SHALL DISABLE WITH THE LEAD GROUP.
         - 7.1.2.2.3. WHEN THE HEAT PUMP SYSTEM IS STARTED THE DIVERTING VALVE MV-2 SHALL DIVERT TO SUPPLY WATER TO THE FACILITY HEATING CIRCUIT.
           - 7.1.2.3.1. WHEN THE SETPOINT IS SATISFIED MV-2 SHALL DIVERT TO RECIRCULATE TO THE BUFFER TANK. OPERATIONAL HEAT PUMP GROUPS SHALL REMAIN IN ENABLED UNTIL A RUNTIME OF AT LEAST 2 MINS (ADJ.) HAS ELAPSED AFTER A START.
       - 7.1.2.4. ORDER OF OPERATIONS - HEAT PUMP GROUP START:
         - 7.1.2.4.1. START HOT WATER INJECTION PUMP (PUMP P-1 OR P-3)
         - 7.1.2.4.2. START BOTH COL CIRCULATION PUMP (PUMP P-2 OR P-4)
         - 7.1.2.4.3. START HEAT PUMP (HP-1 OR HP-2)
8. WELL PUMP AND COLD GLYCOL LOOP TEMPERATURE CONTROL.
   - 8.1. THE WELL PUMPS (WP-1 AND WP-2) ARE TO BE OPERATED IN A LEAD/LAG FASHION ACCORDING TO A RUNHOUR ROTATION, INITIALLY SET TO 100 RUNHOURS (ADJ.)
     - 8.1.1. IF RUN STATUS IS NOT RECEIVED FROM THE LEAD PUMP WITHIN 30 SEC (ADJ.) OF AN ENABLE COMMAND, ALARM THE OWS, DISABLE THE PUMP, AND ROTATE THE LEAD.
   - 8.2. THE COLD GLYCOL LOOP RETURN TEMPERATURE (CGRT) IS TO BE MAINTAINED WITHIN A PERMISSIBLE TEMPERATURE RANGE NOMINALLY AS FOLLOWS:
     - 8.2.1. MINIMUM CGRT: 2.5°C (ADJ.)
       - 8.2.1.1. PROVIDE ALARMS IF THE CGRT IS BELOW: -5°C (ADJ.)
       - 8.2.1.2. PROVIDE ALARMS IF THE CGRT IS ABOVE: 35°C (ADJ.)
     - 8.3. IF THE CGRT IS OBSERVED TO BE AT THE MINIMUM FOR 30 SEC. (ADJ.) OR LONGER, WHILE PUMP 2 AND/OR PUMP 4 ARE RUNNING:
       - 8.3.1. THE LEAD WELL PUMP SHALL BE STARTED AT MINIMUM SPEED (75%).
       - 8.3.2. THE SPEED OF THE WELL PUMP SHALL BE INCREMENTALLY INCREASED AT A RATE OF 15% PER MIN (ADJ.).
       - 8.3.3. THE BMS SHALL PREVENT THE ACTIVE GLYCOL PUMPS (PUMP 2 AND OR PUMP 4) FROM STOPPING.
       - 8.3.4. THE LEAD WELL PUMPS SHALL STOP WHEN THE CGRT IS OBSERVED TO BE 5°C (ADJ.)ABOVE THE MINIMUM VALUE FOR 5MIN (ADJ.)
         - 8.3.4.1. IF THE LEAD WELL PUMP HAS BEEN IN OPERATION AT 90% (ADJ.) SPEED OR HIGHER FOR 5 MINS (ADJ.), AND THE CGRT IS LESS THAN 3°C (ADJ.) ABOVE THE MINIMUM CUT IN TEMPERATURE (I.E. 2.5°C):
           - 8.3.4.1.1. START THE LAG WELL PUMP AT 75% (ADJ.), RAMP DOWN THE LEAD WELL PUMP TO MATCH THE SPEED, AND MODULATE THE PUMPS IN UNISON.
           - 8.3.4.1.2. IF THE CGRT IS OBSERVED TO BE 5°C ABOVE THE MINIMUM FOR 5 MIN.
             - 8.3.4.1.2.1. DISABLE THE LAG WELL PUMP.
9. ENERGY MONITORING (FOR KIOSK APPLICATION)
   - 9.1. THE BMS SHALL MONITOR THE POWER CONSUMPTION OF THE MAIN HEAT PUMPS, AND TRACK FOR HISTORICAL TRENDING.
   - 9.2. THE ENERGY TRANSFER FROM THE BIOMASS SYSTEM SHALL BE TRACKED FOR ENERGY MONITORING AT THE KIOSK APPLICATION USING THE TEMPERATURE AND FLOW SENSORS.



DUCTED FANCOIL UNIT CONTROL (TYPICAL)

1. ANY VALUES PRESENTED IN THIS SEQUENCE FOLLOWED BY (ADJ.) ARE TO BE USER ADJUSTABLE FROM THE BUILDING MANAGEMENT SYSTEM (BMS).
2. THE BMS SHALL HAVE A CUSTOM GRAPHIC FOR THE FANCOIL ON A WEB-ACCESSIBLE PLATFORM.
3. THE UNIT IS TO CYCLE ON IN RESPONSE TO SPACE CONDITIONING COMMANDS RELATED TO THE ZONE SETPOINT.
4. THE UNIT SHALL HAVE DIFFERENT SETPOINTS FOR OCCUPIED AND UNOCCUPIED MODES. THE SCHEDULE SHALL ALLOW FOR OCCUPANCY TO BE SET IN 15 MINUTE INCREMENTS OVER A 24/7 CALENDAR.
   - 4.1. NOMINALLY THE OCCUPIED HOURS SHALL BE SET AS FOLLOWS:
     - 4.1.1. BETWEEN SEPT 1ST AND JUNE 30TH, MONDAY THROUGH FRIDAY: 6:30AM THROUGH 6:00PM
5. FOR PURPOSES OF THIS SEQUENCE EACH FANCOIL SYSTEM IS TO CONSIST OF THE FOLLOWING FOLLOWING CONTROLLED EQUIPMENT:
   - 5.1. ROOM TEMPERATURE SENSOR
   - 5.2. ROOM PASSIVE INFRARED (PIR) OCCUPANCY SENSOR
   - 5.3. UNIT FAN
   - 5.4. UNIT COIL VALVE
6. ZONE TEMPERATURE SETPOINTS:
   - 6.1. FACILITY HEATING MODE:
     - 6.1.0.1. OCCUPIED SETPOINT: 20°C (ADJ.) ± 2°C (ADJ.)
     - 6.1.0.2. UNOCCUPIED SETPOINT: 14°C (ADJ.) ± 2°C
   - 6.1.1. FACILITY VENTILATION MODE:
     - 6.1.1.1.1. OCCUPIED SETPOINT: 20°C (ADJ.) ± 2°C (ADJ.)
     - 6.1.1.1.2. UNOCCUPIED SETPOINT: NO HEATING RESPONSE.
   - 6.1.2. FACILITY COOLING MODE:
     - 6.1.2.1.1. OCCUPIED MODE: NO HEATING RESPONSE
     - 6.1.2.1.2. UNOCCUPIED MODE: NO HEATING RESPONSE
   - 6.2. ZONE SETPOINT USER OVERRIDE:
     - 6.2.1. ZONE TEMPERATURE SENSORS EQUIPPED WITH SETPOINT OVERRIDE BUTTONS ARE TO ALLOW USERS TO INCREASE OR DECREASE THE HEATING SETPOINT BY 2°C (ADJ.) DURING AN OCCUPIED PERIOD.
     - 6.2.2. THE ZONE TEMPERATURE OCCUPIED SETPOINT SHALL RESET TO DEFAULT EACH DAY.
     - 6.2.3. DURING AN UNOCCUPIED PERIOD IF A USER ADJUSTS A ZONE TEMPERATURE SENSOR, OR IF THE PIR SENSOR DETECTS OCCUPANCY, THE RELATED ZONE SHALL REVERT TO OCCUPIED MODE FOR THE DURATION OF THE DETECTED OCCUPANCY PLUS 30 MINS (ADJ.)
7. MORNING WARM-UP SEQUENCE.
   - 7.1. IF THE FACILITY IS IN HEATING MODE, AND A SCHEDULED OCCUPANCY PERIOD WILL START WITHIN 30 MINS (ADJ.):
     - 7.1.1. THE ZONE SETPOINT SHALL UPDATE TO THE OCCUPIED SETPOINT, AND THE FANCOIL UNIT SHALL RESPOND ACCORDINGLY.

2 M501 FANCOIL CONTROL DIAGRAM & SEQUENCE (TYPICAL)
NTS



SEQUENCE OF OPERATIONS ZONE VAV BOXES (TYPICAL)

1. ANY VALUES PRESENTED IN THIS SEQUENCE FOLLOWED BY (ADJ.) ARE TO BE USER ADJUSTABLE FROM THE BUILDING MANAGEMENT SYSTEM (BMS).
2. THE BMS SHALL HAVE A CUSTOM GRAPHIC FOR THE VAV BOXES ON A WEB-ACCESSIBLE PLATFORM.
3. WHEN THE ASSOCIATED AHU IS TO START, ALL VAV BOXES ARE TO BE ENABLED, AND TO REMAIN OPEN FULLY FOR THE FIRST 10 MINS (ADJ.) OF OPERATION.
4. FOR THE PURPOSES OF THIS SEQUENCE THE VAV SYSTEM IS TO CONSIST OF THE FOLLOWING CONTROLLED EQUIPMENT:
   - 4.1. VAV ZONE MODULATION DAMPER
   - 4.2. ZONE CO2 SENSOR
5. ZONE VAV MODULATION AND VENTILATION CONTROL.
   - 5.1. WHEN THE ERV IS OPERATING THE ZONE VAV DAMPERS SHALL OPEN, AND MODULATE INCREMENTALLY TO MAINTAIN A CO2 SETPOINT. OF 1100PPM (ADJ.) ± 100PPM (ADJ.).
   - 5.2. THE MINIMUM POSITION FOR A VAV BOX DAMPER SHALL BE 50% (ADJ.)
   - 5.3. DURING MORNING WARM UP OR NIGHT PURGE OPERATION, THE VAV BOX DAMPERS SHALL OPEN FULLY.

3 M501 VAV BOX CONTROL DIAGRAM & SEQUENCE (TYPICAL)
NTS

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PROFESSIONAL ENGINEER — Ryan L. Cooke 1476 — PROVINCE OF PRINCE EDWARD ISLAND — DATE 2022-02-07

Client: Department of Transportation and Infrastructure

Project Title: Eliot River Elementary School
28 Terry Fox Place
Cornwall, PE
C0A 1H0
DTI Project No.: 170-20031

Sheet Title: Control Diagrams

No.	Description	Date
0	Issued For Addendum #1	2022-02-07

Date: 2022-02-07
Drn By: R.L.C., P.Eng. / N.L.V.
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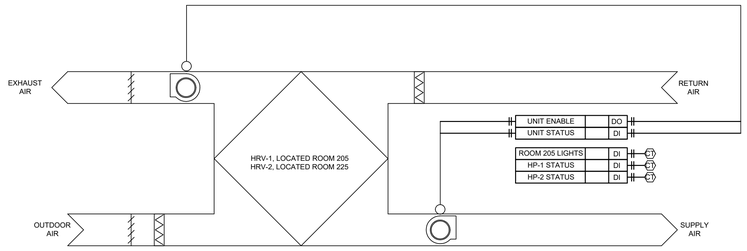
Revision: 0
Project Number: 201103
Drawing Number: M6-501



1 M502 STAND-ALONE HRV (HRV-1, HRV-2) CONTROL DIAGRAM AND SEQUENCE
NTS

HRV-1 AND HRV-2 (MECHANICAL ROOMS - LEVEL 2)

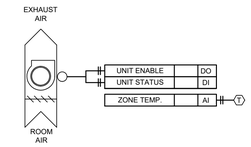
1. ANY VALUES PRESENTED IN THIS SEQUENCE FOLLOWED BY (ADJ.) ARE TO BE USER ADJUSTABLE FROM THE BUILDING MANAGEMENT SYSTEM (BMS).

2. THE BMS SHALL HAVE A CUSTOM GRAPHIC FOR THE HRV-1 AND HRV-2 ON A WEB-ACCESSIBLE PLATFORM.

3. RUN CONDITIONS:
 3.1. HRV-1
  3.1.1. THE UNIT SHALL HAVE A USER ADJUSTABLE SCHEDULE TO DETERMINE THE NORMAL OPERATING HOURS ADJUSTABLE IN 15 MINUTE INCREMENTS OVER A 24/7 CALENDAR. NOMINALLY OCCUPIED HOURS SHALL BE:
   3.1.1.1. BETWEEN SEPT 1ST AND JUNE 30TH, MONDAY THROUGH FRIDAY: 6:30AM THROUGH 6:00PM
  3.1.2. THE UNIT SHALL ALSO START IF THE FOLLOWING CONDITIONS ARE TRUE
   3.1.2.1. ROOM 205 LIGHTS ARE ON
   3.1.2.2. HEAT PUMP 1 OR HEAT PUMP 2 IS OPERATING.

 3.2. HRV-2
  3.2.1. THE UNIT SHALL HAVE A USER ADJUSTABLE SCHEDULE TO DETERMINE THE NORMAL OPERATING HOURS, ADJUSTABLE IN 15 MINUTE INCREMENTS OVER A 24/7 CALENDAR. NOMINALLY AS FOLLOWS:
   3.2.1.1. BETWEEN SEPT 1ST AND JUNE 30TH, MONDAY THROUGH FRIDAY: 6:30AM THROUGH 6:00PM.

COOLING EXHAUST FANS (EF-1, EF-2)



1. ANY VALUES PRESENTED IN THIS SEQUENCE FOLLOWED BY (ADJ.) ARE TO BE USER ADJUSTABLE FROM THE BUILDING MANAGEMENT SYSTEM (BMS).

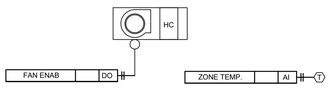
2. THE BMS SHALL HAVE A CUSTOM GRAPHIC FOR THE ZONE HEATING CONTOLS ON A WEB-ACCESSIBLE PLATFORM.

3. EF-1 (ELECTRICAL ROOM 227)
 3.1. UNIT TO CYCLE ON IF ROOM TEMPERATURE REACHES 30°C (ADJ.), AND TO REMAIN ON UNTIL ROOM TEMPERATURE FALLS TO 25°C.
 3.2. IF ERV-1 AND ERV-2 ARE OPERATING IN NIGHT PURGE MODE, EF-1 SHALL CYCLE ON AND REMAIN IN OPERATION FOR THE DURATION OF THE MODE.

4. EF-2 (MECHANICAL ROOM 205)
 4.1. UNIT TO CYCLE ON IF ROOM TEMPERATURE REACHES 30°C (ADJ.), AND TO REMAIN ON UNTIL ROOM TEMPERATURE FALLS TO 25°C.
 4.2. IF ERV-1 AND ERV-2 ARE OPERATING IN NIGHT PURGE MODE, EF-2 SHALL CYCLE ON AND REMAIN IN OPERATION FOR THE DURATION OF THE MODE.
 4.3. THE CONNECTION TO THE ZONE REFRIGERANT DETECTOR SHALL BE PRESERVED.

2 M502 COOLING EXHAUST FANS (EF-1, EF-2) CONTROL DIAGRAM AND SEQUENCE
NTS

UNIT HEATER CONTROL



1. THE BELOW SEQUENCE IS TYPICAL FOR UNIT HEATERS LOCATED IN THE FOLLOWING ZONES:
 1.1. NORTH PENTHOUSE
 1.2. SOUTH PENTHOUSE

2. THE BMS SHALL HAVE A CUSTOM GRAPHIC FOR THE UNIT HEATERS ON A WEB-ACCESSIBLE PLATFORM.

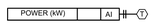
3. ZONE TEMPERATURE SETPOINTS:
 3.1. FACILITY HEATING MODE:
  3.1.1.1. SETPOINT: 15°C (ADJ.) ± 2°C (ADJ.)

 3.1.2. FACILITY VENTILATION MODE:
  3.1.2.1. NO HEATING RESPONSE

 3.1.3. FACILITY COOLING MODE:
  3.1.3.1. NO HEATING RESPONSE

3 M502 UNIT HEATER CONTROL SEQUENCE
NTS

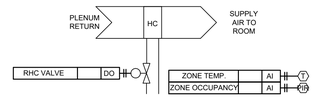
FACILITY ELECTRIC POWER METER



1. DIVISION 25 TO SUPPLY A POLYPHASE POWER METER FOR INSTALLATION ON THE MAIN POWER ENTRANCE (IN COORDINATION WITH DIVISION 26). TO PROVIDE THE INFORMATION OUTLINED IN DETAIL WITHIN THE ENERGY KIOSK APPLICATION DESCRIPTION.

4 M502 FACILITY ELECTRICAL ENTRANCE POWER MONITORING
NTS

DUCTED REHEAT COIL CONTROL (TYPICAL)



1. ANY VALUES PRESENTED IN THIS SEQUENCE FOLLOWED BY (ADJ.) ARE TO BE USER ADJUSTABLE FROM THE BUILDING MANAGEMENT SYSTEM (BMS).

2. THE BMS SHALL HAVE A CUSTOM GRAPHIC FOR THE REHEAT COIL ON A WEB-ACCESSIBLE PLATFORM.

3. THE REHEAT COIL VALVE IS TO OPEN IN RESPONSE TO ZONE HEATING DEMANDS.

4. ZONE TEMPERATURE SETPOINTS:
 4.1. FACILITY HEATING MODE:
  4.1.1.1. OCCUPIED SETPOINT: 20°C (ADJ.) ± 2°C (ADJ.)
  4.1.1.2. UNOCCUPIED SETPOINT: 14°C (ADJ.) ± 2°C

 4.1.1. FACILITY VENTILATION MODE:
  4.1.1.1. OCCUPIED SETPOINT: 20°C (ADJ.) ± 2°C (ADJ.)
  4.1.1.2. UNOCCUPIED SETPOINT: NO HEATING RESPONSE.

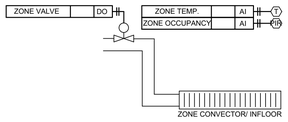
 4.1.2. FACILITY COOLING MODE:
  4.1.2.1. OCCUPIED MODE: NO HEATING RESPONSE
  4.1.2.2. UNOCCUPIED MODE: NO HEATING RESPONSE

 4.2. ZONE SETPOINT USER OVERRIDE:
  4.2.1. ZONE TEMPERATURE SENSORS EQUIPPED WITH SETPOINT OVERRIDE BUTTONS ARE TO ALLOW USERS TO INCREASE OR DECREASE THE HEATING SETPOINT BY 2°C (ADJ.) DURING AN OCCUPIED PERIOD.
  4.2.2. THE ZONE TEMPERATURE OCCUPIED SETPOINT SHALL RESET TO DEFAULT EACH DAY.
  4.2.3. DURING AN UNOCCUPIED PERIOD IF A USER ADJUSTS A ZONE TEMPERATURE SENSOR, OR IF THE PIR SENSOR DETECTS OCCUPANCY, THE RELATED ZONE SHALL REVERT TO OCCUPIED MODE FOR THE DURATION OF THE DETECTED OCCUPANCY PLUS 30 MINS (ADJ.)

5. MORNING WARM-UP SEQUENCE.
 5.1. IF THE FACILITY IS IN HEATING MODE, AND A SCHEDULED OCCUPANCY PERIOD WILL START WITHIN 30 MINS (ADJ.):
  5.1.1. THE ZONE SETPOINT SHALL UPDATE TO THE OCCUPIED SETPOINT, AND THE REHEAT COIL SHALL RESPOND ACCORDINGLY.

5 M502 DUCTED REHEAT COIL CONTROL SEQUENCE
NTS

ZONE HEATING CONTROL



1. ANY VALUES PRESENTED IN THIS SEQUENCE FOLLOWED BY (ADJ.) ARE TO BE USER ADJUSTABLE FROM THE BUILDING MANAGEMENT SYSTEM (BMS).

2. THE BMS SHALL HAVE A CUSTOM GRAPHIC FOR THE ZONE HEATING CONTOLS ON A WEB-ACCESSIBLE PLATFORM.

3. THE ZONE VALVE IS TO OPEN TO MAINTAIN THE ZONE SETPOINT ACCORDING TO THE OCCUPANCY SCHEDULE.

4. ZONE TEMPERATURE SETPOINTS:
 4.1. FACILITY HEATING MODE:
  4.1.1.1. OCCUPIED SETPOINT: 20°C (ADJ.) ± 2°C (ADJ.)
  4.1.1.2. UNOCCUPIED SETPOINT: 14°C (ADJ.) ± 2°C

 4.1.1. FACILITY VENTILATION MODE:
  4.1.1.1. OCCUPIED SETPOINT: 20°C (ADJ.) ± 2°C (ADJ.)
  4.1.1.2. UNOCCUPIED SETPOINT: NO HEATING RESPONSE.

 4.1.2. FACILITY COOLING MODE:
  4.1.2.1. OCCUPIED MODE: NO HEATING RESPONSE
  4.1.2.2. UNOCCUPIED MODE: NO HEATING RESPONSE

 4.2. ZONE SETPOINT USER OVERRIDE:
  4.2.1. ZONE TEMPERATURE SENSORS EQUIPPED WITH SETPOINT OVERRIDE BUTTONS ARE TO ALLOW USERS TO INCREASE OR DECREASE THE HEATING SETPOINT BY 2°C (ADJ.) DURING AN OCCUPIED PERIOD.
  4.2.2. THE ZONE TEMPERATURE OCCUPIED SETPOINT SHALL RESET TO DEFAULT EACH DAY.
  4.2.3. DURING AN UNOCCUPIED PERIOD IF A USER ADJUSTS A ZONE TEMPERATURE SENSOR, OR IF THE PIR SENSOR DETECTS OCCUPANCY, THE RELATED ZONE SHALL REVERT TO OCCUPIED MODE FOR THE DURATION OF THE DETECTED OCCUPANCY PLUS 30 MINS (ADJ.)

5. MORNING WARM-UP SEQUENCE.
 5.1. IF THE FACILITY IS IN HEATING MODE, AND A SCHEDULED OCCUPANCY PERIOD WILL START WITHIN 30 MINS (ADJ.):
  5.1.1. THE ZONE SETPOINT SHALL UPDATE TO THE OCCUPIED SETPOINT, AND THE REHEAT COIL SHALL RESPOND ACCORDINGLY.

6 M502 ZONE HEATING CONTROL
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Ryan L Cooke
1476
PROVINCE OF PRINCE EDWARD ISLAND
DATE

Client
Department of Transportation and Infrastructure

Project Title
Eliot River Elementary School
28 Terry Fox Place
Cornwall, PE
C0A 1H0
DTI Project No.: 170-20031

Sheet Title
Control Diagrams

No.	Description	Date
0	Issued For Addendum #1	2022-02-07

Date: 2022-02-07
Drn By: R.L.C., P.Eng. / N.L.V.
Chk By: R.L.C., P.Eng.
Revision: 0
Project Number: 201103
Drawing Number: M6-502

SUSTAINABILITY INFORMATION KIOSK APPLICATIONS

1. ANY VALUES PRESENTED IN THIS SEQUENCE FOLLOWED BY (ADJ.) ARE TO BE USER ADJUSTABLE, FROM OPERATOR LEVEL ACCESS ACCOUNTS OR HIGHER.

2. THE FOLLOWING MODULES ARE TO BE PRESENTED ON THE KIOSK WORKSTATION PROVIDED IN THE MAIN LOBBY OF THE SCHOOL, WHERE INDICATED ON THE LAYOUT.
   - 2.1. THE KIOSK SHALL HAVE THE LOWEST-LEVEL SECURITY ACCESS, AND NO ABILITY TO ADJUST ACTIVE SETPOINTS, PROVIDING READ-ONLY ABILITIES TO THE BUILDING MANAGEMENT SYSTEM.

3. IF ANY SCREEN IS LEFT INACTIVE WITH NO USER INTERVENTION FOR 3 MINS (ADJ.) THE KIOSK SHALL REVERT TO DISPLAY THE HOME PAGE.
   - 3.1. ALL SCREENS SHALL HAVE A BUTTON WHICH WILL ALLOW THE USER TO RESET TO THE HOME PAGE OR MAIN MENU.

4. HOME PAGE:
   - 4.1. THE HOME PAGE OF THE KIOSK IS TO DISPLAY A PERSPECTIVE VIEW OF THE BUILDING, (HIGH DEFINITION PHOTOGRAPHIC), WITH THE FOLLOWING INFORMATION AVAILABLE:
     - 4.1.1. ACTIVE WEATHER WITH AN ANIMATION FUNCTION (NOMINALLY 'ABOVE' THE SCHOOL IN THE PERSPECTIVE PHOTO).
     - 4.1.2. A 5-DAY WEATHER FORECAST (OBTAINED FROM A FREE WEATHER SERVICE (ENVIRONMENT CANADA OR SIMILAR)
     - 4.1.3. ACTIVE FACILITY CONDITIONING MODE (HEATING, FREE COOLING, OR VENTILATION)
     - 4.1.4. ACTIVE FACILITY POWER USAGE (IN kW)
     - 4.1.5. ACTIVE FACILITY THERMAL ENERGY USAGE (IN EQUIVALENT kW)
     - 4.1.6. ACTIVE FACILITY PHOTOVOLTAIC POWER GENERATION (IN WATTS)
     - 4.1.7. LINK TO THE MAIN MENU SCREEN.

5. MAIN MENU
   - 5.1. THE MAIN MENU FUNCTION IS TO BE THE CENTRAL NAVIGATION POINT, ACCESSIBLE FROM ANY WINDOW, AND SHALL ALLOW THE USERS TO SELECT ANY OF THE FOLLOWING GRAPHIC SCREENS:
     - 5.1.1. ENERGY USE STATISTICS PAGE
     - 5.1.2. FACILITY EMISSIONS STATISTICS PAGE
     - 5.1.3. VENTILATION SYSTEM PAGE
     - 5.1.4. HEATING SYSTEM PAGE
     - 5.1.5. FACILITY ZONE CONDITIONING PAGE
     - 5.1.6. HOME PAGE RETURN BUTTON

6. ENERGY USE STATISTICS PAGE:
   - 6.1. THIS PAGE SHALL PROVIDE THE INFORMATION REQUESTED BELOW, WITH A BACKGROUND IMAGE OF THE SCHOOL, ALL REQUESTED DATA SHOULD BE PRESENTED IN BAR CHART FORM WITH VALUES.
   - 6.2. THE ENERGY USE STATISTICS PAGE IS TO SUMMARIZE THE INFORMATION PRESENTED BELOW :
     - 6.2.1. ACTIVE FACILITY POWER USAGE - DISPLAYED IN KILOWATTS OF ACTIVE USAGE - UPDATED IN 15-MINUTE AVERAGED PERIODS.
       - 6.2.1.1. CURRENT CALENDAR MONTH PEAK DEMAND (MONTH TO DATE).
       - 6.2.1.2. PREVIOUS YEAR, SAME MONTH PEAK DEMAND.
       - 6.2.1.3. PREVIOUS YEAR PEAK DEMAND.
     - 6.2.2. ELECTRICAL ENERGY USAGE INFORMATION IN KILOWATT HOURS INCLUDING:
       - 6.2.2.1. MONTH-TO DATE kWh.
       - 6.2.2.2. PREVIOUS YEAR, SAME MONTH kWh.
       - 6.2.2.3. YEAR-TO-DATE kWh
       - 6.2.2.4. PREVIOUS YEAR TO DATE kWh.
       - 6.2.2.5. PREVIOUS YEAR TOTAL kWh.
     - 6.2.3. THERMAL ENERGY USAGE (BIOMASS), AS AN ESTIMATE IN EQUIVALENT KILO-WATT HOURS, DATA TO INCLUDE:
       - 6.2.3.1. MONTH-TO DATE ekWh.
       - 6.2.3.2. PREVIOUS YEAR, SAME MONTH ekWh.
       - 6.2.3.3. YEAR-TO-DATE ekWh
       - 6.2.3.4. PREVIOUS YEAR TO DATE ekWh.
       - 6.2.3.5. PREVIOUS YEAR TOTAL ekWh.
     - 6.2.4. FACILITY ENERGY USE INTENSITY DATA, REPRESENTED IN TOTAL ENERGY USE IN ekWh (COMBINED ELECTRICAL AND BIOMASS) PER SQUARE FOOT OF FACILITY AREA, FOR THE FOLLOWING CATEGORIES:
       - 6.2.4.1. YEAR TO DATE ekWh/sqft
       - 6.2.4.2. PREVIOUS YEAR TO DATE ekWh/sqft
       - 6.2.4.3. PREVIOUS YEAR TOTAL ekWh/sqft
       - 6.2.4.4. PRE-RETROFIT ekWh/sqft
       - 6.2.4.5. AVERAGE SCHOOL ekWh/sqft (NORTH USA & CANADA AVERAGE)

7. FACILITY EMISSIONS STATISTICS PAGE:
   - 7.1. THE EMISSIONS PAGE WILL PROVIDE A SUMMARY OF THE CARBON FOOTPRINT OF THE BUILDING IN CALCULATED TONNES OF CO2, AND EMISSIONS FROM EQUIVALENT PASSENGER VEHICLES, ALONG WITH SOME BENCHMARK DATA FOR REFERENCE, ALL REQUESTED DATA SHOULD BE PRESENTED IN BAR CHART FORM WITH VALUES.:
     - 7.1.1. CURRENT YEAR TO DATE EMISSIONS FROM ELECTRICAL ENERGY USAGE (BIOMASS IS CONSIDERED TO BE CARBON-NEUTRAL).
     - 7.1.2. PREVIOUS YEAR EMISSIONS (FROM ELECTRICAL ENERGY USAGE).
     - 7.1.3. ANNUAL ENERGY EMISSIONS PRE HEAT PUMP RETROFIT (2019 YEAR).
     - 7.1.4. ANNUAL ENERGY EMISSIONS PRIOR TO BIOMASS CONVERSION (2014 YEAR)
     - 7.1.5. TYPICAL SCHOOL CARBON EMISSIONS (NORTH USA AND CANADA REGION)
     - 7.1.6. CARBON REDUCTION THROUGH PHOTOVOLTAIC ARRAY.

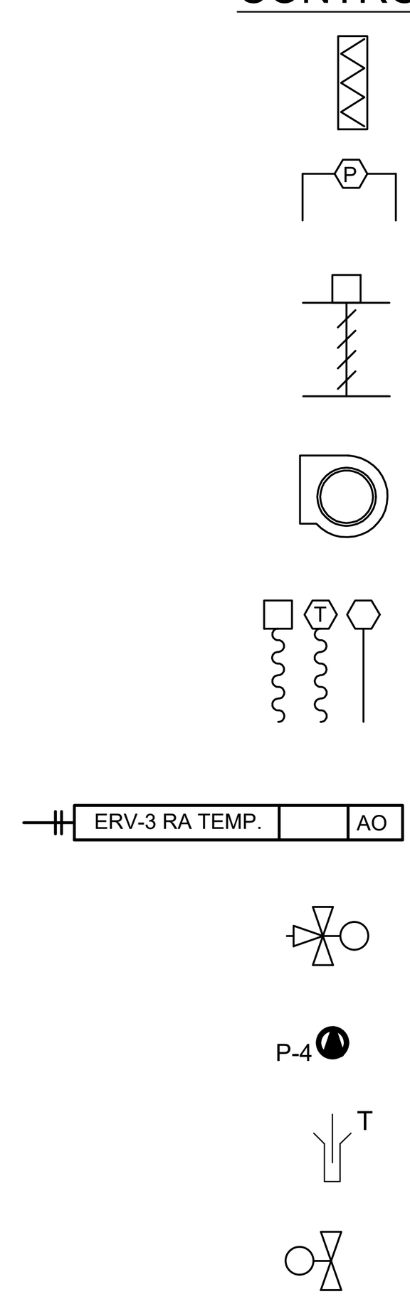
8. VENTILATION SYSTEM PAGE:
   - 8.1. THIS PAGE IS TO DISPLAY ERV-1, WITH ACTIVE OPERATING INFORMATION (READ ONLY). FROM THIS WORKSTATION ONLY THE USER WILL BE ABLE TO ACCESS SPECIAL POP-UP DIALOG WINDOWS WHICH PROVIDE EXPLANATORY INFORMATION IN LAYMANS TERMS FOR THE FOLLOWING ITEMS (NOTE EXACT MESSAGING TO BE COORDINATED WITH CONSULTANT DURING THE SUBMITTAL PHASE):
     - 8.1.1. 'ABOUT ERV' - THIS WILL BE A GENERAL INFORMATION DESCRIBING ERV OPERATION.
     - 8.1.2. 'ERV CORE': HIGH LEVEL DESCRIPTION OF THE HEAT RECLAIM CORE.
     - 8.1.3. 'FAN VFD' - HIGH LEVEL DESCRIPTION OF ENERGY SAVINGS VIA FAN SPEED ADJUSTMENT.
     - 8.1.4. 'CO2 CONTROL' - BASIC DESCRIPTION OF THE DEMAND CONTROL VENTILATION PROCESS
     - 8.1.5. SPECIAL SEQUENCE - NIGHT PURGE: - GENERAL DESCRIPTION OF HOW NIGHT PURGE WORKS TO FREE COOL.

9. HEATING SYSTEM PAGE:
   - 9.1. THIS PAGE IS TO DISPLAY THE THERMAL PLANT SCHEMATIC, AND SHOW ACTIVE READ-ONLY DATA FROM THE CONTROL SYSTEM. EXPLANATORY INFORMATION IN LAYMANS TERMS IS TO BE PROVIDED AS FOLLOWS:
     - 9.1.1. BIOMASS HEATER - GENERAL DESCRIPTION OF HOW BIOMASS COMBUSTION PROVIDES HEAT AND IS CARBON NEUTRAL.
     - 9.1.2. GEOTHERMAL HEAT PUMPS - HIGH LEVEL EXPLANATION AS TO HOW THE HEAT PUMP SYSTEM GENERATES HEAT.
     - 9.1.3. VARIABLE-SPEED PUMPING - EXPLAIN HOW VARIABLE SPEED PUMPING CAN SAVE ENERGY (SIMILAR TO FAN SPEED ADJUSTMENT).

10. FACILITY ZONE CONDITIONING PAGE:
    - 10.1. THIS PAGE (OR PAGES) IS TO SHOW A FACILITY FLOORPLAN, WITH ALL ACTIVE TEMPERATURES, TEMPERATURE SETPOINTS, CO2 LEVELS, AND WHETHER THE LOCAL HEATING TERMINAL IS ACTIVE.

1 / M503 SUSTAINABILITY KIOSK APPLICATION - FUNCTIONAL DESCRIPTION
NTS

CONTROL LEGEND



- AIR FILTER
- DIFFERENTIAL AIR PRESSURE SENSOR
- MOTORIZED AIRFLOW CONTROL DAMPER
- BLOWER FAN
- DUCTED SENSORS (ACRONYM DENOTES TYPE)
- CONTROL POINT
- THREE-WAY HOT WATER CONTROL VALVE
- PUMP
- SENSOR WELL IN PIPE
- 2-WAY HOT WATER CONTROL VALVE

ACRONYMS:

AI	ANALOG INPUT (I.E. TEMPERATURE SENSOR)
AO	ANALOG OUTPUT (I.E. PUMP SPEED)
BT	BUFFER TANK
BWRT	BIOMASS WATER RETURN TEMPERATURE
BWST	BIOMASS WATER SUPPLY TEMPERATURE
C	COMMON
CGRT	COLD GLYCOL RETURN TEMPERATURE
CGST	COLD GLYCOL SUPPLY TEMPERATURE
CO2	CARBON DIOXIDE CONCENTRATION
DB	DEADBAND
DI	DIGITAL INPUT (I.E. STATUS)
DO	DIGITAL OUTPUT (I.E. ON/OFF)
DP	DIFFERENTIAL PRESSURE
EA	EXHAUST AIR
ekWh	EQUIVALENT KILO-WATT HOURS
ENAB	ENABLE
ERV	ENERGY RECOVERY VENTILATOR
EXH	EXHAUST
FILT	AIR FILTER
GF	GLYCOL FEEDER
H	HUMIDITY
HC	HEATING COIL
HP	HEAT PUMP
HUM	HUMIDIFIER
HWRT	HOT WATER RETURN TEMPERATURE
HWST	HOT WATER SUPPLY TEMPERATURE
HX	HEAT EXCHANGER
kWh	KILO-WATT HOURS
NC	NORMALLY CLOSED (CLOSED WHEN NOT ENERGIZED)
NO	NORMALLY OPEN (OPEN WHEN NOT ENERGIZED)
OA	OUTDOOR AIR
OAT	OUTDOOR AIR TEMPERATURE
P	PUMP
POS	POSITION
RA	RETURN AIR
RF	RETURN FAN
SA	SUPPLY AIR
SF	SUPPLY FAN
SP	SETPOINT
T	TEMPERATURE
WP	WELL PUMP

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PROFESSIONAL ENGINEER – PROVINCE OF PRINCE EDWARD ISLAND – Ryan L. Cooke 1476 – 2022-02-07 – DATE

Client: Department of Transportation and Infrastructure

Project Title: Eliot River Elementary School
28 Terry Fox Place
Cornwall, PE
C0A 1H0
DTI Project No.: 170-20031

Sheet Title: Kiosk Application Description
Control Legend and Acronyms

No.	Description	Date
0	Issued For Addendum #1	2022-02-07

Date: 2022-02-07
Drn By: R.L.C., P.Eng. / N.L.V.
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