



Addendum #1

Bid Opportunity: 7251-RW-22

Waterloo Oxford District Secondary School - Family Studies Renovation & HVAC Upgrades

Closing Date: Wednesday, April 6, 2022, 2:00 PM

The following issued by the Board shall form part of the Bid / Proposal Solicitation document. The revisions and additions noted herein along with any attachments shall be read in conjunction with all other related documents. This Addendum shall, take precedence over the previously issued documents where differences occur. Receipt of this addendum must be acknowledged in the Bidding System, bids&tenders.

If you have already submitted a Bid / Proposal, it will be automatically withdrawn as a result of this addendum. You must resubmit the Bid / Proposal acknowledging all addenda and revising your Bid / Proposal to comply with all addenda.

The information below, attachments and drawings provide additional clarification and does not change the Scope or intent of the bid document.

ATTACHMENTS

1.0 MECHANICAL / ELECTRICAL

1. Refer to Mechanical and Electrical Addendum prepared by MNE Engineering Inc., attached (20 pages).

ADDENDUM 01

To:	Cornerstone Architecture	Date:	April 1, 2022
		Project:	Waterloo-Oxford District Secondary School Family Studies Renovation & HVAC Upgrades
cc:		Project Nos:	WRDSB Tender #7251-RW-22 MNE No. 22002

This addendum forms part of the contract documents and amends the drawings and specifications.

Mechanical

1. Reference Specification Division 20
 - a. Add Item 1.1.4 as follows:
 - i. Unit ventilators delivery is critical. Expectations are as follows:
 - Immediately upon project award, shop drawings are to be generated and submitted to Consultant for review.
 - Consultant will expedite shop drawing review.
 - Immediately upon receiving shop drawings reviewed by Consultant, order is to be placed.
2. Reference Specification Division 22
 - a. Remove Items 2.13.1a. and 2.13.1b.
3. Reference Specification Division 23
 - a. In Item 3.24.3h.ii., remove the following, 'timer, on/off mode or a BACnet link [available with BACnet Controller].'
 - b. In Item 3.25.1j., replace the following, 'and be base bid. Alternate products must show savings and clearly indicate all areas where they do not meet specified product.' with 'Approved alternates include Temspec and Changeair / Systemair.'
4. Reference Specification Division 25
 - a. Add attached graphical sequence.
5. Reference Unit Ventilator Schedule / M1.2
 - a. In Remarks:
 - i. Replace 'Replaceable 2" (50mm) filters c/w one extra set.' with 'MERV 13 disposable filters.'
 - ii. Add the following, 'Motorized damper actuators to be factory installed & wired.'
 - iii. Add the following to 'Heating coil freezestat (factory installed & wired)', 'Wire to relay to shut down fan.'
 - iv. Add the following, 'Heating coil manual air vent & drain valve.'

- v Add the following to 'Digital Ready controls package suitable for Controls Trade.', 'All control devices wired to a terminal strip.'
6. Reference Recovery Ventilator Schedule / M1.2
- a. In Remarks:
 - i Remove the following, 'Dry contacts for operation of.'
 - ii Add the following to 'Digital Ready controls package suitable for Controls Trade.', 'Start / stop contact. All control devices wired & controlled by unit.'
7. Reference Grease Interceptor Schedule / M1.2
- a. Revise Symbol GI-1 as follows:
 - i Description: Grease Interceptor, 50 gpm (95 lpm) Max Flow, 100 lbs (23 kg) Grease Capacity
 - ii Manufacturer & Model: Mifab MI-G-7
 - iii Remarks: 32"L x 24"W x 24"H (800mm x 600mm x 600mm). Provide extension to suit inverts, sediment bucket, 3" (75mm) inlet & outlet connections.
 - b. Remove Symbol GI-2 and GI-3.
8. Reference Diffuser & Grille Schedule / M1.2
- a. Add Symbol E as follows:
 - i Description: Eggcrate Transfer Grille
 - ii Manufacturer & Model: Krueger EGC5-F22-NONE-01-00-00-44
 - iii Remarks: Provide 0.5" (13mm) core, surface-mount frame, screw hole mounting.
9. Reference Wallfin Heater Piping Detail / M1.3
- a. Add the following, 'Note: Two-way control valve c/w actuator shall be supplied by Controls Trade & installed by Mech Trade.'
10. Reference Drawing Notes / M2.1
- a. Revise Note 4 to read 'Install grease interceptor mounted recessed in floor below refrigerators in approx this location. Location shall permit adequate service access. Install as per manufacturer & Code requirements c/w inlet / outlet cleanouts, venting, etc.'
 - b. Revise Note 5 to read 'Route cold water & hot water piping within cavity behind millwork.'
 - c. Revise Note 9 to read 'Reserved.'
 - d. Revise Note 14 to read '50mm automatic control valve located above ceiling access door serves perimeter heaters in adjacent greenhouse.'
 - e. Revise Note 16 to read 'Remove residential clothes washer c/w cold water & hot water piping to kitchen sink (on exterior wall), sanitary piping to below floor & cap, etc.'
 - f. Add the following to Note 18 'Provide piping within exposed enclosure similar to Rectorseal Slimduct linset covers to drop ceiling.'
 - g. Revise Note 20 to read 'Reserved.'
 - h. Add Note 22 to read 'Provide 75mm standing waste extended to max height secured to rear of millwork. Provide drain offset below sink & extend piping to secure to rear of cabinetry centered above standing waste c/w 25mm air gap.'
 - i. Add Note 23 to read 'Remove two fire extinguishers located within space & turn over to Owner.'
 - j. Add Note 24 to read 'Provide surface-mount fire extinguisher at a location to be determined during construction. Refer to spec.'

11. Reference Detail 1 / M2.1
 - a. In Family Studies 103, add Note 23.
 - b. In Potting Room 104B, add Note 14 to automatic control valve indicated in middle of space.

12. Reference Detail 2 / M2.1
 - a. In Family Studies 103, revise residential clothes washer symbol from RCW to RCW-1.
 - b. In Family Studies 103, indicate sanitary piping to be 50mm from behind RCW-1 to connection at existing underground piping.
 - c. In Family Studies 103, revise grease interceptors and associated sanitary piping as per attached sketch SK-M01.
 - d. In Family Studies 103, add Note 24.
 - e. In Teachers Common Rm 103C, revise orientation of condensate piping cleanout to suit direction of flow.
 - f. In Potting Room 104B and Science Classroom 104, remove Note 21 from wallfin heaters.
 - g. In Potting Room 104B, add Note 14 to automatic control valve indicated in middle of space.

13. Reference Detail 1 / M3.1
 - a. In Transformer 300A, removal or rework of pneumatic or digital controls associated with removal of existing building operator control panel to be completed as part of a cash allowance. Extent of scope to be determined during construction.

14. Reference Detail 2 / M3.1
 - a. Between Corridor B01 and Family Studies 103, add 450mm x 300mm acoustically lined transfer duct immediately north of range hood RH-1 complete with combination fire and smoke damper. Provide 400mm x 350mm type E grille at ceiling of both spaces. Locate Family Studies 103 grille 1000mm from wall to suit installation of smoke detector.
 - b. In Family Studies 103, all residential clothes dryer exhaust ductwork to be insulated. Also refer to Note 4.
 - c. In Family Studies 103, provide sign indicating cooling for the space is disabled during NFPA hood operation. Exact wording and location of sign to be determined during construction.
 - d. In Family Studies 103, revise range hood exhaust louvre on exterior of building to be 650mm x 450mm. Vertically, position louvre between top of ceiling and underside of joists. Horizontally, position louvre min 400mm between louvre and adjacent window and min 400mm between louvre and adjacent wall.
 - e. In Teachers Common Rm 103C, revise return branch ductwork connection from Office 103B to be to return main ductwork, not supply main ductwork.
 - f. In Teachers Common Rm 103C, switch S/A and R/A riser tags to second floor to correctly indicate respective systems.
 - g. In Transformer 300A, removal or rework of pneumatic or digital controls associated with removal of existing building operator control panel to be completed as part of a cash allowance. Extent of scope to be determined during construction.

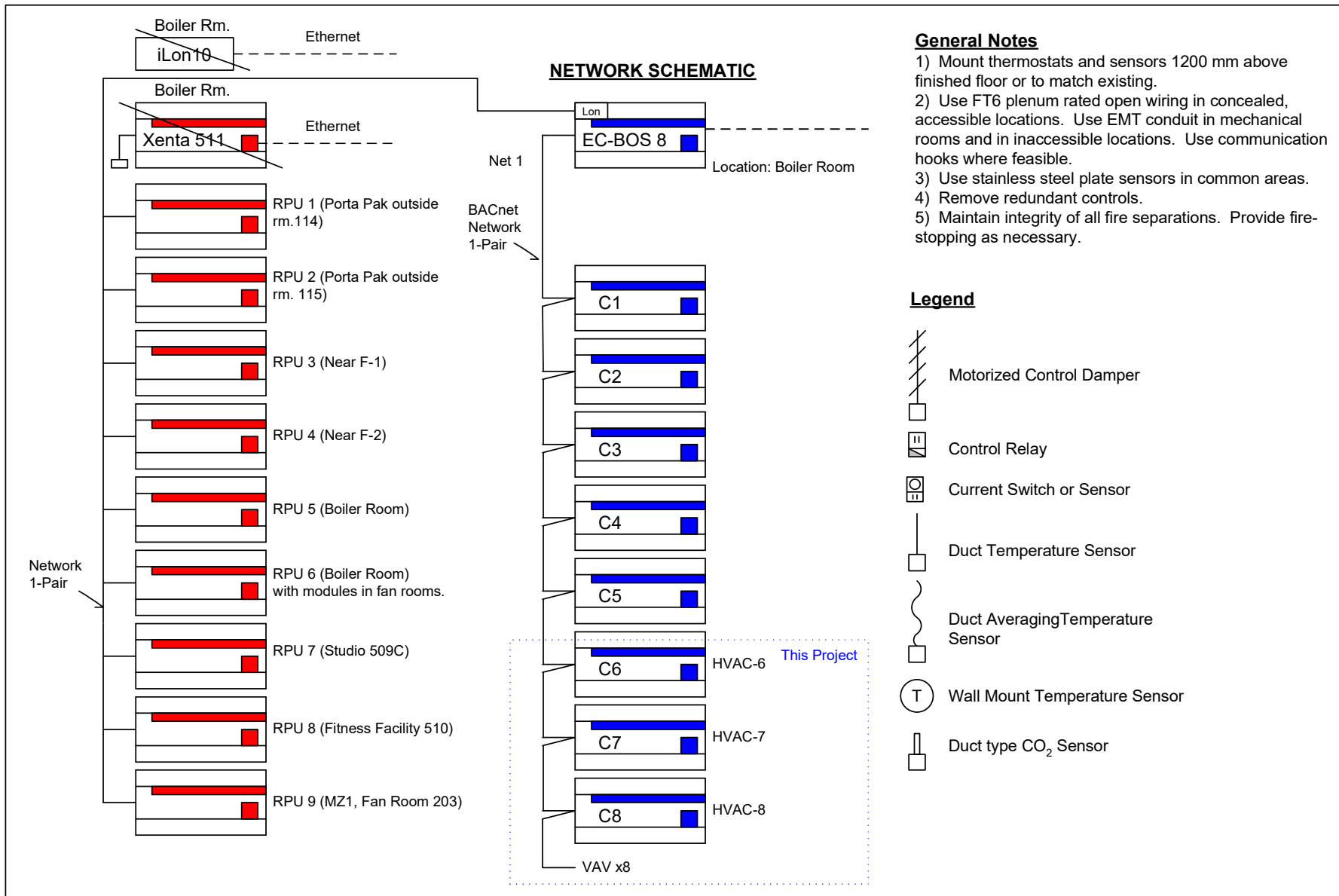
15. Reference Detail 2 / M3.2
 - a. In Classroom 121, 122, 123, 124, 125, 126, 127, 128, provide motorized damper below relief cap complete with BAS controls.

- b. In Classroom 121, 122, 123, 124, 125, 126, 127, 128, provide acoustic lining on all rectangular supply ductwork from associated unit ventilator. Ductwork dimensions indicated at these locations are for required free area and as such must be increased to accommodate lining.
 - c. In Boys WR 120, revise door grille to be type DG, not FRDG.
16. Reference Drawing Notes / M4.1
- a. Add Note 17 to read 'Provide expansion loop for 50mm high pressure gas piping as per Code requirements.'
17. Reference Detail 2 / M4.1
- a. Indicate expansion loop for 50mm high pressure gas piping and add Note 17.

Electrical

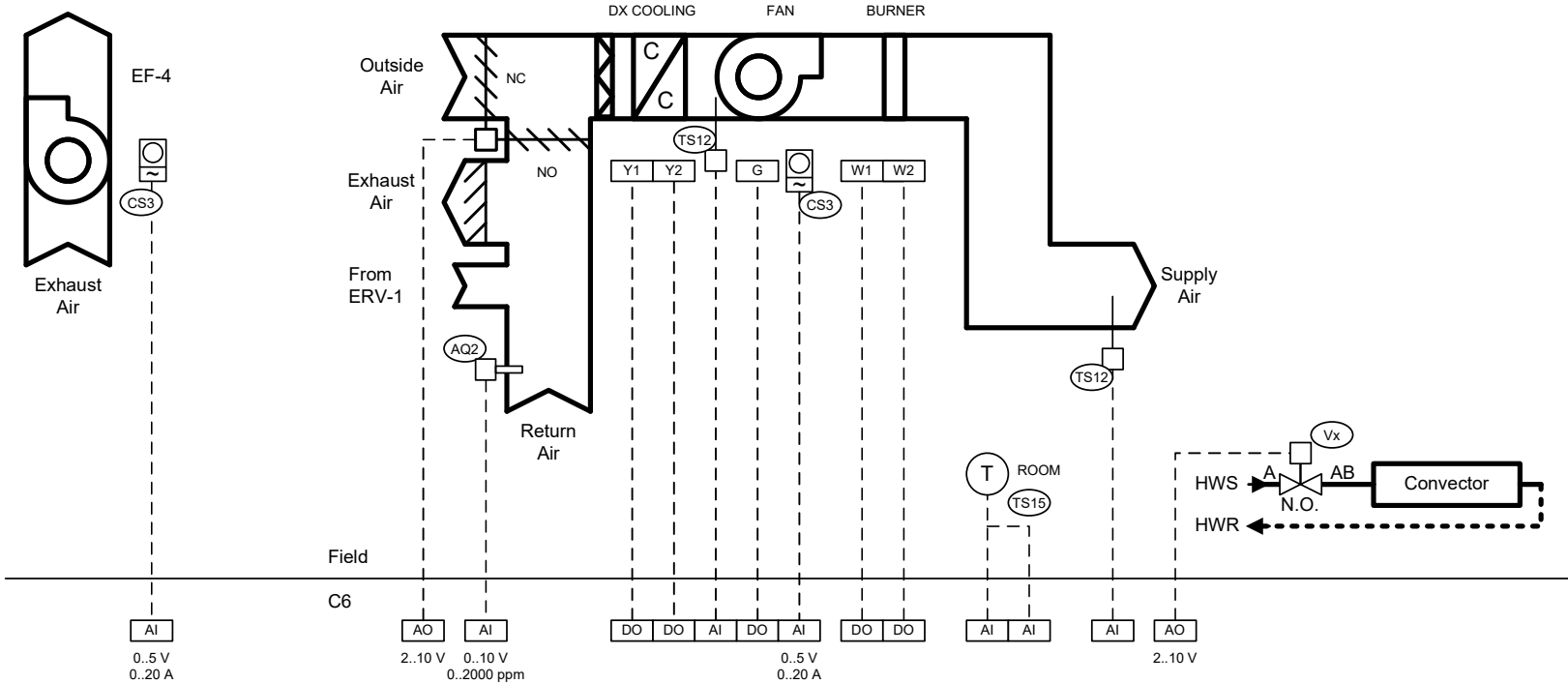
1. Reference SKE-01 for approximate locations of proposed night lights.
- a. Night lights shall not be controlled by sensors, nor key switch.
2. Clarification to 2/E1.1 Note 10.
- a. Deletion of the Building Control Cabinet (BCC) and associated line voltage wiring shall be included in the bid. Specified allowance is only for electrical systems that may be impacted by BCC deletion.
3. Reference E2.2 Note 18, Wiring for Equipment Schedule, and Panel MB.
- a. Provide one additional Mechanical Power Supply (MPS) above finished ceiling of Corridor 821.
 - b. Provide branch wiring from a 15A-1P circuit in MB45 to two MPS. Circuit other two from MB41.
4. Reference E1.1, E3.3 & SKE-02.
- a. Relocate two duct smoke detectors indicated as DEL in Corridor 801. Provide new sampling tubes.
 - b. One RELD duct smoke detector shall be installed with the smoke damper at Prep Room 102C ERV-1 ductwork.
 - c. One RELD duct smoke detector shall be installed with an additional smoke damper at Family Studies 103 transfer duct.
 - d. Extend circuit MB35 to the added smoke damper.
 - e. Revise drawing Note #17 as follows:
 - i. PROVIDE NEW FIRE ALARM DEVICES FOR NEW ZONES:
 - ZN40: GROUND FLOOR EAST FLOW.
 - ZN41: GROUND FLOOR EAST VALVE.
 - ZN42: SECOND FLOOR EAST FLOW.
 - ZN43: SECOND FLOOR EAST VALVE.
 - ZN44: ROOM 103 HOOD SUPPRESSION SYSTEM.
 - ZN45: EAST WING ENERGY RECOVERY UNIT. (ERV-1).
- CONFIRM EXACT QUANTITIES AND LOCATION WITH DIVISION 21 AND 23 SUBCONTRACTORS.

End of Addendum



	Job #:	Owner:	Drawn By:	Title: Communication Schematic and General Notes	1
	Job Name: Waterloo Oxford DSS Family Studies HVAC Upgrade	Waterloo Region District School Board	Revision Date: March 30, 2022		

Single Zone Rooftop Unit



Unit	Serves	Supply (cfm)	# Stages Cooling	# Stages Heating	Power Exhaust	Cntrl	Rad (MBh)	RadVlv (Tag)	Notes
HVAC-6	Fam Studies Kitchen	1200	2	2	No	C6	29	V1	* EF-4 Interlock

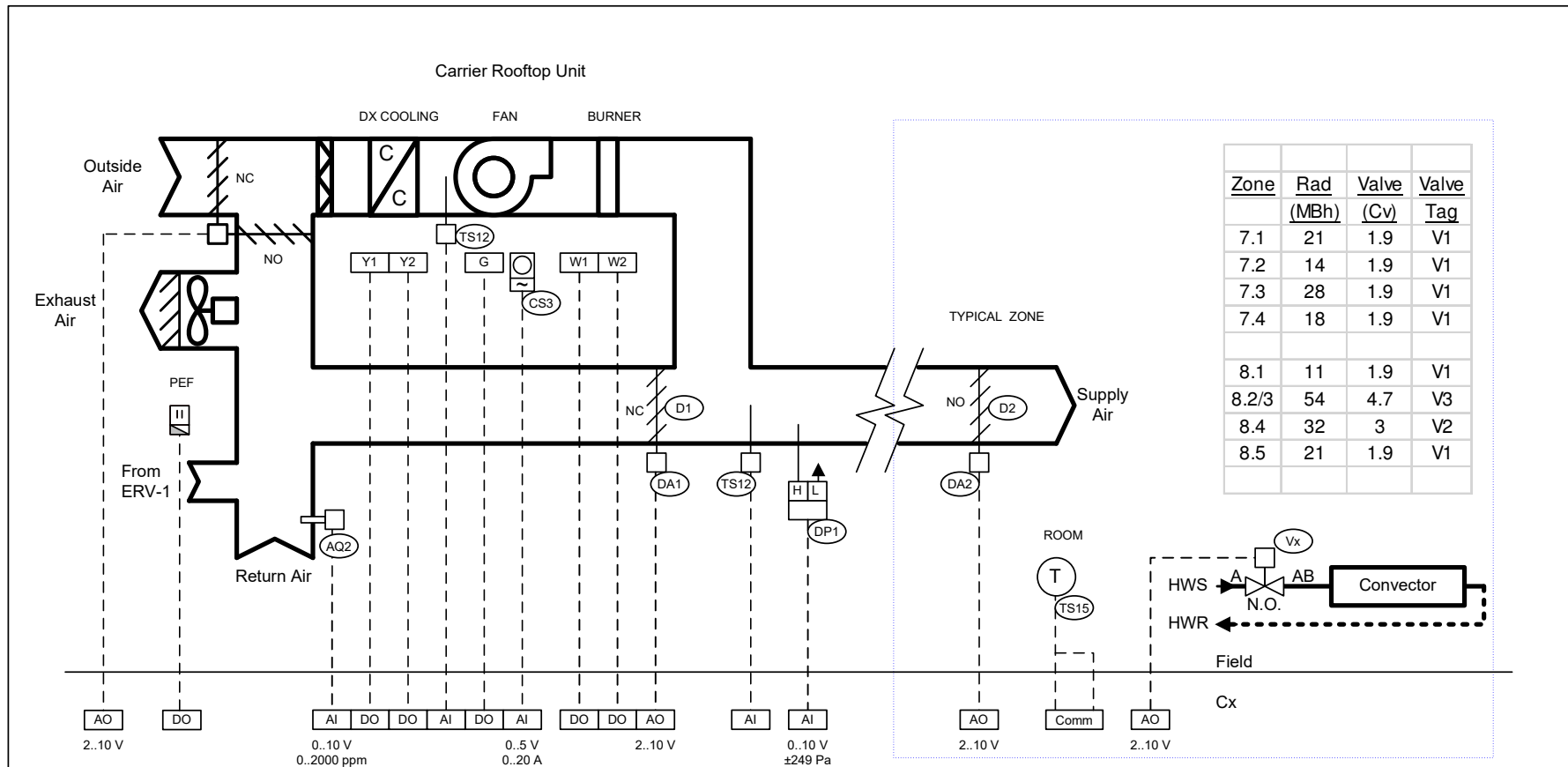
* Minimum Outdoor Air Setpoint increases and cooling is disabled when EF-4 is on.

Job #:
Job Name: Waterloo Oxford DSS
Family Studies HVAC Upgrade

Owner:
Waterloo Region
District School Board

Drawn By:
Revision Date:
March 30, 2022

Title: **HVAC-6 Rooftop Controls**



Unit	Serves	Supply Air (cfm)	Two Systems As Shown				Perim. Rad	RPU	Notes
			Zones	Cooling Stages	Heating Stages	Power Exhaust			
HVAC-7	Staff Room / Offices	1200	4	2	2	No	2	C7	
HVAC-8	Science Classrooms	3000	5	2	2	Yes	3	C8	

Job #:	Owner:	Drawn By:	Title: HVAC with VVT Control Schematic	3
	Job Name: Waterloo Oxford DSS Family Studies HVAC Upgrade	Waterloo Region District School Board		

SEQUENCE OF OPERATION

UNOCCUPIED MODE

The supply fan is off, the power exhaust fan is off, the mixing dampers are in the 0% outside air position, the heating is off and the cooling is off. The bypass damper is in the 100% open position. The zone dampers are in the 50% open position. The system cycles on a call for unoccupied heating, with the supply air static pressure setpoint increased by 20%. If the override pushbutton is pressed, the system will switch to the occupied mode for 2 hours (adjustable).

OCCUPIED MODE

Fan Operation

The supply fan operates continuously. An optimized start routine is provided for heating and cooling.

Zone Damper

The room sensor modulates the zone damper between minimum and maximum settings to maintain setpoint. The setpoint is adjustable +/-1 °C at the sensor. The control is reverse acting when the supply air temperature is more than 1 °C above room temperature and direct acting when the supply air temperature is more than 1 °C below room temperature. If the system mode is different from the zone mode (e.g. system is in heating mode but zone requires cooling), the zone damper closes to a reduced minimum position to minimize overheating/overcooling.

System Heating/Cooling Decision Process

The system mode is determined by the number of zones that deviate from their respective zone heating/cooling setpoints. If the total number of zones requesting heating outnumber (or are equal to) the total number of zones requesting cooling, the system will go to heating mode. If the total number of zones requesting cooling outnumber the total number of zones requesting heating, the system will go to cooling mode. Once in the heating or cooling mode, the reference zone becomes the zone with the greatest call. The system will lock-in the selected mode until all zones are satisfied. If any zone is deprived of ventilation air for more than 20 minutes, the system will “unlock”, go into forced ventilation mode for 5 minutes, and then reselect the required mode of operation. Zones designated as “slave zones” (typically corridors) cannot request heating or cooling, but will utilize heating/cooling when it is available.

The rad valve operates as the first stage of heating.

Ventilation Mode

The system operates in ventilation mode (no heating or cooling) under the following conditions:

- 1) No zones are calling for heating or cooling.
- 2) System is switching between heating and cooling (system operates in ventilation mode for 5 minutes).
- 3) One or more zones have been operating at a reduced min. position for more than 20 minutes (system operates in forced ventilation mode for 5 minutes).

System Heating Control

Stage 1 and stage 2 heating are controlled from the reference zone as follows:

Reference Zone Call for Heat

Stage 1 On	1.0 °C
Stage 1 Off	0.5 °C
Stage 2 On	1.5 °C
Stage 2 Off	1.0 °C

System Cooling Control

Stage 1 and stage 2 cooling are controlled from the reference zone as follows:

Reference Zone Call for Cooling

Stage 1 On	1.2 °C
Stage 1 Off	0.5 °C
Stage 2 On	1.5 °C
Stage 2 Off	0.9 °C

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SEQUENCE OF OPERATION (CONTINUED)

Economizer Operation

Economizer operation will be substituted for first stage cooling when the outside air temperature is suitable. The power exhaust fan runs when the outside air damper is more than 50% open. The CO₂ sensor will increase the amount of minimum outside air as the CO₂ level increases from 1000 ppm to 1200 ppm. During morning warm-up or cool-down the outside air minimum position is set to zero.

Bypass Operation

The supply air static pressure sensor modulates the bypass damper between minimum and maximum settings to maintain setpoint.

Limits & Safeties (VVT ver. 3)

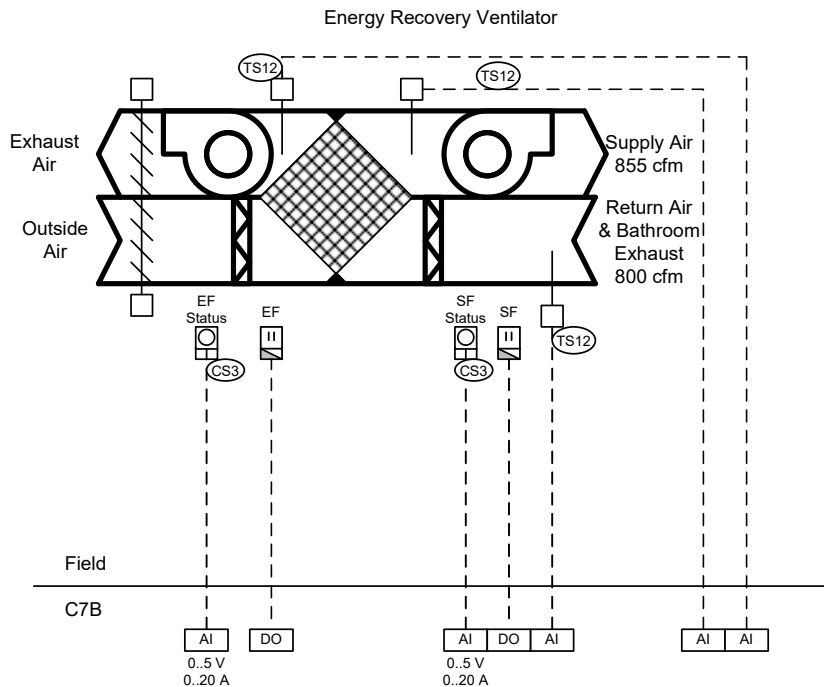
- 1) If the outside air temperature exceeds the global free cooling setpoint, the mixing dampers return to minimum outside air position.
- 2) The maximum amount of outside air is limited based on the outside air temperature to prevent excessively low supply air temperatures during startup.
- 3) The mixed air temperature sensor acts as a low limit to ensure temperature does not fall below setpoint. In applications where the mixed air sensor is located after the DX coil, the setpoint is reduced when DX cooling is enabled.
- 4) The supply air temp. sensor acts as a high limit for heating (70/55°C, 60/45°C) and a low limit for cooling (5/10°C, 8/13°C).
- 5) The supply air temperature sensor acts as a software freezestat (1/5°C, 3 minute delay, auto reset after 5 minute delay).
- 6) The supply fan has a delay-off time of 90 seconds.
- 7) DX cooling has a minimum-off time of 5 minutes.
- 8) DX cooling is disabled when the outside air temperature is below the global DX disable setpoint or when the fan is off.
- 9) Gas heating is disabled when the outside air temperature is above the global heating disable setpoint or when the fan is off.
- 10) Stage 1 gas heating has a minimum run time of 3 minutes.
- 11) During ventilation mode, if the supply air temperature falls below 15°C for more than two minutes, stage 1 heating will turn on until the temperature exceeds 25°C (to improve comfort).
- 12) The default zone setpoint is increased by 1°C when mechanical cooling is enabled (providing heating is disabled).
- 13) When the ventilation lockout switch is engaged, the outside air dampers close, and the system switches to unoccupied mode of operation.
- 14) Minimum outside air is set to zero when the global ventilation schedule is off (stand-by occupancy).

Alarms

An alarm will be generated upon the following conditions:

- 1) Fan status does not match start/stop signal.
- 2) Mixed air temperature too high (50/48°C) or too low (5/7°C).
- 3) Supply air temperature too high (65/63°C) or too low (5/7°C).
- 4) Space temperature too high (38/36°C) or too low (14/16°C).
- 5) Supply air static pressure too low (10/20 Pa) or too high (240/230 Pa).
- 6) Weekly fan runtime limit exceeded.
- 7) Return air CO₂ too high (1700/1650 ppm) or too low (250/300 ppm).
- 8) Software freezestat tripped.

	Job #:	Owner:	Drawn By:	Title: HVAC with VVT Sequence of Operation 2	5
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SEQUENCE OF OPERATION

Unoccupied Mode

The exhaust fan is off, supply fan is off and the dampers are closed.

Occupied Mode

The supply and exhaust fans run continuously when the associated rooftop unit is operating and the ventilation time schedule is on.

Limits & Safeties

- 1) The unit has internal frost controls (supply fan stops, exhaust fan defrosts the core).
- 2) The supply air temperature sensor acts as a software freeze stat (-1/5°C, 3 minute delay, auto reset after 5 minute delay).
- 3) The fans stop on a fire alarm condition.
- 4) If the mixed air damper position exceeds 30% outside air on both HVAC units, the ERV supply fan stops, but the exhaust fan keeps running.
- 5) The exhaust air temperature cycles the supply fan to maintain the exhaust air temperature at +1°C.

Alarms

An alarm will be generated upon the following conditions:

- 1) Supply fan or exhaust fan in incorrect state.
- 2) Supply air temperature too high (35/33°C) or too low (1/3°C).
- 3) Return air temperature too high (40/38°C) or too low (14/16°C).
- 4) Exhaust air temperature too high (40/38°C) or too low (-5/-3°C)..
- 5) Fan runtime exceeded weekly setpoint.

		One System As Shown		
UNIT	Supply Air (cfm)	Make Model	RPU	Notes
ERV-1	855	Aldes H650-FI	C8B	Serves HVAC-6,7 & 8

	Job #:	Owner: Waterloo Region District School Board	Drawn By:	Title: Energy Recovery Ventilator Controls	6
	Job Name: Waterloo Oxford DSS Family Studies HVAC Upgrade		Revision Date: March 30, 2022		

SEQUENCE OF OPERATION

Unoccupied Mode

The supply fan is off, the mixing dampers are in the 0% outside air position, the heating is off and the cooling is off. The rad valve opens first then the fan cycles on a call for unoccupied heating. If the override pushbutton is pressed, the system will switch to the occupied mode for 2 hours (adjustable).

Occupied Mode

An optimized start routine is provided for heating and cooling. During morning warm-up or cool-down the outside air minimum position is set to zero. The supply fan runs continuously. The room temperature sensor cycles applicable stages of heating to maintain the occupied heating setpoint. It also modulates the mixing dampers (for free cooling) and cycles applicable stages of mechanical cooling to maintain the occupied cooling setpoint. Local setpoint adjust (+/-2 °C) is provided. The rad valve is the first stage of heating.

Limits & Safeties

- 1) Minimum outside air is provided when enabled by the global minimum outside air time schedule.
- 2) The return air carbon dioxide sensor acts as a high limit to increase the amount of minimum outside air from 0 to 40% as the reading increases from 1000ppm to 1200ppm.
- 3) If the outside air temperature exceeds the global free cooling setpoint temperature (indicating that free cooling is unavailable) the mixing dampers return to minimum outside air position.
- 4) The maximum amount of outside air is limited based on the outside air temperature to prevent excessively low supply air temperatures during startup.
- 5) The mixed air temperature sensor acts as a low limit to ensure temperature does not fall below setpoint.
- 6) The supply air temp. sensor acts as a high limit for heating (58/48 °C) and a low limit for cooling (6/11 °C, 9/14 °C).
- 7) The supply air temperature sensor acts as a software freezestat (2/5 °C, 3 min. delay, auto reset after 5 minute delay).
- 8) The supply fan has a delay-off time of 90 s.
- 9) Cooling cannot turn on until heating has been off for a minimum of 5 minutes.
- 10) DX cooling has a minimum off-time of 5 minutes.
- 11) DX cooling is disabled when the outside air temp. is below the global DX disable setpoint or when the fan is off.
- 12) During occupied hours heating stage 2 has a delay-on time of 15 min., except when the outside air temp. is below -3/-1 °C.
- 13) Gas heating is disabled when the outside air temp. is above the global heating disable setpoint or when the fan is off.
- 14) When ventilation lockout is engaged the outside air dampers close and the unit switches to unoccupied mode.
- 15) On a fire alarm condition, the system shuts down.

Alarms

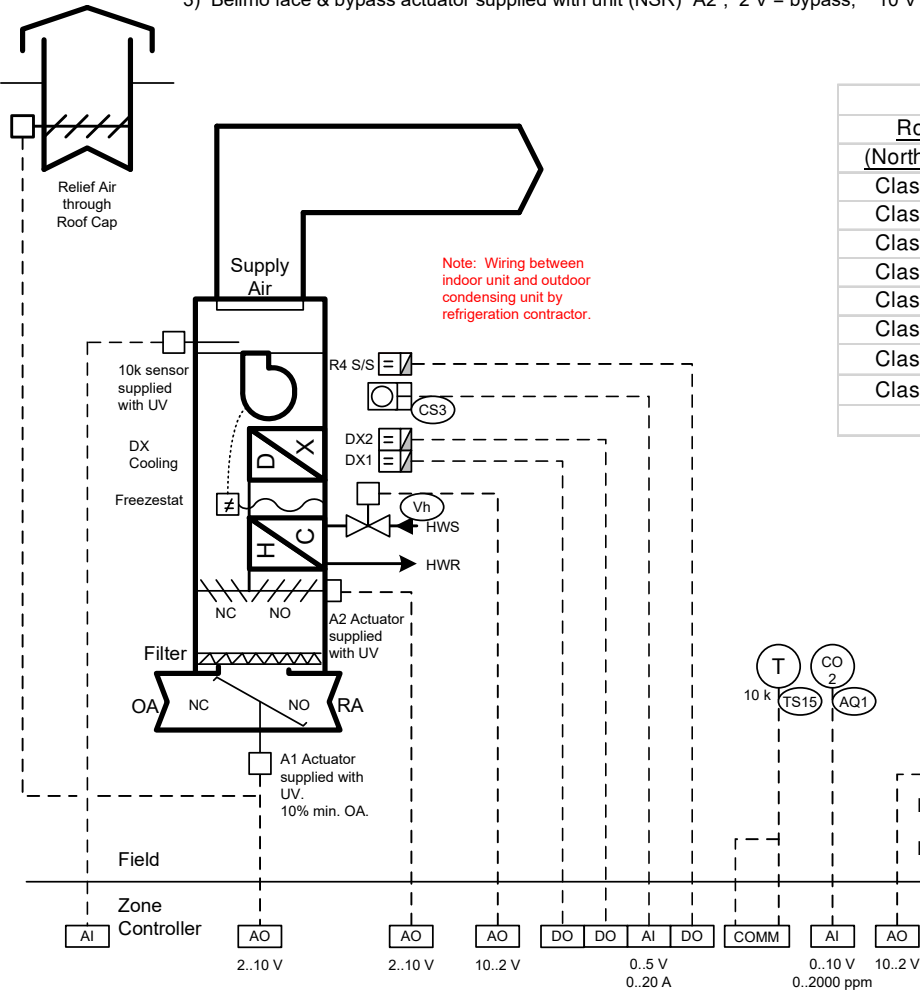
An alarm will be generated upon the following conditions:

- 1) Fan status does not match start/stop signal.
- 2) Supply air temperature too high (65/60 °C) or too low (5/7 °C).
- 3) Space temperature too high (42/40 °C) or too low (14/15 °C).
- 4) Mixed air temperature too high (50/48 °C) or too low (5/7 °C).
- 5) Fan runtime exceeded weekly setpoint.
- 6) Software freezestat tripped.
- 7) Return air CO2 too high (1700/1650 ppm) or too low (250/300 ppm).

	Job #:	Owner:	Drawn By:	Title: HVAC-6 Rooftop Sequence of Operation	7
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Notes:

- 1) Freezestat is factory wired to shut down fan and close outside air damper.
- 2) Belimo mixing damper actuator supplied with unit (SR) "A1", 2 V = OA closed
- 3) Belimo face & bypass actuator supplied with unit (NSR) "A2", 2 V = bypass, 10 V = open to coil.



8 Systems as Shown							
Room	Unit	Air	DX Clg	Htg	Htg	Rad1	Rad
(North Wing)		(cfm)	(tons)	(MBh)	(Vh)	(MBh)	(Vr)
Class 128	UV-1	1000	3	60	V4	37	V5
Class 126	UV-2	1000	3	60	V4	28	V6
Class 124	UV-3	1000	3	60	V4	28	V6
Class 122	UV-4	1000	3	60	V4	28	V6
Class 121	UV-5	1000	3	60	V4	27	V6
Class 123	UV-6	1000	2	60	V4	27	V6
Class 125	UV-7	1000	2	60	V4	27	V6
Class 127	UV-8	1200	2	60	V4	34	V5

Job #:
 Job Name: Waterloo Oxford DSS
 Family Studies HVAC Upgrade

Owner:
 Waterloo Region
 District School Board

Drawn By:
 Revision Date:
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Title: **Unit Ventilator Controls**

SEQUENCE OF OPERATION

Unoccupied Mode

The fan is off, the face & bypass damper is in the face position, the DX cooling is off and the mixing dampers are in the 0% outside air position. First the rad valves open then the fan cycles with full heating to maintain the unoccupied heating setpoint (initially 17.5°C). If the pushbutton on the room sensor is pressed, the system will revert to occupied mode for a period of 2 hours.

Occupied Mode

An optimized start routine for heating advances the system start time when morning warm-up is required. The fan runs continuously to maintain room temperature. The room temperature sensor modulates the mixing dampers in sequence with DX cooling to maintain the cooling setpoint, and modulates the face & bypass dampers and rad valve to maintain the heating setpoint. The setpoint can be adjusted +/-2°C at the room temperature sensor. The cooling setpoint is maintained at 2°C higher than the heating setpoint and will not go below 23.5°C. Fan status is monitored by a current sensor.

Limits and Safeties

- 1) If the outside air temperature exceeds the free cooling setpoint, the mixing dampers return to minimum position.
- 2) Mixed air damper minimum position control is provided during occupied periods (initially 10% OA).
- 3) The minimum outdoor damper position is increased from minimum to 40% as the CO₂ increases from 1000 to 1200 ppm.
- 4) The fan must be running before the mixing dampers and DX cooling will operate.
- 5) The supply air sensor acts as a low limit to ensure temperature does not fall below setpoint (initially 16°C, reset to 13°C on a call for free cooling).
- 6) A software freezestat on the supply air temperature shuts the fan down and closes the outdoor air damper when the supply air temperature is below 3°C for 30 seconds (resets at 6°C with 5 minute delay before restart).
- 7) If the hard-wired freezestat trips, the fan shuts down, outside air damper closes and face & bypass damper opens to face.
- 8) DX cooling is disabled when the outside air temperature falls below the global mechanical cooling disable setpoint (initially 14°C).
- 9) DX cooling has a minimum off time of 5 minutes.
- 10) DX cooling has a supply air temperature low limit (6/12°C).
- 11) The face & bypass damper is in the face position when DX cooling is operating.

Alarms

An alarm is indicated at the operator's terminal if any of the following occur:

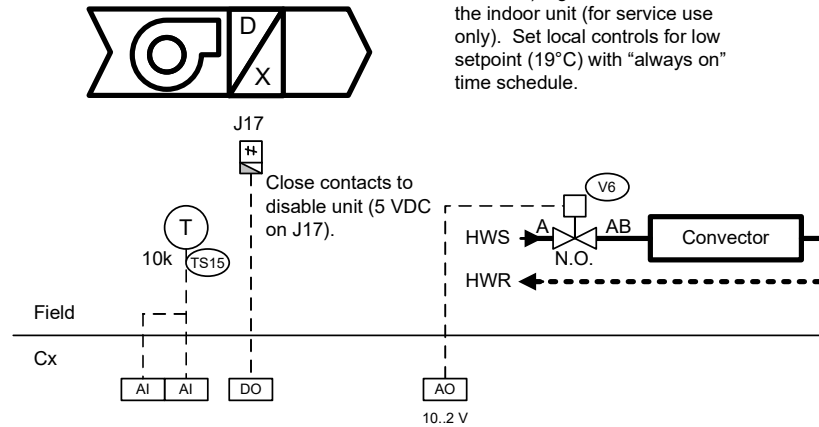
- 1) Fan status does not match fan start/stop signal.
- 2) Room temperature too high (36/34°C) or too low (14/16°C).
- 3) Supply air temperature too high (65/63°C) or too low (8/10°C).
- 4) Software freezestat tripped.
- 5) Fan runtime exceeded weekly runtime setpoint.
- 6) Room CO₂ level too high (1700/1650 ppm) or too low (250/300 ppm).

	Job #:	Owner:	Drawn By:	Title: Unit Ventilator Sequence of Operation	9
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DUCTLESS SPLIT A/C UNIT

Control wiring between indoor unit and outdoor unit by refrigeration contractor.

Install wall controller (if available) high on the wall near the indoor unit (for service use only). Set local controls for low setpoint (19°C) with "always on" time schedule.



2 Systems as Shown				
Room	Unit	Cooling	RPU	Notes
CU Lunch Rm	DS-1	1 Tons	TBA	
Head CU	DS-2	1 Tons	TBA	Rad Valve

SEQUENCE OF OPERATION

Unoccupied Mode

The system is off. If the pushbutton on the room sensor is pressed, the system will switch to the occupied mode for a period of 2 hours (adjustable).

Occupied Mode

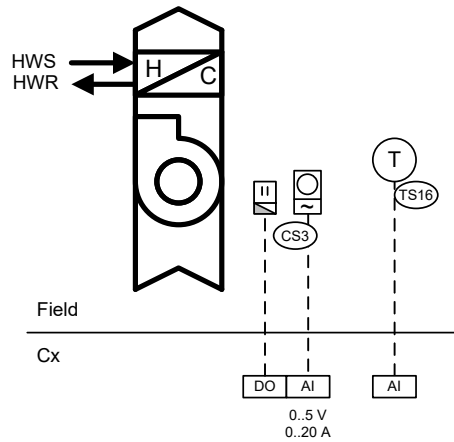
Room temperature sensor cycles the ductless split to maintain the occupied cooling setpoint. Setpoint adjust of +/-2°C is provided. The unit is disabled when the outside air temperature is below the global mechanical cooling disable setpoint (initially 12/14°C). A minimum off-time of 5 minutes is provided.

Alarms

An alarm is generated at the BAS if the zone temperature exceeds programmed alarm limits.

Job #:	Owner:	Drawn By:	Title: Ductless Split AC Controls	10
	Job Name: Waterloo Oxford DSS Family Studies HVAC Upgrade	Waterloo Region District School Board		

FAN FORCED HEATERS



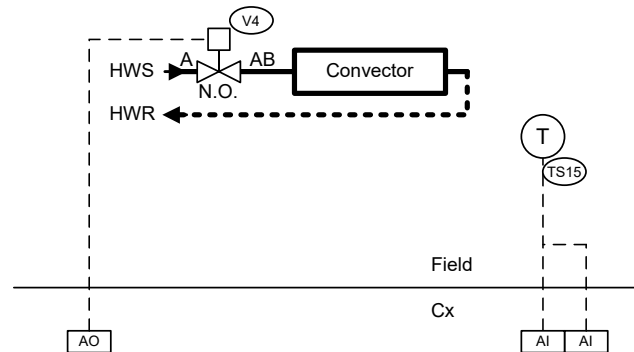
	1 Systems as Shown		
Room	Heater	RPU	Notes
Ent Near Stair 902	FF-1	TBA	

SEQUENCE OF OPERATION

Room temperature sensor TS16 cycles the fan to maintain the occupied or unoccupied heating setpoint. Heating is locked out when the outside air temperature exceeds 10°C.

An alarm is generated at the BAS if the room temperature is too cold (14/16°C) or too hot (38/36°C).

PERIMETER RADIATION



	Two Systems As Shown	
Room	Valve Size	Notes
Potting 104B		Two valves

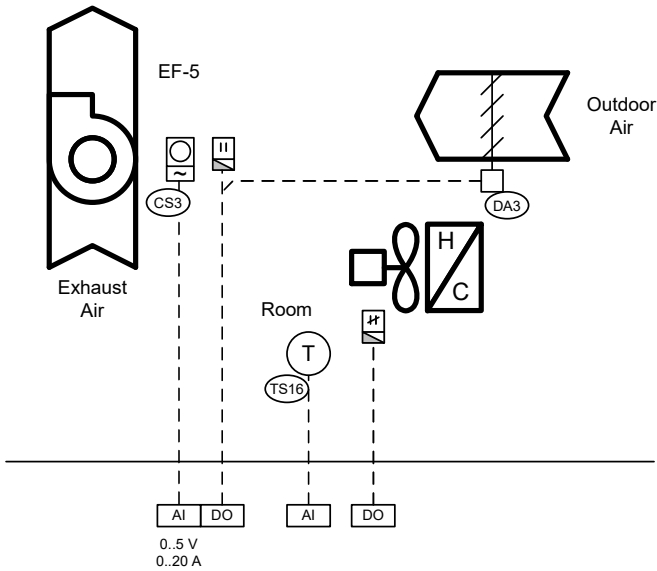
SEQUENCE OF OPERATION

Room temperature sensor TS15 controls the rad valve for heating to maintain the heating setpoint, which is reduced during unoccupied hours. Local setpoint adjust and pushbutton override is provided.

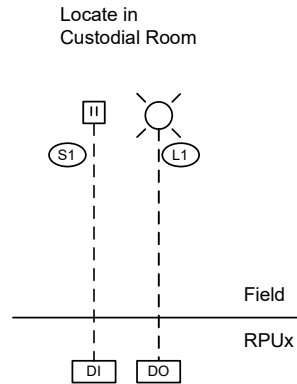
An alarm is generated at the BAS if the room temperature is too cold (14/16°C) or too hot (38/36°C).

	Job #:	Owner: Waterloo Region District School Board	Drawn By:	Title: Miscellaneous Controls	11
	Job Name: Waterloo Oxford DSS Family Studies HVAC Upgrade		Revision Date: March 30, 2022		

EXHAUST FAN & HEATER



EMERGENCY VENTILATION CONTROL



LOW HOT WATER HEATING SUPPLY TEMPERATURE ALARM

Add to HeatLoss Alarm on RPU5

1 System as Shown			
Room	Heater	Cntrl	Notes
Fan Room 120A		TBA	

SEQUENCE OF OPERATION

Room temperature sensor TS16 cycles the heater to maintain the heating setpoint and the fan to maintain the cooling setpoint. The cooling setpoint is 4°C above the heating setpoint. Heating is locked out when the outside air temperature exceeds 10°C. An alarm is generated at the BAS if the room temperature is too cold (14/16°C) or too hot (38/36°C).

SEQUENCE OF OPERATION

When the pushbutton is pushed to activate ventilation lockout, the indicator light turns on and an alarm is generated at the BAS. Outdoor air dampers close, connected exhaust fans stop and HVAC equipment is switched to unoccupied mode.

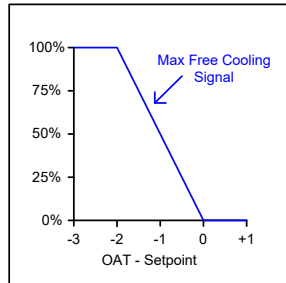
SEQUENCE OF OPERATION

If the hot water heating supply water temperature is more than 15°C below setpoint, or falls below 45°C, a critical alarm will be activated through the security system. An alarm will also be generated at the BAS. The alarm will be disabled between April 15 and October 15, which is when heating systems are typically allowed to shut down based on outside air temperature.

	Job #:	Owner:	Drawn By:	Title: Miscellaneous Controls	12
	Job Name: Waterloo Oxford DSS Family Studies HVAC Upgrade	Waterloo Region District School Board	Revision Date: March 30, 2022		

FREE COOLING SETPOINT

The average outdoor air relative humidity is sent from the Vista Server to the Global Input for this school where the Free Cooling Setpoint is calculated.



Detail 1

SEQUENCE OF OPERATION

Free cool when OAT < minimum(23, 29.4°C - Ø/7.43) where Ø is the average relative humidity in %RH. The free cooling signal is 100% when the outdoor air temperature is more than 2°C less than the free cooling setpoint. It drops linearly as the outdoor air temperature increases from 2°C less than the free cooling setpoint to 0% at the setpoint. This free cooling signal is used in each mixed air damper controller as the maximum the outdoor air dampers can open.

STAND-BY VENTILATION OCCUPANCY SCHEDULE

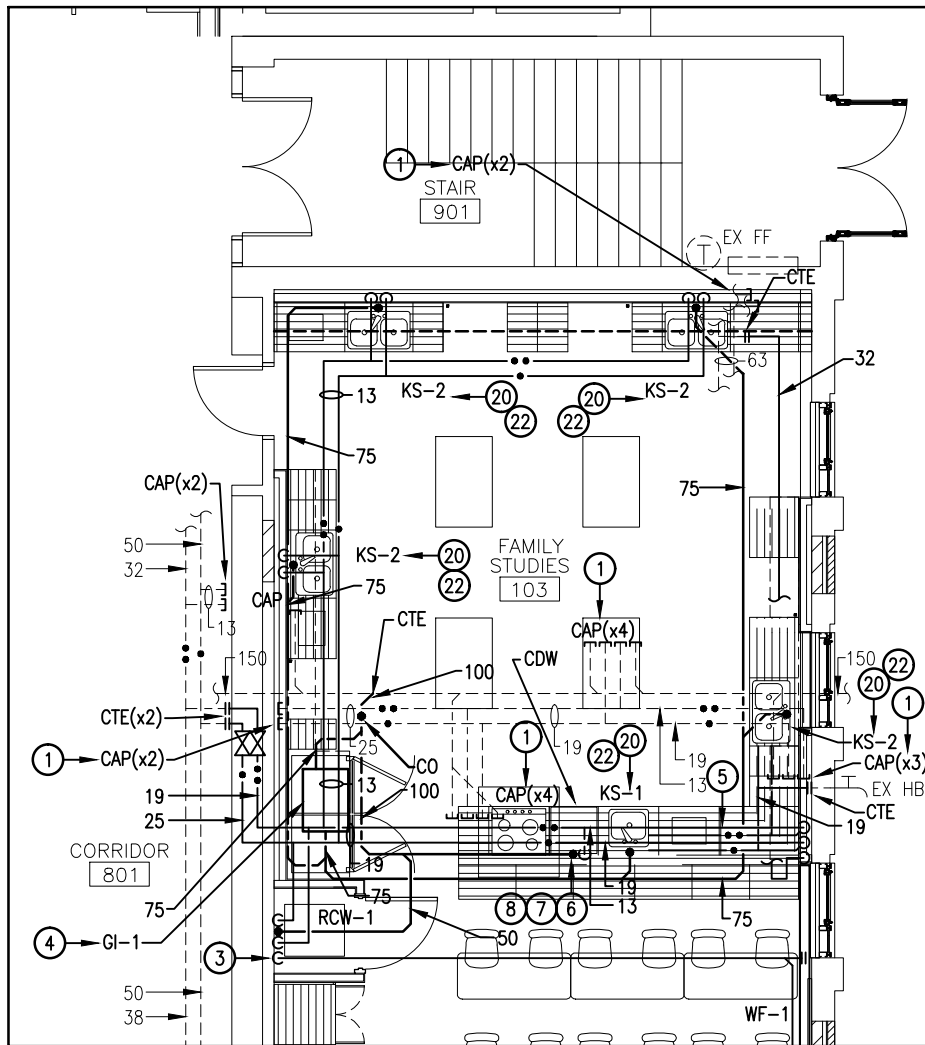
Add to Existing Menta Programs

Weekly Schedule on Main Graphic

SEQUENCE OF OPERATION

Minimum outdoor air damper position is 0% even during occupied periods unless the Minimum Outdoor Air Schedule for the school is in Occupied mode. Each unit has an 'opt-out' parameter so that it can run with an individual minimum outdoor air schedule.

	Job #:	Owner: Waterloo Region District School Board	Drawn By:	Title: Miscellaneous Controls	13
	Job Name: Waterloo Oxford DSS Family Studies HVAC Upgrade		Revision Date: March 30, 2022		



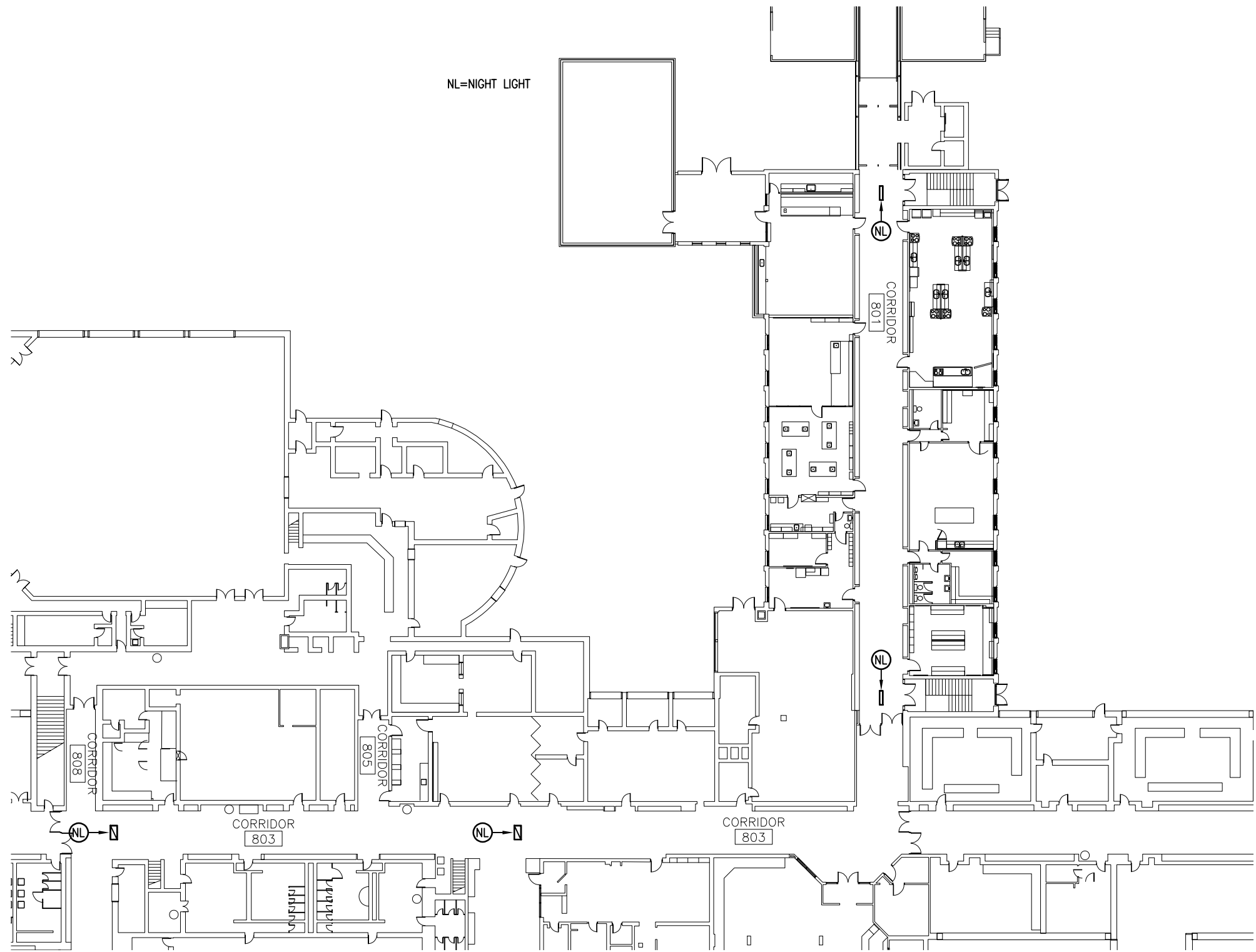
GROUND FLOOR PIPING RENOVATION PLAN
 SCALE: 1:100



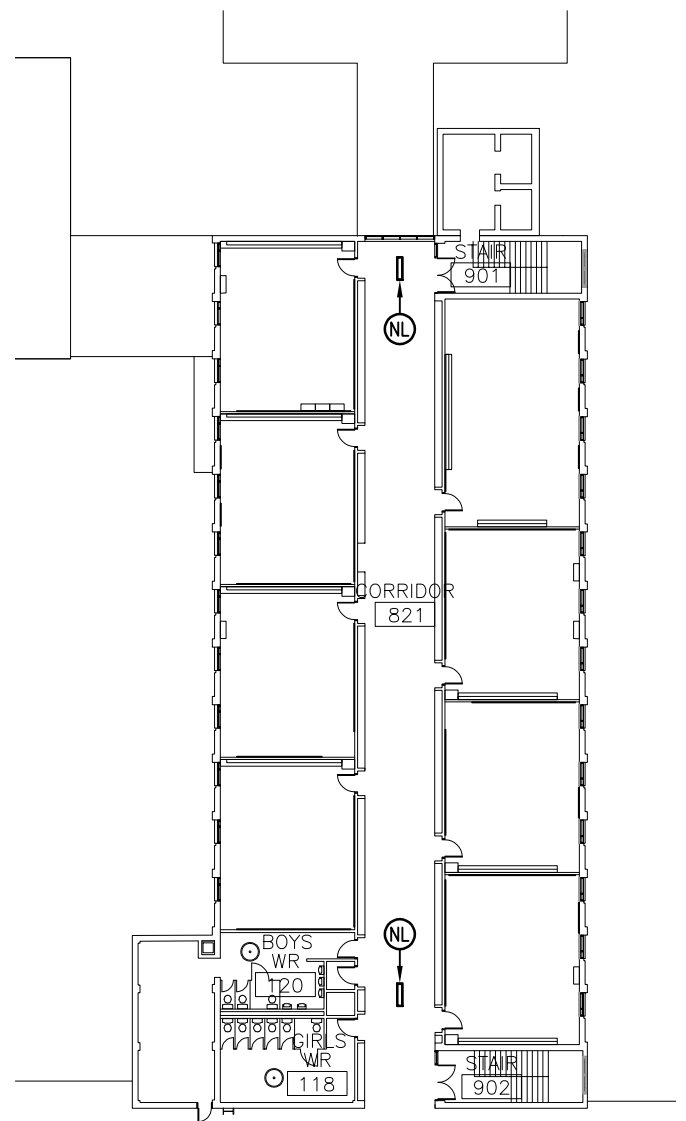
MNE Engineering Inc.
 22 Kevco Place – Box A
 Kitchener, Ontario N2C 2G5
 (519) 894-9408
 www.mneengineering.ca

PROJECT: WODSS-FAM STUDIES RENO & HVAC UPGRADES
 DRAWING: GROUND FLOOR PIPING RENO PLAN
 DWG NO: SK-M01 JOB NO: 22002
 SCALE: AS NOTED DRAWING BY: J.S.S.
 DATE: MARCH 2022 CHECKED BY: K.K.

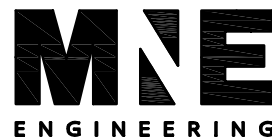
03	
02	
01	ISSUE FOR ADDENDUM 01
REV#	REVISION
	CLIENT: WATERLOO REGION DSB



PARTIAL GROUND FLOOR – NIGHT LIGHTS
SCALE 1:400

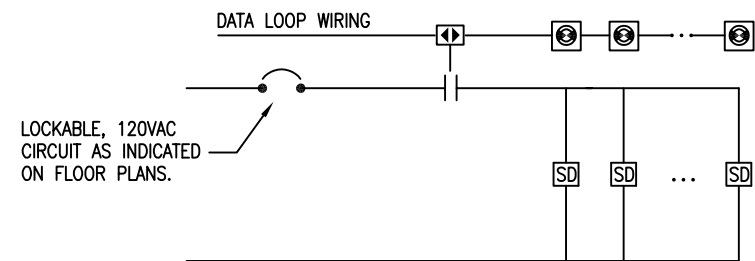


PARTIAL SECOND FLOOR – NIGHT LIGHTS
SCALE 1:400



MNE Engineering Inc.
22 Kevco Place – Box A
Kitchener, Ontario N2C 2G5
(519) 894-9408
www.mneengineering.ca

PROJECT:	WODSS-FAMILY STUDIES RENOVATION & HVAC UPGRADES	03	
DRAWING:	PARTIAL FLOOR PLANS – NIGHT LIGHTING	02	
DWG NO:	SKE-01	JOB NO:	22002
SCALE:	AS NOTED	DRAWING BY:	A.W.T.
DATE:	APRIL/2022	CHECKED BY:	A.W.G.
		01	ADDENDUM 01
		REV#	REVISION
		CLIENT:	WRDSB

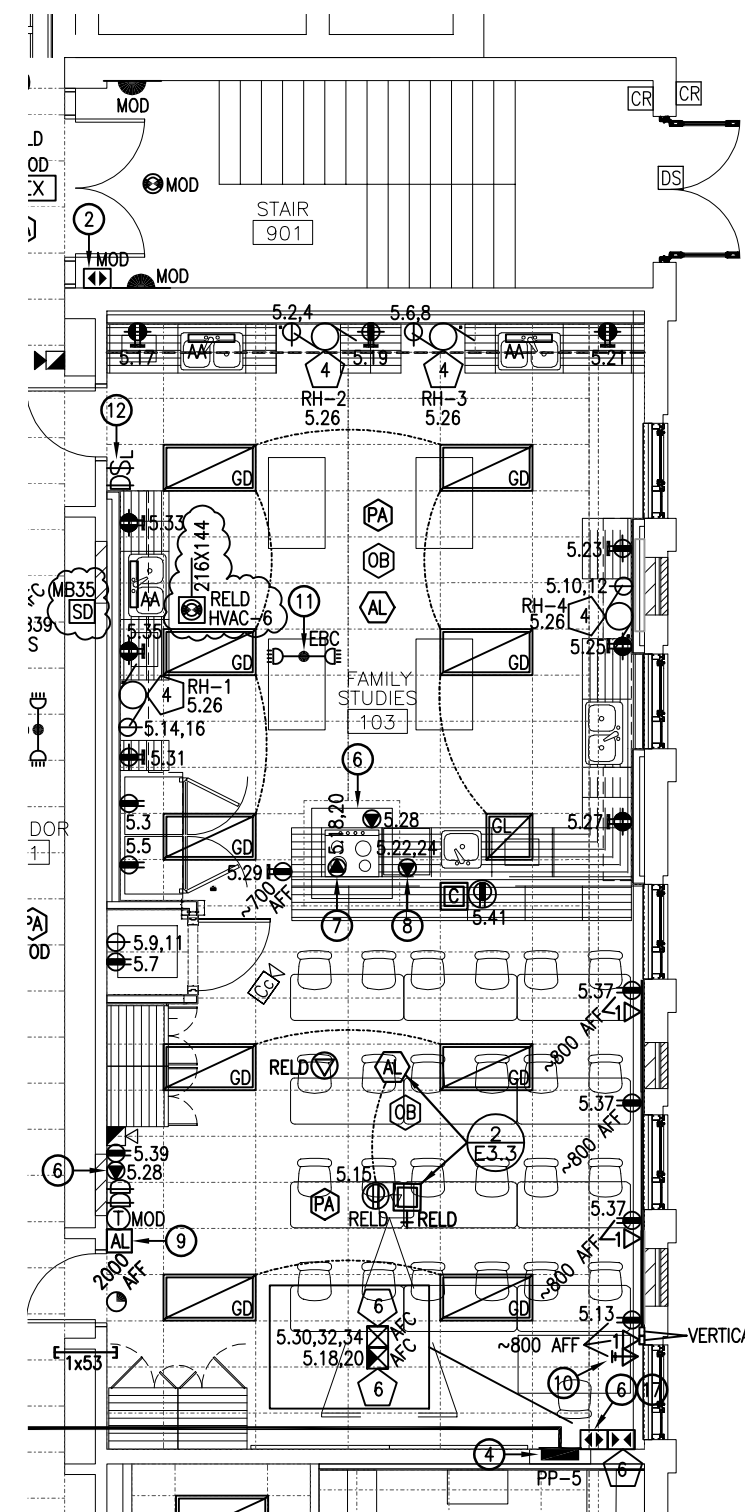


NOTES:

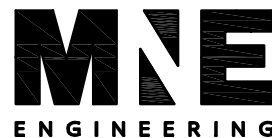
- 120V SMOKE DAMPERS PROVIDED BY DIVISION 23, POWER OPEN, SPRING CLOSED.
- PROVIDE SMOKE DETECTORS WITHIN 5'-0" (1.5m) ON BOTH SIDES OF THE RATED SEPARATION, OR PROVIDE A DUCT-TYPE SMOKE DETECTOR DOWNSTREAM OF THE DAMPER IN ACCORDANCE WITH OBC 3.1.8.9A. REFER TO FLOOR PLANS.
- PROVIDE A FIRE RELAY MODULE TO ACTIVATE A POWER RELAY. EXTEND POWER WIRING TO SMOKE DAMPERS.
- PROGRAM FIRE RELAY MODULE TO CLOSE THE SMOKE DAMPER UPON SIGNAL FROM THE ASSOCIATED SMOKE DETECTOR(S).
- PROVIDE FIRE ALARM RELAY SO THAT THE ASSOCIATED AIR HANDLING UNIT IS SHUT DOWN UPON ACTIVATION OF ANY OF THE SMOKE DETECTORS ASSOCIATED WITH THAT UNIT.
- PROVIDE ACCESS DOORS AS REQUIRED FOR INSPECTION AND RESET.
- ASSOCIATED SMOKE DETECTORS SHALL BE MAPPED TO BOTH THE FLOOR INITIATING ZONE AND THE ASSOCIATED AIR HANDLING INITIATING ZONE.
- THIS DETAIL IS SCHEMATIC IN NATURE.

SMOKE DAMPER WIRING SCHEMATIC

N.T.S.



PARTIAL REVISED GROUND FLOOR ELECTRICAL PLAN
SCALE 1:100



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Kitchener, Ontario N2C 2G5
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www.mneengineering.ca

PROJECT: WODSS-FAMILY STUDIES RENOVATION & HVAC UPGRADES	03
DRAWING: PARTIAL GROUND FLOOR ELECTRICAL PLAN & SCHEMATIC	02
DWG NO: SKE-02	JOB NO: 22002
SCALE: AS NOTED	DRAWING BY: A.W.T.
DATE: APRIL/2022	CHECKED BY: A.W.G.
	01 ADDENDUM 01
	REV# REVISION
	CLIENT: WRDSB