# Addendum # 4

# Bid Opportunity: 25-7736-RFT

# Waterloo-Oxford District Secondary School

# ACE Classroom & Science Classroom Renovations

# Closing Date: Tuesday April 29, 2025 2:00 PM

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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If you have already submitted a Bid/ Proposal, it will be automatically withdrawn as a result of this addendum.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.

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THIS ADDENDUM CONSISTS OF:

.1 COVER PAGE (1 PAGE)
.2 QUESTIONS/ ANSWERS (3 PAGES)
.3 ARCHITECTURAL ADDENDUM #4 (2 PAGES)
.4 ARCHITECTURAL SPECIFICATIONS (1 PAGE)
.5 ARCHITECTURAL DRAWINGS (3 PAGES)
.6 MECHANICAL/ ELECTRICAL ADDENDUM 03 (20 PAGES)

4.1 QUESTIONS/ ANSWERS

**Question 1:**

Please clearly identify new walls vs existing walls. It is difficult to differentiate between the current line weights.

**Answer 1:**

Refer to Enlarged Floor Plans on Drawings A2.02 and A2.03. New walls are tagged and dimensioned on these Drawings.

**Question 2:**

Please confirm if CB-1 is to receive drywall on one side or on both sides. The floor plans show CB-1 as having drywall on both sides, where the schedule only notes 1-sided.

**Answer 2:**

For CB-1 walls, gypsum board is to be provided on one side only, as noted in the Wall Assemblies on Drawing A0.01.

**Question 3:**

Please provide a bulkhead detail as one is not provided on A0.01.

**Answer 3:**

Refer to details on Drawings A3.01, A5.02, and A6.01.

**Question 4:**

Please provide more details regarding the mechanical trench cover and its requirements.

**Answer 4:**

Refer to Details provided with Addendum # 3.

**Question 5:**

Please clearly identify new walls vs existing walls. It is difficult to differentiate between the current line weights.

**Answer 5:**

Refer to Answer to Question 1.

**Question 6:**

Please confirm if CB-1 is to receive drywall on one side or on both sides. The floor plans show CB-1 as having drywall on both sides, where the schedule only notes 1-sided.

**Answer 6:**

Refer to Answer to Question 2.

**Question 7:**

Please provide a bulkhead detail as one is not provided on A 0.01.

**Answer 7:**

Refer to Answer to Question 3.

**Question 8:**

Can you advise if the question regarding Sol Shades be an approved alternate to the window coverings?

**Answer 8:**

Refer to Addendum # 3. Technical information is required to assess this product. Bids are to be submitted based on the Specifications provided. An alternate price may be submitted for this product but should not be included in the Bid.

**Question 9:**

re Fire/Smoke Dampers. Drawing E3.1 and M3.4 show a qty of 3 only. Are there no other requirements for smoke/fire dampers such as the RTU's for Labs 202, 203, 209?

**Answer 9:**

Three combination fire & smoke dampers are required at 206/208 corridor penetrations, as this system serves multiple fire compartments. Combination fire & smoke dampers are not required in RTU systems serving 202, 204, 209 or ACE area (VVT) as these RTUs each only serve one fire compartment.

**Question 10:**

Can the AV Equipment for Science Lab 208, ACE Life skills Classroom 201, ACE Dev Ed Classroom 203 & Biology Lab 209 be grouped together with the pre-existing cash allowance and the total allowance be adjusted accordingly?

**Answer 10:**

AV equipment for rooms with projectors is to be included in Bid. AV equipment for rooms with TV's is part of the cash allowance. This is outlined in the Division 27 specification and was adjusted as part of MNE Addendum 01. Refer also to Mechanical/ Electrical Addendum 03.

**Question 11:**

Can the AV Equipment for Science Lab 208, ACE Life skills Classroom 201, ACE Dev Ed Classroom 203 & Biology Lab 209 be grouped together with the pre-existing cash allowance and the total allowance be adjusted accordingly?

**Answer 11:**

Refer to Answer to Question 10.

**Question 12:**

2. Can the AV Equipment for Science Lab 208, ACE Life skills Classroom 201, ACE Dev Ed Classroom 203 & Biology Lab 209 be grouped together with the pre-existing cash allowance and the total allowance be adjusted accordingly?

**Answer 12:**

Refer to Answer to Question 10.

**Question 13:**

Will all the specified abatement be completed prior to the rough-in portion of the project?

**Answer 13:**

Abatement is required to be completed prior to the installation of any new materials/ equipment.

**Question 14:**

HH Hawkins, a fume hood manufacturer from BC has requested to submit for this project in lieu of Mott Lab. Please confirm this will be an acceptable manufacturer.

**Answer 14:**

Technical information is required to assess this product. Bids are to be submitted based on the Specifications provided. An alternate price may be submitted for this product but should not be included in the Bid.

4.2 ARCHITECTURAL SPECIFICATIONS

.1 Section 01 21 00 Allowances

.1 REPLACE Page 3 with Page 3R, attached.

.2 Section 12 24 13 Manually Operated Window Shades

.1 REPLACE Article 2.2.1 with the following:

.1 Visually Transparent Single-Fabric Shadecloth: single thickness non-raveling 0.762mm thick vinyl fabric, woven from 0.457mm diameter extruded vinyl yarn comprising of 21% polyester and 79% reinforced vinyl, in colours selected from manufacturer's available range. 3% Open **and 1% Open**. Colour as selected by Consultant from standard product range.

.2 REPLACE Article 3.5.1 with the following:

.1 Provide fabric window shades on **ALL** new windows **as follows:**

**.1 Rooms 201, 201A, 202, 203, 204, 204A, 205, 206, 207, 208, 209: 3% open.**

**.2 Rooms 203C and 203D: 1% open.**

4.3 ARCHITECTURAL DRAWINGS

.1 Drawing A5.02 Building Sections

**.1 ADD DETAIL AT INTERSECTION OF NEW PARAPET/ FASCIA CONSTRUCTION AT EXISTING LIBRARY/ 200 WING (GRID LINE E, BETWEEN GRID LINES 13 AND 14), AS SHOWN ON DRAWING ASK.009, ATTACHED.**

.2 Drawing A7.01R Interior Elevations

**.1 PARTIAL FIRST FLOOR PLAN 1/A7.01R: IN ROOMS 202 AND 204, REVISE NOTE "BLACKOUT BLINDS" TO READ "WINDOW BLINDS – REFER TO SPECIFICATIONS.**

.3 Drawing A7.02R Interior Elevations

**.1 PARTIAL FIRST FLOOR PLAN 1/A7.02R: IN ROOM 208, REVISE NOTE "BLACKOUT BLINDS" TO READ "WINDOW BLINDS – REFER TO SPECIFICATIONS.**

.4 Drawing A7.03 Interior Elevations

**.1 ACE LIFESKILLS CLASSROOM 201 – NORTH ELEVATION 2/A7.03: REPLACE ELEVATION WITH THAT SHOWN ON DRAWING ASK.007, ATTACHED.**

.5 Drawing A7.04R Interior Elevations

**.1 ACE DEV ED CLASSROOM 203 – NORTH ELEVATION 1/A7.04R: REPLACE ELEVATION WITH THAT SHOWN ON DRAWING ASK.008, ATTACHED.**

**.2 PARTIAL FIRST FLOOR PLAN 2/A7.04R: IN ROOM 203D, REVISE NOTE "BLACKOUT BLINDS" TO READ "WINDOW BLINDS – REFER TO SPECIFICATIONS.**

.6 Drawing A7.05R Interior Elevations

**.1 PARTIAL FIRST FLOOR PLAN 5/A7.05R: IN ROOM 209, REVISE NOTE "BLACKOUT BLINDS ON HIGH LEVEL WINDOWS " TO READ "WINDOW BLINDS ON HIGH LEVEL WINDOWS – REFER TO SPECIFICATIONS.**

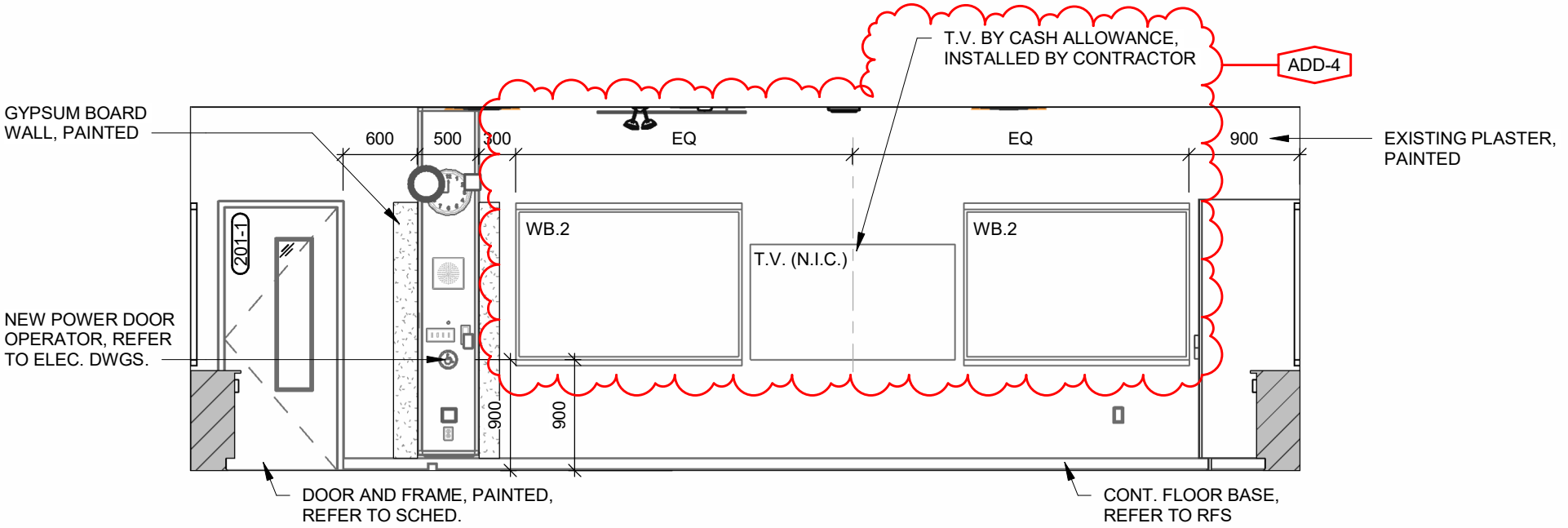
4.4 MECHANICAL/ ELECTRICAL

.1 Refer to Addendum 03 issued by MNE Engineering Ltd., dated April 25, 2025 (20 pages).

**END OF ADDENDUM # 4**

| | | |
|---|---|---|
| 8 | Supply and Installation of Data/ Voice Cabling Installation, Public Address and Network Equipment (including terminations) | $45,000.00 |
| 9 | Supply and Installation of Assistive Listening Equipment: | $25,000.00 |
| 10 | Supply and Installation of Audio/ Video Equipment: | **$50,000.00** |
| | **Total of All Allowances:** | **$310,000.00** |

END OF SECTION




1
ASK.007

## ACE LIFESKILLS CLASSROOM 201 - NORTH ELEVATION

0 0.5 1 2.5 5m

1:50

# Waterloo-Oxford District Secondary School

1206 Snyder's Rd W, Baden, ON N3A 1A4

ACE CLASSROOM & SCIENCE CLASSROOM RENOVATIONS

Project No.: 1128B

ACE LIFESKILLS CLASSROOM 201 - REVISED NORTH ELEVATION - 2/A7.03

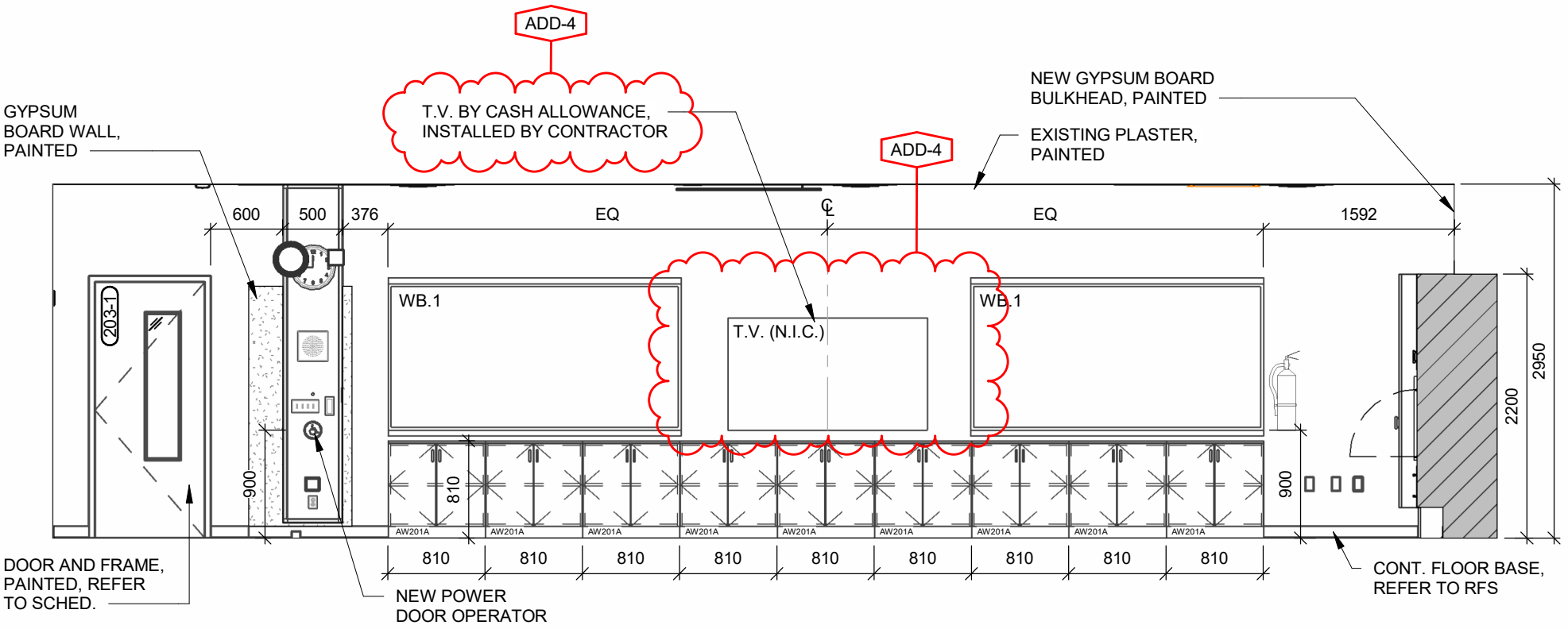
Plot Date: 04/24/25

CORNERSTONE ARCHITECTURE

102-320 Thames St. London ON Canada N6A E01
P 519 432 6644 F 519 432 6737
cornerstonearchitecture.ca



ASK.007




1
ASK.008

## ACE DEV ED CLASSROOM 203 - NORTH ELEVATION

0 0.5 1 2.5 5m

1:50

# Waterloo-Oxford District Secondary School

1206 Snyder's Rd W, Baden, ON N3A 1A4

ACE CLASSROOM & SCIENCE CLASSROOM RENOVATIONS

Project No.: 1128B

ACE DEV ED CLASSROOM 203 - REVISED NORTH ELEVATION - 1/A7.04R

Plot Date: 04/24/25

CORNERSTONE ARCHITECTURE
102-320 Thames St. London ON Canada N6A E01
P 519 432 6644 F 519 432 6737
cornerstonearchitecture.ca



ASK.008


1
ASK.009

DETAIL AT PARAPET ABUTMENT

0 100 200 500 1000 mm

1:10

# Waterloo-Oxford District Secondary School

1206 Snyder's Rd W, Baden, ON N3A 1A4

ACE CLASSROOM & SCIENCE CLASSROOM RENOVATIONS

Project No.: 1128B

PARAPET ABUTMENT AT LIBRARY WALL

Plot Date: 04/24/25

CORNERSTONE ARCHITECTURE

102-320 Thames St. London ON Canada N6A E01
P 519 432 6644 F 519 432 6737
cornerstonearchitecture.ca



ASK.009

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

**ADDENDUM 03**

| | | | |
|---|---|---|---|
| **To:** | Cornerstone Architecture | **Date:** | April 25, 2025 |
| | | **Project:** | Waterloo-Oxford District Secondary School |
| **cc:** | WRDSB | **Project No:** | 25004 |

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

**Mechanical**

1. Reference specification section Division 25.

    a. Include attached graphical sequences and include the following additional comments:
        i For exhaust fan EF-17, in addition to BAS controls for enable, speed and status, provide BAS controls for associated isolation and by-pass dampers and control as follows:
            - When the EF is operational, the isolation damper should be 100% open. When the fan is disabled, the isolation damper should be 100% closed.
            - The bypass damper is permitted to open as required to maintain the hood velocity within an acceptable range.
                - With the design flow required, the bypass damper should be fully closed.
                - When the sash is partially open, the bypass damper can be controlled to reduce the hood exhaust flow and thereby reduce the hood velocity if desired.
                - When the sash is fully closed, the bypass damper should be fully open for a period of time to discharge any contaminants remaining in the system before shutting off the fan.
                - When the exhaust fan is disabled, the bypass damper can be fully closed.
        ii Provide BAS controls for fume hood TSI monitor FHM10 to avoid alarm conditions when fan is intentionally off

2. Reference drawing M1.2.

    a. Refer to EF-1 in Exhaust Fan Schedule:
        i Revise symbol to EF-17.
        ii Revise air flow to 800 cfm (377 l/s).
        iii Revise model to vPlume 122-6 1x1.
        iv Revise electrical to 208-3-60, 1 hp (0.75 kW).
        v Remove 'Set by-pass damper to admit 810 cfm (380 l/s) O/A to permit 790 cfm (370 l/s) E/A from fume hood.'

3. Reference drawing M2.1.

    a. Refer to attached sketch SK-M02 for demolition of storm piping serving existing roof drain above Biology 209.

4. Reference drawings M3.1.

    a. Refer to attached sketch SK-M03 for rerouting of storm piping serving existing roof drain above Biology 209.

5. Reference drawing M3.4.

    a. In detail 1, add note 12 adjacent to main door of Intermediate Science Lab 202, Intermediate Science Lab 204 and Biology Lab 209.
    b. Add the following to Note 12, 'Provide label indicating GENERAL EXHAUST.'

6. Reference drawing M3.5.

    a. In detail 1, revise exhaust fan EF-1 symbol to EF-17.

**Electrical**

1. Refer to drawing E3.1.

    a. Replace drawing with attached drawing E3.1.

2. Refer to drawing E4.4.

    a. Replace drawing with attached drawing E4.4.

3. Refer to WES, E3.3, Panel 'SD Schedule

    a. Revise EF-1 to EF-17.

4. Refer to 1/E3.2

    a. In Univ. WR 203B, Revise 'TO EF-1' to 'TO EF-4'.

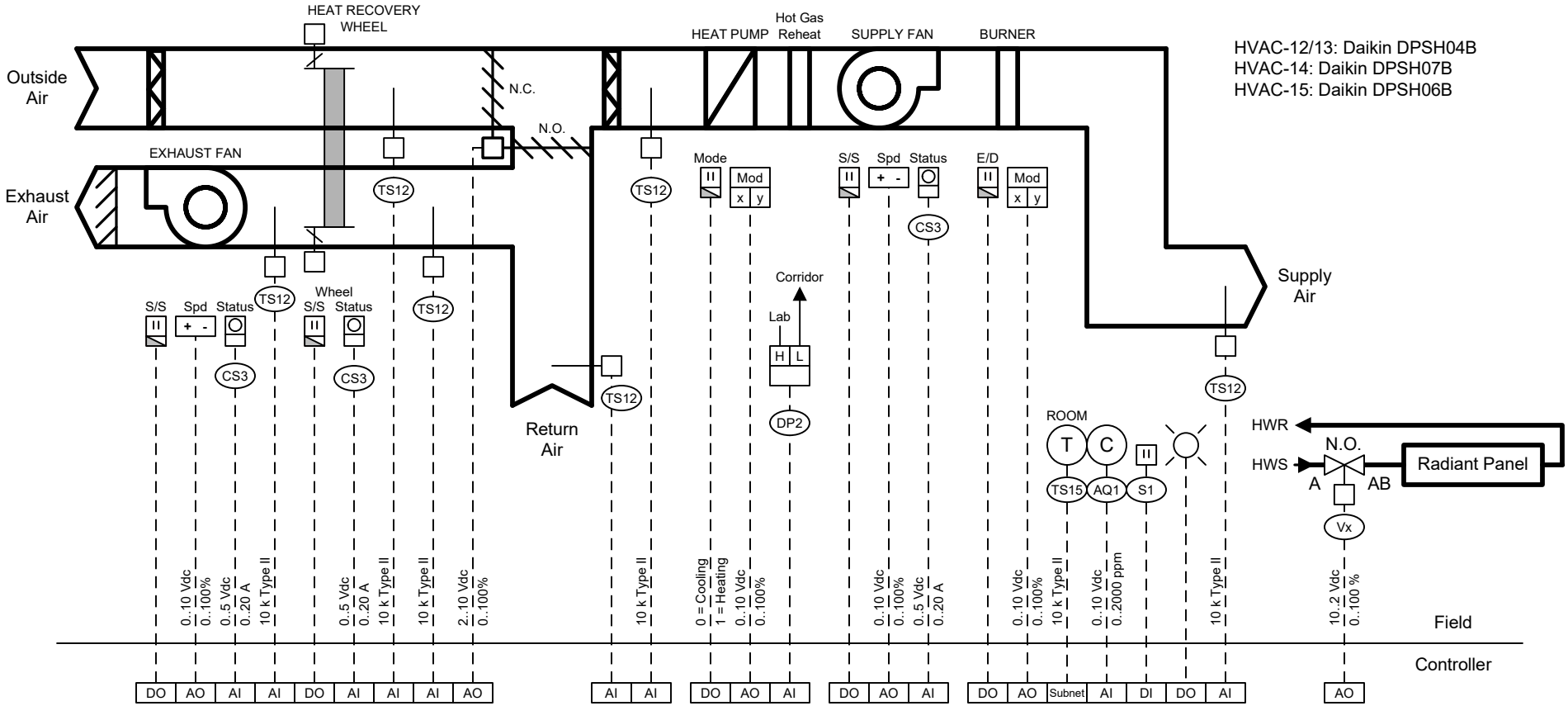
5. Refer to Division 27 Specification

    a. Replace Article 1.2.1c. with the following:
        i Audio/Visual in Science Lab 208 and Biology Lab 209.
    b. Replace Article 1.3.1e. with the following:
        i Audio/Visual in ACE Lifeskills Classroom 201, ACE Dev Ed Classroom 203, Science Lab 202 and Science Lab 204.
    c. Replace Article 4.1.1 with the following:
        i The Electrical Subcontractor shall provide the audio/video systems in Science Lab 208 and Biology Lab 209.

**End of Addendum**

2025 Scope of Work
- Remove ex. pneumatic controls for wallfin heaters and exhaust fans serving east wing science classrooms
- Supply & install controls for new HVAC-12, 13, 14, 15 serving east wing science classrooms
- Supply control valves for new radiant panels
- Ex. east vestibule fan coil FC-3 to remain

## Single Zone Rooftop Unit




| Unit | Serves | ERV S/A (cfm) | ERV E/A (cfm) | DX Clg (MBh) | HP Htg (MBh) | Gas Htg (MBh) | Turndown | MCA | Rad Tag | Vx | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HVAC-12 | Intermediate Science Lab 202 | 1000 | 1100 | 47.0 | 30.2 | 97.2 | 5:1 | 17.1 | RP-1 | | |
| HVAC-13 | Intermediate Science Lab 204 | 1000 | 1100 | 47.0 | 30.2 | 97.2 | 5:1 | 17.1 | RP-2 | | |
| HVAC-14 | Science Lab 208, Prep 206 | 1500 | 1600 | 90.2 | 40.1 | 243.0 | 10:1 | 24.4 | RP-5, RP-4 | | Avg 2 room stats in Lab 208 & Prep 206. If Fume Hood EF-17 is running when HVAC-14 is on, control ERV OA to 1500 cfm and EA to 800 cfm. |
| HVAC-15 | Biology Lab 209 | 1300 | 1400 | 65.1 | 30.7 | 129.6 | 5:1 | 18.0 | RP-6 | | |

| | | | | |
|---|---|---|---|---|
| Job #: | Owner: Waterloo Region District School Board | Drawn By: | Title: **HVAC 12-15 Science Lab Unit Schematic** | 1 |
| Job Name: Waterloo Oxford DSS ACE & Science Classroom Reno. | | Revision Date: April 16, 2025 | | |

## SEQUENCE OF OPERATION

**Unoccupied Mode**

Mode is active usually between 11:00 p.m. to 7:00 a.m. Monday to Friday and 24 hours Saturday and Sunday. The system will be in Unoccupied Mode when not in Morning Warmup, Occupied or Standby modes. The system will cycle between Idle State, Heating State or Pushbutton Override States to meet the demands from each state and return to the Idle State when the demands are satisfied.

***Idle State***

The supply fan is off, the exhaust fan is off, the Global Ventilation Schedule is disabled, the outdoor air mixing dampers are in the 0 % outdoor air position, the heat wheel is off, heating is disabled and cooling is disabled.

***Heating State***

System cycles with full heat on a call for unoccupied heating until setpoint is reached. Mechanical & free cooling is disabled, the global ventilation schedule is disabled.

***Push Button Override State***

If the override pushbutton is pressed, the associated system will switch to the Occupied Mode with outdoor air ventilation enabled for 2 hours (adjustable).

**Morning Warmup Mode**

An optimized start, based on the time of day schedule, outdoor air temperature and the indoor zone temperature is provided for heating. The global ventilation schedule is disabled. The supply fan is on, the outdoor air mixing dampers are in the 0 % outdoor air position and heating is enabled at full capacity. The heat pump is the first stage of heat but when it is in defrost mode or when the outdoor air is too cold, then gas heat is used to provide heat. The optimized start program is to begin up to 105 minutes (adjustable) before the occupancy schedule to allow for morning warm up to bring the space temperature up to occupancy setpoint. Mechanical cooling, free cooling is disabled and the global ventilation schedule is disabled.

**Occupied Mode**

Time of day schedule, which starts the HVAC unit along with an Optimum Start program usually between 7:00 a.m. and 4:00 p.m. Monday to Friday, when not overridden by a Holiday Schedule, Standby Occupancy Mode or Unoccupied Mode. Global Ventilation Schedule is enabled. Fan status is confirmed by a current sensor.

Room heating temperature setpoint nominal: 21.5 °C +/- 1.0 °C
Room free cooling Enabled temperature setpoint nominal 22.5 °C +/-1.0 °C
Room mechanical cooling temperature setpoint nominal 24.5 °C +/- 1.0 °C

**Standby Occupancy Mode**

Time of day schedule starts the unit usually between 4:00 p.m. and 11:00 p.m. Monday to Friday. Minimum Outdoor Air is set to zero when the Global Ventilation Schedule is off. Supply fan runs only on a call from heating. Free cooling is disabled and the global ventilation is disabled.

Room heating temperature nominal: 21.5 °C +/- 1.0 °C
Room mechanical cooling temperature setpoint nominal 24.5 °C +/- 1.0 °C

**General Exhaust Mode**

During occupied hours if pushbutton S1 is pressed, the associated system will enter general exhaust mode and increase ERV outdoor and exhaust air flow to maximum setpoints (refer to Exhaust Fan Control). Pressing the pushbutton a second time will revert the system to Occupied Mode operation.

## SEQUENCE OF OPERATION (continued)

**Heating**

A set of thresholds that are user adjustable at a global (board wide) or local (site specific) level, triggers the heating enable mode based on the outdoor air temperature below the threshold. The threshold is further adjusted by a calendar schedule. Typical default values are: 16 °C from September to May and 5 °C from June to August. When the Heating Mode is active, the default room temperature setpoint remains unchanged.

The heat pump is the first stage of heat (nominally to 5 °C outdoor air temperature) but when it is in defrost mode or when the outdoor air is too cold, then gas heat is used to provide heat. When in heating mode, the mixing dampers are in minimum position and cooling is off. Mechanical heating is used until the heating call (from room controller PID or Unoccupied Heating thresholds) is satisfied. The room temperature sensor regulates heating output to maintain the occupied heating setpoint. Local setpoint adjustment is provided.

Where there is a zone served by radiation, the radiation valve opens (where applicable) and is to be substituted as the first stage of heating.

**Cooling**

A set of thresholds that are user adjustable at a global (board wide) or local (site specific) level, triggers the cooling enable mode based on the Outdoor Air Temperature exceeding the threshold. The threshold is further adjusted by a calendar schedule. Typical default values are: 18 °C from September to May and 21 °C from June to August. When the cooling enable mode is active, the default room temperature setpoint is raised by 2 °C.

When free cooling is available, and a demand for cooling is in place, free cooling will be used first, and if the demand for cooling is still in place, mechanical cooling will be used until the cooling call (from room controller PID) is satisfied. The room temperature sensor also modulates the mixing dampers (for free cooling) to maintain the occupied free cooling setpoint. Cooling setpoint is maintained at 3 °C higher than the default room setpoint and will not go below 23.5 °C. When mechanical cooling is on, heating is off.

**Heat Wheel**

The heat wheel operates continuously during occupied hours unless there is a call for free cooling, or if the mixing dampers are closed.

**Economizer and $CO_2$ Demand Control Ventilation Operation**

During Occupied Mode, economizer operation will be substituted for first stage mechanical cooling when the outdoor air temperature and relative humidity are below the Free Cooling Setpoint. If the outdoor air temperature is below this Free Cooling Setpoint, the mixing dampers will be modulated open on a call for cooling to provide free cooling. During Unoccupied Mode and Standby Occupancy Mode, free cooling is unavailable. During Occupied Mode, If the outdoor air temperature and relative humidity are above the Free Cooling Setpoint, the mixing dampers will be set to the minimum outdoor air threshold unless demand control ventilation is required. The space mounted $CO_2$ sensor acts as a high limit and will increase the amount of minimum outdoor air, to a maximum of 40 % outdoor air as the $CO_2$ level increases from 1000 to 1200 ppm over a ramped 15 minute period.

**Exhaust Fan Control (HVAC-12, 13)**

The exhaust fan speed is controlled to maintain a net air flow of -100 cfm to the space as follows. Differential pressure sensor DP2 adjusts fan speed settings by +/- 10% to maintain a slight negative pressure in the lab space.

1) When the economizer is partially open, the RTU exhaust fan speed is scaled based on minimum and maximum flow and minimum and maximum economizer position.
2) When the economizer is fully open (100% OA), the RTU exhaust fan flow is 1100 cfm.

**Exhaust Fan Control (HVAC-14)**

The exhaust fan speed is controlled to maintain a net air flow of -100 cfm to the space as follows. Differential pressure sensor DP2 adjusts fan speed settings by +/- 10% to maintain a slight negative pressure in the lab space.

1) When the economizer is off (min. OA only) and the fume hood is on, the RTU exhaust fan is off.
2) When the economizer is partially open, the RTU exhaust fan speed is scaled based on minimum and maximum flow and minimum and maximum economizer position.
3) When the economizer is fully open (100% OA) and the fume hood is off, the RTU exhaust fan flow is 1600 cfm.
4) When the economizer is fully open and the fume hood is on, the RTU exhaust fan flow is 800 cfm.

## SEQUENCE OF OPERATION (continued)

**Exhaust Fan Control (HVAC-15)**

The exhaust fan speed is controlled to maintain a net air flow of -100 cfm to the space as follows. Differential pressure sensor DP2 adjusts fan speed settings by +/- 10% to maintain a slight negative pressure in the lab space.

1) When the economizer is partially open, the RTU exhaust fan speed is scaled based on minimum and maximum flow and minimum and maximum economizer position.
2) When the economizer is fully open (100% OA), the RTU exhaust fan flow is 1400 cfm.

**Limits & Safeties**

1) The maximum outdoor air damper position is limited based on the outdoor air temperature to prevent excessively low supply air temperature. When the outdoor air is at or below -15 °C, the maximum position will be 0 % outdoor air. When the outdoor air is at or above 10 °C, the maximum position will be 100 % outdoor air.
2) The maximum outdoor air damper position is limited based on the outdoor air temperature to prevent excessively high supply air temperature. When the outdoor air is at or above 30 °C, the maximum position will be 0 % outdoor air. When the outdoor air is at or below 10 °C, the maximum position will be 100 % outdoor air.
3) The mixed air temperature sensor acts as a low limit to ensure the temperature does not fall below setpoint (typically 11 °C). The setpoint is reduced (to typically 5 °C) when DX cooling is enabled.
4) The supply air temperature sensor acts as a high limit for heating (60/50 °C) and a low limit for cooling (5/10 °C).
5) The supply air temperature sensor acts as a software freezestat (1/5 °C, 1 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 outdoor air temperature is below the global DX disable setpoint or when the fan is off.
9) Gas heating is disabled when the outdoor 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) The heat pump is disabled when the outdoor air temperature is below 5 °C.
12) Defrost mode is determined by a sudden drop in supply air temperature while the heat pump is heating.
13) During Occupied Mode and when the outdoor air is above -1/-3 °C, heating stage 2 has a delay-on time of 15 minutes.
14) The default zone setpoint is increased by 2 °C when mechanical cooling is enabled (providing heating is disabled).
15) The following adjustable limits are provided for the room temperature setpoints: Heating: 22 °C maximum, mechanical cooling 23.5 °C minimum (adjustable).
16) When the ventilation lockout switch is engaged, the outdoor air dampers close, free cooling is disabled and the system enters the standby occupancy mode.
17) Minimum outdoor air is provided when the global ventilation schedule is active. The minimum outdoor air is set to 0 % when the schedule is inactive.
18) The space carbon dioxide sensor acts as a high limit to increase the amount of minimum outdoor air from 0 to 40 % as the reading increases from 1000 ppm to 1200 ppm.
19) Cooling cannot turn on until heating has been off for a minimum of 5 minutes.

**Alarms**

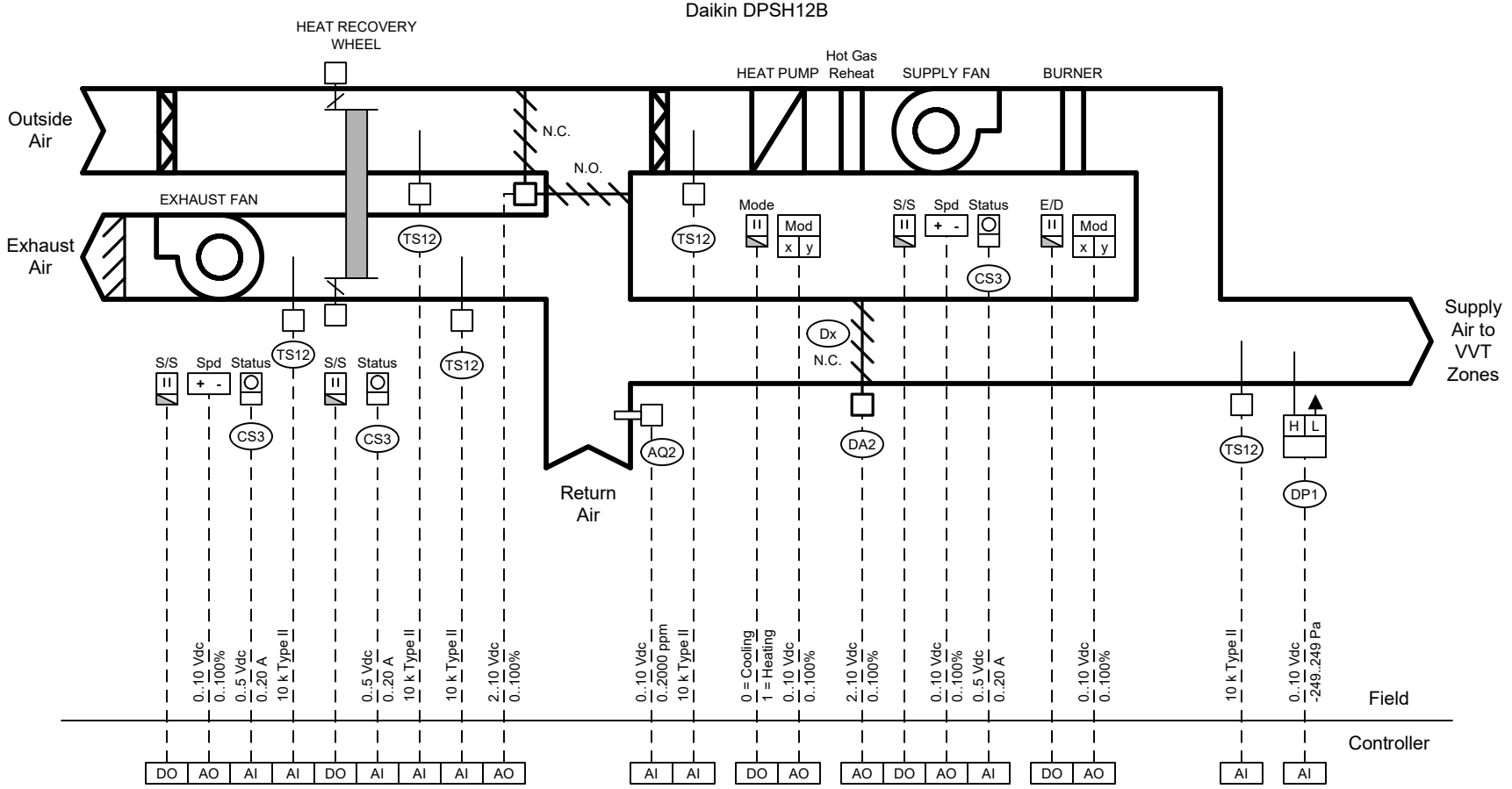
An alarm will be generated upon the following conditions:

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) Weekly fan runtime limit exceeded.
6) Software freezestat tripped.
7) Space $CO_2$ too high (1700/1650 ppm) or too low (250/300 ppm) (15 minute delay).
8) Heat wheel status does not match start/stop signal.

2025 Scope of Work
- Remove ex. pneumatic controls for wallfin heaters and exhaust fans serving east wing Spec Ed rooms
- Supply & install controls for new VVT HVAC-16 serving east wing ACE rooms
- Supply control valves for new radiant panels
- Supply control dampers for HVAC-16 zones and bypass

## HVAC-16 VVT Rooftop Unit

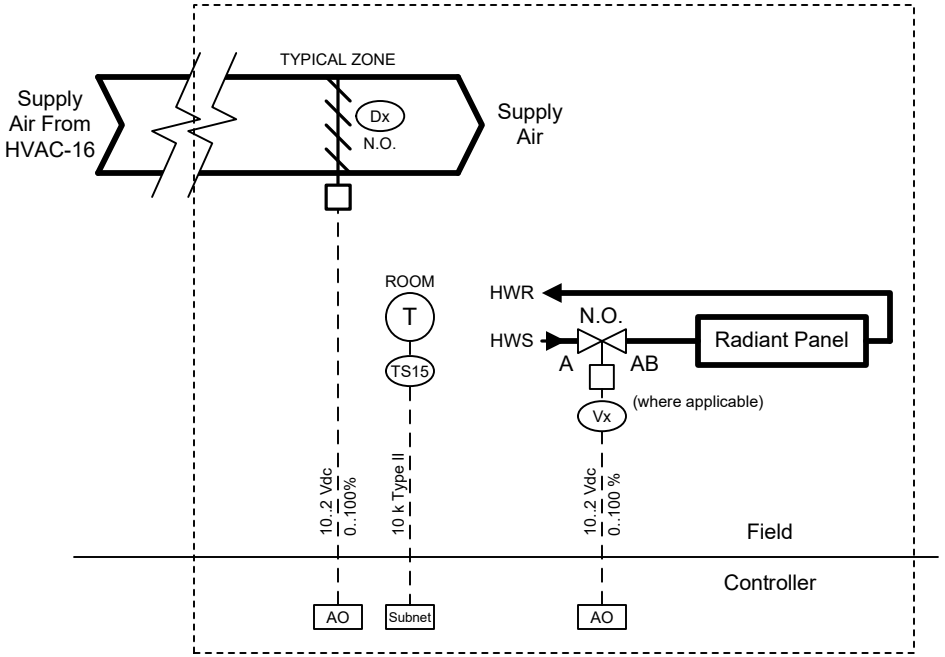
Daikin DPSH12B




| Unit | Serves | S. Fan (cfm) | E. Fan (cfm) | DX Clg (MBh) | HP Htg (MBh) | Gas Htg (MBh) | Turndown | MCA | Notes |
|---|---|---|---|---|---|---|---|---|---|
| HVAC-16 | ACE Classroom Area | 4800 | 4800 | 145.1 | 59.9 | 243.0 | 10:1 | 97.1 | |

| | | | | |
|---|---|---|---|---|
| | Job #: | Owner: Waterloo Region District School Board | Drawn By: | Title: **HVAC-16 ACE Classroom VVT Schematic** |
| | Job Name: Waterloo Oxford DSS ACE & Science Classroom Reno. | | Revision Date: April 16, 2025 | |

## HVAC-16 VVT Zones




| | 6 Systems As Shown | | | |
|---|---|---|---|---|
| Zone | Location | Rad Panel | Vx | Notes |
| Z16.1 | ACE Lifeskills Classroom 201 | RP-12 | | |
| Z16.2 | ACE Dev Ed Classroom 203 | RP-9/10/11 | | |
| Z16.3 | ACE Office 205 | RP-8 | | |
| Z16.4 | Resource Room 207 | RP-7 | | |
| Z16.5 | Science Office 204A | RP-3 | | |
| Z16.6 | Corridor 802 | -- | -- | Slave zone (no cooling) |
| | | | | |

## SEQUENCE OF OPERATION

**Unoccupied Mode**

Mode is active usually between 11:00 p.m. to 7:00 a.m. Monday to Friday and 24 hours Saturday and Sunday. The system will be in Unoccupied Mode when not in Morning Warmup, Occupied or Standby modes. The system will cycle between Idle State, Heating State or Pushbutton Override States to meet the demands from each state and return to the Idle State when the demands are satisfied.

***Idle State***

The supply fan is off, the Global Ventilation Schedule is disabled, the outdoor air mixing dampers are in the 0 % outdoor air position, heating is disabled and cooling is disabled. The bypass damper is in the 100 % open position. The zone dampers are in the 50 % open position.

***Heating State***

System cycles with full heat on a call for unoccupied heating until setpoint is reached. The VVT HVAC unit supply air static pressure setpoint is increased by 20 %. Bypass damper and associated zone dampers modulate to maintain setpoint. Mechanical & free cooling is disabled, the global ventilation schedule is disabled.

***Push Button Override State***

If the override pushbutton is pressed, the associated system will switch to the Occupied Mode with outdoor air ventilation enabled for 2 hours (adjustable).

**Morning Warmup Mode**

An optimized start, based on the time of day schedule, outdoor air temperature and the indoor zone temperature is provided for heating. The global ventilation schedule is disabled. The supply fan is on, the outdoor air mixing dampers are in the 0 % outdoor air position and heating is enabled at full capacity. The heat pump is the first stage of heat but when it is in defrost mode or when the outdoor air is too cold, then gas heat is used to provide heat. The optimized start program is to begin up to 105 minutes (adjustable) before the occupancy schedule to allow for morning warm up to bring the lowest space temperature up to occupancy setpoint. Mechanical cooling, free cooling is disabled and the global ventilation schedule is disabled.

**Occupied Mode**

Time of day schedule, which starts the HVAC unit along with an Optimum Start program usually between 7:00 a.m. and 4:00 p.m. Monday to Friday, when not overridden by a Holiday Schedule, Standby Occupancy Mode or Unoccupied Mode. Global Ventilation Schedule is enabled. Fan status is confirmed by a current sensor.

Room heating temperature setpoint nominal: 21.5 °C +/- 1.0 °C
Room free cooling Enabled temperature setpoint nominal 22.5 °C +/-1.0 °C
Room mechanical cooling temperature setpoint nominal 24.5 °C +/- 1.0 °C

**Standby Occupancy Mode**

Time of day schedule starts the unit usually between 4:00 p.m. and 11:00 p.m. Monday to Friday. Minimum Outdoor Air is set to zero when the Global Ventilation Schedule is off. Supply fan runs only on a call from heating. Free cooling is disabled and the global ventilation is disabled.

Room heating temperature nominal: 21.5 °C +/- 1.0 °C
Room mechanical cooling temperature setpoint nominal 24.5 °C +/- 1.0 °C

**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. A minimum 5 minute delay between heating and cooling is provided.

## SEQUENCE OF OPERATION (continued)

**System Heating/Cooling Decision Process**

The system mode is determined by the number of zones that deviate by 1.2 °C from their respective zone heating/cooling setpoints. The number of zones is "weighted" by the deviation from setpoint. 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 Enabled Mode and in reverse for Cooling Enabled Mode. Once in Heating Enabled Mode or Cooling Enabled Mode, the reference zone becomes the zone of greatest call. The system will lock-in the selected mode until all zones are satisfied. If all zones are not satisfied within 20 minutes (60 minutes if all zones are in the same mode) the system will "unlock" and enable Forced Ventilation Mode. The outdoor air temperature determines the heating or cooling priority.

***Heating Enabled Mode***

In Heating Enabled Mode, the highest priority zone calling for heating is given first priority. If there is any zone calling for cooling, this is given second priority.

***Cooling Enabled Mode***

In the Cooling Enabled Mode, the highest priority zone calling for cooling is given first priority. If any zone is calling for heating, this is given second priority.

**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 (default ventilation mode).
2) System is switching between heating and cooling (system operates in ventilation mode for 5 minutes) (default ventilation mode).
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**

The supply air temperature sensor modulates the gas heating or heat pump heating (when available) to maintain the supply air temperature setpoint, which is reset from the reference zone deviation from setpoint as follows:

| ZtDev | Supply Air Temp. |
|---|---|
| -0.5 °C | 30 °C |
| -1.5 °C | 40 °C |

Where there is a zone served by radiation, the radiation valve opens (where applicable) and is to be substituted as the first stage of heating.

**System Cooling Control**

The supply air temperature sensor modulates the DX cooling to maintain the supply air temperature setpoint, which is reset from the reference zone deviation from setpoint as follows:

| ZtDev | Supply Air Temp. |
|---|---|
| +0.5 °C | 18 °C |
| +1.5 °C | 13 °C |

**Heat Wheel**

The heat wheel operates continuously during occupied hours unless there is a call for free cooling, or if the mixing dampers are closed.

**Bypass Operation**

The supply air static pressure sensor modulates the bypass damper between minimum and maximum settings to maintain supply static pressure setpoint. The supply static pressure setpoint is reduced during both Default and Forced Ventilation modes, typically 10 Pa for acoustic noise reduction. During Unoccupied Mode the supply static pressure setpoint is increased by 20 %.

## SEQUENCE OF OPERATION (continued)

**Economizer and $CO_2$ Demand Control Ventilation Operation**

During Occupied Mode, economizer operation will be substituted for mechanical cooling when the outdoor air temperature and relative humidity are below the Free Cooling Setpoint. If the outdoor air temperature is below this free cooling setpoint the mixing dampers will be modulated open on a call for cooling to provide free cooling. During Unoccupied Mode and Standby Occupancy Mode, free cooling is unavailable. During Occupied Mode, If the outdoor air temperature and relative humidity are above the Free Cooling Setpoint Sequence of Operation, the mixing dampers will be set to the minimum outdoor air threshold unless demand control ventilation is required. The duct mounted $CO_2$ sensor acts as a high limit and will increase the amount of minimum outdoor air, to a maximum of 40 % outdoor air as the $CO_2$ level increases from 1000 to 1200 ppm over a ramped 15 minute period. The exhaust fan speed is modulated with the position of the mixing dampers.

**Limits & Safeties**

1) The maximum outdoor air damper position is limited based on the outdoor air temperature to prevent excessively low supply air temperature. When the outdoor air is at or below -15 °C, the maximum position will be 0 % outdoor air. When the outdoor air is at or above 10 °C, the maximum position will be 100 % outdoor air.
2) The maximum outdoor air damper position is limited based on the outdoor air temperature to prevent excessively high supply air temperature. When the outdoor air is at or above 30 °C, the maximum position will be 0 % outdoor air. When the outdoor air is at or below 10 °C, the maximum position will be 100 % outdoor air.
3) The mixed air temperature sensor acts as a low limit to ensure the temperature does not fall below setpoint (typically 11 °C). The setpoint is reduced (to typically 5 °C) when DX cooling is enabled.
4) The supply air temperature sensor acts as a high limit for heating (60/50 °C) and a low limit for cooling (5/10 °C).
5) The supply air temperature sensors 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 outdoor air temperature is below the global DX disable setpoint or when the fan is off.
9) Gas heating is disabled when the outdoor air temperature is above the global heating disable setpoint or when the fan is off.
10) Gas heating has a minimum run time of 3 minutes.
11) The heat pump is disabled when the outdoor air temperature is below 5 °C.
12) Defrost mode is determined by a sudden drop in supply air temperature while the heat pump is heating.
13) During default or forced ventilation mode, if the supply air temperature falls below 15 °C for more than two minutes, heating will turn on until the temperature exceeds 25 °C (to improve comfort).
14) The default zone setpoint is increased by 3 °C when mechanical cooling is enabled (providing heating is disabled).
15) The following adjustable limits are provided for the room temperature setpoints: Heating: 22 °C maximum, mechanical cooling 23.5 °C minimum (adjustable).
16) When the ventilation lockout switch is engaged, the outdoor air dampers close, free cooling is disabled and the system enters the standby occupancy mode.
17) Minimum outdoor air is provided when the global ventilation schedule is active. The outdoor air is set to 0 % when the schedule is inactive.
18) The return air carbon dioxide sensor acts as a high limit to increase the amount of minimum outdoor air from 0 to 40 % as the reading increases from 1000 ppm to 1200 ppm.
19) Cooling cannot turn on until heating has been off for a minimum of 5 minutes.

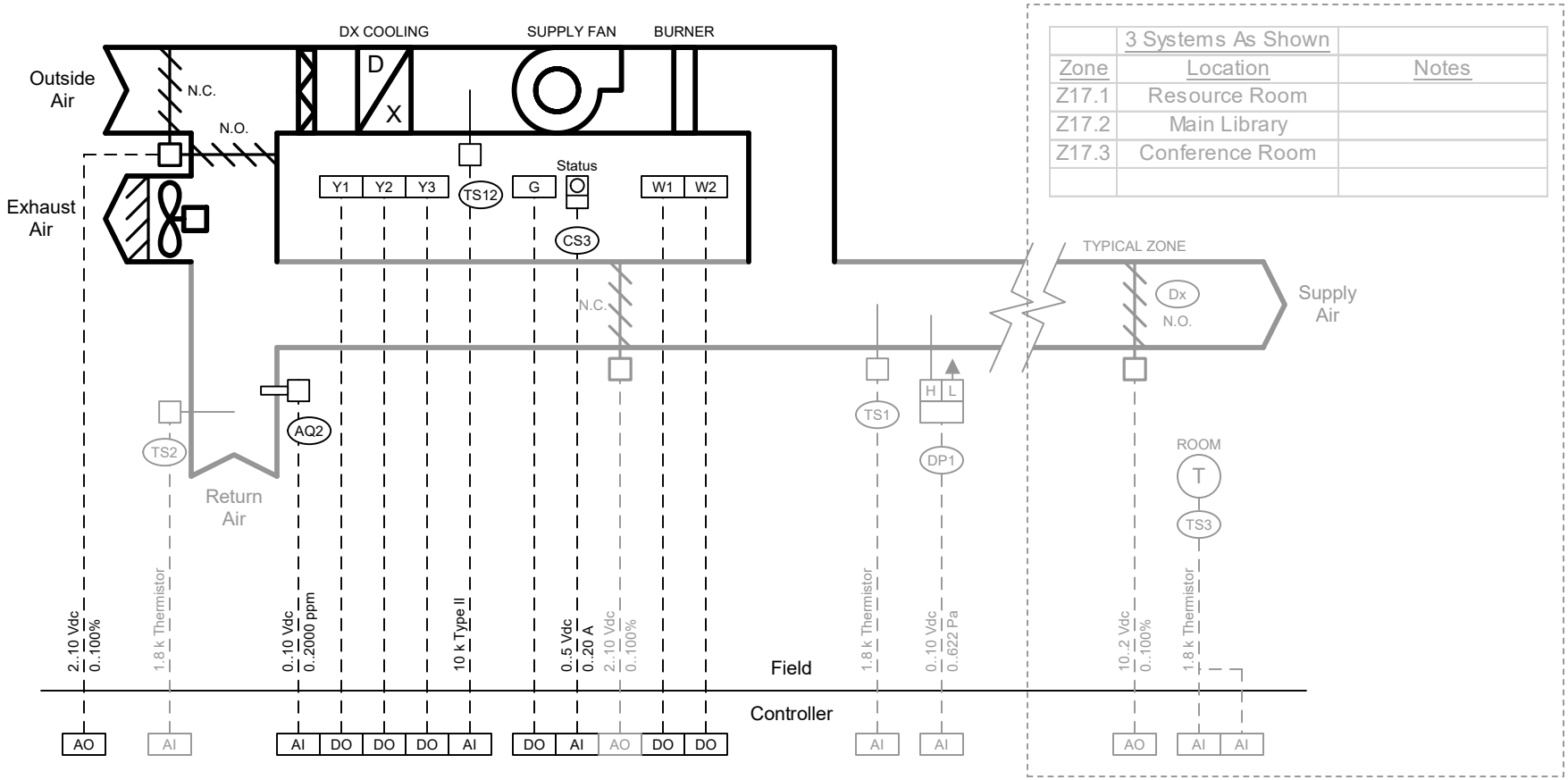
**Alarms**

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 (5/15 Pa) or too high (240/230 Pa) (30 minute delay).
6) Weekly fan runtime limit exceeded.
7) Software freezestat tripped.
8) Return air $CO_2$ too high (1700/1650 ppm) or too low (250/300 ppm) (15 minute delay).
9) Heat wheel status does not match start/stop signal.

2025 Scope of Work
- Supply & install / modify existing controls as needed to suit replacement of Library VVT HVAC-1 with new HVAC-17

## HVAC-17 VVT Rooftop Unit

Lennox LGT180H5M-Y 15T




| | 3 Systems As Shown | |
|---|---|---|
| Zone | Location | Notes |
| Z17.1 | Resource Room | |
| Z17.2 | Main Library | |
| Z17.3 | Conference Room | |
| | | |

| Unit | Serves | S. Fan | DX Clg | Gas Htg | Stages | MCA | Notes |
|---|---|---|---|---|---|---|---|
| | | (cfm) | (MBh) | (MBh) | (H/C) | | |
| HVAC-17 | Library | 5800 | 177.0 | 292.0 | 2/3 | 69.0 | |
| | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | Job #: | Owner: Waterloo Region District School Board | Drawn By: | Title: **HVAC-17 Library VVT Schematic** | 10 |
| | Job Name: Waterloo Oxford DSS ACE & Science Classroom Reno. | | Revision Date: April 16, 2025 | | |

## SEQUENCE OF OPERATION

**Unoccupied Mode**

Mode is active usually between 11:00 p.m. to 7:00 a.m. Monday to Friday and 24 hours Saturday and Sunday. The system will be in Unoccupied Mode when not in Morning Warmup, Occupied or Standby modes. The system will cycle between Idle State, Heating State or Pushbutton Override States to meet the demands from each state and return to the Idle State when the demands are satisfied.

***Idle State***

The supply fan is off, the Global Ventilation Schedule is disabled, the outdoor air mixing dampers are in the 0 % outdoor air position, heating is disabled and cooling is disabled. The bypass damper is in the 100 % open position. The zone dampers are in the 50 % open position.

***Heating State***

System cycles with full heat on a call for unoccupied heating until setpoint is reached. The VVT HVAC unit supply air static pressure setpoint is increased by 20 %. Bypass damper and associated zone dampers modulate to maintain setpoint. Mechanical & free cooling is disabled, the global ventilation schedule is disabled.

***Push Button Override State***

If the override pushbutton is pressed, the associated system will switch to the Occupied Mode with outdoor air ventilation enabled for 2 hours (adjustable).

**Morning Warmup Mode**

An optimized start, based on the time of day schedule, outdoor air temperature and the indoor zone temperature is provided for heating. The global ventilation schedule is disabled. The supply fan is on, the outdoor air mixing dampers are in the 0 % outdoor air position and heating is enabled at full capacity. The optimized start program is to begin up to 105 minutes (adjustable) before the occupancy schedule to allow for morning warm up to bring the lowest space temperature up to occupancy setpoint. Mechanical cooling, free cooling is disabled and the global ventilation schedule is disabled.

**Occupied Mode**

Time of day schedule, which starts the HVAC unit along with an Optimum Start program usually between 7:00 a.m. and 4:00 p.m. Monday to Friday, when not overridden by a Holiday Schedule, Standby Occupancy Mode or Unoccupied Mode. Global Ventilation Schedule is enabled. Fan status is confirmed by a current sensor.

Room heating temperature setpoint nominal: 21.5 °C +/- 1.0 °C
Room free cooling Enabled temperature setpoint nominal 22.5 °C +/- 1.0 °C
Room mechanical cooling temperature setpoint nominal 24.5 °C +/- 1.0 °C

**Standby Occupancy Mode**

Time of day schedule starts the unit usually between 4:00 p.m. and 11:00 p.m. Monday to Friday. Minimum Outdoor Air is set to zero when the Global Ventilation Schedule is off. Supply fan runs only on a call from heating. Free cooling is disabled and the global ventilation is disabled.

Room heating temperature nominal: 21.5 °C +/- 1.0 °C
Room mechanical cooling temperature setpoint nominal 24.5 °C +/- 1.0 °C

**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. A minimum 5 minute delay between heating and cooling is provided.

## SEQUENCE OF OPERATION (continued)

**System Heating/Cooling Decision Process**

The system mode is determined by the number of zones that deviate by 1.2 °C from their respective zone heating/cooling setpoints. The number of zones is "weighted" by the deviation from setpoint. 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 Enabled Mode and in reverse for Cooling Enabled Mode. Once in Heating Enabled Mode or Cooling Enabled Mode, the reference zone becomes the zone of greatest call. The system will lock-in the selected mode until all zones are satisfied. If all zones are not satisfied within 20 minutes (60 minutes if all zones are in the same mode) the system will "unlock" and enable Forced Ventilation Mode. The outdoor air temperature determines the heating or cooling priority.

***Heating Enabled Mode***

In Heating Enabled Mode, the highest priority zone calling for heating is given first priority. If there is any zone calling for cooling, this is given second priority.

***Cooling Enabled Mode***

In the Cooling Enabled Mode, the highest priority zone calling for cooling is given first priority. If any zone is calling for heating, this is given second priority.

**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 (default ventilation mode).
2) System is switching between heating and cooling (system operates in ventilation mode for 5 minutes) (default ventilation mode).
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 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, 2 and 3 cooling is 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 | 1.4 °C |
| Stage 2 Off | 0.9 °C |
| Stage 3 On | 1.6 °C |
| Stage 3 Off | 1.1 °C |

**Bypass Operation**

The supply air static pressure sensor modulates the bypass damper between minimum and maximum settings to maintain supply static pressure setpoint. The supply static pressure setpoint is reduced during both Default and Forced Ventilation modes, typically 10 Pa for acoustic noise reduction. During Unoccupied Mode the supply static pressure setpoint is increased by 20 %.

## SEQUENCE OF OPERATION (continued)

**Economizer and $CO_2$ Demand Control Ventilation Operation**

During Occupied Mode, economizer operation will be substituted for mechanical cooling when the outdoor air temperature and relative humidity are below the Free Cooling Setpoint. If the outdoor air temperature is below this free cooling setpoint the mixing dampers will be modulated open on a call for cooling to provide free cooling. During Unoccupied Mode and Standby Occupancy Mode, free cooling is unavailable. During Occupied Mode, If the outdoor air temperature and relative humidity are above the Free Cooling Setpoint Sequence of Operation, the mixing dampers will be set to the minimum outdoor air threshold unless demand control ventilation is required. The duct mounted $CO_2$ sensor acts as a high limit and will increase the amount of minimum outdoor air, to a maximum of 40 % outdoor air as the $CO_2$ level increases from 1000 to 1200 ppm over a ramped 15 minute period.

**Limits & Safeties**

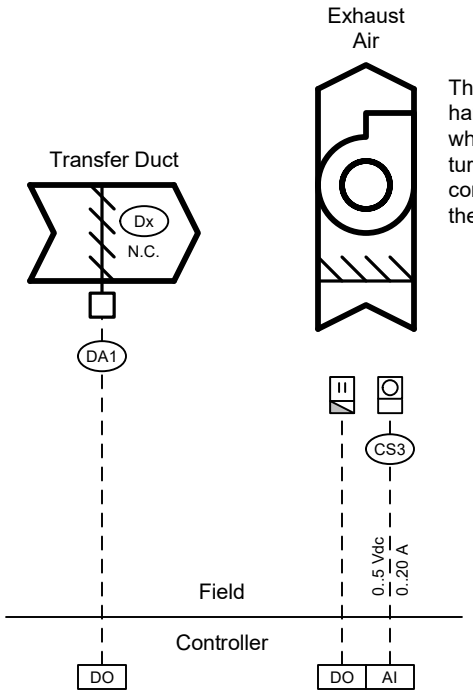
1) The maximum outdoor air damper position is limited based on the outdoor air temperature to prevent excessively low supply air temperature. When the outdoor air is at or below -15 °C, the maximum position will be 0 % outdoor air. When the outdoor air is at or above 10 °C, the maximum position will be 100 % outdoor air.
2) The maximum outdoor air damper position is limited based on the outdoor air temperature to prevent excessively high supply air temperature. When the outdoor air is at or above 30 °C, the maximum position will be 0 % outdoor air. When the outdoor air is at or below 10 °C, the maximum position will be 100 % outdoor air.
3) The mixed air temperature sensor acts as a low limit to ensure the temperature does not fall below setpoint (typically 11 °C). The setpoint is reduced (to typically 5 °C) when DX cooling is enabled.
4) The supply air temperature sensor acts as a high limit for heating (60/50 °C) and a low limit for cooling (5/10 °C).
5) The supply air temperature sensors 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 outdoor air temperature is below the global DX disable setpoint or when the fan is off.
9) Gas heating is disabled when the outdoor 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 default or forced 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 3 °C when mechanical cooling is enabled (providing heating is disabled).
13) The following adjustable limits are provided for the room temperature setpoints: Heating: 22 °C maximum, mechanical cooling 23.5 °C minimum (adjustable).
14) When the ventilation lockout switch is engaged, the outdoor air dampers close, free cooling is disabled and the system enters the standby occupancy mode.
15) Minimum outdoor air is provided when the global ventilation schedule is active. The outdoor air is set to 0 % when the schedule is inactive.
16) The return air carbon dioxide sensor acts as a high limit to increase the amount of minimum outdoor air from 0 to 40 % as the reading increases from 1000 ppm to 1200 ppm.
17) Cooling cannot turn on until heating has been off for a minimum of 5 minutes.

**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 (5/15 Pa) or too high (240/230 Pa) (30 minute delay).
6) Weekly fan runtime limit exceeded.
7) Software freezestat tripped.
8) Return air $CO_2$ too high (1700/1650 ppm) or too low (250/300 ppm) (15 minute delay).

2025 Scope of Work
- Supply & install controls for new Fume Hood EF-17 serving Prep Room 206
- Supply control damper for new transfer duct into Prep Room 206

## FUME HOOD EXHAUST FANS




The fume hood fan is hard-wired to operate when the light is turned on, or when commanded on by the BAS.

### SEQUENCE OF OPERATION

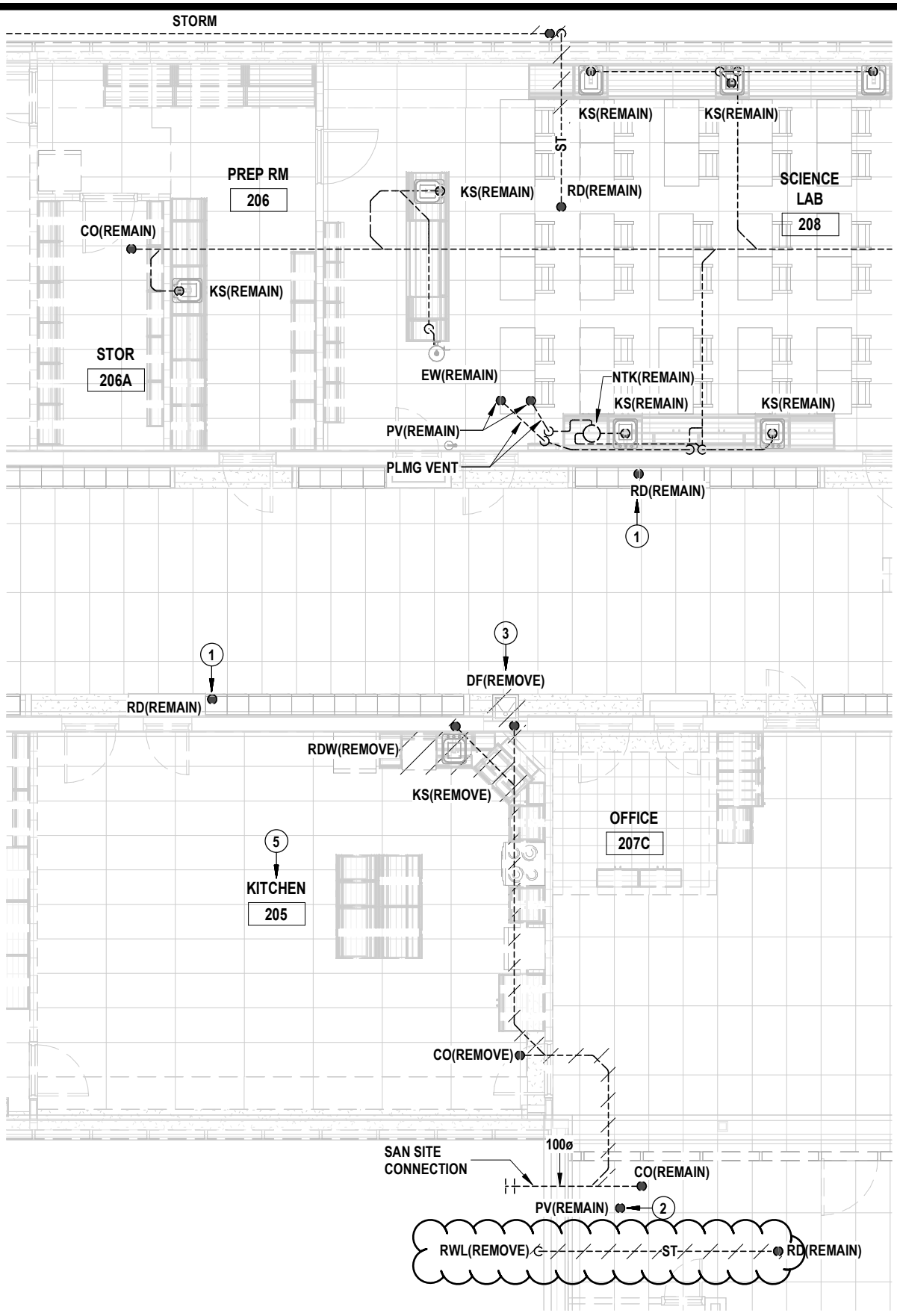
**Unoccupied Mode**
If the fume hood exhaust fan is running when the associated rooftop unit is off, the transfer damper opens to provide air to the room.

**Occupied Mode**
The exhaust fan is controlled by the fume hood light switch. Auto/On control of the fume hood exhaust fan is provided according to a time schedule. Fan status is monitored by a current sensor.

**Limits and Safeties**
1) The exhaust fan has a delay-off time of 90 seconds.

**Alarms**
An alarm will be generated upon the following conditions:
1) Fan status does not match the start/stop signal.
2) Weekly fan runtime limit exceeded.

| UNIT | HP | cfm | Serves | Controller | Notes |
|---|---|---|---|---|---|
| EF-17 | 2 | 800 | Prep Room 206 Fume Hood Exhaust | | Transfer damper remains closed if HVAC-14 is running |
| | | | | | |



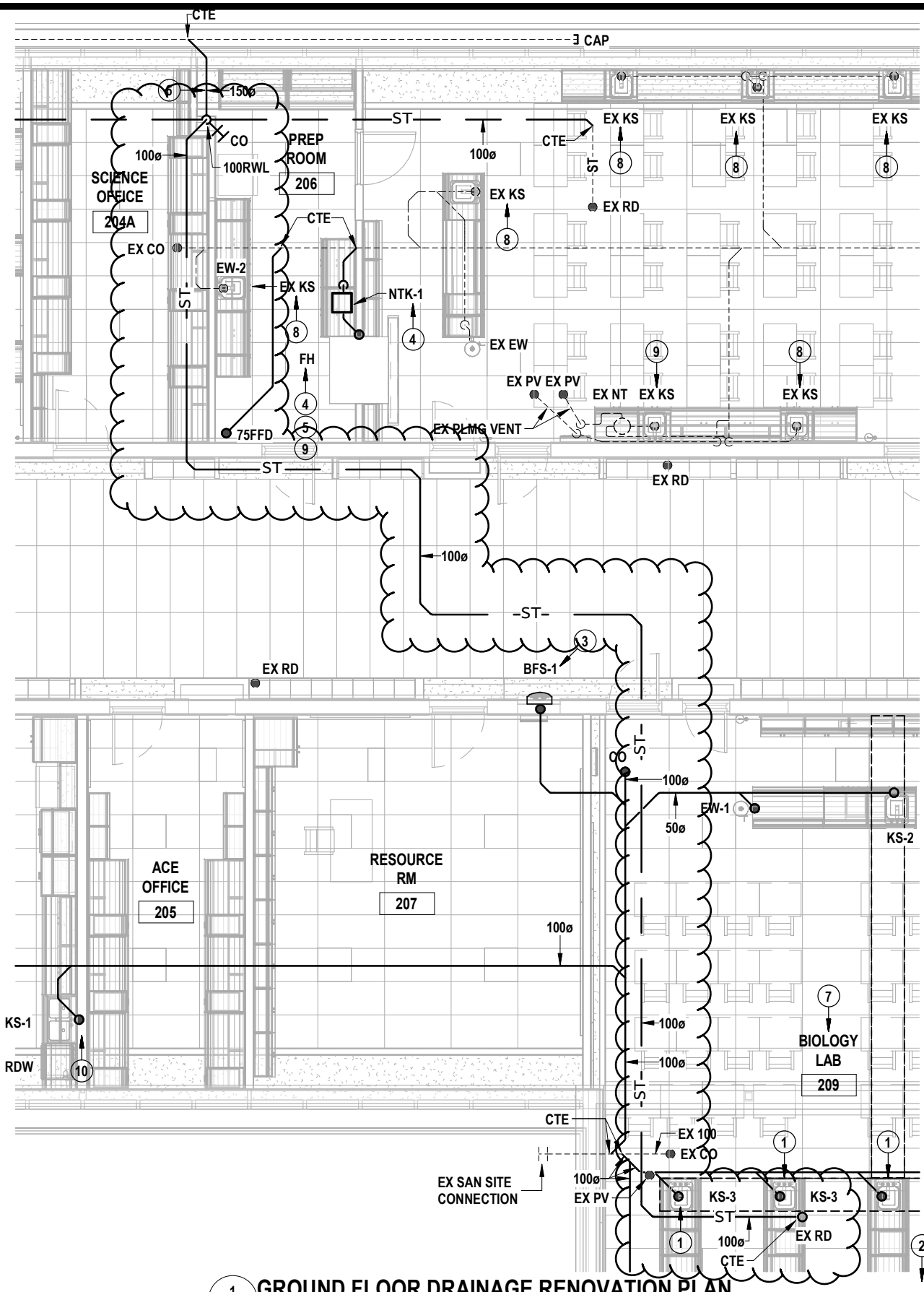

## 1 SK-M02 GROUND FLOOR DRAINAGE DEMOLITION PLAN

SCALE: 1 : 100

MNE ENGINEERING

MNE EngineeringInc.
22 Kevco Place - Box A
Kitchener, Ontario N2C2G5
(519) 894-9408
www.mneengineering.ca

| | | | |
|---|---|---|---|
| PROJECT: Waterloo-Oxford District Secondary School | | 03 | |
| DRAWING: STORM PIPING DEMOLITION REVISIONS | | 02 | |
| DWG NO: SK-M02 | JOB NO: 25004 | 01 | ISSUED FOR MNE ADDENDUM 03 |
| SCALE: AS NOTED | DRAWING BY: J.S.S. | REV # | REVISION |
| DATE: 04/24/25 | CHECKED BY: K.K. | | |

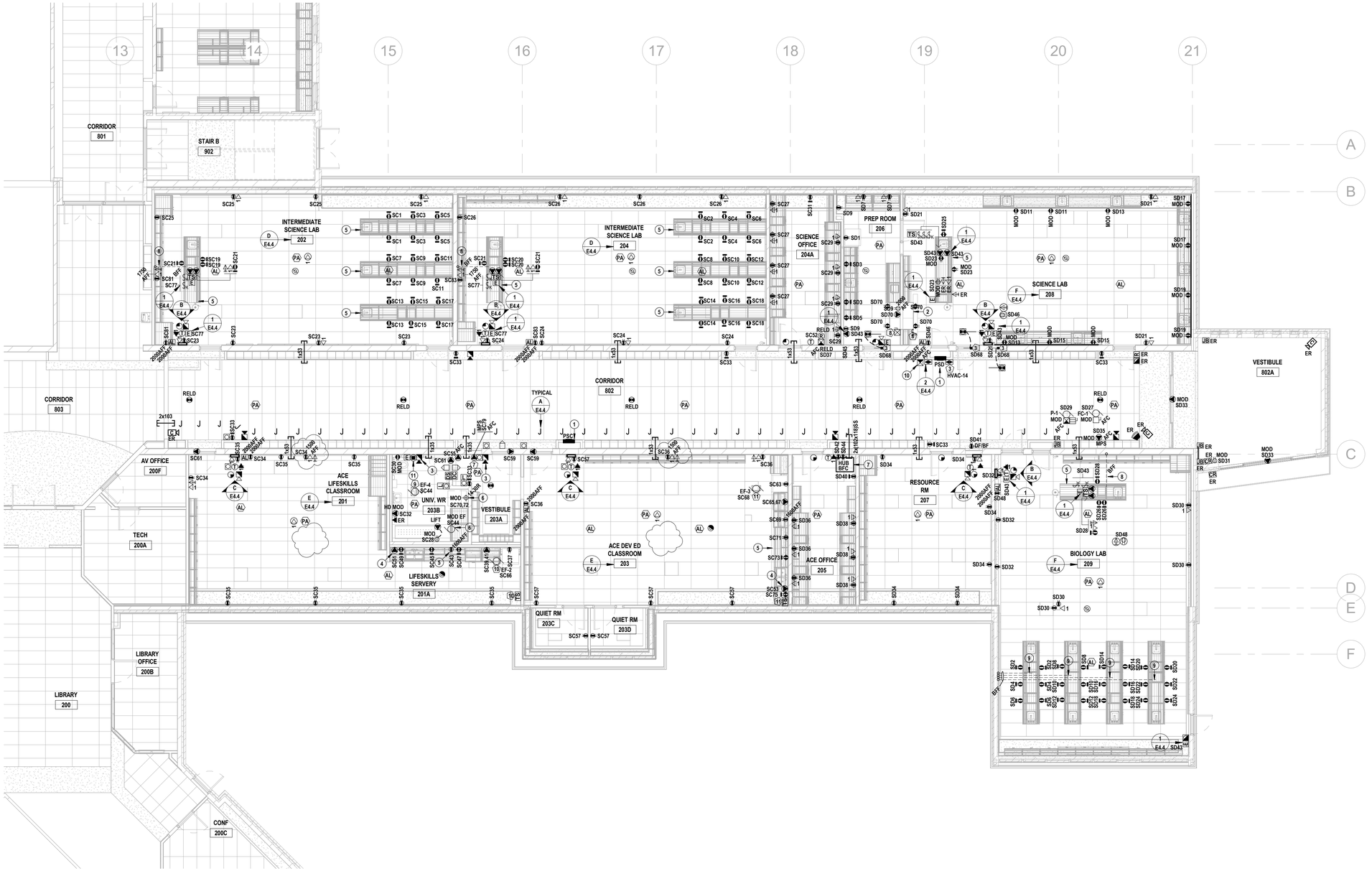



1 SK-M03 **GROUND FLOOR DRAINAGE RENOVATION PLAN**

SCALE: 1 : 100

MNE ENGINEERING
MNE EngineeringInc.
22 Kevco Place - Box A
Kitchener, Ontario N2C2G5
(519) 894-9408
www.mneengineering.ca

| | | | |
|---|---|---|---|
| PROJECT: Waterloo-Oxford District Secondary School | | 03 | |
| DRAWING: STORM PIPING RENOVATION REVISIONS | | 02 | |
| DWG NO: SK-M03 | JOB NO: 25004 | 01 | ISSUED FOR MNE ADDENDUM 03 |
| SCALE: AS NOTED | DRAWING BY: J.S.S. | REV # | REVISION |
| DATE: 04/24/25 | CHECKED BY: K.K. | | |




1 E3.1 **PARTIAL REVISED GROUND FLOOR POWER PLAN**
SCALE: 1 : 100

## REVISED POWER NOTES

1. PROVIDE NEW DISTRIBUTION EQUIPMENT. REFER TO SLD.
2. FUME HOOD PROVIDED BY OTHERS.
   - PROVIDE A DIRECT CONNECTION TO THE POWER JUNCTION BOX ON TOP OF THE FUME HOOD. CONNECTIONS FROM THE JUNCTION BOX TO THE INTEGRAL RECEPTACLES, LIGHT AND SWITCH ARE PRE-WIRED BY THE MANUFACTURER.
   - PROVIDE RECEPTACLE ON TOP OF THE HOOD FOR ALARM KIT.
   - PROVIDE INTERLOCK SUCH THAT THE ALARM KIT IS ONLY ACTIVE WHEN THE FUME HOOD EXHAUST FAN IS ON. PROVIDE RELAYS AS REQUIRED.
3. FIELD ADJUST TO LOWER AUDIBILITY.
4. PROVIDE LIQUID-TIGHT FLEXIBLE CONNECTION FROM BOX AT LOW LEVEL TO APPLIANCE/EQUIPMENT. COORDINATE REQUIREMENTS WITH SUPPLIER(S).
5. COORDINATE INSTALLATION WITH ARCHITECTURAL DETAILS & MILLWORK SUBCONTRACTOR.
6. REWIRE CURRENT SENSING RELAY. ENSURE DRYER BOOSTER FAN IS ACTIVATED WHENEVER THE DRYER IS TURNED ON. REWIRE FAN FROM LOCAL LIGHTING CIRCUIT, UPSTREAM OF LIGHTING CONTROL.
7. COMMUNICATIONS CABINET/HUB. THE FOLLOWING SHALL BE PROVIDED BY OTHERS UNDER ALLOWANCE:
   - CABINET/HUB WITH CABLE MANAGEMENT.
   - NEW FIBRE FEED FROM MAIN TELECOMMUNICATION ROOM.
   - NEW HORIZONTAL CABLING.
   - SWITCH(ES) & PATCH PANELS.

   THE ELECTRICAL SUBCONTRACTOR SHALL PROVIDE THE FOLLOWING:
   - RECEPTACLES PER PLANS.
   - PATHWAYS FOR CABLING.
   - GROUND BUS BAR & BOND CONDUCTOR FROM NEAREST DISTRIBUTION PANEL.
8. PROVIDE UNDERGROUND CONDUITS FOR POWER AND COMMUNICATIONS SERVING THE TEACHER'S BENCH.
9. PROVIDE UNDERGROUND CONDUITS FOR POWER SERVING THE STUDENT'S BENCH.
10. PROVIDE CLEARLY LABELED FIR ALARM RELAY & CONNECTIONS FOR EQUIPMENT SHUTDOWN.
11. PROVIDE AN AID ASSISTANCE INTERCOM STATION. WHEN ACTIVATED, THE INTERCOM STATION SHALL INITIATE A CALL TO THE TELEPHONE HANDSET DESIGNATED BY OWNER. REFER TO SPECIFICATIONS FOR ADDITIONAL DETAILS.

**COMMUNICATIONS & SECURITY PATHWAYS**
- UNLESS OTHERWISE NOTED, PROVIDE A 21MM EMT RISER CONDUIT FROM EACH OUTLET BOX TO THE NEAREST ACCESSIBLE CEILING SPACE.
- PROVIDE EMT CONDUIT SLEEVES CONCEALED AFC & WITHIN WALLS, OF THE QUANTITY & DIAMETER INDICATED. SEAL ALL RATED PENETRATIONS.
- PROVIDE SELF SEALING CONDUIT SLEEVES (SS) WHERE INDICATED.
- PROVIDE OUTLET BOXES FOR ALL INDICATED DEVICES.
- ALL CONDUITS & SLEEVES SHALL BE COMPLETE WITH PULL TAPES & PLASTIC BUSHINGS.

**RETURN AIR PLENUM**
CEILING SPACES ARE USED AS A RETURN AIR PLENUM. THE ELECTRICAL SUBCONTRACTOR SHALL ENSURE THAT ALL NEW WIRING & CABLING WITHIN PLENUM SPACES IS TOTALLY ENCLOSED IN NON-COMBUSTIBLE RACEWAYS OR IS FT-6 RATED (ALSO KNOWN AS COMMUNICATIONS MEDIA PLENUM, OR CMP).

**ACCESS CONTROLLED OPENINGS**
AT EACH CONTROLLED OPENING, PROVIDE THE FOLLOWING CONDUITS (NOT INDICATED) FROM A CLEARLY LABELED BOX AFC, FOR ACCESS CONTROL CABLING INSTALLATIONS:
1x16 TO EACH OF THE FOLLOWING WHERE APPLICABLE:
- MULLION MORTAR BOX FOR CURRENT TRANSFER(S).
- DOOR HEADER.
- AUTO OPERATOR.
- DAY-NIGHT-OFF KEY SWITCH.
- DOOR CONTACT(S).
- ELECTRIC EGRESS DEVICE/DOOR STRIKE.

1x21 TO A SINGLE GANG BOX, UNLESS OTHERWISE SPECIFIED, FOR EACH OF THE FOLLOWING RECESSED DEVICES WHERE INDICATED:
- DOOR OPERATOR PUSH BUTTONS.
- CARD READERS.
- POWER DOOR INDICATORS/LOCKS.

REFER TO DOOR ELEVATION DRAWINGS (BY OTHERS) FOR SPECIFICS.

**SPRINKLERS:**
NEW FIRE DETECTORS ARE REQUIRED SINCE THE NEW SPRINKLER SYSTEM DOES NOT YET PROTECT THE ENTIRE FLOOR AREA.

PROJECT NORTH

THIS AREA OF WORK CONTAINS ASBESTOS CONTAINING MATERIALS (ACM). ALL CONTRACTORS SHALL REFER TO THE ASBESTOS AUDIT AND SECTION 01 35 43, HAZARDOUS MATERIALS FOR APPROPRIATE PROTOCOLS THAT MUST BE FOLLOWED, REGARDLESS OF ABATEMENT OPERATIONS BEING CONDUCTED OR NOT.

LICENSED PROFESSIONAL ENGINEER
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|---|---|---|
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Waterloo-Oxford District Secondary School
ACE CLASSROOM & SCIENCE CLASSROOM RENOVATIONS
1206 Snyder's Rd W, Baden, ON N3A 1A4

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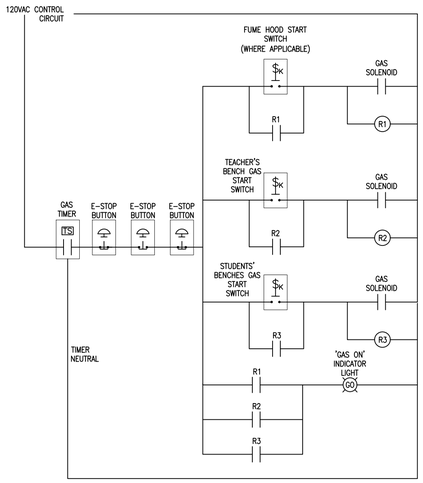
|---|---|
| Project No.: | 25004 |
| Drawn By: | A.W.T. |
| Checked By: | A.W.G. |

PARTIAL REVISED POWER PLAN

E3.1




1 E4.4 SCIENCE LAB BENCH CONTROL SCHEMATIC
N.T.S.

SCHEMATIC NOTES:

PROVIDE MOMENTARY, KEY OPERATED START SWITCHES TO INDEPENDENTLY ENERGIZE THE GAS FOR THE TEACHER'S BENCH AND THE STUDENTS' BENCHES. LABEL AS "TEACHER GAS ON" & "STUDENT GAS ON". PROVIDE EXTRA KEYS & HAND OVER TO OWNERS UPON PROJECT COMPLETION.

PROVIDE SPRING-LOADED, MOMENTARY, EMERGENCY STOP PUSH BUTTON. THE USE OF LATCHING PUSH BUTTONS SHALL NOT BE ACCEPTED. PROVIDE NAMEPLATE STATING "GAS OFF".

POWER TO THE GAS SOLENOID SHALL BE INTERRUPTED IN THE EVENT OF THE STOP SWITCH.

EACH SCIENCE LAB SHALL FUNCTION INDEPENDENTLY.

REFER TO SPECIFICATIONS FOR PRODUCT & INSTALLATION DETAILS.

FUME HOODS SHALL CONTROLLED IN CONJUNCTION WITH ADJOINING SCIENCE LAB CONTROLS.

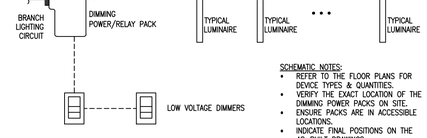
REFER TO FLOOR PLANS FOR QUANTITY/LOCATIONS OF DEVICES.

WIRING/CABING LEGEND:

CAT5e CONTROL CABLING:

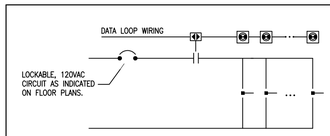
0-10VDC DIMMING WIRING:

LINE VOLTAGE BRANCH WIRING:



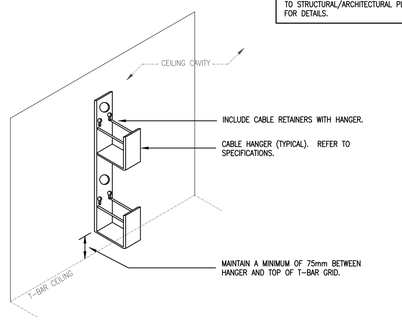

SCHEMATIC NOTES:
- REFER TO THE FLOOR PLANS FOR DEVICE TYPES & QUANTITIES.
- VERIFY THE EXACT LOCATION OF THE DIMMING POWER PACKS ON SITE.
- ENSURE PACKS ARE IN ACCESSIBLE LOCATIONS.
- INDICATE FINAL POSITIONS ON THE AS-BUILT DRAWINGS.

3 E4.4 CABLED LIGHTING CONTROL SCHEMATIC
N.T.S.




SCHEMATIC 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 3.1.8.11.
- PROVIDE A FIRE ALARM RELAY MODULE TO ACTIVATE A POWER RELAY. EXTEND POWER WIRING TO SMOKE DAMPERS.
- PROGRAM THE FIRE ALARM RELAY MODULE TO CLOSE ALL SMOKE DAMPERS ASSOCIATED WITH THE AIR HANDLER/120V CIRCUIT UPON A SIGNAL FROM THE ASSOCIATED SMOKE DETECTORS.
- PROVIDE FIRE ALARM RELAY AT THE ASSOCIATED AIR HANDLING UNIT SO THAT THE EQUIPMENT 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 THE LOCAL FLOOR INITIATING ZONE AND THE ASSOCIATED AIR HANDLING INITIATING ZONE (WHERE APPLICABLE).
- REFER TO FLOOR PLANS FOR DEVICE LOCATIONS & QUANTITIES.

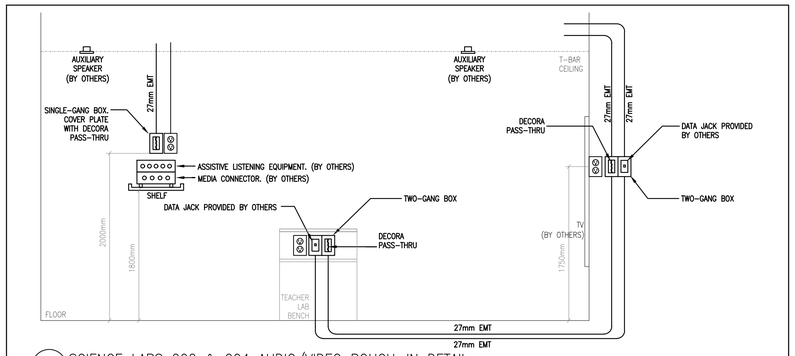
2 E4.4 SMOKE DAMPER WIRING SCHEMATIC
N.T.S.



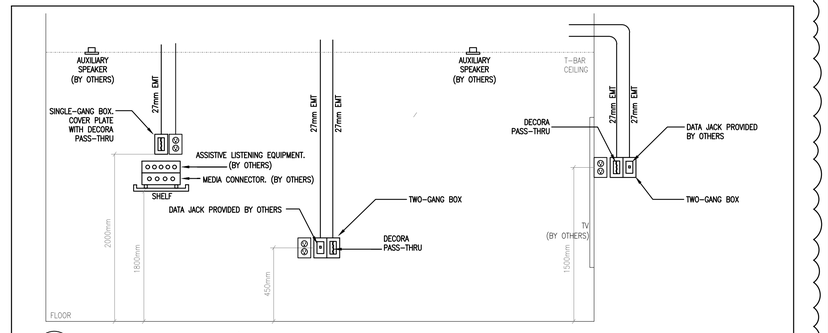

DETAIL NOTES:

1. HANGERS SHALL BE WALL MOUNTED WHEREVER POSSIBLE.
2. WHERE WALL MOUNT IS NOT POSSIBLE, UNITS SHALL BE SUSPENDED FROM THE STRUCTURE WITH THREADED ROD.
3. CORRIDOR MOUNTED HANGERS ARE TO BE MOUNTED IN-LINE. MAXIMUM SPACING BETWEEN HANGERS TO BE 1.0m (40").
4. COORDINATE WITH MECHANICAL TRADES TO AVOID CONFLICTS.
5. INSTALLATION OF POWER WIRING IN HANGERS SHALL NOT BE PERMITTED.
6. PROVIDE TWO TIERS WITH ONLY COMPUTER (DATA) CABLING IN THE TOP TIER. ALL REMAINING COMMUNICATIONS CABLES ARE TO GO INTO LOWER TIER.

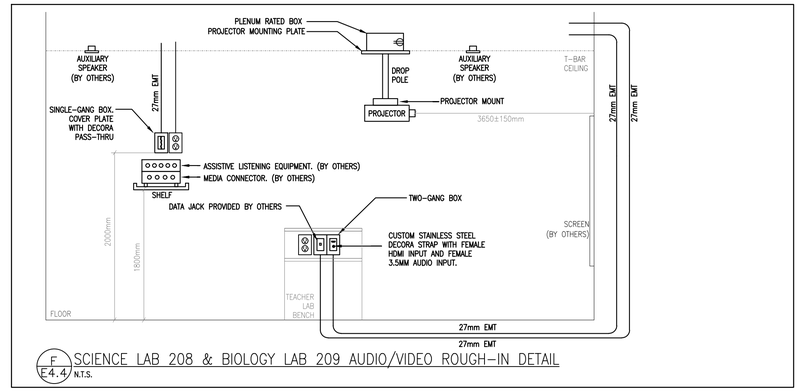
A E4.4 CABLE HANGER DETAIL
N.T.S.



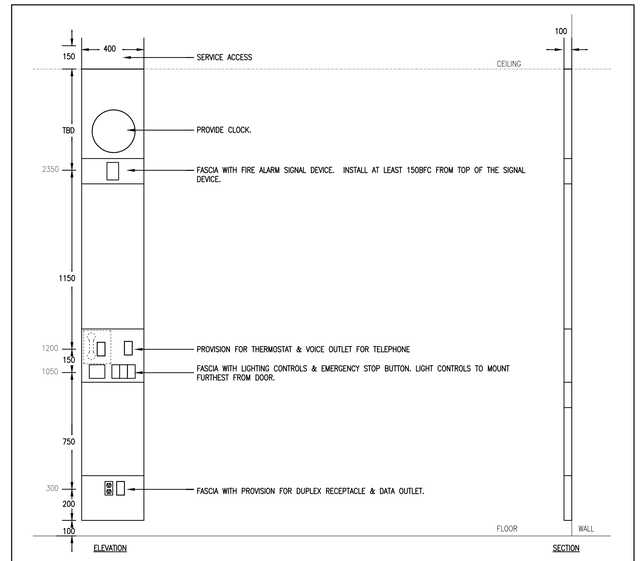

D E4.4 SCIENCE LABS 202 & 204 AUDIO/VIDEO ROUGH-IN DETAIL
N.T.S.




F E4.4 ACE CLASSROOM AUDIO/VIDEO ROUGH-IN DETAIL
N.T.S.

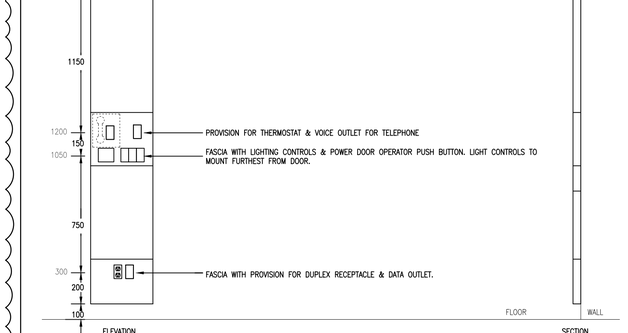



F E4.4 SCIENCE LAB 208 & BIOLOGY LAB 209 AUDIO/VIDEO ROUGH-IN DETAIL
N.T.S.




DETAIL NOTES:
1. CONSOLES SHALL BE SUPPLIED & INSTALLED BY OTHERS.
2. PROVIDE OUTLET BOXES FOR ALL WIRING DEVICES.
3. THE ELECTRICAL SUBCONTRACTOR SHALL PROVIDE ALL WIRING DEVICES AND THE FIRE ALARM SIGNALING DEVICE AS INDICATED ON THE FLOOR PLANS.
4. COORDINATE EXACT CONSOLE LOCATION WITH ARCHITECTURAL DETAILS.
5. ALL INDICATED DIMENSIONS ARE METRIC.

B E4.4 SCIENCE CLASSROOM CONSOLE DETAIL
N.T.S.

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C E4.4 ACE CLASSROOM CONSOLE DETAIL
N.T.S.

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WATERLOO REGION DISTRICT SCHOOL BOARD

# Waterloo-Oxford District Secondary School

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ACE CLASSROOM & SCIENCE CLASSROOM RENOVATIONS

Drawn By: A.W.T.
Checked By: A.W.G.
Project No.: 25004

ELECTRICAL
DETAILS & SCHEMATICS

E4.4