Addendum # 1

Bid Opportunity: 26-7859-RFT

Waterloo-Oxford District Secondary School

Window Replacements, Interior Alterations and HVAC Upgrades

Closing Date: Tuesday, April 21, 2026 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If you have already submitted a Bid/ Proposal, it will be automatically withdrawn as a result of this addendum.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.

ISSUED APRIL 13, 2026

1.1 MECHANICAL/ ELECTRICAL

.1 REFER TO THE ATTACHED MECHANICAL/ ELECTRICAL ADDENDUM 01 (PART OF THIS ADDENDUM #1) PREPARED BY MNE ENGINEERING LTD. DATED APRIL 10, 2026 (17 PAGES).

.2 THIS ADDENDUM CONSISTS OF:

- **.1 MECHANICAL/ ELECTRICAL SUMMARY OF CHANGES (1 PAGE)**
- **.2 MECHANICAL SKETCH SK-M01 (1 PAGE)**
- **.5 REVISED SPECIFICATION SECTION 23 05 00 HVAC (15 PAGES).**

END OF ADDENDUM #1

+ MECHANICAL/ ELECTRICAL ADDENDUM 01 (17 PAGES)

MNE ENGINEERING

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ADDENDUM 01

To:	Cornerstone Architecture Inc.	**Date:**	April 10, 2026
		Project:	Waterloo Oxford District Secondary School Interior Alterations & HVAC Upgrades
cc:	WRDSB	**Project No:**	26012

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

Mechanical

1. Reference Specification 23 05 00

    a. Remove Item 3.17.
    b. Add Items 3.19, 3.20, 3.21, 3.22, 3.23, 3.24 and 3.25. Refer to attachment.

2. Reference M1.2

    a. In Exhaust Fan Schedule, revise EF-23 as follows:
        i Manufacturer & Model: Cook ACE-B (120C OR81)

3. Reference M2.1

    a. Revise note 1 to read: “Remove redundant heating water piping c/w base-mounted pump (in northeast corner), pneumatic control valve, controls, sensors, wiring, etc. within boiler room and cap at mains. Remove redundant pneumatic tubing and cap at main.”

4. Reference 1/M3.2 and 1/M3.5

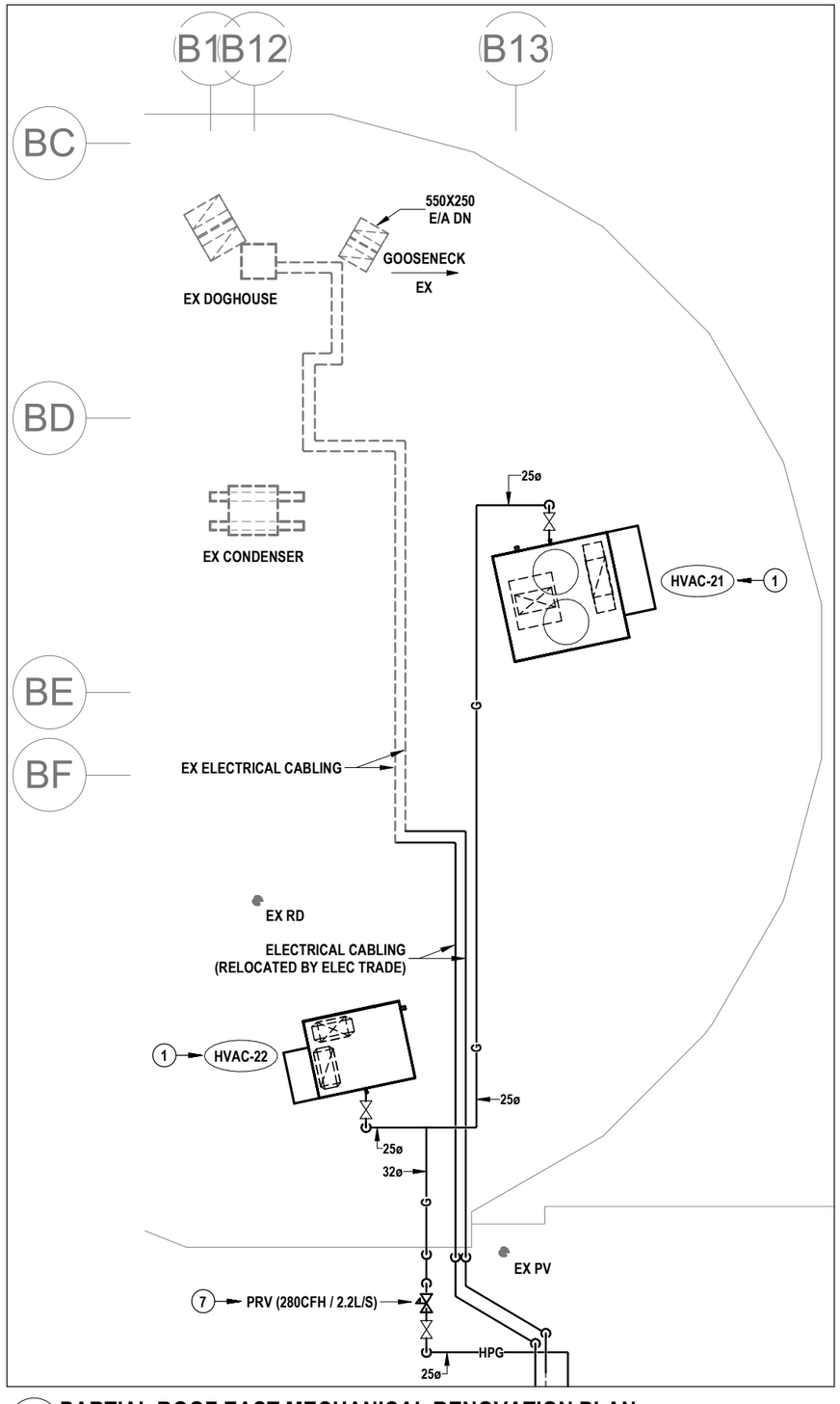
    a. Relocate HVAC-21 and HVAC-22, as well as associated roof-mounted gas piping and gas pressure reducing valve and duct connections below, as per attached sketch SK-M01.

Electrical

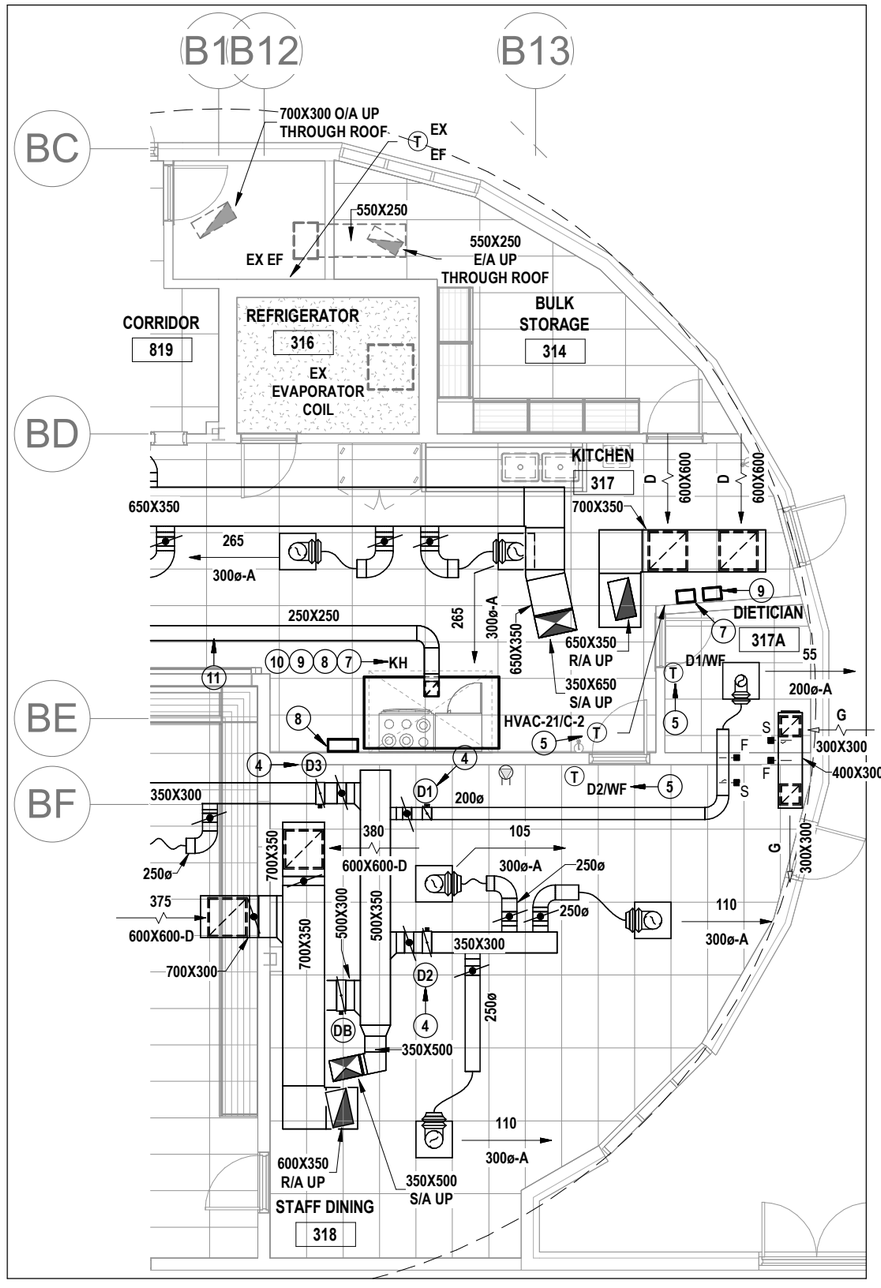
1. Reference 2/E3.4 & 2/E4.4

    a. Relocate HVAC-21 & HVAC-22. Refer to Mechanical sketch SK-M01 for final locations.
    b. Re-route existing roof mounted Teck Cables to suit.

End of Addendum



1 SK-M01 **PARTIAL ROOF EAST MECHANICAL RENOVATION PLAN**
SCALE: 1 : 100



2 SK-M01 **PARTIAL GROUND FLOOR EAST DUCTWORK RENOVATION PLAN**
SCALE: 1 : 100

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PROJECT:	Waterloo Oxford District Secondary School		
DRAWING:	RTU RELOCATION		
DWG NO:	SK-M01	JOB NO:	26012
SCALE:	AS NOTED	DRAWING BY:	J.S.S.
DATE:	04/09/26	CHECKED BY:	K.K.

03	
02	
01	ISSUED FOR MNE ADDENDUM 01
REV #	REVISION

3.19 Downblast Exhaust Fans

.1 Description

a. Fan shall be a spun aluminum, roof-mounted, belt driven, downblast centrifugal exhaust ventilator.

.2 Certifications

a. Fan shall be manufactured at an ISO 9001 certified facility. Fan shall be listed by Underwriters Laboratories (UL 705) and UL listed for Canada (cUL 705). Fan shall bear the AMCA certified ratings seal for sound and air performance.

.3 Construction

a. The fan shall be of bolted and welded construction utilizing corrosion resistant fasteners. The spun aluminum structural components shall be constructed of minimum 16 gauge marine alloy aluminum, bolted to a rigid aluminum support structure. The aluminum base shall have continuously welded curb cap corners for maximum leak protection. The discharge baffle shall have a rolled bead for added strength. A two piece top cap shall have stainless steel quick release latches to provide access into the motor compartment without the use of tools. An integral conduit chase shall be provided through the curb cap and into the motor compartment to facilitate wiring connections. The motor, bearings and drives shall be mounted on a minimum 14 gauge steel power assembly, isolated from the unit structure with rubber vibration isolators. These components shall be enclosed in a weather-tight compartment, separated from the exhaust airstream. Lifting lugs shall be provided to help prevent damage from improper lifting. Unit shall bear an engraved aluminum nameplate. Nameplate shall indicate design CFM, static pressure, and maximum fan RPM. Unit shall be shipped in ISTA certified transit tested packaging.

.4 Wheel

a. Wheel shall be centrifugal backward inclined, constructed of 100 percent aluminum, including a precision machined cast aluminum hub. Wheel inlet shall overlap an aerodynamic aluminum inlet cone to provide maximum performance and efficiency. Wheel shall be balanced in accordance with AMCA Standard 204-05, Balance Quality and Vibration Levels for Fans.

.5 Motor

a. Motor shall be NEMA design B with class B insulation rated for continuous duty and furnished at the specified voltage, phase and enclosure.

.6 Bearings

a. Bearings shall be designed and individually tested specifically for use in air handling applications. Construction shall be heavy duty regreasable ball type in a cast iron pillow block housing selected for a minimum L50 life in excess of 200,000 hours at maximum cataloged operating speed.

.7 Belts and Drives

a. Belts shall be oil and heat resistant, static conducting. Drives shall be precision machined cast iron type, keyed and securely attached to the wheel and motor shafts. Drives shall be sized for 150 percent of the installed motor horsepower. The variable pitch motor drive must be factory set to the specified fan RPM.

.8 For model, accessories and performance requirements, refer to equipment schedule on the drawings.

3.20 Inline Exhaust Fan

.1 Description

a. Fan shall be duct mounted, direct driven centrifugal square inline.

.2 Certifications

a. Fan shall be manufactured at an ISO 9001 certified facility. Fan shall be listed by Underwriters Laboratories (UL 705) and UL listed for Canada (cUL 705). Fan shall bear the AMCA certified ratings seal for sound and air performance.

.3 Construction

a. The fan shall be of bolted construction utilizing corrosion resistant fasteners. Housing shall be minimum 18 gauge galvanized steel with integral duct collars. Bolted access doors shall be provided on three sides, sealed with closed cell neoprene gasketing. Housing shall be pre-drilled to accommodate universal mounting feet for vertical or horizontal installation. Unit shall bear an engraved aluminum nameplate. Nameplate shall indicate design CFM and static pressure. Unit shall be shipped in ISTA certified transit tested packaging.

.4 Wheel

a. Wheel shall be centrifugal backward inclined, constructed of 100% aluminum, including a precision machined cast aluminum hub. Wheel inlet shall overlap an aerodynamic aluminum inlet cone to provide maximum performance and efficiency. Wheel shall be balanced in accordance with AMCA standard 204-05, balance quality and vibration levels for fans.

.5 Motor (SQND-EC)

a. Motor shall be an electronically commutated motor rated for continuous duty and furnished either with internally mounted potentiometer speed controller or with leads for connection to 0-10 VDC external controller.

.6 For model, accessories and performance requirements, refer to equipment schedule on the drawings.

3.21 Upblast (NFPA 96 Kitchen Hood) Exhaust Fan

.1 Description

a. Fan shall be a spun aluminum, roof mounted, belt driven, upblast high pressure centrifugal exhaust ventilator.

.2 Certifications

a. Fan shall be manufactured at an ISO 9001 certified facility. Fan shall be listed by Underwriters Laboratories (UL 762) and UL listed for Canada (Power Ventilator for Restaurant Exhaust Appliances). Fan shall bear the AMCA certified ratings seal for sound and air performance.

.3 Construction

a. The fan shall be of bolted and welded construction utilizing corrosion resistant fasteners. The spun aluminum structural components shall be constructed of minimum 16 gauge marine alloy aluminum, bolted to a rigid aluminum support structure. The aluminum base shall have a one piece inlet spinning and continuously welded curb cap corners for maximum leak protection. The windband shall have a rolled bead for added strength. A two piece top cap shall have stainless steel quick release latches to provide access into the motor compartment without the use of tools. An external wiring compartment with integral conduit chase shall be provided into the motor compartment to facilitate wiring connections. The motor, bearings and drives shall be mounted on a minimum 14 gauge steel power assembly. These components shall be enclosed in a weathertight compartment, separated from the exhaust airstream. A one inch thick, three pound density foil back heat shield shall be utilized to protect the motor and drive components from excessive heat. Lifting lugs shall be provided to help prevent damage from improper lifting. Unit shall bear an engraved aluminum nameplate. Nameplate shall indicate design CFM, static pressure, and maximum fan RPM. Unit shall be shipped in ISTA certified transit tested packaging.

.4 Wheel

a. Wheel shall be centrifugal backward inclined, constructed of 100 percent aluminum, including a precision machined cast aluminum hub. Wheel inlet shall overlap an aerodynamic aluminum inlet cone to provide maximum performance and efficiency. Wheel shall be balanced in accordance with AMCA Standard 20405, Balance Quality and Vibration Levels for Fans.

.5 Motor

a. Motor shall be NEMA design B with class B insulation rated for continuous duty and furnished at the specified voltage, phase and enclosure.

.6 Bearings

a. Bearings shall be designed and individually tested specifically for use in air handling applications. Construction shall be heavy duty regreasable ball type in a cast iron pillow block housing selected for a minimum L50 life in excess of 200,000 hours at maximum cataloged operating speed.

.7 Belts and Drives

a. Belts shall be oil and heat resistant, static conducting. Drives shall be precision machined cast iron type, keyed and securely attached to the wheel and motor shafts. Drives shall be sized for 150 percent of the installed motor horsepower. The variable pitch motor drive must be factory set to the specified fan RPM.

.8 For model, accessories and performance requirements, refer to equipment schedule on the drawings.

3.22 Inline (Condensate Hood) Exhaust Fan

.1 Description

a. Fan shall be duct mounted, belt driven centrifugal square inline.

.2 Certifications

a. Fan shall be manufactured at an ISO 9001 certified facility. Fan shall be listed by Underwriters Laboratories (UL 705) and UL listed for Canada (cUL 705). Fan shall bear the AMCA certified ratings seal for sound and air performance.

.3 Construction

a. The fan shall be of bolted construction utilizing corrosion resistant fasteners. Housing shall be minimum 18 gauge galvanized steel with integral duct collars. Bolted access doors shall be provided on three sides, sealed with closed cell neoprene gasketing. Pivoting motor plate shall utilize threaded L-bolt design for positive belt tensioning. Housing shall be pre-drilled to accommodate universal mounting feet for vertical or horizontal installation. Unit shall bear an engraved aluminum nameplate. Nameplate shall indicate design CFM, static pressure, and maximum fan RPM. Unit shall be shipped in ISTA certified transit tested packaging.

.4 Wheel

a. Wheel shall be centrifugal backward inclined, constructed of 100% aluminum, including a precision machined cast aluminum hub. Wheel inlet shall overlap an aerodynamic aluminum inlet cone to provide maximum performance and efficiency. Wheel shall be balanced in accordance with AMCA Standard 204-05, Balance Quality and Vibration Levels for Fans.

.5 Motor

a. Motor shall be NEMA design B with class B insulation rated for continuous duty and furnished at the specified voltage, phase and enclosure.

.6 Bearings

a. Bearings shall be designed and individually tested specifically for use in air handling applications. Construction shall be heavy duty regreasable ball type in a pillow block

cast iron housing selected for a minimum L50 life in excess of 200,000 hours at maximum cataloged operating speed.

.7 Belts and Drives

a. Belts shall be oil and heat resistant, static conducting. Drives shall be precision machined cast iron type, keyed and securely attached to the wheel and motor shafts. Drives shall be sized for 150% of the installed motor horsepower. The variable pitch motor drive must be factory set to the specified fan RPM.

.8 For model, accessories and performance requirements, refer to equipment schedule on the drawings.

3.23 NFPA 96 Kitchen Hood

.1 General

a. The REV-LOW hood dry extractor shall be a Spring Air Systems model no. DN-BF-7.42/3.92, box canopy, dry ventilator, UL/ULC listed, with VARIFLOW baffles, and built in accordance with the NFPA-96.

.2 Construction

a. The unit casing shall be a minimum 18 gauge stainless steel on all exposed surfaces.

.3 Design

a. The ventilator extractor shall include a full length inlet slot, a centrifugal vortex chamber, and a VARIFLOW baffle. The vortex chamber shall provide a full 270 degree centrifugal spin around the vortex baffle for maximum grease extraction. The VARIFLOW baffles are field adjustable without special tools to provide precise exhaust air flow over all appliances. The vortex chamber, the VARIFLOW baffles, and the fire damper blades, bushings and edge seals shall be fully accessible through the front removable doors within the hood canopy. The grease trough and cup shall be constructed of stainless steel.

.4 Electrical

a. The hood shall have two incandescent lights evenly spaced along the length of the hood. All lights common to one section of the hood to be inter-wired by manufacturer.

.5 Control Panel

a. The control panel shall be a Spring Air Systems Inc. model RPD-P31-MH-SW-LS-ML, factory wired and tested, CSA listed, with stainless steel enclosure with occupied/un-occupied switch and the following options:
   i. Exhaust fan on light.
   ii. Supply fan on light.
   iii. Hood mounted enclosure option.

b. Panel includes Thermal-Start option per requirements of IMC 2006; duct-mounted J-couple assembly including mini-clips, j-box and UL/ULC duct penetration fitting supply by Spring Air Systems and installed by mechanical contractor in main duct leading to exhaust fan, 30 feet of J-couple wire including male and female mini-clip connectors, RPD panel mounted temperature processor set to auto activate exhaust fan at 90F (32C).

.6 Fire Suppression

a. The surface fire suppression system shall be a model WC-5-MW.
b. The hood manufacturer shall supply and install a wet chemical surface fire suppression system for the kitchen exhaust hood. The system shall be UL/ULC listed, and supplied and installed in accordance with the NFPA-96, NFPA-17A and all applicable national and local code requirements.
c. The fire suppression system shall be factory pre-pipe to match the approved appliance lineup under each hood. Each appliance drop shall extend from the roof of the canopy to reduce grease accumulation on the interior canopy piping and simplify cleaning. Each drop and/or fitting in the canopy shall be chrome placed and connected to a UL/ULC hood penetration fitting. Each drop shall include, on the discharge end, a nozzle to suit the appliance being protected and a swivel fitting.
d. The nozzles and fusible links shall be located to protect the appliances, hood plenum, and duct collar.
e. A factory authorized technician shall complete the final hookup on site after all appliance has been set in place under the canopys.
f. All remote wiring shall be by electrical division. The electrical division shall supply and install a shunt trip where electrical appliances are present and interlock the system with the building fire alarm panel.

.7 For additional information, refer to details on the drawings.

3.24 Roof-mounted Energy Recovery Ventilator

.1 General

a. The unit must be tested as per ANSI/UL 1995 and CAN/CSA C22.2 No. 236, Fourth Edition, October 14, 2011. Units shall be ETL certified.
b. All insulation shall comply with NFPA 90A requirements.
c. Provide each unit factory assembled, wired, tested and shipped in one piece. Installation and maintenance bulletins and wiring manuals shall be supplied with each unit.

.2 Cabinet

a. Fabricate unit exterior casing with 22 gauge (painted) galvanized steel panels, bolted to a heavy gauge steel base with lifting slots. Interior panels shall be 1 inch thick, fiberglass insulation filled and protected with a 22 gauge G90 galvanized steel liner.
b. All panels and access doors shall be sealed with a thermal gasket.
c. Access doors shall be flush mounted to the cabinetry and secured with heavy-duty hinges. The door latch handle assembly shall be provided with a full-size grip handle. The assembly shall be gasketed and sealed to prevent thermal bridging.
d. Outdoor units shall have a solid metal roof cap, intake hoods and exhaust hoods.

.3 Filters

a. Provide filter box section with filter guides, hinged and latching access doors for side loading of filters. Filter media shall be UL 900 listed, Class I or Class II.
b. Locate filters in both the supply and return air streams.
c. Supply side filters shall be 2 four-inch-deep pleated panel filter MERV 8. Return side filters shall be 2 four inch deep pleated panel filter rated for MERV 8.
d. Unit shall be complete with a dirty filter pressure drop switch mounted across each filter bank. A dry contact shall close when dirty filters are detected.

.4 Air-to-Air Fixed Plate Energy Recovery Core

a. Heat exchanger cores shall be designed to transfer sensible and latent energy. Core access shall be designed to facilitate inspection for cleaning and maintenance.
b. The total energy recovery core shall be made of a polymeric membrane to recover both sensible and latent energy. Core material shall be coated with the Microban technology to prevent bacterial and mold growth.
c. The ERV core shall inhibit mold and bacterial growth as tested to Standard AATCC 30 with 100% surface inhibition on the *Aspergillus* mold test and 100% surface inhibition the Kirby Bauer *Staphylococcus* bacteria test.
d. The ERV core must be able to tolerate freezing temperatures of -30C and not have an increase in EATR (exhaust air transfer ratio) or decrease in performance after being frozen. Core must also be able to tolerate high temperatures of +60C and not have an increase in EATR or decrease in performance at these elevated temperatures.
e. The ERV core must be water washable to remove dust and contaminants. It shall be flame proof and comply with UL 723 with a flame spread index that shall not be over 25 and a smoke index that shall not be over 50.
f. Total enthalpy cores shall be tested in accordance with per AHRI-1060 and shall be AHRI certified. Products not currently AHRI certified will not be accepted.

.5 Exhaust Defrost

a. Supply air blower shuts down and outside air damper closes. Warm exhaust air defrosts the core for a predetermined duration set by a timer.

.6 Fans

a. Wheels shall be belt drive DWDI centrifugal forward curved type.
b. Fan assemblies including fan, motor and sheaves shall be dynamically balanced by the manufacturer in accordance with AMCA Standard 204-05, *Balance Quality and Vibration Levels for Fans.*
c. Bearings and Drives
    i. Provide self-aligning ball or roller bearings, permanently lubricated (greasable bearings with extended copper lubrication lines). Load rating shall be computed in accordance with AFBMA - ANSI Standards, L-50 life at 200,000 hours (L-50 life at 500,000 hours) heavy duty pillow block type.
    ii. Provide solid, hot rolled steel, ground and polished shaft, protectively coated with lubricating oil.
    iii. Provide variable pitch sheaves on all motors 7 1/2 HP and lower. Provide constant pitch sheaves on all motors greater than 7 1/2 HP sizes V-belt drive

for a service factor of 1.25. On constant pitch units, allow for one sheave change including belts (parts only, labour by Balancing Trade).

d. Locate fan and motor internally on a steel base. Provide access to motor, drive and bearings through hinged access door. Provide fan and motor assembly mounted on (rubber in shear) (spring) vibration isolators inside cabinet.
e. Motors shall be high efficiency l800 RPM, open drip-proof -ODP (totally enclosed fan cooled- TEFC) premium efficiency.

.7 Unit Controls

a. Terminal boards for outdoor air damper: Power and control (24VAC, 10VA) for the outdoor air damper internal to the unit.
b. Terminal boards for exhaust air damper: Power and control (24VAC, 10VA) for the exhaust air damper internal to the unit.
c. 24VAC, 20 VA power: Power supply 24VAC 20VA for external accessories.
d. Start/Stop dry contact: The state of the unit (Start/Stop) is controlled via a normally open (NO) dry contact.
e. General Alarm dry contact: When the unit goes into alarm mode, a dry contact (NO) is closed.
f. Occupancy control dry contact: The state of the unit (Start/Stop) is controlled via a normally open (NO) dry contact.
g. Unit to come with temperature sensor for outdoor air temperature
h. Fan interlock on OA: Dry contact (NO) that closes when the outdoor air motor is started.
i. Non-fused disconnect: The unit will be equipped with a non-fused disconnect.

.8 For model, accessories and performance requirements, refer to equipment schedule on the drawings. Approved equals include Oxygen 8, Valent and Cook.

3.25 Rooftop Units

.1 General

a. Furnish as shown on plans, Daikin Applied Rebel Heating and Cooling Unit(s) model DPS.
b. The complete unit shall be cETLus listed.
c. The unit shall be ASHRAE 90.1-2016 compliant and labeled.
d. Each unit shall be specifically designed for outdoor rooftop application and include a weatherproof cabinet. Each unit shall be completely factory assembled and shipped in one piece. Packaged units shall be shipped fully charged with R-32 Refrigerant and oil.
e. The unit shall undergo a complete factory run test prior to shipment. The factory test shall include a refrigeration circuit run test, a unit control system operations checkout, a unit refrigerant leak test and a final unit inspection.
f. All units shall have decals and tags to indicate caution areas and aid unit service. Unit nameplates shall be fixed to the main control panel door.
g. Electrical wiring diagrams shall be attached to the control panels. Installation, operating and maintenance bulletins and start-up forms shall be supplied with each unit.
h. Performance: All scheduled EER, IEER, capacities and face areas are minimum accepted values.

i. All scheduled amps, kW, and HP are maximum accepted values that allow scheduled capacity to be met.

j. Warranty: The manufacturer shall provide 12-month parts only warranty. Defective parts shall be repaired or replaced during the warranty period at no charge. The warranty period shall commence at startup or six months after shipment, whichever occurs first.

.2 Casing

a. Panel construction shall be double-wall construction for all panels. All floor panels shall have a solid galvanized steel inner liner on the air stream side of the unit to protect insulation during service and maintenance. Insulation shall be a minimum of 1" thick with an R-value of 7.0, and shall be 2 part injected foam. Panel design shall include no exposed insulation edges. Unit cabinet shall be designed to operate at total static pressures up to 5.0 inches w.g.

b. Exterior surfaces shall be constructed of pre-painted galvanized steel for aesthetics and long term durability. Paint finish to include a base primer with a high quality, polyester resin topcoat of a neutral beige color. Finished panel surfaces to withstand a minimum 1000-hour salt spray test in accordance with ASTM B117 standard for salt spray resistance.

c. Service doors shall be provided on the fan section, filter section, control panel section, and heating vestibule in order to provide user access to unit components. All service access doors shall be mounted on multiple, stainless steel hinges and shall be secured by a latch system. Removable service panels secured by multiple mechanical fasteners are not acceptable.

d. The unit base shall overhang the roof curb for positive water runoff and shall seat on the roof curb gasket to provide a positive, weathertight seal. Lifting brackets shall be provided on the unit base to accept cable or chain hooks for rigging the equipment.

.3 Filters

a. The filter section shall be provided with a 2 inch (50mm) prefilter rack and a 4 inch (100mm) final filter rack. A set of 2 inch (50mm) construction filters shall ship with the unit.

.4 Outdoor / Return Air Section

a. Unit shall be provided with an outdoor air economizer section. The economizer section shall include outdoor, return, and exhaust air dampers. The economizer operation shall be fully integral to the mechanical cooling and allow up to 100% of mechanical cooling if needed to maintain the cooling discharge air temperature. The outdoor air hood shall be factory installed and constructed from galvanized steel finished with the same durable paint finish as the main unit. The hood shall include moisture eliminator filters to drain water away from the entering air stream. The outside and return air dampers shall be sized to handle 100% of the supply air volume. The dampers shall be parallel blade design. Damper blades shall be gasketed with side seals to provide an air leakage rate of 1.5 cfm / square foot of damper area at 1" differential pressure in according with testing defined in AMCA 500. A barometric exhaust damper shall be provided to exhaust air out of the back of the unit. A bird screen shall be provided to prevent infiltration of rain and foreign

materials. Exhaust damper blades shall be lined with vinyl gasketing on contact edges.

b. Control of the dampers shall be by a factory installed direct coupled actuator. Damper actuator shall be of the modulating, spring return type. A comparative enthalpy control shall be provided to sense and compare enthalpy in both the outdoor and return air streams to determine if outdoor air is suitable for “free” cooling. If outdoor air is suitable for “free” cooling, the outdoor air dampers shall modulate in response to the unit’s temperature control system.

c. Unit shall be provided with a 100% outdoor air hood. The 100% outdoor air hood shall allow outdoor air to enter from the back of the unit, at the draw-through filter section. The outdoor air hood shall be factory installed and constructed from galvanized steel finished with the same durable paint finish as the main unit. The hood shall include a bird screen to prevent infiltration of foreign materials and a rain lip to drain water away from the entering air stream.

.5 Supply Fan

a. Supply fan shall be a single width, single inlet (SWSI) airfoil centrifugal fan. The fan wheel shall be Class II construction with fan blades that are continuously welded to the hub plate and end rim. The supply fan shall be a direct drive fan mounted to the motor shaft. Belts and sheaves are not acceptable due to the additonal maintenance.

b. All fan assemblies shall be statically and dynamically balanced at the factory, including a final trim balance, prior to shipment.

c. Supply fan and motor assembly combinations larger than 8 hp or 22" diameter shall be internally isolated on 1" deflection, spring isolators and include removable shipping tie downs.

d. (DPS003-DPS015) The fan motor shall be a totally enclosed EC motor that is speed controlled by the rooftop unit controller. The motor shall include thermal overload protection and protect the motor in the case of excessive motor temperatures. The motor shall have phase failure protection and prevent the motor from operation in the event of a loss of phase. Motors shall be premium efficiency.

.6 Exhaust Fan

a. Exhaust fan shall be a single width, single inlet (SWSI) airfoil centrifugal fan. The fan wheel shall be Class II construction with aluminum fan blades that are continuously welded to the hub plate and end rim. The exhaust fan shall be a direct drive fan mounted to the motor shaft. Belts and sheaves are not acceptable due to the additional maintenance.

b. The fan motor shall be a totally enclosed EC motor that is speed controlled by the rooftop unit controller. The motor shall include thermal overload protection and protect the motor in the case of excessive motor temperatures. The motor shall have phase failure protection and prevent the motor from operation in the event of a loss of phase. Motors shall be premium efficiency.

c. The unit DDC controller shall provide building static pressure control. The unit controller shall provide proportional control of the exhaust fans from 25% to 100% of the supply air fan designed airflow to maintain the adjustable building pressure setpoint. The field shall mount the required sensing tubing from the building to the factory mounted building static pressure sensor.

.7 Cooling Coil

a. The indoor coil section shall be installed in a draw through configuration, upstream of the supply air fan. The coil section shall be complete with a factory piped cooling coil and an ASHRAE 62.1 compliant double sloped drain pan.
b. The direct expansion (DX) cooling coils shall be fabricated of seamless high efficiency copper tubing that is mechanically expanded into high efficiency aluminum plate fins. Coils shall be a multi-row, staggered tube design with a minimum of 3 rows. All cooling coils shall have an interlaced coil circuiting that keeps the full coil face active at all load conditions. All coils shall be factory leak tested with high pressure air under water.
c. The cooling coil shall have an electronic controlled expansion valve. The unit controller shall control the expansion valve to maintain liquid subcooling and the superheat of the refrigerant system.
d. The refrigerant suction lines shall be fully insulated from the expansion valve to the compressors.
e. The drain pan shall be stainless steel and positively sloped. The slope of the drain pan shall be in two directions and comply with ASHRAE Standard 62.1. The drain pan shall have a minimum slope of 1/8" per foot to provide positive draining. The drain pan shall extend beyond the leaving side of the coil. The drain pan shall have a threaded drain connection extending through the unit base.

.8 Heat Pump Heating & Condensing Section

a. The evaporator coil, condenser coil, compressors and refrigerant circuit shall be designed for heat pump operation. The refrigerant circuit shall contain a 4-way reversing valve for the heat pump operation. The outdoor coil shall have an electronic expansion valve to control the refrigerant flow. The unit controller shall modulate the expansion valve to maintain compressor operation within the compressor operational envelope
b. The refrigerant system shall have a pump-down cycle.
c. The unit shall have a natural gas furnace for hybrid heating. When the heat pump operation cannot maintain the discharge air temperature setpoint the natural gas furnace shall temper the airstream to the discharge air temperature setpoint.
d. The unit shall have a hot water coil for hybrid heating. When the heat pump operation cannot maintain the discharge air temperature setpoint the hot water coil shall temper the airstream to the discharge air temperature setpoint.
e. Outdoor coils shall have seamless copper tubes, mechanically bonded into aluminum plate-type fins. The fins shall have full drawn collars to completely cover the tubes. A sub-cooling coil shall be an integral part of the main outdoor air coil. Each outdoor air coil shall be factory leak tested with high-pressure air under water.
f. Outdoor coils shall have seamless copper tubes, mechanically bonded into aluminum plate-type fins. The fins shall have full drawn collars to completely cover the tubes. A sub-cooling coil shall be an integral part of the main outdoor air coil. Each outdoor air coil shall be factory leak tested with high-pressure air under water.
g. Outdoor air coils shall be protected from incidental contact to coil fins by a coil guard. Coil guard shall be constructed of cross wire welded steel with PVC coating. The unit shall have scroll compressors.
h. Fan motors shall be an ECM type motor for proportional control. The unit controller shall proportionally control the speed of the condenser fan motors to maintain the head pressure of the refrigerant circuit in ambient conditions up to 125°F. Mechanical cooling shall be provided to 0°F. Heat Pump Heating shall be provided to -10F. The motor shall include thermal overload protection and protect the motor in

the case of excessive motor temperatures. The motor shall have phase failure protection and prevent the motor from operation in the event of a loss of phase.

i. Pressure transducers shall be provided for the suction pressure and head pressure. Temperature sensor shall be provided for the suction temperature and the refrigerant discharge temperature of the compressors. Each circuit shall be dehydrated and factory charged with R32 Refrigerant and oil.

.9 Hot Gas Reheat

a. Unit shall be equipped with a fully modulating hot gas reheat coil with hot gas coming from the unit condenser
b. Hot gas reheat coil shall be a microchannel design. The aluminum tube shall be a microchannel design with high efficiency aluminum fins. Fins shall be brazed to the tubing for a direct bond. The capacity of the reheat coil shall allow for a 20°F temperature rise at all operating conditions.
c. The modulating hot gas reheat systems shall allow for independent control of the cooling coil leaving air temperature and the reheat coil leaving air temperature. The cooling coil and reheat coil leaving air temperature setpoints shall be adjustable through the unit controller. During the dehumidification cycle the unit shall be capable of 100% of the cooling capacity. The hot gas reheat coil shall provide discharge temperature control within +/- 2°F.
d. Each coil shall be factory leak tested with high- pressure air under water.

.10 Gas Heating Section

a. The rooftop unit shall include a natural gas heating section. The gas furnace design shall be one natural gas fired heating module factory installed downstream of the supply air fan in the heat section. The heating module shall be a tubular design with in-shot gas burners.
b. Each module shall have modulating heating control.
c. The heat exchanger tubes shall be constructed of stainless steel.
d. The module shall have an induced draft fan that will maintain a negative pressure in the heat exchanger tubes for the removal of the flue gases.
e. Each burner module shall have two flame roll-out safety protection switches and a high temperature limit switch that will shut the gas valve off upon detection of improper burner manifold operation. The induced draft fan shall have an airflow safety switch that will prevent the heating module from turning on in the event of no airflow in the flue chamber.
f. The factory-installed DDC unit control system shall control the gas heat module. Field installed heating modules shall require a field ETL certification. The manufacturer's rooftop unit ETL certification shall cover the complete unit including the gas heating modules.

.11 Heat Pump Heating

a. The evaporator coil, condenser coil, compressors and refrigerant circuit shall be designed for heatpump operation. The refrigerant circuit shall contain a 4 way reversing valve for the heatpump operation. The outdoor coil shall have an electronic expansion valve to control the refrigerant flow. The unit controller shall modulate the expansion valve to maintain compressor operation within the compressor operational envelope.

b. The refrigerant system shall have a pump-down cycle.

.12 Electrical

a. Each unit shall be wired and tested at the factory before shipment. Wiring shall comply with CSA standards. All wiring shall be number coded per the electrical wiring diagrams. All electrical components shall be labeled according to the electrical diagram and be CSA recognized.
b. A terminal block shall be provided for the main power connection and a terminal board shall be provided for the low voltage control wiring. Knockouts shall be provided in the bottom of the main control panel for field wiring entrance. Branch short circuit protection, 115-volt control circuit transformer and fuse, system switches, and a high temperature sensor shall also be provided with the unit.
c. Each compressor and condenser fan motor shall be furnished with contactors and internal thermal overload protection. Supply fan motors shall be supplied with external overload protection.
d. A single non-fused disconnect switch shall be provided for disconnecting electrical power at the unit. Disconnect switches shall be mounted internally to the control panel and operated by an externally mounted handle.

.13 Controls

a. Refrigeration only controls.
b. Provide a microprocessor based system to control all refrigeration functions including compressor speed, condenser fan function, unit safety protection, including compressor minimum run and minimum off times, and diagnostics. This system shall operate the unit at peak efficiency utilizing variable head pressure control and electronic expansion valve while maintaining the cooling, or heating in heat pump operation, call per third party control. The microprocessor control shall consist of only direct expansion required temperature sensors, pressure sensors, controller and keypad/display operator interface. Refrigeration sensors and controller shall be factory mounted, wired and tested.
c. The microprocessor controls shall be solely dependent on communications with a 3rd party DDC rooftop controller supplied by the BAS contractor for proper unit operation. The microprocessor memory shall be protected from voltage fluctuations as well as any extended power failures. No commissioning settings shall be lost, even during extended power shutdowns.
d. The microprocessor controls shall be dependent on starting and stopping and modulation of the unit via terminal strip control and logic. The control system shall be capable of providing a remote alarm indication. The microprocessor shall provide compressor capacity & status, defrost status (heat pump only), condensate overflow alarm, and dirty filter alarm.
e. All digital and analog inputs and outputs shall be protected against damage from transients or incorrect voltages. All field wiring shall be terminated at a separate, clearly marked terminal strip.
f. The keypad interface shall allow convenient navigation and access to the commissioning functions. The unit keypad/display character format shall be 4 lines x 20 characters. All control settings shall be password protected against unauthorized changes. For ease of service, the display format shall be English language readout. Coded formats with look-up tables will not be accepted. The user interaction with the display shall provide the following information as a minimum:

g. Supply and exhaust fan speed control limits.
h. Refrigeration alarm details.
i. Daikin will provide the following terminals for remote control by 3rd party DDC controller (BAS supplied):

i.	Compressor capacity command/status	(Ao/Ai)
ii.	Compressor capacity status	(Bi)
iii.	Supply fan S/S	(Bo)
iv.	Supply fan capacity	(Ao)
v.	Exhaust fan S/S	(Bo)
vi.	Exhaust fan capacity	(Ao)
vii.	Outdoor air damper	(Ao)
viii.	Mode select (heat/cool)	(Bo)
ix.	Heating Modulation/Enable	(Ao/Bo)
x.	Heat S/S	(Bo)
xi.	Defrost Status (Heat Pump Only)	(Bi)
xii.	Alarm Status	(Bi)
xiii.	Alarm Reset (120V)	(Bo)
xiv.	Hot Gas Reheat Capacity	(Ao)
xv.	Airflow Measuring Station	(Ai)
xvi.	Outdoor Enthalpy Sensor	(Bi)
xvii.	Dirty Filter	(Bi)

j. BAS contractor shall be responsible for supply and install of the following loose sensors as required to meet the specified sequences:
   i. Discharge air temperature
   ii. Outdoor air temperature/humidity
   iii. Return air temperature
   iv. Entering/Leaving wheel temperature
   v. Duct static pressure
   vi. Space temperature/humidity
   vii. Space/building pressure
   viii. Duct high limit
   ix. CO2 measuring
   x. Airflow proving
   xi. Condensate overflow

.14 Roof Curb

a. A prefabricated heavy gauge galvanized steel, mounting curb shall be provided for field assembly on the roof decking prior to unit shipment. The roof curb shall be a full perimeter type with complete perimeter support of the air handling section and condensing section. The curb shall be a minimum of 24" high and include a nominal 2"×4" wood nailing strip. Gasket shall be provided for field mounting between the unit base and roof curb. The roof curb shall be approved by the National Roofing Contractors Association. The roof curb shall be insulated.
b. If units with digital scroll compressors are used instead of variable speed compressors, the installing contractor shall fill the roof curb with Roxul Safe and Sound Insulation and shall provide a picture of the curb prior to the unit being installed.

.15 Startup Service And Warranty

a. Manufacturer shall furnish a factory trained service technician to perform the unit startup. Manufacturer shall provide instruction to the owner's personnel on the operation and maintenance of the unit. Factory technician to provide copy of start-up log to owner and to demonstrate operation and maintenance to owners' representative. The warranty period shall commence at the date of initial startup and shall continue for a period of one (1) year not to exceed eighteen (18) months from shipment. Manufacturer's warranty shall include all parts and labour to install parts.

.16 For model, accessories and performance requirements, refer to equipment schedule on the drawings.

END OF SECTION