

SPECIFICATIONS CONTINUED:

ANIMAL AUTOPSY AHU HEATING COIL (HC-3):

REPLACE EXISTING HEATING COIL WITH NEW COIL SIZED FOR LOWER HYDRONIC SYSTEM TEMPERATURE. COIL SHALL BE COPPER TUBE AND ALUMINUM FIN WITH 129 FINS PER FOOT

PERFORMANCE

FLUID: PROPYLENE GLYCOL/WATER 35/60  
FLUID FLOW: 0.448L/S (7.1 GPM)  
AIR EDB: -40°C (-40°F)  
AIR LDB: 49°C (105.9°F)  
AIR FLOW: 425L/S (901 CFM)  
FLUID PD: 2.286m (7.5FT)  
AIR PD: 3mm (0.12in H2O)  
EFT: 52.2°C (126°F)  
LFT: 29.8°C (85.6°F)  
ACCEPTABLE PRODUCT: DAIKIN 5WQ1206A OR APPROVED EQUAL

HYDRONIC SYSTEM PUMPS (SP-01 & SP-02):

SYSTEM PUMPS SHALL BE REDUNDANT NEMA PREMIUM EFFICIENCY SELF SENSING VFD VARIABLE FLOW PUMPS WITH FLANGED CONNECTIONS

PERFORMANCE

SIZE: 3" x 3"  
MAXIMUM FLOW: 7.9L/S (125 GPM)  
TOTAL HEAD: 13.7m (45FT)  
POWER: 3 HP  
VOLTAGE: 575V/3ø/60Hz  
ACCEPTABLE PRODUCT: TACO SKS 3009-1760-3 OR APPROVED EQUAL

BOILER B-1/B-2 EXCHANGER PUMPS P-100 A&B:

BOILER HEAT EXCHANGER PUMPS SHALL BE REDUNDANT NEMA PREMIUM EFFICIENCY STATIC FLOW INLINE PUMPS WITH FLANGED CONNECTIONS.

PERFORMANCE

SIZE: 3" x 3"  
MAXIMUM FLOW: 4L/S (63.8 GPM)  
TOTAL HEAD: 4.57m (15FT)  
POWER: 1 HP  
VOLTAGE: 575V/3ø/60Hz  
ACCEPTABLE PRODUCT: TACO KV 3006 OR APPROVED EQUAL

LAB EXHAUST HEAT CAPTURE PUMPS (P-101 A&B):

PUMPS SHALL BE REDUNDANT NEMA PREMIUM EFFICIENCY STATIC FLOW HORIZONTAL END SUCTION PUMPS WITH FLANGED CONNECTIONS.

PERFORMANCE

SIZE: 2" x 1-1/4"  
MAXIMUM FLOW: 3.785L/S (60 GPM)  
TOTAL HEAD: 15.25m (50FT)  
POWER: 2 HP  
VOLTAGE: 575V/3ø/60Hz  
ACCEPTABLE PRODUCT: TACO CI 1207 OR APPROVED EQUAL

ANIMAL AUTOPSY AHU COIL PUMPS (P-102 A&B):

PUMPS SHALL BE REDUNDANT NEMA PREMIUM EFFICIENCY INLINE VFD CIRCULATORS WITH FLANGED CONNECTIONS.

PERFORMANCE

SIZE: 1"  
MAXIMUM FLOW: 0.63L/S (10 GPM)  
TOTAL HEAD: 9.14m (30FT)  
POWER: 1/4 HP  
VOLTAGE: 230V/1ø/60Hz  
ACCEPTABLE PRODUCT: TACO VR3452-FC1A01 OR APPROVED EQUAL

AIR SEPARATOR (AS-2):

NORTH WING,  
CAST IRON AIR SEPARATOR WITH REMOVABLE STRAINER AND BLOW DOWN CONNECTION, 4"ø INLET AND OUTLET.  
ACCEPTABLE PRODUCT: ARMSTRONG VAS-4 OR TACO ACO4F-125

AIR SEPARATOR (AS-3):

CAST IRON AIR SCOOP SEPARATOR, WITH BAFFLE, C/W HY-VENT FOR AIR REMOVAL.  
ACCEPTABLE PRODUCT: TACO 431

AIR SEPARATOR (AS-4):

NORTH WING,  
CAST IRON AIR SEPARATOR WITH REMOVABLE STRAINER AND BLOW DOWN CONNECTION, 4"ø INLET AND OUTLET.  
ACCEPTABLE PRODUCT: ARMSTRONG VAS-3 OR TACO ACO3F-125

EXPANSION TANK (ET-2):

VERTICAL DIAPHRAGM, PRE-CHARGED, CARBON STEEL SHELL, BUTYL/EPDM DIAPHRAGM, VERTICAL INSTALLATION, WITH SIGHT GLASS.

PERFORMANCE

CAPACITY: 168L  
ACCEPTANCE VOLUME: 85.55L  
WORKING PRESSURE: 862 kPa (125 PSI)  
ACCEPTABLE PRODUCT: AMTROL AX-80V OR APPROVED EQUAL

EXPANSION TANK (ET-4):

VERTICAL DIAPHRAGM, PRE-CHARGED, CARBON STEEL SHELL, BUTYL/EPDM DIAPHRAGM, VERTICAL INSTALLATION, WITH SIGHT GLASS.

PERFORMANCE

VOLUME: 82L  
ACCEPTANCE VOLUME: 42.8L  
WORKING PRESSURE: 862 kPa (125 PSI)  
ACCEPTABLE PRODUCT: AMTROL AX-40V OR APPROVED EQUAL

GLYCOL FEED TANK (GMU-1&2):

FEED TANK SHALL INCLUDE LEVEL GAUGE, 125mm FILL/ACCESS OPENING W/COVER, GRADUATED FUNNEL WITH STAINLESS STEEL FILTER, PUMP SUCTION HOSE WITH INLET STRAINER AND CHECK VALVE, PRESSURE PUMP WITH FUSE CONNECTION, LOW FLUID LEVEL PUMP CUT-OUT FLOAT SWITCH, MANUAL PURGE AIR/AGITATING DIVERTER VALVE, SNUBBER WITH PRESSURE SWITCH, LIQUID FILLED PRESSURE GAUGE. UNIT TO BE SUPPLIED WITH ULC LISTED POWER SUPPLE ADAPTER, 100-240VAC/1ø TO 24VDC/50-60Hz.

HYDRONIC INPUT

CAPACITY: 25L  
PRESSURE RANGE: 70-170 KPa  
ACCEPTABLE PRODUCT: AX10M INDUSTRIES MF 200

FLOW INDICATING TRANSMITTERS (FIT)

ALL WATER FLOW METERS SHALL BE IN-LINE ELECTROMAGNETIC METERS WITH PTFE LINER AND Bacnet COMMUNICATION PROTOCOL.

ACCEPTABLE PRODUCT: ONICON F-3100 SERIES

BTU METER (UIT)

SYSTEM BTU METER SHALL COME WITH INPUT CONNECTION FOR INLINE ELECTROMAGNETIC FLOW METER, TEMPERATURE SENSORS FOR SUPPLY AND RETURN PIPING, AND Bacnet COMMUNICATION PROTOCOL.

ACCEPTABLE PRODUCT: ONICON SYSTEM 20 BTU METER.

BASEBOARD CONVECTOR HEATERS (BB-1 TO BB-11):

BASEBOARD HEATERS SHALL BE MULTI-PASS LOW WATER TEMPERATURE HIGH OUTPUT FIN ELEMENTS. ELEMENTS SHALL COME WITH BRASS COLLECTORS C/W 1/2" NPTF CONNECTIONS, 55 FINS PER FOOT, DUST PROOF COATING, AND FLAT TOP ENCLOSURE.

HYDRONIC INPUT

FLUID: WATER  
INLET TEMPERATURE: 54.4°C (130°F)  
OUTLET TEMPERATURE: 32.2°C (90°F)

SEE BASEBOARD SCHEDULES ON DRAWINGS M05 AND M06 FOR SIZING

ACCEPTABLE PRODUCT: JAGA TEMPO WALL OR APPROVED EQUAL

UNIT HEATERS (UH-1 TO UH-3):

UNIT HEATERS SHALL BE COMMERCIAL HYDRONIC HORIZONTAL DISCHARGE UNIT HEATERS COMPLETE WITH THERMOSTAT.

HYDRONIC INPUT

FLUID: WATER  
INLET TEMPERATURE: 54.4°C (130°F)  
OUTLET TEMPERATURE: 32.2°C (90°F)

SEE UNIT HEATER SCHEDULE ON DRAWING M05 FOR SIZING

ACCEPTABLE PRODUCT: REZNOR WS SERIES OR APPROVED EQUAL

FORCE FLOW HEATER (FF-1):

FORCED AIR CABINET UNIT HEATER SHALL BE SIZED AS PER SPECIFICATIONS OUTLINED ON DRAWING M05.

HYDRONIC INPUT

FLUID: WATER  
INLET TEMPERATURE: 54.4°C (130°F)  
OUTLET TEMPERATURE: 32.2°C (90°F)  
ACCEPTABLE PRODUCT: ZEHNDER RITTLING RW-280 OR APPROVED EQUAL

BOILER SYSTEM SEQUENCE OF OPERATIONS:

BOILER CONTROLLER

CONTROLLER TO MODULATE BOILER 'B-3' AND 'B-4' WHEN OUTDOOR AIR TEMPERATURE DROPS BELOW WARM WEATHER SHUT DOWN SETPOINT. CONTROLLER SHALL MODULATE BURNER OUTPUT TO MAINTAIN HEATING SYSTEM AT CALCULATED SETPOINT BASED ON THE OUTDOOR TEMPERATE SENSOR READING. BOILER 'B-3' AND 'B-4' SHALL MODULATE TOGETHER FROM MINIMUM TO MAXIMUM IN ORDER TO MAXIMIZE BURNER/NATURAL GAS EFFICIENCY. BOILERS ARE TO OPERATE IN CONDENSING MODE CONTINUALLY OR AS LARGE A FRACTION OF TIME AS SYSTEM ALLOWS. CONTROLLER TO ENSURE EQUAL RUN TIME, FIRING MODULATION, AND PRE/POST PURGING. WHEN THE OUTDOOR TEMPERATURE RISES ABOVE THE ADJUSTABLE WARM WEATHER SHUTDOWN SETPOINT, THE BOILERS ARE TO DEACTIVATE.

PUMP SEQUENCERS

PUMP SEQUENCER TO ACTIVATE SYSTEM PUMP WHEN OUTDOOR AIR TEMPERATURE DROPS BELOW WARM WEATHER SHUTDOWN SETPOINT AND SHALL RUN CONTINUOUSLY DURING HEATING SEASON. SEQUENCER SHALL SWITCH TO BACKUP PUMP IN THE EVENT OF FAILURE OF THE PRIMARY PUMP, OR IF FLOW DEMAND EXCEEDS PRIMARY PUMP. SEQUENCER SHALL BE CAPABLE OF FLOW PROOF TESTING AND PUMP ROTATION BASED ON RUN HOURS. SEQUENCE TO BE SETUP WITH CRITICAL AND NON-CRITICAL ALARMS.

BOILERS SHALL NOT ACTIVATE UNLESS THE SYSTEM IS PROVEN 'ON'. SYSTEM PUMPS SHALL ALSO ACTIVATE TO PERMIT PRE AND POST PURGING.

THE BOILERS SHALL OPERATE AS OFTEN AS FEASIBLE IN COMBINED EQUAL MODULATION BUT SHALL ROTATE AS REQUIRED TO ENSURE EQUAL CUMULATIVE RUN TIME HOURS.

WHEN THE OUTDOOR AIR TEMPERATURE RISES ABOVE THE ADJUSTABLE WINTER SETPOINT TEMPERATURE (SUMMER MODE). THE BOILERS AND CIRCULATING PUMPS SHALL DEACTIVATE.

SYSTEM PUMPS 'SP-1'AND 'SP-2' ARE VARIABLE SELF SENSING PUMPS AND SHALL VARY FLOW BASED ON SYSTEM DEMANDS AS CONTROLLERS MODULATE TO MAINTAIN DESIRED FLOW.

PROVIDE ALL CONTROLS, MODULES, CONTROL WIRING, SENSORS, RELAYS AND SWITCHES REQUIRED FOR OPERATION OF THE HOT WATER HEATING SYSTEMS AS DESCRIBED.

VENTILATION NOTES:

- CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS AT SITE PRIOR TO WORK, AND REVIEW STRUCTURAL AND ARCHITECTURAL DRAWINGS AS WELL AS SITE CONDITIONS THOROUGHLY. REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO FABRICATION.
- AHU EQUIPMENT AND DUCTWORK SHALL BE INSTALLED ACCORDING TO THE DESIGN DRAWINGS, AND SHALL BE ERECTED IN AN APPROVED, SUBSTANTIAL AND WORKMANLIKE MANNER. DUCTWORK MATERIALS, GAUGE THICKNESS, HANGERS, AND INSTALLATION SHALL BE TO SMACNA STANDARDS.
- ALL NEW DUCTWORK SHALL BE INSTALLED AS TIGHT TO WALLS/STRUCTURE AS POSSIBLE.
- CONTRACTOR IS RESPONSIBLE TO PROVIDE AND MAINTAIN TEMPORARY VENTILATION FOR THE NORTH WING DURING DEMOLITION AND INSTALLATION OF THE NORTH WING AHU. TEMPORARY AHU WILL BE REQUIRED FOR UP TO APPROXIMATELY 3 WEEKS FOR NORTH WING AIR VENTILATION WHILE NEW AHU IS UNDER CONSTRUCTION. A MINIMUM OF 4500 CFM FRESH AIR IS TO BE PROVIDED TO THE BUILDING. LOCATION OF TEMPORARY SYSTEM IS TO BE CONFIRMED ON SITE DURING CONSTRUCTION.
- PROVIDE TURNING VANES IN ALL 90° DUCT ELBOWS.
- NORTH AND SOUTH WING SYSTEM(S) SHALL BE TESTED, ADJUSTED & BALANCED BY A QUALIFIED, INDEPENDENT BALANCING TAB CONTRACTOR AFTER COMPLETION. BALANCE FLOWS TO WITHIN 5% OF DESIGN VALUES. PROVIDE SHEAVES AND BELTS AS REQUIRED FOR FINAL BALANCE. SUBMIT REPORTS TO THE ENGINEER FOR REVIEW.
- PROVIDE ALL DUCT TRANSITIONS AS REQUIRED.
- SEAL ALL DUCTWORK JOINTS USING 'DURO-DYNE' DUCT SEALER TO ACHIEVE A CLASS 'A' SEAL. SEAL ALL JOINTS IN DUCT INSULATION VAPOR BARRIER USING TAPE AND DUCT SEALER.
- PROVIDE ALL NECESSARY HANGERS AND SUPPORT STEEL FOR ALL EQUIPMENT AND DUCTWORK. INSTALLATION AND SPACING SHALL ADHERE TO SMACNA STANDARDS.
- ALL SUPPLY AND RETURN DUCTWORK SHALL BE ACOUSTICALLY LINED TO A MINIMUM OF 3M (10'-0") FROM INLET AND OUTLET CONNECTIONS AT ALL AIR HANDLING EQUIPMENT.
- ALL DUCTWORK SHALL BE THERMALLY INSULATED WITH R6 55.56mm (2-3/16") THICK FLEXIBLE FIBERGLASS DUCT INSULATION WITH FSK BACKING.
- CONTROLS CONTRACTOR SHALL PROVIDE AND INSTALL ALL TRANSFORMERS, STARTERS, CONTROLS, AND THERMOSTATS FOR ALL AIR HANDLING EQUIPMENT. MOUNT THERMOSTATS AT 1525mm (5'-0") A.F.F., UNLESS REQUIRED OTHERWISE BY CODE. WIRE ALL COMPONENTS TO MAKE A WORKING SYSTEM.
- PROVIDE FLEXIBLE CONNECTIONS AT INLETS AND OUTLETS TO ALL AIR HANDLING EQUIPMENT AND HEAT PUMPS. CONNECTIONS TO BE BETWEEN 100mm (4") AND 200mm (8") WIDE, APPROVED FIREPROOF, WATERPROOF GLASS FABRIC FASTENED BY GALVANIZED BANDS W/TIGHTENING SCREWS. INDOORS: NEOPRENE COATED. OUTDOORS: HYPALON COATED.
- PROVIDE DUCT CLEANING SERVICE FOR SYSTEM IN ACCORDANCE WITH SPECIFICATION SECTION 23 01 31
- BALANCING FOR HVAC SYSTEM SHALL BE IN ACCORDANCE WITH SPECIFICATION SECTION 23 05 93.
- GAS TO STEAM AIR HUMIDIFIERS REQUIRE 13mm DOMESTIC COLD WATER SUPPLY LINE COMPLETE WITH SURGE SUPPRESSOR, 5mm FILTER, AND TOTALIZING FLOW METER.

VENTILATION PRODUCTS:

DUCT ACOUSTIC LINER:

INSTALL WHERE SHOWN ON THE DRAWINGS AND AS DESCRIBED ABOVE 12mm (1/2") THICK FLEXIBLE DUCT LINER. MATERIAL TO MEET THE REQUIREMENTS OF NFPA 90A AND NFPA 90B.

NORTH WING AIR HANDLER (AHU-1):

NEW MULTIZONE DUAL DECK AIR HANDLER UNIT SHALL BE OF MODULAR DESIGN CAPABLE OF BREAKING DOWN INTO UNITS UNDER 864mm (34in) WIDE. UNIT SHALL INCLUDE VFD FAN CONTROL, SUMMER AND WINTER MERV8 FILTER SET, HYDRONIC PREHEAT, COOLING AND MAIN HEAT COILS (SEE PREHEAT COIL IN HYDRONIC PRODUCTS), RETURN AIR CO2 SENSOR FOR DAMPER CONTROL, HUMIDIFICATION WAND, AND FREEZE PROTECTION THERMOSTAT.

PERFORMANCE

AIR FLOW: 3425L/S (7257 CFM)  
MAXIMUM FAN POWER: 0.8 W/CFM  
INLET AIR TEMP.: 4.6°C (40.2°F)  
HEAT COIL INLET TEMP.: 4.4°C (40°F)  
AHU OUTLET TEMP.: 32.4°C (90°F)  
ACCEPTABLE PRODUCT: DAIKIN CAH014GMAC OR APPROVED EQUAL

GAS TO STEAM AIR HUMIDIFIERS (AH-1 TO AH-3):

SOUTH WING, AND ANIMAL AUTOPSY AIR HANDLING UNITS SHALL BE SUPPLIED WITH NATURAL GAS FIRED STEAM HUMIDIFIERS. UNITS SHALL BE CONDENSING COMPLETE WITH STAINLESS STEEL TANK AND HEAT EXCHANGER, SACRIFICIAL ANODE, AUTOMATIC BLOW DOWN, HUMIDITY SENSORS, AND HUMIDISTAT.

PERFORMANCE

VOLTAGE: 120V/1ø/60Hz  
ANIMAL AUTOPSY CAPACITY: 23KG/HR (50LB/HR)  
ACCEPTABLE PRODUCT: NORTEC GS-50 OR APPROVED EQUAL  
NORTH WING CAPACITY: 68 KG/HR (150LB/HR)  
SOUTH WING CAPACITY: 68 KG/HR (150LB/HR)  
ACCEPTABLE PRODUCT: NORTEC GS-150 OR APPROVED EQUAL

NORTH WING RETURN AIR FAN (RAF-1):

RETURN AIR FAN SHALL BE A VFD CONTROLLED DIRECT DRIVE INLINE CENTRIFUGAL BLOWER. BLOWER SHALL INCLUDE PREMIUM EFFICIENCY MOTOR, STANDARD NEMA 1 DISCONNECT, INTEGRAL INLET AND OUTLET COLLARS FOR SLIP FIT DUCT CONNECTIONS, EXTENDED LUBE LINES, STRAIGHTEN VALVES, AND HIGH EFFICIENCY MIXED FLOW WHEEL.

PERFORMANCE

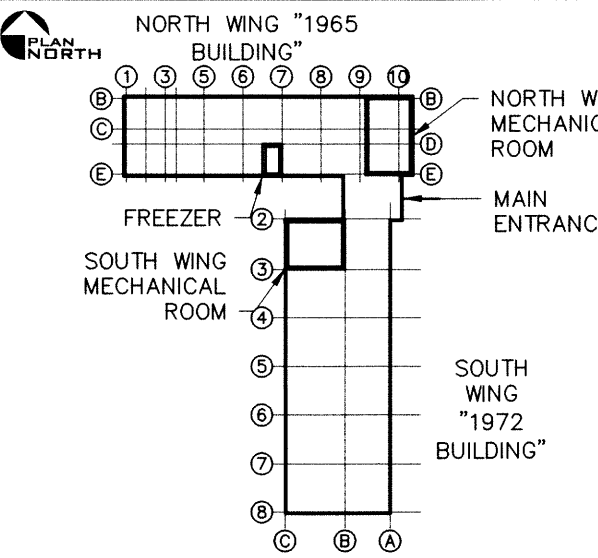
AIR FLOW: 3425L/S (7257 CFM)  
MAXIMUM FAN POWER: 0.8 W/CFM  
STATIC PRESSURE: 38.1mm (1.5 inWC)  
HORSE POWER: 5 HP  
VOLTAGE: 575/3ø/60Hz  
CURRENT: 6.1 FLA  
ACCEPTABLE PRODUCT: COOK 2520MXHPD11 OR APPROVED EQUAL



Environment Canada  
Environnement Canada

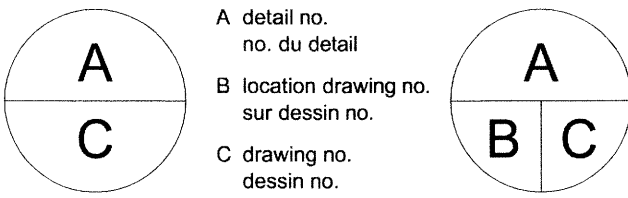
Real Property  
Management Division  
Technical Services

Division Gestion  
des biens immobilier  
Services Techniques



BUILDING KEY PLAN

LEGEND



project project

MECHANICAL UPGRADE  
115 PERIMETER ROAD  
SASKATOON, SASK.

ENVIRONMENT CANADA  
335 River Rd  
Ottawa ON, K1V 1C7

drawing dessin

MECHANICAL  
SPECIFICATION  
(SHT 2 OF 2)

Designed By	GDK	Conçu par
Date	2017/05/15	(yyyy/mm/dd)
Drawn By	BJB	Dessiné par
Date	2017/06/05	(yyyy/mm/dd)
Reviewed By	ADR	Examiné par
Date	2017/06/23	(yyyy/mm/dd)
Approved By	AMB	Approuvé par
Date	2017/06/23	(yyyy/mm/dd)
Tender		Soumission

Project Manager	Administrateur de projets
EC PMDI Proj no.	Consultant Proj no.
	17-0006-001
Drawing no.	No. du dessin

M02



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