AGRICULTURE & AGRI-FOOD CANADA
SASKATOON RDC HOT WATER TANK REPLACEMENTS

107 SCIENCE PLACE
SASKATOON, SASKATCHEWAN

ISSUED FOR TENDER
(2020.04.27)

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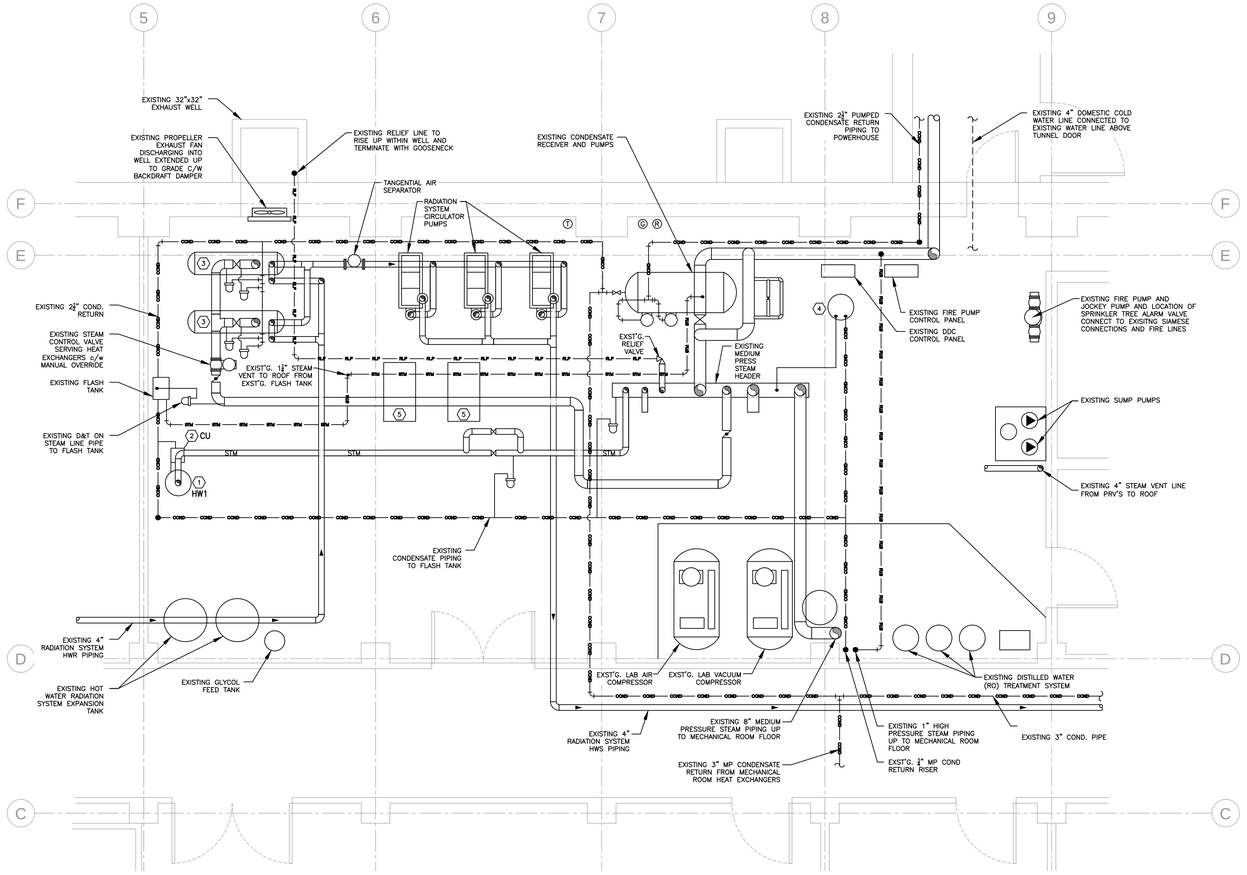
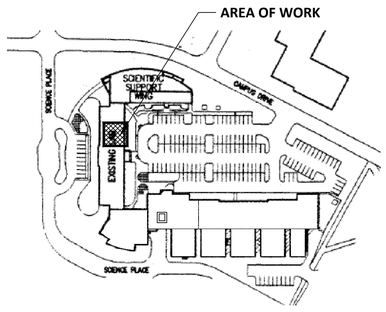
DRAWING INDEX

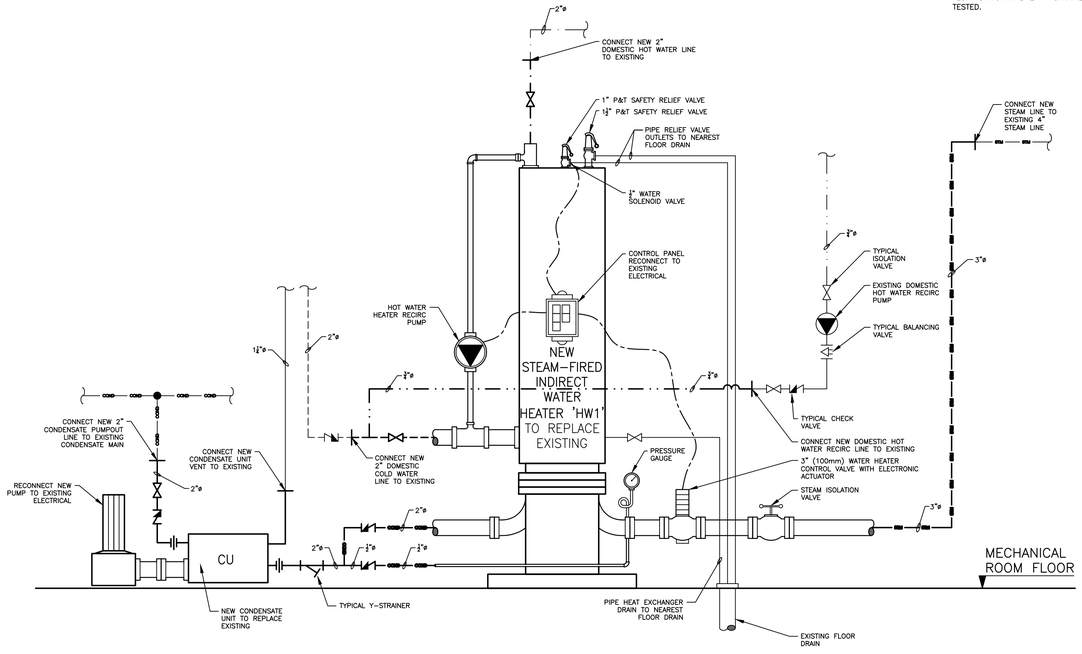
MECHANICAL



1 SUB BASEMENT MACHINE ROOM PLAN (LAB WING)
SCALE: 1:50



2 KEY PLAN
SCALE: N.T.S.



3 LAB WING WATER HEATER REPLACEMENT PIPING SCHEMATIC
SCALE: NTS

DEMOLITION KEYNOTES ⟨XX⟩ —DENOTES KEYNOTE ON DRAWING

1. EXISTING STEAM-FIRED AERO HOT WATER HEATING SYSTEM TO BE DE-COMMISSIONED, REMOVED, AND REPLACED WITH NEW AERCO STEAM-FIRED HOT WATER HEATING SYSTEM 'HW1'. DISCONNECT EXISTING HOT WATER HEATER FROM EXISTING STEAM SUPPLY, CONDENSATE RETURN, COLD WATER SUPPLY, HOT WATER SUPPLY, HOT WATER RECIRC, AND ELECTRICAL AND REMOVE UNITS. INSTALL NEW HOT WATER HEATER 'HW1' AND RECONNECT TO EXISTING STEAM SUPPLY, CONDENSATE RETURN, COLD WATER SUPPLY AND HOT WATER SUPPLY, HOT WATER RECIRC AND ELECTRICAL. SEE DETAIL 3/M01 FOR PIPING SCHEMATIC. ALL ELECTRICAL DISCONNECTION AND RECONNECTION TO BE COMPLETED IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE.
2. EXISTING CONDENSATE RECEIVER UNIT TO BE DE-COMMISSIONED, REMOVED AND REPLACED WITH NEW CONDENSATE UNIT 'CU'. DISCONNECT EXISTING CONDENSATE UNIT FROM EXISTING CONDENSATE RETURN, VENT, ELECTRICAL, DRAIN, ETC. INSTALL NEW CONDENSATE UNIT 'CU1' AND RECONNECT TO EXISTING CONDENSATE RETURN, DRAIN, VENT, ELECTRICAL, ETC. SEE DETAIL 3/M01 FOR PIPE SCHEMATIC. ELECTRICAL DISCONNECTION AND RECONNECTION TO BE COMPLETED IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE.
3. EXISTING HEAT EXCHANGER TO REMAIN.
4. STEAM-FIRED DOMESTIC WATER HEATER TO REMAIN.
5. EXISTING MECHANICAL EQUIPMENT TO REMAIN.

MECHANICAL EQUIPMENT SCHEDULE

HW1 – HOT WATER HEATER #1
SUPPLY AND INSTALL A WATTS AERCO DW+ INDIRECT FIRED DOUBLE-WALL PACKAGED WATER HEATER OR EQUAL MODEL SWDW24/3.00 STEAM TO WATER DOUBLE WALL 24 WITH 3.00 INCH VALVE. UNIT TO PROVIDE A TOTAL HOT WATER FLOW OF 55GPM (3.46L/S) WITH A COLD WATER INLET TEMPERATURE OF 40°F (4.4°C), HOT WATER OUTLET TEMPERATURE OF 140°F (60°C), A STEAM SUPPLY PRESSURE OF 15PSIG (103.4kPA), HEATER COIL PRESSURE OF 9.56PSIG (67.24kPA), AND A STEAM CONSUMPTION OF 3012LBS/HR (1366.8KG/HR). UNIT TO BE COMPLETE WITH REAL-TIME, LOAD TRACKING AND RESPONSIVE CONTROLS TO MAINTAIN ACCURATE HOT WATER TEMPERATURE UNDER DIVERSIFIED LOADS, DOUBLE WALL TUBING WITH 2-DISTINCT, COPPER TUBE WALLS SEPARATING THE POTABLE WATER FROM STEAM HEAT TRANSFER MEDIUM VIA VENTED AIR GAP. UNIT CONSTRUCTION TO MEET ALL DOUBLE-WALL HEAT EXCHANGER REQUIREMENTS AS SET FORTH BY BOCA, IAPMO AND NAPHCC. ALL WATER WETTED PARTS TO BE 304 STAINLESS STEEL, VIRGIN TEFLON, COPPER OR COPPER ALLOY. UNIT TO BE OF SEMI-INSTANTANEOUS DESIGN WITH STEAM TUBES AND WATER IN SHELL. UNIT TO BE COMPLETE WITH ELECTRONIC CONTROLS PACKAGE (ECV) WITH ELECTRONIC VALVE ACTUATOR AND STATE-OF-THE-ART CONTROLLER WITH FAIL-SAFE AUTO-SHUTDOWN RESPONSE TO OVER-TEMPERATURE CONDITIONS, DIAL-IN SETPOINT AND TUNE SYSTEM PARAMETERS USING CONTROL BOX, REMOTE ACCESS TO MONITOR OR CONTROL PERFORMANCE SETTINGS, FULL INTEGRATION TO BAS SOFTWARE, EASY ONE-TOUCH START-UP, ±2°F TEMPERATURE CONTROL WHEN UNDER CONSTANT LOAD CONDITIONS AND ±1°F TEMPERATURE CONTROL UNDER NORMAL LOAD CHANGES. UNIT TO ALSO BE COMPLETE WITH 1.5" (38mm) INSULATED JACKET, PAINTED STEEL STAND, P&T RELIEF VALVES WATER SOLENOID, 3" HOT WATER OUTLET, 2" NPT PLUGGED DRAIN, STEAM PRESSURE GAUGE, DOUBLE WALL TUBE LEAK DETECTION PORT, 2" NPT CONDENSATE OUTLET, RECIRC PUMP, 3" NPT COLD WATER INLET , AND 2"-150# FLANGED STEAM INLET. UNIT ELECTRICAL IS 115 VOLT, SINGLE PHASE. SEE DETAIL 3/M01.

HW2 – HOT WATER HEATER #2
SUPPLY AND INSTALL A WATTS AERCO DW+ INDIRECT FIRED DOUBLE-WALL WATER HEATER OR EQUAL MODEL SWDW68/4.00 STEAM TO WATER DOUBLE WALL 68 WITH 4 INCH VALVE. UNIT TO PROVIDE A TOTAL HOT WATER FLOW OF 88.5GPM (5.6L/S) WITH A COLD WATER INLET TEMPERATURE OF 40°F (4.4°C), HOT WATER OUTLET TEMPERATURE OF 140°F (60°C), A STEAM SUPPLY PRESSURE OF 15PSIG (103.4kPA), HEATER COIL PRESSURE OF 9.75PSIG (67.22kPA), AND A STEAM CONSUMPTION OF 4572LBS/HR (2074KG/HR). UNIT TO BE COMPLETE WITH REAL-TIME, LOAD TRACKING AND RESPONSIVE CONTROLS TO MAINTAIN ACCURATE HOT WATER TEMPERATURE UNDER DIVERSIFIED LOADS, DOUBLE WALL TUBING WITH 2-DISTINCT, COPPER TUBE WALLS SEPARATING THE POTABLE WATER FROM STEAM HEAT TRANSFER MEDIUM VIA VENTED AIR GAP. UNIT CONSTRUCTION TO MEET ALL DOUBLE-WALL HEAT EXCHANGER REQUIREMENTS AS SET FORTH BY BOCA, IAPMO AND NAPHCC. ALL WATER WETTED PARTS TO BE 304 STAINLESS STEEL, VIRGIN TEFLON, COPPER OR COPPER ALLOY. UNIT TO BE OF SEMI-INSTANTANEOUS DESIGN WITH STEAM TUBES AND WATER IN SHELL. UNIT TO BE COMPLETE WITH ELECTRONIC CONTROLS PACKAGE (ECV) WITH ELECTRONIC VALVE ACTUATOR AND STATE-OF-THE-ART CONTROLLER WITH FAIL-SAFE AUTO-SHUTDOWN RESPONSE TO OVER-TEMPERATURE CONDITIONS, DIAL-IN SETPOINT AND TUNE SYSTEM PARAMETERS USING CONTROL BOX, REMOTE ACCESS TO MONITOR OR CONTROL PERFORMANCE SETTINGS, FULL INTEGRATION TO BAS SOFTWARE, EASY ONE-TOUCH START-UP, ±2°F TEMPERATURE CONTROL WHEN UNDER CONSTANT LOAD CONDITIONS AND ±4°F TEMPERATURE CONTROL UNDER NORMAL LOAD CHANGES. UNIT TO ALSO BE COMPLETE WITH 1.5" (38mm) INSULATED JACKET, PAINTED STEEL STAND, P&T RELIEF VALVES, WATER SOLENOID, 3" HOT WATER OUTLET, 2" NPT PLUGGED DRAIN, STEAM PRESSURE GAUGE, DOUBLE WALL TUBE LEAK DETECTION PORT, 4"-150# FLANGED CONDENSATE OUTLET, RECIRC PUMP, 3" NPT COLD WATER INLET , AND 4" FLANGED STEAM INLET. UNIT ELECTRICAL IS 115 VOLT, SINGLE PHASE. SEE DETAILS 3/M02 AND 4/M02..

CU – CONDENSATE UNIT
REPLACE EXISTING CONDENSATE UNIT WITH A NEW HOFFMAN SPECIALTY WATCHMAN SERIES WCS MODEL WCS 6-20B CONDENSATE UNIT OR EQUAL. UNIT TO HAVE A CAPACITY OF 80PM WITH A DISCHARGE PRESSURE OF 22PSI AND A 6 GALLON RECEIVER CAPACITY. UNIT TO BE COMPLETE WITH 1.3HP, 3500RPM, 115 VOLT, CLOSE COUPLE BRONZE CENTRIFUGAL PUMP, ⅜" STEEL RECEIVER, INLET/VENT AND OVERFLOW RECEIVER OPENINGS, AND DOUBLE POLE ADJUSTABLE FLOAT SWITCH AND 2" Y-STRAINER FOR RECEIVER INLET. UNIT TO BE FACTORY WIRED AND TESTED.

MECHANICAL DEMOLITION GENERAL NOTES

1. THE CONTRACTOR IS RESPONSIBLE FOR THE COMPLETE REMOVAL AND DISPOSAL OF ALL EXISTING MECHANICAL EQUIPMENT INCLUDING PIPING, FITTINGS, INSULATION, VENTING, ETC. AS NOTED.
2. PATCH ALL SURFACES DISTURBED AS A RESULT OF DEMOLITION INCLUDING CEILINGS, ROOF, FLOORS, WALLS, ETC. AND MAKE GOOD AND LEVEL TO EXISTING SURROUNDINGS.
3. THE CONTRACTOR IS RESPONSIBLE FOR FINAL CLEANING OF THE AFFECTED AREAS.
4. COORDINATE ALL WORK WITH THE OWNER'S PHASING PLAN TO MINIMIZE INTERRUPTION DURING BUSINESS AND OPERATING HOURS.
5. THE CONTRACTOR SHALL PROTECT ALL OCCUPIED AREAS WITH BOARDING, DUST BARRIERS, ETC. AND CLEAN UP WORK SPACES ON A DAILY BASIS.
6. THE CONTRACTOR WILL BE RESPONSIBLE FOR COORDINATION OF THE REMOVAL, REINSTALLATION, AND/OR REPLACEMENT OF EXISTING BUILDING ITEMS. DISTURBED AS A RESULT OF THE DEMOLITION AND INSTALLATION OF NEW MECHANICAL SYSTEMS WHERE NECESSARY.
7. THE CONTRACTOR SHALL MAINTAIN A CLEAN, ORGANIZED WORK AND DISPOSAL STAGING AREA. PROVIDE GARBAGE/REFUSE CONTAINER FOR DEMOLITION MATERIAL AND INCLUDE ALL COSTS FOR REMOVAL AND DISPOSAL. COORDINATE STAGING AREA WITH OWNERS.
8. ALL HAZARDOUS WASTE SUCH AS REFRIGERANT, OIL, CHEMICALS, ETC. TO BE DISPOSED OF IN ACCORDANCE WITH THE MINISTRY OF ENVIRONMENT AND THE CITY OF SASKATOON REQUIREMENTS.
9. LOCATION AND CONFIGURATION OF EXISTING EQUIPMENT, PIPE, ETC. WAS OBTAINED FROM EXISTING DRAWINGS AND SITE VISITS. CONTRACTOR TO DETERMINE AND VERIFY EXACT CONFIGURATION AND LOCATION OF EXISTING MECHANICAL SYSTEMS ON SITE.
10. TO OUR KNOWLEDGE AND BASED ON OUR INITIAL SITE INSPECTION. THERE DOES NOT APPEAR TO BE ANY ASBESTOS MATERIAL IN THE AFFECTED AREA. SHOULD THE CONTRACTOR ENCOUNTER POTENTIAL ASBESTOS MATERIAL, ADVISE CONSULTANT BEFORE PROCEEDING.

NOTE THAT FACILITY WILL REMAIN OPEN AND OPERATIONAL FOR THE DURATION OF THIS PROJECT. CONTRACTOR TO COORDINATE WITH OWNER THE DECOMMISSIONING, REMOVAL OF EXISTING HOT WATER HEATING SYSTEMS AND INSTALLATION AND RE-COMMISSIONING OF NEW HOT WATER HEATING SYSTEMS WITH OWNERS TO MINIMIZE DISRUPTION TO THE OWNERS OPERATION. THIS WILL LIKELY INCLUDE SOME WORK TO OCCUR OUTSIDE OF NORMAL OPERATING HOURS.

MECHANICAL RENOVATION GENERAL NOTES

1. ALL EQUIPMENT TO BE INSTALLED AS PER MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
2. ALL PIPING IS SHOWN SCHEMATICALLY.
3. CONTRACTOR IS RESPONSIBLE TO OBTAIN ALL NECESSARY PERMITS AND PAY PERMIT AND INSPECTION FEES.
4. CONTRACTOR TO COORDINATE AND INCLUDE THE COMMISSIONING AND START UP OF THE NEW HOT WATER HEATER AND RELATED CONTROLS WITH THE HOT WATER HEATER SUPPLIER/MANUFACTURER.
5. THE CONTRACTOR SHALL SUBMIT ALL REQUIRED DOCUMENTATION TO THE MINISTRY OF ENVIRONMENT TECHNICAL SAFETY AUTHORITY INCLUDING WATER HEATER PRESSURE VESSEL DOCUMENTATION. CONTRACTOR TO BE RESPONSIBLE FOR INSPECTION AND CERTIFICATION INCLUDING FEES.
6. COORDINATE COORDINATE SCHEDULE IN DETAIL WITH OWNER. BUILDING WILL REMAIN OCCUPIED AND IN OPERATION THRU THE DURATION OF DEMOLITION, INSTALLATION AND COMMISSIONING. ANY WORK WHICH CAUSES DISRUPTION TO THE BUILDING OPERATION, DISRUPTION TO THE BUILDING ACCESS, OR IS NOISY, MAY NEED TO BE COMPLETED AFTER HOURS.
7. REFER TO DRAWING M03 FOR MECHANICAL SPECIFICATIONS AND DETAILS.

MECHANICAL LEGEND

PROPOSED	EXISTING		PROPOSED	EXISTING	
	RLF	RELIEF LINE			3-WAY CONTROL VALVE
	COND	CONDENSATE LINE			PUMP
	STM	STEAM LINE			DOMESTIC COLD WATER
		SANITARY SEWER			DOMESTIC HOT WATER
		ISOLATION VALVE			DOMESTIC HOT WATER RECIRC
	P	PRESSURE GAUGE			STRAINER
		FITTING			STEAM TRAP
		UNION		W	WATER METER
		CHECK VALVE			SOFT WATER
		DRAIN		TW	TEMPERED WATER
				G	GAS METER
				R	GAS REGULATOR

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2020-04-27
SASKATCHEWAN

Project Title:

AGRICULTURE & AGRI-FOOD CANADA SASKATOON RDC HOT WATER TANK REPLACEMENTS

107 SCIENCE PLACE
SASKATOON, SASKATCHEWAN

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LAB WING HOT WATER HEATER REPLACEMENT

Designed By:	GAS	Scale:	AS INDICATED
Drawn By:	DAN	Date:	APRIL 2020
Checked By:	GAS	Date:	APRIL 2020
Project No.:	5197		

M01

Revision No.: - Date: -

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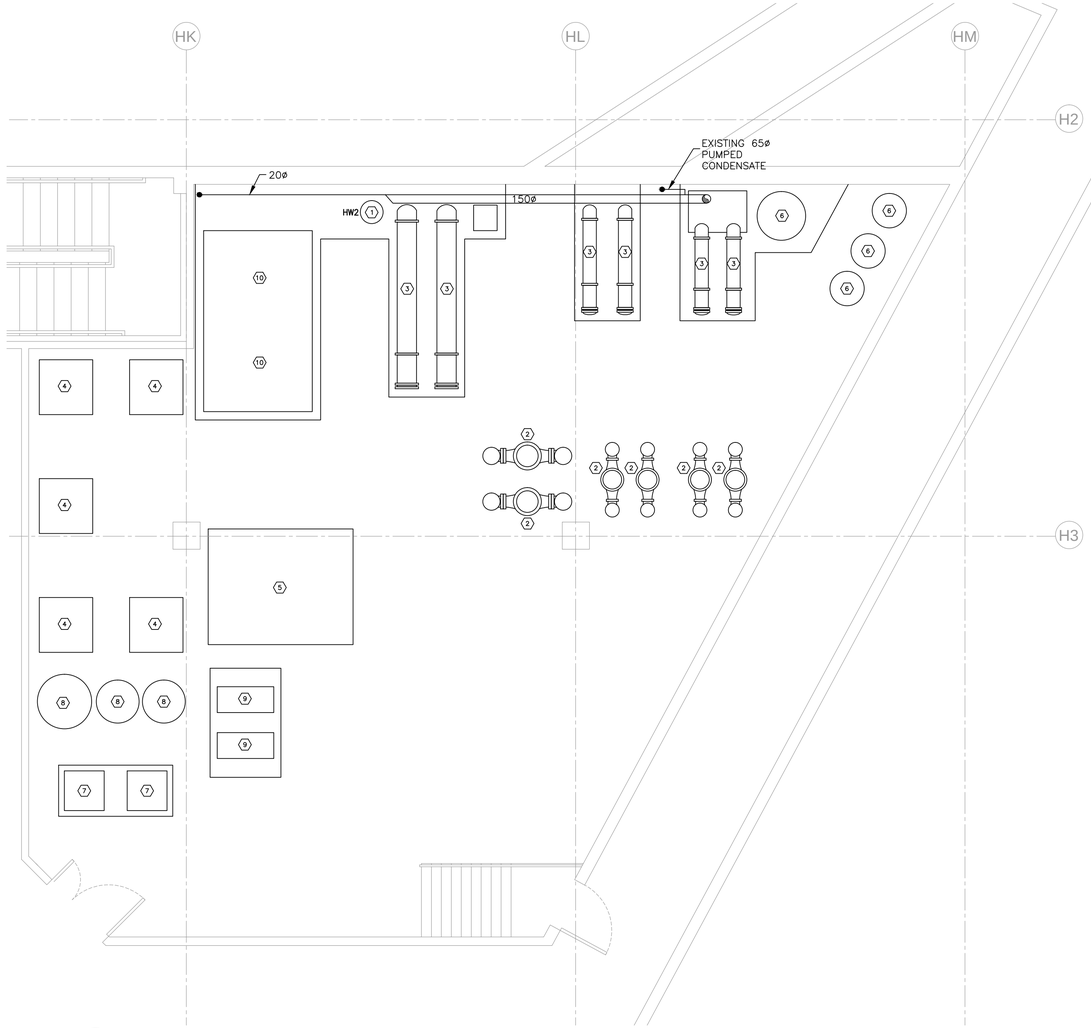
M:\Current Projects\5197 AAFC Hot Water heating\5197 DRAWINGS\5197 WORKING DRAWINGS\5197M01



1 BASEMENT MECHANICAL ROOM EQUIPMENT LAYOUT
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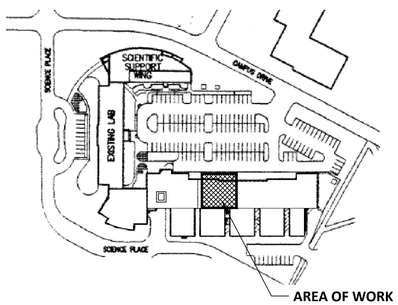


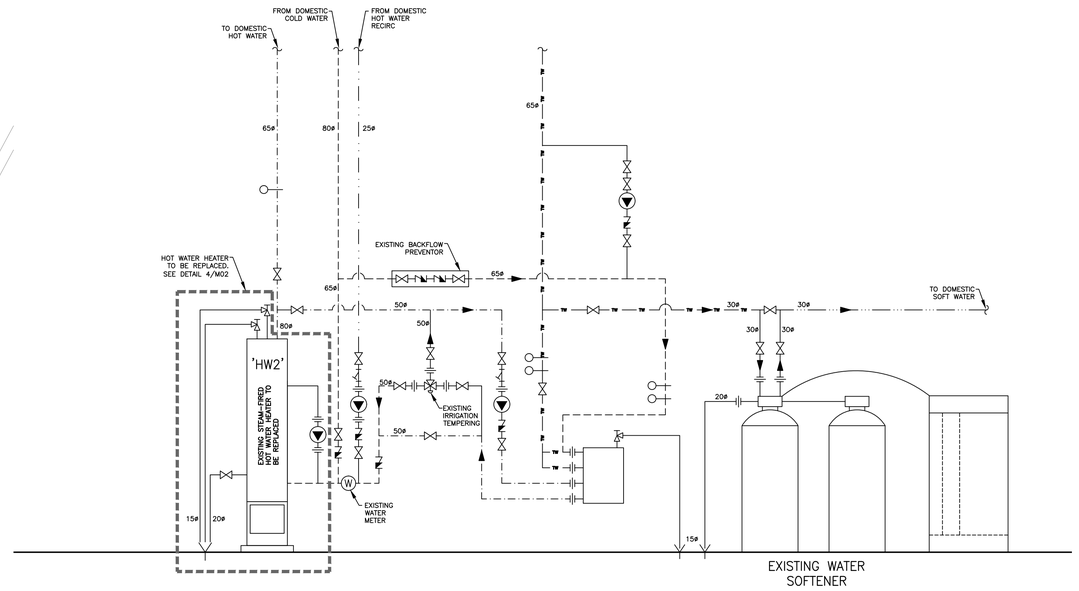
2 KEY PLAN
SCALE: N.T.S.

DEMOLITION KEYNOTES ⟨XX⟩ — DENOTES KEYNOTE ON DRAWING

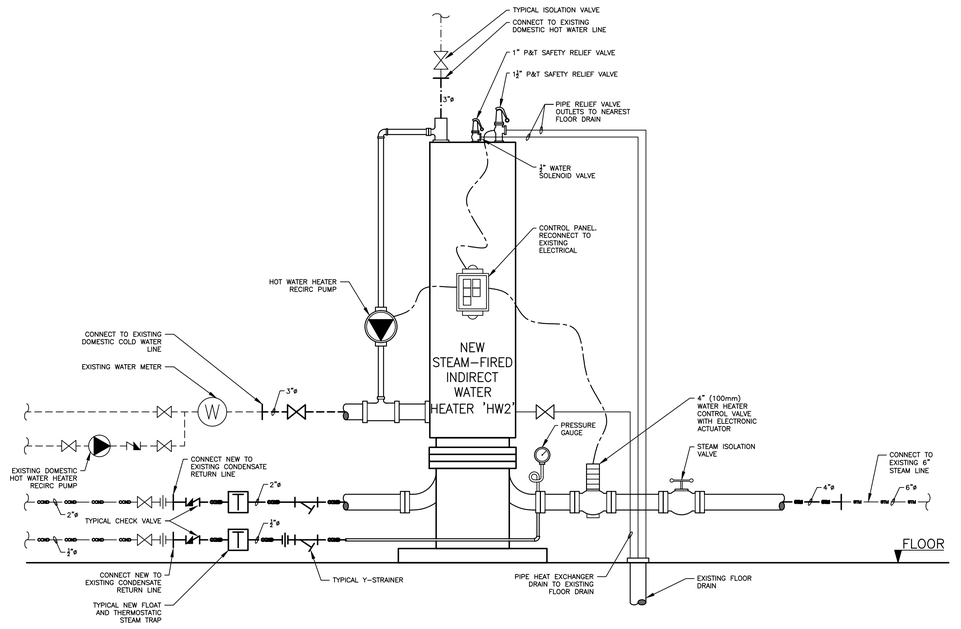
1. EXISTING STEAM FIRED HOT WATER HEATER TO BE REPLACED. DISCONNECT EXISTING HOT WATER HEATER FROM EXISTING STEAM SUPPLY, CONDENSATE RETURN, COLD WATER SUPPLY, HOT WATER SUPPLY, HOT WATER RECIRC AND ELECTRICAL AND REMOVE UNIT. INSTALL NEW HOT WATER HEATER 'HW2' AND RECONNECT TO EXISTING STEAM SUPPLY, CONDENSATE RETURN, COLD WATER SUPPLY, HOT WATER SUPPLY, HOT WATER RECIRC, AND ELECTRICAL. SEE DETAILS 3/M02 AND 4/M02 FOR PIPING SCHEMATICS. ALL ELECTRICAL DISCONNECTION AND RECONNECTION TO BE COMPLETED IN ACCORDANCE WITH THE REQUIREMENTS OF THE CANADIAN ELECTRICAL CODE.
2. EXISTING PUMPS TO REMAIN.
3. EXISTING HEAT EXCHANGER TO REMAIN.
4. EXISTING MECHANICAL EQUIPMENT TO REMAIN.
5. EXISTING VACUUM PUMP SYSTEM TO REMAIN.
6. EXISTING EXPANSION TANK TO REMAIN.
7. EXISTING AIR DRYER TO REMAIN.
8. EXISTING AIR RECEIVER TO REMAIN.
9. EXISTING AIR COMPRESSOR TO REMAIN.
10. EXISTING PACKAGED PRESSURE TANK SYSTEM TO REMAIN.

MECHANICAL GENERAL NOTES

1. SEE DRAWING M01 FOR MECHANICAL EQUIPMENT SCHEDULE, MECHANICAL DEMOLITION GENERAL NOTES, MECHANICAL GENERAL NOTES, LEGEND, ETC.
2. SEE DRAWING M03 FOR MECHANICAL SPECIFICATIONS.



3 EXISTING DOMESTIC HOT WATER AND LABORATORY WATER SCHEMATIC (FOR REFERENCE)
SCALE: NTS



4 HEADERHOUSE WATER HEATER REPLACEMENT PIPING SCHEMATIC
SCALE: NTS

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2020-04-27
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Project Title:

AGRICULTURE & AGRI-FOOD CANADA SASKATOON RDC HOT WATER TANK REPLACEMENTS

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HEADERHOUSE WING HOT WATER HEATER REPLACEMENT

Designed By:	GAS	Scale:	AS INDICATED
Drawn By:	DAN	Date:	APRIL 2020
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M02

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MECHANICAL SPECIFICATIONS

1.0 GENERAL

1.1 GENERAL PROVISIONS

1.1.1
THE CONTRACTOR SHALL PROVIDE A COMPLETE AND FULLY OPERATIONAL MECHANICAL SYSTEM.

1.1.2
THE CONTRACTOR SHALL EXAMINE THE SITE PRIOR TO SUBMITTING THEIR QUOTE TO FAMILIARIZE THEMSELVES WITH THE WORK INVOLVED.

1.1.3
ANY DISCREPANCIES AND OMISSIONS DISCOVERED SHALL BE REPORTED TO THE ENGINEER IMMEDIATELY AND PRIOR TO TENDER CLOSING FOR RECERTIFICATION BY ADDENDUM.

1.1.4
EACH CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR LAYING OUT THEIR WORK AND FOR ANY DAMAGE CAUSED BY IMPROPER EXECUTION OF THEIR WORK. CONTRACTOR TO CARRY ALL NECESSARY INSURANCE COVERAGE.

1.2.0 WARRANTY

1.2.1
THE MECHANICAL CONTRACTOR AS A CONDITION PRECEDENT TO FINAL PAYMENT AFTER COMPLETION OF THIS WORK SHALL PROVIDE THE OWNER WITH A WRITTEN GUARANTEE WARRANTING ALL MATERIALS, LABOUR, AND EQUIPMENT FOR ONE (1) FULL YEAR FROM DATE OF ACCEPTANCE.

1.3.0 WORK, PRODUCTS, AND QUALITY

1.3.1
EQUIPMENT AND MATERIALS TO BE NEW AND FREE FROM DEFECTS AND HAVE DESIGN CHARACTERISTICS AS SPECIFIED.

1.3.2
ALL WORK AND MATERIALS SHALL BE INSTALLED AS SHOWN AND IN ACCORDANCE WITH THE NATIONAL BUILDING CODE AND ALL LOCAL CODES AND BUILDING REGULATIONS.

1.3.3
ALL EQUIPMENT SHALL BE C.S.A. APPROVED.

1.4.0 FEES AND PERMITS

1.4.1
THE MECHANICAL CONTRACTOR WILL OBTAIN AND PAY FEES FOR ALL PERMITS NECESSARY FOR COMPLETION OF THIS CONTRACT.

1.4.2
CONTRACTOR TO FURNISH ALL CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK CONFORMS WITH STANDARDS AND REQUIREMENTS OF THE AUTHORITIES HAVING JURISDICTION.

1.5.0 TESTING

1.5.1
TEST ALL EQUIPMENT AND MATERIALS WHERE REQUIRED BY THE SPECIFICATIONS OR AUTHORITIES HAVING JURISDICTION TO DEMONSTRATE ITS PROPER OPERATION TO THE OWNER.

1.5.2
CARRY OUT ALL HYDRAULIC TESTS PRIOR TO COVERING PIPE IN ANY WAY.
– TEST ALL WATER PIPING AT 700 kPA (100 psi) PRESSURE FOR A PERIOD OF TWO (2) HOURS WITH NO APPRECIABLE PRESSURE DROP.
–TEST ALL STEAM AND CONDENSATE RETURN PIPING AT 1.5 TIMES OPERATING PRESSURE FOR A PERIOD OF 2 HOURS WITH NO APPRECIABLE PRESSURE DROP.

1.6.0 CUTTING AND PATCHING

1.6.1
THE MECHANICAL CONTRACTOR SHALL PROVIDE SLEEVES 200mm (8") DIAMETER AND SMALLER AS REQUIRED TO EXECUTE THE MECHANICAL INSTALLATION.

1.7.0 FLASHING AND COUNTERFLASHING

1.7.1
ALL MECHANICAL WORK PASSING THROUGH THE ROOF SHALL BE FLASHED BY THE MECHANICAL CONTRACTOR. COUNTERFLASHING TO BE DONE BY THE ROOFING CONTRACTOR.

1.8.0 APPROVALS

1.8.1
REQUEST FOR APPROVAL OF EQUIVALENT EQUIPMENT FROM MANUFACTURER'S NOT SPECIFIED ON DRAWINGS SHALL BE MADE IN WRITING SEVEN DAYS PRIOR TO TENDER CLOSING.

1.9.0 SHOP DRAWINGS

1.9.1
PRIOR TO THE FABRICATION OF ANY MATERIALS AND EQUIPMENT, SUBMIT A MINIMUM OF SEVEN (7) COMPLETE SETS OF SHOP DRAWINGS AND DATA SHEETS COVERING ALL ITEMS OF MECHANICAL EQUIPMENT UNDER THIS CONTRACT FOR REVIEW BY THE ENGINEER. ELECTRONIC PDF'S ARE ALSO ACCEPTABLE.

1.10.0 ELECTRIC MOTORS AND WIRING

1.10.1
SUPPLY ALL MECHANICAL EQUIPMENT WITH ELECTRIC MOTORS AS REQUIRED.

1.10.2
THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE TO SUPPLY ALL MOTOR STARTERS AND DISCONNECT SWITCHES FOR ALL MOTORS FOR THIS PROJECT AND INSTALL LINE VOLTAGE WIRING TO STARTERS AND FROM STARTERS TO MOTORS, EXCEPT WHERE PRE–WIRED IN PACKAGED EQUIPMENT.

1.10.3
ELECTRICAL CONTROLS CONNECTED TO MECHANICAL EQUIPMENT SHALL BE SUPPLIED BY THE MECHANICAL CONTRACTOR AND SHALL BE INSTALLED, WIRED, AND CONNECTED BY THE MECHANICAL CONTROLS SUBCONTRACTOR.

1.10.4
MECHANICAL SHALL CONFIRM ALL EQUIPMENT ELECTRICAL RATINGS WITH ELECTRICAL DRAWINGS AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO ORDERING EQUIPMENT.

1.11.0 MAINTENANCE MANUALS

1.11.1
FURNISH THREE (3) SETS OF MAINTENANCE MANUALS WITH INFORMATION OUTLINED BELOW TO THE ENGINEER PRIOR TO FINAL INSPECTION FOR APPROVAL.

1.11.2
MAINTENANCE MANUALS SHALL CONTAIN THE FOLLOWING:

– WARRANTY CERTIFICATE, COMMISSIONING REPORT
– DESCRIPTION OF ALL SYSTEMS
– DESCRIPTION OF COMPONENTS OF EACH PIECE OF EQUIPMENT
– DESCRIPTION OF CONTROL SYSTEM
– COMPLETE SET OF MARKED–UP AS–BUILT DRAWINGS
– DETAILED MAINTENANCE AND LUBRICATION SCHEDULE
– OPERATING AND MAINTENANCE INSTRUCTIONS FOR MAJOR EQUIPMENT
– LIST OF EQUIPMENT SUPPLIERS AND MANUFACTURERS
– DATA TO BE ASSEMBLED IN HARD COVER BINDERS
– IDENTIFY FRONT COVER WITH PROJECT NAME & PROJECT LOCATION
– LIST OF CONTRACTORS AND CONSULTANTS
– PROVIDE INDEX AND INDEX LABELS

1.12.0 OPERATING INSTRUCTIONS

1.12.1
ARRANGE AND PAY FOR THE SERVICE OF FULLY QUALIFIED PERSONNEL INCLUDING MANUFACTURER'S REPRESENTATIVES TO INSTRUCT THE OWNER IN OPERATION AND PREVENTIVE MAINTENANCE OF EACH PIECE OF EQUIPMENT AND SYSTEM SUPPLIED AND INSTALLED.

1.13.0 SUPPORTS, ANCHORS, AND SLEEVES

1.13.1
INSTALL SUPPORTS OF STRENGTH AND RIGIDITY TO SUIT LOADING WITHOUT UNDULY STRESSING OF BUILDING. LOCATE ADJACENT TO EQUIPMENT TO PREVENT UNDUE STRESS IN PIPING AND EQUIPMENT.

1.13.2
PROVIDE CHROME PLATED FLOOR, CEILING, AND WALL ESCUTCHEONS AS REQUIRED FOR PIPING IN FINISHED AREAS.

1.13.3
SEISMIC RESTRAINTS SHALL BE PROVIDED AS REQUIRED BY LOCAL CODE. WHEN LOCAL CODE HAS NO STANDARDS, SEISMIC RESTRAINTS SHALL BE PROVIDED AND INSTALLED PER SMACNA STANDARDS.

1.14.0 IDENTIFICATION

1.14.1
THE MECHANICAL CONTRACTOR SHALL SUPPLY AND PERMANENTLY INSTALL LAMACOIDS TO PROVIDE IDENTIFICATION OF ALL INSTALLED EQUIPMENT.

1.14.2
IDENTIFY ALL PIPING BY MEANS OF COLORED, SELF–ADHESIVE LABELS AND DIRECTIONAL ARROWS USING 19mm (3/4") HIGH LETTERING TO MATCH EXISTING.

1.14.3
LABEL ALL VALVES LARGER THAN 25mm (1").

1.15.0 RECORD DRAWINGS

1.15.1
THE MECHANICAL CONTRACTOR SHALL KEEP ON SITE EXTRA SETS OF PRINTS AND SPECIFICATIONS ON WHICH ALL CHANGES AND DEVIATIONS FROM THE ORIGINAL DESIGN SHALL BE RECORDED DAILY. THESE CHANGES MUST BE NEATLY ADDED TO A CLEAN SET OF DRAWINGS AND GIVEN TO THE OWNERS MARKED "AS–BUILT".

1.16.0 EQUIPMENT AND MATERIALS CLEAN–UP

1.16.1
PIPING, FIXTURES, DUCTS, AND EQUIPMENT SHALL BE THOROUGHLY CLEANED OF DIRT, GREASE, ADHESIVE LABELS, AND FOREIGN MATERIALS.

2.0 PLUMBING

2.1.0 PIPE AND FITTINGS

2.1.1
ALL PIPING SHALL MEET THE REQUIREMENTS OF THE PROVINCIAL PLUMBING CODE AND NATIONAL BUILDING CODE.

2.1.2
DOMESTIC WATER ABOVE GROUND: TYPE K OR TYPE L, HARD COPPER, 95/5 SOLDER JOINTS, WROUGHT COPPER OR BRONZE FITTINGS.

2.1.3
WASTE AND VENT PIPING ABOVE GROUND: TYPE DWV OR HARD DRAWN DRAINAGE TUBE, CAST BRASS FITTINGS, 50/50 SOLDER JOINTS. CAST IRON SOIL PIPE AND FITTINGS, MECHANICAL JOINTS.

2.2.0 VALVES

2.2.1
VALVES ON WATER PIPING SHALL BE AS FOLLOWS:

– GATE VALVES 50mm (2") AND SMALLER: CRANE No. 1320C
– GATE VALVES 65mm (2½") AND LARGER: CRANE No. 465 1/2C
– GLOBE VALVES 50mm (2") AND SMALLER: CRANE No. 1310
– GLOBE VALVES 65mm (2½") AND LARGER: CRANE No. 351
– CHECK VALVES 50mm (2") AND SMALLER: CRANE No. 1342
– CHECK VALVES 65mm (2½") AND LARGER: CRANE No. 373
– BALL VALVES 6mm (1/4") THRU 50mm (2"): GRINNELL FIG. 1550

3.0 STEAM AND CONDENSATE PIPING

3.1 PIPING

3.1.1
STEEL PIPE TO ASTM A53/A 53M, GRADE B SCHEDULE 40. WITH GROOVED ENDS FOR MECHANICAL GROOVE JOINTS.

3.1.2
NPS 2" AND UNDER SCREWED FITTING WITH PTFE TAPE.

3.1.3
CAST–IRON THREADED FITTING ASME 16.4, CLASS 300.

3.1.4
WROUGHT STEEL FLANGES AND FLANGED FITTINGS TO ASME 16–5 CLASS 250, BUTT WELD, RAISED FACE.

3.1.5
FLANGE GASKETS TO ASME 16.21 NON–METALLIC FLAT.

3.1.6
BOLT AND NUTS TO ASME B18.2.1.

3.1.7
STEEL PIPE NIPPLES TO ASTM A53/A 53M.

3.1.8
SCREWED FITTINGS MALLEABLE IRON TO ASME B16.3 CLASS 300.

3.1.9
PIPE FLANGES AND FLANGED FITTINGS CAST IRON TO ASME 16.1 CLASS 125, STEEL TO ASME B 16.5.

3.1.10
BUTT WELDING FITTINGS TO ASME 16.9.

3.1.11
UNIONS MALLEABLE CAST IRON TO ASME 16.3, CLASS 300.

3.1.12
FITTING FOR ROUGH GROOVE PIPING MALLEABLE IRON TO ASTM A47/A47M OR DUCTILE IRON TO ASTM A536.

3.2
INSULATE PIPING AS PER INSULATION SECTION 4.0.

3.3
PROVIDE PIPING EXPANSION COMPENSATION BY MEANS OF EXPANSION LOOPS AND OFFSETTING OF PIPES.

3.4
BRANCH TAKE–OFFS OFF HEATING PIPES SHALL BE OFF THE TOP HALF OF MAINS.

3.5 VALVES

3.5.1
NPS 2 AND SMALLED SCREWED ENDS.

3.5.2
NPS 2½" AND LARGER FLANGED OR GROOVED ENDS.

3.5.3
STOP CHECK VALVE MALLEABLE IRON FLANGED OR THREADED WITH CYLINDRICAL DISC BRASS ALLOY STEM, PRESSURE CLASS 250, OUTSIDE SCREW AND YORK OPERATOR.

3.5.4
DRAIN VALVES GATE CLASS 250 NON RISING STEM SOLID WEDGE DISK.

3.5.5
BALL VALVES NPS 2 AND UNDER BRONZE, FULL PORT.

3.5.6
GATE VALVE NPS2 AND UNDER CLASS 250 RISING STEM WEDGE DISC, NPS 2½" AND OVER RISING STEM WEDGE DISC, BRONZE TRIM.

3.5.8 – VALVES
SERVICE VALVES TO BE GATE TYPE WITH LOCKING HANDLE COMPOSITE DISC AND SEAL TO SUIT SERVICE ENCOUNTERED. DRAIN VALVES TO BE GATE VALVES SHALL BE IRON BODY, BRONZE MOUNTED, O, S&Y, DOUBLE DISC OR WEDGE WITH FLANGED ENDS. (CRANE CO., RISING STEM, 250 psi RATING).

3.6 SUPPORTS

3.6.1
MECHANICAL ROOM PIPING SHALL BE SUPPORTED WITH CLEVIS HANGERS FROM ROOF OR STEEL FLOOR STANDS TO PREVENT EXCESSIVE STRESS ON EQUIPMENT AND CIRCULATING PUMPS.

3.7 FLOAT AND THERMOSTAT TRAPS

THREADED CONNECTIONS,CAST IRON BODY AND BOLTED CAP, REPLACEABLE STAINLESS STEEL FLOAT MECHANISM, HARDENED STAINLESS STEEL HEAD AND SEAT, BALANCE PRESSURE TRAP, STAINLESS STEEL OR MONEL THERMOSTATIC BELLOWS, THERMOSTATIC AIR VENT CAPABLE OF WITHSTANDING 45°F OF SUPERHEAT AND RESISTING WATER HAMMER WITHOUT SUSTAINING DAMAGE, THERMOSTATIC VACUUM BREAKER WITH PHOSPHOR BRONZE BELLOWS AND STAINLESS STEEL CAGE, VALVE AND SEAT, MAXIMUM 125PSIG WORKING PRESSURE.

3.8 Y–STRAINERS

ASTM A126, CLASS B CAST IRON WITH BOLTED COVER AND BOTTOM DRAIN CONNECTION, THREADED ENDS, STAINLESS STEEL STRAINER SCREEN 20 MESH AND PERFORATED STAINLESS STEEL BASKET WITH 50% FREE AREA, TAPPED BLOW–OFF PLUG RATED FOR 250PSIG STEAM.

4.0 INSULATION

4.1.0 GENERAL

4.1.1
ALL INSULATION AND MATERIALS ASSOCIATED WITH INSULATION SHALL HAVE A FLAME SPREAD RATING OF NOT MORE THAN 25 AND A SMOKE DEVELOPED CLASSIFICATION OF NOT MORE THAN 50.

4.1.2
ALL PIPING INSULATION SHALL BE FIBROUS GLASS WITH K VALUE MAXIMUM 0.3 W/m DEGREES CELSIUS AT 24 DEGREES CELSIUS WITH FACTORY APPLIED JACKET – MANSON AK PIPE INSULATION OR APPROVED EQUAL.

4.1.3
ALL EXPOSED INSULATED PIPING TO BE COVERED WITH PVC JACKET.

4.1.4
ENSURE INSULATION IS CONTINUOUS THROUGH INSIDE WALLS. PACK AROUND PIPES WITH FIRE–PROOF, SELF SUPPORTING INSULATION MATERIALS.

4.1.5 INSULATION SCHEDULE:

STEAM AND CONDENSATE RETURN LINES – 25mm (1"); DOMESTIC HOT, COLD & RECIRC WATER LINES – 25mm (1").

5.0 ELECTRICAL

5.1.0 GENERAL CONDITIONS

5.1.1
ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE 2018 CANADIAN ELECTRICAL CODE, LOCAL BY–LAWS, AND UTILITY REQUIREMENTS.

5.1.2
ALL GOODS AND MATERIAL SHALL BE NEW, AND CARRY CSA APPROVAL SEAL. IN ADDITION, ALL FIRE ALARM EQUIPMENT SHALL CARRY ULC APPROVAL SEAL.

5.1.3
IN NO INSTANCE SHALL THE STANDARD ESTABLISHED BY THE DRAWINGS AND SPECIFICATIONS BE REDUCED BY ANY CODE OR ORDINANCE. ALL REFERENCES TO CODES SHALL BE TO THE LATEST EDITION.

5.1.4
ALL GOODS AND MATERIALS SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE.

5.1.5
ALL WORK SHALL BE EXECUTED IN A WORKMANLIKE AND SUBSTANTIAL MANNER, NEAT IN ITS MECHANICAL APPEARANCE AND ARRANGEMENT.

5.1.6
BEFORE COMMENCING THE WORK, THE ELECTRICAL CONTRACTOR SHALL EXAMINE THE WORK OF OTHER SUB–TRADES, AND REPORT AT ONCE ANY DEFECTS OR INTERFERENCE AFFECTING THE WORK UNDER THIS CONTRACT, OR THE GUARANTEE OF SAME.

5.1.7
AS THIS PROJECT INVOLVES A RENOVATION TO AN OCCUPIED EXISTING BUILDING, THE CONTRACTOR SHALL VISIT THE SITE DURING THE TENDERING PERIOD, AND THOROUGHLY SATISFY HIMSELF THAT THE WORK CONTAINED IN THESE DRAWINGS AND SPECIFICATIONS CAN BE CARRIED OUT. NO ALLOWANCE WILL BE MADE AFTER CONTRACT AWARD FOR ANY EXPENSE INCURRED BY THE CONTRACTOR FOR HAVING TO ADJUST THIS WORK TO PROVIDE A COMPLETE, FULLY OPERATIONAL INSTALLATION.

5.1.8
THE ELECTRICAL CONTRACTOR SHALL REVIEW ALL PROJECT DRAWINGS AND CONNECT TO EQUIPMENT FURNISHED IN OTHER DIVISIONS AND BY OWNER.

5.1.9
PROVIDE LABOUR AND MATERIALS REQUIRED TO INSTALL, TEST AND PLACE INTO OPERATION A COMPLETE ELECTRICAL SYSTEM.

5.1.10
EXAMINE ALL DRAWINGS TO ENSURE THAT WORK UNDER THIS DIVISION CAN BE PROPERLY INSTALLED WITHOUT INTERFERENCE.

5.1.11
WHERE DISCREPANCIES, AMBIGUITIES, OBVIOUS OMISSIONS OR ERRORS HAVE BEEN MADE IN DRAWINGS AND SPECIFICATIONS, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CLARIFY SAME PRIOR TO TENDER CLOSING. NO ALLOWANCE SHALL BE MADE AFTER CONTRACT AWARD FOR ANY EXPENSE INCURRED BY THE CONTRACTOR FOR HAVING TO ADJUST THE WORK TO PROPERLY CONFORM.

5.1.12
NO DEVIATION FROM SPECIFIED MATERIALS SHALL BE ALLOWED, EXCEPT WHERE ALTERNATIVE MATERIAL HAVE BEEN SPECIFICALLY ACCEPTED IN WRITING.

5.1.13
WHERE MATERIALS ARE NOT DIRECTLY SPECIFIED BY CATALOGUE NUMBER AND MANUFACTURER'S NAME, A HIGH INDUSTRY SPECIFICATION GRADE PRODUCT SHALL BE PROVIDED. THE CONSULTANT SHALL BE THE SOLE JUDGE OF WHETHER THIS STANDARD IS BEING MET.

5.1.14
ALL REFERENCES TO KNOWN STANDARD SPECIFICATIONS SHALL MEAN AND INTEND THE LATEST EDITION OF SUCH SPECIFICATION.

5.1.15
ALL TENDERS SHALL BE BASED ON MATERIALS SPECIFIED, EXCEPT WHERE APPROVAL OF EQUIVALENT PRODUCTS HAS BEEN OBTAINED IN WRITING FROM THE CONSULTANT.

5.1.16
PROVIDE ALL MOTOR CONNECTIONS, INCLUDING STARTERS, OVERLOAD PROTECTION AND DISCONNECTING DEVICES AT MOTORS. ALL MOTOR DRIVEN EQUIPMENT SHALL BE PROVIDED WITH A LOCKABLE DISCONNECTING DEVICE.

5.1.17
CHECK OTHER DIVISIONS TO ENSURE THAT SUITABLE PROVISIONS HAVE BEEN PROVIDED FOR ALL MOTORS. IT IS POSSIBLE THAT SOME MOTORS MAY VARY IN SIZE, NUMBERS AND CHARACTERISTICS, DEPENDING ON THE EQUIPMENT MANUFACTURER'S SPECIFIC REQUIREMENTS. ANY VARIATIONS IN THIS REGARD WILL NOT CONSTITUTE CAUSE FOR FURTHER CONSIDERATION.

5.1.18
IN THE EVENT OF ANY INSPECTION AUTHORITY REQUESTING DEVIATION FROM THE DESIGN, NOTIFY THE CONSULTANT, AND OBTAIN APPROVAL BEFORE PROCEEDING WITH ANY CHANGE.

5.1.19
SHOULD ANY CUTTING OR REPAIRING OF EITHER UNFINISHED OR FINISHED WORK BE REQUIRED, THE CONTRACTOR SHALL EMPLOY THE PARTICULAR TRADE WHOSE WORK IS INVOLVED, TO SO SUCH CUTTING AND PATCHING, AND SHALL PAY FOR ANY RESULTING COSTS.

5.2.0 CONDUCTORS AND CONDUIT

5.2.1
ALL CONDUCTORS SHALL BE MINIMUM #12AWG(COPER). ALL CONDUCTORS #12AWG TO #8AWG SHALL BE RATED FOR MINIMUM 600V RW–90 XLPE. CONDUCTORS #6AWG AND LARGER SHALL BE RATED FOR MINIMUM 1000V RW–90 XLPE. WIRING IN CHANNEL BACK OF FLOURESCENT FIXTURES SHALL BE 600V TYPE GTF OR TEW. SIZE, GRADE OF INSULATION, VOLTAGE AND MANUFACTURER'S NAME SHALL BE MARKED AT REGULAR INTERVALS.

5.2.2
ALL NEW CONDUIT AND WIRE SHALL BE CONCEALED AND RUN IN LINE WITH BUILDING STRUCTURES AND MECHANICAL DUCTWORK.

5.2.3
PROVIDE CONDUIT FOR ALL POWER, SYSTEMS SHALL BE SUPPLIED AND INSTALLED AS HEREIN SPECIFIED.

5.2.4
RUNS OF CONDUIT AND CABLES, WHERE SHOWN, ARE INDICATED ONLY BE GENERAL LOCATION AND ROUTING. CONDUITS AND CABLES SHALL BE INSTALLED TO PROVIDE MAXIMUM HEADROOM, AND TO INTERFERE AS LITTLE AS POSSIBLE WITH FREE USE OF SPACES THROUGH WHICH THEY PASS.

5.2.5
INSTALL EQUIPMENT GENERALLY IN LOCATIONS AND ROUTES SHOWN, CLOSE TO BUILDING STRUCTURE WITH MINIMUM INTERFERENCE WITH OTHER SERVICES OR FREE SPACE. REMOVE AND REPLACE IMPROPERLY INSTALLED EQUIPMENT TO THE SATISFACTION OF THE CONSULTANT AT NO EXTRA COST.

5.2.6
CONDUIT SHALL BE INSTALLED TO CONSERVE HEADROOM AND SPACE THROUGH WHICH THEY PASS. WHERE SPACE IS INDICATED FOR FUTURE EQUIPMENT, LEAVE SPACE CLEAR.

5.2.7
CONDUIT SHALL BE OF SUFFICIENT SIZE TO PERMIT EASY REMOVAL OF CONDUCTORS AT ANY TIME. CONDUIT SIZES, WHERE SHOWN ON DRAWINGS, ARE MINIMUM AND SHALL NOT BE REDUCED.

5.2.8
FLEXIBLE CONDUIT AND EMT CONNECTORS SHALL BE OF THE INSULATED THROAT TYPE.

5.2.9
ALL CONDUITS SHALL BE TERMINATED WITH A SUITABLE BUSHING.

5.2.10
EMT ENTERING BOXES OR ENCLOSURES SHALL BE TERMINATED WITH NYLON INSULATED CONCRETE TIGHT CONNECTORS.

5.2.11
CONDUIT AND CABLES HALL BE INSTALLED TO AVOID PROXIMITY TO WATER AND HEATING PIPES. THEY SHALL NOT RUN WITHIN 150mm OF SUCH PIPES, EXCEPT WHERE CROSSINGS ARE UNAVOIDABLE, IN WHICH CASE THEY SHALL BE KEPT AT LEAST 25mm FROM COVERING OF PIPE CROSSED.

5.2.12
PVC CONDUIT AND NON–METALLIC TUBING SHALL NOT PASS THROUGH A FIRE PARTITION OR FLOOR SEPARATION. WHERE IT IS NECESSARY FOR PVC CONDUIT OR NON–METALLIC TUBING TO PASS THROUGH A FIRE BARRIER, A HILTI FIRE STOP COLLAR SHALL BE PROVIDED FOR EITHER SIDE OF THE FORE BARRIER. ALSO, PVC CONDUIT AND NON–METALLIC TUBING SHALL NOT BE USED IN RETURN AIR PLENUMS.

5.2.13
ALL BRANCH CIRCUITRY IS TO BE IN EMT CONDUIT UNLESS NOTED OTHERWISE.

5.3.0 GROUNDING

5.3.1
THE ENTIRE INSTALLATION SHALL BE GROUNDED IN ACCORDANCE WITH THE 2018 CANADIAN ELECTRICAL CODE AND DETAILS AS SHOWN ON THE DRAWINGS.

5.3.2
ALL GROUND CONDUCTORS SHALL BE BARE OR INSULATED, STRANDED, MEDIUM HARD DRAWN COPPER WIRE. ALL INSULATED GROUND WIRES SHALL BE GREEN.

5.4.0 DEMOLITION

5.4.1
ALL NECESSARY DEMOLITION OF EXISTING ELECTRICAL EQUIPMENT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

5.4.2
ALL SALVAGED MATERIAL SHALL REMAIN THE PROPERTY OF THE OWNER, UNLESS OTHERWISE NOTED, AND SHALL BE STOCKPILED AS PER THE OWNER'S INSTRUCTIONS.

5.5.0 FUSIBLE SWITCHES

5.5.1
FUSIBLE SWITCHES SHALL BE QUICK–MAKE, QUICK–BREAK, VISIBLE BLADES, INTEGRAL HANDLE MECHANISM, DE–IONIZING ARC QUENCHERS, DOOR INTERLOCK TO PREVENT ACCESS TO FUSES WHEN SWITCH IS 'ON', FRONT OPERATION, HIGH PRESSURE FUSE CLIPS AND RECESSED LIVE PARTS. OPERATING HANDLES TO HAVE PROVISION FOR PADLOCKING IN EITHER 'ON' OR 'OFF' POSITIONS. HANDLE TO BE MARKED TO CLEARLY INDICATE SWITCH CONTACT POSITIONS. FUSIBLE SWITCHES SHALL BE MANUFACTURED BY SCHNEIDER ELECTRIC, CUTLER–HAMMER, OR SIEMENS.

5.6.0 FUSES

5.6.1
NEW FUSES SHALL BE CSA CERTIFIED HRC1–J TIME DELAY AND SHALL BE IN ACCORDANCE WITH CSA SPECIFICATION C22–2 NO. 106–M92. HRC1 FUSE DIMENSION AND CURRENT LIMITING PERFORMANCE SHALL BE IN ACCORDANCE WITH THE UL STANDARD 198C. FUSE INTERRUPTING RATING SHALL BE 200,000 AMPERES RMS SYMMETRICAL, UNLESS NOTED OTHERWISE. ALL FUSES SHALL BE MANUFACTURED BY LITTLEFUSE, BUSS, FERRAZ SHAWMUT, OR EDISON.

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2024-27
PROVINCE OF
SASKATCHEWAN

Project Title:

AGRICULTURE & AGRI-FOOD CANADA SASKATOON RDC HOT WATER TANK REPLACEMENTS

107 SCIENCE PLACE
SASKATOON, SASKATCHEWAN

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