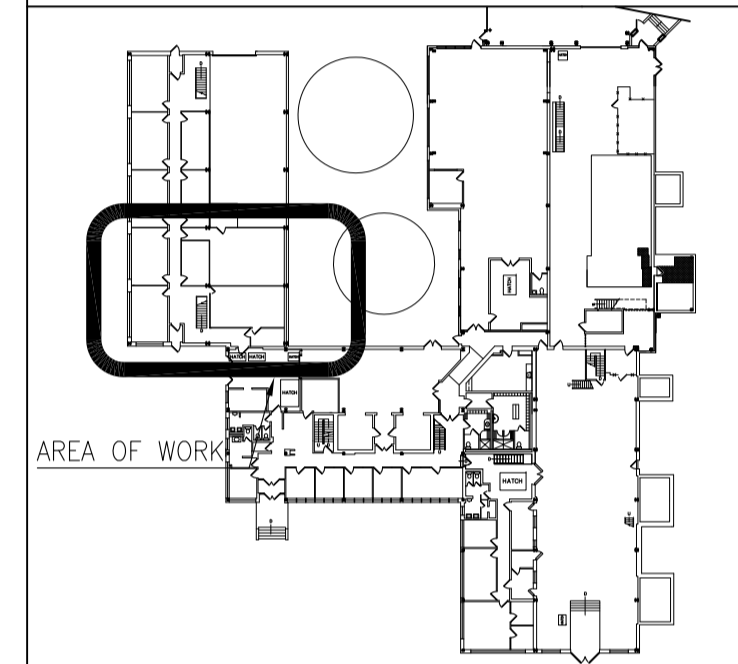


GENERAL NOTES

- CONTRACTORS TO CHECK AND VERIFY ALL DIMENSIONS ON SITE PRIOR TO DEMOLITION OR CONSTRUCTION AND REPORT ANY ERRORS OR OMISSIONS TO DEPARTMENTAL REPRESENTATIVE.
- CONTRACTORS MUST VISIT THE SITE & FULLY FAMILIARIZE THEMSELVES WITH THE SCOPE OF THE WORK.
- PREVENT THE SPREAD OF DUST & DEBRIS BEYOND THE WORK AREA AND CLEAN ALL SURFACES AT COMPLETION.
- MAKE GOOD ALL SURFACES AFFECTED BY THIS WORK.
- COORDINATE ALL SHUTDOWNS WITH THE DEPARTMENTAL REPRESENTATIVE.
- PROVIDE ALL LABOUR AND MATERIAL REQUIRED TO FORM A COMPLETE, FUNCTIONAL SYSTEM AS DESCRIBED ON DRAWINGS.

KEY PLAN

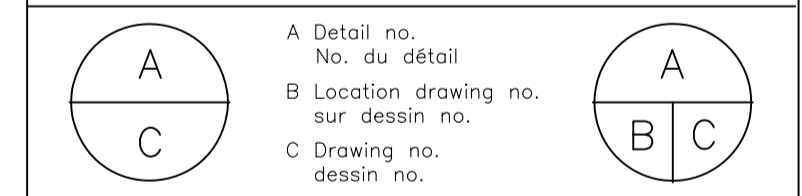


AREA OF WORK

No.	Date	Revision	By: / Par:
0	DEC 2014	ISSUED FOR TENDER	Z. M.

Date Printed / Date imprimée

- Verify all dimensions and site conditions and be responsible for same
- Vérifier toutes les dimensions et l'état des lieux et en assumer la responsabilité



project / projet

BUILDING M-10 CHILLER REPLACEMENT

MONTREAL ROAD CAMPUS

MECHANICAL NEW INSTALLATION PLAN

designed / conçu Z. M. / B. L. date / date NOV. 2014

drawn / dessiné Z. M. / B. L. scale / échelle AS NOTED

checked / vérifié A. L. S. sheet / feuille M02 of/de M03

approved / approuvé B. V. W.O.no. / D.T.no. A1-005221-06-01

dwg.no. / dessin no. 4045-M02

LEGEND

- EXISTING
- NEW
- CHS CHILLED WATER SUPPLY
- CHR CHILLED WATER RETURN
- CTS COOLING TOWER WATER SUPPLY
- CTR COOLING TOWER WATER RETURN
- DCW DOMESTIC COLD WATER
- SAN SANITARY DRAIN
- V VENT
- GATE VALVE
- BUTTERFLY VALVE

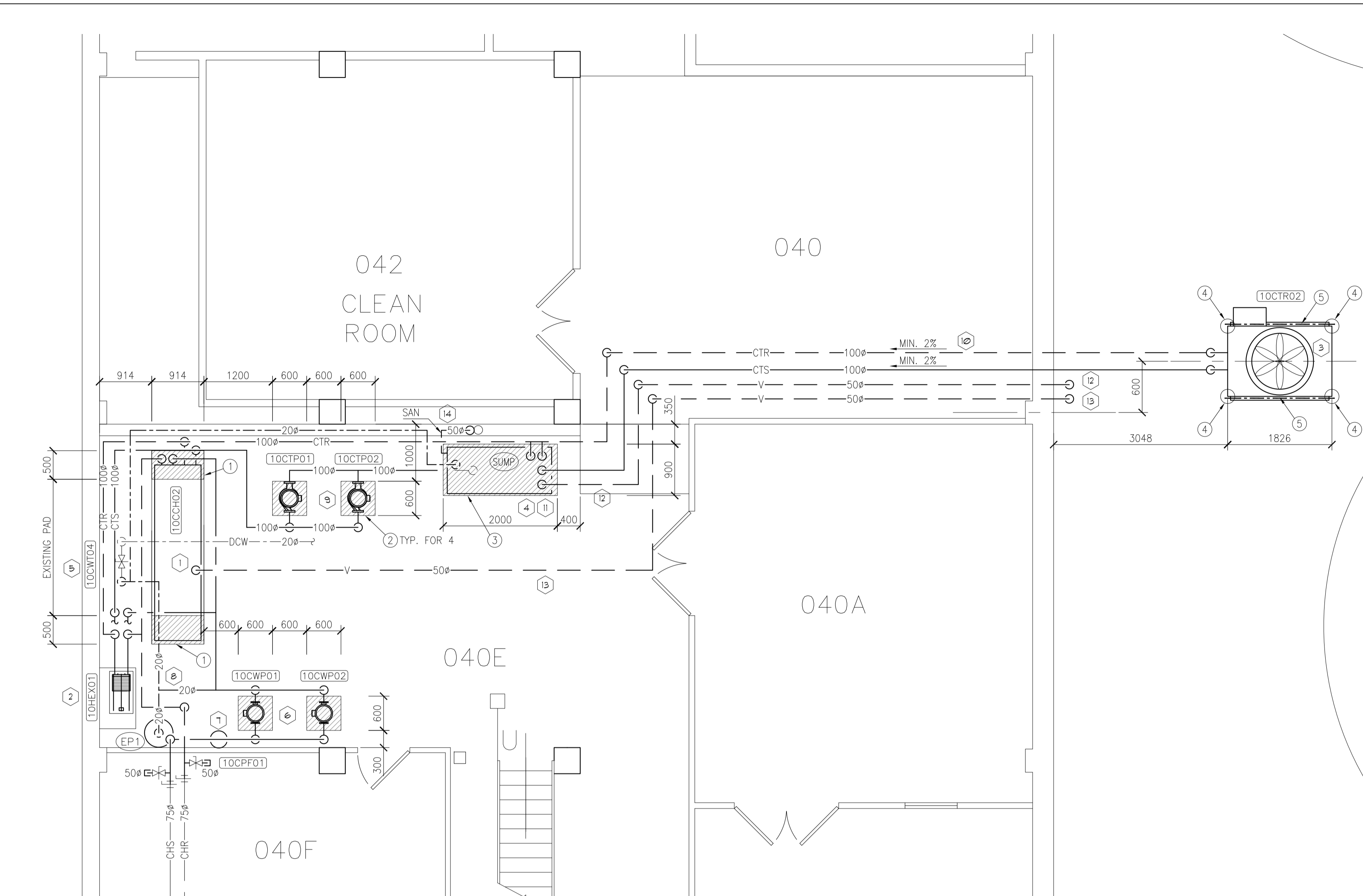
MECHANICAL NOTES:

- PROVIDE NEW WATER COOLED CHILLER ON EXTENDED HOUSEKEEPING PAD AS SHOWN. PROVIDE CHILLED WATER PIPING FROM CHILLER EVAPORATOR TO EXISTING BUILDING CHILLED WATER LINE IN ROOM 040F. PROVIDE COOLING TOWER WATER PIPING AS SHOWN. REFER TO SCHEDULE AND PIPING DIAGRAM ON M-03 FOR DETAIL.
- PROVIDE NEW FREE COOLING HEAT EXCHANGER ON EXISTING HOUSEKEEPING PAD AS SHOWN. PROVIDE CHILLED WATER AND COOLING TOWER WATER PIPING AS SHOWN. REFER TO SCHEDULE AND PIPING DIAGRAM ON M-03 FOR DETAIL.
- PROVIDE NEW COOLING TOWER AND SUPPORT STRUCTURE AS SHOWN. PROVIDE COOLING TOWER WATER PIPING AS SHOWN. REFER TO SCHEDULE AND PIPING DIAGRAM ON M-03 FOR DETAIL.
- RELOCATE EXISTING REMOTE SUMP TO NEW LOCATION AS SHOWN. PROVIDE NEW 400 mm HIGH CONCRETE HOUSEKEEPING PAD AS SHOWN. PROVIDE COOLING TOWER WATER, MAKE-UP WATER, OVERFLOW AND DRAINAGE PIPING. REFER TO PIPING DIAGRAM ON M-03 FOR DETAIL.
- RELOCATE EXISTING WATER METER 10WMT04 C/W ALL CONTROL WIRING FROM ROOM 001 BESIDE OLD SUMP LOCATION TO NEW LOCATION IN ROOM 040E BEHIND NEW CHILLER. PROVIDE NEW PRESSURE REGULATING VALVE AND PRESSURE GAUGE. PROVIDE MAKEUP WATER PIPING FROM METER TO SUMP AND CHILLED WATER PUMP. REFER TO PIPING DIAGRAM ON M-03 FOR DETAIL.
- PROVIDE NEW CHILLED WATER PUMPS ON NEW 100 mm HIGH CONCRETE HOUSEKEEPING PAD AS SHOWN. REFER TO PIPING DIAGRAM ON M-03 FOR DETAIL.
- PROVIDE NEW CHEMICAL POT FEEDER INSTALLED ON THE FLOOR AS SHOWN. REFER TO PIPING DIAGRAM ON M-03 FOR DETAIL.
- PROVIDE NEW CHILLED WATER MAKE-UP LINE AND EXPANSION TANK AS SHOWN. REFER TO PIPING DIAGRAM ON M-03 FOR DETAIL.
- PROVIDE NEW COOLING TOWER WATER PUMPS ON NEW 100 mm HIGH CONCRETE HOUSEKEEPING PAD AS SHOWN. REFER TO PIPING DIAGRAM ON M-03 FOR DETAIL.
- PROVIDE COOLING TOWER WATER PIPING AS SHOWN. INSULATE AS PER SPEC. HORIZONTAL COOLING TOWER WATER PIPING SHALL BE SLOPED TOWARDS REMOTE SUMP AT A MINIMUM 2% SLOPE.
- PROVIDE COVER FOR REMOTE SUMP. COVER SHALL BE MADE OF CLEAR ACRYLIC SHEET WITH MINIMUM THICKNESS OF 9.5 mm.
- PROVIDE 50ø VENT PIPE TO OUTSIDE AS SHOWN. TERMINATE VENT PIPE WITH AN GOOSENECK DOWN, AT LEAST 1000 mm ABOVE GRADE.
- PROVIDE VENT PIPE FROM CHILLER SAFETY RELIEVE VALVES TO OUTSIDE AS SHOWN. TERMINATE VENT PIPE WITH AND GOOSENECK DOWN, AT LEAST 1000 mm ABOVE GRADE.
- PROVIDE OVERFLOW AND DRAIN PIPE FROM SUMP TO FLOOR DRAIN AS SHOWN. REFER TO PIPING DIAGRAM ON M-03 FOR DETAIL.

ARCHITECTURAL NOTES:

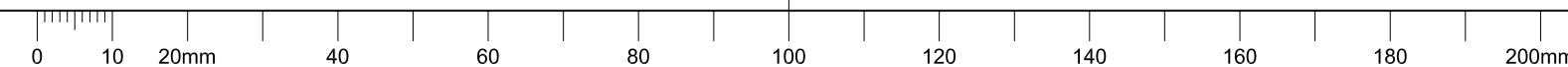
- NEW EXTENSIONS TO EXISTING HOUSEKEEPING PAD. SIZE: 500mm X 914mm. THICKNESS TO MATCH EXISTING PAD (± 100mm).
- NEW SMALL HOUSEKEEPING PADS (4 TOTAL). SIZE: 600mm X 600mm. THICKNESS: 100mm.
- NEW LARGE HOUSEKEEPING PAD. SIZE: 900mm X 2000mm. THICKNESS: 400mm.
- NEW 508mm ø CONCRETE PIERS (4 TOTAL), TO SUPPORT NEW STEEL BEAMS. SET 4 25mm ø ANCHOR BOLTS (PER PIER) INTO CONCRETE AT TIME OF POUR, TO ANCHOR TO STEEL BEAMS (USE PLYWOOD TEMPLATE TO SET BOLTS). ANCHOR BOLTS TO CONFORM TO ASTM A-36. PIERS ARE TO EXTEND A MINIMUM OF 1219mm BELOW GRADE, OR TO BEDROCK. BACKFILL AROUND PIERS WITH 19mm (3/4") CRUSHED STONE.
- NEW GALVANIZED STEEL W200x27 I-BEAM SUPPORTS. ANCHOR TO NEW CONCRETE PIERS. T/O I-BEAM TO BE 1220mm ABOVE GRADE. COORDINATE HEIGHT WITH CONCRETE PIER INSTALLATION. BEAM LENGTHS AND LOCATIONS AS PER COOLING TOWER MANUFACTURER'S RECOMMENDATIONS.

*ALL CONCRETE SHALL HAVE A 28-DAY COMPRESSIVE STRENGTH OF 35 MPa WITH 8% ENTRAINED AIR. TAKE 2 CONCRETE COMPRESSION CYLINDERS AT TIME OF POUR. ONE SHALL BE TESTED AT 7 DAYS AND ONE AT 28 DAYS. AFTER CONCRETE POUR, HEAT CONCRETE FOR A MINIMUM PERIOD OF 3 DAYS.



1 NEW INSTALLATION PLAN
 M-02 SCALE 1:50

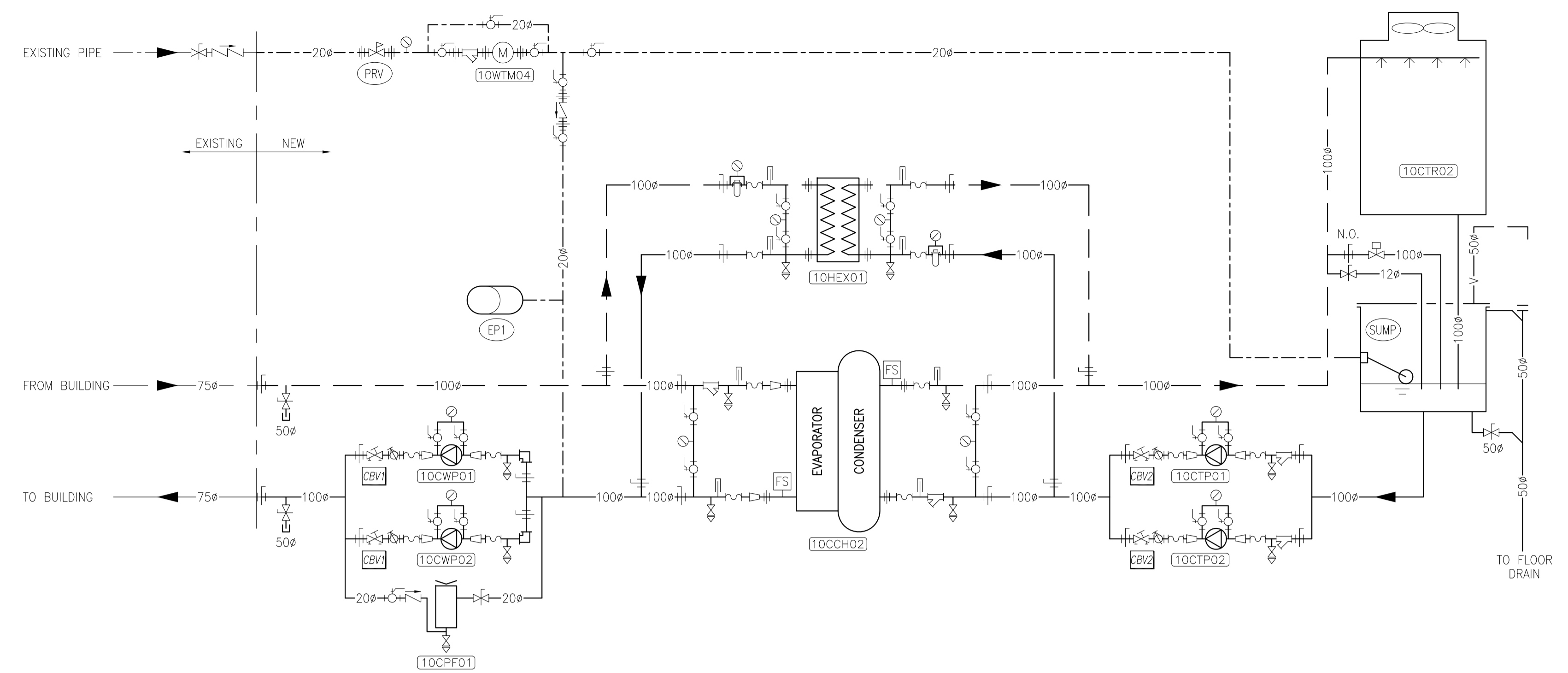
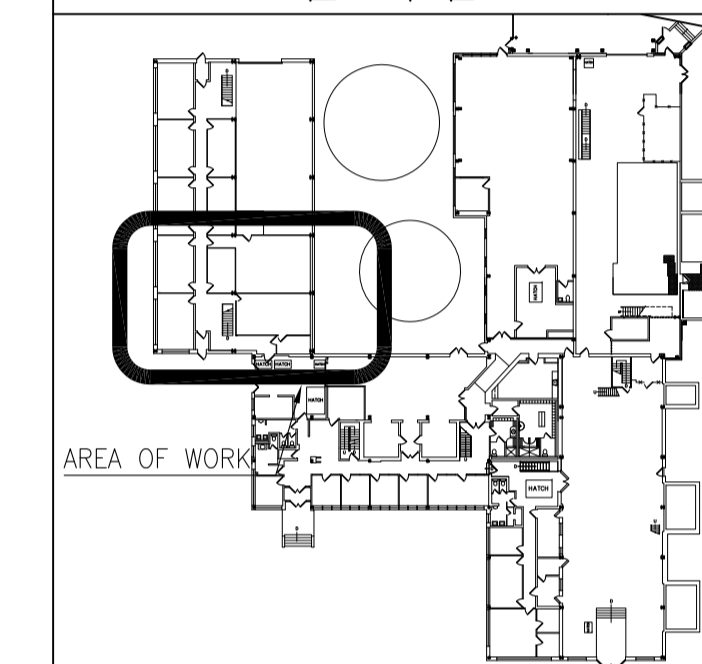
C



GENERAL NOTES

- CONTRACTORS TO CHECK AND VERIFY ALL DIMENSIONS ON SITE PRIOR TO DEMOLITION OR CONSTRUCTION AND REPORT ANY ERRORS OR OMISSIONS TO DEPARTMENTAL REPRESENTATIVE.
- CONTRACTORS MUST VISIT THE SITE & FULLY FAMILIARIZE THEMSELVES WITH THE SCOPE OF THE WORK.
- PREVENT THE SPREAD OF DUST & DEBRIS BEYOND THE WORK AREA AND CLEAN ALL SURFACES AT COMPLETION.
- MAKE GOOD ALL SURFACES AFFECTED BY THIS WORK.
- COORDINATE ALL SHUTDOWNS WITH THE DEPARTMENTAL REPRESENTATIVE.
- PROVIDE ALL LABOUR AND MATERIAL REQUIRED TO FORM A COMPLETE, FUNCTIONAL SYSTEM AS DESCRIBED ON DRAWINGS.

KEY PLAN



LEGEND

---	EXISTING
---	NEW
---CHS---	CHILLED WATER SUPPLY
---CHR---	CHILLED WATER RETURN
---CTS---	COOLING TOWER WATER SUPPLY
---CTR---	COOLING TOWER WATER RETURN
---DCW---	DOMESTIC COLD WATER
---SAN---	SANITARY DRAIN
---V---	VENT
⊥	GATE VALVE
⊥	BUTTERFLY VALVE
⊥	BALL VALVE
⊥	CHECK VALVE
⊥	CIRCUIT BALANCING VALVE
⊥	2-WAY CONTROL VALVE
⊥	PRESSURE REDUCING VALVE
⊥	"Y" STRAINER
⊥	BASKET STRAINER
⊥	PIPE UNION
⊥	PIPE REDUCER
⊥	FLEXIBLE PIPE CONNECTION
⊥	TRIPLE DUTY VALVE
⊥	PRESSURE GAUGE
⊥	THERMOMETER
⊥	FLOW SWITCH
⊥	WATER METER

1 PIPING DIAGRAM
 M-03 SCALE N. T. S.

WATER-COOLED CHILLER

MANUFACTURER	DAIKIN
REF	-
EQUIPMENT I. D.	10CCH02
MODEL	WGZ060D
CAPACITY	211.0 kW
REFRIGERANT	R410a
CHARGE	45.4 kg
OVERALL DIMENSION	3454.4x833.1x1610.4 (h)
WEIGHT	-
SHIPPING	1205.6 kg
OPERATING	1256.9 kg
EVAPORATOR	-
FLUID	WATER
FLOW	9.3 L/s
PRESSURE DROP	44.8 kPa
CONDENSER	-
FLUID	WATER
FLOW	11.6 L/s
PRESSURE DROP	38.9 kPa
ELECTRICAL	-
POWER SUPPLY	V/Ph/Hz 575/3/60
INPUT POWER	46.6 kW
MCA	68 AMP
REMARK	C/W HOT GAS BYPASS, ACOUSTICAL COMPRESSOR WRAPS, SINGLE-POINT POWER CONNECTION TO FACTORY-INSTALLED DISCONNECT SWITCH, SUPPLEMENTARY OVERLOADS, FACTORY-INSTALLED WATER FLOW SWITCHES, AND BAS INTERFACE.

COOLING TOWER

MANUFACTURER	EVAPCO
REF	-
EQUIPMENT I. D.	10CTRO2
MODEL	AT-14-66
CAPACITY	228.6 kW
WATER FLOW	11.4 L/s
OVERALL DIMENSION	1825.6x1231.9x2908.3 (h)
WEIGHT	-
SHIPPING	630.5 kg
OPERATING	1115.8 kg
FAN MOTOR	-
POWER SUPPLY	V/Ph/Hz 575/3/60 HP 3.0
REMARK	C/W EVAPAK FILL, INVERTER CAPABLE, PREMIUM EFFICIENT FAN MOTOR, 304 WELDED STAINLESS STEEL COLD WATER BASIN, MOTOR ACCESS LADDER, VIBRATION SWITCH, AND REMOTE SUMP CONNECTION.

CHEMICAL POT FEEDER

MANUFACTURER	NALCO
REF	-
EQUIPMENT I. D.	10CPF01
MODEL	F03610
SIZE	2 GAL
REMARK	N/A

BASKET STRAINER

MANUFACTURER	COLTON INDUSTRIES
REF	-
EQUIPMENT I. D.	-
MODEL	150BFSB1
SIZE	100 mm
REMARK	C/W MESH LINED STANDARD SCREENS WITH 30% OPEN AREA, FOR HEAT EXCHANGER 10HEX01

COOLING TOWER WATER PUMP

MANUFACTURER	ARMSTRONG PUMPS
REF	-
EQUIPMENT I. D.	10CTP01 / 10CTP02
MODEL	4380-3x3x10
FLOW	11.4 L/s
HEAD	209.2 kPa
MOTOR	-
POWER	7.5 HP V/Ph/Hz 575/3/60
REMARK	C/W FTV-A 4 FLO-TREX VALVE

EXPANSION TANK

MANUFACTURER	AMTROL
REF	-
EQUIPMENT I. D.	-
MODEL	EP1
REMARK	PRE-CHARGE PRESSURE TO BE 206.8 kPa (30 PSI)

HEAT EXCHANGER

MANUFACTURER	BELL & GOSSETT
REF	-
EQUIPMENT I. D.	10HEX01
MODEL	AP22, PN-BY5434
CAPACITY	106.0 kW
OVERALL DIMENSION	724x521x1194 (h)
DESIGN PRESSURE	1034.2 kPa
CONNECTIONS	100# CLASS 150 FLANGE
CHILLED WATER SIDE	-
ENT. TEMP.	12.8 / 55 °C/°F
LVG. TEMP.	10.0 / 50 °C/°F
FLOW	9.1 L/s
PRESSURE DROP	26.5 kPa
COOLING TOWER WATER SIDE	-
ENT. TEMP.	6.7 / 44 °C/°F
LVG. TEMP.	8.9 / 48 °C/°F
FLOW	11.4 L/s
PRESSURE DROP	34.1 kPa
REMARK	N/A

CHILLED WATER PUMP

MANUFACTURER	ARMSTRONG PUMPS
REF	-
EQUIPMENT I. D.	10CWP01 / 10CWP02
MODEL	4380-2x2x6
FLOW	9.1 L/s
HEAD	358.7 kPa
MOTOR	-
POWER	10.0 HP V/Ph/Hz 575/3/60
REMARK	C/W FTV-A 4 FLO-TREX VALVE AND SG-44 SUCTION GUIDE

SEQUENCE OF OPERATION:

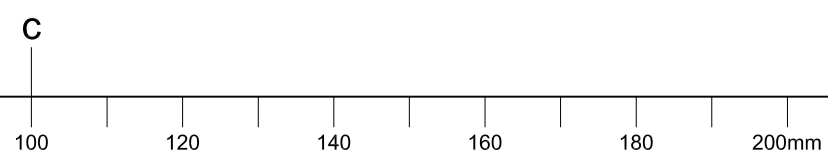
- GENERAL CONTRACTOR SHALL SUBCONTRACT AIRTRON CANADA, (613)247-7938, FOR ALL CONTROL WORK.
- RE-USE AND RELOCATE EXISTING CONTROL POINTS WHERE POSSIBLE.
- BOTH CHILLED WATER PUMPS 10CWP01/10CWP02 AND COOLING TOWER WATER PUMPS 10CTP01/10CTP02 SHALL OPERATE IN A LEAD/LAG FASHION. THE LEAD PUMP SHALL BE CONTROLLED BY THE SYSTEM TO TURN ON AND OFF. WHILE RUNNING, SHOULD THE LEAD PUMP FAIL, THE LAG PUMP WILL START AUTOMATICALLY AND AN ALARM SENT. THE LEAD/LAG OF BOTH CHILLED WATER PUMPS AND COOLING TOWER WATER PUMPS SHALL BE ALTERNATED ON A BI-WEEKLY BASIS AUTOMATICALLY.
- SUMMER OPERATION
 - ISOLATION VALVES CORRESPONDING TO CHILLER 10CCH02 SHALL BE OPEN, AND ISOLATION VALVES CORRESPONDING TO HEAT EXCHANGER 10HEX01 AND COOLING TOWER WATER DRAIN LINE VALVE SHALL BE CLOSED.
 - WHEN COOLING IS REQUIRED, CHILLED WATER PUMP SHALL BE ACTIVATED TO CIRCULATE CHILLED WATER THROUGH THE SYSTEM.
 - WHEN CHILLED WATER SUPPLY TEMPERATURE IS ABOVE SETPOINT, COOLING TOWER WATER PUMP SHALL BE ACTIVATED FIRST. AFTER 60 SECONDS (OPERATOR ADJUSTABLE) OF DELAY, CHILLER 10CCH01 SHALL BE ACTIVATED TO MAINTAIN CHILLED WATER SUPPLY TEMPERATURE SETPOINT.
 - CHILLED WATER SUPPLY TEMPERATURE SETPOINT: 7.2 °C (45 °F)
 - WHEN COOLING TOWER WATER PUMP IS RUNNING, MODULATE VFD ON COOLING TOWER FAN MOTOR AND OPEN/CLOSE COOLING TOWER WATER BYPASS VALVE (ON/OFF ONLY) TO MAINTAIN COOLING TOWER WATER SUPPLY TEMPERATURE SETPOINT.
 - COOLING TOWER WATER SUPPLY TEMPERATURE SETPOINT: 29.4 °C (85 °F)
- FREE COOLING OPERATION
 - WHEN OPERATOR OF THE SYSTEM MANUALLY SWITCH THE OPERATION FROM SUMMER TO FREE COOLING MODE THE FOLLOWING SHALL OCCUR:
 - CHILLER 10CCH02 SHALL BE DE-ACTIVATED.
 - ISOLATION VALVES CORRESPONDING TO HEAT EXCHANGER 10HEX01 SHALL BE CLOSED.
 - ISOLATION VALVES CORRESPONDING TO HEAT EXCHANGER 10HEX01 SHALL BE OPEN.
 - ISOLATION VALVE ON 12# COOLING TOWER DRAIN LINE SHALL BE OPEN.
 - CHANGE COOLING TOWER WATER SUPPLY TEMPERATURE SETPOINT TO 6.7 °C (44 °F).
 - CHANGE CHILLED WATER SUPPLY TEMPERATURE SETPOINT TO 10 °C (50 °F).
 - CHILLED WATER AND COOLING TOWER WATER PUMPS SHALL BE ACTIVATED.
 - WHEN COOLING TOWER WATER RETURN TEMPERATURE IS HIGHER THAN 7.8 °C (46 °F), COOLING TOWER WATER BYPASS VALVE SHALL BE CLOSED, AND COOLING TOWER FAN MOTOR VFD MODULATED TO MAINTAIN COOLING TOWER WATER SUPPLY TEMPERATURE SETPOINT.
 - WHEN COOLING TOWER WATER RETURN TEMPERATURE IS LOWER THAN 7.2 °C (45 °F), COOLING TOWER WATER BYPASS VALVE SHALL BE OPEN.
 - WHEN OUTDOOR TEMPERATURE DROPS BELOW 0 °C (32 °F) (OPERATOR ADJUSTABLE), DEACTIVATE CHILLED WATER AND COOLING TOWER PUMPS. COOLING TOWER WATER BYPASS VALVE SHALL BE OPEN.

CIRCUIT BALANCE VALVE

MANUFACTURER	TA HYDRONICS
REF	-
EQUIPMENT I. D.	CBV1/CBV2
MODEL	STAF-SG
SIZE	DN100
CLASS	150
REMARK	N/A

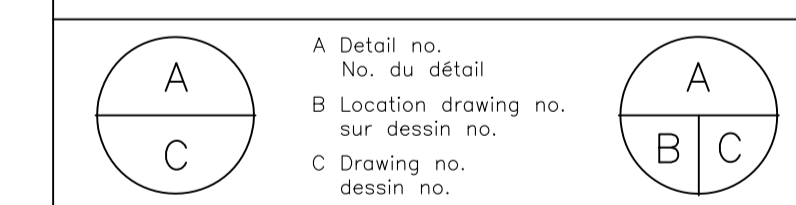
PRESSURE REDUCING VALVE

MANUFACTURER	WATTS
REF	-
EQUIPMENT I. D.	PRV
MODEL	LFN45B-EZ
SIZE	DN20
SET PRESSURE	206.8 kPa (30 PSI)
REMARK	N/A



No.	Date	ISSUED FOR TENDER	Revision	Z. M.
0	DEC. 2014			

Date Printed	Date imprimée



project **BUILDING M-10 CHILLER REPLACEMENT** projet

location **MONTREAL ROAD CAMPUS** dessin

drawing **MECHANICAL PIPING DIAGRAM, SCHEDULE AND SEQUENCE OF OPERATION** dessin

designed	conçu	date	date
Z. M.		NOV. 2014	
drawn	dessiné	scale	échelle
Z. M.		AS NOTED	
checked	vérifié	sheet of/de	feuille
A. L. S.		M03 of/de M03	
approved	approuvé	W.O.no.	D.T.no.
B. V.		A1-005221-06-01	
dwg.no.	dessin no.		
4045-M03			

