ELECTRICAL DRAWING LIST

GENERAL NOTES

1. DO NOT SCALE DRAWINGS FOR INSTALLATION PURPOSES. OBTAIN ALL DIMENSIONS FROM THE MANUFACTURER'S SHOP DRAWINGS, AND ON SITE INSPECTIONS.
2. PRIOR TO INSTALLATION OF BOXES IN WALLS, VERIFY THAT NO INTERFERENCES EXIST.
3. MECHANICAL AND ELECTRICAL TRADES SHALL WORK IN CONJUNCTION WITH EACH OTHER SO AS TO AVOID INTERFERENCES BETWEEN PIPING, DUCTWORK, CONDUIT, LIGHTING FIXTURES, ETC.
4. REVIEW MECHANICAL DRAWINGS AND PROVIDE ON SITE INSPECTIONS TO DETERMINE FULL EXTENT OF PROJECT PRIOR TO SUBMITTING BID.
5. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE ONTARIO BUILDING CODE (OBC), ONTARIO ELECTRICAL SAFETY CODE (OESC) AND THE LOCAL AUTHORITIES REQUIREMENTS.
6. THE ELECTRICAL CONTRACTOR SHALL COORDINATE THE INSTALLATION WITH THE WORK OF OTHER TRADES. PROVIDE HORIZONTAL AND/OR VERTICAL OFFSETS AS REQUIRED TO SUIT THIS COORDINATION.
7. REFER TO THE ARCHITECTURAL DRAWINGS FOR ALL WIRING DEVICE FINAL HEIGHT AND LOCATION.
8. ALL WIRING SHALL BE A MINIMUM #12 AWG IN CONDUIT SUITABLE FOR THE APPLICATION.
9. AC90 (BX) SHALL ONLY BE ALLOWED FOR SHORT RUNS OF LESS THAN 5 FEET IN LENGTH, UNLESS OTHERWISE NOTED.
10. ALL MATERIALS SHALL BEAR A CSA (CANADIAN STANDARDS ASSOCIATION LABEL.
11. ALL INTERIOR LIGHT SWITCHES, RECEPTACLES, AND DATA OUTLETS, INCLUDING CONDUITS SHALL BE "CONCEALED" WITIN THE WALL STRUCTURE.
12. ELECTRICAL SWITCHES, OUTLETS, PUSH-BUTTONS ETC. SHALL COMPLY WITH ACCESSIBILITY FOR ONTARIANS WITH DISABILITES ACT (AODA) FOR MOUNTING HEIGHTS AND LOCATION WHERE APPLICABLE.
13. EXIT SIGNS SHALL BE GREEN, EDGE-LIT, "RUNNING-MAN" PICTOGRAM C/W LED LIGHT SOURCE, ALUMINUM HOUSING, AND UNIVERSAL MOUNTING. WHERE HIGH CEILING EXIST PROVIDE A PENDANT MOUNT TYPE SUSPENDED FROM A THREADED ROD OR EMT CONDUIT AT THE HEIGHT SPECIFIED.
14. BATTERY PACKS SHALL C/W 20% SPARE CAPACITY,12VOLT, ALUMINUM HOUSING C/W TWO (2) 4-WATT, LED, MR-16, DIE CAST HEADS AND WHITE FINISH. PROVIDE MATCHING REMOTE HEADS.
15. ALL UNIVERSAL WASHROOM HARDWARE DEVICES TO BE PROVIDED BY THE ELECTRICAL CONTRACTOR C/W WIRING AND CONDUIT FOR A COMPLETE INSTALLATION, UNLESS OTHERWISE NOTED.
16. ALL SECURITY DOOR ACCESS HARDWARE DEVICES SHALL BE SUPPLIED "BY OTHERS". THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL WIRING AND CONDUIT ROUGH-IN FOR A COMPLETE INSTALLATION, UNLESS OTHERWISE NOTED.
17. ALL COMMUNICATION CABLING TO BE PROVIDED BY THE ELECTRICAL CONTRACTOR C/W CONDUIT, OUTLET JACKS, AND FACE PLATES FOR A COMPLETE INSTALLATION, UNLESS OTHERWISE NOTED. MAXIMUM LENGTH OF ETHERNET CABLES SHALL BE 300 FEET.
18. ALL AUDIO/VISUAL DEVICES SHALL BE SUPPLIED "BY OTHERS". THE ELECTRICAL CONTRACTOR SHALL PROVIDE CONDUIT ROUGH-IN ONLY, UNLESS OTHERWISE NOTED.
19. POWER AND CONTROL WIRING FOR MECHANICAL EQUIPMENT ON THE ROOF MUST RISE WITHIN THE CURB UNLESS OTHERWISE NOTED.
20. ALL EXTERIOR OUTLET BOXES TO BE "CONCEALED" AND SHALL C/W A VAPOUR BARRIER CHAMBER TO PREVENT AIR LEAKAGE.
21. THE ELECTRICAL CONTRACTOR SHALL PROVIDE BALANCED PHASING (A,B,C) FOR ALL EQUIPMENT PANEL LOADS. ADJUST BREAKER SCHEDULES AS REQUIRED.
22. PROVIDE FIRE-STOP MATERIAL AS REQUIRED FOR ALL WALL AND FLOOR PENETRATIONS TO MAINTAIN THE SMOKE SEAL AND FIRE RATING. FOR RECESSED JUNCTION BOXES USE HILTI - FIRE BLOK.
23. PROVIDE ALL MATERIALS AND ACCESSORIES REQUIRED FOR A COMPLETE GROUNDING SYSTEM AS REQUIRED BY THE GOVERNING AUTHORITIES. GROUND ALL EQUIPMENT AND DEVICES AS REQUIRED AND IN ACCORDANCE WITH THE OESC.
24. UPON THE COMPLETION OF THE CONTRACT, ISSUE A FORMAL CERTIFICATE INDICATING THE DATE OF COMPLETION OF WORK. REPAIR OR REPLACE ANY DEFECTS WHICH MAY APPEAR IN ANY OF THE WORK WITHIN ONE (1) YEAR.

DEMOLITION NOTES

1. ELECTRICAL SYSTEMS SHOWN ON DEMOLITION PLANS ARE BASED ON INFORMATION OBTAINED FROM ORIGINAL CONSTRUCTION CONTRACT/TENDER DOCUMENTS. THESE DRAWINGS ARE NOT BASED ON 'AS-BUILT RECORD' OR ON EXHAUSTIVE FIELD MEASUREMENT AND ARE PROVIDED TO ASSIST THE CONTRACTOR IN DETERMINING THE EXTENT OF WORK REQUIRED. THE CONTRACTOR SHALL MAKE ALLOWANCE IN THEIR TENDER PRICE FOR THE REMOVAL OF ADDITIONAL ABANDONED SERVICES AND THE PROTECTION OF EXISTING SERVICES THAT MUST REMAIN. RECORD THE LOCATION OF ALL EXISTING SERVICES THAT REMAIN ON AS-BUILT RECORD DRAWINGS.

LEGEND - SINGLE LINE DIAGRAM

THIS LEGEND OF SYMBOLS REPRESENTS MANTECON PARTNERS INC. STANDARD LEGEND. ALL SYMBOLS MAY NOT APPEAR ON DRAWINGS.

SYMBOL	DESCRIPTION
	BREAKER (MCCB)
	FUSED DISCONNECT SWITCH
	SWITCH
	FUSE
	DRAWOUT BREAKER
M	METER SOCKET
	TRANSFORMER
G	GENERATOR
DMM	DIGITAL MULTIMETER
	AUTOMATIC TRANSFER SWITCH (ATS)
LSI	BREAKER WITH LSI PROTECTION
LSIG	BREAKER WITH LSIG PROTECTION
SPD	SURGE PROTECTION DEVICE
kWh	POWER METER

LEGEND - ABBREVIATION

THIS LEGEND OF SYMBOLS REPRESENTS MANTECON PARTNERS INC. STANDARD LEGEND. ALL SYMBOLS MAY NOT APPEAR ON DRAWINGS.

SYMBOL	DESCRIPTION
R	REMOVE
R/R	REMOVE AND REINSTALL
ER	EXISTING TO BE RELOCATED
EX	EXISTING TO REMAIN
GFI	GROUND FAULT INTERRUPT
NL	NIGHT LIGHT
WP	WEATHER-PROOF
ADO	AUTOMATIC DOOR OPENER
HD	HAND DRYER
D/W	DISHWASHER
F/R	REFRIGERATOR
M/W	MICROWAVE
PTO	PUSH TO OPEN
PTL	PUSH TO LOCK

LEGEND - POWER SYSTEM

THIS LEGEND OF SYMBOLS REPRESENTS MANTECON PARTNERS INC. STANDARD LEGEND. ALL SYMBOLS MAY NOT APPEAR ON DRAWINGS.

SYMBOL	DESCRIPTION
	ELECTRICAL PANEL
	DUPLEX RECEPTACLE - CEILING MOUNTED
	DIRECT CONNECTION
	NON FUSED DISCONNECT SWITCH
	FUSED DISCONNECT SWITCH
	NON-FUSED DIRECT CONNECTION
	MOTOR CONNECTION (DISCONNECT BY ELECTRICAL)
	MOTOR CONNECTION (COMBINATION STARTER BY ELECTRICAL)
	MOTOR CONNECTION (UNIT MOUNTED DISCONNECT BY MECHANICAL)

TRUE NORTH

CONSTRUCTION NORTH

MANTECON PARTNERS
STRUCTURAL MECHANICAL ELECTRICAL CIVIL ENGINEERS

15 Foundry Street, Dundas, ON, L9H 2V6
Phone: (905)648-0373 www.manteconpartners.com

SEAL

NO.	ISSUED	DATE	BY
3	REISSUED FOR TENDER	2025/09/08	P.O
2	ISSUED FOR TENDER	2025/08/06	P.O
1	ISSUED FOR 75% DESIGN	2025/03/21	P.O

CENTENNIAL COLLEGE

CLIENT
CENTENNIAL COLLEGE
65 Carl Hall Rd, Toronto, ON

PROJECT:
CENTENNIAL COLLEGE
DOWNSVIEW
CAMPUS IT ROOM UPGRADES

DRAWING TITLE:
GENERAL NOTES

DRAWN BY: P.O	SCALE: NTS
CHECKED BY: N.A	DRAWING NUMBER: E000
DATE: MAR. 2025	
PROJECT NUMBER: 25-007	

ELECTRICAL SPECIFICATIONS

PART 1 - GENERAL

1. DEFINITIONS: FOLLOWING ARE DEFINITIONS OF WORDS FOUND IN THIS SPECIFICATION AND ON ASSOCIATED DRAWINGS.
   a. "CONCEALED" - HIDDEN FROM NORMAL SIGHT IN FURRED - SPACES, SHAFTS, CEILING SPACES, WALLS, UNDERFLOOR, AND PARTITIONS.
   b. "EXPOSED" - ALL ELECTRICAL WORK VISIBLE TO BUILDING OCCUPANTS.
   c. "PROVIDE" - (AND ALL TENSES OF "PROVIDE") SUPPLY INSTALL, WIRE AND CONNECT COMPLETE.
   d. "INSTALL" - (AND ALL TENSES OF "INSTALL") - INSTALL, WIRE AND CONNECT COMPLETE, PRODUCTS AND SERVICES SPECIFIED.
   e. "SUPPLY" - SUPPLY ONLY.
   f. "FINISHED AREA" - ANY AREA OR PART OF AN AREA WHICH RECEIVES A FINISH SUCH AS PAINT, OR IS FACTORY FINISHED.
   g. "GOVERNING AUTHORITY" AND/OR "REGULATORY AUTHORITY" AND/OR "MUNICIPAL AUTHORITY" - ALL GOVERNMENT DEPARTMENTS, AGENCIES, STANDARDS, RULES AND REGULATIONS THAT APPLY TO AND GOVERN THE ELECTRICAL WORK AND TO WHICH THE WORK MUST ADHERE.
   h. "OR APPROVED EQUAL" - MATERIAL OR EQUIPMENT PROPOSED BY CONTRACTOR, IN LIEU OF THAT SPECIFIED, AS APPROVED BY CONSULTANT.
   i. "AS INDICATED" - AS SHOWN ON DRAWINGS AND/OR NOTED IN SPECIFICATIONS.
   j. "CONSULTANT" - ARCHITECT OR CONSULTING ENGINEER WHO HAS PREPARED THE CONTRACT DOCUMENTS ON BEHALF OF THE OWNER.
2. PROVIDE ALL WORK AND MATERIALS IN ACCORDANCE WITH THE LATEST EDITIONS OF THE ONTARIO ELECTRICAL SAFETY CODE, THE ONTARIO BUILDING CODE, APPLICABLE CSA AND ULC STANDARDS, THE REQUIREMENTS OF THE ELECTRICAL SAFETY AUTHORITY AND ALL OTHER APPLICABLE MUNICIPAL AND PROVINCIAL CODES AND REGULATIONS. ANY MATERIALS, EQUIPMENT OR INSTALLATIONS NOT MEETING ALL REQUIREMENTS OF THE APPROPRIATE REGULATORY AGENCIES WILL NOT BE ACCEPTED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THESE REQUIREMENTS ARE MET AND PROVIDE EVIDENCE OF SUCH AS REQUESTED.
3. CAREFULLY EXAMINE THE SITE AND TENDER DOCUMENTS FOR THE WORK IN ACCORDANCE WITH THE INSTRUCTIONS TO BIDDERS. VISIT THE EXISTING BUILDING AND BECOME FAMILIAR WITH EXISTING ARCHITECTURAL, STRUCTURAL AND MECHANICAL CONDITIONS, THE LOCATION OF EXISTING ELECTRICAL EQUIPMENT AND INSTALLATIONS, AND OTHER FACTORS RELATED TO THE WORK TO BE DONE. NO EXTRA CHARGES WILL BE CONSIDERED FOR ANYTHING WHICH COULD HAVE BEEN REVEALED IN THE COURSE OF SUCH EXAMINATIONS.
4. THE ELECTRICAL CONTRACTOR SHALL BE HELD RESPONSIBLE FOR THE SATISFACTORY COMPLETION OF ALL WORK BEARING UPON THE ELECTRICAL TRADE. PLAN WORK WELL IN ADVANCE TO ELIMINATE DELIVERY AND INSTALLATION DIFFICULTIES. CO-ORDINATE WORK WITH OTHER TRADES TO PREVENT CONFLICTS ON SITE AND RESOLVE INTERFERENCES. PROVIDE WORK IN STAGES AND AT TIMES REQUIRED BY THE PROJECT SCHEDULE.
5. ALL ELECTRICAL WORK SHALL BE COMPLETED TO BUILDING OWNER REQUIREMENTS AND BUILDING STANDARDS IN ACCORDANCE WITH THE RELEVANT SECTIONS, ARTICLES AND DETAILS OF THE BASE BUILDING SPECIFICATIONS AND DRAWINGS.
6. OBTAIN AND PAY FOR PERMITS REQUIRED BY THE ELECTRICAL SAFETY AUTHORITY (ESA) AND LOCAL INSPECTION AUTHORITIES FOR THIS WORK. PRESENT FINAL CERTIFICATES TO CONSULTANT AND OWNER.
7. ALL WORK SHALL BE PROVIDED BY QUALIFIED JOURNEYMAN ELECTRICIANS OR APPRENTICES HOLDING VALID ONTARIO CERTIFICATES OF QUALIFICATION AND BE SUPERVISED BY A COMPETENT FOREMAN.
8. PRIOR TO THE CONSULTANT RELEASING THE COMPLIANCE LETTER, THE WORK MUST BE COMPLETE AND SAFE. AND THE FOLLOWING DOCUMENTATION MUST BE SUBMITTED WITH NO DEFICIENCIES:
   a. ESA INSPECTION CERTIFICATE
9. CARRY OUT ALL WORK IN ACCORDANCE WITH ONTARIO ELECTRICAL SAFETY CODE (OESC) REGULATIONS INCLUDING BULLETINS, AND ELECTRICAL SAFETY AUTHORITY INSPECTION REQUIREMENTS.
10. PAY ALL FEDERAL AND PROVINCIAL SALES TAXES APPLICABLE.
11. ALL EQUIPMENT SHALL BE NEW AND CSA (OR EQUIVALENT PER OESC) APPROVED UNLESS OTHERWISE NOTED.
12. MATERIALS SUPPLIED SHALL CONFORM TO MINIMUM PUBLISHED REQUIREMENTS AND RECOMMENDATIONS, OR BETTER, OF APPLICABLE STANDARDS OF:
    - CSA - CANADIAN STANDARDS ASSOCIATION
    - EEMAC - ELECTRICAL AND ELECTRONIC MANUFACTURERS' ASSOCIATION OF CANADA
    - NEMA - NATIONAL ELECTRICAL MANUFACTURERS' ASSOCIATION
    - ULC - UNDERWRITERS LABORATORIES OF CANADA LTD.
    - OESC - ONTARIO ELECTRICAL SAFETY CODE
    - ESA - ELECTRICAL SAFETY AUTHORITY
    - OBC - ONTARIO BUILDING CODE
13. DRAWINGS WHICH ACCOMPANY THESE SPECIFICATIONS ARE DIAGRAMMATIC AND SHOW THE REQUIRED DISTRIBUTION, NUMBER AND LOCATIONS OF THE ELECTRICAL EQUIPMENT, FIXTURES AND OUTLETS, AND INDICATE SUGGESTED CIRCUITING. DO NOT SCALE DRAWINGS BUT USE ONLY DIMENSIONS WHICH ARE SHOWN. WHERE EXACT BUILDING DIMENSIONS AND DETAILS ARE REQUIRED, USE ONLY DIMENSIONS FROM THE ARCHITECTURAL DRAWINGS OR JOB SITE DIMENSIONS.
14. KEEP A COMPLETE AND SEPARATE SET OF PRINTS ON SITE AT ALL TIMES AND NOTE THEREON CLEARLY, NEATLY, ACCURATELY AND PROMPTLY ALL ARCHITECTURAL, STRUCTURAL, MECHANICAL AND ELECTRICAL CHANGES, REVISIONS AND ADDITIONS TO THE WORK AND DEVIATIONS FROM THE CONTRACT DOCUMENTS. ACCURATE LOCATIONS, DEPTH, SIZE AND TYPE OF UNDERGROUND UTILITIES SHALL BE INCLUDED IN THESE RECORD DRAWINGS. INDICATE ALSO ON THE RECORD DRAWINGS THE LOCATION OF ACCESS PANELS OR REMOVABLE CEILING TILES WHICH COVER EQUIPMENT OR JUNCTION BOXES WHICH MAY REQUIRE FUTURE ACCESS OR WHERE CONDUIT OR WIRING FOR FUTURE USE IS LOCATED. THE FINAL AS-BUILT DRAWINGS SHALL BE SUBMITTED AT THE COMPLETION OF THE PROJECT WITH AN APPLICATION FOR A CERTIFICATE OF TOTAL PERFORMANCE. INDICATE IN RED INK ON AS-BUILT DRAWINGS ALL DEVIATIONS AND APPROVED CHANGES FROM THE CONTRACT DRAWINGS.
15. SUBMIT FOR REVIEW A SINGLE (1) SET OF SHOP DRAWINGS AND DATA SHEETS IN .PDF FORMAT COVERING ALL ITEMS OR EQUIPMENT TO BE INSTALLED UNDER THE CONTRACT. SHOP DRAWINGS SHALL SHOW ALL RELEVANT PERFORMANCE AND INSTALLATION INFORMATION. EQUIPMENT WILL NOT BE ACCEPTED ON SITE UNTIL REVIEW OF SHOP DRAWINGS IS COMPLETE. SUBMIT SHOP DRAWINGS FOR LIGHTING FIXTURES, EXIT LIGHTS, EMERGENCY LIGHTS AND BATTERY UNITS, DISCONNECT SWITCHES, STARTERS, TRANSFORMERS, NEW PANELS, FIRE ALARM, VOICE/DATA WIRING, AND OTHER SYSTEMS SPECIFIED IN THIS PROJECT TO CONSULTANT FOR REVIEW.
16. ARCHITECTURAL SPECIFICATIONS AND DRAWINGS SHALL BE REVIEWED IN CONJUNCTION WITH THESE DRAWINGS AS THEY ARE PART OF THIS WORK.
17. COORDINATE WITH ALL TRADES AND ARRANGE EQUIPMENT IN PROPER RELATION WITH OTHER APPARATUS, DUCTS, PIPES, ETC., AND WITH BUILDING CONSTRUCTION AND ARCHITECTURAL FINISHES.
18. IN GENERAL, ALL NECESSARY CUTTING AND PATCHING FOR THE ELECTRICAL WORK SHALL BE PROVIDED BY THE APPROPRIATE TRADE AT THE EXPENSE OF THE CONTRACTOR UNLESS INDICATED OTHERWISE ON THE DRAWINGS. HOLES THROUGH EXTERIOR WALLS AND ROOF ARE TO BE PROPERLY FLASHED AND MADE WEATHERPROOF. REPAIR ANY DAMAGE CAUSED BY THE ELECTRICAL TRADE TO EXISTING BUILDINGS OR EQUIPMENT, ETC., TO THE OWNER'S SATISFACTION. IN GENERAL, PAINTING OF ELECTRICAL WORK AND PATCHES AS REQUIRED WILL BE PROVIDED BY THE ELECTRICAL TRADE.
19. MATERIALS REMOVED AND NOT REUSED WILL BECOME OWNERS PROPERTY, AND SHALL BE DISPOSED OF FROM THE SITE PRIOR TO COMPLETION OF WORK AS DIRECTED BY OWNER.
20. THOROUGHLY CLEAN ALL ELECTRICAL EQUIPMENT DURING CONSTRUCTION AND ON COMPLETION OF CONTRACT. REMOVE ALL ELECTRICAL DEBRIS FROM THE SITE.
21. PROVIDE LEGIBLE SIGNS AND BARRIERS ON OR AROUND ALL LIVE PANELS AND EQUIPMENT DURING CONSTRUCTION TO PREVENT INJURY OR SHOCK.
22. TEST ALL EQUIPMENT AND WIRING AT ANY TIME REQUESTED BY THE OWNER AS PART OF THE CONTRACT. PROVIDE ALL METERS, MATERIALS AND LABOUR REQUIRED TO CARRY OUT THIS WORK. PRIOR TO CONNECTION OF ADDITIONAL LOADS TO EXISTING SOURCES, ENSURE THROUGH LOAD MEASUREMENT AND MONITORING THAT THE REQUIRED EXCESS CAPACITY IS AVAILABLE.
23. UPON COMPLETION OF THE ELECTRICAL INSTALLATIONS, TRIAL OPERATE ALL EQUIPMENT, SYSTEMS AND DEVICES TO ENSURE CORRECT FUNCTIONING. FOLLOWING SATISFACTORY TRIAL OPERATION, INSTRUCT THE OWNER'S REPRESENTATIVE REGARDING OPERATION AND MAINTENANCE OF THE SYSTEMS AND EQUIPMENT INSTALLED.
24. PERFORM ALL WORK IN SUCH A MANNER AS TO CAUSE AS LITTLE DISTURBANCE OR INCONVENIENCE AS POSSIBLE TO THE EXISTING OPERATIONS. WHERE DEEMED NECESSARY BY THE OWNER OR CONSULTANT, PROVIDE TEMPORARY MEASURES AS REQUIRED TO MAINTAIN SPECIFIC SERVICES AND/OR PROVIDE WORK OUTSIDE REGULAR HOURS AT NO ADDITIONAL COST. DO NOT INTERRUPT ANY ELECTRICAL SERVICES WITHOUT PRIOR AUTHORIZATION.
25. PROVIDE ALL SLEEVES, INSERTS, HANGERS AND CORE DRILLING OF SLAB REQUIRED FOR THE ELECTRICAL WORK. TREAT ALL SLEEVES OR HOLES PIERCING ACOUSTICAL SEPARATIONS FOR INSTALLATIONS OF THIS DIVISION TO MAINTAIN ACOUSTICAL RATING. ALL GAPS SHALL BE PACKED WITH ACOUSTICAL INSULATION AND SEALED AT BOTH ENDS WITH ACOUSTICAL CAULKING. PATCH ALL OPENINGS AROUND INSTALLATIONS OF THIS DIVISION PIERCING FIRE OR SMOKE SEPARATIONS WITH AN APPROVED WATERTIGHT SMOKE AND FIRE STOP SEALANT.
26. PROVIDE ALL ACCESS DOORS REQUIRED FOR THE ELECTRICAL INSTALLATIONS. ACCESS DOOR

ELECTRICAL SPECIFICATIONS

SIZE, TYPE AND FIRE RATING SHALL BE IN ACCORDANCE WITH THE ARCHITECTURAL SPECIFICATIONS AND CONDITIONS.

27. GENERALLY, MOUNT EQUIPMENT AS CLOSE AS PRACTICAL TO THE LOCATION SHOWN ON THE DRAWINGS TAKING INTO CONSIDERATION SITE CONDITIONS. ENSURE ALL EQUIPMENT IS LOCATED IN A MANNER ALLOWING EASY ACCESS FOR MAINTENANCE, REPAIR OR ADJUSTMENT. CONFIRM ALL ARCHITECTURAL CONDITIONS SUCH AS GLAZING, DOOR SWINGS, FURNITURE AND EQUIPMENT TYPES AND LAYOUTS, ETC., ON SITE PRIOR TO INSTALLING ANY RELATED ITEM OR WIRING.
28. THE OWNER RESERVES THE RIGHT TO RELOCATE ANY FIXTURE, OUTLET, DEVICE, EQUIPMENT, ETC., UP TO 3 m (10') PRIOR TO INSTALLATION WITHOUT INCURRING ANY EXTRA COST. CONFIRM LOCATIONS, MOUNTING HEIGHT AND ARRANGEMENT OF ALL OUTLETS ON SITE PRIOR TO INSTALLATION.
29. PROVIDE SPRINKLERPROOF HOODS AND DOORS FOR ELECTRICAL EQUIPMENT INSTALLED IN SPRINKLERED AREAS.
30. IF ASBESTOS MATERIAL IS ENCOUNTERED, STOP WORK IN THE AFFECTED AREA IMMEDIATELY AND NOTIFY THE CONSULTANT AND OWNER.
31. GUARANTEE ALL MATERIAL AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM DATE OF ACCEPTANCE BY OWNER/CONSULTANT. PROVIDE WRITTEN GUARANTEE.
32. OWNER RESERVES RIGHT TO TRIAL AND/OR TEMPORARY USAGE PRIOR TO ACCEPTING INSTALLATION.
33. ON COMPLETION OF PROJECT AND BEFORE FINAL PAYMENT, SUBMIT:
    a. ONE (1) SET OF AUTOCAD AS-BUILT DRAWINGS WITH ALL CHANGES NOTED THEREON. ARRANGE COMPUTER FILE IN LAYERS TO EXACTLY MATCH THE LAYERING SYSTEM OF THE CONSULTANT. DRAWING SHALL HAVE THE ELECTRICAL CONTRACTORS LOGO AND CONTACT INFORMATION ISSUED FOR AS BUILT WITH THE CURRENT DATE.
    b. ONE (1) SET OF PDF'S AS-BUILT DRAWINGS WITH ALL CHANGES NOTED THEREON. PLOT USING THE CONSULTANT CTB FILE. DRAWING SHALL HAVE THE ELECTRICAL CONTRACTORS LOGO AND CONTACT INFORMATION, ISSUED FOR AS BUILT WITH THE CURRENT DATE.
    c. SUBMIT THREE (3) COPIES (BOTH ELECTRONIC (CD) AND HARDCOPIES) OF MAINTENANCE DATA AND OPERATING INSTRUCTIONS IN A HARD-BACK, 3 RING BINDER, EACH OF WHICH IS TO INCLUDE:
       - 1 COPY OF EACH SHOP DRAWING (REVISED AS PER THE REVIEWED DRAWINGS).
       - 1 COPY OF EQUIPMENT PARTS LIST.
       - 1 COPY OF RECOMMENDED LIST OF SPARE PARTS.
       - 1 COPY OF OPERATING AND MAINTENANCE INSTRUCTIONS.
       - 1 COPY OF EQUIPMENT INSTALLATION DETAILS, CONSTRUCTION AND PERFORMANCE DATA.
       - 1 LIST OF ALL MANUFACTURING AND EQUIPMENT SERVICE DEPOTS INCLUDING TELEPHONE NUMBERS.
       - 1 COPY OF THE ELECTRICAL SAFETY AUTHORITY FINAL INSPECTION CERTIFICATE.
       - 1 COPY OF ANY OTHER CERTIFICATES, APPROVAL LETTERS, ETC.

38. WIRING AND CONDUIT SHALL BE CONCEALED IN WALLS OR ABOVE CEILINGS UNLESS OTHERWISE APPROVED.
39. SUPPLY, INSTALL, WIRE AND CONNECT ALL EQUIPMENT SHOWN, SPECIFIED OR MENTIONED.

PART 2 - PRODUCTS

IDENTIFICATION FOR ELECTRICAL SYSTEMS

39. PROVIDE LAMACOID LABELS (3-PLY) WHITE LETTERED ON BLACK BACKGROUND- 1/4" HIGH LETTERING ON ALL ELECTRICAL EQUIPMENT SUPPLIED, MOUNTED AND/OR CONNECTED BY THIS CONTRACT.
40. PROVIDE BRADY LABELING ON ALL RECEPTACLE COVER PLATES INDICATING PANEL AND CIRCUITING NUMBER CONNECT BY THIS CONTRACT.

WIRE AND CABLE

41. ALL WIRING SHALL BE COLOUR CODED AS PER OESC AND BE IDENTIFIED WITH BRADY OR EQUIVALENT SELF-STICKING PERMACODE WIRE MARKERS.
42. IN GENERAL, ALL WIRING SHALL BE TYPE R90 XLPE INSTALLED IN CONDUIT OR RACEWAYS UNLESS OTHERWISE SPECIFIED. USE ONLY COPPER CONDUCTORS, MINIMUM SIZE NO. 12, SIZED AND COLOUR CODED ACCORDING TO THE ELECTRICAL SAFETY CODE WHERE NOT INDICATED.
43. SIZE ALL WIRING FOR A MAXIMUM OF 3% VOLTAGE DROP IN A FEEDER OR BRANCH CIRCUIT, AND 5% VOLTAGE DROP FROM THE SUPPLY SIDE OF THE CONSUMER SERVICE TO THE POINT OF UTILIZATION.
44. T90 NYLON MAY BE USED IN LIEU OF R90 FOR INTERIOR INSTALLATIONS UP TO SIZE #10, HOWEVER, CONDUIT FILL SHALL BE BASED ON R90 RATING.
45. THE USE OF FLEXIBLE CABLE (TYPE AC90 ONLY) IS TO BE RESTRICTED TO INTERIOR PARTITION WALLS, ACCESSIBLE CEILING SPACES AND FINAL CONNECTIONS TO LIGHT FIXTURES. THE FLEXIBLE CABLE SHALL BE RESTRICTED TO 3600 mm (12') IN LENGTH AND BE SUITABLY CLIPPED AND SUPPORTED EVERY 900 mm (3').
46. ALL 120 V (SINGLE PHASE) BRANCH CIRCUITS SHALL BE PROVIDED WITH A SEPARATE NEUTRAL CONDUCTOR FOR EACH CIRCUIT. PIGTAIL CONNECT NEUTRAL CONDUCTORS AT ALL DEVICES. JOIN ALL CONDUCTORS USING APPROVED SOLDERLESS WING NUT PRESSURE CONNECTORS.
47. ALL WIRING SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS, ALL REGULATORY REQUIREMENTS AND SHALL SATISFY ALL APPLICABLE CODES. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CHECK AND REPLACE AS REQUIRED ANY EXISTING WIRING BEING RE-USED.
48. FEEDERS AND BRANCH CIRCUITS RATED 100 AMPERES OR GREATER SHALL BE CHECKED WITH A 1000 V MEGGAR FOR 15 SECONDS BEFORE ENERGIZATION.
49. WIRE AND CONNECT MOTORS, SUPPLIED BY OTHERS, AS INDICATED.
50. BX (AC-90) CABLE IS ONLY PERMITTED TO LIGHT FIXTURES WITH A MAXIMUM LENGTH OF 1500mm.
51. PROVIDE VFD CERTIFIED CABLES ON THE LOAD SIDE OF VFD'S TO MOTOR TERMINAL CONNECTIONS. COORDINATE WITH EQUIPMENT AND CABLE SUPPLIER RECOMMENDATIONS TO MATCH MOTOR LOAD REQUIREMENTS.

DISCONNECT SWITCHES

52. FUSED AND NON-FUSED, HEAVY DUTY, VISIBLE BLADES IN THE OFF POSITION, QUICK-MAKE, QUICK-BREAK MECHANISM, LOAD BREAK TYPE WITH DOOR/HANDLE/SWITCHING MECHANISM INTERLOCK WITH OVERRIDE, LOCK-OFF PROVISION, ARC EXTINGUISHERS, SILVER PLATED WIPE ACTION CONTACTS, AND SPRING REINFORCED FUSE CLIPS, OF SIZES INDICATED, CSA CERTIFIED. PROVIDE DISCONNECT SWITCHES AHEAD OF EACH PIECE OF EQUIPMENT WHERE NECESSARY TO MEET CODE REQUIREMENTS.
53. FUSIBLE SWITCH UNITS INSTALLED IN EXISTING SWITCHBOARD EXTENSION SHALL HAVE QUICK MAKE-QUICK BREAK MECHANISM WITH PROVISIONS FOR LOCKING IN THE OPEN OR CLOSED POSITION, AND DOOR/HANDLE/SWITCHING MECHANISM INTERLOCK WITH OVERRIDE. ALL FUSIBLE UNITS SHALL BE MODULAR TYPE EQUIPPED FOR HRCI FUSES AND INCLUDE AUXILIARY CONTACTS OR OTHER SPECIAL FEATURES AS NOTED ON THE DRAWINGS.
54. SWITCH FUSE HOLDERS SHALL HAVE REINFORCED CLIPS. FUSES SHALL BE EASILY REMOVABLE WHEN THE SWITCH IS IN THE OFF POSITION.
55. ALL SWITCHES SHALL HAVE AMPLE GUTTER SPACE FOR TOP OR BOTTOM WIRING AND BE PROVIDED WITH ENCLOSURES TO SUIT THE SPECIFIC APPLICATION.

MOTOR STARTERS, CONTACTORS AND RELAYS

56. PROVIDE MANUAL AND MAGNETIC MOTOR STARTERS FOR MOTORS AND EQUIPMENT AS INDICATED. STARTERS SHALL INCLUDE MANUAL RESET, ADJUSTABLE THERMAL OVERLOAD UNITS WITH INTEGRAL SINGLE PHASE PROTECTION AND BE COMPLETE WITH INTERLOCKS, AUXILIARY RELAYS, CONTROL TRANSFORMERS, TERMINALS, ETC., REQUIRED FOR PROPER OPERATION. REFER TO THE DRAWINGS FOR FURTHER DETAILS OF MECHANICAL EQUIPMENT CONTROL AND WIRING REQUIREMENTS.
57. PROVIDE AC CONTROL RELAYS AND CONTACTORS WITH REQUIRED COIL AND CONTACT RATING AND PILOT LIGHT FOR CONTROL OF EQUIPMENT AND MISCELLANEOUS LOADS AS SHOWN. PROVIDE AUXILIARY COMPONENTS, CONTROL TRANSFORMERS, TERMINALS, SWITCHES, ETC., REQUIRED FOR CONTROL AND CONNECTION.

FUSES

58. PROVIDE 600V 200,000 RMS SYMMETRICAL INTERRUPTING RATING, HRCI TYPE J (600A OR LESS) AND HRCI TYPE L (OVER 600A). FOR MOTOR PROTECTION: TIME DELAY 200,000A RMS SYMMETRICAL RATING, HRCI TYPE J TIME DELAY (600A OR LESS) AND HRCI TYPE L TIME DELAY (OVER 600A).
59. PROVIDE FUSE SIZE AND TYPE COMPATIBLE WITH VFD MANUFACTURER REQUIREMENTS.

PANELBOARDS

60. PANELS SHALL BE OF THE TYPE WITH VOLTAGE AND CURRENT RATING AS SHOWN ON THE DRAWINGS, SIZED TO ACCOMMODATE BRANCH CIRCUIT BREAKERS AND SPACES AS INDICATED. BUS BRACING SHALL BE PROVIDED TO SUIT THE SHORT CIRCUIT CAPACITY RATING INDICATED ON THE DRAWINGS OR MINIMUM [10] [22] KA AT 208 V, 3 PHASE OR [14] [18] [25] KA AT 600 V, 3 PHASE AS APPLICABLE. RESTRICTIVE DIMENSIONS SHALL BE AS SHOWN. PROVIDE LOCKING DOORS FOR ALL PANELS. ALL PANEL DOORS, TRIM AND SURFACE MOUNT TUBS SHALL BE FINISHED IN LIGHT GRAY ENAMEL PAINT. TUBS FOR FLUSH MOUNT PANELS SHALL BE GALVANIZED.
61. PROVIDE PANEL LABELS AND NEATLY TYPEWRITTEN PANEL DIRECTORY INSIDE DOOR IN PLASTIC SLEEVE.
62. UNLESS OTHERWISE NOTED ALL BREAKERS SHALL BE RATED MINIMUM [14] [18] [25] KA SYMMETRICAL INTERRUPTING CAPACITY AT 600 VOLTS, 3 PHASE OR [10] [22] KA SYMMETRICAL INTERRUPTING CAPACITY AT 208 VOLTS, 3 PHASE AS APPROPRIATE AND NOT LESS THAN THE SHORT CIRCUIT CAPACITY AS SHOWN ON THE DRAWINGS.
63. PROVIDE BREAKER LOCK-ON DEVICES FOR ALL ESSENTIAL AND EQUIPMENT LOADS.

ELECTRICAL SPECIFICATIONS

64. CONNECT ALL SINGLE PHASE LOADS SUCH THAT THERE IS THE LEAST POSSIBLE IMBALANCE OF PHASES UNDER NORMAL CONDITIONS.

RACEWAYS AND BOXES

65. PROVIDE OUTLET BOXES OF ADEQUATE SIZE OF TYPE APPROVED FOR THE PARTICULAR APPLICATION AS REQUIRED FOR ALL WIRING DEVICES, LIGHT FIXTURES, ETC., OR AS SHOWN. PROVIDE JUNCTION BOXES, COMPLETE WITH BLANK COVERS AS REQUIRED OR SHOWN FOR ALL WIRING SYSTEMS. INSTALL ALL BOXES TO BE ACCESSIBLE, IF NECESSARY PROVIDE ACCESS PANELS. SECURE ALL BOXES INDEPENDENT OF THE CONDUIT/WIRING SYSTEM.
66. IN ALL CASES USE ONLY CONDUIT AND RACEWAYS APPROVED FOR THE PARTICULAR APPLICATION AND OF ADEQUATE SIZE TO SUIT TYPE AND NUMBER OF CONDUCTORS BEING CARRIED. PROVIDE A SEPARATE GROUND CONDUCTOR IN ALL CONDUITS. THE CONDUIT SYSTEM SHALL NOT BE USED AS THE GROUND PATH. WHERE INDICATED, USE CONDUIT AS SPECIFIED. EVERY CONDUIT OR SECTION OF ARMOURED CABLE SHALL BE ADEQUATELY SECURED USING APPROVED SUPPORTS, CLAMPS AND FASTENERS TO ENSURE A SAFE AND SOUND INSTALLATION. ALL CONDUIT OR ARMOURED CABLE RUN IN FINISHED AREAS SHALL BE CONCEALED IN WALLS, CEILINGS OR FURRING UNLESS OTHERWISE INDICATED OR APPROVED BY THE OWNER. ARMOURED CABLE SHALL NOT BE USED WHERE EXPOSED UNLESS OTHERWISE NOTED.
67. BOXES FOR INDOOR USE: CODE GAUGE ELECTRO-GALVANIZED STEEL FOR CONCEALED MOUNTING AND GALVANIZED CAST FERRALLOY OR CAST BRUSHED ALUMINUM FOR EXPOSED USE, UNLESS OTHERWISE NOTED.
68. FIXTURE BOXES: ELECTRO-GALVANIZED STEEL 100mm (4") OCTAGON COMPLETE WITH 10mm (3/8") FIXTURE STUD WHERE NECESSARY.
69. ALL JUNCTION BOXES IN CONCEALED CEILING SPACES SHALL BE LABELED WITH PEN MARKER AS TO CIRCUITS CONTAINED THEREIN.
70. SWITCHES AND RECEPTACLE BOXES SHALL BE 1104 TYPE FOR RECESSED MOUNTING.
71. IN AREAS WITH SOLID CEILINGS, ELECTRICAL AND SYSTEMS JUNCTION BOXES ALONG WITH ASSOCIATED WIRE AND CONDUIT SHALL BE LOCATED IN AREAS WHERE CEILING ACCESS IS POSSIBLE, OR ACCESS PANELS MAY BE PROVIDED WITH THE APPROVAL OF THE OWNER OR CONSULTANT.
72. EMT CONDUIT SHALL BE USED FOR WIRING AND CONCEALED WHEREVER POSSIBLE. EMT COUPLINGS AND CONNECTORS SHALL BE STEEL SETSCREW CONCRETE TIGHT OR STEEL COMPRESSION RAIN TIGHT.
73. ALL CONDUIT IN PUBLIC AREAS WITH EXPOSED CEILING MUST BE PAINTED EMT. PAINT COLOUR TO BE CONFIRMED BY ARCHITECT.

WIRING DEVICES

74. SWITCHES AND RECEPTACLES: PROVIDE SPECIFICATION GRADE WIRING DEVICES AS SHOWN ON THE DRAWINGS. DEVICES SHALL BE AS MANUFACTURED BY HUBBELL (OR APPROVED EQUAL) AS NOTED BELOW:
    - 15 AMP., 120 V DUPLEX RECEPTACLE - 5252
    - 20 AMP. DUPLEX RECEPTACLE (T-SLOT) - 5352
    - 15 AMP. GROUND FAULT DUPLEX RECEPTACLE - GF5252
    - 20 AMP. GROUND FAULT DUPLEX RECEPTACLE - GF5352
    - WEATHERPROOF IN-USE RECEPTACLE COVER - WP826

67. PROVIDE <SMOOTH HIGH IMPACT LEXAN OR NYLON> <VERTICALLY BRUSHED STAINLESS STEEL> COVERPLATES, COLOURED TO MATCH DEVICE, FOR FLUSH MOUNTED DEVICES OR GALVANIZED STEEL TYPE COVERPLATES WITH ROUNDED CORNERS FOR SURFACE MOUNTED DEVICES AS APPROPRIATE FOR ALL OUTLETS, GANGED TYPE FOR ALL GROUPED OUTLETS. PROVIDE SPECIAL RECEPTACLES AND OUTLET TYPES AS IDENTIFIED ON THE DRAWINGS.
68. WHITE FINISH WITH WHITE THERMOPLASTIC WHEN INSTALLED ON DRYWALL. BACK OF HOUSE SPACES (STORAGE, SERVICE ROOMS, ETC) WITH CONCRETE OR BLOCK WALL SHALL BE STAINLESS STEEL COVER PLATES. SWITCHES AND RECEPTACLES SHALL BE DECORA STYLE MEETING ACCESSIBILITY STANDARDS UNLESS OTHERWISE NOTED.
69. ALL EXTERIOR RECEPTACLES SHALL BE GFCI AND COME WITH WHILE-IN-USE COVERS AS PER OESC.
70. MOUNT DEVICES AT THE FOLLOWING HEIGHTS UNLESS NOTED OTHERWISE OR TO COMPLY WITH OBC, BARRIER FREE DESIGN:
    a. RECEPTACLES - 450MM (17.7")
    b. ELECTRICAL PANELS - 1981MM (78") TO TOP

PART 3 - EXECUTION

1. PROVIDE ALL GROUNDING REQUIRED BY THE ONTARIO ELECTRICAL SAFETY CODE OR ANY LOCAL AUTHORITIES REGARDLESS OF WHETHER IT HAS BEEN SHOWN. THIS INCLUDES EQUIPMENT GROUNDING AS WELL AS SYSTEM (SERVICE) AND DISTRIBUTION GROUNDING. PROVIDE ADDITIONAL SPECIFIC PROVISIONS AS INDICATED, INCLUDING GROUND CONNECTIONS FOR MAIN ELECTRICAL ROOM AND BUILDING STRUCTURE. PROVIDE THESE INSTALLATIONS ACCORDING TO ELECTRICAL SAFETY CODE REGULATIONS. COLLECT ALL GROUND CONNECTIONS AT A COMMON POINT IN THE MAIN ELECTRICAL ROOM, WHICH IN TURN IS CONNECTED TO THE MAIN SERVICE GROUND.
2. ALL GROUNDED FEEDERS AND BRANCH CIRCUITS SHALL BE PROVIDED WITH A SEPARATE GROUND CONDUCTOR SIZED ACCORDING TO THE ELECTRICAL SAFETY CODE REGULATIONS. THE CONDUIT SYSTEM SHALL NOT BE USED AS THE GROUND PATH, HOWEVER ALL CONDUITS SHALL BE SOLIDLY GROUNDED.
3. ARRANGE GROUNDS SUCH THAT UNDER NORMAL OPERATING CONDITIONS CURRENT FLOW IN ANY GROUNDING CONDUCTOR IS NOT OBJECTIONABLE AND WILL NOT HARM PERSONNEL OR EQUIPMENT. ARRANGE SERVICE GROUNDS AND DISTRIBUTION GROUNDS TO PROVIDE GROUND RESISTANCE READINGS WITHIN VALUES REQUIRED BY THE ONTARIO ELECTRICAL SAFETY CODE AND THE ELECTRICAL SAFETY AUTHORITY.
4. IN GENERAL, PROVIDE ALL POWER SUPPLY WIRING, LINE VOLTAGE CONTROL WIRING AND ELECTRICAL SAFETY CODE REQUIRED DISCONNECT SWITCHES FOR ANY EQUIPMENT INSTALLED BY OTHER TRADES. VERIFY THE ELECTRICAL CHARACTERISTICS AND WIRING REQUIREMENTS OF ALL EQUIPMENT BEFORE PROCEEDING WITH THE ACTUAL INSTALLATIONS. REFER TO THE DRAWINGS FOR A DESCRIPTION OF EQUIPMENT WIRING AND CONTROL REQUIREMENTS AND COMPONENTS TO BE PROVIDED BY THE CONTRACTOR.
5. CO-OPERATE WITH ALL OTHER TRADES ON THE JOB SUCH THAT ALL EQUIPMENT CAN BE INSTALLED WITHOUT ANY CONFLICTS OR DELAYS. PROVIDE AND MAINTAIN TEMPORARY WIRING, LIGHTING AND POWER SUPPLY INSTALLATIONS AS REQUIRED BY OTHER TRADES DURING CONSTRUCTION.
6. THE CONTRACTOR SHALL VISIT THE SITE TO DETERMINE THE EXTENT OF DEMOLITION, REMOVAL, RELOCATION, RE-ROUTING AND RECONNECTION OF EXISTING ELECTRICAL EQUIPMENT, FIXTURES, OUTLETS AND WIRING REQUIRED FOR THE EXECUTION AND COMPLETION OF THIS PROJECT. IN GENERAL, RELOCATE EXISTING SERVICES AS REQUIRED TO ACCOMMODATE NEW EQUIPMENT AND INSTALLATIONS AND ARCHITECTURAL CHANGES. IN AREAS BEING TOTALLY RENOVATED, PROVIDE ALL ELECTRICAL DEMOLITION WORK AND REPLACE EXISTING INSTALLATIONS WITH NEW AS SHOWN. EXTRA CHARGES FOR PREMIUM TIME LABOUR, IF REQUIRED TO COMPLETE THE PROJECT AS DESCRIBED, SHALL BE INCLUDED IN THE BID PRICE.
7. SEQUENCE OF DISCONNECTION AND REMOVAL AND/OR RELOCATION OF EXISTING EQUIPMENT AND WIRING SHALL BE CO-ORDINATED WITH THE OWNER AND OTHER TRADES AND SHALL CONFORM TO THE REQUIREMENTS AND CONDITIONS OUTLINED IN THE SPECIFICATIONS.
8. WIRING LOCATED IN AREAS BEING ALTERED BUT FEEDING OUTLETS OR EQUIPMENT IN OTHER AREAS REQUIRED TO REMAIN IN SERVICE, SHALL BE REWORKED, EXTENDED AND RE-ROUTED AS REQUIRED TO MAINTAIN THE CONTINUITY OF THESE SERVICES. PROVIDE ADEQUATE PROTECTION TO EXISTING WIRING AND EQUIPMENT WHICH HAS BECOME EXPOSED TO MECHANICAL INJURY IN THE COURSE OF ALTERATIONS OR NEW INSTALLATIONS.
9. INSTALL ALL CONDUIT AND FEEDERS RUNNING THROUGH THE EXISTING BUILDING ALONG ROUTES APPROVED ON SITE BY THE OWNER. NEW INSTALLATIONS WILL NOT NECESSARILY BE ALLOWED ALONG SHORTEST ROUTES BUT SHOULD FOLLOW CORRIDORS OR ROUTES OF EXISTING MAIN RUNS WHERE POSSIBLE.
10. IN SOME INSTANCES, NEW OUTLETS AND EQUIPMENT ARE SHOWN IN THE SAME LOCATION AS THE EXISTING OUTLETS. THESE MAY BE FED THROUGH THE EXISTING CONDUITS PROVIDED THAT THE CONDUITS ARE IN GOOD CONDITION AND ARE ACCEPTABLE TO THE ELECTRICAL SAFETY AUTHORITY FOR RE-USE. ALL WIRING TO NEW OUTLETS AND EQUIPMENT SHALL BE NEW UNLESS OTHERWISE INDICATED. ALL UNUSED CONDUIT ENTRANCE OPENINGS SHALL BE SEALED.
11. UNLESS NOTED OTHERWISE, ALL EXISTING ELECTRICAL EQUIPMENT WHICH IS NOT TO BE RE-USED SHALL BECOME THE PROPERTY OF THIS CONTRACTOR (FOR DISPOSAL OR REMOVAL FROM THE SITE AS APPLICABLE) AND HAVE AN APPROPRIATE SALVAGE VALUE INCLUDED IN THE CONTRACT. EXISTING ELECTRICAL EQUIPMENT TO BE RE-USED (RELOCATED AND RECONNECTED) SHALL BE CLEANED, PAINTED, REFURBISHED AND REPAIRED AS REQUIRED BEFORE REINSTALLATION. (TURN OVER EXISTING LIGHT FIXTURES, ELECTRICAL PANELS AND STIPULATED DEVICES NOT TO BE RE-USED OR DISPOSED OF TO THE OWNER.)
12. IN FINISHED AREAS OF THE EXISTING BUILDING, AS MUCH WIRING AS POSSIBLE SHALL BE CONCEALED. WHERE, IN THE CONTRACTOR'S OPINION IT IS ABSOLUTELY NECESSARY OR ADVANTAGEOUS TO RUN WIRING ON THE SURFACE, (NOT SIMPLY TO AVOID CUTTING WALL OR FLOOR) OBTAIN APPROVAL FROM THE OWNER BEFORE PROCEEDING. ALL SURFACE RACEWAYS INSTALLED SHALL BE AS MANUFACTURED BY WIREMOLD UNLESS OTHERWISE INDICATED. WIREMOLD RACEWAYS SHALL BE SIZED AS INDICATED OR TO SUIT CONDUCTORS BEING CARRIED. USE ONLY APPROVED COMPONENTS, FITTINGS AND METHODS FOR SECURING, JOINING AND SUPPORTING SURFACE RACEWAYS AND OUTLET BOXES. SURFACE MOUNT RACEWAYS SHALL BE PAINTED BY THE CONTRACTOR TO MATCH THE ADJACENT WALL OR CEILING FINISH.
13. SERVICE AND DISTRIBUTION SYSTEM POWER INTERRUPTIONS SHALL BE KEPT TO A MINIMUM. POWER INTERRUPTIONS MUST BE CO-ORDINATED WITH THE OWNER AND ALL OTHER TRADES BY THIS CONTRACTOR. WRITTEN APPLICATION FOR ELECTRICAL INTERRUPTIONS MUST BE RECEIVED FROM THE CONTRACTOR INDICATING THE DATE, TIME AND ESTIMATED DURATION OF THE

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INTERRUPTION. APPLICATION FOR APPROVAL OF THE POWER INTERRUPTIONS MUST BE SUBMITTED TO THE OWNERS AND CONSULTANT AT LEAST TWO WEEKS PRIOR TO THE REQUESTED SHUT-DOWN DATE.

14. IN SOME SECTIONS OF THIS SPECIFICATION, MATERIALS AND EQUIPMENT ARE SPECIFICALLY DESCRIBED AND NAMED BY MANUFACTURER FOR THE PURPOSE OF ESTABLISHING A MINIMUM STANDARD OF MATERIALS, PRODUCT QUALITY AND OTHER SPECIFIED REQUIREMENTS.
15. THE PROJECT SYSTEMS DESIGN AS PER THE DRAWINGS AND SPECIFICATIONS IS BASED ON THE SPECIFIED MANUFACTURER'S EQUIPMENT BUT IS INTENDED TO BE APPROPRIATE FOR EQUIVALENT EQUIPMENT OF ALL OTHER MANUFACTURERS CONTAINED ON THE "APPROVED MANUFACTURER'S LIST"
16. PRODUCTS OF MANUFACTURER'S LISTED AS "ALTERNATES" ARE SUBJECT TO SHOP DRAWING REVIEW TO ENSURE THAT THEY ARE EQUIVALENT TO THE PRODUCTS OF THE SPECIFIED MANUFACTURER. ALTERNATE MANUFACTURER'S EQUIPMENT SHALL CONFORM TO THE SPACE LIMITATIONS IMPOSED BY THE PROJECT AND THE INTENT AS OUTLINED IN THIS SPECIFICATION AND DRAWINGS.
17. THE CONTRACTOR MAY SUBMIT ALTERNATIVE PROPOSALS OF MANUFACTURERS NOT LISTED IN THE APPROVED MANUFACTURERS LIST OF PROPOSALS OR MODIFIED DESIGN WITH APPROPRIATE COSTS, DELIVERY, AND SYSTEM DESIGN ADJUSTMENTS WHICH HE FEELS MAY BE ADVANTAGEOUS CONSIDERATIONS FOR THE PROJECT.

APPROVED MANUFACTURERS LIST

DIVISION 26

TESTING / COMMISSIONING COMPANY:
RONDAR; G.T. WOOD; SCHNEIDER ELECTRIC

DISCONNECT SWITCHES, LIGHTING AND POWER PANELS:
EATON; SIEMENS; SCHNEIDER ELECTRIC

MOTOR CONTROLS, RELAYS, CONTACTORS, ETC.:
ALLEN-BRADLEY; SIEMENS; EATON; SCHNEIDER ELECTRIC

VARIABLE FREQUENCY DRIVES:
ALLEN-BRADLEY; SIEMENS; EATON; SCHNEIDER ELECTRIC; DANFOSS; ABB

FUSES:
GOULD; BUSSMAN

TRUE NORTH | CONSTRUCTION NORTH

MANTECON PARTNERS
STRUCTURAL MECHANICAL ELECTRICAL CIVIL ENGINEERS
15 Foundry Street, Dundas, ON, L9H 2V6
Phone: (905)648-0373 www.manteconpartners.com

SEAL

NO.	ISSUED	DATE	BY
3	RE-ISSUED FOR TENDER	2025/09/08	P.O
2	ISSUED FOR TENDER	2025/08/06	P.O
1	ISSUED FOR 75% DESIGN	2025/03/21	P.O

CENTENNIAL COLLEGE

CLIENT
CENTENNIAL COLLEGE
65 Carl Hall Rd, Toronto, ON

PROJECT:
CENTENNIAL COLLEGE DOWNSVIEW CAMPUS IT ROOM UPGRADES

DRAWING TITLE:
ELECTRICAL SPECIFICATIONS

DRAWN BY: P.O	SCALE: NTS
CHECKED BY: N.A	DRAWING NUMBER: E001
DATE: MAR. 2025	
PROJECT NUMBER: 25-007	

UPS SPECIFICATIONS

1 GENERAL

1.1 REFERENCES

.1 Abbreviations and Acronyms:

.1 UPS: Uninterruptible Power Supply

.2 PDU: Power Distribution Unit

.3 SBM: Static Bypass Module

.4 SBS: Static Bypass Switch

.5 MBS: Maintenance Bypass Switch

.6 MBP: Maintenance Bypass Panel

.7 MBC: Maintenance Bypass Cabinet

.8 THD: Total Harmonic Distortion

.9 SCR: Silicon Controlled Rectifier

.2 Reference Codes and Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction.

.1 Ontario Building Code

.2 Ontario Electric Safety Code

.3 Institute of Electrical and Electronics Engineers, Inc. (IEEE):

.1 ANSI/IEEE 519, "Guide for Harmonic Control and Reactive Compensation of Static Power Converters" (copyrighted by IEEE, ANSI approved).

.4 International Organization for Standardization (ISO):

.1 ISO 9001, "Quality Management Systems _ Requirements."

.2 ISO 14001, "Environmental Management Systems _ Requirements with Guidance for Use."

.5 Underwriters Laboratories, Inc. (UL):

.1 UL 1778 second Edition, "Standard for Uninterruptible Power Supply Equipment" (copyrighted by UL, ANSI approved).

.2 UL 60950-1, "Standard for Information Technology Equipment."

.6 International Electrotechnical Commission (IEC)

.1 IEC 61000-4-2, "Electromagnetic Compatibility - Testing and Measurement Techniques; Electrostatic Discharge Immunity Test.

.2 IEC 61000-4-3, "Electromagnetic Compatibility - Testing and Measurement Techniques; Radiated, Radio Frequency, Electromagnetic Field Immunity Test."

.3 IEC 61000-4-4, "Electromagnetic Compatibility - Testing and Measurement Techniques; Electrical Fast Transient/Burst Immunity Test."

.4 IEC 61000-4-5, "Electromagnetic Compatibility - Testing and Measurement Techniques; Surge Immunity Test."

.5 IEC 62040-2, "Uninterruptible Power Systems - Electromagnetic Compatibility (EMC) Requirements,"

.6 IEC 62040-3, "Uninterruptible Power Systems - Method of Specifying the Performance and Test Requirements."

.7 CSA:

.1 C22.2 no. 107.1-M95, "General Use Power Supplies."

.2 60950-1, "Information Technology Equipment - Safety - Part 1: General Requirements."

.8 EMC:

.1 FCC part 15 Class A.

1.2 SUMMARY

.1 Provide design and engineering, labor, material, equipment, related services, and supervision required, including, but not limited to, manufacturing, fabrication, erection, and installation for a static UPS as required for the complete performance of the work and as shown on the Drawings and as herein specified.

.2 The work specified in this Section includes, but shall not be limited to, a continuous duty, three_phase, solid state, on_line double conversion static UPS.

.1 The UPS shall utilize a rack_mounted N+1 redundant, scalable array architecture. The UPS shall be ENERGY STAR qualified. The system power train shall be comprised of 10 kVA/10 kW power modules and shall be capable of being configured for N+X redundant operation at the rated system load. UPS shall facilitate the replacement of swappable power modules in less than ten minutes. Each 10 kVA/10 kW power module shall contain a fully rated input rectifier/boost converter hereafter referred to as the input converter, a fully rated output inverter, and battery charging circuit. The system shall also be comprised of a continuous duty bypass static switch module that can be swapped by trained personnel, battery modules that can be swapped by trained personnel, redundant control modules, redundant logic power supplies, and LCD interface/display. All of the above system components shall be housed in standard 600 mm wide by 1070 mm deep by 2000 mm high cabinets.

.2 This Section describes the performance, functionality, and design of the PDU and the battery system.

.3 The UPS and associated equipment shall operate in conjunction with a primary power supply and an output distribution system to provide quality uninterrupted power for mission critical, electronic equipment load.

.4 All programming and miscellaneous components for a fully operational system as described in this Section shall be available as part of the UPS.

1.3 SYSTEM DESCRIPTION

.1 Design Requirements:

.1 The UPS shall be sized for 30 kVA and 30 kW load with N+1 redundancy.

.2 The UPS battery shall be sized for 30 kW at a power factor of 1.0 for 34 minutes.

.3 The UPS unit shall be scalable for future 40 kVA and 40kW maximum load with N+1 redundancy.

.2 System Characteristics:

.1 System Capacity: The system shall be rated for full kW output in the following frame sizes:

.1 40 kVA/kW, can be configured with up to five, 10 kW power modules for 50 kW with no redundancy or 40 kW N+1 redundancy.

.2 Input:

.1 AC Input Nominal Voltage: 208 volts three-phase, 4 wires, 60 hertz.

.2 AC Input Voltage Window: ±15 percent of nominal (while providing nominal charging to the battery system).

.3 Short Circuit Withstand Rating: 30,000 symmetrical amperes.

.4 Maximum Frequency Range: 40 hertz to 70 hertz.

.5 Input Power Factor:

.1 Greater than 0.96 at 50 percent load.

.2 Greater than 0.99 at 100 percent load.

.6 Input Current Distortion With No Additional Filters:

.1 Less than 6 percent at 100 percent load.

.2 Less than 6 percent at 50 percent load.

.7 Soft Start: Shall be linear from 0 percent to 100 percent input current and shall not exhibit inrush. This shall take place over a 15 second time period.

.3 UPS Output:

.1 AC Output Nominal Output: 208 volts, three-phase, 4 wires, 60 hertz.

.2 AC Output Voltage Distortion: Maximum 3 percent at 100 percent linear load.

.3 AC Output Voltage Regulation: ±1 percent for 100 percent linear or non-linear load.

.4 Voltage Transient Response: ±5 percent maximum for 100 percent load step.

.5 Voltage Transient Recovery: Within less than 60 milliseconds.

.6 Output Voltage Harmonic Distortion:

.1 Less than 2 percent THD maximum and 1 percent single harmonic for a 100 percent linear load.

.2 Less than 5 percent THD maximum for a 100 percent non-linear load.

.7 Overload Rating:

.1 Normal Operation:

.1 150 percent for 30 seconds.

.2 Up to 105 percent.

.2 Bypass Operation:

.1 100 percent continuous.

.2 1000 percent for 500 milliseconds.

.8 System AC-AC Efficiency: Greater than 94% from 50% to 100% load in double- conversion mode. ENERGY STAR qualified.

.9 Output Power Factor Rating: The UPS output shall not require derating for purely resistive loads (power factor of 1). The output kW and kVA ratings of the UPS output shall be equal. For loads exhibiting a power factor of 0.9 leading to 0.8 lagging no derating of the UPS shall be required.

1.4 SUBMITTALS

.1 Complete sets of shop drawings will be submitted indicating the following:

.1 Product Data:

.1 As bid system bill of materials.

.2 Product catalog sheets or equipment brochures.

.3 Product guide specifications.

.2 Installation information, including, but not limited to, weights and dimensions.

.3 Information about terminal locations for power and control connections.

.4 Drawings for requested optional accessories.

.5 Wiring diagrams detailing power, signal, and control systems, clearly differentiating between manufacturer installed wiring and field installed wiring, and between components provided by the manufacturer and those provided by others.

.6 Submit system single line operation diagram.

.2 For Closeout submittals provide the following:

.1 Installation manual, which shall include, but shall not be limited to, instructions for storage, handling, examination, preparation, installation, and start up of UPS.

.2 Operation and maintenance manual, which shall include, but shall not be limited to, safe and correct operating instructions of the UPS functions.

1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturer Qualifications: Manufacturer shall be a firm engaged in the manufacture of solid state UPS of types and sizes required, and whose products have been in satisfactory use in similar service for a minimum of 20 years.

.1 The manufacturer shall be ISO 9001 certified and shall be designed to internationally accepted standards.

.2 Installer Qualifications: Installer shall be a firm that shall have a minimum of five years of successful installation experience with projects utilizing solid state UPS similar in type and scope to that required for this Project.

.2 Regulatory Requirements: Comply with applicable requirements of the laws, codes, ordinances, and regulations of Federal, State, and local authorities having jurisdiction. Obtain necessary approvals from such authorities.

.1 Work shall also be designed in accordance with the following:

.1 UL 1778 4th edition

.2 UL 60950-1

.2 Where applicable, the UPS shall also be designed in accordance with publications from the following organizations and committees:

.1 National Fire Protection Association (NFPA).

.2 National Electrical Manufacturers Association (NEMA).

.3 Occupational Safety and Health Administration (OSHA).

.4 Institute of Electrical and Electronics Engineers, Inc. (IEEE); ANSI/IEEE 519.

.5 ISO 9001

.6 ISO 14001

.7 FCC

.8 ENERGY STAR

.3 All equipment and components must be CSA approved, ULC approved, or approved by Special Inspection from the Electrical Safety Authority.

.4 Pre-Installation Conference: Prior to commencing the installation, meet at the Project site to review the material selections, installation procedures, and coordination with other trades. Pre-installation conference shall include, but shall not be limited to, the Contractor, the Installer, and any trade that requires coordination with the work. Date and time of the pre-installation conference shall be acceptable to the Owner and the Engineer.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials to the Project site in supplier's or manufacturer's original wrappings and containers, labeled with supplier's or manufacturer's name, material or product brand name, and lot number, if any.

.2 Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1.7 PROJECT CONDITIONS

.1 Environmental Requirements: Do not install the UPS until space is enclosed and weatherproof, wet work in space is completed and nominally dry, work above ceilings is complete, and ambient temperature and humidity conditions are and will be continuously maintained at values near those indicated for final occupancy.

.1 Environmental:

.1 Storage Ambient Temperature: 5 °F (15 °C) to 104 °F (40 °C).

.2 Operating Temperature Range: 32 to 104 °F (0 to 40 °C).

.3 Operating Ambient Temperature: 77 °F (25 °C).

.4 Relative Humidity: 0% to 95% non condensing.

.2 Altitude: Maximum installation with no derating of the UPS output shall be 10,000 feet (3048 m) above sea level.

.3 Audible Noise as measured 3 feet (914 mm) from surface:

.1 60 dBA at 70% load.

.2 67 dBA at 100% load.

1.8 WARRANTY

.1 Special Warranty: The Contractor shall warrant the work of this Section to be in accordance with the Contract Documents and free from faults and defects in materials and workmanship for period indicated below. This special warranty shall extend the one-year period of limitations contained in the General Conditions. The special warranty shall be countersigned by the Installer and the manufacturer.

.1 The UPS shall be covered by a full parts and labor warranty from the manufacturer for a period of 12 months from date of installation or acceptance by the Owner or 18 months from date of shipment from the manufacturer, whichever occurs first.

.2 Extended Warranty: The Installer shall warrant the equipment of this Section to be in accordance with the Contract Documents and free from faults and defects in materials and workmanship for period indicated below. The extended warranty shall be countersigned by the Installer and the manufacturer.

.1 The UPS shall be covered by a full parts and labor warranty from the manufacturer for a period of an additional 4 years from date of Total Completion of the Contract.

.3 Additional Owner Rights: The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

1.9 MAINTENANCE

.1 A complete offering of preventative and full service maintenance contracts for the UPS system and the battery system shall be available from the manufacturer. Contract work shall be performed by factory trained service personnel.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the Drawings, Schedules and Specification:

.1 Acceptable manufacturers are:

.1 Schneider Electric / APC

.2 Liebert / Vertiv

.3 Eaton

.2 Single source responsibility: Obtain each type of product in this Section from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

.3 Basis of Design: Product specified is "APC Symmetra PX 40 kW" as manufactured by Schneider Electric. Items specified are to establish a standard of quality for design, function, materials, and appearance.

2.2 MODES OF OPERATION

.1 Normal: The Input converter and output inverter shall operate in an on-line manner to continuously regulate power to the critical load. The input and output converters shall be capable of full battery recharge while simultaneously providing regulated power to the load for all line and load conditions within the range of the UPS specifications.

.2 Battery: Upon failure of the AC input source, the critical load shall continue being supplied by the output inverter, which shall derive its power from the battery system. There shall be no interruption in power to the critical load during both transfers to battery operation and retransfers from battery to normal operation.

.3 Recharge: Upon restoration of utility power to the UPS input, the input converter and output inverter shall simultaneously recharge the battery and provide regulated power to the critical load.

.4 Static Bypass: The SBM shall be used to provide controller transfer of critical load from the inverter output to the bypass source. This transfer, along with its retransfer, shall take place with no power interruption to the critical load. In the event of an emergency, this transfer shall be an automatic function.

.5 Maintenance Bypass: The system shall be equipped with an external make before break MBC to electrically isolate the UPS during routine maintenance and service of the UPS. The MBC shall allow for the completely electrical isolation of the UPS.

2.3 INPUT CONVERTER

.1 General: The Input converters of the system shall be housed within the removable power modules, and shall constantly control the power imported from the mains input of the system, to provide the necessary UPS power for precise regulation of the DC bus voltage, battery charging, and main inverter regulated output power.

.2 Input Current Total Harmonic Distortion: The input current THD shall be held to less than 5% at full system load, while providing conditioned power to the critical load bus, and charging the batteries under steady state operating conditions. This shall be true while supporting either a linear or non-linear load. This shall be accomplished without the requirement for additional filters, magnetic devices, or other components.

.3 Soft Start Operation: As a standard feature, the UPS shall contain a user-adjustable soft start, capable of limiting the input current from 0% to 100% of the input over a default 10 second period, when returning to the AC utility source from battery operation. The change in current over the change in time shall take place in a linear manner throughout the entire operation.

.4 Magnetization Inrush Current: The UPS shall exhibit zero inrush current as a standard product. If provided with an optional isolation transformer, inrush should be limited to 11 times the nominal input current of the transformer.

.5 Input Current Limit:

.1 The Input converter shall control and limit the input current draw from utility to 130% of the rated UPS output. During conditions where input current limit is active, the UPS shall be able to support 100% load, charge batteries at 10% of the UPS output rating, and provide voltage regulation with mains deviation ±15%.

.6 Redundancy: The UPS shall be capable of being configured with redundant Input converters, each with semiconductor fusing, and logic-controlled contactors to isolate a failed module from the input bus.

.7 Backfeed Protection: The above mentioned logic controlled contactor shall also provide the backfeed protection required by UL 1778, CSA 22.2, and IEC/EN Standards.

.8 Charging:

.1 The battery charging shall keep the DC bus float voltage of nominal 218 volts, ±1%.

.2 The battery charging circuit shall contain a temperature compensation circuit, which shall regulate the battery charging to optimize battery life.

.3 The battery charging circuit shall remain active when in static bypass and in normal operation.

.4 Maximum charging power: 10% (default) or 20% of output power rating or a maximum charge current of 0.25 CA.

2.4 OUTPUT INVERTER

.1 General: The UPS output inverter shall constantly develop the UPS output voltage waveform by converting the DC bus voltage to AC voltage through a set of semiconductor driven power converters. In both normal operation and battery operation, the output inverters shall create an output voltage independent of the mains input voltage. Input voltage anomalies such as brown outs, spikes, surges, sags, and outages shall not affect the amplitude or sinusoidal nature of the output voltage sine wave of the inverters.

.2 Overload Capability: Steady state overload conditions, of up to 150% of system capacity shall be sustained by the inverter for 30 seconds in normal and battery operation. Should overloads persist past the outlined time limitation, the critical load shall be switched to the automatic static bypass output of the UPS.

.3 Output Contactor: The output inverter shall be provided with an output mechanical contactor to provide physical isolation of the inverter from the critical bus. With this feature a failed inverter shall be isolated from the critical bus.

.4 Battery Protection: The inverter shall be provided with monitoring and control circuits to limit the level of discharge on the battery system.

.5 Redundancy: The UPS shall be capable of being configured with redundant output inverters, each with semiconductor fusing, and logic controlled contactors to remove a failed component from the input, DC, and output critical bus.

2.5 STATIC BYPASS

.1 As part of the UPS, a system SBM shall be provided with no break transfer of the critical load from the inverter output to the static bypass input source during times where maintenance is required, or the inverter cannot support the critical bus. Such times may be due to prolonged or severe overloads, or UPS failure. The UPS and SBS shall constantly monitor the auxiliary contacts of their respective circuit breakers, as well as the bypass source voltage, and inhibit potentially unsuccessful transfers to static bypass from taking place.

.2 The design of the SBS power path shall consist of SCR(s) with a continuous duty rating of 125% of the UPS output rating.

.3 An automatic transfer of load to static bypass shall take place whenever the load on the critical bus exceeds the overload rating of the UPS. Automatic transfers of the critical load from static bypass back to normal operation shall take place when the overload condition is removed from the critical output bus of the system. Automatic transfers of load to static bypass shall also take place if for any reason the UPS cannot support the critical bus.

.4 Manually initiated transfers to and from static bypass shall be initiated through the UPS display interface.

.5 The static bypass shall be capable of handling overloads equal to or less than 125% of the rated system output continuously. For instantaneous overloads caused by inrush current from magnetic devices, or short circuit conditions, the static bypass shall be capable of sustaining overloads of 1000% of system capacity for periods of up to 100 milliseconds.

.6 The SBS shall be of a modular design.

.7 As a requirement of UL 1778, backfeed protection in the static bypass circuit shall also be incorporated in the system design. To achieve backfeed protection, a mechanical contactor in series with the bypass SCR(s) shall be controlled by the UPS/SBS, to open immediately upon sensing a condition where backfeeding of the SBS by any source connected to the critical output bus of the system is occurring. One such condition could be a result of a shorted SCR.

2.6 DISPLAY AND CONTROLS

.1 The UPS shall be controlled by two fully redundant intelligence modules (IM) that can be swapped by trained personnel. These modules shall have separate, optically isolated, communication paths to the power and static switch modules. Logic power for the control modules shall be derived from redundant power supplies, each having a separate AC and DC input and output. The communication of the control modules shall be of controller area network (CAN Bus).

.2 A microprocessor controlled display unit shall be located on a hinged door in front of the system. The display shall consist of an alphanumeric display with backlight, four LEDs for quick status overview, and a keypad consisting of pushbutton switches.

.3 The following metered data shall be available on the alphanumeric display:

.1 Year, month, day, hour, minute, second of occurring events.

.2 Source input voltage.

.3 Output AC voltage.

.4 Output AC current.

.5 Input frequency.

.6 Battery voltage.

.4 The display unit shall allow trained personnel to display a time and date stamped log.

.5 The display unit shall allow the Owner to display a log of active alarms. The following minimum set of alarm conditions shall be available:

.1 Input frequency outside configured range.

.2 AC adequate for UPS but not for bypass.

.3 Low/no AC input, startup on battery.

.4 Intelligence module inserted.

.5 Intelligence module removed.

.6 Redundant intelligence module inserted.

.7 Redundant intelligence module removed.

.8 Number of batteries changed since last on.

.9 Number of power modules changed since last on.

.10 Number of batteries increased.

.11 Number of batteries decreased.

.12 Number of power modules increased.

.13 Number of power modules decreased.

.14 Number of external battery cabinets increased.

.15 Number of external battery cabinets decreased.

.16 Redundancy restored.

.17 Need battery replacement.

.18 The redundant intelligence module is in control.

.19 UPS fault.

.20 On battery.

.21 Shutdown or unable to transfer to battery due to overload.

.22 Load shutdown from bypass, input frequency, volts outside limits.

.23 Fault, internal temperature exceeded system normal limits.

.24 Input circuit breaker open.

.25 System level fan failed.

.26 Bad battery module.

.27 Bad power module.

.28 Intelligence module installed and failed.

.29 Redundant intelligence module installed and failed.

.30 Redundancy lost.

.31 Redundancy below alarm threshold.

.32 Runtime below alarm threshold.

.33 Load above alarm threshold.

.34 Load no longer above alarm threshold.

.35 Minimum runtime restored.

.36 Bypass not in range (either frequency or voltage).

.37 Backfeed contactor stuck in OFF position.

.38 Backfeed contactor stuck in ON position.

.39 UPS in bypass due to internal fault.

.40 UPS in bypass due to overload.

.41 System in forced bypass.

.42 Fault, bypass relay malfunction.

.43 High DC warning.

.44 High DC shutdown.

.45 Low battery shutdown.

.46 Low battery warning.

.6 The following controls or programming functions shall be accomplished by the use of the display unit. Pushbutton membrane switches shall facilitate these operations:

.1 Silence audible alarm.

.2 Display or set the date and time.

.3 Transfer critical load to and from static bypass.

.4 Test battery condition on demand.

.5 Set intervals for automatic battery tests.

.6 Adjust set points for different alarms.

.7 Program the parameters for remote shutdown.

.8 Enable or disable the automatic restart feature (field service engineer only).

.7 The following potential free (dry) contacts shall be available on an optional relay interface board:

.1 Normal operation.

.2 Battery operation.

.3 Bypass operation.

.4 Common fault.

.5 Low battery.

.6 UPS off.

.8 A communication interface board shall provide the following communication port:

.1 RS232 serial port: Enables local access to the UPS for management and monitoring, and provides UPS data and simple signaling support.

2.7 BATTERY

.1 The UPS batteries shall be of a modular construction and shall be protected by a fuse. Trained personnel shall be capable of swapping the battery modules without the requirement to transfer to bypass. Each battery module shall be monitored for voltage and temperature for use by the UPS battery diagnostic and temperature compensated charger circuitry.

.2 The battery jars housed within each removable battery module shall be of the valve regulated lead acid (VRLA) type.

.3 The UPS shall incorporate a battery management system to continuously monitor the health of each removable battery module. This system shall notify the user in the event a failed or weak battery module is found.

2.8 ACCESSORIES

.1 Battery Disconnect Breaker: Each UPS system shall have a 250 volt DC rated, thermal magnetic trip molded case circuit breaker. Each circuit breaker shall be equipped shunt trip mechanisms and 1A/1B auxiliary contacts. The circuit breakers shall be located within the UPS cabinet or as part of a line-up-and-match type battery cabinet.

.2 Maintenance System Bypass:

.1 The maintenance system bypass panel shall provide power to the critical load from the bypass source, during times where maintenance or service of the UPS is required. The maintenance system bypass shall provide a mechanical means of complete isolation of the UPS from the critical output distribution. The maintenance system bypass panel shall be constructed in a standard 29.53 inch wide x 37.8 inch high x 9.25 inch deep, wall-mount style cabinet.

.2 As a minimum, the maintenance system bypass shall contain the following features and accessories:

.1 Appropriately rated switches to fully isolate the UPS during times where maintenance is required. As a part of this design there shall be a UPS input switch designated as Q1, a UPS output switch designated as Q2, and a wrap-around maintenance bypass switch designated as Q3. Minimum 1A/1B auxiliary contacts for the purpose of relaying status information of each switch actuator to the UPS and maintenance system bypass shall be provided, along with a means of locking out the switches to inhibit operation of the bypass transfer pair. The maintenance system bypass shall be available for a 208 volt input.

.2 For purposes of providing local annunciation of status and alarm messages, the maintenance system bypass shall have an alphanumeric display with pushbutton switches, allowing retrieval of active alarms, system level programming, and event history of the maintenance system bypass. For purposes of simplicity and ease of use, the maintenance system bypass display shall be identical in nature to that of the Symmetra PX 40 kW UPS.

.3 The maintenance system bypass shall also have a full length hinged front door, with locking mechanism; to allow access to the three maintenance bypass switches.

.4 The maintenance system bypass shall bear a full mimic diagram outside the hinged front door. Also associated with the mimic panel shall be indicating lights, capable of depicting proper operation of maintenance bypass circuit breaker and UPS output switch.

.3 Modular Battery Solutions: For purposes of providing extended UPS back-up power, modular battery cabinets shall be available. For ease of maintenance the modular battery cabinet shall house draw-out battery cartridges. These cartridges shall conform to OSHA lifting requirements for one person to replace battery cartridges without lifting tools or additional mechanisms. Battery cartridges shall interlock in place within the battery cabinet to ensure proper contact. When withdrawing a battery cartridge, a catch shall stop the battery cartridge from inadvertently being withdrawn in an unsafe manner. The modular battery solution shall be housed in a standard, 24 inch (610 mm) wide, 36 inch (914 mm) deep, 42U high equipment racks. Up to four modular battery cabinets may be added for increased battery runtime.

.4 Floor Anchor Brackets: Floor anchor brackets shall be available to solidly connect UPS, and battery cabinet to minimize unintended moving of the equipment.

.5 StruxureWare Data Center Expert: A centralized infrastructure management platform hereafter referred to as Data Center Expert shall be available for purposes of complete system monitoring and management of all components outlined in this specification used as a single solution for small IT or part of the StruxureWare software stack providing data to systems such as Data Center Operation.

.1 Monitoring - Data Center Expert shall be capable of monitoring a PDU through a network of Cat 5 cable and a switch supplied by the user. This switch shall relay information to Data Center Expert, which in turn shall allow access to this information via the user's public network via a single IP address.

.2 Monitored Values: Data Center Expert shall be capable of monitoring alarms, general status parameters, voltage and current of the PDU.

.3 Thresholds: For individualized customer needs, Data Center Expert shall allow for user configurable thresholds for alarm notification. With this feature, Data Center Expert can notify clients of reaching thresholds for PDU capacity, or branch circuit breaker capacity. Other custom programmable alarm points for non-Schneider Electric products shall also be available via dry contact input signal.

.4 Public Network Monitoring: Data Center Expert shall also be capable of monitoring other Schneider Electric devices that are connected to the client's public network.

2.9 SOFTWARE AND CONNECTIVITY

.1 Network Adaptor: The Network Management Card shall allow one or more network management systems (NMS) to monitor and manage the UPS in TCP/IP network environments. The management information base (MIB) shall be provided in DOS and UNIX "tar" formats. The SNMP interface adaptor shall be connected to the UPS via Ethernet Port.

.2 Unattended Shutdown:

.1 The UPS, in conjunction with a network interface card, shall be capable of gracefully shutting down one or more operating systems.

.3 Remote UPS Monitoring: The following methods of remote UPS monitoring shall be available:

.1 Web Monitoring: Remote monitoring shall be available via a web browser such as Internet Explorer.

.2 Simple Network Management Protocol (SNMP): Remote UPS monitoring shall be possible through a standard MIB II compliant platform.

.4 Software Compatibility: The UPS manufacturer shall have available software to support graceful shutdown and remote monitoring with PowerChute Network Shutdown (PCNS) for the following operating system families:

.5 Microsoft Windows

.1 MAC OS X

.2 Hyper-V

.3 VMware

.4 Linux

.5 Unix

2.10 SOURCE QUALITY CONTROL

.1 Equipment shall be provided with all auxiliary components and mounting hardware required for installation in the building as intended.

3 EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: Examine areas and conditions under which the work is to be installed, and notify the Contractor in writing, with a copy to the Owner and the Architect/Engineer, of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

.1 Beginning of the work shall indicate acceptance of the areas and conditions as satisfactory by the Installer.

3.2 INSTALLATION

.1 Preparation and installation shall be in accordance with reviewed product data, final shop drawings, manufacturer's written recommendations, and as indicated on the Drawings.

.2 Factory assisted UPS start up will be required. Factory trained service personnel shall perform the following inspections, test procedures, and on site training:

.1 Visual Inspection:

.1 Inspect equipment for signs of damage.

.2 Verify installation per manufacturer's instructions.

.3 Inspect cabinets for foreign objects.

.4 Inspect battery units.

.5 Inspect power modules.

.2 Mechanical Inspection:

.1 Check UPS and external MBC internal control wiring connections.

.2 Check UPS and external MBC internal power wiring connections.

.3 Check UPS and external MBC terminal screws, nuts, and/or spade lugs for tightness.

.3 Electrical Inspection:

.1 Verify correct input and bypass voltage.

.2 Verify correct phase rotation of mains connections.

.3 Verify correct UPS control wiring and terminations.

.4 Verify voltage of battery modules.

.5 Verify neutral and ground conductors are properly landed.

.6 Inspect external MBS for proper terminations and phasing.

.4 Site Testing:

.1 Ensure proper system start up.

.2 Verify proper firmware control functions.

.3 Verify proper firmware bypass operation.

.4 Verify proper MBS operation.

.5 Verify system set points.

.6 Verify proper inverter operation and regulation circuits.

.7 Simulate utility power failure.

.8 Verify proper charger operation.

.9 Document, sign, and date test results.

.5 On Site Operational Training:

.1 During the factory assisted start up, operational training for site personnel shall include, but shall not be limited to, key pad operation, LED indicators, start up and shutdown procedures, maintenance bypass and AC disconnect operation, and alarm information.

.3 FIELD QUALITY CONTROL

.1 Manufacturer Field Service:

.1 Worldwide Service: The UPS manufacturer shall have a worldwide service organization available, consisting of factory trained field service personnel to perform start up, preventative maintenance, and service of the UPS system and power equipment. The service organization shall offer 24 hours a day, 7 days a week, 365 days a year service support.

.2 Replacement Parts: Parts shall be available through the worldwide service organization 24 hours a day, 7 days a week, 365 days a year. The worldwide service organization shall be capable of shipping parts within four working hours or on the next available flight, so that the parts may be delivered to the Owner within 24 hours.

.4 DEMONSTRATION

.1 General: Provide the services of a factory authorized service representative of the manufacturer to provide start up service and to demonstrate and train the Owner's personnel.

.1 Test and adjust controls and safeties. Replace damaged or malfunctioning controls and equipment.

.2 Train the Owner's maintenance personnel on procedures and schedules related to start up and shutdown, troubleshooting, servicing, and preventive maintenance.

.3 Review data in operation and maintenance manuals with the Owner's personnel.

.4 Schedule training with the Owner, through the Architect/Engineer, with at least seven day's advanced notice.

.5 PROTECTION

.1 Provide final protection and maintain conditions in a manner acceptable to the Installer that shall ensure that the solid state UPS shall be without damage at time of Substantial Completion.

END OF SECTION

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15 Foundry Street, Dundas, ON, L9H 2V6
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1	ISSUED FOR 75% DESIGN	2025/03/21	P.O

CENTENNIAL COLLEGE

CLIENT
CENTENNIAL COLLEGE
65 Carl Hall Rd, Toronto, ON

PROJECT:
CENTENNIAL COLLEGE
DOWNSVIEW
CAMPUS IT ROOM UPGRADES

DRAWING TITLE:
UPS SPECIFICATIONS

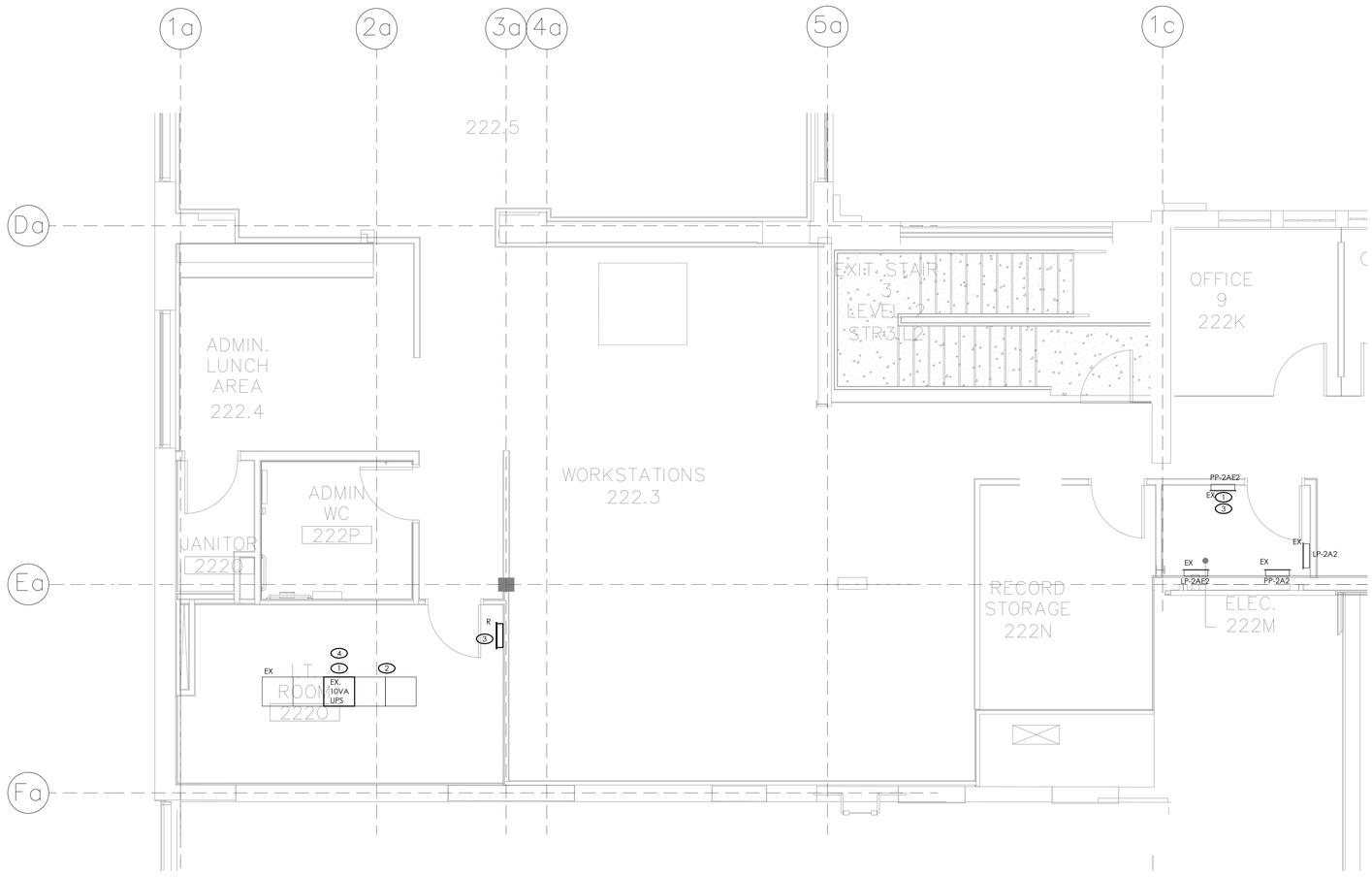
DRAWN BY: P.O	SCALE: NTS
CHECKED BY: N.A	DRAWING NUMBER: E002
DATE: MAR. 2025	
PROJECT NUMBER: 25-007	

DEMOLITION NOTES

1. DEMOLISH EXISTING 70A2P BREAKER IN PANEL PP-2AE2 AND ASSOCIATED WIRING/CONDUIT FEEDING EXISTING 10 KVA UPS.
2. REMOVE EXISTING 10KVA UPS & RETURN TO OWNER.
3. DEMOLISH EXISTING 100A SINGLE PHASE PANEL AND ASSOCIATED WIRING/CONDUIT BACK TO PANEL PP-2AE2. WIRING/CONDUIT SERVING UNUSED IT RECEPTACLES TO REMAIN.
4. RELOCATE EXISTING IT EQUIPMENT IN CABINETS ADJACENT TO UPS CABINET TO PROVIDE TEMPORARY LOCATION FOR EXISTING UPS. RELOCATE EXISTING UPS INTO TEMPORARY LOCATION WHERE IT SHALL REMAIN TO PROVIDE TEMPORARY POWER FOR EXISTING IT EQUIPMENT WHILE PROPOSED UPS IS INSTALLED. PROVIDE WIRING/ CONDUIT AS REQUIRED TO EXTEND EXISTING IT EQUIPMENT FEEDS TO TEMPORARY UPS LOCATION.

GENERAL NOTES

1. ALL SHUTDOWNS SHALL BE KEPT TO A MINIMUM. COORDINATE SHUTDOWNS WITH OWNER.



1 EDOO IT ROOM DEMOLITION POWER PLAN
SCALE: 1:50

ORIGINAL SHEET – ARCH D

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DRAWING TITLE:
IT ROOM DEMOLITION
POWER PLAN

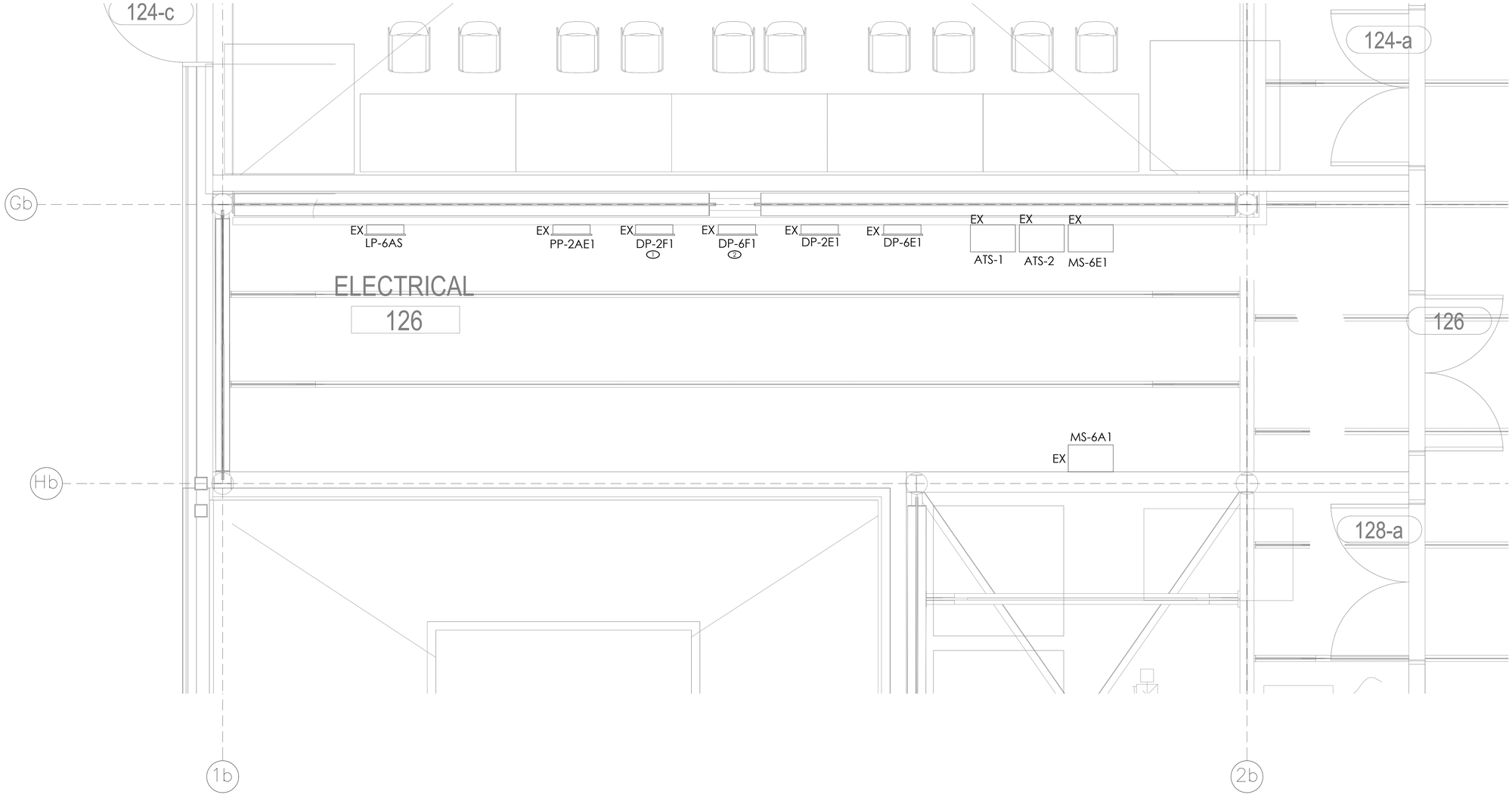
DRAWN BY: P.O	SCALE: 1:50
CHECKED BY: N.A	DRAWING NUMBER: ED00
DATE: MAR. 2025	
PROJECT NUMBER: 25-007	

September 08, 2025 – 04:44pm Plotted by: jcrowe

File: J:\Drawings\25-007 – UPS and Cooling Assessment at Downsview Campus – Centennial College\3-Working Documents\ELE\ED1 – IT ROOM 2220 & ELEC ROOM 222 – DEMO.dwg

DRAWING NOTES

1. PROVIDE 175A3P BREAKER IN PANEL DP-2F1 AND WIRING/CONDUIT AS REQUIRED TO FEED PROPOSED SPLITTER IN IT ROOM 2220
2. PROVIDE THREE 15A3P BREAKERS IN PANEL DP-6F1 AND WIRING/CONDUIT AS REQUIRED TO FEED PROPOSED VRF UNITS ON ROOF. REFER TO DRAWING E202 FOR ROOF PLAN.



1 E100 ELECTRICAL ROOM POWER AND DATA LAYOUT PLAN
SCALE: 1:25

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PROJECT:
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DRAWING TITLE:
ELECTRICAL ROOM POWER AND DATA LAYOUT PLAN

DRAWN BY:	SCALE: AS INDICATED
CHECKED BY:	DRAWING NUMBER: E100
DATE: MAR. 2025	
PROJECT NUMBER: 25-007	

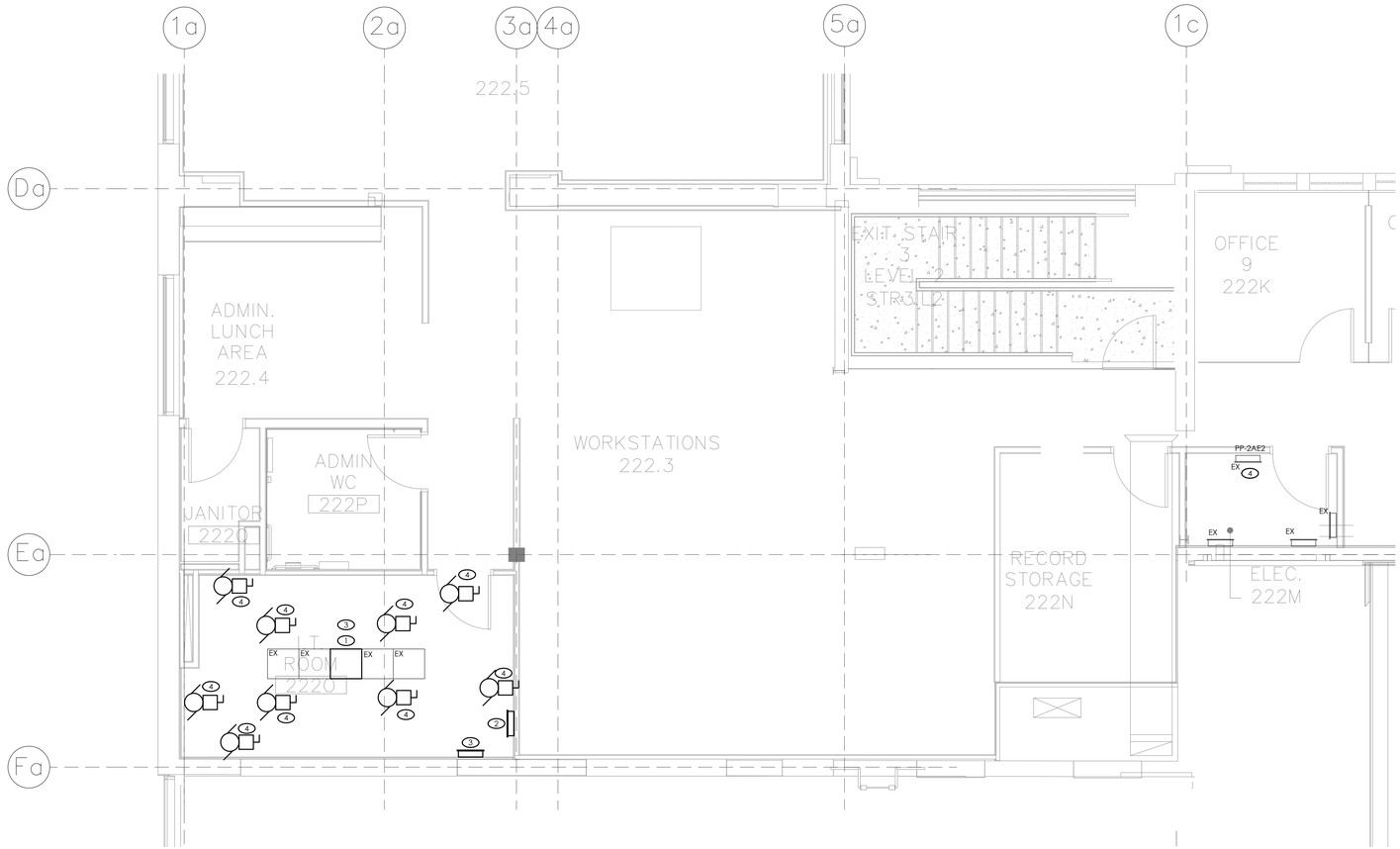
File: J:\Drawings\25-007 - UPS and Cooling Assessment at Downsview Campus - Centennial College\3-Working Documents\E\E200 - Ground Floor Elec. Room - PROPOSED.dwg

DRAWING NOTES

1. PROVIDE NEW 30 KVA UPS SCALABLE TO 40KVA [SY40K40F OR APPROVED EQUIVALENT]. PROVIDE WIRING/CONDUIT FROM MAINTENANCE BYPASS PANEL TO PROPOSED UPS. REFER TO MANUFACTURERS INSTALLATION INSTRUCTIONS.
2. PROVIDE NEW MAINTENANCE BYPASS PANEL [SBP40KFC1M1 OR APPROVED EQUIVALENT] IN INDICATED LOCATION. PROVIDE WIRING/CONDUIT AS REQUIRED TO FEED PROPOSED MAINTENANCE BYPASS FROM EXISTING PANEL DP-2F1. ELECTRICAL CONTRACTOR TO PROVIDE WIRING/CONDUIT AS REQUIRED TO CONNECT.
3. PROVIDE NEW 3-PHASE 200A PANEL FED FROM PROPOSED UPS. PROVIDE CIRCUIT BREAKERS AND WIRING/ CONDUIT AS REQUIRED TO RE-FEED ALL EXISTING IT EQUIPMENT. ONCE EXISTING IT EQUIPMENT HAS BEEN FED FROM PROPOSED PANEL 2P1, REMOVE EXISTING UPS AND RETURN TO OWNER.
4. INDICATED EQUIPMENT SHALL BE FED FROM EXISTING PANEL PP-2AE2. REFER TO DRAWING E300 FOR PANEL SCHEDULES.

GENERAL NOTES

1. ALL SHUTDOWNS SHALL BE KEPT TO A MINIMUM. COORDINATE SHUTDOWNS WITH OWNER.



1 E101 IT ROOM PROPOSED POWER PLAN
SCALE: 1:50

ORIGINAL SHEET – ARCH D

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DRAWING TITLE:
IT ROOM PROPOSED POWER PLAN

DRAWN BY: P.O	SCALE: 1:50
CHECKED BY: N.A	DRAWING NUMBER: E101
DATE: MAR. 2025	
PROJECT NUMBER: 25-007	

September 08, 2025 – 04:45pm Plotted by: jcrowe

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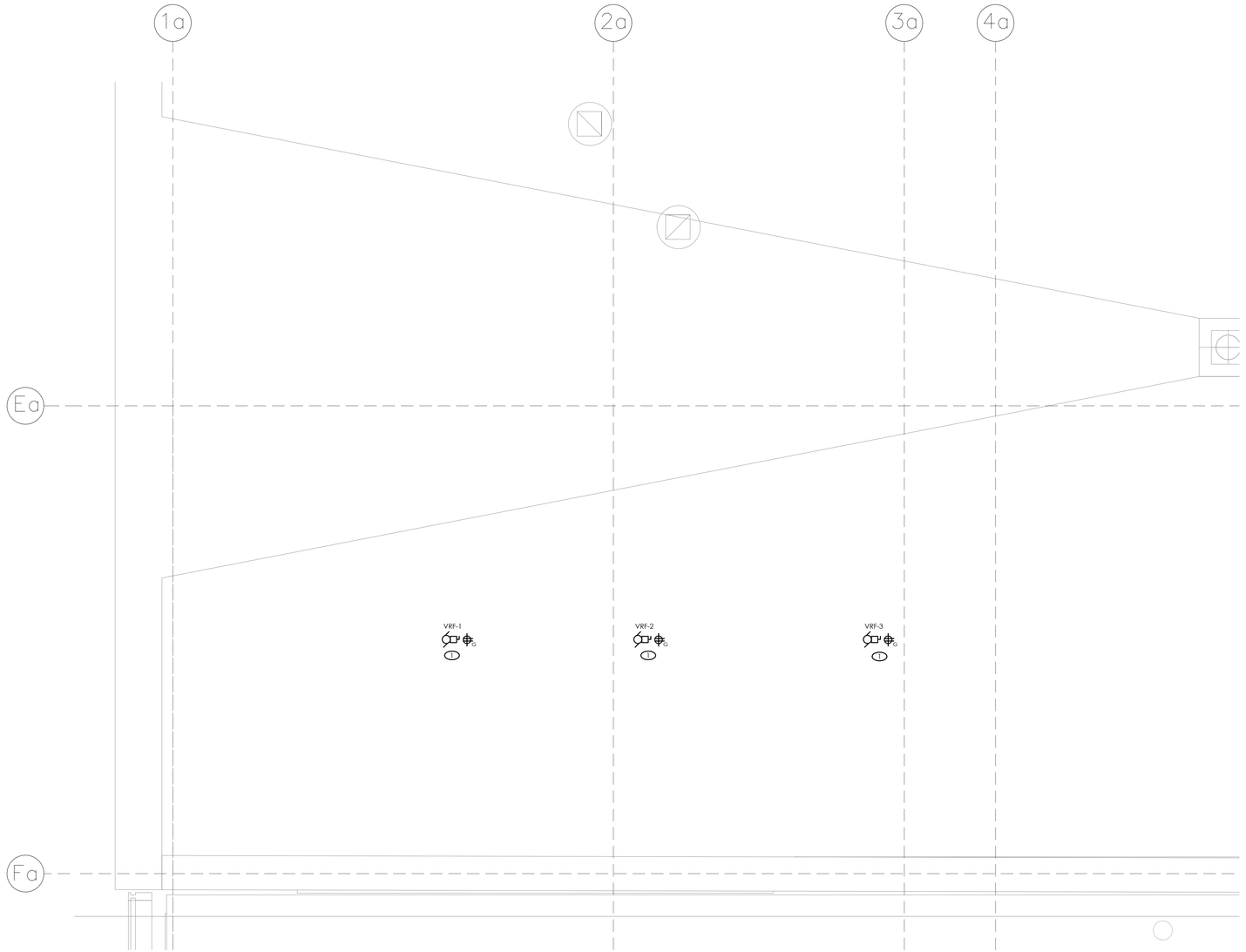
DRAWING NOTES

1. PROVIDE WIRING/CONDUIT FROM PANEL DP-6F1 TO PROPOSED VRF-1, VRF-2, AND VRF-3 DISCONNECTS.



1 / E102 ROOF PROPOSED POWER PLAN
SCALE: 1:20

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DRAWING TITLE:
ROOF PROPOSED POWER PLAN

DRAWN BY: P.O	SCALE: 1:20
CHECKED BY: N.A	DRAWING NUMBER: E102
DATE: MAR. 2025	
PROJECT NUMBER: 25-007	

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September 08, 2025 – 04:45pm Plotted by: jcrowe

PANEL : PP-2AE2

NOTES: SQUARE D MAKE, NQ TYPE PANEL
CONTRACTOR TO CONFIRM BREAKER FEEDING EXISTING 10kVA UPS

VOLTAGE: 208/120V, 3PH, 4W
AMPERAGE: 100A
kA RATING: 10kA
PANEL LOCATION: 222M
FED FROM: DP-2F1
LOAD (KW): -
LOAD (A): -

☐ RECESSED
☒ SPRINKLERPROOF
☐ MAIN BREAKER
☐ FEED-THRU LUGS
☐ GROUND LG

WATTS	DESCRIPTION	BRK	CCT	PH	CCT	BRK	DESCRIPTION	WATTS
	BOILER 1	15A / 3P	1	A	2	15A / 2P	EXISTING LOAD	
			3	B	4	20A / 2P	CD/FCU-4	
			5	C	6			
	BOILER 2	15A / 3P	7	A	8	20A / 2P	CD/FCU-5	
			9	B	10			
			11	C	12	100A / 2P	SPARE	
	EXCESS PRESSURE PUMP	15A	13	A	14			
	CONTROL PANEL	15A	15	B	16	15A	IT ROOM 2220	
			17	C	18	20A	EXISTING LOAD	
	EXISTING LOAD	70A / 2P	19	A	20			
			21	B	22	70A / 2P	EXISTING LOAD	
	EXISTING LOAD	70A / 2P	23	C	24			
			25	A	26			
			27	B	28			
			29	C	30			
			31	A	32			
			33	B	34			
			35	C	36			
			37	A	38			
			39	B	40			
			41	C	42			
			43	A	44			
			45	B	46			
			47	C	48			
			49	A	50			
			51	B	52			
			53	C	54			
			55	A	56			
			57	B	58			
			59	C	60			
			61	A	62			
			63	B	64			
			65	C	66			
	SPD	30A / 3P	67	A	68			
			69	B	70	20A / 2P	SPARE	
			71	C	72			

1 E200 PROPOSED PANEL PP-2AE2 SCHEDULE
SCALE: NTS

PANEL : DP-2F1

NOTES: SQUARE D MAKE, NQ TYPE PANEL

VOLTAGE: 208/120V,3PH, 4W
AMPERAGE: 400A
kA RATING: 22kA
PANEL LOCATION: ROOM 126
FED FROM: DP-6F1
LOAD (KW): -
LOAD (A): -

☐ RECESSED
☒ SPRINKLERPROOF
☐ MAIN BREAKER
☐ FEED-THRU LUGS
☐ GROUND LG

WATTS	DESCRIPTION	BRK	CCT	PH	CCT	BRK	DESCRIPTION	WATTS
	PP-2AE2	100A / 3P	1	A	2	100A / 3P	PP-2BE1	
			3	B	4			
			5	C	6			
	PP-2AE1	60A / 3P	7	A	8	175A / 3P	PROPOSED UPS	
			9	B	10			
			11	C	12			
	SPD	30A / 3P	13	A	14			
			15	B	16			
			17	C	18			
			19	A	20			
			21	B	22	60A / 3P	PP-2BE2	
			23	C	24			
			25	A	26			
			27	B	28			
			29	C	30			

2 E200 PROPOSED PANEL DP-2F1 SCHEDULE
SCALE: NTS

PANEL : 2P1

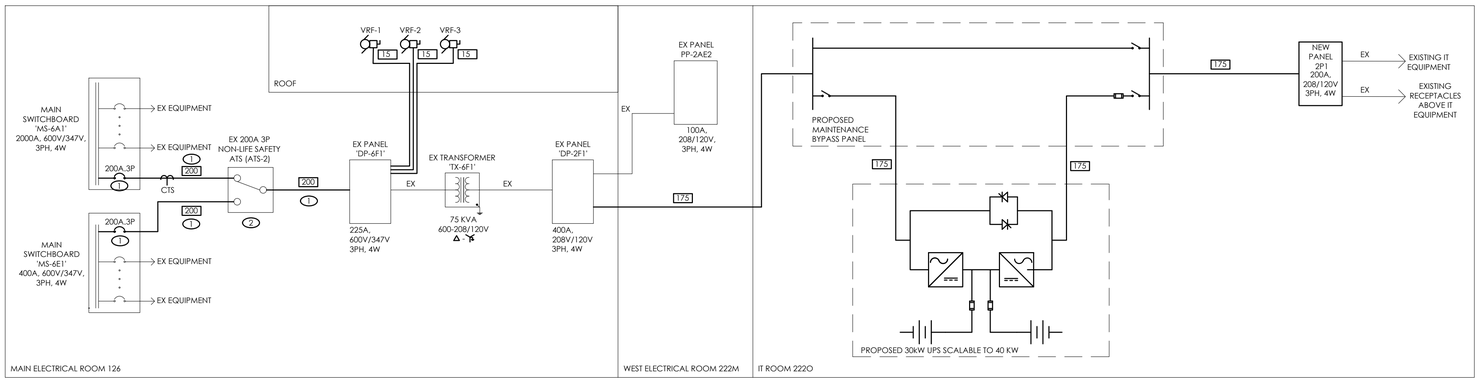
NOTES:

VOLTAGE: 208/120V, 3PH, 4W
AMPERAGE: 200A
kA RATING: 10kA
PANEL LOCATION: 222O
FED FROM: PROPOSED UPS
LOAD (KW): -
LOAD (A): -

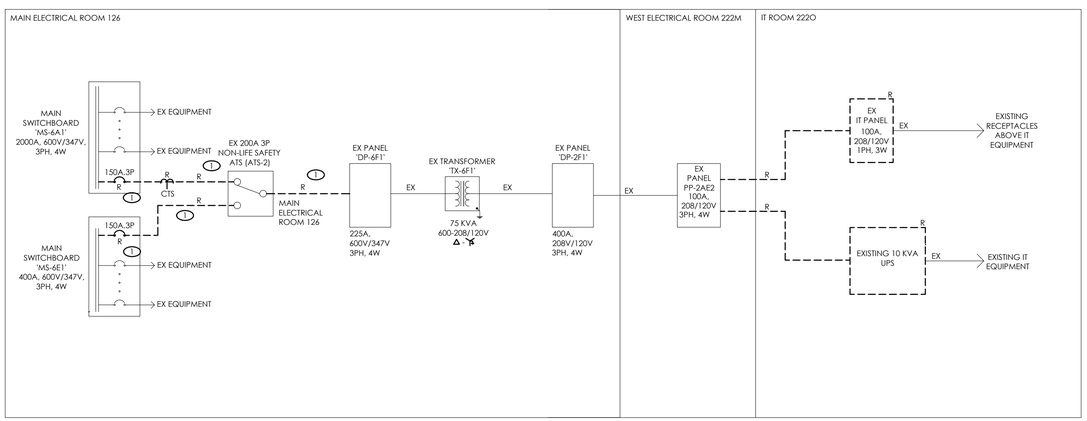
☐ RECESSED
☒ SPRINKLERPROOF
☒ MAIN BREAKER
☐ FEED-THRU LUGS
☐ GROUND LG

WATTS	DESCRIPTION	BRK	CCT	PH	CCT	BRK	DESCRIPTION	WATTS
	EXISTING IT RECEPTACLES	30A / 2P	1	A	2	30A / 2P	EXISTING IT RECEPTACLES	
			3	B	4			
	EXISTING IT RECEPTACLES	30A / 2P	5	C	6	30A / 2P	EXISTING IT RECEPTACLES	
			7	A	8			
	EXISTING IT RECEPTACLES	30A / 2P	9	B	10	30A / 2P	EXISTING IT RECEPTACLES	
			11	C	12			
	SPARE	30A / 2P	13	A	14	30A / 2P	SPARE	
			15	B	16			
	SPARE	30A / 2P	17	C	18	30A / 2P	SPARE	
			19	A	20			
	SPARE	30A / 2P	21	B	22	30A / 2P	SPARE	
			23	C	24			
			25	A	26			
			27	B	28			
			29	C	30			
			31	A	32			
			33	B	34			
			35	C	36			
			37	A	38			
			39	B	40			
			41	C	42			
			43	A	44			
			45	B	46			
			47	C	48			

2 E200 PROPOSED PANEL 2P1 SCHEDULE
SCALE: NTS



3 E200 PROPOSED SINGLE LINE DIAGRAM
SCALE: NTS



4 E200 DEMOLITION SINGLE LINE DIAGRAM
SCALE: NTS

DRAWING NOTES

1. (SEPARATE PRICE #1) REFEED EXISTING ATS-2 FROM SWITCHBOARDS MS-6E1 AND MS-6A1. PROVIDE ONE 200A3P SQUARE D MAKE, HJ TYPE, LSI BREAKER TO REPLACE EXISTING BREAKER IN SWITCHBOARD MS-6E1. PROVIDE ONE 200A3P SQUARE D MAKE, HL TYPE, THERMAL MAGNETIC BREAKER TO REPLACE EXISTING BREAKER IN SWITCHBOARD MS-6A1. PROVIDE WIRING/CONDUIT FROM THE EXISTING SWITCHBOARDS TO ATS-2 AND FROM ATS-2 TO PANEL DP-6F1. PROVIDE NEW CTS TO BE TIED INTO METER DM-4. COORDINATE SHUT DOWNS WITH OWNER, PROVIDE FIRE WATCH. PROVIDE SHORT CIRCUIT, COORDINATION AND ARC FLASH STUDY.
2. PROVIDE POWER MONITORING ON ATS-2 FOR A DURATION OF 2 WEEKS AND PROVIDE REPORT FOR CONSULTANT REVIEW.

WIRING SCHEDULE

TAG	FEEDER DESCRIPTION
T5	3X#10 AWG R90 CU + #10 AWG BOND IN 3/4" EMT CONDUIT
175	4X#2/0 AWG R90 CU + #6 AWG BOND IN 2" EMT CONDUIT
200	4X#3/0 AWG R90 CU + #4 AWG BOND IN 2-1/2" EMT CONDUIT

DRAWING NOTES

1. (SEPARATE PRICE #1) DEMOLISH EXISTING 150A3P BREAKERS FEEDING ATS-2 IN SWITCHBOARDS MS-6E1 AND MS-6A1. DEMOLISH WIRING/CONDUIT FROM THE EXISTING SWITCHBOARDS TO ATS-2 AND FROM ATS-2 TO PANEL DP-6F1. DEMOLISH EXISTING CTS CONNECTED TO FEED. COORDINATE SHUT DOWNS WITH OWNER, PROVIDE FIRE WATCH.

TRUE NORTH

CONSTRUCTION NORTH

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SEAL

NO.	ISSUED	DATE	BY
3	RE-ISSUED FOR TENDER	2025/09/08	P.O
2	ISSUED FOR TENDER	2025/08/06	P.O
1	ISSUED FOR 75% DESIGN	2025/03/21	P.O

CENTENNIAL COLLEGE

CLIENT
CENTENNIAL COLLEGE
65 Carl Hall Rd, Toronto, ON

PROJECT:
CENTENNIAL COLLEGE
DOWNSVIEW
CAMPUS IT ROOM UPGRADES

DRAWING TITLE:
DETAILS SHEET 1 OF 1

DRAWN BY:	SCALE:
P.O	AS INDICATED
CHECKED BY:	DRAWING NUMBER:
N.A	E200
DATE:	
MAR. 2025	
PROJECT NUMBER:	
25-007	

File: J:\Drawings\25-007 - UPS and Cooling Assessment at Downsview Campus - Centennial College\3-Working Documents\E\E300 DETAILS.dwg

MECHANICAL EQUIPMENT WIRING SCHEDULE

DETAILS				EQUIPMENT						STARTER											ISOLATING DEVICE					BREAKER/FUSE SIZE	REMOTE CONTROL				INTERLOCKED WITH	INTERLOCKED BY	MAINTENANCE RECEPTACLE	SUPPLIED BY: ES = ELECTRICAL CONTRACTOR MS = MECHANICAL CONTRACTOR OS = OTHERS INSTALLED BY: EI = ELECTRICAL CONTRACTOR MI = MECHANICAL CONTRACTOR OI = OTHERS SUPPLIED & INSTALLED BY: EP = ELECTRICAL CONTRACTOR MP = MECHANICAL CONTRACTOR OP = OTHERS
										TYPE						ACCESSORIES																		
TAG	DESCRIPTION	SERVES	UNIT LOCATION	HP	KILOWATTS	FULL LOAD AMPS (A)	MINIMUM CIRCUIT AMPS	VOLTAGE (V)	PHASE	MANUAL	MAGNETIC	COMBO MAGNETIC	INTEGRAL	VFD (LOOSE)	CONTROL VOLTAGE	HAND/OFF/AUTO	ON/OFF/PB	PILOT LIGHT	CONTROL TRANSF.	AUX. CONTACTS	NEMA 1	NEMA 3R	NEMA 12	NEMA 4X	LOCK OFF BKR		THERMOSTAT	SENSOR	BMS	TIMER				NOTES
FC-1	FAN COIL 1	IT ROOM 2220	IT ROOM 2220		5.3		0.54	208	1				MP								EP					15			MP					
FC-2	FAN COIL 2	IT ROOM 2220	IT ROOM 2220		5.3		0.54	208	1				MP								EP					15			MP					
FC-3	FAN COIL 3	IT ROOM 2220	IT ROOM 2220		5.3		0.54	208	1				MP								EP					15			MP					
FC-4	FAN COIL 4	IT ROOM 2220	IT ROOM 2220		5.3		0.54	208	1				MP								EP					15			MP					
FC-5	FAN COIL 5	IT ROOM 2220	IT ROOM 2220		8.8		0.63	208	1				MP								EP					15			MP					
FC-6	FAN COIL 6	IT ROOM 2220	IT ROOM 2220		8.8		0.63	208	1				MP								EP					15			MP					
FC-7	FAN COIL 7	IT ROOM 2220	IT ROOM 2220		8.8		0.63	208	1				MP								EP					15			MP					
FC-8	FAN COIL 8	IT ROOM 2220	IT ROOM 2220		8.8		0.63	208	1				MP								EP					15			MP					
FC-9	FAN COIL 9	IT ROOM 2220	IT ROOM 2220		8.8		0.63	208	1				MP								EP					15			MP					
VRF-1	ROOF TOP CONDENSER 1	IT ROOM 2220	ROOF TOP		21.1		11	575	3				MP									EP				15			MP					
VRF-2	ROOF TOP CONDENSER 2	IT ROOM 2220	ROOF TOP		21.1		11	575	3				MP									EP				15			MP					
VRF-3	ROOF TOP CONDENSER 3	IT ROOM 2220	ROOF TOP		21.1		11	575	3				MP									EP				15			MP					

1 / E201 MECHANICAL EQUIPMENT WIRING SCHEDULE
SCALE: NTS

TRUE NORTH

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SEAL

NO.	ISSUED	DATE	BY
2	RE-ISSUED FOR TENDER	2025/09/08	P.O
1	ISSUED FOR TENDER	2025/08/06	P.O

CENTENNIAL COLLEGE

CLIENT
CENTENNIAL COLLEGE
65 Carl Hall Rd, Toronto, ON

PROJECT:
CENTENNIAL COLLEGE
DOWNSVIEW
CAMPUS IT ROOM UPGRADES

DRAWING TITLE:
MECHANICAL EQUIPMENT
WIRING SCHEDULE

DRAWN BY: P.O
SCALE: AS INDICATED
CHECKED BY: N.A
DRAWING NUMBER: E301
DATE: MAR. 2025
PROJECT NUMBER: 25-007

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