

POWER SINGLE LINE DIAGRAM SYMBOLS	
	CKT BREAKER, ### INDICATES TRIP SETTING, # INDICATES NUMBER OF POLES
	DRAW-OUT CKT BREAKER, ### INDICATES TRIP SETTING, # INDICATES NUMBER OF POLES
	FUSED SWITCH, ### INDICATES TRIP SETTING, # INDICATES NUMBER OF POLES
	ENCLOSED CIRCUIT BREAKER
	ENCLOSED NON-FUSED SWITCH
	ENCLOSED FUSED SWITCH
	INTERLOCK
	AUTOMATIC TRANSFER
	SOLID STATE, ELECTRONIC ADJUSTABLE TRIP
	GROUND FAULT PROTECTION
	SURGE PROTECTIVE DEVICE
	DIGITAL MULTIMETER
	UTILITY METER
	AUTOMATIC/MANUAL TRANSFER SWITCH
	AUTOMATIC TRANSFER SWITCH, WITH BYPASS ISOLATION
	TRANSFORMER
	GENERATOR
	PANELBOARD
	PAD MOUNTED TRANSFORMER
	GROUND
	POTENTIAL TRANSFORMER
	CURRENT TRANSFORMER

POWER DISTRIBUTION AND SMALL POWER			
	DUPLEX RECEPTACLE, WALL MOUNTED		DOUBLE DUPLEX RECEPTACLE, WALL MOUNTED
	DUPLEX RECEPTACLE, ABOVE BACKSPASH OF CABINET, COUNTERTOP OR SINK		DOUBLE DUPLEX RECEPTACLE, ABOVE BACKSPASH OF CABINET, COUNTERTOP OR SINK
	DUPLEX RECEPTACLE, FLUSH MTD IN CEILING		DOUBLE DUPLEX RECEPTACLE, FLUSH MOUNTED IN CEILING
	HALF SWITCHED DUPLEX RECEPTACLE, WALL MOUNTED		SIMPLEX RECEPTACLE, WALL MOUNTED
	SPECIAL PURPOSE RECEPTACLE, WALL MOUNTED, NEMA CONFIGURATION AS NOTED ON PLANS		SPECIAL PURPOSE RECEPTACLE, CEILING MOUNTED, NEMA CONFIGURATION AS NOTED ON PLANS
	SHADING REPRESENTS RECEPTACLE ON LIFE SAFETY BRANCH		SHADING REPRESENTS RECEPTACLE ON UPS BRANCH
	SHADING REPRESENTS RECEPTACLE ON NON-LIFE SAFETY BRANCH		SHADING REPRESENTS RECEPTACLE WITH ISOLATED GROUND
	DISCONNECT SWITCH, REFER TO EQUIPMENT CONNECTION SCHEDULE FOR DISCONNECT TYPE, UON		
	COMBINATION MOTOR STARTER DISCONNECT		
	MOTOR STARTER		
	VARIABLE FREQUENCY DRIVE		
	DIRECT CONNECTION, WALL MOUNTED, SUBSCRIPT 'X' INDICATES UNIQUE IDENTIFIER, REFER TO EQUIPMENT CONNECTION SCHEDULE.		
	DIRECT CONNECTION, CEILING MOUNTED, SUBSCRIPT 'X' INDICATES UNIQUE IDENTIFIER, REFER TO EQUIPMENT CONNECTION SCHEDULE.		
	MOTOR, SUBSCRIPT 'X' DENOTES MOTOR DESIGNATION, REFER TO EQUIPMENT CONNECTION SCHEDULE		
	GROUND BUS BAR		
	FURNITURE OUTLET, WALL MOUNTED		
	PANELBOARD		
	TRANSFORMER		
	FLOOR BOX, DUPLEX RECEPTACLE		SPECIAL FLOORBOX, "IF" INDICATES UNIQUE FLOOR BOX TYPE
	FLOOR BOX, DOUBLE DUPLEX RECEPT		

CIRCUITING	

GROUNDING AND LIGHTNING PROTECTION	
	BONDING CONNECTION
	DOWN CONDUCTOR
	UP CONDUCTOR
	TEE CONNECTOR
	AIR TERMINAL
	MAIN CONDUCTOR CABLE
	COUNTERPOISE CONDUCTOR CABLE
	BONDING CONDUCTOR CABLE
	GROUND ROD

DEMOLITION	
< R >	EXISTING TO BE REMOVED
< RL >	EXISTING TO BE RELOCATED
< EX >	EXISTING TO REMAIN
< NL >	EXISTING - NEW LOCATION
*****	DEMOLITION CONDUIT
	DEMOLITION EQUIPMENT
	EXISTING TO REMAIN CONDUIT
	EXISTING TO REMAIN EQUIPMENT
	RELOCATED / NEW CONDUIT
	RELOCATED / NEW EQUIPMENT

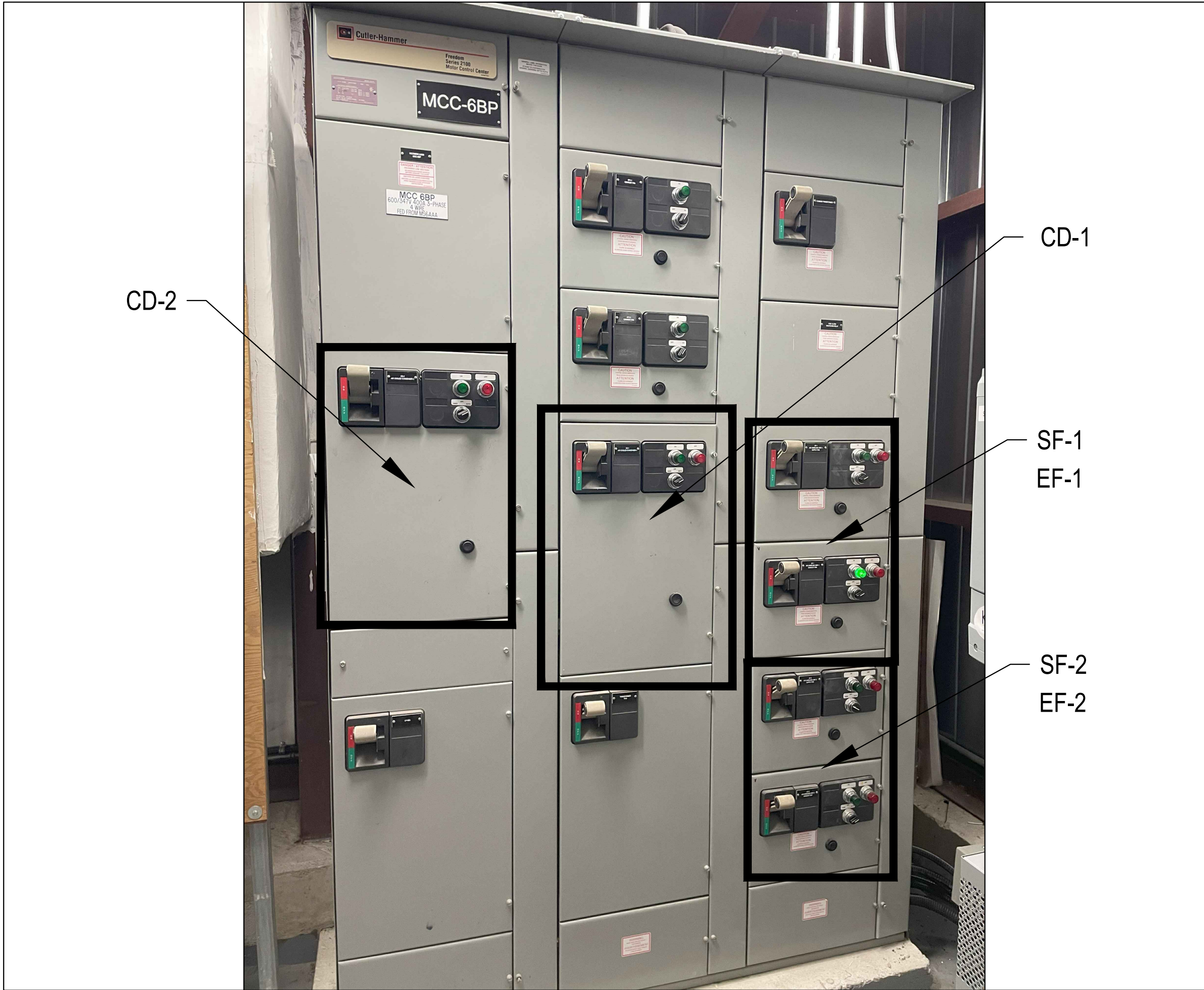
TAGS AND CALL OUT SYMBOLS	
	SECTION CALLOUT SECTION DESIGNATION SHEET NUMBER
	DETAIL CALLOUT DETAIL DESIGNATION SHEET NUMBER
	REVISION CALLOUT
	KEYNOTE CALLOUT

ABBREVIATIONS			
A	ANALOG	MCB	MAIN CIRCUIT BREAKER
AFCI	ARC FAULT CIRCUIT INTERRUPTOR	MCC	MOTOR CONTROL CENTER
APF	ABOVE FINISHED FLOOR	MD	MOTORIZED DAMPER
ATS	AUTOMATIC TRANSFER SWITCH	MH	MOUNTING HEIGHT
BM	BEAM MOUNTED	NC	NORMALLY CLOSED
CK	CLOCK HANGER	NO	NORMALLY OPEN
CL	CEILING MOUNTED	OC	OVER THE COUNTER
EMT	ELECTRICAL METALLIC TUBING	PL	POLE MOUNTED
EP	EXPLOSION PROOF	PTZ	PAN, TILT, ZOOM
F	FURNITURE OR MILLWORK MOUNTED	ST	SHUNT TRIP
FL	FLOOR MOUNTED	TP	TAMPER PROOF
GFCI	GROUND FAULT CIRCUIT INTERRUPTER	WP	WEATHER PROOF
GFI	GROUND FAULT INTERRUPTER		

FIRE ALARM SYSTEM			
	SMOKE DETECTOR, DUCT MOUNTED		



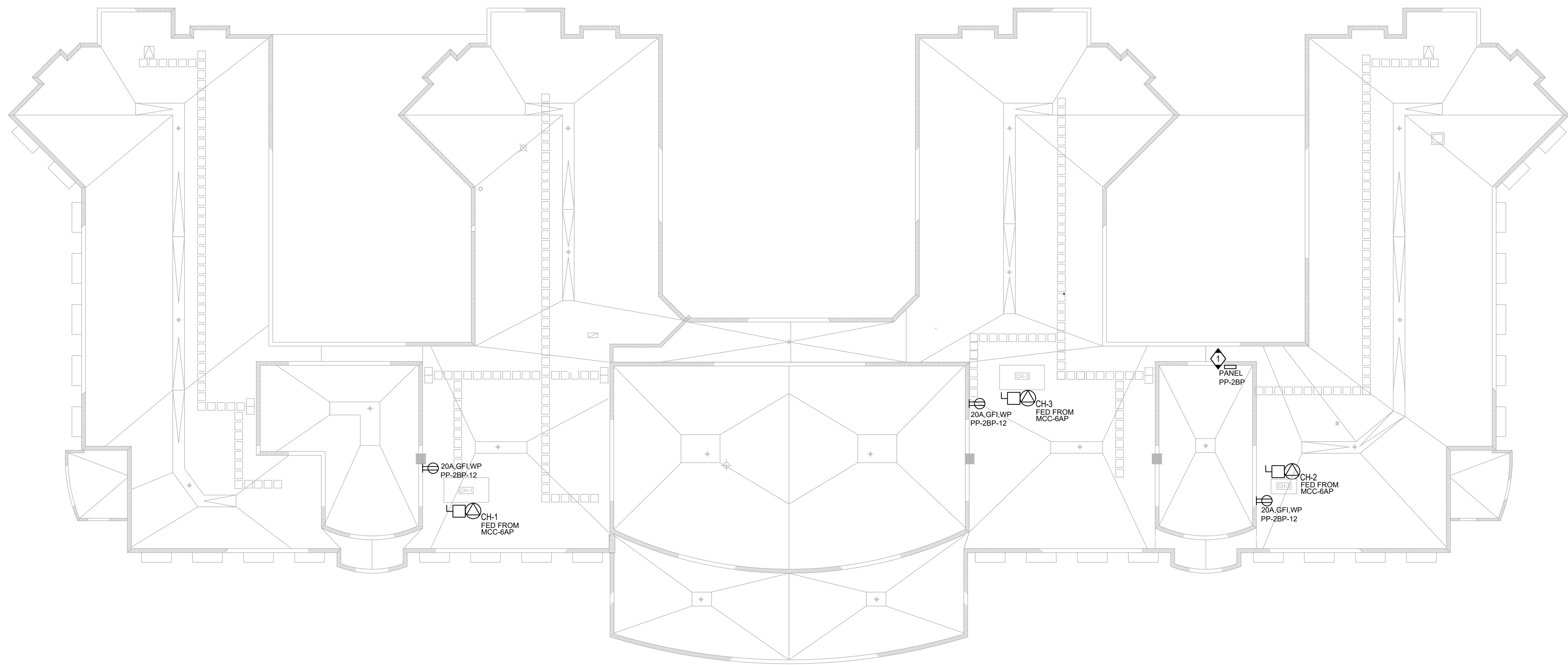
1 MCC-6AP EXISTING EQUIPMENT
E000 SCALE: N.T.S.



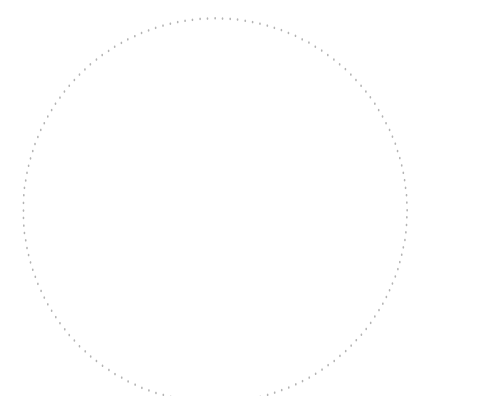
2 MCC-6BP EXISTING EQUIPMENT
E000 SCALE: N.T.S.

DRAWING LIST		
DRAWING NO.	DRAWING NAME	DRAWING SCALE
E000	ELECTRICAL GENERAL NOTES, LEGEND, KEY PLAN AND DRAWING LIST	N.T.S.
E101	ELECTRICAL ROOF PLAN	1:200
E102	ELECTRICAL PENTHOUSE PLAN	1:100
E201	SINGLE LINE DIAGRAM AND SCHEDULES	N.T.S.
E301	ELECTRICAL SPECIFICATIONS	N.T.S.

GENERAL NOTES	
1.	ELECTRICAL DOCUMENTS ARE BASED ON AVAILABLE INFORMATION AND, SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL, INTERIOR DESIGN, STRUCTURAL, KITCHEN / FOOD SERVICE, MECHANICAL, ELEVATORS, FF&E, CIVIL, AND LANDSCAPE CONSULTANT DOCUMENTS.
2.	THE ELECTRICAL DRAWINGS ARE DIAGRAMMATIC AND SHOW GENERAL ARRANGEMENTS OF ELECTRICAL AND SYSTEMS DEVICES. THE FINAL LOCATION AND ELEVATION OF ALL ELECTRICAL AND SYSTEMS DEVICES SHALL BE COORDINATED WITH ARCHITECTURAL/INTERIOR DESIGNER'S PACKAGES. REPORT ANY DISCREPANCIES TO CONSULTANT.
3.	PROVIDE COMPLETE FIRE ALARM SYSTEM AS REQUIRED BY APPLICABLE CODES AND AUTHORITY HAVING JURISDICTION.
4.	PROVIDE ELECTRICAL COORDINATION WITH MECHANICAL EQUIPMENT SELECTION AND LOCATION. REFER TO MECHANICAL EQUIPMENT SCHEDULES FOR DETAILS. VERIFY THE FINAL LOCATION OF MECHANICAL EQUIPMENT PRIOR TO INSTALLATION. REFER TO MECHANICAL EQUIPMENT / MOTOR CONTROL DETAIL FOR FURTHER DETAILS.
5.	CONTRACTOR SHALL INCLUDE FOR PAYMENT OF REQUIREMENT PERMITS, FEES, LICENCES, CERTIFICATES OF INSPECTION, ETC. IF REQUIRED.
6.	CABLE AND CONDUIT SIZES INDICATED ON DRAWINGS ARE MINIMUM SIZES AND SHALL BE INCREASED BASED ON ACTUAL ROUTING AND VOLTAGE DROP.



NOTES:
EXISTING PANEL PP-2BP IS 225A, 120/208V,
30kW CUTLER-HAMMER JOB NO. 24B857200.
PROVIDE ONE (1) NEW 20A 1P CIRCUIT BREAKER
FOR ALL NEW ROOFTOP MAINTENANCE
RECEPTACLES



1-800-656-3217 / 1-800-656-0767
220 Commerce Valley Drive West, Suite 110
Northham, ON L3T 9A5
Canada

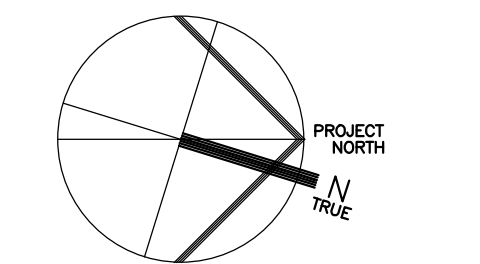
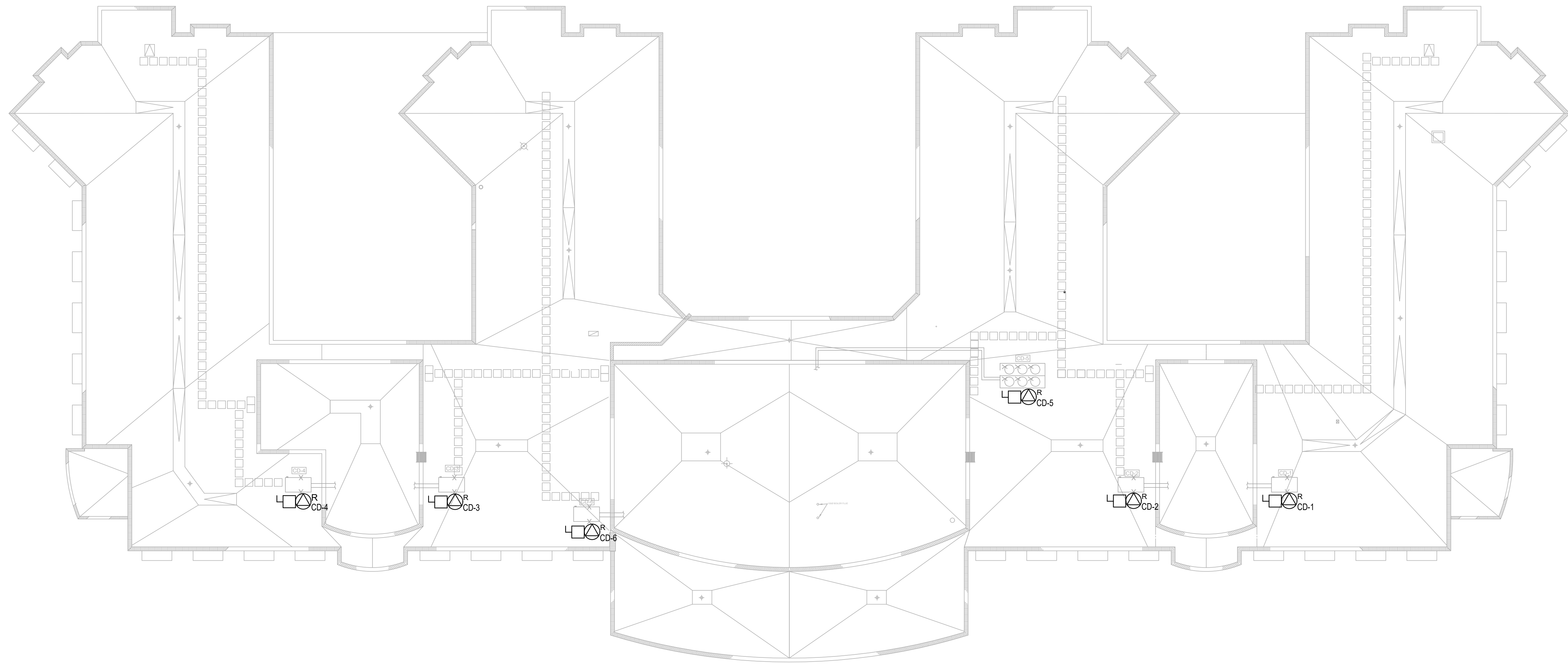
www.exp.com

- BUILDINGS
- ENERGY
- INFRASTRUCTURE
- EARTH & ENVIRONMENT
- INDUSTRIAL
- SUSTAINABILITY

Issued		
No.	Date	Description
1	2024-11-08	ISSUED FOR PERMIT / TENDER

2 NEW CONSTRUCTION - ELEC - ROOF PLAN
E101 / SCALE: 1:200

GENERAL NOTES:
1. FOR EACH MECHANICAL EQUIPMENT SHOWN TO BE REMOVED,
DISCONNECT UNIT AND REMOVE ALL ASSOCIATED FEEDERS,
CONDUITS, AND SUPPORTS BACK TO SOURCE. REMOVAL OF
MECHANICAL EQUIPMENT BY MECHANICAL CONTRACTOR.



Contractor Must Check & Verify all Dimensions on the Job.

Do Not Scale Drawings.

All Drawings, Specifications and Related Documents are the Copyright Property of the
Architect and Shall be Returned Upon Request. Reproduction of Drawings,
Specifications and Related Documents in Part or Whole is Prohibited Without the
Written permission of the Architect.

This Drawing is Not to be Used for Construction Until Signed by the Architect.

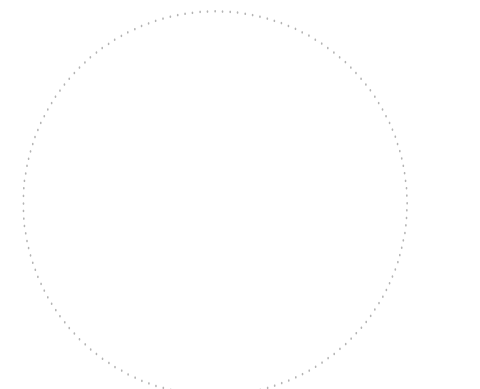
WESBURN MANOR LTC
AHU REPLACEMENT

ELECTRICAL ROOF PLAN

1 RENOVATION - ELEC - ROOF PLAN
E101 / SCALE: 1:200

N.T.S.

E101



1-800-686-3217 / 1-800-686-0767
220 Commerce Valley Drive West, Suite 110
Northham, ON L7T 6A8
Canada

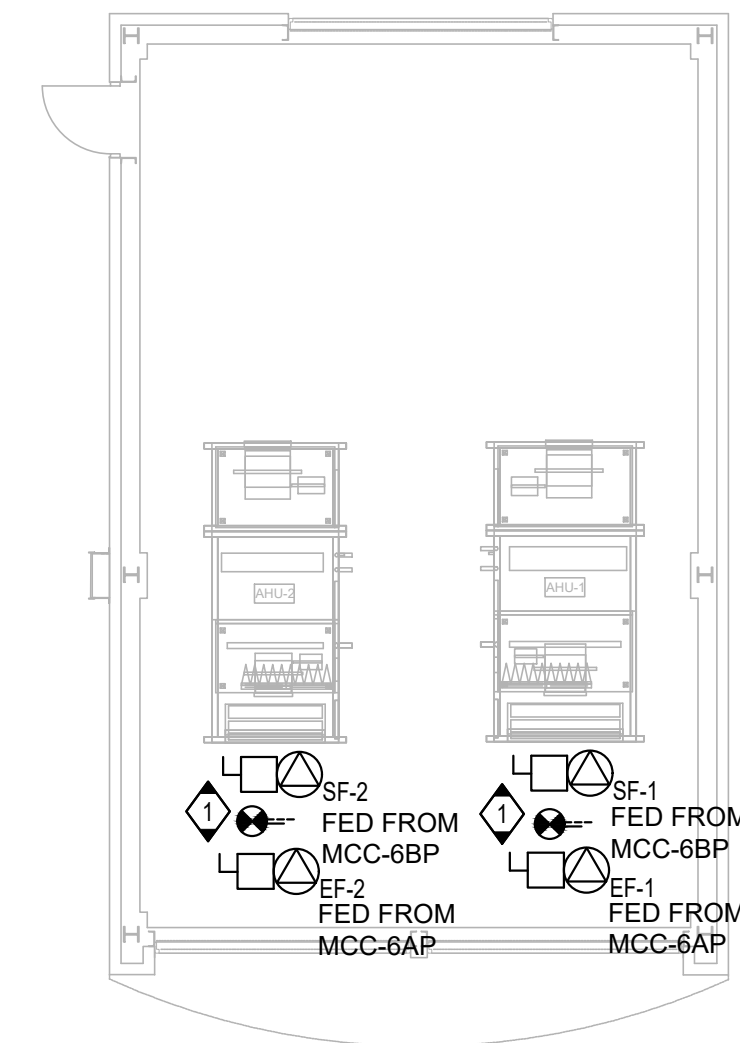
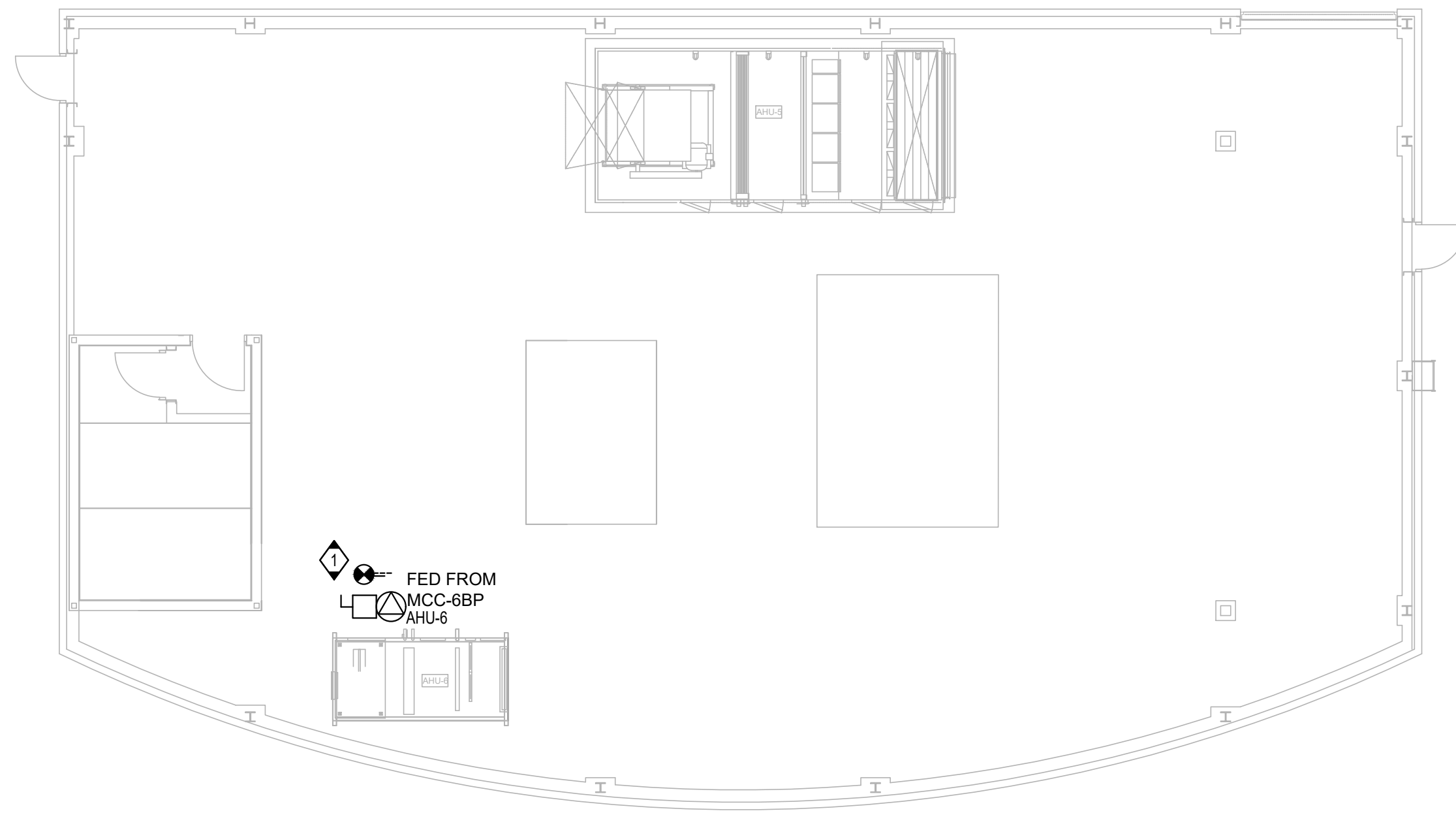
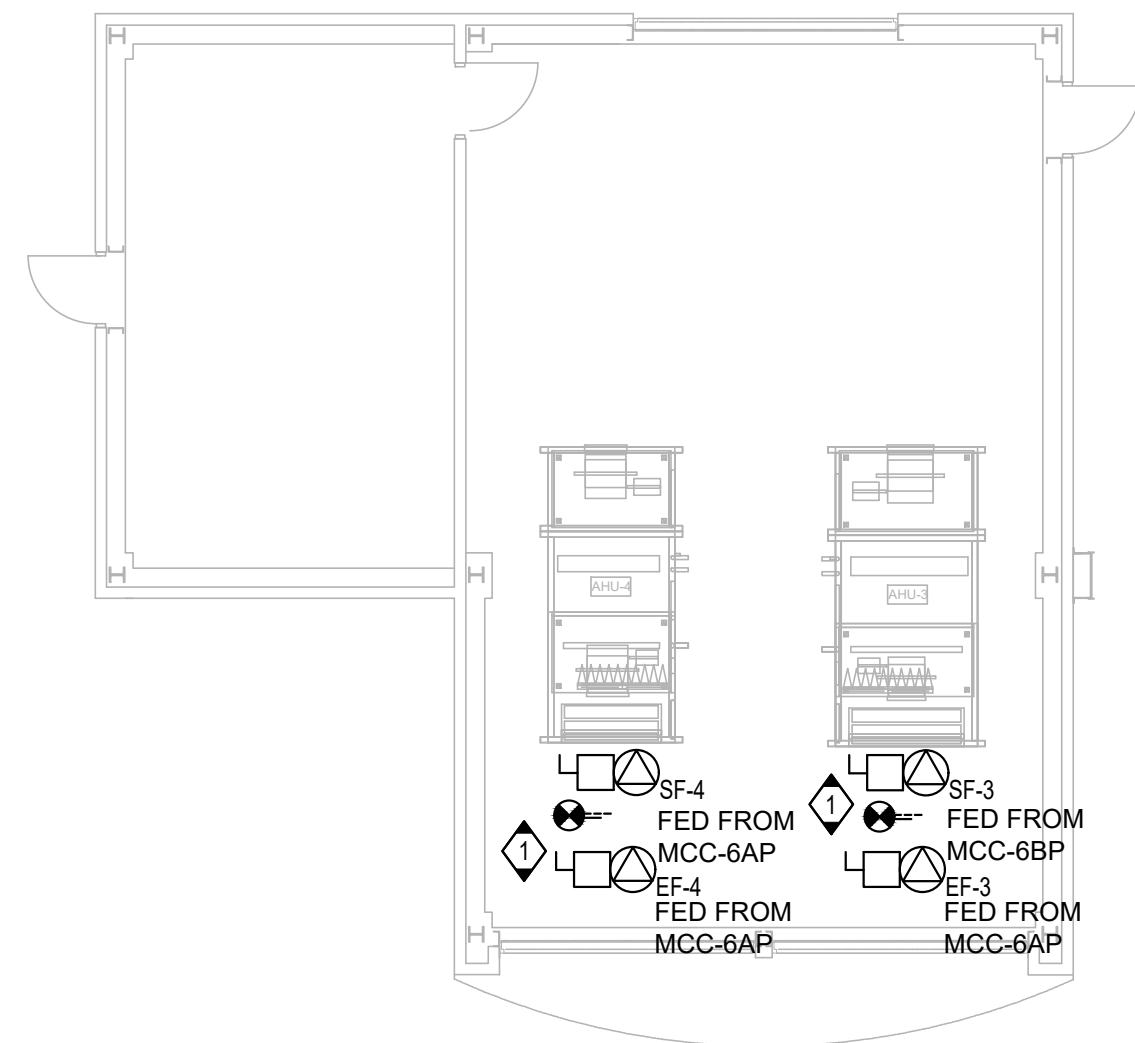
www.exp.com

- BUILDINGS
- ENERGY
- INFRASTRUCTURE
- EARTH & ENVIRONMENT
- INDUSTRIAL
- SUSTAINABILITY

Issued		
No.	Date	Description
1	2024-11-08	ISSUED FOR PERMIT / TENDER

NOTES:

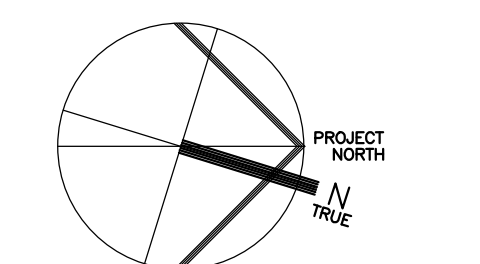
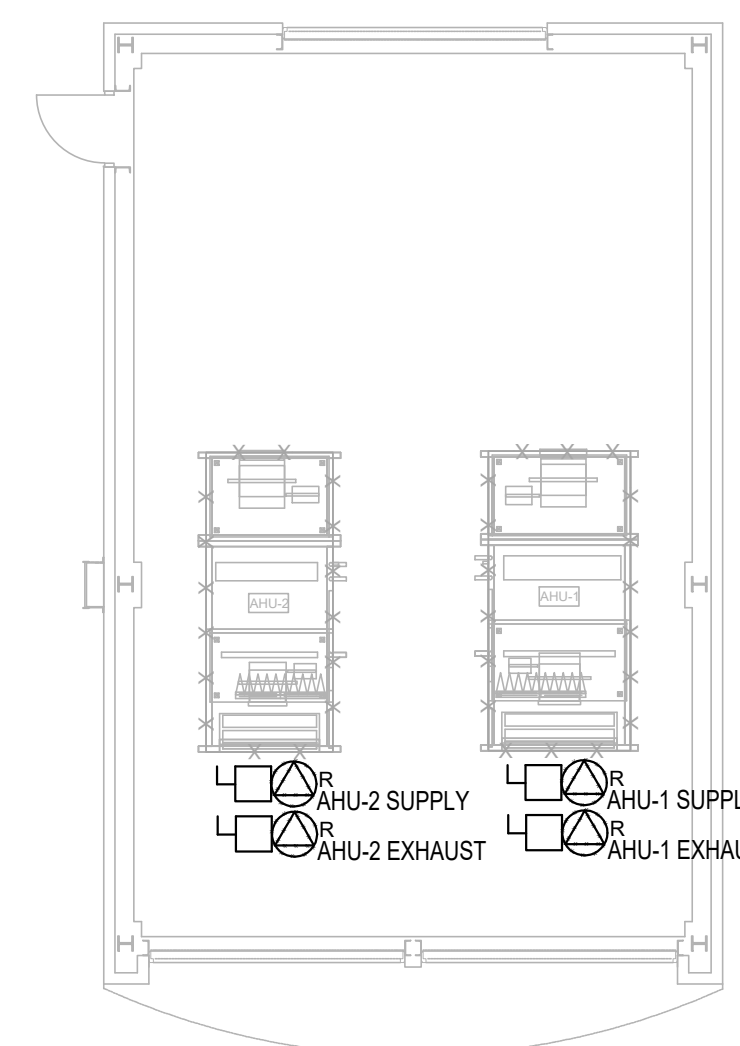
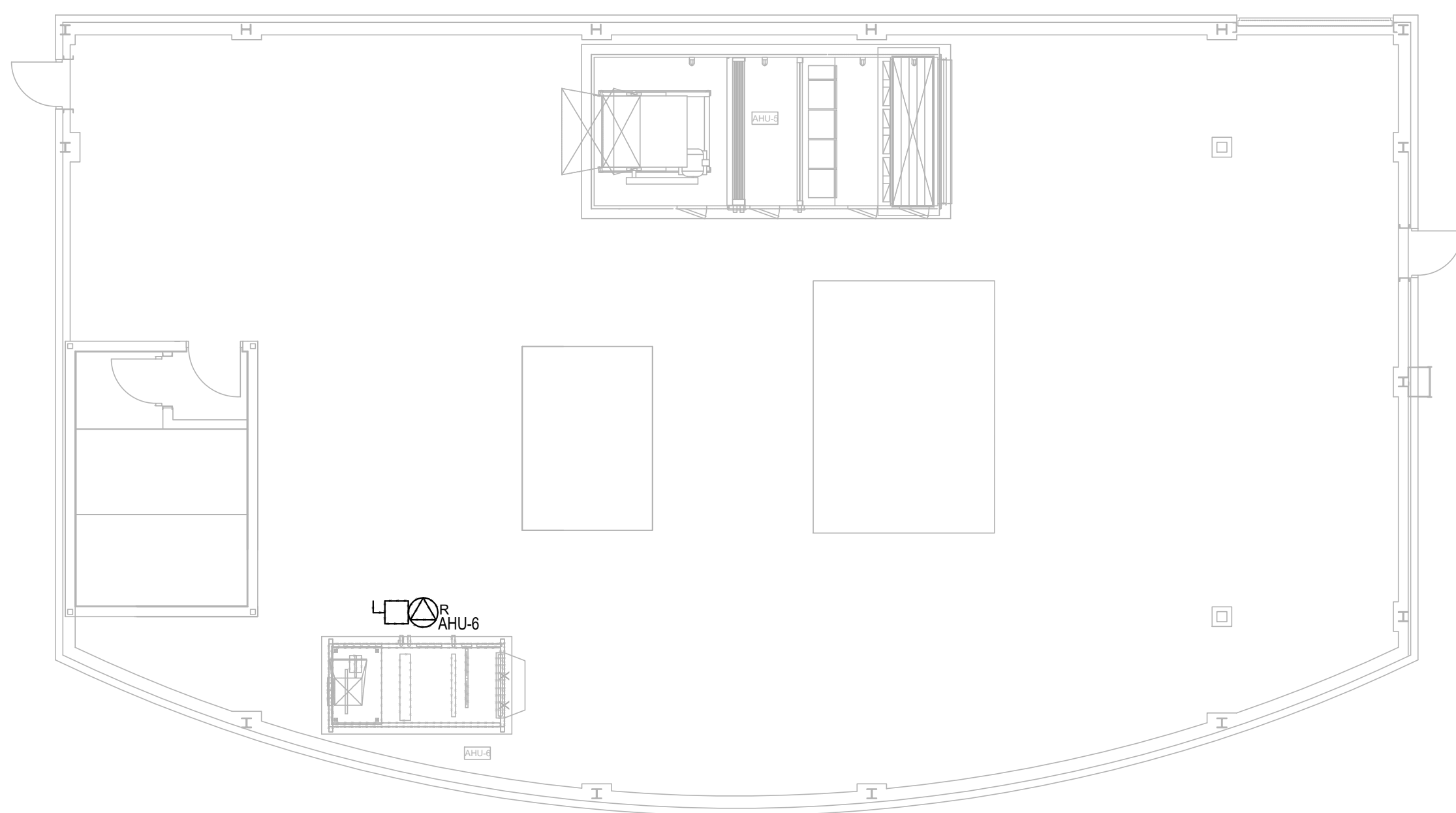
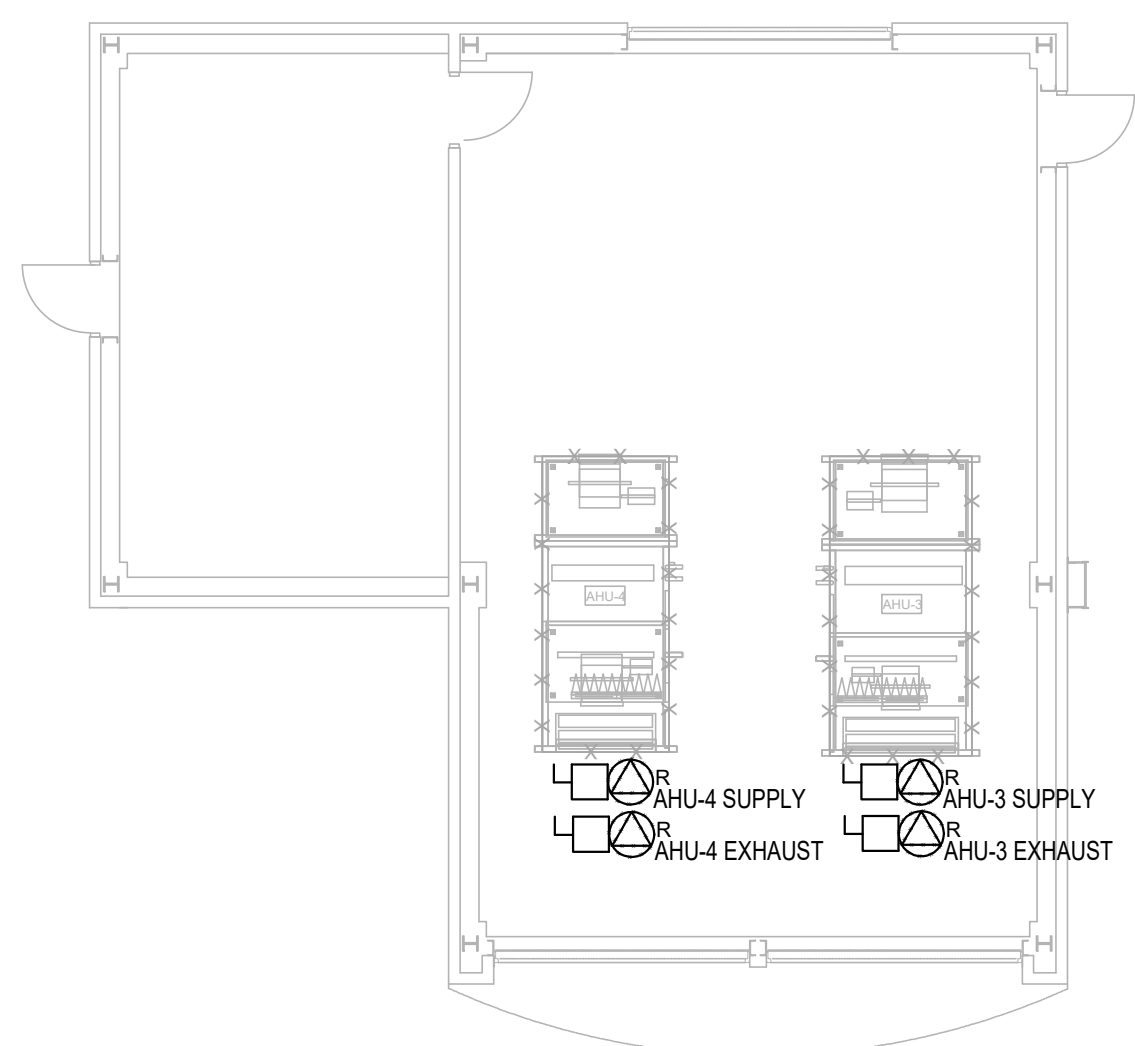
- PROVIDE NEW DUCT TYPE SMOKE DETECTOR AND CONNECT TO EXISTING FIRE ALARM ZONE FOR AHU
- PROVIDE FIRE ALARM VERIFICATION AS PER CSA-S537



2 NEW CONSTRUCTION - ELEC - PENTHOUSE
E102 / SCALE: 1:100

GENERAL NOTES:

- FOR EACH MECHANICAL EQUIPMENT SHOWN TO BE REMOVED, DISCONNECT UNIT AND REMOVE ALL ASSOCIATED FEEDERS, CONDUITS, AND SUPPORTS BACK TO SOURCE. REMOVAL OF MECHANICAL EQUIPMENT BY MECHANICAL CONTRACTOR.



Contractor Must Check & Verify all Dimensions on the Job.

Do Not Scale Drawings.

All Drawings, Specifications and Related Documents are the Copyright Property of the Architect and Shall be Returned Upon Request. Reproduction of Drawings, Specifications and Related Documents in Part or Whole is Prohibited Without the Written permission of the Architect.

This Drawing is Not to be Used for Construction Until Signed by the Architect.

WESBURN MANOR LTC
AHU REPLACEMENT

ELECTRICAL PENTHOUSE PLAN

N.T.S.

E102

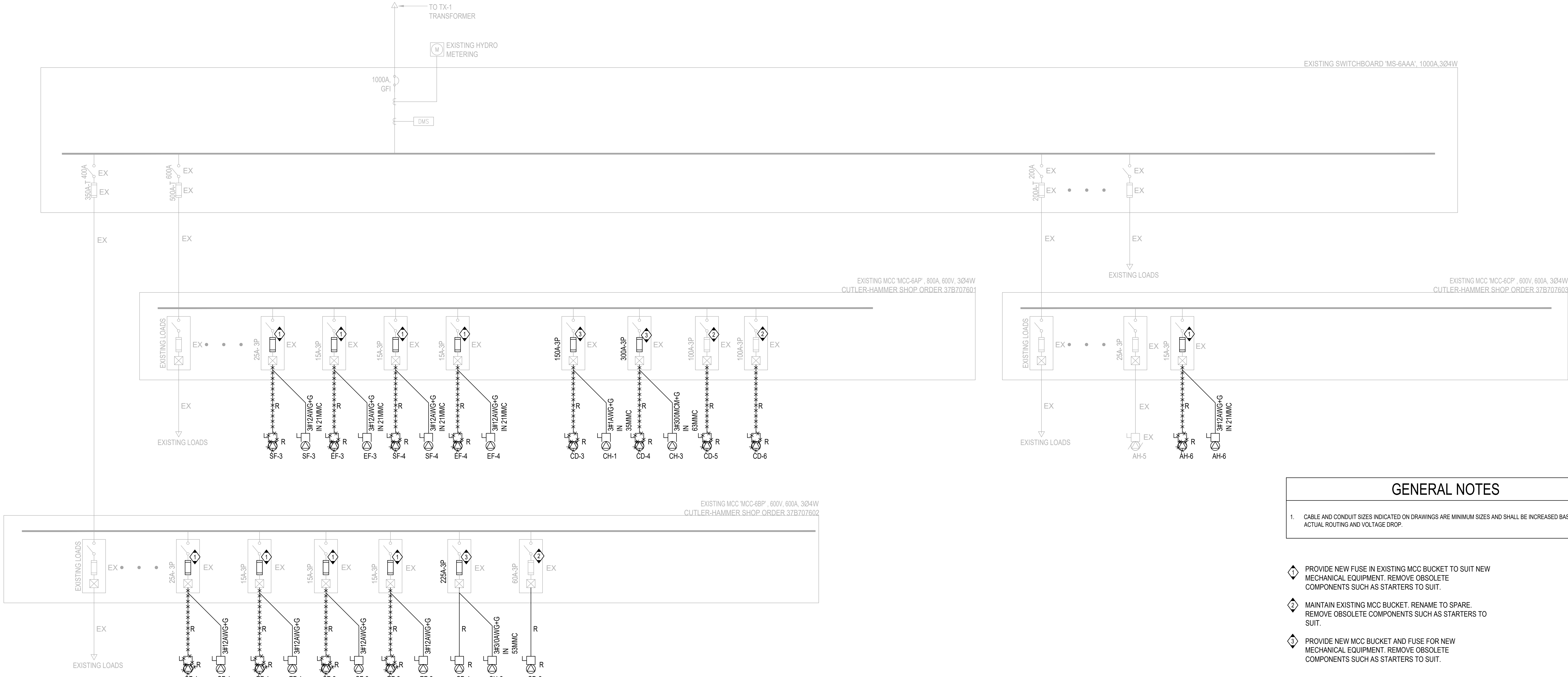
1 RENOVATION - ELEC - PENTHOUSE
E102 / SCALE: 1:100

MECHANICAL SCHEDULE BY MECHANICAL

AIR HANDLING UNIT SCHEDULE																																		
SYSTEM	REFERENCE	DESCRIPTION	LOCATION	MANUFACTURER	MODEL	SUPPLY AIR FLOW		SUPPLY FAN	SUPPLY FAN		RETURN AIR FLOW		RETURN FAN	RETURN FAN		COOLING COIL							HEATING COIL					FILTERS		HUMIDIFIER				
						(CFM)	(L/S)	E.S.P.	MOTOR		(CFM)	(L/S)	E.S.P.	MOTOR		FLUID	FLUID PRESSURE DROP (KPA)	TOTAL (KW)	SENSIBLE (KW)	EAT DB (°C)	EAT WB (°C)	LAT DB (°C)	LAT WB (°C)	FLUID	FLUID PRESSURE DROP (KPA)	TOTAL (KW)	EAT DB (°C)	LAT DB (°C)	PRE-FILTER	FILTER	DISPERSION MANIFOLD STEAM LOAD (LBS/HR)	S/F POWER (VPH/Hz)	R/F POWER (VPH/Hz)	S/F F (A)
						(Pa)	(KW)	(HP)	(Pa)	(KW)	(HP)																							
	TAG																																	
	AHU-1	NEW	NORTH PENTHOUSE	DAIKIN	CAH014GDAC	6540	3086.88	299	7.5	10.0	4600	2171.2	249	3.7	5.0	40% PG	36	114.0	66.0	32.2	23.9	14.6	14.5	WATER	11	182.9	-20.6	27.9	MERV 8	MERV 13	114	575/360	575/360	9.8
	AHU-2	NEW	NORTH PENTHOUSE	DAIKIN	CAH0120DAC	6140	2898.06	299	5.6	7.5	4100	1935.2	249	3.7	5.0	40% PG	36	108.1	62.1	32.2	23.9	14.7	14.4	WATER	11	166.3	-20.6	26.4	MERV 8	MERV 13	149	575/360	575/360	7.6
	AHU-3	NEW	SOUTH PENTHOUSE	DAIKIN	CAH014GDAC	7150	3374.8	299	7.5	10.0	4100	1935.2	249	3.7	5.0	40% PG	50	128.2	72.6	32.2	23.9	14.6	14.2	WATER	14	199.2	-20.6	27.7	MERV 8	MERV 13	129	575/360	575/360	9.8
	AHU-4	NEW	SOUTH PENTHOUSE	DAIKIN	CAH0120DAC	5400	2548.8	299	5.6	7.5	4600	2171.2	249	3.7	5.0	40% PG	28	93.6	54.2	32.2	23.9	14.8	14.6	WATER	36	155.2	-20.6	29.3	MERV 8	MERV 13	137	575/360	575/360	7.6
	AHU-5	EXISTING	CENTRAL PENTHOUSE	HAAKON	7701SD01	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	40% PG	63	442.5	313.3	27.2	19.8	12.9	12.7	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING
	AHU-6	NEW	CENTRAL PENTHOUSE	DAIKIN	CAH010GDAC	5000	2360	299	5.6	7.5	N/A	N/A	N/A	N/A	N/A	40% PG	30	85.5	49.6	32.2	23.9	15.1	14.7	WATER	37	141.2	-20.6	28.4	MERV 8	MERV 13	N/A	575/360	N/A	7.6
NOTES: 1. AHU-5 IS AN EXISTING UNIT, ONLY COOLING COIL (DX) TO BE REPLACED WITH CHILLED GLYCOL COIL, C/W PERFORMANCE AS PER THIS SCHEDULE. 2. CONTRACTOR TO PROVIDE TWO FEEDS TO THE UNITS AHU-1,2,3,4 AND SINGLE FEED TO AHU-6 3. STARTER/VPD TO BE SUPPLIED BY MECHANICAL CONTRACTOR AND INSTALLED BY ELECTRICAL CONTRACTOR 4. ALL UNITS SIZED WITH ECONOMIZER MODE 5. ALL UNITS COOLING COIL FLUID IS 40% PROPYLENE GLYCOL 6. PROVIDE 25-50mm RUBBER/NEOPRENE PADS.																																		

CHILLER SCHEDULE (AIR COOLED)																																								
SYSTEM REFERENCE TAG	AHU SERVED	TYPE	MODEL	MANUFACTURER	LOCATION	REFRIGERANT		CAPACITY		INPUT POWER		PEAK ENERGY EFFICIENCY		NPLV	FLOW (L/s)	EFT (°C)	LFT (°C)	PRESSURE DROP (kPa)	COMPRESSORS	EFFICIENCY		MAXIMUM SOUND POWER LEVEL OF EQUIPMENT								ELECTRICAL				EMERGENCY POWER		SIZE			OPERATING WEIGHT (kg)	REMARKS
						TYPE	CHARGE (LBS)	(TON)	(kW)	(kW)	(kW/TON)	(kW/TON)	(kW/TON)							EER	(BTU/W·H)	83 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	VPHHz	(A)	(A)	(A)	(A)	(Y/N)	LENGTH (mm)	WIDTH (mm)	HEIGHT (mm)		
CH-1	AHU-1, 2	AIR-COOLED SCROLL COMPRESSOR	AG200AF	DAIKIN	ROOF	R32	40	93.4	208.7	72.4	1.22	0.69	9.9	10.0	4.4	42.4	4.0	9.84	48	49	52	56	60	64	68	72	76	80	575360	125	150	35	N	32510	2250	23140	2116			
CH-2	AHU-3, 4, 5	AIR-COOLED SCROLL COMPRESSOR	AG200PF	DAIKIN	ROOF	R32	64	123.9	291.5	100.9	1.22	0.77	13.7	10.0	4.4	46.4	4.0	9.85	48	52	55	61	61	64	64	64	68	72	76	575361	175	225	65	N	42640	2250	23140	2170		
CH-3	AHU-6	AIR-COOLED SCROLL COMPRESSOR	AG200PF	DAIKIN	ROOF	R32	100	129.0	453.8	164.5	1.27	0.78	21.4	10.0	4.4	46.9	4.0	9.41	47	55	57	65	62	69	57	64	70	76	80	575362	207	300	65	N	54100	2250	23140	3.889		
NOTES: <div>1. ALL CHILLERS TO BE C/W CONTROL PANEL, YES. 2. CONTRACTOR TO COORDINATE THE CONTROL PANEL LOCATION BASED ON SYSTEM LAYOUT 3. CONTRACTOR TO COORDINATE THE UNIT CLEARANCE AS PER MANUFACTURER RECOMMENDATION 4. CONTRACTOR TO COORDINATE WITH STRUCTURAL DRAWINGS FOR OUTDOOR CHILLER SUPPORT</div>																																								

2 MECHANICAL EQUIPMENT SCHEDULE
E201 / SCALE: N.T.S.



1 SINGLE LINE DIAGRAM
E201 / SCALE: N.T.S.

WESBURN MANOR LTC
AHU REPLACEMENT

SINGLE LINE DIAGRAM AND
SCHEDULES

N.T.S.

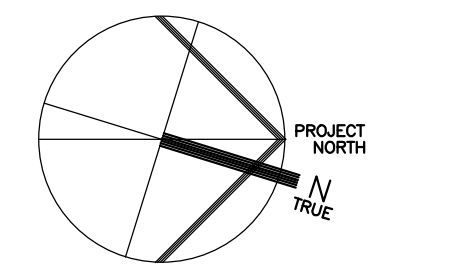
E201

<p>1. SCOPE OF WORK</p> <p>1.1. SUPPLY LABOUR, TOOLS, SERVICES AND EQUIPMENT, AND PROVIDE MATERIALS REQUIRED TO COMPLETE WORK IN ACCORDANCE WITH THIS SPECIFICATION AND DRAWINGS. COMPLY WITH LAWS, REGULATIONS AND CODES OF AUTHORITIES HAVING JURISDICTION. CONFORM TO REQUIREMENTS OF BIDDING DOCUMENTS AND DIVISION 1. PERFORM WORK IN ACCORDANCE WITH LOCAL APPLICABLE GOVERNING CODES AND AUTHORITIES INCLUDING THE ONTARIO BUILDING CODE AND ONTARIO ELECTRICAL SAFETY CODE (OESC).</p> <p>2. DEFINITIONS</p> <p>2.1. "CONCEALED" –MEANS HIDDEN FROM NORMAL SIGHT IN FURRED SPACES, SHAFTS, CEILING SPACES, WALLS AND PARTITIONS.</p> <p>2.2. "EXPOSED" –MEANS WORK NORMALLY VISIBLE, INCLUDING WORK IN EQUIPMENT ROOMS, SERVICE TUNNELS, AND SIMILAR SPACES.</p> <p>2.3. "FINISHED" – MEANS WHEN IN DESCRIPTION OF ANY AREA OR PART OF AN AREA OR A PRODUCT WHICH RECEIVES A FINISH SUCH AS PAINT, OR IN CASE OF A PRODUCT MAY BE FACTORY FINISHED.</p> <p>2.4. "PROVISION" OR "PROVIDE" (AND TENSES OF "PROVIDE") –MEANS SUPPLY AND INSTALL COMPLETE.</p> <p>2.5. "INSTALL" (AND TENSES OF "INSTALL") –MEANS SECURE IN POSITION, CONNECT COMPLETE, TEST, ADJUST, VERIFY AND CERTIFY.</p> <p>2.6. "SUPPLY" –MEANS TO PROCURE, ARRANGE FOR DELIVERY TO SITE, INSPECT, ACCEPT DELIVERY AND ADMINISTER SUPPLY OF PRODUCTS; DISTRIBUTE TO AREAS; AND INCLUDE MANUFACTURER'S SUPPLY OF ANY SPECIAL CABLES, STANDARD ON SITE TESTING, INITIAL START-UP, PROGRAMMING, BASIC COMMISSIONING, WARRANTIES AND MANUFACTURER'S ASSISTANCE TO CONTRACTOR.</p> <p>2.7. "DELETE" OR "REMOVE" (AND TENSES OF "DELETE" OR "REMOVE") –MEANS TO DISCONNECT, MAKE SAFE, AND REMOVE OBSOLETE MATERIALS INCLUDING BACK BOXES AND EXPOSED PIPING AND RACEWAYS; AND PATCH AND REPAIR/FINISH SURFACES TO MATCH ADJOINING SIMILAR CONSTRUCTION; INCLUDE FOR ASSOCIATED RE–PROGRAMMING OF SYSTEMS AND/OR CHANGE OF DOCUMENTATION IDENTIFICATIONS TO SUIT DELETIONS, AND PROPERLY DISPOSE OF DELETED PRODUCTS OFF SITE UNLESS OTHERWISE INSTRUCTED BY CONSULTANT.</p> <p>2.8. "BAS" –MEANS BUILDING AUTOMATION SYSTEM; "BMS" –MEANS BUILDING MANAGEMENT SYSTEM.</p> <p>2.9. "GOVERNING AUTHORITY" AND/OR "AUTHORITY HAVING JURISDICTION" AND/OR "REGULATORY AUTHORITY" AND/OR "MUNICIPAL AUTHORITY" –MEANS GOVERNMENT DEPARTMENTS, AGENCIES, STANDARDS, RULES AND REGULATIONS THAT APPLY TO AND GOVERN WORK AND TO WHICH WORK MUST ADHERE.</p> <p>2.10. "MECHANICAL DIVISIONS" – REFERS TO DIVISIONS 20, 21, 22, 23, 25 AND OTHER DIVISIONS AS SPECIFICALLY NOTED, AND WHICH WORK AS DEFINED IN SPECIFICATIONS AND/OR ON DRAWINGS IS RESPONSIBILITY OF MECHANICAL CONTRACTOR, UNLESS OTHERWISE NOTED.</p> <p>2.11. "ELECTRICAL DIVISIONS" –REFERS TO DIVISIONS 26, 27, 28 AND OTHER DIVISIONS AS SPECIFICALLY NOTED, AND WHICH WORK AS DEFINED IN SPECIFICATIONS AND/OR ON DRAWINGS IS RESPONSIBILITY OF ELECTRICAL CONTRACTOR, UNLESS OTHERWISE NOTED.</p> <p>2.12. "CONSULTANT" –MEANS PERSON, FIRM OR CORPORATION IDENTIFIED AS SUCH IN AGREEMENT OR DOCUMENTS, AND IS LICENSED TO PRACTICE IN PLACE OF THE WORK, AND HAS BEEN APPOINTED BY OWNER TO ACT FOR OWNER IN A PROFESSIONAL CAPACITY IN RELATION TO THE WORK.</p> <p>2.13. WHEREVER WORDS "INDICATED", "SHOWN", "NOTED", "LISTED", OR SIMILAR WORDS OR PHRASES ARE USED IN CONTRACT DOCUMENTS THEY ARE UNDERSTOOD, UNLESS OTHERWISE DEFINED, TO MEAN PRODUCT REFERRED TO IS "INDICATED", "SHOWN", "LISTED", OR "NOTED" ON CONTRACT DOCUMENTS.</p> <p>2.14. WHEREVER WORDS "REVIEWED", "SATISFACTORY", "AS DIRECTED", "SUBMIT", OR SIMILAR WORDS OR PHRASES ARE USED IN CONTRACT DOCUMENTS THEY ARE UNDERSTOOD, UNLESS OTHERWISE DEFINED, TO MEAN THAT WORK OR PRODUCT REFERRED TO IS "REVIEWED BY", "TO THE SATISFACTION OF", "SUBMITTED TO", ETC., CONSULTANT.</p> <p>3. EXAMINATION OF SITE AND DOCUMENTS</p> <p>3.1. PRIOR TO SUBMITTING BID, CAREFULLY EXAMINE CONDITIONS AT SITE WHICH WILL OR MAY AFFECT WORK, DRAWINGS, AND SPECIFICATIONS, AND BECOME FAMILIAR WITH BUILDING CONSTRUCTION, FINISHES AND OTHER WORK ASSOCIATED WITH WORK IN ORDER THAT BID INCLUDES FOR EVERYTHING NECESSARY FOR COMPLETION OF WORK.</p> <p>4. PERMITS, CERTIFICATES AND FEES</p> <p>4.1. PAY FOR AND OBTAIN PERMITS TO COMPLETE WORK. WHEN WORK IS COMPLETE, SUPPLY AND TURN OVER INSPECTION CERTIFICATES FROM GOVERNING AUTHORITIES TO CONSULTANT. PAY FEES AND CHARGES LEVIED BY MUNICIPALITY AND OTHER GOVERNING AUTHORITIES FOR PERMITS, INSPECTIONS AND CERTIFICATES. KEEP COPY OF SUCH PERMITS AND CERTIFICATES, ETC., ON JOB SITE.</p> <p>5. CO-ORDINATION AND CO-OPERATION</p> <p>5.1. COORDINATE ALL WORK WITH OTHER TRADES TO ENSURE A PROPER AND COMPLETE INSTALLATION. NOTIFY ALL TRADES CONCERNED OF REQUIREMENT FOR OPENINGS, SLEEVES, INSERTS AND OTHER HARDWARE NECESSARY IN THEIR WORK FOR INSTALLATION OF YOUR WORK, AND, WHERE YOUR WORK IS TO BE INTEGRATED WITH WORK OF OTHER TRADES OR IS TO BE INSTALLED IN CLOSE PROXIMITY WITH WORK OF OTHER TRADES, CAREFULLY COORDINATE WORK PRIOR TO AND DURING INSTALLATION.</p> <p>5.2. EXACT LOCATIONS AND ROUTING OF SERVICES MUST BE PROPERLY PLANNED, COORDINATED AND ESTABLISHED WITH ALL AFFECTED TRADES PRIOR TO INSTALLATION SUCH THAT THEY WILL CLEAR EACH OTHER AS WELL AS ANY OBSTRUCTIONS. GENERALLY, PIPING REQUIRING UNIFORM PITCH SHALL BE GIVEN RIGHT OF WAY, WITH OTHER SERVICES LOCATED AND ARRANGED TO SUIT.</p> <p>6. NOISE CONTROL</p> <p>6.1. WORK WHICH MAY CAUSE NOISE DISTURBANCES MUST BE SCHEDULED AT TIMES APPROVED BY CONSULTANT. COORDINATE WORK WITH TRADES TO MINIMIZE NOISE DISTURBANCES.</p> <p>7. DEMOLITION</p> <p>7.1. IT IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO VERIFY EXACT EXTENT OF DEMOLITION/ REMOVALS/ RELOCATIONS ON SITE PRIOR TO PRICING THE WORK.</p> <p>7.2. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR REMOVAL OF ALL REDUNDANT POWER WIRING AND CONDUITS.</p> <p>8. CLEANING UP</p> <p>8.1. DURING CONSTRUCTION, KEEP SITE REASONABLY CLEAR OF RUBBISH AND WASTE MATERIAL RESULTING FROM WORK ON DAILY BASIS. AFTER COMPLETION OF WORK, REMOVE RUBBISH AND DEBRIS, ARRANGE AND PAY FOR REPAIR OF DAMAGES CAUSED AND LEAVE PREMISES AND WORK IN GOOD ORDER.</p> <p>9. PROTECTION OF EQUIPMENT AND MATERIAL</p> <p>9.1. PROPERLY PROTECT AND STORE ALL EQUIPMENT AND MATERIALS ON SITE FROM DAMAGE. CONTRACTOR SHALL BE RESPONSIBLE FOR SAFE STORAGE OF ALL EQUIPMENT AND GOODS TO BE RELOCATED AND SHALL REPAIR OR REPLACE DAMAGED EQUIPMENT AND GOODS AT DISCRETION OF OWNER.</p> <p>10. INSPECTION OF WORK</p> <p>10.1. CONSULTANT SHALL AT ALL TIMES HAVE ACCESS TO WORK AND SHALL BE NOTIFIED AT AGREED UPON TIMES OF STAGES OF WORK.</p> <p>10.2. WHERE STANDARDS OF WORK ARE SPECIFIED OR IMPLIED AND WORK DOES NOT COMPLY WITH PERFORMANCE SPECIFIED OR IMPLIED, SUCH DEFICIENCY SHALL BE CORRECTED AS DIRECTED BY CONSULTANT. ANY SUBSEQUENT TESTING TO VERIFY PERFORMANCE SHALL BE DONE AT CONTRACTOR'S EXPENSE. ANY CHARGES FOR OWNER'S STAFF, CONSULTANT OR OTHER PERSONNEL RELATED TO SUCH RETESTING SHALL ALSO BE AT EXPENSE OF CONTRACTOR.</p> <p>11. PRODUCTS</p> <p>11.1. PRODUCTS LISTED AND/OR SPECIFIED ON CONTRACT DOCUMENTS ARE SELECTED TO ESTABLISH DESIGN STANDARDS. IN MOST CASES, ACCEPTABLE MANUFACTURERS ARE LISTED. BASE YOUR BID PRICE ON BASE SPECIFIED PRODUCTS OR PRODUCTS SUPPLIED FROM ACCEPTABLE MANUFACTURERS. ENSURE PRODUCTS SUPPLIED FROM MANUFACTURERS OTHER THAN BASE SPECIFIED MANUFACTURERS ARE EQUIVALENT TO SPECIFIED PRODUCTS. CHANGES TO MANUFACTURERS OF PRODUCTS MAY BE PROPOSED TO</p>	<p>CONSULTANT FOR ACCEPTANCE PRIOR TO CLOSING OF BIDS, LISTING IN EACH CASE CORRESPONDING CREDIT. CONSULTANT HAS SOLE DISCRETION IN ACCEPTING ANY PROPOSED SUBSTITUTION. INCLUDE IN BID PRICE ANY ADDITIONAL COSTS FOR CHANGES TO ASSOCIATED OR ADJACENT WORK RESULTING FROM PROVISION OF PRODUCTS SUPPLIED BY MANUFACTURER OTHER THAN BASE SPECIFIED MANUFACTURER. ANY PROPOSED CHANGES INITIATED BY CONTRACTOR AFTER AWARD OF CONTRACT MAY BE CONSIDERED BY THE CONSULTANT AT CONSULTANT'S DISCRETION, WITH COSTS FOR SUCH CHANGES IF APPROVED BY CONSULTANT, AND COSTS OF SUCH REVIEW BY THE CONSULTANT TO BE PAID FOR BY THE CONTRACTOR.</p> <p>12. WARRANTY</p> <p>12.1. WARRANT WORK TO BE IN STRICT ACCORDANCE WITH CONTRACT DOCUMENTS AND FREE FROM DEFECTS FOR 1 YEAR PERIOD FROM DATE OF WRITTEN ACCEPTANCE BY CONSULTANT. REPAIR AND/OR REPLACE ANY SUCH DEFECTS WHICH APPEAR IN WORK WITHIN WARRANTY PERIOD, ORDINARY WEAR AND TEAR AND WILFUL DAMAGE BY, OR CARELESSNESS OF OWNER'S STAFF OR AGENTS EXCEPTED, WITHOUT ADDITIONAL EXPENSE TO OWNER. WHERE SUCH DEFECTS OCCUR, BE RESPONSIBLE FOR COSTS INCURRED IN MAKING DEFECTIVE WORK GOOD, INCLUDES REPAIR OR REPLACEMENT OF BUILDING FINISHES, OTHER MATERIALS, OR DAMAGE TO OTHER EQUIPMENT CAUSED BY SUCH DEFECTS, OR BY SUBSEQUENT REPLACEMENT OR REPAIRS.</p> <p>13. DISCONNECTION, REMOVAL AND RELOCATION WORK</p> <p>13.1. IN AREAS WHICH ARE NOT BEING ARCHITECTURALLY RENOVATED AND WHICH ELECTRICAL CONTRACTOR MUST RUN SERVICES THROUGH, BE RESPONSIBLE FOR REMOVAL AND REINSTALLATION OF ARCHITECTURAL, CEILING TILES, MECHANICAL EQUIPMENT, SPRINKLERS, ETC., AS REQUIRED FOR INSTALLATION OF YOUR WORK. IF THE REQUIRED ELECTRICAL WORK IS REQUIRED TO ACCOMMODATE WORK OF OTHER TRADES, AND IF REMOVAL OF EXISTING CEILING TILES IS NOT THE RESPONSIBILITY OF OTHERS, BE RESPONSIBLE FOR ALL WORK TO GAIN ACCESS TO THOSE DEVICES THAT NEED TO BE WORKED ON. SECURELY SUPPORT ANY DEVICE/LUMINAIRE LEFT "DANGLING" DUE TO REMOVAL OF SUPPORTING MEANS. RE-INSTALL DEVICES AFTER INSPECTION OF WORK IS APPROVED BY CONSULTANT. PRIOR TO REMOVAL OF CEILING TILES OR OTHER DEVICES, INSPECT FOR DAMAGES/WORKING ORDER AND REPORT ANY DEFICIENCIES TO OWNER PRIOR TO START OF WORK. PATCH AND MAKE GOOD (INCLUDING PAINTING) SURFACES TO MATCH EXISTING.</p> <p>14. RECORD DRAWINGS (AS-BUILTS)</p> <p>14.1. DRAWINGS FOR THIS PROJECT HAVE BEEN PREPARED ON A CAD SYSTEM. THE SOFTWARE USED IS AUTOCAD RELEASE 2010. COPIES OF DRAWINGS ON DISKS FOR USE IN PREPARING AS-BUILTS, MAY BE PURCHASED FROM CONSULTANT AT A COST OF \$25 CDN. PLUS GST PER DRAWING.</p> <p>14.2. WHEN WORK BEGINS AT SITE, CLEARLY AND ACCURATELY MARK ON A BOUND SET OF WHITE PRINTS OF CONTRACT DRAWINGS, ON A DAILY BASIS, ALL CHANGES AND DEVIATIONS FROM ROUTING OF AND LOCATIONS OF EQUIPMENT SHOWN ON CONTRACT DRAWINGS, CHANGES AND DEVIATIONS INCLUDING THOSE MADE BY ADDENDA, CHANGE ORDERS, AND SITE INSTRUCTIONS, AND CHANGES AND DEVIATIONS INDICATED ON SUPPLEMENTAL DRAWINGS ISSUED WITH ADDENDA, CHANGE ORDERS, AND SITE INSTRUCTIONS. MAINTAIN "AS-BUILT" WHITE PRINTS AT SITE FOR PERIODIC INSPECTION BY CONSULTANT THROUGHOUT DURATION OF WORK. PAY PARTICULAR ATTENTION TO ACCURATELY DIMENSIONING LOCATION OF ALL CONCEALED SERVICES TERMINATED FOR FUTURE EXTENSION, ALL BURIED WORK AND SERVICES, AND WORK CONCEALED WITHIN BUILDING IN INACCESSIBLE LOCATIONS.</p> <p>14.3. WHERE WORK ENDS AT SITE, UPDATE A COMPUTER FILE COPY OF CONTRACT DOCUMENT DRAWING SET SO THAT IT REFLECTS ALL DEVIATIONS FROM ORIGINAL CONTRACT DOCUMENT DRAWINGS, THUS FORMING A TRUE "AS-BUILT" DRAWING DISK SET. PROVIDE A SET OF REPRODUCIBLE MYLAR PRINTS OF CONTRACT DRAWINGS PRODUCED FROM TRUE "AS-BUILT" DRAWING SET. SUBMIT "AS-BUILT" DRAWING COMPACT DISKS WITH WHITE PRINTS AND CAD PRODUCED "AS-BUILT" MYLAR PRINTS TO CONSULTANT. ALL SUBMITTED DRAWINGS SHALL BE OF THE SAME QUALITY AS ORIGINAL CONTRACT DOCUMENT DRAWINGS.</p> <p>14.4. UPDATE OWNER'S DISTRIBUTION RISER DIAGRAMS POSTED IN ELECTRICAL ROOMS.</p> <p>15. SHOP DRAWINGS AND OPERATING/MAINTENANCE INSTRUCTION MANUALS</p> <p>15.1. SUBMIT SHOP DRAWINGS AND OPERATING/MAINTENANCE INSTRUCTION MANUALS FOR FOLLOWING:</p> <p>15.1.1. DISTRIBUTION EQUIPMENT;</p> <p>15.1.2. PROPERLY IDENTIFY SHOP DRAWINGS FOR REVIEW AND SHOW IN DETAIL EQUIPMENT AND MATERIALS. ENDORSE EACH DRAWING, INCLUDE COMPANY NAME AND SUBMITTAL DATE. PROVIDE MANUALS AS INDEXED, IDENTIFIED HARD COVER 3-RING BINDERS COMPLETE WITH:</p> <p>15.2.1. TITLE SHEET AND LIST OF CONTENTS;</p> <p>15.2.2. A COPY OF EACH "REVIEWED" SHOP DRAWING;</p> <p>15.2.3. EXPLANATIONS OF OPERATING PRINCIPLES AND SEQUENCES;</p> <p>15.2.4. PART LISTS WITH NUMBERS;</p> <p>15.2.5. RECOMMEND MAINTENANCE PRACTICES AND PRECAUTIONS;</p> <p>15.2.6. COPIES OF INSPECTION CERTIFICATES ISSUED BY GOVERNING</p> <p>15.2.7. WIRING AND CONNECTION DIAGRAMS;</p> <p>15.2.8. COPIES OF ADDITIONAL AND REVISED PANELBOARD DIRECTORIES.</p> <p>15.3. PROVIDE 2 SETS OF MANUALS. CONFIRM EXACT QUANTITY AND METHOD OF AUTHORITIES;</p> <p>16. GENERAL CONDUIT AND CONDUCTOR INSTALLATION REQUIREMENTS</p> <p>16.1. INSTALL CONDUIT AND CONDUCTORS CONCEALED TO DEGREE MADE POSSIBLE BY FINISHES AND PROVIDE INSTALLATIONS IN ACCORDANCE WITH CEC AND LOCAL GOVERNING AUTHORITIES. PLAN AND COORDINATE LOCATIONS AND ROUTING OF SERVICES, WITH TRADES PRIOR TO INSTALLATION. IN AREAS WHERE A MULTIPLICITY OF SERVICES OCCURS, PREPARE DETAIL DRAWINGS AND SUBMIT TO CONSULTANT FOR REVIEW PRIOR TO START OF AFFECTED WORK.</p> <p>16.2. WHERE CONDUIT AND/OR CONDUCTORS ARE EXPOSED, ARRANGE SAME TO AVOID INTERFERENCE WITH OTHER WORK AND PARALLEL TO BUILDING LINES.WHERE HORIZONTAL CONDUITS AND/OR CONDUCTORS ARE EXPOSED, INSTALL AS HIGH AS POSSIBLE. DO NOT INSTALL CONDUIT AND/OR CONDUCTORS WITHIN 6" (150 mm) OF "HOT" PIPES OR EQUIPMENT UNLESS CONDUIT AND/OR CONDUCTORS ARE ASSOCIATED WITH EQUIPMENT. INDEPENDENTLY RUN CONDUIT AND CONDUCTORS MUST BE SUPPORTED FROM THE CEILING/WALL STRUCTURE, NOT FROM CEILING HANGERS, DUCTWORK, PIPING, CABLE TRAYS, ETC.</p> <p>16.3. IDENTIFY CONDUIT RUNS. (I.E.: TAG BOTH ENDS OF CONDUIT RUNS).</p> <p>16.4. AT NO EXTRA COST, ALLOW FOR FINAL RELOCATIONS OF DEVICES UP TO 10' (3M) TO SUIT FINAL COORDINATED DEVICE LOCATIONS, PRIOR TO INSTALLATION OF WALL COVERINGS.</p> <p>16.5. GENERALLY, CONDUCTORS AND CONDUIT ARE SIZED ON DRAWINGS, BUT IN ABSENCE OF DIRECTION IN TYPE AND SIZING, TYPE AND SIZE REQUIRED QUANTITY IN ACCORDANCE WITH THE INTENDED APPLICATION, TO APPLICABLE OESC REQUIREMENTS. SIZES WHERE SHOWN, ARE MINIMUM SIZES AND SHALL NOT BE REDUCED UNLESS APPROVED BY CONSULTANT.</p> <p>16.6. CONDUCTORS IN PLENUM SPACES AND IN RAISED FLOOR AREAS SHALL COMPLY WITH OBC AND OESC REQUIREMENTS WITH REGARDS TO FLAME AND SMOKE TEST.</p> <p>17. CONDUIT</p> <p>17.1. PROVIDE CONDUIT FOR CONDUCTORS. INTERIOR CONDUIT TO BE EMT (THINWALL) GALVANIZED, ELECTRICAL METALLIC TUBING TO CSA C22.2 NO. 83, COMPLETE WITH FACTORY MADE BENDS WHERE SITE BENDING IS NOT POSSIBLE, AND JOINTS AND TERMINATIONS MADE WITH SET SCREW TYPE CONNECTORS WITH INSULATED THROATS, AND CONCRETE TIGHT WHERE REQUIRED.</p> <p>17.2. FOR SHORT BRANCH CIRCUIT CONNECTORS TO MOTORIZED EQUIPMENT AND TRANSFORMERS (MINIMUM LENGTH 18" [460 mm], MAXIMUM LENGTH 24" [600 mm]) WITH 180 DEGREE LOOP (WHERE POSSIBLE), PROVIDE GALVANIZED STEEL FLEXIBLE LIQUID-TIGHT METALLIC CONDUIT TO CSA C22.2 NO. 56, COMPLETE WITH IDEAL "STEEL TOUGH" LIQUID TIGHT FLEXIBLE CONDUIT CONNECTORS AT TERMINATIONS.</p> <p>17.3. FOR EXTERIOR LOCATIONS, PROVIDE CSA APPROVED AND LABELLED, FT-4 RATED, RIGID PLASTIC (PVC) CONDUIT COMPLETE WITH SITE MADE HEAT GUN BENDS ON CONDUIT TO 50 MM (2") DIAMETER, FACTORY MADE ELBOWS IN CONDUIT LARGER THAN 50 MM (2") DIAMETER, SOLVENT WELD JOINTS; FACTORY MADE EXPANSION JOINTS WHERE REQUIRED, AND TERMINATIONS MADE WITH PROPER AND SUITABLE CONNECTORS AND ADAPTORS.</p> <p>17.4. SUPPORT AND SECURE CONDUIT AT SPACING IN ACCORDANCE WITH CODE REQUIREMENTS BY MEANS OF GALVANIZED PIPE STRAPS, CONDUIT CLIPS, RING BOLT TYPE HANGERS, OR BY OTHER PROPER MANUFACTURED DEVICES. PROVIDE CONDUIT FITTINGS CONSTRUCTED OF SAME MATERIALS AS CONDUIT AND SUITABLE FOR APPLICATION. SQUARE AND PROPERLY REAM ENDS OF SITE CUT CONDUIT. GENERALLY, CONDUIT IS SIZED ON DRAWINGS. SIZE CONDUIT NOT SIZED ON DRAWINGS IN ACCORDANCE WITH CODE. BEND CONDUIT AT FULL CONDUIT DIAMETER WITH NO KINKING AND NO FLAKING OR CRACKING OF FINISHES.</p> <p>17.5. PROVIDE COOPER B-LINE "DURA-BLOK" SERIES ROOFTOP SUPPORT SYSTEMS FOR CONDUIT RUNS ON ROOF. INSTALL ROOFTOP SUPPORT SYSTEM IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS TO SUIT TYPE OF RACEWAY AND ROOFING MATERIALS. USE PROPERLY SIZED CLAMPS TO SUITE CONDUIT SIZES. ENSURE THAT INSTALLATION AND USE OF SYSTEM DOES NOT INVALIDATE ROOF WARRANTY.</p> <p>18. CONDUCTORS</p> <p>18.1. PROVIDE CONDUCTORS. WIRE SHALL BE INSTALLED IN CONDUIT. REFER TO DRAWINGS FOR SIZING OF CONDUCTORS. GENERALLY, BRANCH CIRCUIT CONDUITOR SIZES ARE INDICATED ON CONSULTANT'S DRAWINGS. SUCH SIZES ARE MINIMUM REQUIREMENTS AND MUST BE INCREASED, TO SUIT LENGTH OF RUN AND VOLTAGE DROP IN ACCORDANCE WITH SCHEDULE OBTAINED FROM CONSULTANT. CONDUCTORS NOT SIZED ON DRAWINGS SHALL BE SIZED IN ACCORDANCE WITH CODE. PROVIDE CABLE SUPPORT SYSTEM ACCESSORIES WHICH ARE NOT SPECIFIED HEREIN OR SHOWN ON DRAWINGS BUT ARE REQUIRED FOR PROPER INSTALLATION.</p> <p>18.2. INTERIOR CONDUCTORS TO BE "THW90" SINGLE CONDUCTOR TO CSA C22.2 NO. 38, 600/1000 VOLTS, MAXIMUM 90°C (194°F) CONDUCTOR TEMPERATURE, -40°C (-40°F) MINIMUM INSTALLATION TEMPERATURE, X-LINK POLYETHYLENE (XLPE) INSULATION, COLOUR CODED.</p> <p>18.3. EXTERIOR CONDUCTORS SHALL BE "RW90" CSA CERTIFIED, SINGLE COPPER CONDUCTOR TO CSA C22.2 NO. 38, MAXIMUM 90°C (194°F) CONDUCTOR TEMPERATURE, -40°C (-40°F) MINIMUM INSTALLATION TEMPERATURE, EXTRA THICKNESS X-LINK POLYETHYLENE (XLPE) INSULATION SUITABLE FOR WET AND BURIED INSTALLATIONS, COLOUR CODED.</p> <p>18.4. DO NOT USE "BX" TYPE CABLING, ALL CIRCUITS SHALL BE CONDUCTORS IN CONDUIT.</p> <p>18.5. CONDUCTORS UP TO AND INCLUDING NO. 10 AWG SHALL BE SOLID. CONDUCTORS IN SIZES LARGER THAN NO. 10 AWG SHALL BE STRANDED. PROVIDE CONDUCTORS CONSTRUCTED OF 98% CONDUCTIVE COPPER AND APPROVED FOR 600V. DO NOT USE CONDUCTORS SMALLER THAN NO. 12 AWG UNLESS OTHERWISE NOTED.</p> <p>18.6. PROVIDE IDI ELECTRIC "IDEAL" NO. 451, NO. 452 AND NO. 453 "WING-NUT" CSA CERTIFIED 600V RATED PRESSURE TIGHT CONNECTORS.</p> <p>18.7. WHEN PULLING WIRES INTO CONDUIT, USE IDI ELECTRIC "IDEAL YELLOW 77" LUBRICANT. ENSURE WIRES ARE KEPT STRAIGHT AND ARE NOT TWISTED OR ABRAISED.</p> <p>18.8. DO NOT USE CONDUCTORS SMALLER THAN NO. 12 AWG IN SYSTEMS OVER 30 VOLTS, UNLESS OTHERWISE NOTED.</p> <p>18.9. COLOUR CODE CONDUCTORS THROUGHOUT TO IDENTIFY PHASES, NEUTRALS AND GROUND BY MEANS OF SELF-LAMINATING COLOURED TAPE, COLOURED CONDUCTOR INSULATION, OR PROPERLY SECURED COLOURED PLASTIC DISCS. COLOURS, UNLESS OTHERWISE NOTED, TO BE AS FOLLOWS:</p> <p>18.9.1. PHASE A – RED;</p> <p>18.9.2. PHASE B – BLACK;</p> <p>18.9.3. PHASE C – BLUE;</p> <p>18.9.4. GROUND – GREEN;</p> <p>18.9.5. NEUTRAL – WHITE;</p> <p>18.9.6. CONTROL – ORANGE.</p> <p>18.10. USE 300V RATING FOR FIRE ALARM, SECURITY AND OTHER LOW VOLTAGE CIRCUITS, 600V RATING FOR 120/208V CIRCUITS, 1000V RATING FOR 347/600V CIRCUITS.</p> <p>18.11. CONDUCTORS SHALL BE OVERSIZED TO ENSURE VOLTAGE DROP IS 2% MAXIMUM AT PANEL LOCATION OR 5% AT LOAD.</p> <p>19. FIRESTOPPING AND SMOKE SEAL MATERIALS</p> <p>19.1. SASBESTOS-FREE, ELASTOMERIC MATERIALS AND INTUMESCENT MATERIALS, TESTED, LISTED AND LABELLED BY ULC IN ACCORDANCE WITH CAN 4-S115-M85, AND CAN/ULC-S101-M FOR INSTALLATION IN ULC DESIGNATED FIRESTOPPING, AND SMOKE SEAL SYSTEMS.</p> <p>19.2. SYSTEMS TO CONSIST OF BOTH ELASTOMERIC AND INTUMESCENT MATERIALS THAT ARE COMPATIBLE WITH ABUTTING DISSIMILAR MATERIALS AND FINISHES.</p> <p>19.3. TYPICALLY, FOR OPENINGS OF UP TO 10" (250 MM) IN DIAMETER, PROVIDE PUTTY PAD TYPE FIRESTOP MATERIALS EQUIVALENT TO SPECIFIED TECHNOLOGIES INC. "SPECSEAL" INTUMESCENT, NON- HARDENING, WATER RESISTANT PUTTIES CONTAINING NO SOLVENTS, INORGANIC FIBRES OR SILICONE COMPOUNDS.</p> <p>19.4. TYPICALLY, FOR OPENINGS OF GREATER THAN 10" (250 MM) IN DIAMETER, AND FOR RECTANGULAR OPENINGS, PROVIDE PILLOW TYPE FIRESTOP MATERIALS EQUIVALENT TO SPECIFIED TECHNOLOGIES INC. "SPECSEAL" RE-ENTERABLE, NON-CURING, MINERAL FIBRE CORE ENCAPSULATED ON SIX SIDES WITH INTUMESCENT COATING CONTAINED IN A FLAME RETARDANT POLY BAG.</p> <p>20. OUTLET BOXES, PULLBOXES AND JUNCTION BOXES</p> <p>20.1. OUTLET BOXES: PROVIDE CSA APPROVED STAMPED GALVANIZED STEEL OUTLET BOX FOR EACH LUMINAIRE, FIRE ALARM DEVICE, ETC. REFER TO DRAWINGS FOR LOCATIONS OF OUTLETS. CONFIRM EXACT LOCATIONS PRIOR TO ROUGHING-IN. BOXES FOR RIGID STEEL CONDUITS SHALL BE CAST FS/FD TYPES.</p> <p>20.2. PULLBOXES AND JUNCTION BOXES: PROVIDE GALVANIZED OR PRIME COATPAINTED STEEL, SUITABLE IN RESPECTS FOR APPLICATION AND COMPLETE WITH SCREW ON OR HINGED COVERS AS REQUIRED, AND CONNECTORS SUITABLE FOR CONNECTED CONDUIT.</p> <p>20.3. PROVIDE PULLBOXES AND JUNCTION BOXES WHEREVER NECESSARY TO FACILITATE CONDUCTOR/CONDUIT INSTALLATIONS. GENERALLY, PROVIDE CONDUIT RUNS EXCEEDING 100' (30 m) IN LENGTH, OR WITH MORE THAN 3 – 90 DEGREE BENDS WITH PULLBOX INSTALLED AT CONVENIENT AND SUITABLE INTERMEDIATE ACCESSIBLE LOCATION. PROVIDE JUNCTION BOXES AND PULLBOXES SIZED IN ACCORDANCE WITH CODE TO SUIT NUMBER AND SIZE OF CONDUITS AND CONDUCTORS. BOXES MUST BE ACCESSIBLE AFTER WORK IS COMPLETE.</p> <p>20.4. SIZE, ARRANGEMENT AND TYPE OF BOXES MUST BE SUITABLE FOR APPLICATION. CLEARLY IDENTIFY MAIN PULL AND/OR JUNCTION BOXES BY SPRAY PAINTING COVERS AGREED UPON WITH OWNER AND SHALL BE CONFIRMED ON SITE.</p> <p>20.5. WHERE REQUIRED, SUPPLY ACCESS DOORS OF MINIMUM NO. 12 GAUGE. PRIME COATED STEEL COMPLETE WITH HINGES AND FRAMES TO GIVE ACCESS TO BOXES AND CONDUCTOR JOINTS AND OTHER SIMILAR ELECTRICAL WORK WHICH MAY NEED MAINTENANCE OR REPAIR, BUT WHICH IS CONCEALED IN INACCESSIBLE CONSTRUCTION. CONFIRM FINISHES WITH OWNER.</p> <p>21. RECEPTACLES, SWITCHES AND FACEPLATES</p> <p>21.1. PROVIDE CSA APPROVED, HEAVY DUTY, SPECIFICATION GRADE, 347V, WHITE, ROCKER STYLE LOW VOLTAGE SWITCHES THAT SHALL BE COMPATIBLE WITH THE EXISTING BASE BUILDING LIGHTING CONTROL SYSTEM.</p> <p>21.2. PROVIDE CSA APPROVED HEAVY DUTY, PREMIUM QUALITY DUPLEX CONSTRUCTION U-GROUND, 15A-125V, 3W AND EQUAL TO HUBBELL SPECIFICATION GRADE RECEPTACLES. DEVICES SHALL BE BACK AND SIDE WIRED. PROVIDE IMPACT RESISTANT THERMOPLASTIC FACEPLATES WITH MATCHING SCREWS. CONFIRM TYPE AND FINISH OF DEVICES WITH OWNER PRIOR TO ORDERING.</p> <p>21.3. COVER PLATES SHALL BE METAL WITH WHITE COLOUR, BLACK FOR ALL FLOOR BOX LOCATIONS.</p> <p>21.4. IDENTIFY CIRCUIT NUMBERS ON RECEPTACLE DESIGNATED LABELLING SPACES. PROVIDE PERMANENTLY LABELLED, SELF ADHESIVE, IDENTIFICATION TAPE ON OUTSIDE OF EACH DEVICE OUTLET, IDENTIFYING LOCATION FROM WHERE EACH DEVICE IS FED.</p> <p>22. FASTENING AND SECURING HARDWARE</p> <p>22.1. PROVIDE PROPER FASTENERS AND SIMILAR HARDWARE REQUIRED FOR CONDUIT, CONDUCTORS, AND FOR EQUIPMENT HANGER AND/OR SUPPORT MATERIAL UNLESS OTHERWISE NOTED. EXPLOSIVE POWDER ACTUATED FASTENERS WILL NOT BE PERMITTED UNLESS SPECIFIC WRITTEN APPROVAL FOR THEIR USE AND TYPE HAS BEEN OBTAINED FROM CONSULTANT. UNDER NO CIRCUMSTANCES USE CEILING SUSPENSION HANGERS OR GRIDS FOR SUSPENSION OF CONDUIT AND CONDUCTORS.</p> <p>23. IDENTIFICATION NAMEPLATES</p> <p>23.1. FOR EACH PIECE OF ELECTRICAL DISTRIBUTION EQUIPMENT FROM ELECTRICAL SOURCE OF SUPPLY UP TO AND INCLUDING PANELBOARDS, PROVIDE ENGRAVED LAMACOD IDENTIFICATION NAMEPLATES SECURED TO APPARATUS WITH STAINLESS STEEL SCREWS, WORDING TO INDICATE SOURCE OF ELECTRICAL SUPPLY AND SIZED TO SUIT EQUIPMENT FOR WHICH IT IS PROVIDED. CONFIRM EXACT NAMEPLATE WORDING, COLOUR, DESIGNATIONS, AND SIZES WITH OWNER PRIOR TO MANUFACTURE.</p> <p>24. DISCONNECTS</p> <p>24.1. THE DISCONNECT SWITCHES SHALL HAVE THE OPERATING HANDLE INTERLOCKED WITH THE SWITCH COVER SO THAT IT CAN ONLY BE OPENED WHEN THE SWITCH IS IN THE "OFF" POSITION, AND THE HANDLE CANNOT BE PUT IN THE "ON" POSITION UNLESS THE COVER IS CLOSED.</p> <p>24.2. THE FUSED SWITCHES SHALL HAVE STEEL REINFORCED CLIPS AND FUSES SHALL BE EASILY REMOVABLE WHEN THE SWITCH IS IN THE "OFF" POSITION.</p> <p>24.3. SWITCHES SHALL HAVE AMPLE QUITTER SPACE FOR TOP OR BOTTOM WIRING AND SHALL HAVE FULLY VISIBLE BLADES WHEN IN THE "OFF" POSITION, QUICK-MAKE, QUICK-BREAK, MECHANISM AND BE HORSE-POWER RATED.</p> <p>24.4. SWITCHES USED OUTDOORS SHALL BE IN A WEATHERPROOF ENCLOSURE. SWITCHES USED INDOORS SHALL BE SPRINKLER PROOF, NEMA 3R.</p> <p>24.5. SWITCHES SHALL HAVE PROVISION FOR PADLOCKING IN THE "OFF" POSITION AND INTERLOCK DEFEAT.</p> <p>24.6. ALL MOTORS SHALL BE PROVIDED WITH WITH A DISCONNECT SWITCH BY THIS DIVISION UNLESS OTHERWISE NOTED.</p> <p>25. GROUNDING AND BONDING</p> <p>25.1. PROVIDE REQUIRED GROUNDING AND BONDING WORK IN ACCORDANCE WITH DRAWINGS, LOCAL GOVERNING ELECTRICAL AUTHORITY, GOVERNING AUTHORITIES HAVING JURISDICTION AND LOCAL GOVERNING ELECTRICAL INSPECTION AUTHORITY. PROVIDE LOCAL GOVERNING ELECTRICAL UTILITY'S GROUNDING REQUIREMENTS FOR STATIONS, VAULTS AND ELECTRICAL ROOMS, AS APPLICABLE. CONFIRM REQUIREMENTS WITH LOCAL GOVERNING ELECTRICAL UTILITY.</p> <p>25.2. GROUND AND BOND OTHER EQUIPMENT SUCH AS TRANSFORMERS, SWITCHBOARDS, PANELBOARDS, AND SIMILAR METAL WORK TO PERIMETER GROUND BUS. PROVIDE MINIMUM NO. 3/0 INSULATED GROUND WIRE FROM GROUND BUS IN ELECTRICAL ROOMS TO SWITCHBOARDS, TRANSFORMERS, STRUCTURE, FLOOR, ETC.</p> <p>26. GENERAL ELECTRICAL WORK TESTING</p> <p>26.1. GENERAL</p> <p>26.1.1. IN ADDITION TO TESTS REQUIRED BY GOVERNING AUTHORITIES AND REGULATIONS, TEST WORK TO ENSURE THERE ARE NO GROUNDS OR CROSSES. ENSURE DEVICES ARE COMMISSIONED AND OPERABLE. CONNECT CIRCUITS TO PANELBOARDS SO AS TO BALANCE ACTUAL LOADS (WATTAGE) WITHIN 5%. IF REQUIRED, TRANSPOSE CIRCUITS WHEN WORK IS COMPLETE TO MEET THIS REQUIREMENT.</p> <p>26.2. SHOCK AND ARC FLASH PROTECTION</p> <p>26.2.1. PROVIDE FOR ELECTRIC SHOCK AND ARC FLASH PROTECTION AS REQUIRED BY LOCAL GOVERNING ELECTRICAL CODE AND LOCAL GOVERNING AUTHORITIES. SCOPE OF WORK TO BE FOR ADDITIONAL AND REVISED EQUIPMENT AND FIRST LEVEL OF UPSTREAM DEVICES.</p> <p>26.2.2. DETERMINE SEVERITY OF POTENTIAL EXPOSURE, PLANNING SAFE WORK PRACTICES AND SELECTING PERSONAL PROTECTIVE EQUIPMENT UNDER GENERAL GUIDELINES OF GOVERNING EDITION OF CSA 2462.</p> <p>26.2.3. DESIGN SAFETY SIGNS AND LABELS FOR APPLICATIONS TO EQUIPMENT UNDER GENERAL GUIDELINES OF ANSI Z535.4.</p> <p>26.2.4. DETERMINE ARC FLASH HAZARD DISTANCE AND INCIDENT ENERGY THAT WORKERS MAY BE EXPOSED TO FROM ELECTRICAL EQUIPMENT UNDER GENERAL GUIDELINES OF IEEE 1584.</p> <p>26.2.5. INCORPORATE DOCUMENTATION WITH DISTRIBUTION SYSTEM AND COORDINATION STUDY REPORT.</p> <p>26.2.6. PROVIDE LABELS AS REQUIRED ON EQUIPMENT, MEETING APPLICABLE STANDARDS AND CODES TO SATISFACTION OF CONSULTANT.</p> <p>26.2.7. ACCEPTABLE COMPANIES TO PROVIDE THIS WORK ARE TO BE SUCCESSFUL MANUFACTURER OF ELECTRICAL DISTRIBUTION SYSTEM EQUIPMENT AND INCLUDE:</p> <p>26.2.7.1. EATON ELECTRIC SERVICES DIVISION;</p> <p>26.2.7.2. SCHNEIDER ELECTRIC SERVICES DIVISION;</p> <p>26.2.7.3. SIEMENS ELECTRIC SERVICES DIVISION.</p> <p>26.2.7.4. G.T. WOODS;</p> <p>26.2.7.5. AC TESLA;</p> <p>26.2.7.6. PELIKAN INC.</p> <p>27. MECHANICAL TRADES WIRING</p> <p>27.1. ALL STARTERS AND CONTROL WIRING ARE PROVIDED BY MECHANICAL CONTRACTOR. ELECTRICAL CONTRACTOR SHALL RECEIVE ALL STARTERS AND INSTALL ALL STARTERS AND THERMOSTATS SUPPLIED BY MECHANICAL TRADE AND PROVIDE ALL POWER WIRING.</p> <p>27.2. SUPPLY, INSTALL AND CONNECT ALL REQUIRED DISCONNECT SWITCHES.</p> <p>27.3. CONFIRM ELECTRICAL REQUIREMENTS AND EXACT LOCATIONS OF ALL MECHANICAL EQUIPMENT WITH MECHANICAL CONTRACTOR PRIOR TO INSTALLATION. COORDINATE WITH MECHANICAL DRAWINGS, AS REQUIRED.</p> <p>28. FIRE ALARM</p> <p>28.1. THE EXISTING FIRE ALARM SYSTEM SHALL BE OPERATIONAL AT ALL TIMES DURING CONSTRUCTION.</p> <p>28.2. EXISTING FIRE ALARM CONTROL PANEL SHALL REMAIN, UNLESS INDICATED OTHERWISE. PROVIDE ALL ASSOCIATED COMPONENTS (I.E. DEVICES, MODULES, CONDUIT, WIRING ETC.) TO SUIT ADDITION/RELOCATION OF DEVICES AS SHOWN ON DRAWINGS.</p> <p>28.3. PROVIDE EXTENSION TO THE EXISTING FIRE ALARM SYSTEM AS SHOWN ON THE DRAWINGS COMPLETE WITH ALL COMPONENTS, EQUIPMENT, WIRING, ETC., FOR A COMPLETE & OPERATING SYSTEM.</p> <p>28.4. PROVIDE NEW FIRE ALARM DEVICES AS SHOWN ON THE DRAWINGS AND CONNECT TO THE EXISTING FIRE ALARM SYSTEM. PROVIDE ALL ASSOCIATED COMPONENTS TO SUIT.</p> <p>28.5. NEW FIRE ALARM DEVICES SHALL MATCH EXISTING.</p> <p>28.6. ALL WIRING SHALL HAVE COPPER CONDUCTORS.</p> <p>28.7. ALL EQUIPMENT AND WIRING SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION AND MUST COMPLY WITH ULC STANDARD CAN/ULC-S524-14.</p> <p>28.8. THE AUDIBILITY TESTING SHALL BE PROVIDED BY THE FIRE ALARM SYSTEM</p>	<p>CONTRACTOR/TESTING/VERIFICATION COMPANY. THE VERIFICATION REPORT SHALL BE PREPARED AND SUBMITTED FOR REVIEW BY THE CONSULTANT.</p> <p>28.9. A CERTIFICATE SHALL BE PROVIDED BY THE SYSTEM MANUFACTURER/INSTALLER UPON COMPLETION OF THE INSPECTION, VERIFYING THAT THE SYSTEM IS INSTALLED, TESTED, SUPERVISED AND OPERATES ACCORDING TO ALL CODES AND AUTHORITIES HAVING JURISDICTION. SUBMIT THE CERTIFICATE/VERIFICATION REPORT TO THE CONSULTANT FOR REVIEW.</p> <p>29. CLOSEOUT DOCUMENTS</p> <p>29.1. FOLLOWING DOCUMENTS ARE TO BE PROVIDED:</p> <p>29.1.1. AS-BUILT DRAWINGS COMPLETE WITH CAD FILE DRAWINGS; ENSURE MAIN BRANCH CONDUITS, JUNCTION BOXES, AND ASSOCIATED ARE SHOWN ON AS BUILT DRAWINGS.</p> <p>29.1.2. APPROVED AND STAMPED SHOP DRAWINGS;</p> <p>29.1.3. ESA INSPECTION CERTIFICATE;</p> <p>29.1.4. MAINTENANCE MANUALS CONTAINING DATA SHEETS, BROCHURE, OPERATING AND MAINTENANCE INFORMATION, LAMPING SPECIFICATIONS, RECOMMENDED SPARE PARTS LIST FOR ALL INSTALLED ELECTRICAL EQUIPMENT;</p> <p>29.1.5. COPY OF PANEL BOARD SCHEDULES;</p> <p>29.1.6. EMERGENCY LIGHTING CONFIRMATION LETTER</p> <p>29.1.7. VERIFICATION REPORTS AND CERTIFICATE(S) FOR ANY FIRE ALARM COMPONENTS OR TIE-INS.</p> <p>29.2. PROVIDE 3 SETS OF CLOSEOUT DOCUMENTS BOUND IN HARD COVERS WITH "OPERATING AND MAINTENANCE MANUAL" TITLE ON COVER, AFTER SUBSTANTIAL COMPLETION OF THE PROJECT.</p>
---	--	--

1-800-666-3217 / 1-800-666-0767
 220 Commerce Valley Drive West, Suite 110
 Markham, ON L3T 0A4
 Canada

www.exp.com
 • BUILDINGS • EARTH & ENVIRONMENT
 • ENERGY • INDUSTRIAL
 • INFRASTRUCTURE • SUSTAINABILITY

Issued
 No. 2024-11-08
 Date 2024-11-08
 Description ISSUED FOR PERMIT / TENDER



Contractor Must Check & Verify all Dimensions on the Job.
 Do Not Scale Drawings.
 All Drawings, Specifications, and Related Documents are the Copyright Property of the
 Applicant and Shall be Returned Upon Request. Reproduction of Drawings,
 Specifications and Related Documents in Total or in Whole is Forbidden Without the
 Written permission of the Applicant.
 This Drawing is Not to be Used for Construction Until Signed by the Applicant.

WESBURN MANOR LTC
 AHU REPLACEMENT

ELECTRICAL SPECIFICATIONS

N.T.S.

E301