

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS FOR THIS PROJECT.

1. CONFORM WITH APPLICABLE REQUIREMENTS OF THE MINISTRY OF LABOUR, AND THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS.
2. PROVIDE COMPLETE INSTALLATION IN ACCORDANCE WITH THE FOLLOWING:
 1. ONTARIO BUILDING CODE (OBC);
 2. NATURAL GAS AND PROPANE INSTALLATION CODE (GAS CODE);
 3. ASHRAE;
 4. SMACNA;
 5. NFPA;
 6. ALL OTHER RELEVANT CODES AND STANDARDS, AS APPLICABLE.
3. OBTAIN ALL PERMITS REQUIRED FOR THE INSTALLATION OF MECHANICAL TRADES WORK, ARRANGE FOR INSPECTIONS AND TESTS, AND PAY ALL FEES AND COSTS FOR THE PERMITS, INSPECTIONS AND FEES. OBTAIN PERMITS IMMEDIATELY AFTER NOTIFICATION OF AWARD OF CONTRACT.
4. PROVIDE DIGITAL AND HAND COPY OF COMPLETE OPERATING AND MAINTENANCE INSTRUCTIONS FOR EQUIPMENT FURNISHED UNDER THIS CONTRACT. BIND INSTRUCTIONS IN 3 RING BINDERS. INCLUDE THE FOLLOWING:

- .1 SCHEMATIC DIAGRAM OF ELECTRICAL SYSTEMS.
- .2 CONTROL SHOP DRAWINGS AND OPERATING SCHEME INCLUDING WIRING OF COMPONENTS.
- .3 WIRING DIAGRAM OF CONTROL PARTS
- .4 OPERATING INSTRUCTIONS, INCLUDING START-UP AND SHUT-DOWN PROCEDURE.
- .5 MAINTENANCE INSTRUCTIONS INCLUDING PREVENTIVE MAINTENANCE INSTRUCTIONS FOR COMPONENTS OF THE EQUIPMENT.
- .6 COMPLETE PARTS LIST OF ASSEMBLIES AND THEIR COMPONENT PARTS, SHOWING MANUFACTURER'S NAME, CATALOGUE NUMBER, AND NEAREST REPLACEMENT SOURCE.
- .7 LIST OF RECOMMENDED SPARE PARTS AND QUANTITY OF EACH ITEM TO BE STOCKED.
- .8 MANUFACTURER'S WARRANTIES AND GUARANTEES.
- .9 CLEAN ALL MECHANICAL SYSTEMS AT PROJECT COMPLETION.
- .6 COMPLETE AS-BUILT DRAWINGS SHOWING ALL CHANGES AS WORK PROGRESSES.

1. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH THE "TRADE QUALIFICATION AND APPRENTICESHIP ACT" AND REGULATIONS, BY PERSONS WHO HOLD THE FOLLOWING CERTIFICATES OF QUALIFICATION (AS APPLICABLE):
 1. PLUMBER;
 2. REFRIGERATION & AIR CONDITIONING SYSTEMS MECHANIC;
 3. SHEET METAL WORKER.
2. ALL FUEL-RELATED WORK TO BE CARRIED OUT IN ACCORDANCE WITH TSSA REQUIREMENTS AND ONTARIO REGULATION 215/01, "FUEL INDUSTRY CERTIFICATES" BY PERSONS WHO HOLD THE APPROPRIATE CERTIFICATE FOR THE WORK BEING PERFORMED.

1. LOCATE AND PROTECT ALL EXISTING EXTERIOR SITE SERVICES.
2. RETAIN AND PROTECT ALL EXISTING INTERIOR SERVICES AND BUILDING FABRIC. MAKE GOOD ANY AND ALL DAMAGE RESULTING FROM THIS WORK.
3. CONNECTIONS TO EXISTING SERVICES SHALL BE COORDINATED WITH THE OWNER.
4. EXECUTE WORK WITH LEAST POSSIBLE INTERFERENCE OR DISTURBANCE TO NORMAL USE OF THE EXISTING BUILDING.
5. CUTTING AND PATCHING:
 1. EXECUTE CUTTING, FITTING AND PATCHING REQUIRED TO MAKE THE WORK FIT PROPERLY TOGETHER, CUT AND PATCH FOR MECHANICAL AND ELECTRICAL WORK.
 2. COORDINATE WORK WITH OTHER TRADES SO THAT THERE IS A MINIMUM OF CUTTING, FITTING AND PATCHING.
 3. DRILLING, CUTTING, FITTING AND PATCHING AND MAKING GOOD WHERE NECESSARY DUE TO FAILURE TO DELIVER ITEMS TO BE BUILT IN TIME OR INSTALLATION IN WRONG LOCATION, SHALL BE EXECUTED AS DIRECTED AT NO COST TO THE OWNER.
 4. DRILLING AND CUTTING OF LOAD BEARING STRUCTURAL MEMBERS SHALL BE DONE ON PRIOR EXPRESS WRITTEN PERMISSION OF THE ENGINEER FOR EACH INSTANCE.
 5. CUT HOLES ACCURATELY, WITH SMOOTH, TRUE, CLEAN EDGES; FIT UNITS TO TOLERANCES TO BEST STANDARD PRACTICE FOR APPLICABLE WORK.
 6. HOLES IN BLOCK AND CONCRETE WORK SHALL BE SAWCUT OR CORE-DRILLED, AND SHALL NOT BE MADE WITH A HAMMER GUN.
 7. PATCHED WORK SHALL BE INVISIBLE, SIZE HOLES AND OPENINGS FOR PIPES SO AS TO ALLOW FOR EXPANSION AND CONTRACTION OF SUCH PIPES.

1. PROVIDE SHOP DRAWINGS AND PRODUCT DATA FOR ALL MECHANICAL FIXTURES AND EQUIPMENT FOR APPROVAL, PRIOR TO PROCUREMENT.
2. INSTALL ALL MECHANICAL FIXTURES AND EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
3. EQUIPMENT AND MATERIAL TO BE CANADIAN GAS ASSOCIATION (CGA) CERTIFIED. WHERE THERE IS NO ALLOCATE TO SUPPLYING EQUIPMENT WHICH IS NOT CGA CERTIFIED, OBTAIN TSSA FIELD APPROVAL.
4. LOCATE ALL EQUIPMENT WITH CLEARANCES, AS REQUIRED BY THE MANUFACTURER, THE FUEL CODES, AND ALL OTHER CODES AND REGULATIONS, INCLUDING THE FOLLOWING CLEARANCES:
 1. TO PERMIT PROPER EQUIPMENT OPERATION;
 2. TO PERMIT SUFFICIENT AIRFLOW AROUND EQUIPMENT;
 3. FOR EQUIPMENT SERVICE;
 4. SUFFICIENT DISTANCE FROM COMBUSTIBLE MATERIAL;
 5. WITH SUFFICIENT VENT CLEARANCES;
 6. SUFFICIENT DISTANCE FROM ROOF EDGES OR OTHER HAZARDS;
 7. SERVICE PLATFORMS FOR APPLIANCES INSTALLED 10 FT OR MORE ABOVE FLOOR;
 8. WITH FIXED ACCESS TO ROOF FOR BUILDING HEIGHT GREATER THAN 13'.

1. GENERAL CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR COORDINATING MECHANICAL SERVICES AND CONNECTIONS FOR ALL EQUIPMENT, SUPPLIED BY MECHANICAL OR ANY OTHER TRADES.
2. MAKE ALL MECHANICAL SERVICE CONNECTIONS TO EQUIPMENT SUPPLIED BY OTHERS.
3. CONFIRM ALL SERVICE CONNECTIONS WITH MANUFACTURER AND SUPPLIER, PRIOR TO INSTALLATION. THIS SHALL INCLUDE ALL CONNECTION SIZES, LOCATIONS AND DETAILS, AND SHALL TAKE INTO ACCOUNT EQUIPMENT CLEARANCES AND INSTALLATION REQUIREMENTS.

- .1 PROVIDE DIELECTRIC UNIONS AT ALL PIPING LOCATIONS WHERE DISSIMILAR METALS ARE JOINED.
- .2 PROVIDE ESCUTCHEONS ON ALL PIPES PASSING THROUGH WALLS, PARTITIONS, FLOORS AND CEILINGS, CHROME, NICKEL PLATED BRASS OR TYPE 302 STAINLESS STEEL.

1. SUPPLY ACCESS DOORS, AS REQUIRED IN DUCTWORK AND WALL/CEILING ASSEMBLIES, TO ALL CONCEALED MECHANICAL EQUIPMENT AND OPERATING DEVICES. ACCESS DOORS IN WALL/CEILING ASSEMBLIES TO BE INSTALLED BY OTHER TRADES.
2. ACCESS DOORS SHALL BE FIRE-RATED TYPE, WHERE USED IN FIRE-RATED ASSEMBLIES, AND SHALL MATCH THE RATING OF THE ASSEMBLY.

1. INSTALL IN ACCORDANCE WITH THERMAL INSULATION ASSOCIATION OF CANADA (TIAC) NATIONAL STANDARDS.
2. MAX. FLAME SPREAD RATING: 25.
3. MAX. SMOKE DEVELOPED RATING: 50.
4. DOMESTIC COLD WATER (DCW):
 1. 1" RIGID MOULDED MINERAL FIBRE WITH VAPOUR RETARDER JACKET.
 2. INSULATE ALL PIPING IN FLOORS, WALLS AND CEILINGS, TO POINT OF FIXTURE CONNECTIONS.
5. DOMESTIC HOT WATER (DHW):
 1. 1" RIGID MOULDED MINERAL FIBRE FOR PIPING UP TO 1-1/4" SIZE
 2. 1-1/2" RIGID MOULDED MINERAL FIBRE FOR PIPING 1-1/2" TO 3" SIZE.
 3. INSULATE ALL PIPING IN FLOORS, WALLS AND CEILINGS, TO POINT OF FIXTURE CONNECTIONS.
6. ROOF DRAINS:
 1. 1" RIGID MOULDED MINERAL FIBRE WITH VAPOUR RETARDER JACKET.
 2. INSULATE ALL STORM PIPING ABOVE GROUND.
7. OUTER JACKET:
 1. CONCEALED LOCATIONS: ALL SERVICE JACKET.
 2. EXPOSED LOCATIONS: PVC JACKET.
 3. MECHANICAL/SERVICE ROOMS: PVC JACKET.

1. COORDINATE WATER SERVICE INSTALLATION WITH SUPPLY AUTHORITY:
 1. MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLETE WATER ENTRY INSTALLATION, FROM A POINT IN/ BEYOND THE BUILDING EXTERIOR.
 2. OBTAIN, SUPPLY AND INSTALL ALL WATER METER(S) IN ACCORDANCE WITH THE REQUIREMENTS OF THE MUNICIPALITY, INCLUDING REMOTE READING DEVICES AND WIRING.
 3. SUPPLY AND INSTALL THRUST RESTRAINT (OBC 7.3.4.9) FOR ALL WATER SERVICE PIPES 4" OR MORE IN SIZE.
 4. SUPPLY AND INSTALL PREMISE ISOLATION BACKFLOW PREVENTER IN ACCORDANCE WITH OBC 7.6.2.6. AND CSA B64.10.
2. ABOVE GROUND: COPPER TUBE, HARD DRAWN, TYPE L CAN. OR US MANUFACTURE, INCLUDING FITTINGS. LEAD-FREE SOLDER.
3. WATER SUPPLY PIPING IS SHOWN SCHEMATICALLY. ALL PIPING SHALL BE CONCEALED UNLESS OTHERWISE NOTED.
4. INSTALL TUBING CLOSE TO BUILDING STRUCTURE TO MINIMIZE FURRING, CONSERVE HEDROOM AND SPACE. GROUND EXPOSED PIPING AND RUN PARALLEL TO WALLS.
5. ISOLATE ALL EQUIPMENT, FIXTURES AND BRANCHES WITH VALVES.
6. TEST WATER SYSTEM AT 1½ TIMES SYSTEM OPERATING PRESSURE OR MINIMUM 860 KPA, WHICHEVER IS GREATER. TEST PRESSURE AND TIMEFRAME SHALL BE AS REQUIRED BY OBC 7.3.7.2.
7. FLUSH OUT, DISINSECT AND RINSE SYSTEM, PRIOR TO CONSTRUCTION COMPLETION.
8. WATER HEATERS:
 1. SHALL BE PIPED WITH HEAT TRAPS ON THE INLET AND OUTLET PIPING, AS CLOSE AS PRACTICAL TO THE TANK, IN ACCORDANCE WITH OBC 12.3.14.
9. TEMPERATURE AND PRESSURE RELIEF VALVES:
 1. MAXIMUM TEMPERATURE SETTING OF 210F (99C);
 2. MAXIMUM PRESSURE SETTING OF 150 PSI;
 3. DISCHARGE PER OBC 7.6.1.12.:
 1. TERMINATE WITH AN INDIRECT CONNECTION PIPED TO FLOOR DRAIN, SUMP OR OTHER SAFE LOCATION, WITH A 300mm AIR BREAK; OR
 2. TERMINATE AT A DISTANCE NOT LESS THAN 150mm AND NOT MORE THAN 300mm FROM A FLOOR AND DISCHARGE VERTICALLY DOWN.
9. TRAP SEAL PRIMERS AND ACCESS TO THEM, SHALL BE LOCATED IN THE WASHROOM OR AREA THAT THEY SERVE.
10. SUPPLY AND INSTALL WATER HAMMER ARRESTORS AT THE MIDPOINT AND END OF RUNS OF WATER SUPPLY PIPING AS REQUIRED BY OBC 7.6.1.14.

2. COORDINATE SANITARY AND STORM SERVICE INSTALLATIONS WITH SUPPLY AUTHORITY.

3. APPROXIMATE SUB-FLOOR FINISH ELEVATIONS HAVE BEEN INDICATED ON THE DRAWINGS. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR SETTING FINAL INVERTS BASED ON SITE CONDITIONS.

4. BELOW GROUND/FLOOR:

1. PVC DWV, TYPE SDR35.

5. ABOVE GROUND:

1. PVC DWV SOLID WALL SCHEDULE 40, CERTIFIED TO CAN/CSA STANDARD B181.2, FOR NONCOMBUSTIBLE CONSTRUCTION (FLAME-SPREAD RATING NOT MORE THAN 25 PER CAN/ULC-S102.2).

2. PVC DWV SOLID WALL SCHEDULE 40, CERTIFIED TO CAN/CSA STANDARD B181.2, FOR NONCOMBUSTIBLE CONSTRUCTION (FLAME-SPREAD RATING NOT MORE THAN 25 AND SMOKE DEVELOPED CLASSIFICATION NOT MORE THAN 50 PER CAN/ULC-S102.2 - PLENUMS AND BUILDINGS).

6. PROVIDE CLEANOUTS AS REQUIRED BY THE ONTARIO BUILDING CODE.

7. VENT COMPLETE PLUMBING SYSTEM IN ACCORDANCE WITH THE ONTARIO BUILDING CODE.

1. STEEL PIPE, SCHEDULE 40, SEAMLESS, SCREWED FITTINGS.
2. SUPPLY AND INSTALL:
 1. EXPANSION CONTROL LOOPS ON PIPE SIZES OF 2 IN (50 MM) OR LESS WHENEVER THE PIPE LENGTH IS AT LEAST 100 FT (30 M).
 2. EXPANSION JOINTS ON PIPE SIZES GREATER THAN 2 IN (50 MM) WHENEVER THE PIPE LENGTH IS AT LEAST 100 FT (30 M).
3. SLOPE PIPING DOWN IN DIRECTION OF FLOW TO LOW POINTS.

- .1 CLEANED AFTER ASSEMBLY;
- .2 PAINTED WITH ONE BASE LAYER OF METAL PRIMER;
- .3 PAINTED WITH ONE TOP COAT OF EXTERIOR ENAMEL PAINT;
- .4 COLOUR ON EXTERIOR WALL – TO MATCH WALL
- .5 COLOUR ON ROOF AND INTERIOR OF BUILDING - YELLOW.
- .5 TEST SYSTEM IN ACCORDANCE WITH NATURAL GAS AND PROPANE INSTALLATION CODE.

- .1 RECTANGULAR DUCT:
 - .1 RIGID GALVANIZED STEEL, LOCK FORMING QUALITY TO ASTM A653/A653M.
 - .2 THICKNESS, FABRICATION, REINFORCEMENT AND SUPPORT/ATTACHMENT TO ASHRAE OR SMACNA.
- .2 ROUND DUCT:
 - .1 RIGID GALVANIZED STEEL, LOCK FORMING QUALITY TO ASTM A653/A653M.
 - .2 THICKNESS, FABRICATION, REINFORCEMENT AND SUPPORT/ATTACHMENT TO ASHRAE OR SMACNA.
- .3 SEAL CLASSIFICATION:
 - .1 CLASS A: LONGITUDINAL SEAMS, TRANSVERSE JOINTS, DUCT WALL PENETRATIONS AND CONNECTIONS MADE AIRTIGHT WITH SEALANT AND TAPE.

4. FITTINGS:
 1. FABRICATION: TO SMACNA.
 2. RADIUS ELBOWS.
 1. RECTANGULAR: STANDARD WITH CENTRELINE RADIUS 1.5 TIMES DUCT DIMENSION, WITH SINGLE THICKNESS TURNING VANES.
 2. ROUND: FIVE PIECE WITH CENTRELINE RADIUS 1.5 TIMES DIAMETER.
 3. MITRED ELBOWS, RECTANGULAR: WITH DOUBLE THICKNESS TURNING VANES.
5. BRANCHES:
 1. RECTANGULAR MAIN AND BRANCH: WITH RADIUS ON BRANCH 1.5 TIMES WIDTH OF DUCT 45 DEGREES ENTRY ON BRANCH.
 2. ROUND MAIN AND BRANCH: ENTER MAIN DUCT AT 45 DEGREES WITH CONICAL CONNECTION.
 3. PROVIDE VOLUME CONTROL DAMPER IN BRANCH DUCT NEAR CONNECTION TO MAIN DUCT.
 4. MAIN DUCT BRANCHES: WITH SPLITTER DAMPER.
6. TRANSITIONS:
 1. DIVERGING: 20 DEGREES MAXIMUM INCLUDED ANGLE.
 2. CONVERGING: 30 DEGREES MAXIMUM INCLUDED ANGLE.
7. FIRE STOPPING
 1. RETAINING ANGLES AROUND DUCT, ON BOTH SIDES OF FIRE SEPARATION IN ACCORDANCE WITH SECTION.
 2. FIRE STOPPING MATERIAL AND INSTALLATION MUST NOT DISTORT DUCT.
8. DAMPERS:
 1. MANUFACTURE TO SMACNA STANDARDS.
 2. SINGLE BLADE DAMPERS:
 1. FABRICATE FROM SAME MATERIAL AS DUCT, BUT ONE SHEET METAL THICKNESS HEAVIER. V-GROOVE STIFFENED.
 2. SIZE AND CONFIGURATION TO RECOMMENDATIONS OF SMACNA.
 3. LOCKING QUADRANT (WITH SHAFT EXTENSION TO ACCOMMODATE INSULATION THICKNESS, IF REQUIRED).
 4. INSIDE AND OUTSIDE NYLON END BEARINGS.
 5. CHANNEL FRAME OF SAME MATERIAL AS ADJACENT DUCT, COMPLETE WITH ANGLE STOP.
9. DUCT LEAKAGE: IN ACCORDANCE WITH SMACNA HVAC AIR DUCT LEAKAGE TEST MANUAL.
10. ALL DUCT AND SEAL MATERIALS TO HAVE A FLAME SPREAD RATING OF LESS THAN 25 AND A SMOKE DEVELOPED CLASSIFICATION OF LESS THAN 50.
11. PAINT VISIBLE INTERIOR SURFACES OF ALL PLenum BOXES MATTE BLACK.
12. PROVIDE FLEXIBLE CONNECTIONS AT ALL EQUIPMENT DUCT CONNECTION POINTS.
13. SOUND CONTROL:
 1. ALL SUPPLY AIR BRANCH DUCT LOCATIONS SHOWN ARE SCHEMATIC.
 2. ALL SUPPLY AIR BRANCH DUCTS SHALL BE SEPARATED BY A MINIMUM HORIZONTAL DISTANCE C THE BRANCH DUCT DIAMETER TO MINIMIZE SOUND TRANSFER.

.1 ALL ROOF CURBS SHALL:
.1 BE SEISMICALLY DESIGNED;
.2 BE SLOPED TO ACCOMMODATE ROOF SLOPE, AS REQUIRED;
.3 EXTEND A MINIMUM OF 14" ABOVE THE FINISHED ROOF SURFACE.

1. REFER TO DRAWINGS FOR DUCT THAT IS IDENTIFIED TO BE INSULATED.
2. INSTALL IN ACCORDANCE WITH THERMAL INSULATION ASSOCIATION OF CANADA (TIAC) NATIONAL STANDARDS.
3. MAX. FLAME SPREAD RATING: 25.
4. MAX. SMOKE DEVELOPED RATING: 50.
5. THERMAL INSULATION - RECTANGULAR DUCT:
 1. 1" (R4.3) RIGID MINERAL FIBRE BOARD WITH VAPOUR RETARDER JACKET.
 2. ALUMINUM JACKET WITH MOISTURE BARRIER.
6. THERMAL INSULATION - ROUND DUCT:
 1. 1" (R3.3) MINERAL FIBRE BLANKET WITH VAPOUR RETARDER JACKET.
 2. ALUMINUM JACKET WITH MOISTURE BARRIER.

1.	MECHANICAL CONTRACTOR RESPONSIBILITY:
	1. REFER TO ARCHITECTURAL DRAWINGS, TO VERIFY LOCATION OF ALL FIRE SEPARATIONS AND FIRE RATED MEMBRANES.
	2. PROVIDE DAMPERS FROM HULTI AND/OR 3M FOR FIRE PROTECTION OF ALL PIPING, DUCT AND MECHANICAL ITEMS PENETRATING OR PASSING THROUGH A FIRE SEPARATION OR FIRE-RATED ASSEMBLY, FOR REVIEW BY ARCHITECT AND ENGINEER.
	3. ALL PIPING, DUCT AND MECHANICAL ITEMS SHALL BE TIGHTLY FITTED AND SEALED WITH FIRESTOP MATERIAL AT ALL FIRE SEPARATIONS AND FIRE-RATED MEMBRANES.
2.	FIRE DAMPERS:
	1. FIRE DAMPERS SHALL BE CAN/ULC-S112 (STANDARD METHOD OF FIRE TEST OF FIRE DAMPER ASSEMBLIES) LISTED AND LABELLED.
	2. FIRE DAMPERS SHALL BE NFPA 80 (STANDARD FOR FIRE DOORS AND OTHER OPENING PROTECTION) NFPA 90A (STANDARD FOR THE INSTALLATION OF AIR-CONDITIONING AND VENTILATING SYSTEMS) AND NFPA 101 (LIFE SAFETY CODE) COMPLIANT.
	3. DUCTWORK SHALL BE FITTED WITH FIRE DAMPERS AT ALL FIRE SEPARATIONS AND FIRE-RATED MEMBRANES.
	4. SUPPLY AND INSTALL ACCESS DOORS IN ARCHITECTURAL FINISH (WALL, CEILING OR FLOOR) TO ALL DUCT, IN COMMON AREA WHERE POSSIBLE.
	5. SUPPLY AND INSTALL TIGHTLY-FITTED ACCESS DOOR IN DUCT TO ACCESS, INSPECT AND RESET FIRE DAMPER.
	6. TYPES: DYNAMIC - FOR USE IN AIR HANDLING SYSTEMS THAT DO NOT SHUTDOWN UPON FIRE ALARM.

4. FIRE DAMPER AND DUCT SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS REQUIREMENTS, AND SHALL BE SEALED WITH FIRESTOPPING MATERIAL.
5. ALL MECHANICAL MATERIALS USED WITHIN CEILING RETURN AIR PLENUMS SHALL HAVE FLAME-SPREAD RATING NOT MORE THAN 25 AND SMOKE DEVELOPED CLASSIFICATION NOT MORE THAN 50 PER CAN/ULC-S102.2.
6. MOCK-UPS:
 1. PREPARE MOCK-UPS OF TYPICAL FIRESTOP IN ACCORDANCE OF THE FOLLOWING, FOR REVIEW AND APPROVAL BY THE OWNER, ENGINEER AND MUNICIPAL BUILDING INSPECTOR:
 1. SANITARY PIPING – WALL AND CEILING/FLOOR FIRE SEPARATION;
 2. STORM PIPING – WALL AND CEILING/FLOOR FIRE SEPARATION;
 3. DCW AND DHW PIPING – WALL AND CEILING/FLOOR FIRE SEPARATION;
 4. FIRE DAMPER INSTALLATION – WALL AND CEILING/FLOOR FIRE SEPARATION.
 2. ALL FIRESTOP INSTALLATIONS SHALL BE COMPLETED IN ACCORDANCE WITH THE APPROPRIATE PRODUCT INSTALLATION INSTRUCTIONS, AND THE REFERENCED UL/ULC LISTING AND/OR TEST STANDARD.
 3. SUPPLY A COPY OF THE PRODUCT INSTALLATION INSTRUCTIONS WITH ULC LISTING AND/OR TEST STANDARD REFERENCE, FOR EACH INSTALLATION.
 4. MOCK-UP MAY REMAIN AS PART OF WORK.

THE AMBULANCE AND DECON BAYS, AND ADJACENT ROOMS, UP TO A LEVEL OF 50mm ABOVE THE FLOOR SHALL BE CONSIDERED A CLASS I (FLAMMABLE GASES OR VAPOURS) ZONE 2 LOCATION.

ALL EQUIPMENT USED WITHIN THE AREA SHALL BE APPROVED FOR THE CLASSIFICATION.

- .1 IDENTIFY MECHANICAL EQUIPMENT WITH LAMICOID NAMEPLATES.
- .2 LABEL ALL PIPING AT LEAST ONCE IN EVERY ROOM, AND AT NO MORE THAN 25 FT CENTERS.

1. ALL MECHANICAL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE EARTHQUAKE LOAD AND EFFECTS REQUIRED BY THE ONTARIO BUILDING CODE.
2. MECHANICAL ELEMENTS AND COMPONENTS (EQUIPMENT, PIPES, DUCTS, ETC.), AND THEIR CONNECTIONS TO THE BUILDING SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SMACNA/ANSI SEISMIC RESTRAINT MANUAL OR OTHER GUIDELINE REFERENCED IN THE ONTARIO BUILDING CODE.
3. PROVIDE SHOP DRAWINGS FOR SUPPORT, CONNECTIONS AND SEISMIC RESTRAINT OF ALL MECHANICAL EQUIPMENT, PIPES AND DUCTS, INCLUDING, BUT NOT LIMITED TO:
 1. ROOFTOP HVAC EQUIPMENT;
 2. FURNACES;
 3. CONDENSING UNITS AND HEAT PUMPS;
 4. TYPICAL DUCT SUPPORTING SYSTEM;
 5. TYPICAL SAN, STM, DCM, DHW PIPE SUPPORTING SYSTEM;
 6. TYPICAL NATURAL GAS PIPE SUPPORTING SYSTEM.
4. THESE SHOP DRAWINGS SHALL BE DESIGNED AND SEALED BY A PROFESSIONAL ENGINEER IN THE PROVINCE OF ONTARIO, WITH EXPERIENCE IN SEISMIC ENGINEERING.
5. FOLLOWING PROJECT COMPLETION, SEISMIC ENGINEER SHALL PROVIDE A LETTER OF FINAL SITE REVIEW.
6. CONTRACTOR SHALL CARRY THE COST OF THE SEISMIC ENGINEERING, INCLUDING SITE REVIEWS, DESIGN AND SHOP DRAWING PREPARATION.

1. ALL MECHANICAL BUILDING, PIPING, DUCTWORK, AND RELATED ITEMS SHALL BE SECURELY SUPPORTED ATTACHED AND FASTENED TO BUILDING STRUCTURE, AND SHALL NOT BE FASTENED TO THE ROOF DECK.

2. PIPE HANGERS AND SUPPORTS SHALL BE FABRICATED AND INSTALLED IN ACCORDANCE WITH MSS STANDARD SP-58, PIPE HANGERS AND SUPPORTS – MATERIALS, DESIGN, MANUFACTURE, SELECTION, APPLICATION AND INSTALLATION.

3. PLATFORMS SHALL BE FABRICATED FROM STRUCTURAL GRADE STEEL MEETING THE REQUIREMENTS OF ONTARIO BUILDING CODE, INCLUDING CSA STANDARD W59 WELDED STEEL CONSTRUCTION, AND THE REQUIREMENTS OF THE CANADIAN WELDING BUREAU.

1 INFORMATION INVOLVING ACCURATE DIMENSIONING OF THE BUILDING SHALL BE TAKEN FROM SITE BY
2 CONTRACTOR.
3 DRAWINGS ARE IN DIAGRAMMATIC FORM, INTENDED TO CONVEY THE SCOPE OF WORK AND GENERAL
4 ARRANGEMENT FOR EQUIPMENT. COORDINATE PHYSICAL LOCATION OF ALL EQUIPMENT WITH OTHER
AND ALLOW FOR ANY ADDITIONAL PIPING, DUCTING, FITTINGS, SUPPORTS, ETC., IN ORDER TO AVOID
INTERFERENCE AND FACILITATE THE WORKS.
CONTRACTOR TO MAKE ANY NECESSARY MODIFICATIONS OR ADDITIONS, WITHOUT CHARGE, TO
ACCOMMODATE SITE CONDITIONS AND COORDINATION.
COORDINATE ALL MECHANICAL EQUIPMENT WIRING, INCLUDING LOW VOLTAGE CONTROL WIRING, WITH
ELECTRICAL TRADES.

1. COMMISSIONING:
 1. START-UP AND COMMISSION THE FOLLOWING SYSTEMS:
 1. PLUMBING FIXTURES;
 2. HVAC;
 3. GAS DETECTION AND EXHAUST SYSTEM.
 2. PERFORM SYSTEMATIC TESTS, PROCEDURES AND CHECKS ON SYSTEMS, AS FOLLOWS:
 1. TO VERIFY OPERATION IN ACCORDANCE WITH CONTRACT DOCUMENTS, DESIGN CRITERIA, INTENT, AND MANUFACTURER'S REQUIREMENTS;
 2. TO ENSURE APPROPRIATE DOCUMENTATION IS PROVIDED;
 3. TO EFFECTIVELY TRAIN BUILDING OPERATIONAL STAFF.
 3. SYSTEMS ARE TO BE OPERATED AT FULL CAPACITY, WITH CORRECTION OF ALL DEFICIENCIES AND ADJUSTMENTS TO MEET OPTIMUM PERFORMANCE.
 4. PROVIDE WRITTEN REPORT AT END OF COMMISSIONING OUTLINING EQUIPMENT OPERATIONAL CONDITIONS AND PARAMETERS.
2. TESTING, ADJUSTING AND BALANCING:
 1. TEST, ADJUST AND BALANCE (TAB) ALL PLUMBING AND HVAC EQUIPMENT AND SYSTEMS; INCLUDE THE FOLLOWING:
 1. FURNACES;
 2. HEAT PUMPS;
 3. ROOFTOP PACKAGED HVAC UNITS;
 4. EXHAUST FANS.
 2. TAB SHALL BE PERFORMED BY A THIRD PARTY TESTING AGENCY, QUALIFIED TO ONE OF THE FOLLOWING:
 1. ASSOCIATED AIR BALANCE COUNCIL, (AABC), NATIONAL STANDARDS FOR TOTAL SYSTEM BALANCE.
 2. NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB), PROCEDURAL STANDARDS FOR TESTING, ADJUSTING, BALANCING OF ENVIRONMENTAL SYSTEMS.
 3. SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA) HVAC TAB HVAC SYSTEMS - TESTING, ADJUSTING AND BALANCING.
 3. TAB PROCEDURE SHALL BE COMPLETED IN ACCORDANCE WITH ASHRAE STANDARD 111, MEASUREMENT, TESTING, ADJUSTING AND BALANCING OF BUILDING HVAC SYSTEMS.
 4. PROVIDE DETAILED REPORT AT END OF TAB, IN ACCORDANCE WITH THE REPORTING PROCEDURE OF ASHRAE STANDARD 111.
3. DEMONSTRATION AND TRAINING:
 1. DEMONSTRATE OPERATION AND MAINTENANCE OF EQUIPMENT AND SYSTEMS TO OWNER'S PERSONNEL ONE WEEK PRIOR TO DATE OF FINAL INSPECTION
 2. PRIOR TO DEMONSTRATION AND TRAINING, ENSURE THAT EQUIPMENT HAS BEEN INSPECTED & INTO OPERATION, INCLUDING COMPLETION OF COMMISSIONING AND TESTING, ADJUSTING, AND BALANCING.
 3. DEMONSTRATE START-UP, OPERATION, CONTROL, ADJUSTMENT, TROUBLE-SHOOTING, SERVICE AND MAINTENANCE OF EACH ITEM OF EQUIPMENT.
 4. INSTRUCT PERSONNEL IN PHASES OF OPERATION AND MAINTENANCE USING OPERATION AND MAINTENANCE MANUALS AS BASIS OF INSTRUCTION. REVIEW CONTENTS OF MANUAL IN DETAIL TO EXPLAIN ASPECTS OF OPERATION AND MAINTENANCE.
 5. ENSURE AMOUNT OF TIME REQUIRED FOR INSTRUCTION OF EACH ITEM OF EQUIPMENT OR SYSTEMS AS FOLLOWS:
 1. PLUMBING SYSTEM – 2 HOURS OF INSTRUCTION;
 2. HVAC SYSTEM – 4 HOURS OF INSTRUCTION.

	DCW DOMESTIC COLD WATER PIPE	
	DHW DOMESTIC HOT WATER PIPE	
	DHWR DOMESTIC HOT WATER RETURN PIPE	
	SAN SANITARY PIPE	
	V SANITARY VENT PIPE	
	STM STORM PIPE	
	NAT GAS NATURAL GAS PIPE	

CFM L/s	CUBIC FEET PER MINUTE LITRES PER SECOND		SIZE		REGISTER, GRILLE, DIFFUSER IDENTIFICATION	
			TYPE	RATE		
D	DAMPER				DUCT SECTION EXHAUST AIR	
FD	FIRE DAMPER				DUCT SECTION RETURN AIR	
SFD	SMOKE/FIRE DAMPER				DUCT SECTION SUPPLY AIR	
EA	EXHAUST AIR					
OA	OUTDOOR AIR					
RA	RETURN AIR					
SA	SUPPLY AIR					

ALL SHOWN WORK IS PART OF THE BASE PRICE EXCEPT WHERE SPECIFICALLY NOTED AS BEING PART OF SEPARATE PRICE

Brockville, Ontario (613)349-0555



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0	2025-09-26	FOR REVIEW
NO.	DATE	REVISION

COLBOURNE
& KEMBEL
ARCHITECTS INC.
Kingston, ON

LOYALIST
AMBULANCE
Loyalist Business
Park

MECHANICAL

Notes

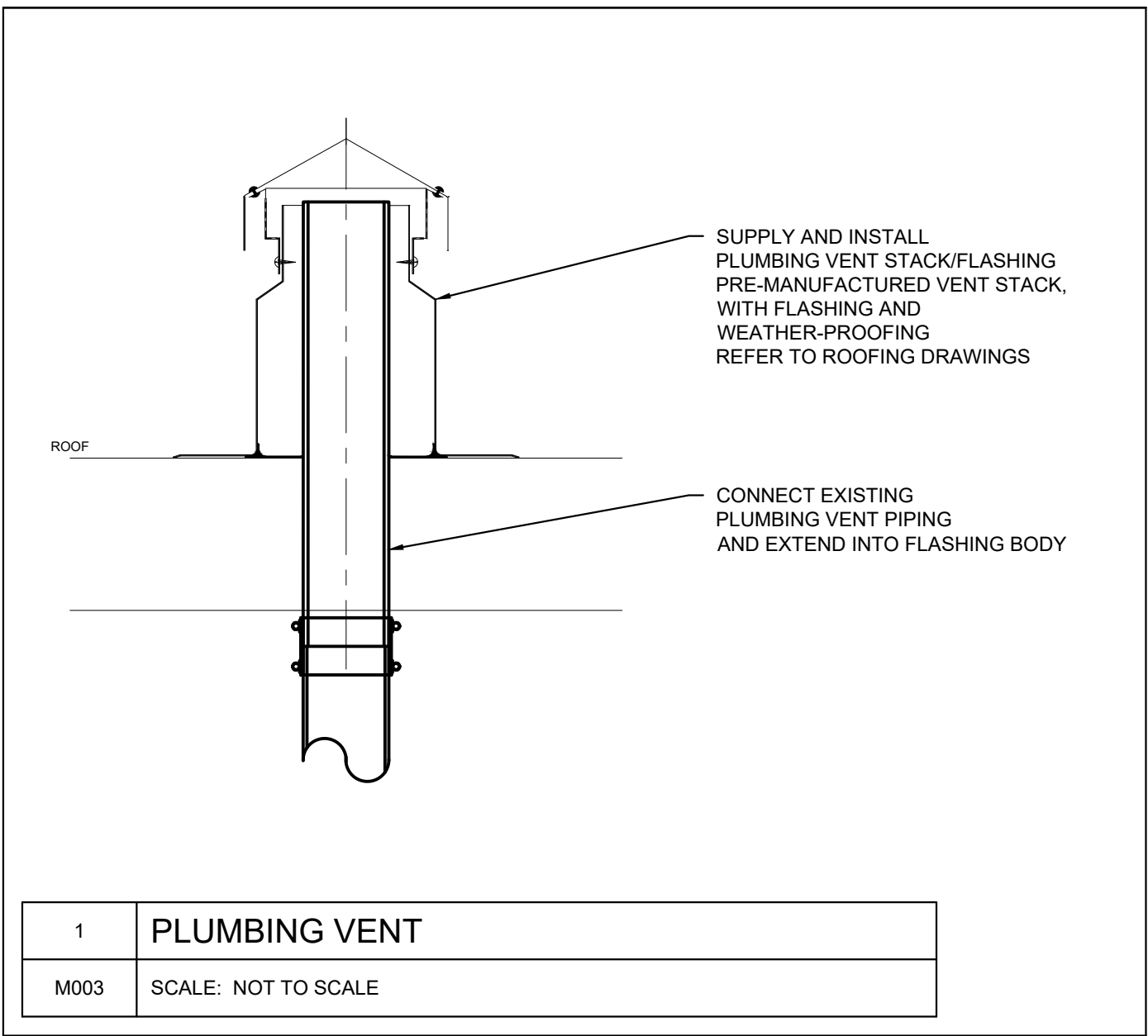
DESIGN BY:	M. MORRIS
DRAWN BY:	A.M.
DATE:	AUG 2025
PROJECT No.:	892
SCALE:	AS SHOWN

M001

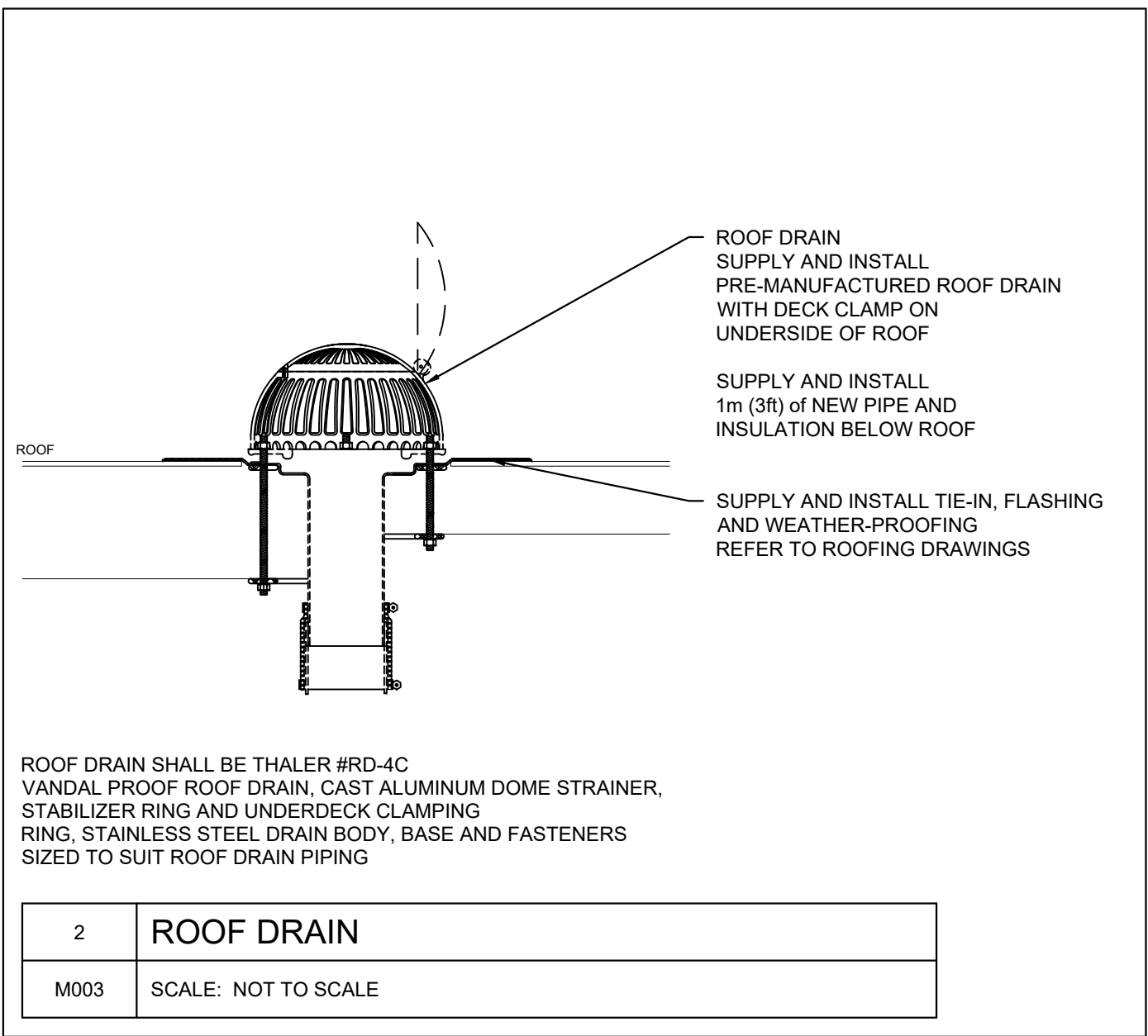
EYEWASH/SHOWER SCHEDULE								
UNIT	DESCRIPTION	PIPE SIZE					ACCEPTABLE PRODUCT	NOTES
		TRAP (in) (mm)	WASTE (in) (mm)	VENT (in) (mm)	DCW (in) (mm)	DHW (in) (mm)		
EWS-1	EYE WASH/SHOWER BARRIER FREE PEDESTAL-MOUNTED	1-1/4" 32	1-1/4" 32	1-1/4" 32	1/2" 13	1/2" 13	BRADLEY #S19-212B UNIT #S19-2150 MIXING VALVE	STAINLESS STEEL BOWL GALV. STEEL PIPING SAFETY YELLOW PAINT MIXING VALVE

REGISTER, GRILLE & DIFFUSER SCHEDULE									
UNIT	DESCRIPTION	CONSTRUCTION	CONFIGURATION			FRAME	FINISH	ACCEPTABLE PRODUCT	NOTES
			PATTERN	BLADE SPACING	DEFLECTION (deg)				
S1	SA DIFFUSER CEILING SQUARE CONE	STEEL	4 CONE FIXED AIR PATTERN	-	-	LAY-IN INVERTED T DRYWALL FLANGE	WHITE	EH PRICE #SCD STEEL	
S2	SA DIFFUSER CEILING ROUND CONE	STEEL	4 CONE FIXED AIR PATTERN	-	-	SCREW FASTEN TO DUCT	WHITE	OR APPROVED EQUAL EH PRICE #RCD STEEL	
R1	EGG CRATE RA CEILING	ALUMINUM	FIXED GRID	25x25x25mm, 1x1x1in	0	LAY-IN INVERTED T DRYWALL FLANGE	WHITE	OR APPROVED EQUAL EH PRICE #82	
R2	LOUVRED RA GRILLE CEILING/WALL	STEEL	SINGLE DEFLECTION ADJUSTABLE	19mm, 3/4 in PARALLEL TO LONG DIM	ADJUSTABLE	STANDARD 32mm, 1.25in	WHITE	EH PRICE #530 STEEL SINGLE	
								OR APPROVED EQUAL	

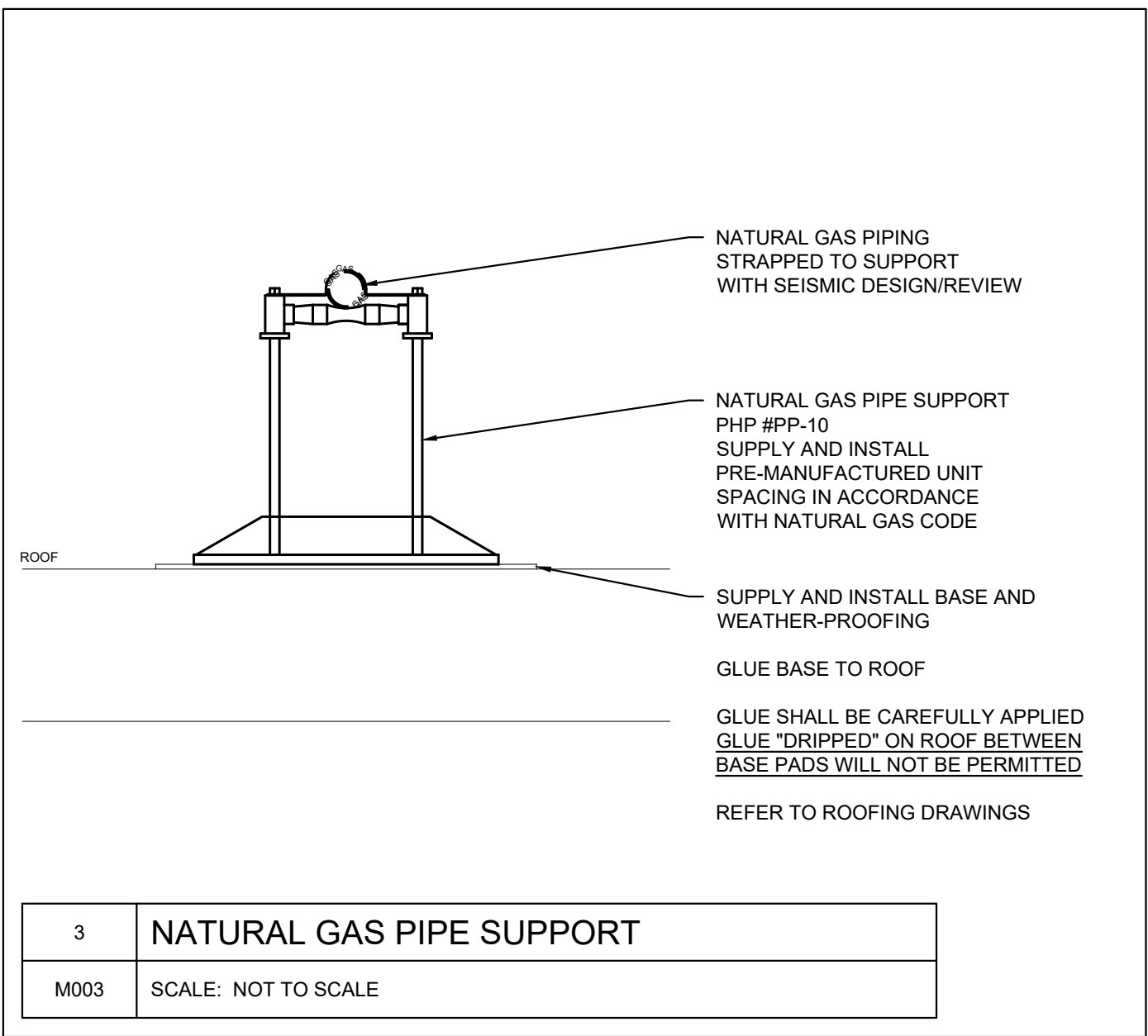
MORRIS Engineering Ltd. Brockville, Ontario (613)349-0555		
		
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NO.	DATE	REVISION
<u>CLIENT:</u> COLBOURNE & KEMBEL ARCHITECTS INC. Kingston, ON		
<u>PROJECT:</u> LOYALIST AMBULANCE Loyalist Business Park		
<u>DRAWING:</u> MECHANICAL Schedules		
<u>DESIGN BY:</u> M. MORRIS <u>DRAWN BY:</u> A.M. <u>DATE:</u> AUG 2025 <u>PROJECT No.:</u> 892 <u>SCALE:</u> AS SHOWN	M002	



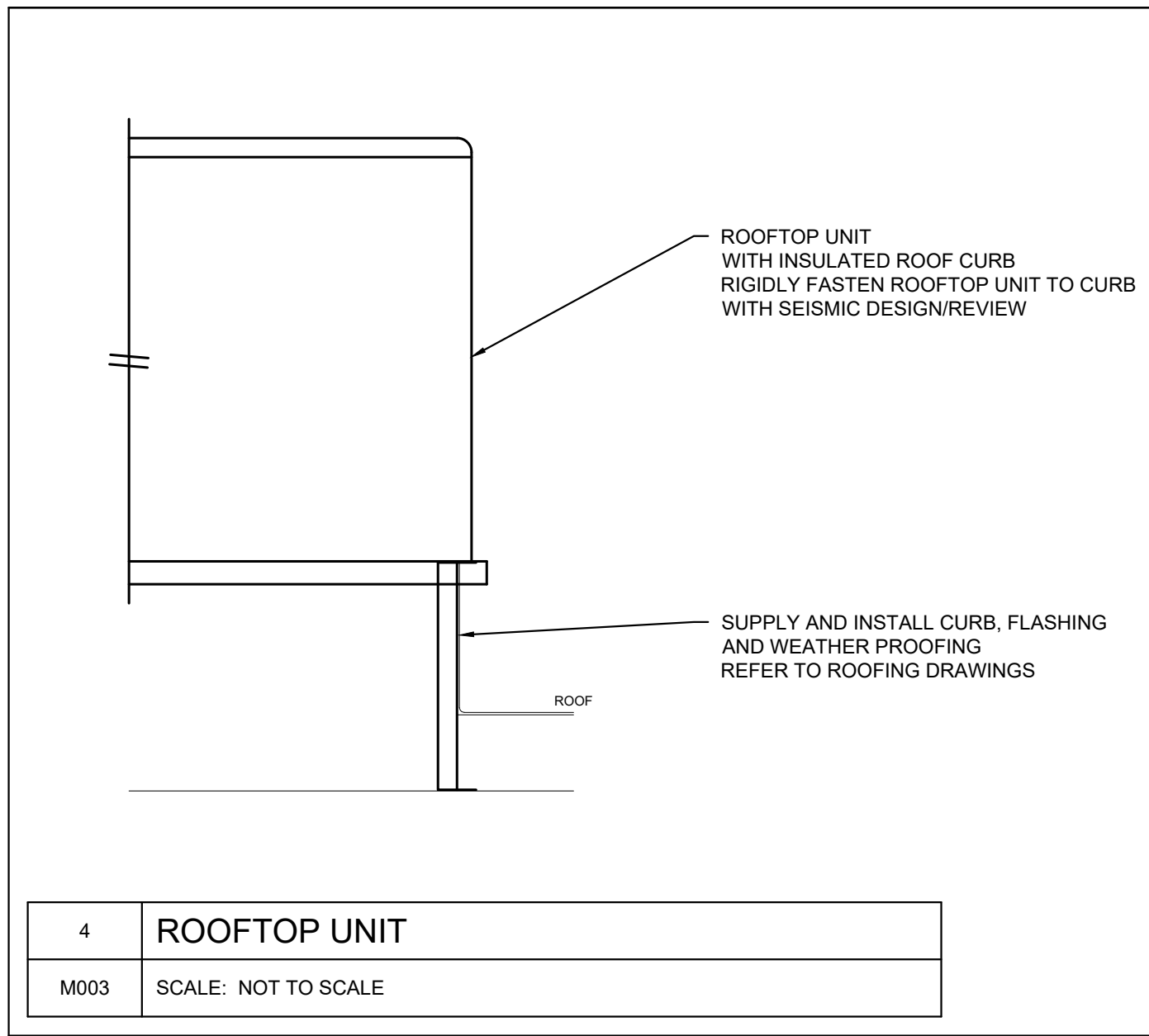
1	PLUMBING VENT
M003	SCALE: NOT TO SCALE



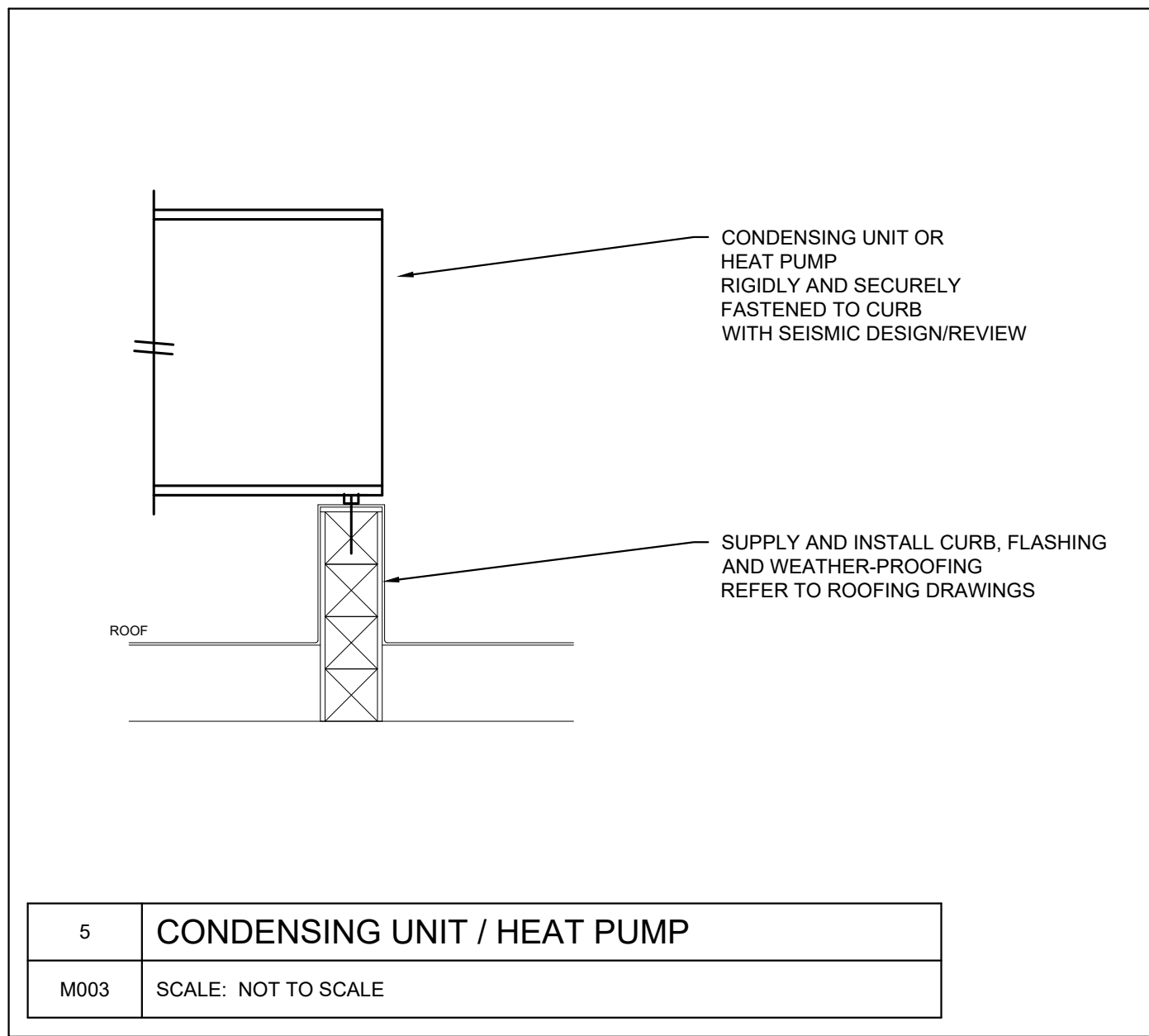
2	ROOF DRAIN
M003	SCALE: NOT TO SCALE



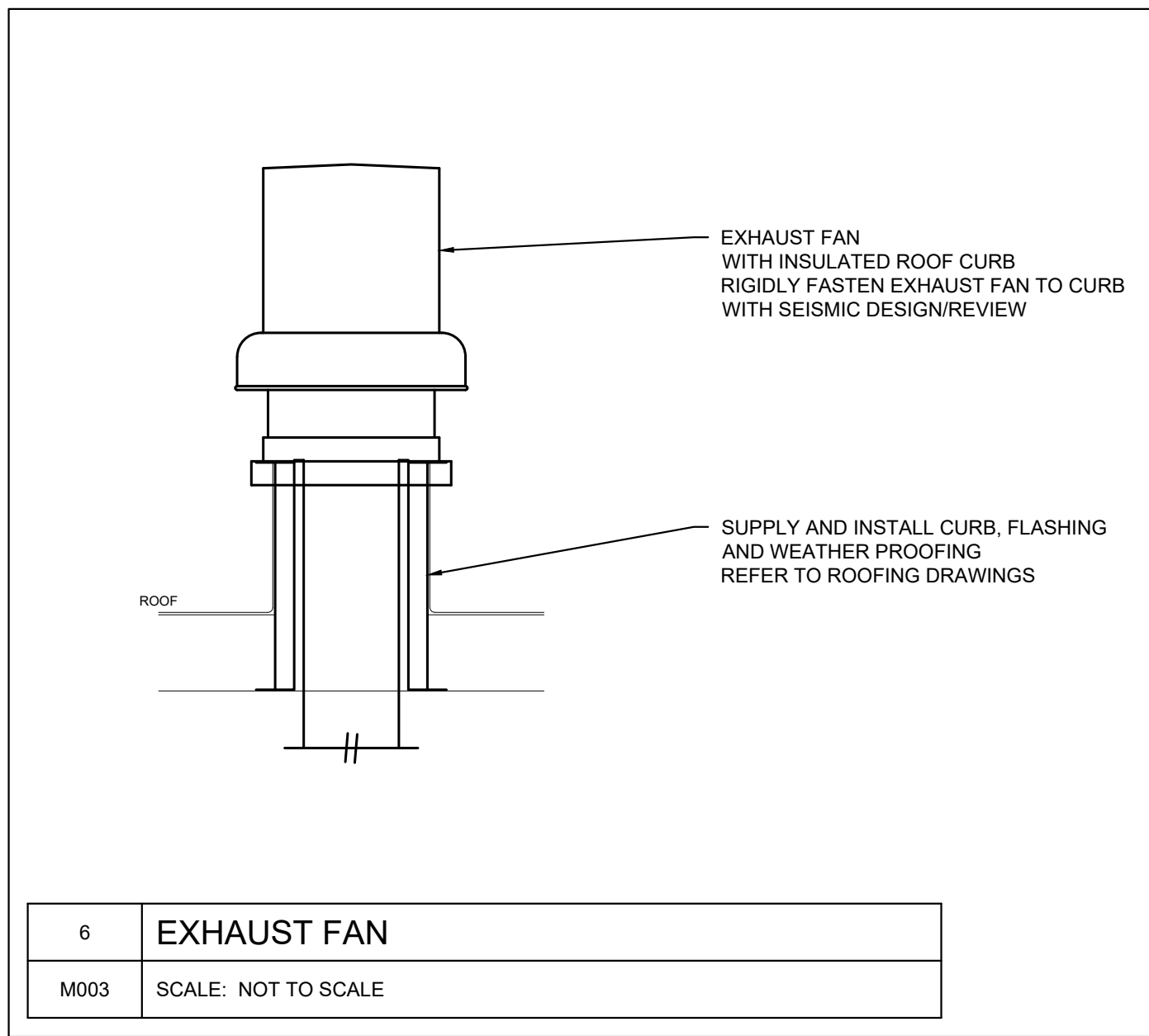
3	NATURAL GAS PIPE SUPPORT
M003	SCALE: NOT TO SCALE



4	ROOFTOP UNIT
M003	SCALE: NOT TO SCALE

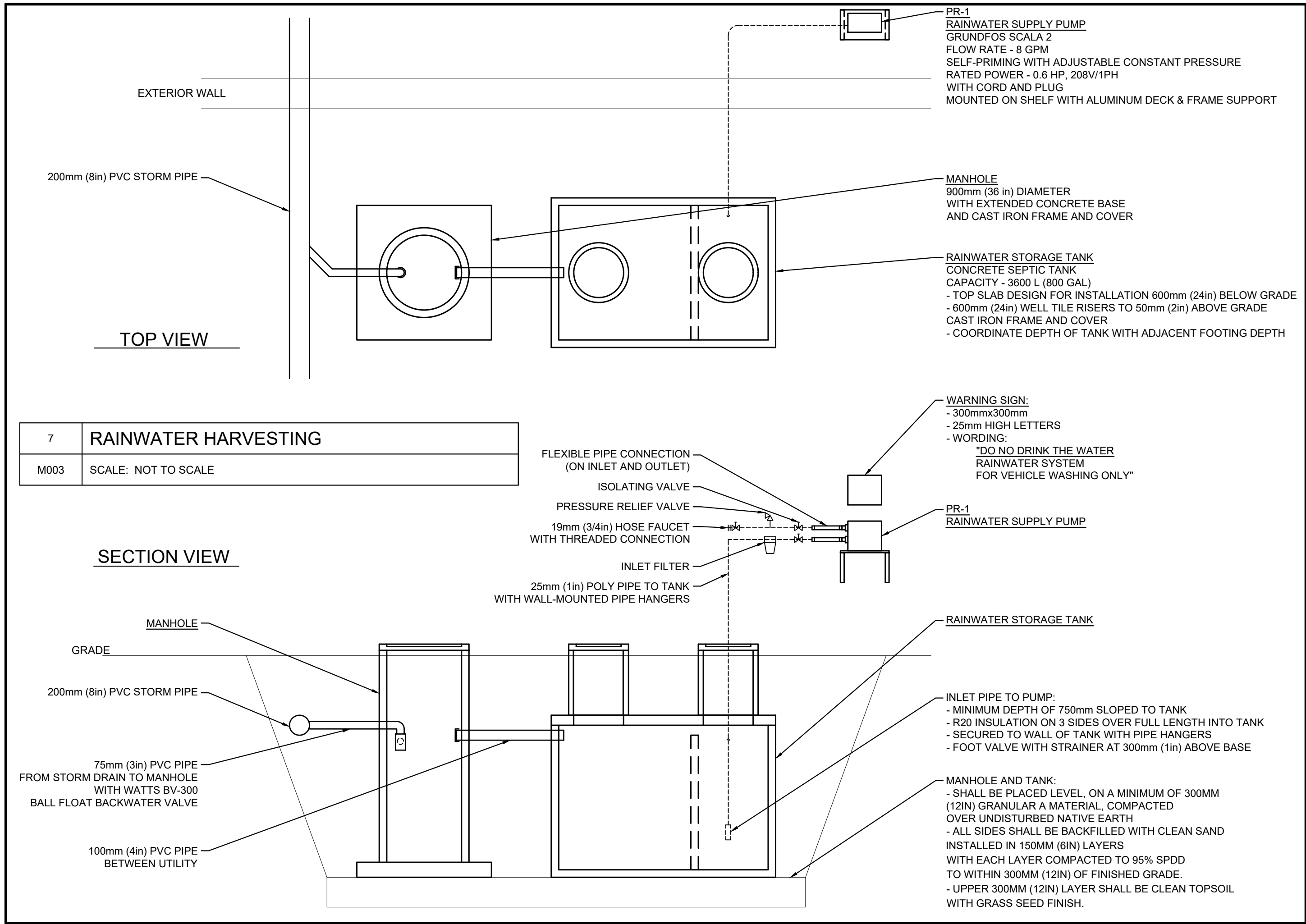


5	CONDENSING UNIT / HEAT PUMP
M003	SCALE: NOT TO SCALE



6	EXHAUST FAN
M003	SCALE: NOT TO SCALE

RANGE HOOD SCHEDULE												
UNIT	DESCRIPTION	FAN				DUCT CONN (in)	ELECTRICAL			ACCEPTABLE PRODUCT	NOTES	
		CFM	ESP	DRIVE	SONES		VOLT	PHASE	POWER			MOCP
RH-1	RANGE HOOD 30" STAINLESS STEEL	230	0.1	DIRECT	4.5	3.25x10 DUCTED	120	1	1.7A	15A	NUTONE #WA65 OR APPROVED EQUAL	2 SPEED 2 x 40W LAMPS



7	RAINWATER HARVESTING
M003	SCALE: NOT TO SCALE

EXHAUST FAN (CABINET) SCHEDULE											
UNIT	DESCRIPTION	FAN			DUCT CONN	VOLT (V)	PHASE	ELECTRICAL POWER (W)	ACCEPTABLE PRODUCT	NOTES	
		FLOW	ESP	DRIVE							
EF-1	EXHAUST FAN CEILING	28 L/s 60 CFM	2.5mm 0.1 in	DIRECT	1.5	254 x 83 mm 10 x 3.25 in	120	1	39	PENN BARRY #ZT GREENHECK OR APPROVED EQUAL	DIM - L x W x D - 336 x 336 x 168 mm, 13.25 x 13.25 x 6.625 in GRILLE - 280 x 337 mm, 11 x 13.25 in CONTROL - WALL SWITCH GRILLE - ALUMINUM, PAINTED CAP - WALL, GALV STEEL, PAINTED TO MATCH WALL FINISH UNED HOUSING, BACKDRAFT DAMPER
EF-2	EXHAUST FAN CEILING	60 L/s 128 CFM	6 mm 0.25 in	DIRECT	3.3	254 x 83 mm 10 x 3.25 in	120	1	79	PENN BARRY #Z5 GREENHECK OR APPROVED EQUAL	DIM - L x W x D - 318 x 232 x 232 mm, 12.5 x 9.125 x 9.125 in GRILLE - 280 x 337 mm, 11 x 13.25 in CONTROL - WALL SWITCH GRILLE - ALUMINUM, PAINTED CAP - WALL, GALV STEEL, PAINTED TO MATCH WALL FINISH UNED HOUSING, BACKDRAFT DAMPER
EF-3	EXHAUST FAN INLINE	112 L/s 240 cfm	6 mm 0.25 in	DIRECT	2.5	254 x 83 mm 10 x 3.25 in	120	1	84	PENN BARRY #Z8 GREENHECK OR APPROVED EQUAL	DIM - L x W x D - 318 x 232 x 232 mm, 12.5 x 9.125 x 9.125 in GRILLE - 280 x 337 mm, 11 x 13.25 in CONTROL - VARIABLE SPEED GRILLE - ALUMINUM, PAINTED CAP - WALL, GALV STEEL, PAINTED TO MATCH WALL FINISH UNED HOUSING, BACKDRAFT DAMPER
EF-4	EXHAUST FAN INLINE	112 L/s 240 cfm	6 mm 0.25 in	DIRECT	2.5	254 x 83 mm 10 x 3.25 in	120	1	84	PENN BARRY #Z8 GREENHECK OR APPROVED EQUAL	CONTROL - WALL SWITCH AND RELAY PANEL GRILLE - ALUMINUM, PAINTED CAP - WALL, GALV STEEL, PAINTED TO MATCH WALL FINISH UNED HOUSING, BACKDRAFT DAMPER

EXHAUST FAN & CONTROL SCHEDULE									
DESCRIPTION	FAN		WALL OP'G (in)	ELECTRICAL			ACCEPTABLE PRODUCT	NOTES	
	CFM	ESP		VOLT	PHASE	HP			
EXHAUST FAN EF-G1 CENTRIGUFAL WALL-MOUNTED	1000 VARIABLE	0.25	16x16	208	1	1/3	CANARM #SD OR APPROVED EQUAL	WALL SLEEVE, BACKDRAFT DAMPER HINGED SUBBASE, BIRD/INSECT SCREEN SAFETY DISCONNECT SWITCH	
EXHAUST FAN EF-G2 CENTRIGUFAL WALL-MOUNTED	2500 VARIABLE	0.25	16x16	208	1	1/3	CANARM #SD OR APPROVED EQUAL	WALL SLEEVE, BACKDRAFT DAMPER HINGED SUBBASE, BIRD/INSECT SCREEN SAFETY DISCONNECT SWITCH	
EXTERIOR LOUVRE							VENTEX #2420 OR APPROVED EQUAL	4" DEEP ALUMINUM, MILL FINISH FLANGE FRAME, INSECT SCREEN	
INTERIOR DAMPER							RUSKIN #CD36 OR APPROVED EQUAL	LOW LEAKAGE GALVANIZED STEEL GROOVE REINFORCED BLADES BLADE SEALS	
DAMPER MOTOR							BELIMO #LF24 OR APPROVED EQUAL		
GAS DETECTION CONTROLLER							QEL #Q4C-x-R00 CONTROLLER		
GAS TRANSMITTER/SENSOR	CO						QEL #Q5		
NOTES: REFER TO ELECTRICAL DRAWINGS FOR SYSTEM SCHEMATIC DIAGRAM - MECHANICAL CONTRACTOR SHALL SUPPLY ALL EQUIPMENT (ABOVE) FOR WIRING AND CONNECTION BY ELECTRICAL CONTRACTOR.									

MORRIS

Engineering Ltd.

Brockville, Ontario (613)349-0555

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NO.	DATE	REVISION

CLIENT:

COLBOURNE & KEMBEL ARCHITECTS INC.

Kingston, ON

PROJECT:

LOYALIST AMBULANCE

Loyalist Business Park

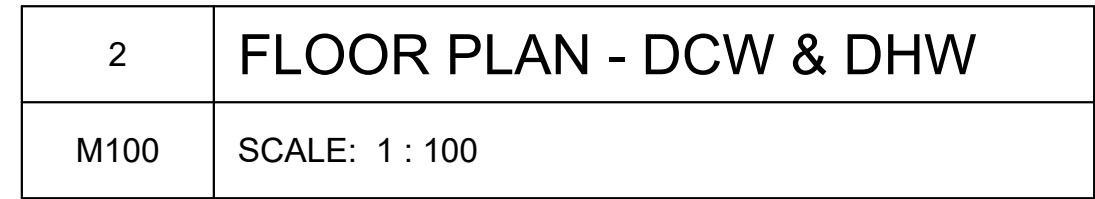
DRAWING:

MECHANICAL

Details & Schedules

DESIGN BY:	M. MORRIS	M003
DRAWN BY:	A.M.	
DATE:	AUG 2025	
PROJECT No.:	892	
SCALE:	AS SHOWN	

THESE INVERT CALCULATIONS ARE APPROXIMATE.
GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR
SETTING FINAL INVERTS BASED ON SITE CONDITIONS.



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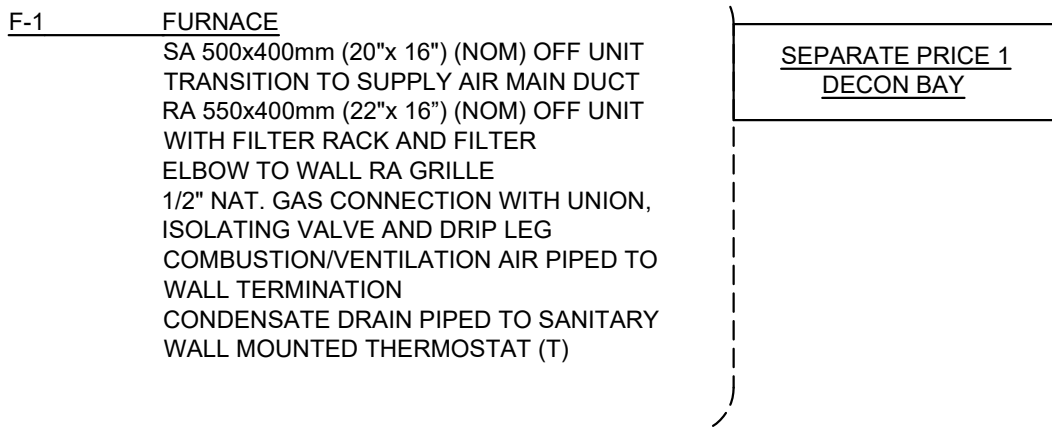


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M100

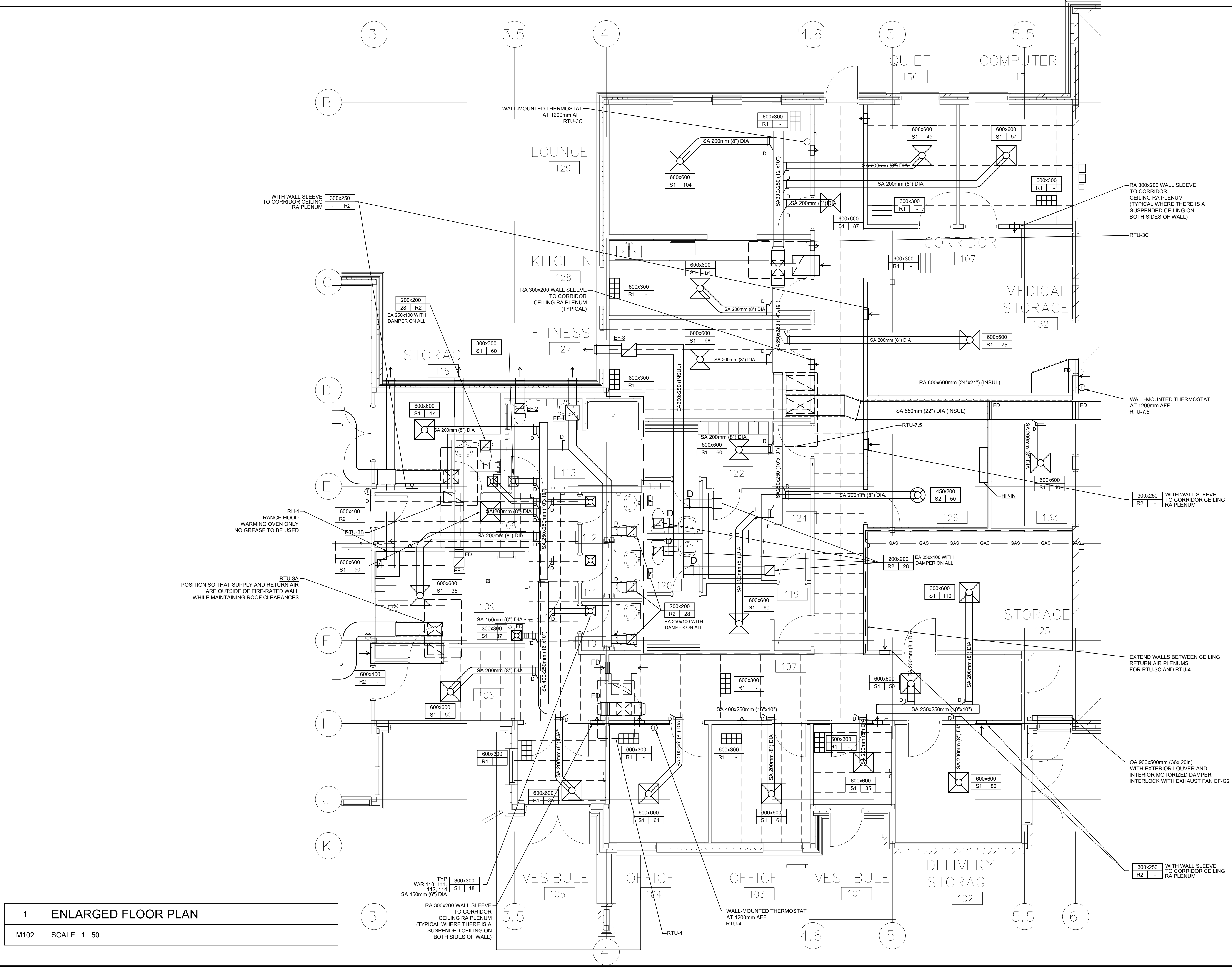
NATURAL GAS SERVICE								
1.	<u>NOTES:</u>							
1.1	COMPLETE INSTALLATION SHALL BE IN ACCORDANCE WITH THE NATURAL GAS AND AND PROPANE INSTALLATION CODE (GAS CODE)							
1.2	MECHANICAL CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR COORDINATION OF NATURAL GAS SERVICE INSTALLATION AND/OR ALTERATIONS WITH THE SUPPLY AUTHORITY							
2.	<u>SUPPLY PRESSURE TO EQUIPMENT:</u>							
	7 IN WC (1.75 kPa)							
3.	<u>TOTAL CONNECTED LOAD:</u>							
	F-1	FURNACE	1	x	60	Mbtu/hr	60	Mbtu/hr
	RTU-3	ROOFTOP HVAC UNIT	3	x	120	Mbtu/hr	360	Mbtu/hr
	RTU-4	ROOFTOP HVAC UNIT	1	x	130	Mbtu/hr	130	Mbtu/hr
	RTU-7.5	ROOFTOP HVAC UNIT	1	x	200	Mbtu/hr	200	Mbtu/hr
	TOTAL NATURAL GAS LOAD						750	Mbtu/hr
	<u>CONTRACTOR SHALL VERIFY TOTAL GAS LOAD</u>							
4.	<u>CLEARANCE TO RELIEF DEVICE:</u>							
	NATURAL GAS:							
	- BUILDING OPENING	1m (3 ft)						
	- MECHANICAL AIR INTAKE	3m (10 ft)						
	- SOURCE OF IGNITION	1m (3 ft)						
	- ELECTRICAL	1m (3 ft)						

RTU-3A RTU-3B	ROOFTOP HVAC UNIT SA 450x425mm (17'8"x16'7") (NOM) OFF UNIT ELBOW WITH TURNING VANES TO SA 450x450mm (18"x18") INSULATE TO TRAINING ROOM WALL RA 640x370mm (25.2"x14'6") (NOM) OFF UNIT ELBOW WITH TURNING VANES TO RA 600x600mm (24"x16") INSULATE TO TRAINING ROOM WALL	HP-IN DUCTLESS SPLIT HEAT PUMP INDOOR UNIT WALL-MOUNTED PIPE CONDENSATE DRAIN TO SANITARY
		EF-1 EXHAUST FAN EA 250x100mm (10"x4") (INSUL) TO EXTERIOR WALL CAP
RTU-3C	ROOFTOP HVAC UNIT SA 450x425mm (17'8"x16'7") (NOM) OFF UNIT WYE WITH TURNING VANES TO SA 400x250 (16"x10") MAIN DUCTS RA 640x370mm (25.2"x14'6") (NOM) OFF UNIT ELBOW WITH TURNING VANES TO RA 600x250mm (24"x10") DUCT TO CORRIDOR CEILING SPACE	EF-2 EXHAUST FAN EA 250x100mm (10"x4") (INSUL) TO EXTERIOR WALL CAP
		EF-3 EXHAUST FAN EA 250x200mm (10"x8") (INSUL) TO EXTERIOR WALL CAP
RTU-4	ROOFTOP HVAC UNIT SA 450x425mm (17'8"x16'7") (NOM) OFF UNIT WYE WITH TURNING VANES TO SA 400x250 (16"x10") MAIN DUCTS RA 640x370mm (25.2"x14'6") (NOM) OFF UNIT ELBOW WITH TURNING VANES TO RA 600x250mm (24"x10") DUCT TO CORRIDOR CEILING SPACE	EF-4 EXHAUST FAN EA 250x200mm (10"x8") (INSUL) TO EXTERIOR WALL CAP WITH ACCESS DOOR
		EF-G1 EXHAUST FAN MOUNT AT 15 FT AFF
RTU-7.5	ROOFTOP HVAC UNIT SA 850x450mm (34"x18") (NOM) OFF UNIT ELBOW WITH TURNING VANES TO SA 600x600mm (24"x24") INSULATE TO AMBULANCE BAY WALL RA 850x450mm (34"x18") (NOM) OFF UNIT ELBOW WITH TURNING VANES TO RA 600x600mm (24"x24") INSULATE TO AMBULANCE BAY WALL	EF-G2 EXHAUST FAN MOUNT AT 15 FT AFF
		RH-1 RANGE HOOD EA 250x100mm (10"x4") (INSUL) TO EXTERIOR WALL CAP



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M101



1	ENLARGED FLOOR PLAN
M102	SCALE: 1 : 50

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Engineering Ltd.

Brockville, Ontario (613)349-0555

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CLIENT:

COLBOURNE & KEMBEL ARCHITECTS INC.
Kingston, ON

PROJECT:

LOYALIST AMBULANCE
Loyalist Business Park

DRAWING:

MECHANICAL HVAC

Enlarged Floor Plan

DESIGN BY:	M. MORRIS	M102
DRAWN BY:	A.M.	
DATE:	AUG 2025	
PROJECT No.:	892	
SCALE:	AS SHOWN	

EQUIPMENT NOTES:

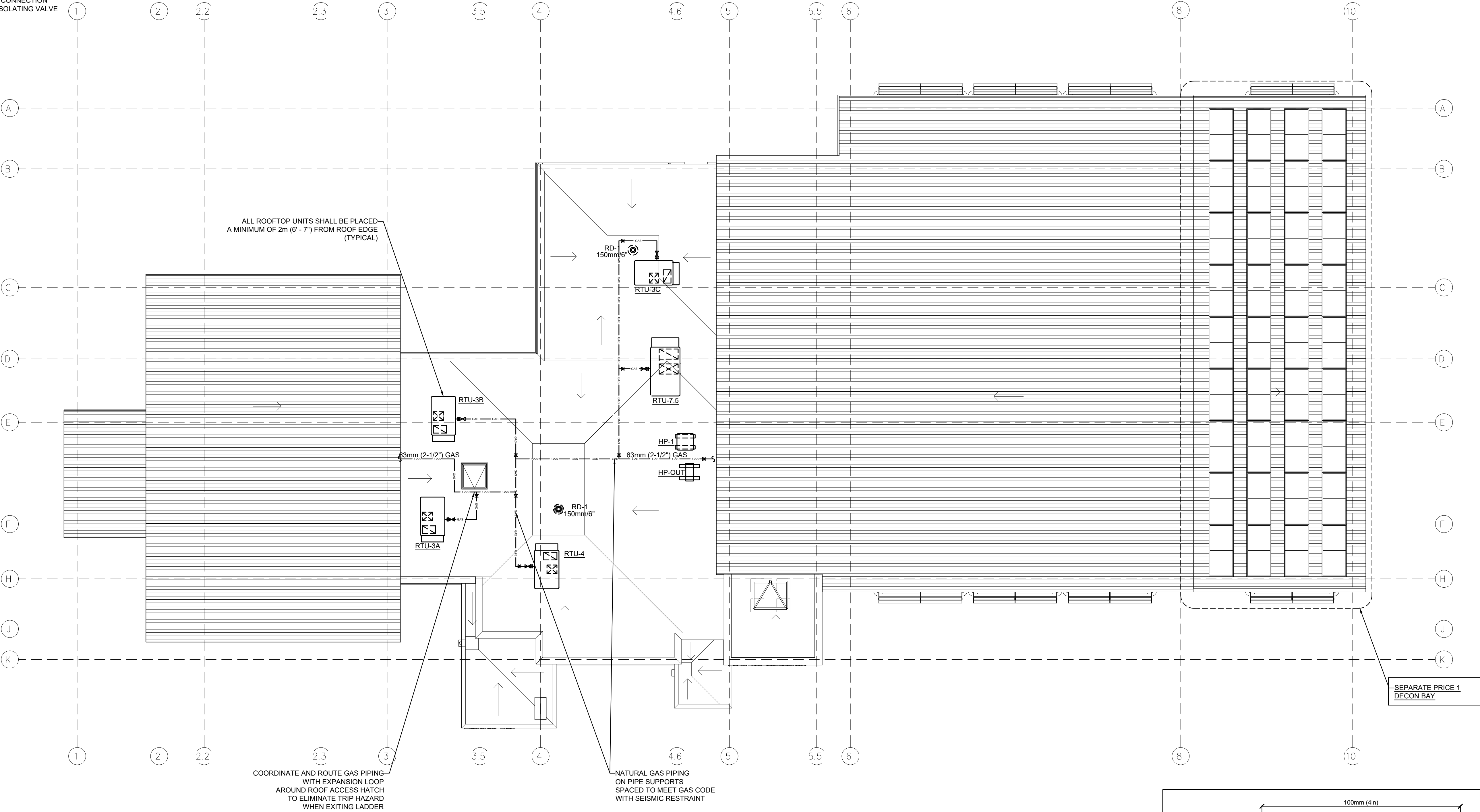
RTU-3A ROOFTOP HVAC UNIT (HYBRID)
RTU-3B, 3C HEAT PUMP WITH NATURAL GAS BACK-UP HEAT
DOWNFLOW DISCHARGE
MOUNTED ON MINIMUM 400mm (16") SEISMIC CURB
1/2" NATURAL GAS CONNECTION
WITH UNION AND ISOLATING VALVE

RTU-4 ROOFTOP HVAC UNIT (HYBRID)
HEAT PUMP WITH NATURAL GAS BACK-UP HEAT
DOWNFLOW DISCHARGE
MOUNTED ON MINIMUM 400mm (16") SEISMIC CURB
1/2" NATURAL GAS CONNECTION
WITH UNION AND ISOLATING VALVE

RTU-7.5 ROOFTOP HVAC UNIT (HYBRID)
HEAT PUMP WITH NATURAL GAS BACK-UP HEAT
DOWNFLOW DISCHARGE
MOUNTED ON MINIMUM 400mm (16") SEISMIC CURB
3/4" NATURAL GAS CONNECTION
WITH UNION AND ISOLATING VALVE

HP-OUT DUCTLESS SPLIT HEAT PUMP
OUTDOOR UNIT
MOUNTED ON BUILT-UP ROOF CURB

HP-1 HEAT PUMP
MOUNTED ON BUILT-UP ROOF CURB



1	ROOF PLAN
M103	SCALE: 1 : 100

100mm (4in)

50mm (2in)

EF-1

.....MCA,V/.....PH

ELEC PNL #, CCT #

CONTRACTOR SHALL SUBMIT LABEL SHOP DRAWINGS
WITH NOTES FOR APPROVAL
PRIOR TO MANUFACTURE

ENGRAVED LAMICOID LABEL
3mm (1/8in) THICK
ADHESIVE AND RIVET-FASTEN TO
UNIT OR EQUIPMENT

2	EQUIPMENT LABEL
M103	SCALE: NOT TO SCALE

MORRIS
Engineering Ltd.

Brockville, Ontario (613)349-0555

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CLIENT:

COLBOURNE
& KEMBEL
ARCHITECTS INC.
Kingston, ON

PROJECT:

LOYALIST
AMBULANCE
Loyalist Business
Park

DRAWING:

MECHANICAL

Roof Plan

DESIGN BY:	M. MORRIS	M103
DRAWN BY:	A.M.	
DATE:	AUG 2025	
PROJECT No.:	892	
SCALE:	AS SHOWN	

ELECTRICAL NOTES		
ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS FOR THIS PROJECT.		
1	GENERAL:	
.1	CONFORM WITH APPLICABLE REQUIREMENTS OF THE MINISTRY OF LABOUR, AND THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS.	
.2	DO COMPLETE INSTALLATION IN ACCORDANCE WITH THE FOLLOWING:	
.1	ONTARIO ELECTRICAL SAFETY CODE;	
.2	ELECTRICAL SAFETY AUTHORITY;	
.3	ELECTRICAL SUPPLY AUTHORITY.	
.3	SUBMIT TO ELECTRICAL SAFETY AUTHORITY AND SUPPLY AUTHORITY NECESSARY NUMBER OF DRAWINGS AND SPECIFICATIONS FOR APPROVAL PRIOR TO COMMENCEMENT OF WORK.	
.4	GENERAL CONTRACTOR AND ELECTRICAL CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR COORDINATING AND OBTAINING ELECTRICAL SERVICE LAYOUT FROM THE SUPPLY AUTHORITY.	
.5	PAY ALL ELECTRICAL PERMIT AND INSPECTION FEES.	
.6	GROUND COMPLETE SYSTEM IN ACCORDANCE WITH THE ONTARIO ELECTRICAL SAFETY CODE AND ELECTRICAL SAFETY AUTHORITY.	
.7	IDENTIFICATION AND LABELLING:	
.1	IDENTIFY ELECTRICAL EQUIPMENT WITH LAMICOID NAMEPLATES, INCLUDING AMPERAGE, VOLTAGE, PHASE AND POWER SOURCE.	
.2	PROVIDE TYPEWRITTEN PANEL DIRECTORIES.	
.3	PROVIDE ADHESIVE LABEL ON ALL SWITCH, RECEPTACLE AND DEVICE COVER PLATES INDICATING SUPPLY CIRCUIT DESIGNATION.	
.4	CONDUIT AND CABLE IDENTIFICATION:	
.1	ACCESS CONTROL – PURPLE;	
.2	DATA – BLUE;	
.3	FIRE ALARM – RED;	
.4	INTRUSION DETECTION SYSTEM – YELLOW;	
.5	MECHANICAL CONTROL – ORANGE;	
.6	SURVEILLANCE – GREEN;	
.7	TELEPHONE AND PA SYSTEM – WHITE.	
.8	PROVIDE DIGITAL AND HARD COPY OF COMPLETE OPERATING AND MAINTENANCE INSTRUCTIONS FOR EQUIPMENT FURNISHED UNDER THIS CONTRACT. BIND INSTRUCTIONS IN 3-RING BINDERS. INCLUDE THE FOLLOWING:	
.1	SCHEMATIC DIAGRAM OF ELECTRICAL SYSTEMS.	
.2	CONTROL SHOP DRAWINGS AND OPERATING SEQUENCE INCLUDING WIRING OF COMPONENTS.	
.3	WIRING DIAGRAM OF CONTROL PANELS.	
.4	OPERATING INSTRUCTIONS, INCLUDING START-UP AND SHUT-DOWN PROCEDURE.	
.5	MAINTENANCE INSTRUCTIONS INCLUDING PREVENTIVE MAINTENANCE INSTRUCTIONS FOR COMPONENTS OF THE EQUIPMENT.	
.6	COMPLETE PARTS LIST OF ASSEMBLIES AND THEIR COMPONENT PARTS, SHOWING MANUFACTURER'S NAME, CATALOGUE NUMBER, AND NEAREST REPLACEMENT SOURCE.	
.7	LIST OF RECOMMENDED SPARE PARTS AND QUANTITY OF EACH ITEM TO BE STOCKED.	
.8	MANUFACTURERS' WARRANTIES AND GUARANTEES.	
.9	CLEAN ALL ELECTRICAL SYSTEMS AT PROJECT COMPLETION.	
.10	COMPLETE AS-BUILT DRAWINGS SHOWING ALL CHANGES AS WORK PROGRESSES.	
2	CONTRACTOR QUALIFICATIONS:	
.1	ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE FOLLOWING:	
.1	ONTARIO ELECTRICAL SAFETY CODE (AND IN PARTICULAR SECTION 2 ADMINISTRATION GENERAL RULES, WHERE CODE APPLICATION IS DEFINED FOR ITEMS WHICH THE CODE DOES NOT APPLY – IT IS NOT BASED ON VOLTAGE); AND	
.2	ONTARIO REGULATION 570/05, LICENSING OF ELECTRICAL CONTRACTORS AND MASTER ELECTRICIANS, MADE UNDER THE ELECTRICITY ACT 1998 (THIS ACT AND REGULATION CAN BE FOUND ON THE ONTARIO E-LAWS WEBSITE).	
.2	ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH THE "TRADES QUALIFICATION AND APPRENTICESHIP ACT" AND REGULATIONS, BY PERSONS WHO HOLD THE FOLLOWING CERTIFICATES OF QUALIFICATION (AS APPLICABLE):	
.1	ELECTRICIAN- CONSTRUCTION & MAINTENANCE.	
3	EXISTING FACILITIES AND DEMOLITION:	
.1	LOCATE AND PROTECT ALL EXISTING EXTERIOR SITE SERVICES.	
.2	RETAIN AND PROTECT ALL EXISTING INTERIOR SERVICES AND BUILDING FABRIC. MAKE GOOD ANY AND ALL DAMAGE RESULTING FROM THIS WORK.	
.3	CONNECTIONS TO EXISTING SERVICES SHALL BE COORDINATED WITH THE OWNER.	
.4	EXECUTE WORK WITH LEAST POSSIBLE INTERFERENCE OR DISTURBANCE TO NORMAL USE OF THE EXISTING BUILDING.	
.5	CUTTING AND PATCHING:	
.1	EXECUTE CUTTING, FITTING AND PATCHING REQUIRED TO MAKE THE WORK FIT PROPERLY TOGETHER. CUT AND PATCH FOR PROCESS, MECHANICAL AND ELECTRICAL WORK.	
.2	COORDINATE WORK WITH OTHER TRADES SO THAT THERE IS A MINIMUM OF CUTTING, FITTING AND PATCHING.	
.3	DRILLING, CUTTING, FITTING AND PATCHING AND MAKING GOOD WHERE NECESSARY DUE TO FAILURE TO DELIVER ITEMS TO BE BUILT IN TIME OR INSTALLATION IN WRONG LOCATION, SHALL BE EXECUTED AS DIRECTED AT NO COST TO THE OWNER.	
.4	DRILLING AND CUTTING OF LOAD BEARING STRUCTURAL MEMBERS SHALL BE DONE ON PRIOR EXPRESS WRITTEN PERMISSION OF THE ENGINEER FOR EACH INSTANCE.	
.5	CUT HOLES ACCURATELY, WITH SMOOTH, TRUE, CLEAN EDGES. FIT UNITS TO TOLERANCES TO BEST STANDARD PRACTICE FOR APPLICABLE WORK.	
.6	HOLES IN BLOCK AND CONCRETE WORK SHALL BE SAWCUT OR CORE-DRILLED, AND SHALL NOT BE MADE WITH A HAMMER GUN.	
.7	PATCHED WORK SHALL BE INVISIBLE, SIZE HOLES AND OPENINGS FOR PIPES SO AS TO ALLOW FOR EXPANSION AND CONTRACTION OF SUCH PIPES.	
4	FIXTURES AND EQUIPMENT:	
.1	PROVIDE SHOP DRAWINGS AND PRODUCT DATA FOR ALL ELECTRICAL FIXTURES AND EQUIPMENT FOR APPROVAL, PRIOR TO PROCUREMENT.	
.2	INSTALL ALL ELECTRICAL FIXTURES AND EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.	
.3	EQUIPMENT AND MATERIAL TO BE CSA CERTIFIED. WHERE THERE IS NO ALTERNATIVE TO SUPPLYING EQUIPMENT WHICH IS NOT CSA CERTIFIED, OBTAIN SPECIAL APPROVAL FROM ELECTRICAL SAFETY AUTHORITY.	
5	EQUIPMENT SUPPLIED BY OTHERS:	
.1	GENERAL CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR COORDINATING ELECTRICAL SERVICES AND CONNECTIONS FOR ALL EQUIPMENT, INCLUDING EQUIPMENT SUPPLIED BY TRADES OTHER THAN ELECTRICAL.	
.2	ELECTRICAL CONTRACTOR SHALL TAKE FULL RESPONSIBILITY FOR MAKING ALL ELECTRICAL SERVICE CONNECTIONS TO EQUIPMENT SUPPLIED BY OTHERS, INCLUDING:	
.1	REVIEW OF ALL SHOP DRAWINGS FOR EQUIPMENT SUPPLIED BY OTHERS, WHICH REQUIRE ELECTRICAL CONNECTIONS.	
.2	VERIFY AND CONFIRM ALL SERVICE CONNECTIONS WITH MANUFACTURER, SUPPLIER AND OTHER TRADES, PRIOR TO PROCUREMENT OF ELECTRICAL PANELS, BREAKERS, WIRE/CABLE, DISCONNECT SWITCHES, MOTOR STARTERS, RECEPTACLES AND RELATED EQUIPMENT.	
.3	REVIEW OF EQUIPMENT SUPPLIED BY OTHERS, SHALL INCLUDE ALL CONNECTION SIZES, LOCATIONS AND DETAILS, AND SHALL TAKE INTO ACCOUNT EQUIPMENT CLEARANCES AND INSTALLATION REQUIREMENTS.	
6	CONDUITS:	
.1	RIGID GALVANIZED STEEL, WITH THREADED FITTINGS, WHERE SUBJECT TO MECHANICAL INJURY, IN SERVICE AREAS ONLY.	
.2	ELECTRICAL METALLIC TUBING (EMT), HOT DIPPED GALVANIZED STEEL, WITH THREADED CONNECTORS AND COUPLINGS, WHERE NOT SUBJECT TO MECHANICAL INJURY, IN SERVICE AREAS ONLY.	
.3	RIGID PVC CONDUIT BELOW FLOOR AND IN CORROSIVE AREAS.	
7	WIRES AND CABLE:	
.1	VOLTAGE DROP:	
.1	FEEDER CONDUCTORS SHALL BE SIZED FOR A MAXIMUM VOLTAGE DROP OF 2% AT DESIGN LOAD.	
.2	BRANCH CIRCUIT CONDUCTORS SHALL BE SIZED FOR A MAXIMUM VOLTAGE DROP OF 3% AT DESIGN LOAD.	
.2	BUILDING WIRES:	
.1	BUILDING WIRES SHALL BE IN CONDUIT SYSTEMS, STRANDED COPPER CONDUCTORS FOR 10 AWG AND LARGER, MINIMUM SIZE 12 AWG, TYPE RW90.	
.3	BUILDING WIRES IN CONCEALED LOCATIONS TO BE COPPER, MINIMUM SIZE 12 AWG, TYPE AS FOLLOWS:	
.1	STEEL STUD OR STEEL FRAMED STRUCTURES – TYPE AC90;	
.2	CEILING RETURN AIR PLENUMS – TYPE AC90.	
.4	ALL WIRING, CABINETS AND BOXES SHALL BE CONCEALED IN WALLS AND CEILINGS, UNLESS OTHERWISE NOTED OR APPROVED. SURFACE-MOUNTED WIRING IS NOT PERMITTED.	
8	DATA AND TELEPHONE:	
.1	SUPPLY AND INSTALL 2 RUNS, 4" CONDUIT FROM SITE TELEPHONE SERVICE LOCATION TO MAIN ELECTRICAL ROOMS.	
.2	SUPPLY AND INSTALL TELEPHONE BACKBOARD.	
.2	DATA/TELEPHONE:	
.1	DATA AND TELEPHONE WIRES CAT 6.	
.2	DATA AND TELEPHONE OUTLETS SHALL BE PROVIDED IN SEPARATE OUTLET BOXES AND SEPARATE CONDUIT.	
.3	SUPPLY, INSTALL AND TERMINATE DATA AND TELEPHONE OUTLETS, AS FOLLOWS:	
.1	1 PORT WALL PLATE – PANDUIT #CFG1WH;	
.2	2 PORT WALL PLATE – PANDUIT #CFG2WH;	
.3	4 PORT WALL PLATE – PANDUIT #CFG4WH;	
.4	FACE PLATE JACK – PANDUIT #CJSE88TG, 2 COLOURS, COLOURS SELECTED BY OWNER'S IT REPRESENTATIVE;	
.5	COVER PLATE – LEVITON #80401-W, 2 COLOURS, COLOURS SELECTED BY OWNER'S IT REPRESENTATIVE.	
.4	SUPPLY, INSTALL AND TERMINATE DATA AND TELEPHONE CABLES IN IT ROOM.	
.5	DATA AND TELEPHONE CABLES SHALL BE TERMINATED IN SEPARATE PATCH PANELS, AS FOLLOWS:	
.1	PATCH PANEL – PANDUIT #CP24BLY (SUPPLY SUFFICIENT QUANTITY TO SEPARATE DATA AND TELEPHONE, AND TO SUIT NUMBER OF OUTLETS);	
.2	PATCH PANEL JACK - PANDUIT #CJSE88TG, 2 COLOURS, COLOURS SELECTED BY OWNER'S IT REPRESENTATIVE.	
.6	ALL TELEPHONE AND DATA CABLING AND TERMINATIONS SHALL BE TESTED IN ACCORDANCE WITH ANSI/EIA/TIA 568-C.2 CATEGORY 6A BALANCED TWISTED –PAIR TELECOMMUNICATIONS CABLING AND COMPONENTS STANDARD, BY A THIRD PARTY TESTING AGENCY	
9	SERVICE EQUIPMENT:	
.1	ELECTRICAL SERVICE EQUIPMENT, PANELBOARDS AND DISCONNECT SWITCHES SHALL BE PRODUCT OF ONE MANUFACTURER THROUGHOUT PROJECT.	
.2	LOW-VOLTAGE DRY-TYPE DISTRIBUTION TRANSFORMERS SHALL MEET THE MINIMAL NOMINAL EFFICIENCY LEVELS OF ASHRAE 90.1 (TABLE 8.4.4.).	
.3	CIRCUIT BREAKERS:	
.1	SUPPLY AND INSTALL GROUND FAULT & ARC-FAULT CIRCUIT PROTECTION, AS REQUIRED BY THE OESC.	
.4	WORKING SPACE ABOUT ELECTRICAL EQUIPMENT SHALL BE PROVIDED IN ACCORDANCE WITH THE ONTARIO ELECTRICAL SAFETY CODE, INCLUDING THE FOLLOWING:	
.1	WORKING SPACE OF 3'4" (1m) WITH SECURE FOOTING;	
.2	WORKING SPACE OF 5'0" (1.5m) WITH SECURE FOOTING FOR EQUIPMENT 1200A OR MORE, OR RATED OVER 750V;	
.3	MINIMUM HEADROOM OF 7'3" (2.2m).	
10	WIRING DEVICES:	
.1	WIRING DEVICES OF ONE MANUFACTURER THROUGHOUT PROJECT – HUBBELL OR LEVITON.	
.2	COMMERCIAL PROJECTS:	
.1	OUTLET BOXES:	
.1	GANG BOXES WHERE WIRING DEVICES ARE GROUPED.	
.2	BLANK COVER PLATES FOR BOXES WITHOUT WIRING DEVICES.	
.2	SWITCHES:	
.1	HEAVY DUTY, 20A/120V;	
.2	SINGLE POLE, AND THREE-WAY, AS APPLICABLE;	
.3	COLOUR: SELECTED BY OWNER/ARCHITECT.	
.3	DUPLEX RECEPTACLES:	
.1	EXTRA HARD USE, CSA TYPE 5-15 R, 15A/125V;	
.2	GFI (GROUND FAULT CIRCUIT INTERRUPTER) WITH DETECT AND TRIP ON GROUND FAULT, STATUS INDICATOR LIGHT AND TEST SWITCH;	
.3	TAMPER-RESISTANT WHERE REQUIRED BY CODE;	
.4	COLOUR: SELECTED BY OWNER/ARCHITECT.	
.4	COVER PLATES:	
.1	STAINLESS STEEL.	
12	LIGHTING:	
.1	GENERAL LIGHTING:	
.1	SUPPORT ALL LIGHTING IN ACCORDANCE WITH THE ONTARIO ELECTRICAL SAFETY CODE AND BULLETINS.	
.2	LIGHT FIXTURES SUPPORTED BY SUSPENDED CEILING SYSTEMS SHALL HAVE ADDITIONAL SUPPORT TO BUILDING STRUCTURE IN ACCORDANCE WITH ONTARIO ELECTRICAL SAFETY CODE BULLETIN #30-4-11.	
.2	FUNCTIONAL TESTING OF LIGHTING CONTROL, IN ACCORDANCE WITH ASHRAE 90.1 (9.4.3):	
.1	LIGHTING CONTROL DEVICES AND CONTROL SYSTEMS SHALL BE TESTED TO ENSURE THAT CONTROL HARDWARE AND SOFTWARE ARE CALIBRATED, ADJUSTED, PROGRAMMED, AND IN PROPER WORKING CONDITION IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS AND MANUFACTURER'S INSTALLATION INSTRUCTIONS.	
.3	EXIT AND EMERGENCY LIGHTING:	
.1	CONNECT DC CIRCUIT FROM EMERGENCY LIGHT BATTERY PACK TO ALL EXIT AND EMERGENCY LIGHTS.	
.2	SIZE EMERGENCY LIGHTING POWER PACK TO PROVIDE FULL LOAD POWER FOR 1 HR PERIOD.	
.3	EMERGENCY LIGHT BATTERY PACKS (UNIT EQUIPMENT) SHALL BE INSTALLED IN SUCH A MANNER THAT IT WILL BE AUTOMATICALLY ACTUATED UPON FAILURE OF THE POWER SUPPLY TO THE NORMAL LIGHTING IN THE AREA COVERED BY THAT UNIT EQUIPMENT PER OESC 46-304(4).	
.4	SITE LIGHTING:	
.1	CONTRACTOR SHALL PROVIDE A FULL PHOTOMETRIC LAYOUT FOR THE PROPOSED SITE LIGHTING FIXTURES.	
13	FIRE PROTECTION:	
.1	ELECTRICAL CONTRACTOR RESPONSIBILITY:	
.1	REFER TO ARCHITECTURAL DRAWINGS, TO VERIFY LOCATION OF ALL FIRE SEPARATIONS AND FIRE-RATED MEMBRANES.	
.2	PROVIDE DRAWINGS FROM HILTI AND/OR 3M FOR FIRE PROTECTION OF ALL ELECTRICAL MATERIALS, INCLUDING PANELS, BOXES, CABLE, WIRE, CONDUIT AND OUTLETS PENETRATING OR PASSING THROUGH A FIRE SEPARATION OR FIRE-RATED ASSEMBLY, FOR REVIEW BY ARCHITECT AND ENGINEER.	
.3	ALL ELECTRICAL MATERIALS, INCLUDING PANELS, BOXES, CABLE, WIRE, CONDUIT AND OUTLETS SHALL BE TIGHTLY FITTED AND SEALED WITH FIRESTOPPING MATERIAL AT ALL FIRE SEPARATIONS AND FIRE-RATED MEMBRANES.	
.2	ALL CABLING AND CONDUIT SHALL BE TIGHTLY FITTED AND SEALED WITH FIRESTOPPING MATERIAL AT ALL FIRE SEPARATIONS AND FIRE-RATED MEMBRANES.	
.3	THE FOLLOWING CONDUCTORS SHALL BE PROTECTED IN ACCORDANCE WITH OBC 3.2.7.10:	
.1	ELECTRICAL FEEDER CONDUCTORS WHICH SERVE ELECTRICAL PANELS;	
.2	BRANCH CIRCUIT CONDUCTORS WHICH SERVE EXIT AND EMERGENCY LIGHTING.	
.3	THIS PROTECTION SHALL INCLUDE CONFORMANCE TO ULC-S139 "FIRE TEST EVALUATION OF INTEGRITY OF ELECTRICAL CABLES", TO PROVIDE A CIRCUIT INTEGRITY RATING OF NOT LESS THAN 1 HOUR (2 HOUR FOR TALL BUILDINGS OR CONTAINED USE AREAS OR INTERCONNECTED FLOOR SPACES).	
.4	PLENUMS (OBC 3.6.4.3):	
.1	ALL MATERIALS WITHIN THE PLENUM SHALL A FLAME-SPREAD RATING NOT MORE THAN 25 AND A SMOKE DEVELOPED CLASSIFICATION NOT MORE THAN 50.	
.5	MOCK-UPS:	
.1	PREPARE MOCK-UPS OF TYPICAL FIRESTOP INSTALLATION OF THE FOLLOWING, FOR REVIEW AND APPROVAL BY THE OWNER, ENGINEER AND MUNICIPAL BUILDING INSPECTOR:	
.1	ELECTRICAL PANELS, BOXES AND OUTLETS – FIRE-RATED WALL;	
.2	CONDUIT AND CABLING – WALL AND CEILING/FLOOR FIRE SEPARATION.	
.2	ALL FIRESTOP INSTALLATIONS SHALL BE COMPLETED IN ACCORDANCE WITH THE APPROPRIATE PRODUCT INSTALLATION INSTRUCTIONS, AND THE REFERENCED UL/ULC LISTING AND/OR TEST STANDARD.	
.3	SUPPLY A COPY OF THE PRODUCT INSTALLATION INSTRUCTIONS WITH ULC LISTING AND/OR TEST STANDARD REFERENCE, FOR EACH INSTALLATION.	
.4	MOCK-UP MAY REMAIN AS PART OF WORK.	
14	EARTHQUAKE LOAD:	
.1	ALL ELECTRICAL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE EARTHQUAKE LOAD AND EFFECTS REQUIRED BY THE ONTARIO BUILDING CODE.	
.2	ELECTRICAL ELEMENTS AND COMPONENTS (FIXTURES, EQUIPMENT, CONDUIT, ETC.), AND THEIR CONNECTIONS TO THE BUILDING SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SMACNA/ANSI SEISMIC RESTRAINT MANUAL OR OTHER GUIDELINE REFERENCED IN THE ONTARIO BUILDING CODE AND ONTARIO ELECTRICAL SAFETY CODE.	
.3	PROVIDE SHOP DRAWINGS FOR SUPPORT, CONNECTIONS AND SEISMIC RESTRAINT OF ALL ELECTRICAL FIXTURES, EQUIPMENT, AND CONDUIT, INCLUDING, BUT NOT LIMITED TO:	
.1	SERVICE AND DISTRIBUTION EQUIPMENT;	
.2	GENERATORS;	
.3	LIGHT FIXTURES AND CEILING FANS;	
.4	ELECTRIC HEATING UNITS;	
.5	TYPICAL CONDUIT AND CABLE SUPPORTING SYSTEM.	
.4	THESE SHOP DRAWINGS SHALL BE DESIGNED AND SEALED BY A PROFESSIONAL ENGINEER IN THE PROVINCE OF ONTARIO, WITH EXPERIENCE IN SEISMIC ENGINEERING.	
.5	FOLLOWING PROJECT COMPLETION, SEISMIC ENGINEER SHALL PROVIDE A LETTER OF FINAL SITE REVIEW.	
.5	CONTRACTOR SHALL CARRY THE COST OF THE SEISMIC ENGINEERING, INCLUDING SITE REVIEWS, DESIGN AND SHOP DRAWING PREPARATION.	
15	LOAD BALANCE:	
.1	MEASURE PHASE CURRENT TO PANELBOARDS WITH NORMAL LOADS (LIGHTING) OPERATING AT TIME OF ACCEPTANCE. ADJUST BRANCH CIRCUIT CONNECTIONS AS REQUIRED TO OBTAIN BEST BALANCE OF CURRENT BETWEEN PHASES AND RECORD CHANGES.	
.2	SUBMIT, AT COMPLETION OF WORK, REPORT LISTING PHASE AND NEUTRAL CURRENTS ON PANELBOARDS, OPERATING UNDER NORMAL LOAD. STATE HOUR AND DATE ON WHICH EACH LOAD WAS MEASURED, AND VOLTAGE AT TIME OF TEST.	
16	HAZARDOUS LOCATIONS AND OTHER SPECIAL CASES:	
.1	THE AREA SHALL BE CONSIDERED A CLASS I (FLAMMABLE GASES OR VAPOURS) ZONE 0,1,2, CLASS II (COMBUSTIBLE OR ELECTRICALLY CONDUCTIVE COMBUSTIBLE DUSTS) DIVISION 1,2, CLASS III (IGNITABLE FIBRES OR FLYINGS) DIVISION 1,2.	
.2	THE AMBULANCE AND DECON BAYS, AND ADJACENT ROOMS, UP TO A LEVEL OF 50mm ABOVE THE FLOOR SHALL BE CONSIDERED A CLASS I (FLAMMABLE GASES OR VAPOURS) ZONE 2 LOCATION.	
.3	ALL ELECTRICAL EQUIPMENT USED WITHIN THE AREA SHALL BE APPROVED FOR THE CLASSIFICATION.	
.4	ALL WIRING PRACTISES SHALL BE DONE IN ACCORDANCE WITH THE ONTARIO ELECTRICAL SAFETY CODE FOR THE ABOVE CLASSIFICATION.	
17	EQUIPMENT SUPPORT:	
.1	ALL ELECTRICAL EQUIPMENT, CONDUIT, WIRING, LIGHTING, DEVICES, AND RELATED ITEMS SHALL BE SECURELY SUPPORTED, ATTACHED AND FASTENED TO BUILDING STRUCTURE, AND SHALL NOT BE FASTENED TO THE ROOF DECK.	
.2	CONDUIT HANGERS AND SUPPORTS SHALL BE FABRICATED AND INSTALLED IN ACCORDANCE WITH CSA C22.2 NO. 18 OUTLET BOXES, CONDUIT BOXES, FITTINGS AND ASSOCIATED HARDWARE.	
.3	PLATFORMS SHALL BE FABRICATED FROM STRUCTURAL GRADE STEEL MEETING THE REQUIREMENTS OF THE ONTARIO BUILDING CODE, INCLUDING CSA STANDARD W59 WELDED STEEL CONSTRUCTION, AND THE REQUIREMENTS OF THE CANADIAN WELDING BUREAU.	
.4	ZIP TIES ARE NOT PERMITTED.	
18	COORDINATION:	
.1	INFORMATION INVOLVING ACCURATE DIMENSIONING OF THE BUILDING SHALL BE TAKEN FROM SITE BY CONTRACTOR.	
.2	DRAWINGS ARE IN DIAGRAMMATIC FORM, INTENDED TO CONVEY THE SCOPE OF WORK AND GENERAL ARRANGEMENT FOR EQUIPMENT. COORDINATE PHYSICAL LOCATION OF ALL EQUIPMENT WITH OTHER TRADES AND ALLOW FOR ANY ADDITIONAL CONDUIT, WIRING, FITTINGS, SUPPORTS, ETC., IN ORDER TO AVOID INTERFERENCE AND FACILITATE THE WORK.	
.3	CONTRACTOR TO MAKE ANY NECESSARY MODIFICATIONS OR ADDITIONS, WITHOUT CHARGE, TO ACCOMMODATE SITE CONDITIONS AND COORDINATION.	
.4	COORDINATE AND VERIFY ALL ELECTRICAL BRANCH CIRCUIT REQUIREMENTS FOR EQUIPMENT SUPPLIED BY OTHERS, PRIOR TO MATERIAL PROCUREMENT OR INSTALLATION.	
.5	PROVIDE ALL WIRING TO ALL MECHANICAL EQUIPMENT, INCLUDING WIRING BELOW 50V. COORDINATE ALL MECHANICAL EQUIPMENT WIRING WITH MECHANICAL TRADES.	
.6	ALL DEVICE AND OUTLET LOCATIONS SHALL BE CAREFULLY COORDINATED WITH THE GENERAL CONTRACTOR OR OWNER, TO ACCOMMODATE ALL FEATURES, INCLUDING PLUMBING FIXTURES, EQUIPMENT AND MILLWORK.	
19	START-UP, COMMISSIONING AND TRAINING:	
.1	START-UP AND COMMISSION THE FOLLOWING SYSTEMS:	
.1	MAIN ELECTRICAL SERVICE EQUIPMENT;	
.2	GENERAL LIGHTING;	
.3	EXIT AND EMERGENCY LIGHTING;	
.4	ELECTRIC HEATING UNITS.	
.2	START-UP AND COMMISSION THE FOLLOWING LIFE SAFETY AND FIRE PROTECTION SYSTEMS, AS A WHOLE TO ENSURE PROPER OPERATION AND INTER-RELATIONSHIP BETWEEN THE SYSTEMS, IN ACCORDANCE WITH OBC 3.2.4.6.:	
.1	SMOKE AND FIRE DAMPERS;	
.2	STANDBY ELECTRICAL POWER SUPPLY;	
.3	EMERGENCY LIGHTING.	
.3	MANUFACTURER SHALL START-UP AND COMMISSION THE FOLLOWING SYSTEMS:	
.1	STANDBY ELECTRICAL POWER SUPPLY.	
.4	PERFORM SYSTEMATIC TESTS, PROCEDURES AND CHECKS ON SYSTEMS, AS FOLLOWS:	
.1	TO VERIFY OPERATION IN ACCORDANCE WITH CONTRACT DOCUMENTS, DESIGN CRITERIA AND INTENT, AND MANUFACTURER'S REQUIREMENTS;	
.2	TO ENSURE APPROPRIATE DOCUMENTATION IS PROVIDED;	
.3	TO EFFECTIVELY TRAIN BUILDING OPERATIONAL STAFF.	
.5	SYSTEMS ARE TO BE OPERATED AT FULL CAPACITY, WITH CORRECTION OF ALL DEFICIENCIES AND ADJUSTMENTS TO MEET OPTIMUM PERFORMANCE.	
.6	PROVIDE WRITTEN REPORT AT END OF COMMISSIONING OUTLINING EQUIPMENT OPERATIONAL CONDITIONS AND PARAMETERS.	

LEGEND - ELECTRICAL

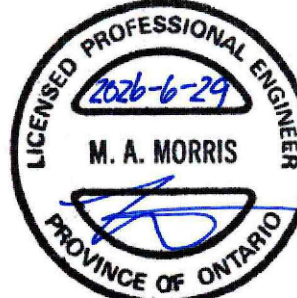
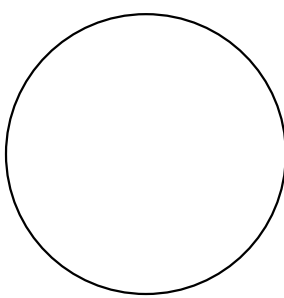
AC	MOUNTED ABOVE COUNTER	
AFF	ABOVE FINISHED FLOOR	
D	DIMMER CONTROL	
GFI	GROUND FAULT CIRCUIT INTERRUPTER PROTECTION	
M	MOTION CONTROL	
WP	WEATHERPROOF	
	ELECTRICAL RECEPTACLE DUPLEX	MOUNTING HEIGHT ABOVE FINISHED FLOOR TO CENTER 400mm (16 in)
	ELECTRICAL RECEPTACLE DUPLEX	MOUNTING HEIGHT ABOVE FINISHED FLOOR TO CENTER 400mm (16 in)
	ELECTRICAL RECEPTACLE SIZE AND TYPE NOTED	
	ELECTRICAL DIRECT WIRE SIZE AND TYPE AS NOTED	
	DISCONNECT SWITCH	
	LIGHT SWITCH	MOUNTING HEIGHT ABOVE FINISHED FLOOR TO CENTER 900mm to 1100mm (35.4in to 43.3 in)
	LIGHT FIXTURE	
	EXIT SIGN	
	EXIT SIGN/EMERGENCY LIGHT	MOUNTING HEIGHT ABOVE FINISHED FLOOR 2100mm (82 in)
	EMERGENCY LIGHT	MOUNTING HEIGHT ABOVE FINISHED FLOOR 2100mm (82 in)
	INTERIOR CAMERA	
	EXTERIOR CAMERA	

ALL SHOWN WORK IS PART OF THE BASE PRICE EXCEPT WHERE SPECIFICALLY NOTED AS BEING PART OF SEPARATE PRICE

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EMERGENCY GENERATOR NOTES

1. REFERENCES:

1. CANADIAN STANDARDS ASSOCIATION, (CSA INTERNATIONAL)

1. CAN3-Z299.3, QUALITY ASSURANCE PROGRAM - CATEGORY 3.

2. NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

1. NEMA MG 1, MOTORS AND GENERATORS.

3. EMERGENCY GENERATOR DESIGN, INSTALLATION, OPERATION, MAINTENANCE AND TESTING SHALL BE IN ACCORDANCE WITH CAN/CSA C282 – “EMERGENCY ELECTRICAL POWER SUPPLY FOR BUILDINGS”.

2. DESCRIPTION:

1. PROVIDE AN AUTOMATIC, UNATTENDED, STANDBY POWER SUPPLY SYSTEM CONSISTING OF:

1. AIR COOLED NATURAL DIESEL GENERATING UNIT WITH CONTROL PANEL.

2. OUTDOOR, WEATHER-PROTECTIVE, SOUND-ATTENUATING HOUSING.

3. AUTOMATIC TRANSFER SWITCH.

4. ACCESSORIES AND EQUIPMENT SPECIFIED IN THIS SPECIFICATION.

5. DESIGN, FABRICATION, TESTING, TRANSPORTATION, DEMONSTRATION AND EQUIPMENT WARRANTY.

6. OBTAIN A COMPREHENSIVE INSPECTION AND CERTIFICATE FOR ALL FUEL RELATED EQUIPMENT AS REQUIRED BY TSSA.

3. DESCRIPTION:

1. DESIGN EQUIPMENT SUITABLE TO MEET THE FOLLOWING REQUIREMENTS:

1. TOTAL LOAD: 250 KW;

2. VOLTAGE: 347/600 V;

3. FREQUENCY: 60 HZ;

4. 3 PHASE / 4 WIRE;

5. POWER FACTOR: 0.8;

6. MAXIMUM ROTATIONAL SPEED: 1800 RPM;

7. PERFORMANCE: AUTOMATIC;

8. AMBIENT TEMPERATURE: 50 DEG C.

4. SUBMITTALS:

1. SUBMIT SHOP DRAWINGS FOR APPROVAL, INCLUDING DETAILS ON THE FOLLOWING:

1. ENGINE: MAKE, MODEL, RATING AND PERFORMANCE CURVES.

2. STARTER MOTOR, MAKE, MODEL.

3. GENERATOR: MAKE, MODEL AND RATING COMPLETE WITH GENERATOR SATURATION CURVES, HEAT DAMAGE CURVES, REACTIVE CAPABILITY AND SPECIAL DATA.

4. VOLTAGE REGULATOR: MAKE, MODEL, TYPE.

5. GOVERNOR: TYPE, MODEL.

6. BATTERY: MAKE, TYPE, VOLTAGE, CAPACITY.

7. CHARGER: MAKE, MODEL, INPUT AND OUTPUT RATING.

8. SUBMIT GENERAL OUTLINE DRAWING OF COMPLETE ASSEMBLY SHOWING ENGINE AND GENERATOR MOUNTING, EXHAUST, RECIRCULATING AND INTAKE AIR LOUVRE ARRANGEMENT, EXHAUST GAS SILENCER AND PIPE ARRANGEMENT, LOCATIONS OF FUEL AND LUBRICATING OIL FILTERS, FUEL SUPPLY CONNECTIONS, LUBRICATING OIL DRAIN VALVE, AIR CLEANER, ENGINE INSTRUMENT PANEL, STARTING MOTOR, POWER AND CONTROL JUNCTION BOXES, ENGINE AND GENERATOR MOUNTING FEET. INDICATE ON DRAWINGS:

1. HORIZONTAL AND VERTICAL DIMENSIONS.

2. WEIGHT OF ENGINE, GENERATOR, BASEPLATE AND EXHAUST SILENCER.

9. IDENTIFY EXACT LOCATIONS AND DETAILS WHERE NECESSARY OF INTERCONNECTING SERVICES.

10. BASEPLATE CONSTRUCTION DETAILS AND MATERIALS.

11. TRANSFER AND BYPASS SYSTEM: MAKE, MODEL, TYPE.

12. TYPE AND LAYOUT OF PANELS.

13. SCHEMATIC AND WIRING DIAGRAMS OF ENGINE, GENERATOR, CONTROL PANEL, AUTOMATIC TRANSFER AND BYPASS PANELS COMPLETE WITH INTERCONNECTING WIRING DIAGRAMS.

14. SINGLE LINE DIAGRAM SHOWING BREAKERS, SWITCHES, METERING AND PROTECTIVE RELAYS.

15. FIELD WIRING DIAGRAMS.

16. COMPLETE BILL OF MATERIALS, INCLUDING MANUFACTURER'S NAME, CATALOGUE NUMBERS AND CAPACITY.

2. PROVIDE MAINTENANCE DATA FOR GENERATING UNIT, INCLUDING:

1. COMPLETE SET OF REVIEWED SHOP DRAWINGS.

2. FACTORY TEST DATA OF ENGINE, GENERATOR, EXCITER, CONTROL LOGIC, METERING AND OTHER PERTINENT TEST DATA.

3. MAINTENANCE AND OPERATION BULLETINS FOR:

1. ENGINE AND ACCESSORIES.

2. GENERATOR.

3. VOLTAGE REGULATOR AND ACCESSORIES.

4. BATTERY CHARGER.

5. SPEED GOVERNOR.

6. STARTING MOTOR.

7. BATTERIES.

8. VENTILATING EQUIPMENT.

9. TIMERS, RELAYS, METERS.

10. POWER CIRCUIT BREAKERS.

11. CONTROLLER, CONTACTORS.

12. OTHER ACCESSORIES.

4. COMPLETE SEQUENCE OF SYSTEM OPERATION.

5. COMPLETE BILL OF MATERIALS INCLUDING NAMEPLATE DATA OF EQUIPMENT AND ACCESSORIES.

5. QUALITY ASSURANCE:

1. DO WORK IN ACCORDANCE WITH CAN3-Z299.3.

6. MAINTENANCE - EXTRA MATERIALS:

1. PROVIDE GENERATOR UNIT WITH STANDARD SET OF ENGINE MANUFACTURER'S SPARE PARTS FOR ONE YEAR NORMAL OPERATIONS.

2. WHERE METRIC SIZE NUTS AND BOLTS ARE USED, PROVIDE ONE SET OF SOCKETS COMPLETE WITH RATCHET HANDLE AND SET OF COMBINATION WRENCHES, TO FIT SIZES USED.

3. PROVIDE COMPLETE SET OF SPECIALIZED TOOLS REQUIRED FOR ADJUSTMENT AND MAINTENANCE OF EQUIPMENT SUPPLIED.

7. TRAINING:

1. PROVIDE A MINIMUM OF 4 HOURS OF TRAINING FOR THE GENERATOR SYSTEM, INCLUDING REVIEW OF WRITTEN PROCEDURES FOR THE FOLLOWING:

1. SYSTEM OPERATION.

2. SYSTEM TESTING REQUIREMENTS.

3. SYSTEM INSPECTION REQUIREMENTS.

8. SERVICE AND WARRANTY:

1. 2 YEAR MAINTENANCE AND SERVICE BY THE GENERATOR SUPPLIER/MANUFACTURER, LISTED IN 10 (BELOW).

2. 5 YEAR COMPREHENSIVE WARRANTY.

9. GENERATOR SET:

1. PROTOTYPE TESTS AND EVALUATION: PROTOTYPE TESTS SHALL HAVE BEEN PERFORMED ON A COMPLETE AND FUNCTIONAL UNIT, COMPONENT LEVEL TYPE TESTS WILL NOT SUBSTITUTE FOR THIS REQUIREMENT. PROTOTYPE TESTING SHALL COMPLY WITH THE REQUIREMENTS OF NFPA 110 FOR LEVEL 1 SYSTEMS.

2. PERFORMANCE:

1. VOLTAGE REGULATION SHALL BE +/- 1.0 PERCENT FOR ANY CONSTANT LOAD BETWEEN NO LOAD AND RATED LOAD.

2. FREQUENCY REGULATION SHALL BE ISOCHRONOUS FROM STEADY STATE NO LOAD TO STEADY STATE RATED LOAD. RANDOM FREQUENCY VARIATION WITH ANY STEADY LOAD FROM NO LOAD TO FULL LOAD SHALL NOT EXCEED PLUS OR MINUS 0.5%.

3. THE GENERATOR SET SHALL BE CAPABLE OF SINGLE STEP LOAD PICK UP OF 100% NAMEPLATE KW AND POWER FACTOR, LESS APPLICABLE DERATING FACTORS, WITH THE ENGINE-GENERATOR SET AT OPERATING TEMPERATURE.

4. THE GENERATOR SET SHALL BE CAPABLE OF SUSTAINING A MINIMUM OF 90% OF RATED NO LOAD VOLTAGE WITH THE SPECIFIED KVA LOAD AT NEAR ZERO POWER FACTOR APPLIED TO THE GENERATOR SET.

3. ENGINE WITH:

1. RADIATOR AND COOLING SYSTEM

2. ROTATING PARTS SHALL BE GUARDED.

3. INDUSTRIAL SPARK-IGNITED START.

4. LUBRICATION SYSTEM.

5. ENGINE MOUNTED BATTERY AND BATTERY CHARGING ALTERNATOR.

6. SOLID-STATE VOLTAGE REGULATOR.

4. AC GENERATOR.

5. MICROPROCESSOR-BASED, ENGINE-GENERATOR SET CONTROL, DESIGNED TO PROVIDE AUTOMATIC STARTING, MONITORING, AND CONTROL FUNCTIONS FOR THE GENERATOR SET. THE CONTROL SYSTEM SHALL ALSO BE DESIGNED TO ALLOW LOCAL MONITORING AND CONTROL OF THE GENERATOR SET, AND REMOTE MONITORING AND CONTROL.

6. THREE POSITION CONTROL SWITCH LABELED RUN/OFF/AUTO.

7. RED "MUSHROOM-HEAD" PUSH-BUTTON EMERGENCY STOP SWITCH.

8. PUSH-BUTTON RESET SWITCH.

9. GENERATOR SET AC DIGITAL OUTPUT METERING INCLUDING VOLTMETER, AMMETER, FREQUENCY METER, AND KILOWATT (KW) METER.

10. GENERATOR SET DIGITAL ALARM AND STATUS MESSAGE DISPLAY, INDICATING THE EXISTENCE OF THE FOLLOWING ALARM AND SHUTDOWN CONDITIONS:

1. LOW OIL PRESSURE (ALARM)

2. LOW OIL PRESSURE (SHUTDOWN)

3. OIL PRESSURE SENDER FAILURE (ALARM)

4. LOW COOLANT TEMPERATURE (ALARM)

5. HIGH COOLANT TEMPERATURE (ALARM)

6. HIGH COOLANT TEMPERATURE (SHUTDOWN)

7. ENGINE TEMPERATURE SENDER FAILURE (ALARM)

8. LOW COOLANT LEVEL (ALARM OR SHUTDOWN-SELECTABLE)

9. FAIL TO CRANK (SHUTDOWN)

10. OVERCRANK (SHUTDOWN)

11. OVERSPEED (SHUTDOWN)

12. LOW DC VOLTAGE (ALARM)

13. HIGH DC VOLTAGE (ALARM)

14. WEAK BATTERY (ALARM)

15. HIGH AC VOLTAGE (SHUTDOWN)

16. LOW AC VOLTAGE (SHUTDOWN)

17. UNDER FREQUENCY (SHUTDOWN)

18. OVER CURRENT (WARNING)

19. OVER CURRENT (SHUTDOWN)

20. SHORT CIRCUIT (SHUTDOWN)

21. GROUND FAULT (ALARM)

22. OVER LOAD (ALARM)

23. EMERGENCY STOP (SHUTDOWN)

11. ENGINE STATUS MONITORING: THE FOLLOWING INFORMATION SHALL BE AVAILABLE FROM A DIGITAL STATUS PANEL ON THE GENERATOR SET CONTROL:

1. ENGINE OIL PRESSURE (PSI OR KPA)

2. ENGINE COOLANT TEMPERATURE (DEGREES F OR C)

3. ENGINE OIL TEMPERATURE (DEGREES F OR C)

4. ENGINE SPEED (RPM)

5. NUMBER OF HOURS OF OPERATION (HOURS)

6. NUMBER OF START ATTEMPTS

7. BATTERY VOLTAGE (DC VOLTS)

12. BASE: THE GENERATOR SET SHALL BE MOUNTED ON A HEAVY DUTY STEEL BASE TO MAINTAIN ALIGNMENT BETWEEN COMPONENTS. THE BASE SHALL INCORPORATE A BATTERY TRAY WITH HOLD-DOWN CLAMPS WITHIN THE RAILS.

13. VIBRATION ISOLATION, INCLUDING SEISMIC RESTRAINTS.

14. EXHAUST SILENCER INSTALLED ACCORDING TO THE GENERATOR SET MANUFACTURERS RECOMMENDATIONS AND TO MEET THE REQUIREMENTS OF THE CERTIFICATE OF APPROVAL (AIR & NOISE).

15. STARTING AND CONTROL BATTERIES.

16. GENERATOR SET MAIN CIRCUIT BREAKER, SET-MOUNTED AND WIRED, UL LISTED, MOLDED CASE TYPE WITH ELECTRONIC TRIP UNIT.

17. OUTDOOR WEATHER-PROTECTIVE SOUND ATTENUATING HOUSING:

1. TO MEET THE REQUIREMENTS OF THE CERTIFICATE OF APPROVAL (AIR & NOISE).

2. THE ENCLOSURE SHALL INCLUDE HINGED DOORS FOR ACCESS TO BOTH SIDES OF THE ENGINE AND ALTERNATOR, AND THE CONTROL EQUIPMENT. KEY-LOCKING AND PADLOCKABLE DOOR LATCHES SHALL BE PROVIDED FOR ALL DOORS. DOOR HINGES SHALL BE STAINLESS STEEL.

3. ALL SHEET METAL SHALL BE PRIMED FOR CORROSION PROTECTION AND FINISH PAINTED FOR OUTDOOR INSTALLATION.

18. BASE MOUNTED, DOUBLE WALL, UL LISTED FUEL TANK WITH 48 HOUR CAPACITY AND WATER SEPARATOR FUEL FILTER. PROVIDE COMPREHENSIVE INSPECTION OF ALL FUEL RELATED EQUIPMENT AS REQUIRED BY TSSA.

19. ENCLOSURE:

1. SOUND ATTENUATED ENCLOSURE.

2. SOUND LEVEL 70DBA AT 7M.

20. AUTOMATIC TRANSFER SWITCH:

1. RATED FOR 600 VOLTS TO CARRY 100 PERCENT OF RATED CURRENT CONTINUOUSLY, WITH BYPASS ISOLATION SWITCH.

2. CSA AND UL APPROVED.

3. TRANSFER SWITCH AND ITS UPSTREAM PROTECTION SHALL BE COORDINATED.

4. TRANSFER SWITCH SHALL BE PROVIDED WITH A MICROPROCESSOR-BASED CONTROL PANEL TO ALLOW THE OPERATOR TO VIEW THE STATUS AND CONTROL OPERATION OF THE TRANSFER SWITCH.

5. THE TRANSFER SWITCH MANUFACTURER SHALL PERFORM A COMPLETE OPERATIONAL TEST ON THE TRANSFER SWITCH PRIOR TO SHIPPING FROM THE FACTORY.

6. GENERATOR WILL ASSUME POWER WITHIN 15 SECONDS OF THE LOSS OF NORMAL POWER, IN ACCORDANCE WITH CSA C282, SENTENCE 5.4.

10. ACCEPTABLE MANUFACTURER AND PRODUCT:

1. CUMMINS:

1. CUMMINS QS18.9G SPARK-IGNITED ENGINE

2. POWERCOMMAND 2.3 ELECTRONIC CONTROL WITH REMOTE MONITORING DEVICE – POWERCOMMAND 500/550

OR APPROVED EQUAL.

2. GENERATOR SET SPECIFICATIONS

1. GOVERNOR REGULATION CLASS: ISO 8528 PART 1 CLASS G3

2. VOLTAGE REGULATION, NO LOAD TO FULL LOAD: ± 1.0%

3. RANDOM VOLTAGE VARIATION: ± 1.0%

4. FREQUENCY REGULATION: ISOCHRONOUS

5. RANDOM FREQUENCY VARIATION: ± 0.25% @ 60 HZ

6. RADIO FREQUENCY EMISSIONS COMPLIANCE: FCC CODE TITLE 47 PART 15 CLASS B

3. ENGINE SPECIFICATIONS

1. DESIGN: TURBOCHARGED AND AFTERCOOLED

2. BORE: 114.1 MM (4.49 IN)

3. STROKE: 144.5 MM (5.69 IN)

4. DISPLACEMENT: 8.9 LITERS (543 IN3)

5. CYLINDER BLOCK: CAST IRON, IN-LINE 6 CYLINDER

6. BATTERY CAPACITY: 850 AMPS STANDARD, DUAL BATTERY OPTIONAL

7. BATTERY CHARGING ALTERNATOR: 100 AMPS

8. STARTING VOLTAGE: 12-VOLT, NEGATIVE GROUND

9. LUBE OIL FILTER TYPE(S): SPIN-ON

10. STANDARD COOLING SYSTEM: 125 KW - 50 °C (122 °F) AMBIENT COOLING SYSTEM

11. RATED SPEED: 1800 RPM

4. ALTERNATOR SPECIFICATIONS

1. DESIGN: BRUSHLESS, 4 POLE, DRIP PROOF, REVOLVING FIELD

2. STATOR: 2/3 PITCH

3. ROTOR: DIRECT COUPLED, FLEXIBLE DISC

4. INSULATION SYSTEM: CLASS H PER NEMA MG1-1.65

5. STANDARD TEMPERATURE RISE: 120 °C (248 °F) STANDBY

6. EXCITER TYPE: TORQUE MATCH (SHUNT) WITH PMG AS OPTION

7. ALTERNATOR COOLING: DIRECT DRIVE CENTRIFUGAL BLOWER

8. AC WAVEFORM TOTAL HARMONIC DISTORTION: < 5% NO LOAD TO FULL LINEAR LOAD, < 3% FOR ANY SINGLE HARMONIC

9. TELEPHONE INFLUENCE FACTOR (TIF): < 50 PER NEMA MG1-22.43

10. TELEPHONE HARMONIC FACTOR (THF): < 3%

5. ENGINE

1. HEAVY-DUTY ENGINE AIR CLEANER

2. EXTENSION – OIL DRAIN

3. ENGINE OIL HEATER

6. CONTROL

1. AC OUTPUT ANALOG METERS

2. STOP SWITCH – EMERGENCY

3. AUXILIARY OUTPUT RELAYS (2)

4. AUXILIARY CONFIGURABLE SIGNAL INPUTS (8) AND RELAY OUTPUTS (8)

7. ALTERNATOR

1. 120 °C TEMPERATURE RISE ALTERNATOR

2. PMG

3. ALTERNATOR HEATER, 120V RECONNECTABLE FULL 1 PHASE OUTPUT ALTERNATOR

8. ENCLOSURE

1. ALUMINUM ENCLOSURES WITH MUFFLER INSTALLED

2. GREEN COLOR, WEATHER, SOUND LEVEL 2, WINTER

9. COOLING SYSTEM

1. SHUTDOWN – LOW COOLANT LEVEL

2. WARNING – LOW COOLANT LEVEL

3. EXTENSION – COOLANT DRAIN

4. COOLANT HEATER OPTIONS:

1. < -17 °C (0 °F) - EXTREME COLD

10. EXHAUST SYSTEM

1. EXHAUST CONNECTOR NPT

2. EXHAUST MUFFLER MOUNTED, CRITICAL SOUND LEVEL

DATA CABLE REEL

UNIT	DESCRIPTION	ACCEPTABLE PRODUCT	NOTES
DATA REEL	DATA CABLE REEL CEILING MOUNTED MANUAL OPERATION	HUBBELL #HBL150	WHITE RETRACTABLE 15m (50FT) CAT 6 CABLE

LIGHT FIXTURE SCHEDULE

UNIT	DESCRIPTION	NOM. DIMN (m)	LAMP	LENS	COLOUR TEMP (K)	WATTS	MEAN LUMENS	VOLTAGE	ACCEPTABLE PRODUCT	NOTES
LW1	LINEAR STRIP WALL MOUNTED	W - 2.1 L - 24	LED		20/25/30 SELECTABLE	10/20/30 SELECTABLE	2500/3700/4900	120	RENO #LSN OR APPROVED EQUAL	
LS14	LINEAR STRIP CEILING MOUNTED	W - 2.1 L - 48	LED		35/40/5000 SELECTABLE	20/30/40 SELECTABLE	2500/3700/4900	120	RENO #LSN OR APPROVED EQUAL	
LV14	LINEAR STRIP CEILING MOUNTED	W - 2.1 L - 48	LED	FROSTED POLYCARB	35/40/5000 SELECTABLE	25/35/48 SELECTABLE	3800/5200/6700	120	RENO #LVP OR APPROVED EQUAL	VAPOUR TIGHT
LR22	RECESSED FLAT PANEL	L - 24 W - 24	LED		35/40/5000 SELECTABLE	20/30/40 SELECTABLE	2600/3900/5200	120	RENO #BLPL OR APPROVED EQUAL	
LR24	RECESSED FLAT PANEL	L - 48 W - 24	LED		35/40/5000 SELECTABLE	30/40/50/60 SELECTABLE	3800/5300/6600/8000	120	RENO #BLPL OR APPROVED EQUAL	
LH1 LH2	HIGH BAY ROUND	DIA - 10.4	LED		35/40/5000 SELECTABLE	80-160 SELECTABLE	13740-22700	120	RENO #HBU OR APPROVED EQUAL	POLE PENDANT MOUNT
LH3	HIGH BAY ROUND	DIA - 13.4	LED		35/40/5000 SELECTABLE	120-250 SELECTABLE	20300-36500	120	RENO #HBU OR APPROVED EQUAL	POLE PENDANT MOUNT

AUTOMATIC CORD REEL

UNIT	DESCRIPTION	VOLT	PHASE	AMP	ACCEPTABLE PRODUCT	NOTES
AR	AUTOMATIC CORD REEL CEILING MOUNTED AUTO AND MANUAL OPERATION	120	1	20	KUSSMAUL ELECTRONICS MODEL 091-220-20-120-AS	AUTO REEL CORD WINDUP AUTO REEL CONTROL BOX AUTO REEL REMOTE PANEL 14m (45ft) CABLE WITH PLUG TO MATCH VEHICLES

ELECTRIC HEATER SCHEDULE

UNIT	DESCRIPTION	DIMN (in)	AIRFLOW (CFM)	WATTS	VOLT	PHASE	ACCEPTABLE PRODUCT	NOTES
BBH1	BASEBOARD HEATER	27.9	-	500	120	1	STELPRO #8 OUELLETTE	WHITE WALL-MOUNTED TSTAT BUILT-IN TSTAT
							OR APPROVED EQUAL	
EUH-1	FAN FORCED HEATER COMMERCIAL GRADE SINGLE UNIT	W - 16.4 H - 23.1 DP - 5.3	160	1500	208	1	STELPRO #WF OUELETTE	WHITE SURFACE MOUNTED WITH WALL BOX BUILT-IN TSTAT
							OR APPROVED EQUAL	

CEILING FAN SCHEDULE

UNIT	DESCRIPTION	FAN (in)	VEL (fpm)	FLOW (cfm)	VOLT (V)	PHASE	POWER (W)	MCCP (A)	ACCEPTABLE PRODUCT	NOTES
CF-1	CEILING FAN INDUSTRIAL	48	700	13000	120	1	86	0.8	CANARM #CP	WITH INFINITE AND REVERSIBLE SPEED CONTROL
									OR APPROVED EQUAL	

EXIT & EMERGENCY LIGHT FIXTURE SCHEDULE

UNIT	DESCRIPTION	LAMP	HOUSING	VOLTAGE	ACCEPTABLE PRODUCT	NOTES
EXT	EXIT LIGHT SELF-POWERED	LED 2W	STEEL WHITE	120-347	RENO #SRMS-U	RUNNING MAN PICTOGRAM WALL/CEILING/SIDE MOUNT SINGLE/DOUBLE FACE, AS REQUIRED ARROW, AS INDICATED TEST SWITCH CHARGE INDICATOR LIGHT
EX2	EXIT LIGHT SELF-POWERED EMERGENCY LIGHT	LED 2W LAMP 2 x 5W	STEEL WHITE	120-347	RENO #SRMC-U	RUNNING MAN PICTOGRAM WALL/CEILING/SIDE MOUNT SINGLE/DOUBLE FACE, AS INDICATED ARROW, AS INDICATED TEST SWITCH CHARGE INDICATOR LIGHT

MORRIS Engineering Ltd.

Brockville, Ontario

(613)349-0555

LICENSED PROFESSIONAL ENGINEER
2026-6-29
M. A. MORRIS
PROVINCE OF ONTARIO

7	2026-06-29	ISSUED FOR TENDER/PERMIT/CONSTRUCTION
6	2026-05-20	FINAL REVIEW
5	2026-03-16	99% REVIEW
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1	2025-12-22	REVISED, FOR REVIEW
0	2025-09-26	FOR REVIEW
NO.	DATE	REVISION

CLIENT:

COLBOURNE & KEMBEL ARCHITECTS INC. Kingston, ON

PROJECT:

LOYALIST AMBULANCE Loyalist Business Park

DRAWING:

ELECTRICAL

Generator Notes & Schedules

DESIGN BY:

M. MORRIS

DRAWN BY:

A.M.

DATE:

AUG 2025

PROJECT No.:

892

SCALE:

AS SHOWN

E002

ELECTRICAL LOAD CALCULATION

OTHER TYPES OF OCCUPANCY (OESC 8-210)									
BASIC LOAD			AREA (sq.ft.)	AREA (sq.m.)	BASIC LOAD (W/sq.m.)		DEMAND FACTOR	LOAD (W)	
TRAINING AREA			2163	201	25		1.00	5024	
ADMINISTRATION AND SUPPORT AREA			4464	415	50		0.90	18863	
EQUIPMENT BAYS			5668	527	25		1.00	13165	
EQUIPMENT BAYS		Future	1400	130	25		1.00	3252	
COLD STORAGE				2616	243	10	1.00	2430	
ADDITIONAL LOAD		QTY	LOAD (W)	LOAD (Am p)	VOLTAGE (V)		PHASE FACTOR	DEMAND FACTOR	LOAD (W)
RANGE		1	6000					1.00	6000
AIR CONDITIONING									
	RTU-3	3			23		1.73	1.00	24829
	RTU-4	1			27		1.73	1.00	9716
	RTU-7.5	1			43		1.73	1.00	15473
	HP-OUT	1			15		1.00	1.00	3120
	HP-1	1			18		1.00	1.00	3744
	Future	1			27		1.73	1.00	9716
MOTORS:									
	- Overhead Door Operators	3/4 HP	8		6.9		1.00	1.00	11482
	Future	2			6.9		1.00	1.00	2870
EXTERIOR LIGHTING		6	200					1.00	1200
EVSE (Electric Vehicle Supply Equipment) - Level 3									150000
TOTAL LOAD									
TOTAL LOAD		VOLTAGE (V)	PHASE FACTOR			(W)		280683	
AMPERAGE		600	1.73			(A)		270	
MAIN SERVICE SIZE (DE-RATED TO 80%)						(A)		338	

- NOTES:
- ELECTRICAL LOAD CALCULATION IS BASED ON THE CALCULATION PROCEDURES FOR MINIMUM CIRCUIT AMPACITY OF THE SERVICE, AS OUTLINED IN THE ONTARIO ELECTRICAL SAFETY CODE, SECTION 8, SERVICE AND FEEDERS.

ELECTRICAL SERVICE NOTES:

1 COORDINATION:

- GENERAL AND ELECTRICAL CONTRACTORS SHALL ASSUME FULL RESPONSIBILITY FOR COORDINATION OF NEW ELECTRICAL SERVICE AND CONNECTION WITH THE SUPPLY AUTHORITY.

2 WORK BY SUPPLY AUTHORITY:

- SUPPLY AUTHORITY SHALL SUPPLY AND INSTALL THE FOLLOWING (TO BE VERIFIED BY THE SUPPLY AUTHORITY):
 - PRIMARY CONDUCTOR, CONDUIT AND CONCRETE ENCASEMENT;
 - TRANSFORMER.

3 WORK BY ELECTRICAL CONTRACTOR:

- ELECTRICAL CONTRACTOR SHALL SUPPLY AND INSTALL THE FOLLOWING (TO BE VERIFIED BY THE SUPPLY AUTHORITY):
 - SECONDARY CONDUCTORS, CONDUIT AND CONCRETE;
 - TRANSFORMER BASE;
 - GROUNDING SYSTEM;
 - PROTECTIVE BOLLARDS.

4 SECONDARY CABLE INSTALLATION:

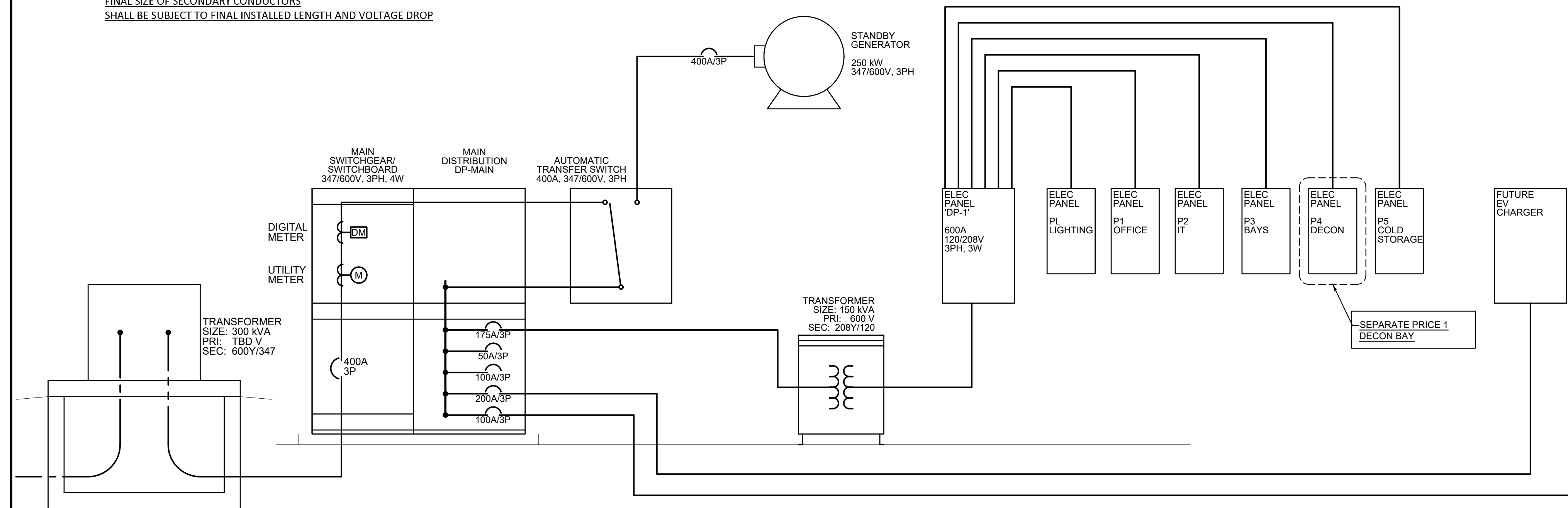
- SECONDARY CONDUCTORS:
TO OESC DIAGRAM D11
 - MAIN SERVICE SHORT CIRCUIT CURRENT RATING (SCCR): 65 kA
 - SECONDARY CONDUCTOR SIZING:

SIZE:	250 MCM
TYPE:	ALUM
CABLES PER PHASE:	2
OESC TABLE 4:	410A
OESC TABLE D11B:	462A
DETAIL NUMBER:	2

FINAL SIZE OF SECONDARY CONDUCTORS
SHALL BE SUBJECT TO FINAL INSTALLED LENGTH AND VOLTAGE DROP

5 DIGITAL METERING UNIT:

- MAIN SWITCHGEAR SHALL HAVE A POWER METER UNIT, WHICH MEASURES DATA FOR ALL PHASES, LINE TO LINE & LINE TO NEUTRAL.
TYPES OF MEASUREMENT WITH ACCURACY:
 - CURRENT +/- 0.15 %;
 - VOLTAGE +/- 0.1 %;
 - FREQUENCY +/- 0.05 %;
 - ACTIVE POWER +/- 0.2 %;
 - APPARENT POWER +/- 0.5 %;
 - REACTIVE POWER +/- 1 %;
 - POWER FACTOR +/- 0.005;
 - ACTIVE ENERGY +/- 0.2 %;
 - REACTIVE ENERGY +/- 1 %.
- DATA RECORDING:
 - EVENT LOGS;
 - MAINTENANCE LOGS;
 - MIN/MAX OF INSTANTANEOUS VALUES;
 - DATA LOGS, ALARM LOGS; AND TIME STAMPING.
- DIGITAL METERING UNIT SHALL HAVE COMMUNICATION OUTPUT, FOR CONNECTION TO BUILDING AUTOMATION AND CONTROL SYSTEM.
- DIGITAL METERING UNIT SHALL BE SCHNEIDER ELECTRIC - POWERLOGIC PM5000, OR EQUAL.



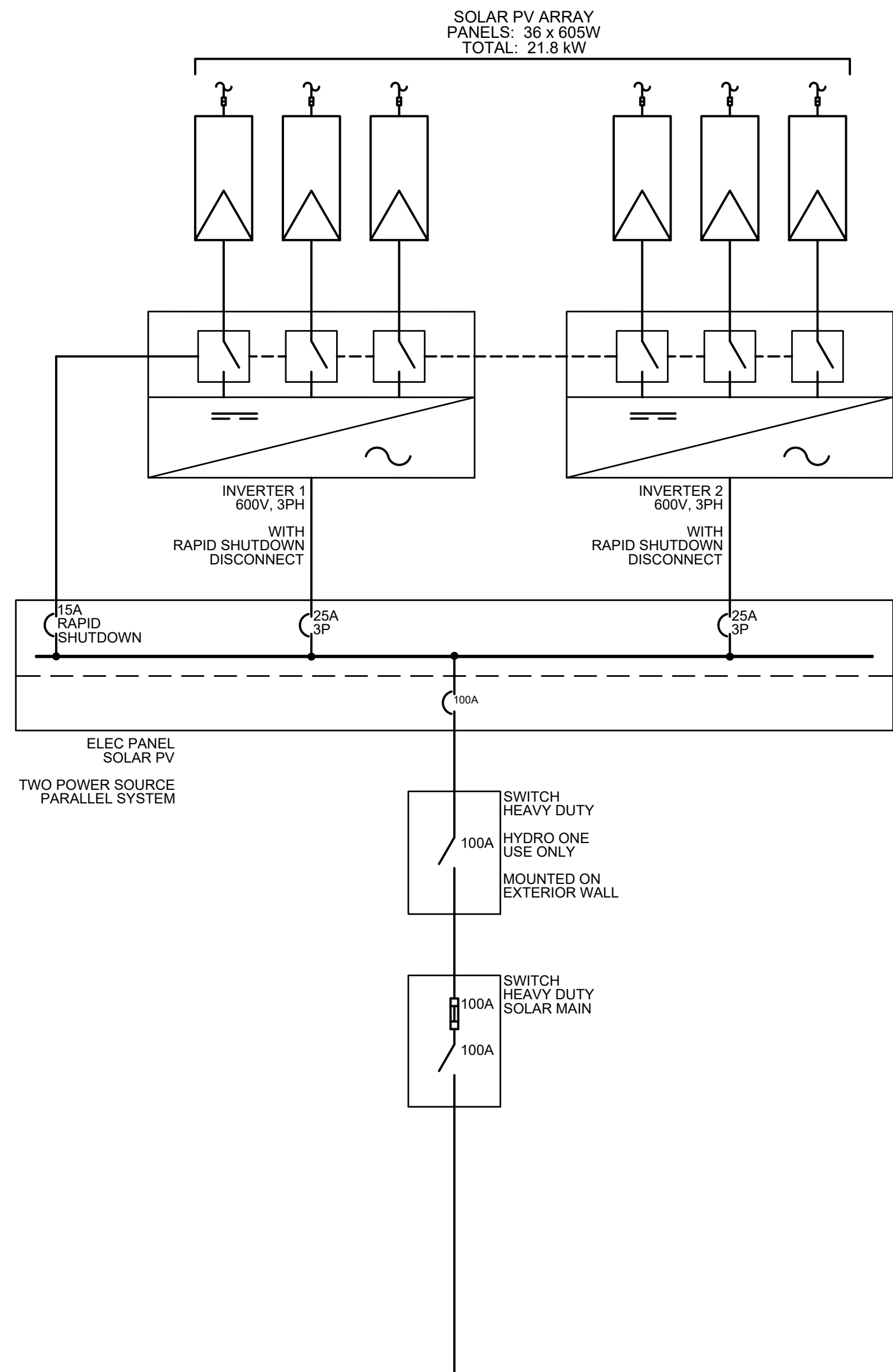
SOLAR SYSTEM:

GENERAL NOTES:

- GENERAL, ELECTRICAL AND SOLAR CONTRACTORS SHALL ASSUME FULL RESPONSIBILITY FOR COORDINATION OF NEW SOLAR SYSTEM CONNECTION WITH THE SUPPLY AUTHORITY. THIS SHALL INCLUDE ALL APPLICATION PREPARATIONS, APPLICATION FEES AND ENGINEERING COSTS. THE CONTRACTOR SHALL NOT INCLUDE HYDRO ONE CONNECTION FEES - THESE SHALL BE PAID BY THE OWNER.
SOLAR SYSTEM CONTRACTOR SHALL PROVIDE A DETAILED STRUCTURAL AND SEISMIC DESIGN OF THE BASE FRAME, BALLAST AND BALLAST CONTAINMENT.
SOLAR SYSTEM CONTRACTOR SHALL PROVIDE A DETAILED ELECTRICAL DESIGN & SINGLE LINE DIAGRAM OF COMPLETE AND FULLY OPERATIONAL SOLAR SYSTEM
- SOLAR SYSTEM CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR COORDINATION OF NEW SOLAR SYSTEM CONNECTION WITH THE ELECTRICAL CONTRACTOR.
- COMMUNICATION CABLE:
 - SUPPLY AND INSTALL DATA COMMUNICATION CABLE (CAT 6) BETWEEN THE INVERTERS AND THE SCHOOL DATA RACK, FOR MONITORING OF THE SYSTEM.
 - DATA COMMUNICATION CABLE SHALL BE INSTALLED IN CONDUIT.
 - TERMINATE THE CABLE AT BOTH ENDS TO MATCH THE INVERTER AND THE DATA RACK SWITCH
- REFER TO ARCHITECTURAL DRAWINGS FOR STRUCTURAL & ROOFING DETAILS

SOLAR ARRAY NOTES:

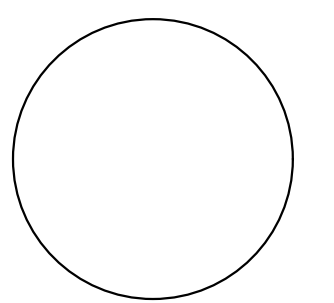
- SOLAR PANEL LAYOUT IS APPROXIMATE AND SHALL BE VERIFIED BY THE GENERAL AND SOLAR CONTRACTORS.
- SOLAR PANELS:
 - QCELL Q-PEAK DUO XL-G115 605W (STANDARD OF ACCEPTANCE).
- SOLAR RACK - ON ROOF:
 - LOCATION:
 - ALL SOLAR PANELS AND RACKING SHALL BE A MINIMUM OF 2m FROM ROOF EDGE.
 - SOLAR ARRAY SHALL NOT INTERFERE WITH ROOFTOP ACCESS OR STORMWATER FLOW TO ROOF DRAINS.
 - RACK:
 - ALUMINUM RAIL AND COMPONENTS.
 - STAINLESS STEEL FASTENERS.
 - RIGID CONSTRUCTION WITH INTEGRAL BALLAST CHASSIS.
 - BALLAST:
 - SHALL BE CONCRETE SECTIONS THAT ARE EMBEDDED IN A BALLAST CHASSIS TO CONTAIN THE BALLAST.
 - THE BALLAST CHASSIS SHALL BE SECURELY FASTENED/AFFIXED TO THE RACKING.
 - CONTACT WITH ROOF:
 - MATERIAL USED SHALL BE PROVEN TO BE COMPATIBLE WITH EXISTING ROOF MEMBRANE.
 - INCLUDE AT ALL POINTS OF CONTACT WITH ROOF:
 - SACRIFICIAL 1-PLY MOD. BIT. CAP SHEET MEMBRANE.
 - RUBBER PROTECTION PAD.



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CLIENT:

COLBOURNE & KEMBEL ARCHITECTS INC. Kingston, ON

PROJECT:

LOYALIST AMBULANCE Loyalist Business Park

DRAWING:

ELECTRICAL

Single Line Diagram

DESIGN BY: M. MORRIS

DRAWN BY: A.M.

DATE: AUG 2025

PROJECT No.: 892

SCALE: AS SHOWN

E003

ELECTRICAL PANEL 'DP1'												
Location: SERVICE ROOM			Mounting: SURFACE									
Rated Amp: 600 A			Mains Amp: 600 A MAIN BREAKER									
Voltage: 120/208V			Phase, Wire: 3 PH, 4 W									
Manufacturer: Square D, Siemens, Cutler-Hammer			Bus: Aluminum									
Cabinet: Trim, Lockable Door			Breakers: Bolt-On									
TVSS: N/A			Isolated Ground: N/A									
Load		Breaker			Breaker			Description		Load		
Watts	Description	Amp	Pole	No.	Amp	Pole	No.	Description		Description	Watts	
80	2LS14	15	1	1	2	1	15	RECEP - SERVICE RM				
400	2REC	20	1	3	4	1	20	RECEP - COMMUNICATIONS	REC	500		
400	2REC	20	1	5	6	1	15	RECEP - EXTERIOR	3REC	600		
		15	1	7	8	1	15	RECEP - EXTERIOR	2REC	400		
		20	1	9	10							
				11	12							
				13	14							
				15	16							
				17	18							
				19	20							
				21	22							
				23	24							
				25	26							
2000	VESTIBULE 101	20	2	27	28							
				29	30							
3000	VESTIBULE 105	20	2	31	32							
				33	34	1	20	FOLDING PARTITION (VERIFY)		500		
1500	BLH-1	15	2	35	36	2	20	SPARE				
				37	38							
8200	RTU-3A	30	3	39	40	3	30	ROOFTOP HVAC UNIT (VERIFY WITH SHOP DRAWING)	RTU-3B	8200		
				41	42							
				43	44							
8200	RTU-3C	30	3	45	46	3	40	ROOFTOP HVAC UNIT (VERIFY WITH SHOP DRAWING)	RTU-4	9700		
				47	48							
				49	50							
15000	RTU-7.5	50	3	51	52	3	125	SOLAR SYSTEM (VERIFY WITH SHOP CONTRACTOR)				
				53	54							
				55	56							
2175	PL LIGHTING	100	3	57	58	3	200	ELECTRICAL PANEL	P1 OFFICE	41820		
				59	60							
				61	62							
2800	P2 IT	100	3	63	64	3	200	ELECTRICAL PANEL	P3 BAYS	35500		
				65	66							
				67	68							
12000	P4 DECON	100	3	69	70	3	100	ELECTRICAL PANEL	P5 COLD STORAGE	15000		
				71	72							
				73	74							
				75	76			FUTURE SPACE FOR SOLAR CONNECTION TO MEET OESC 64-112				
				77	78							
				79	80							
55.755	KW							CONNECTED LOAD	KW	112.22		
								TOTAL CONNECTED LOAD	KW	167.975		

ELECTRICAL PANEL 'PL'												
Location: SERVICE ROOM			Mounting: SURFACE									
Rated Amp: 100 A			Mains Amp: 100 A MAIN BREAKER									
Voltage: 120/208V			Phase, Wire: 3 PH, 4 W									
Manufacturer: Square D, Siemens, Cutler-Hammer			Bus: Aluminum									
Cabinet: Trim, Lockable Door			Breakers: Bolt-On									
TVSS: N/A			Isolated Ground: N/A									
Load		Breaker			Breaker			Description		Load		
Watts	Description	Amp	Pole	No.	Amp	Pole	No.	Description		Description	Watts	
145	2LE1, LE2	15	1	1	2			EXTERIOR LIGHT CONTROL				
		15	2	3	4	2	15	EXTERIOR LIGHTS - ENTRANCES		1LE2, 4LE3	505	
				5	6							
625	1LE2, 5LE3	15	2	7	8	2	20	EXTERIOR LIGHTS - EAST WALL				
				9	10							
450	3LS1	20	2	11	12	1	15	POLE LIGHT FIXTURE CIRCUIT 1		3LS1	450	
				13	14	1	20	SPARE				
				15	16			SPARE				
				17	18							
				19	20							
				21	22							
				23	24							
1.22	KW							CONNECTED LOAD	KW	0.955		
								TOTAL CONNECTED LOAD	KW	2.175		

ELECTRICAL PANEL NOTES												
1.0 DEVICES:		DEVICE QUANTITIES ARE APPROXIMATE. DEVICES SHOWN ON FLOOR PLANS SHALL SUPERSEDE.										
2.0 IDENTIFICATION:		PERMANENT PANEL LABEL INDICATING NAME, AMP, VOLT, PHASE, WIRE TYPEWRITTEN CIRCUITING DIRECTORY										
3.0 EQUIPMENT SUPPLIED BY OTHERS:												
		ELECTRICAL CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR SERVICING REQUIREMENTS FOR ALL EQUIPMENT SUPPLIED BY OTHERS.										
		ELECTRICAL CONTRACTOR SHALL COORDINATE ALL EQUIPMENT WIRING WITH OTHER TRADES.										
		ELECTRICAL CONTRACTOR SHALL VERIFY AND CONFIRM ALL CIRCUITING, AND SHALL PROVIDE A NEW CIRCUITING LEGEND FOR APPROVAL BY OWNER AND ENGINEER, PRIOR TO PROCEEDING WITH WIRING OF PANEL.										
		THIS CIRCUITING STUDY SHALL INCLUDE ALL CIRCUITS.										
NOTATIONS:												
AFI		ARC FAULT CIRCUIT INTERRUPTER										
GFI		GROUND FAULT CIRCUIT INTERRUPTER										
IG		ISOLATED GROUND										
WP		WEATHERPROOF										
TBD		TO BE DETERMINED AND VERIFIED WITH OTHER TRADES										

ELECTRICAL PANEL 'P1 - OFFICE'												
Location: CUSTODIAN ROOM			Mounting: SURFACE									
Rated Amp: 200 A			Mains Amp: 200 A MAIN BREAKER									
Voltage: 120/208V			Phase, Wire: 3 PH, 4 W									
Manufacturer: Square D, Siemens, Cutler-Hammer			Bus: Aluminum									
Cabinet: Trim, Lockable Door			Breakers: Bolt-On									
TVSS: N/A			Isolated Ground: N/A									
Load		Breaker			Breaker			Description		Load		
Watts	Description	Amp	Pole	No.	Amp	Pole	No.	Description		Description	Watts	
80	2LS14	15	1	1	2	1	15	LIGHTS - DELIVERY STORAGE 102		LIGHTS - VEST., OFFICES 103,104	2LR22, 2LR24	160
200	5LS22	15	1	3	4	1	15	LIGHTS - CORRIDOR 106		LIGHTS - CORRIDOR 107	12LR22	480
80	LR24, LS14	15	1	5	6	1	15	LIGHTS - KITCHEN, CUSTODIAN		LIGHTS - WR 110,111,112,113,114,115	2LS14, 5LW1	280
800	4LH2	20	1	7	8	1	20	LIGHTS - TRAINING 116		LIGHTS - TRAINING 117	4LH2	800
800	4LH2	20	1	9	10	1	20	LIGHTS - TRAINING 116		LIGHTS - TRAINING 117	4LH2	800
320	4LS14, 4LW1	15	1	11	12	1	15	LIGHTS - LOCKER 119 - 124		LIGHTS - STOR 125, IT 126	4LS14, 2LR24	240
360	6LR24	15	1	13	14	1	15	LIGHTS - FITNESS 127 KIT 128,LOUNGE 129		LIGHTS - QUIET 130, COMP 131	3LR24	120
400	2REC	15	1	15	16	1	15	RECEP - DELIVERY STORAGE		RECEP - VEST., CORRIDOR 107	6REC	1200
800	4REC	15	1	17	18	1	15	RECEP - OFFICE 103		RECEP - OFFICE 104	4REC	800
800	4REC	15	1	19	20	1	15	RECEP - CORRIDOR 106		RECEP - OFFICE 104 VS MONITOR	REC	200
400	2REC	15	1	21	22	1	15	RECEP - KITCHEN 108 WALL		RECEP - CUSTODIAN 109	REC	200
1000	REC	20	1	23	24	1	15	RECEP - KITCHEN 108 COUNTER		RECEP - WR 110, 111, 112	3REC	600
1000	REC	20	1	25	26	1	15	RECEP - KITCHEN 108 COUNTER		RECEP - WR 113	2REC	400
800	4REC	15	1	27	28	1	15	RECEP - TRAINING 116		RECEP - WR 114, STORAGE 115	2REC	400
800	3REC	15	1	29	30	1	15	RECEP - TRAINING 116		RECEP - TRAINING 117	2REC	400
400	2REC	15	1	31	32	1	15	RECEP - LOCKER 119		RECEP - TRAINING 117	2REC	400
200	REC	15	1	33	34	1	15	RECEP - LOCKER WR 120		RECEP - WR 121	REC	200
800	4REC	15	1	35	36	1	15	RECEP - FITNESS 127		RECEP - LOCKER 122	2REC	400
200	REC	15	1	37	38	1	15	RECEP - KITCHEN 128		RECEP - STORAGE 125	2REC	400
500	REC	15	1	39	40	1	15	RECEP - KITCHEN 128 REFRIG		RECEP - LOUNGE 129	4REC	800
800	REC	20	1	41	42	1	15	RECEP - KITCHEN 128 COUNTER		RECEP - QUIET 130	3REC	600
800	REC	20	1	43	44	1	15	RECEP - KITCHEN 128 COUNTER		RECEP - COMPUTER 131	4REC	800
800	REC	20	1	45	46	1	15	RECEP - KITCHEN 128 COUNTER		RECEP - MEDICAL 132	3REC	600
				47	48	1	15			RECEP - OXYGEN 133	2REC	400
				49	50	1	15			SPARE		
				51	52							
				53	54							
				55	56							
				57	58							
				59	60							
				61	62							
250				63	64			EMERGENCY CALL ASSIST				
250				65	66	1	15	AUTO DOOR OPERATOR - WR 113		RANGE HOOD	RH	150
250				67	68	2	40	AUTO DOOR OPERATOR - BACK OF BLDG		RANGE	RA	6000
250				69	70			AUTO DOOR OPERATOR - TRAINING B				

VIDEO SURVEILLANCE NOTES

PART 1 GENERAL

- 1.1 SECTION INCLUDES

.1 VIDEO CAMERAS.

.2 VIDEO HANDLING.

.3 RECORDING DEVICES.

.4 TRANSMISSION METHODS.
- 1.2 REFERENCE DOCUMENTS

.1 NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

.1 NFPA 101, LIFE SAFETY CODE.

.2 ELECTRONIC INDUSTRIES ASSOCIATION (EIA)

.1 REC 12749, POWER SUPPLIES.

.2 RS 16051, SOUND SYSTEMS.
- 1.3 REFERENCE STANDARDS

.1 CANADIAN STANDARDS ASSOCIATION (CSA INTERNATIONAL)

.1 CSA C22.1-2015, ONTARIO ELECTRICAL CODE, (26TH EDITION) SAFETY STANDARD FOR ELECTRICAL INSTALLATIONS.

.2 UNDERWRITERS LABORATORIES OF CANADA (ULC)

.1 ULC-S317-1996, INSTALLATION AND CLASSIFICATION OF CLOSED CIRCUIT VIDEO EQUIPMENT (CCVC) SYSTEMS FOR INSTITUTIONAL AND COMMERCIAL SECURITY SYSTEMS.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 SUBMIT IN ACCORDANCE WITH GENERAL REQUIREMENTS AND SUBMITTALS.

.2 PRODUCT DATA:

.1 SUBMIT MANUFACTURER'S INSTRUCTIONS, PRINTED PRODUCT LITERATURE AND DATA SHEETS FOR VIDEO SURVEILLANCE EQUIPMENT AND INCLUDE PRODUCT CHARACTERISTICS, PERFORMANCE CRITERIA, PHYSICAL SIZE, FINISH AND LIMITATIONS.

.2 SUBMIT:

.1 FUNCTIONAL DESCRIPTION OF EQUIPMENT.

.2 TECHNICAL DATA SHEETS OF ALL DEVICES.

.3 DEVICE LOCATION PLANS AND CABLE LISTS.

.4 VIDEO CAMERA SURVEILLANCE CHART.

.5 VIDEO INTERCONNECTION DETAIL DRAWINGS.

.3 SHOP DRAWINGS:

.1 SUBMIT DRAWINGS

.2 SUBMIT SHOP DRAWINGS TO INDICATE PROJECT LAYOUT, CAMERA LOCATIONS, POINT-TO-POINT DIAGRAMS, CABLE SCHEMATICS, RISERS, MOUNTING DETAILS AND IDENTIFICATION LABELLING SCHEME

.3 SUBMIT ZONE LAYOUT DRAWINGS INDICATING NUMBER AND LOCATION OF ZONES AND AREAS COVERED.

.4 SAMPLES:

.1 SUBMIT FOR REVIEW AND ACCEPTANCE OF EACH UNIT.

.2 SAMPLES WILL BE RETURNED FOR INCLUSION INTO WORK.

.3 SUBMIT 1 SAMPLE OF EACH CAMERA SELECTED COMPLETE WITH HOUSING, BRACKETS AND MOUNTING HARDWARE.

.4 CAMERA WILL BE RETURNED FOR INCORPORATION INTO WORK AS APPROPRIATE.

.5 CERTIFICATES: SUBMIT CERTIFICATES SIGNED BY MANUFACTURER CERTIFYING THAT MATERIALS COMPLY WITH SPECIFIED PERFORMANCE CHARACTERISTICS AND PHYSICAL PROPERTIES.

1.1 SUBMIT UL PRODUCT SAFETY CERTIFICATES.

1.2 SUBMIT VERIFICATION CERTIFICATE THAT SERVICE COMPANY IS "UL LIST ALARM SERVICE COMPANY".

1.3 SUBMIT VERIFICATION CERTIFICATE THAT MONITORING FACILITY IS "UL LISTED CENTRAL STATION".

1.4 SUBMIT VERIFICATION CERTIFICATE THAT VIDEO SURVEILLANCE SYSTEM IS "CERTIFIED ALARM SYSTEM".

.6 TEST AND EVALUATION REPORTS:

.1 SUBMIT CERTIFIED TEST REPORTS FORM APPROVED INDEPENDENT TESTING LABORATORIES INDICATING COMPLIANCE WITH SPECIFICATIONS FOR SPECIFIED PERFORMANCE CHARACTERISTICS AND PHYSICAL PROPERTIES.

.7 MANUFACTURER'S INSTRUCTIONS: SUBMIT MANUFACTURER'S INSTALLATION INSTRUCTIONS.

.8 MANUFACTURER'S FIELD REPORTS: SUBMIT MANUFACTURER'S WRITTEN REPORTS WITHIN 3 DAYS OF REVIEW, VERIFYING COMPLIANCE OF WORK.

1.5 CLOSEOUT SUBMITTALS

.1 OPERATION AND MAINTENANCE DATA:

.1 SUBMIT MAINTENANCE DATA FOR INCORPORATION INTO MANUALS. INCLUDE THE FOLLOWING:

.1 SYSTEM CONFIGURATION AND EQUIPMENT PHYSICAL LAYOUT.

.2 FUNCTIONAL DESCRIPTION OF EQUIPMENT.

.3 MANUFACTURER'S INSTRUCTIONS FOR OPERATION, ADJUSTMENT AND CLEANING.

.4 ILLUSTRATIONS AND DIAGRAMS TO SUPPLEMENT PROCEDURES.

1.6 DELIVERY, STORAGE AND HANDLING

.1 DELIVER, STORE AND HANDLE MATERIALS IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS.

.2 DELIVERY AND ACCEPTANCE REQUIREMENTS: DELIVER MATERIALS TO SITE IN ORIGINAL FACTORY PACKAGING, LABELLED WITH MANUFACTURER'S NAME AND ADDRESS.

.3 STORAGE AND HANDLING REQUIREMENTS:

.1 STORE MATERIALS OFF GROUND, INDOORS OR IN DRY LOCATION AND IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS IN CLEAN, DRY, WELL-VENTILATED AREA.

.2 STORE AND PROTECT VIDEO SURVEILLANCE MATERIALS FORM NICKS, SCRATCHES, AND BLEMISHES.

.3 REPLACE DEFECTIVE OR DAMAGED MATERIALS WITH NEW.

.4 DEVELOP CONSTRUCTION WASTE MANAGEMENT PLAN WASTE REDUCTION WORKPLAN RELATED TO WORK OF THIS SECTION

.5 PACKAGING WASTE MANAGEMENT: REMOVE FOR REUSE AND RETURN OF PALLETS, CRATES, PADDING, AND PACKAGING MATERIALS AS SPECIFIED IN CONSTRUCTION WASTE MANAGEMENT PLAN WASTE REDUCTION WORKPLAN.

1.7 INSTALLATION REQUIREMENTS

.1 INSTALL ONE CATEGORY 6+ UTP CABLE TO EACH AREA LOCATION IDENTIFIED ON DRAWINGS. CABLE INSTALLATION METHODS SHALL COMPLY WITH THE SYSTEM MANUFACTURERS SPECIFICATIONS, EIA/TIA 568 SERIES REQUIREMENTS AND/OR BICSI INSTALLATION

METHODS. MUST BE CERTIFIED CAT6 END TO END. DESIGN INTENT IS THAT NO CABLING RUN IS OVER 90M.

.2 CONTRACTOR TO INSTALL ONE CATEGORY 6+ UTP CABLE FROM THE IT DATA RACK SHOWN ON THE ATTACHED DRAWING TO THE DVR LOCATION.

.3 WHEN COMING THROUGH CEILING SPACES IN WIRING CLOSETS WIRING SLEEVES MUST BE INSTALLED. SUGGEST AN 18" LONG PIECE OF 2" CONDUIT.

.4 NO EXPOSED CABLES ARE TO BE RUN ACROSS CEILINGS OR WALLS. ALL CONDUIT TO BE PAINTED TO MATCH AND ROUTING TO BE APPROVED BY PRIOR TO INSTALLATION.

.5 WHERE CABLES ARE RUN ABOVE DROP CEILINGS OR CEILING WITH ACCESS ABOVE THEM J HOOKS MUST BE UTILIZED. CADDY CAT CM PRODUCT LINE OR EQUIVALENT SPACED NO MORE THAN 5' APART. J HOOKS TO BE UTILIZED ON ALL RUNS IN CEILING ACCESS SPACES. CABLES ARE NOT TO BE RUN THROUGH OPEN WEB STEEL JOISTS. SUPPORT OFF BOTTOM OF JOIST WITH J HOOK.

.6 IN WIRING CLOSETS ALL CABLES MUST BE GROUPED TOGETHER USING VELCRO STRAPS TO ORGANIZE CABLING AT RACKS. NO ZIP TIES ALLOWED.

.7 A FULL SET OF AS BUILT DRAWINGS SHALL BE PROVIDED UPON COMPLETION OF THE PROJECT. DRAWINGS WILL SHOW FINAL LOCATION OF THE EQUIPMENT RACKS, ELEVATION DRAWS OF EQUIPMENT RACK DETAIL PATCH PANEL ORGANIZATION, LOCATION OF EACH OUTLET AND THE ASSOCIATED ID NUMBER, ANY CONSOLIDATION PANELS OR PULL BOXES. CABLE PATHWAY MUST ALSO BE SHOWN.

.8 CONTRACTOR TO PROVIDE REPORT ON TESTING RESULTS TO PROVE CERTIFIED CAT6.

.9 CONTRACTOR RESPONSIBLE FOR THEIR OWN LADDERS AND LIFTS IF REQUIRED.

.10 SWITCHES CAN BE LOCATED IN THE SAME ROOMS AS THE IT DATA SWITCHES BUT WILL REQUIRE THEIR OWN CABINET.

.11 CONTRACTOR TO PROVIDE POWER FOR NEW SWITCHES USING BOARD APPROVED ELECTRICAL CONTRACTORS.

.12 CAT6 CABLE TO LINK SWITCHES TO DVR IF REQUIRED.

.13 AT DVR LOCATION PROVIDE 26" LED SCREEN AND KEYBOARD AND WORKSTATION FOR IT TO SIT ON.

.14 CAMERA SYSTEM TO PROVIDE 7 DAYS OF STORAGE AT 10 FRAMES PER SECOND.

.15 2 HOUR TRAINING SESSION TO BE PROVIDED UPON COMPLETION OF THE PROJECT.

1.5 WARRANTY

.1 EXTENDED WARRANTY PERIOD MUST INCLUDE WARRANTY AGAINST MEETING SPECIFIED PERFORMANCE REQUIREMENTS, FOR SPECIFIED TIME PERIOD.

.2 MANUFACTURER'S WARRANTY: SUBMIT, FOR DEPARTMENTAL REPRESENTATIVE'S AND CONSULTANT'S ACCEPTANCE, MANUFACTURER'S STANDARD WARRANTY DOCUMENT EXECUTED BY AUTHORIZED COMPANY OFFICIAL.

.3 CONTRACTOR SHALL PROVIDE A 1 YEAR PARTS AND LABOR WARRANTY, FROM DATE OF SUBSTANTIAL PERFORMANCE, AGAINST DEFECTIVE WORKMANSHIP AND/OR SYSTEM COMPONENT FAILURE.

PART 2 PRODUCTS

2.1 MATERIALS

.1 IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO ENSURE THAT THE VIDEO SURVEILLANCE SYSTEM HAS ALL EQUIPMENT, REQUIRED TO FURNISH AND INSTALL A FULLY OPERATIONAL SYSTEM, INCLUDING (BUT NOT LIMITED) TO THE FOLLOWING:

.1 PRIMARY WORKSTATION WITH OPERATING SYSTEM AND SOFTWARE;

.2 ALL NEW CAMERAS, CONTROL, INPUT AND OUTPUT DEVICES;

.3 ALL NEW ELECTRICAL POWER WIRING, CONDUIT AND TRANSFORMERS TO ALL DEVICES;

.4 ALL OTHER DEVICES, WIRING AND APPURTENANCES FOR A FULL OPERATIONAL AND COMPLETE SYSTEM.

.2 CONTRACTOR IS TO SUPPLY, INSTALL AND TERMINATE THE PRODUCTS IN THIS SECTION. CONTRACTOR TO PROVIDE ALL CABLING, CONDUIT FROM DEVICE UP INSIDE WALL TO CORRIDOR CEILING SPACE, BOXES, ETC. CABLING TO HAVE GREEN JACKET. CABLES TO BE FT6 (PLENUM RATED) AND SUPPORTED MINIMUM EVERY 10' BY J HOOKS.

.4 THE VIDEO SURVEILLANCE SYSTEM SHALL BE A EXACQ SERVER TYPE RECORDER WITH NORTHERN OR HIKVISION HIGH RESOLUTION DIGITAL CAMERAS, STRATEGICALLY LOCATED IN HALLWAY AND OUTDOORS. REFER TO DRAWINGS FOR LOCATION.

.1 THE VIDEO SURVEILLANCE SYSTEM SHALL HAVE A PRIMARY COMPUTER WORKSTATION. THE PRIMARY WORKSTATION SHALL BE LOCATED IN THE IT ROOM. FINAL LOCATIONS ARE TO BE DETERMINED ON SITE BY THE OWNER AND CONSULTANT AND SHALL COME AT NO EXTRA COST TO THE OWNER.

.2 LED MONITOR: 42" MONITOR AND SHELF TO BE PROVIDED BY CONTRACTOR FOR EXACQ RECORDER;

.3 OUTDOOR CAMERAS: 4MP (#IP4AFDIR100) WALL MOUNT (#WMS) WITH JUNCTION BOX, AUTOFOCUS, MOTORIZED WITH BRACKET (#PC-135) AND VANDAL DOME;

.4 INDOOR CAMERAS: 4MP TURRET CAMERA (#IP4DIR100) WITH CEILING MOUNT BOX.

.5 NETWORK VIDEO RECORDER- EXACQ (#IP04-08T-R2A) CHANNEL POE NVR WITH 8 TB HARD DRIVE, 2U, 64 IP CAMERA, 300 MBPS WINDOWS/450 MBPS LINUX STORAGE RATE, 120/240 VAC;

.6 SWITCHES: TRENDNET 2-16 PORT AT 370W EACH (#TPE-TG160G)

.7 WALL RACK: 19" WITH PORT MODULAR UNLOADED PATCH PANEL WITH WALL MOUNT RACK (#ERWEN-12E750) AT IT AREA. REFER TO DRAWING FOR LOCATION;

.8 2 PORT SURFACE BOXES AT CAMERA LOCATIONS;

.9 IP CAMERA LICENSE, PER CAMERA WITH 3 YEARS OF SOFTWARE UPDATES.

.10 CAT 6 WIRING – GREEN.

.4 THE CONTRACTOR WILL BE RESPONSIBLE FOR THE INSTALLATION OF GREEN JACKETED CAT-6 CABLING WITH ONE CABLE HOME RUN FROM EACH DEVICE TO THE PATCH PANEL.

.5 THE CONTRACTOR WILL BE RESPONSIBLE FOR THE INSTALLATION OF A GREEN JACKETED CAT-6 NETWORK DROP FROM THE IT DATA RACK TO THE LOCATION OF THE RECORDER.

.6 THE CONTRACTOR WILL BE RESPONSIBLE TO KEEP ALL CABLING RUNS UNDER 90M (300'). THE USE OF ADDITIONAL SWITCHES MAY BE REQUIRED TO ATTAIN THIS.

PART 3 EXECUTION

3.1 INSTALLATION:

.1 CONTRACTOR TO SUPPLY AND TERMINATE END DEVICES. CONTRACTOR TO PROVIDE BOXES, CABLE, CONDUITS FROM DEVICE UP INSIDE WALL TO CORRIDOR CEILING SPACE, ETC. FOR COMPLETE SYSTEM.

.2 INSTALL CABLE AS INDICATED ON RISER DIAGRAM IN CORRIDOR CEILING SPACE.

.3 THE OUTDOOR CAMERAS WILL EACH REQUIRE A FLUSH MOUNTED WATERPROOF SINGLE GANG ELECTRICAL BOX AND 21MM CONDUIT. THE CONDUIT WILL RUN FROM THE CAMERA LOCATION TO THE NEAREST HALLWAY CEILING SPACE WHERE WIRING WILL CONTINUE. PROVIDE COIL OF 2M AT EXTERIOR CAMERA LOCATIONS.

.4 THE CONTRACTOR WILL BE RESPONSIBLE FOR SUPPLYING AND INSTALLING ALL CABLE AND REQUIRED CONDUIT FOR THE SYSTEM AS DESCRIBED IN THIS DOCUMENT AND ON THE DRAWINGS. WITHIN THE BUILDING, CABLE TO BE INSTALLED PRIMARILY IN CORRIDOR CEILING SPACE.

.5 ALL CAMERA CABLES WILL BE HOMERUN AND LABELLED AT BOTH ENDS AND RUN FROM EACH CAMERA TO THE APPROPRIATE EQUIPMENT.

LOCATED IN OFFICE
SUPPLY & INSTALL ON WALL MOUNT

LOCATED IN IT ROOM
SUPPLY & INSTALL DESK FOR THIS EQUIPMENT

①

②

③

④

⑤

⑥

⑦

①

②

③

④

⑤

⑥

⑦

120V SUPPLY

120V SUPPLY

120V SUPPLY

NOTES

GENERAL CONTRACTOR SHALL COORDINATE SUPPLY AND INSTALLATION OF VIDEO SURVEILLANCE SYSTEM SECURITY CONTRACTOR AND ELECTRICAL CONTRACTOR
PROVIDE ALL DEVICES, CONDUIT, WIRING, AND LABOUR FOR A COMPLETE TURNKEY AND FULLY OPERATIONAL SYSTEM.
ALL WIRING SHALL BE IN CONDUIT.
ALL WIRING AND CONDUIT SHALL BE CONCEALED IN WALL OR CEILING

①

DATA SWITCH IN DATA RACK

②

COMPUTER WORSTATION FOR VIDEO SURVEILLANCE SYSTEM WITH OPERATING SYSTEM & SOFTWARE

③

DIGITAL VIDEO RECORDER

④

VIDEO SURVEILLANCE PRIMARY MONITOR

⑤

VIDEO SURVEILLANCE SECONDARY MONITOR

⑥

INTERIOR CAMERA WITH PROTECTION DOME (TYPICAL)

⑦

EXTERIOR CAMERA WITH PROTECTION & WEATHERPROOF DOME (TYPICAL)

1

VIDEO SURVEILLANCE (VS) SYSTEM

E005

SCALE: 1 : 24

MORRIS Engineering Ltd.

Brockville, Ontario

(613)349-0555

7	2026-06-29	ISSUED FOR TENDER/PERMIT/CONSTRUCTION
6	2026-05-20	FINAL REVIEW
5	2026-03-16	99% REVIEW
4	2026-03-09	FINAL REVIEW
3	2026-02-19	REVISED
2	2026-01-31	FOR REVIEW
1	2025-12-22	REVISED, FOR REVIEW
0	2025-09-26	FOR REVIEW
NO.	DATE	REVISION

CLIENT:

COLBOURNE & KEMBEL ARCHITECTS INC. Kingston, ON

PROJECT:

LOYALIST AMBULANCE Loyalist Business Park

DRAWING:

ELECTRICAL

Video Surveillance Notes & Details

DESIGN BY:

M. MORRIS

DRAWN BY:

A.M.

DATE:

AUG 2025

PROJECT No.:

892

SCALE:

AS SHOWN

E005

ELECTRICAL NOTES

ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS FOR THIS PROJECT.

1 GENERAL:

- CONFORM WITH APPLICABLE REQUIREMENTS OF THE MINISTRY OF LABOUR, AND THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS.
DO COMPLETE INSTALLATION IN ACCORDANCE WITH THE FOLLOWING:
 - ONTARIO ELECTRICAL SAFETY CODE;
 - ELECTRICAL SAFETY AUTHORITY;
 - ELECTRICAL SUPPLY AUTHORITY.
- SUBMIT TO ELECTRICAL SAFETY AUTHORITY AND SUPPLY AUTHORITY NECESSARY NUMBER OF DRAWINGS AND SPECIFICATIONS FOR APPROVAL PRIOR TO COMMENCEMENT OF WORK.
GENERAL CONTRACTOR AND ELECTRICAL CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR COORDINATING AND OBTAINING ELECTRICAL SERVICE LAYOUT FROM THE SUPPLY AUTHORITY.
PAY ALL ELECTRICAL PERMIT AND INSPECTION FEES.
- GROUND COMPLETE SYSTEM IN ACCORDANCE WITH THE ONTARIO ELECTRICAL SAFETY CODE AND ELECTRICAL SAFETY AUTHORITY.
- IDENTIFICATION AND LABELLING:
 - IDENTIFY ELECTRICAL EQUIPMENT WITH LAMICOID NAMEPLATES, INCLUDING AMPERAGE, VOLTAGE, PHASE AND POWER SOURCE.
 - PROVIDE TYPEWRITTEN PANEL DIRECTORIES.
 - PROVIDE ADHESIVE LABEL ON ALL SWITCH, RECEPTACLE AND DEVICE COVER PLATES INDICATING SUPPLY CIRCUIT DESIGNATION.
- PROVIDE DIGITAL AND HARD COPY OF COMPLETE OPERATING AND MAINTENANCE INSTRUCTIONS FOR EQUIPMENT FURNISHED UNDER THIS CONTRACT.
- CLEAN ALL ELECTRICAL SYSTEMS AT PROJECT COMPLETION.
- COMPLETE AS-BUILT DRAWINGS SHOWING ALL CHANGES AS WORK PROGRESSES.

2 CONTRACTOR QUALIFICATIONS:

- ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH THE "TRADES QUALIFICATION AND APPRENTICESHIP ACT" AND REGULATIONS, BY PERSONS WHO HOLD THE FOLLOWING CERTIFICATES OF QUALIFICATION (AS APPLICABLE):
 - ELECTRICIAN: CONSTRUCTION & MAINTENANCE.

3 EXISTING FACILITIES AND DEMOLITION:

- LOCATE AND PROTECT ALL EXISTING EXTERIOR SITE SERVICES.

4 FIXTURES AND EQUIPMENT

- PROVIDE SHOP DRAWINGS AND PRODUCT DATA FOR ALL ELECTRICAL FIXTURES AND EQUIPMENT FOR APPROVAL, PRIOR TO PROCUREMENT.
- INSTALL ALL ELECTRICAL FIXTURES AND EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
- EQUIPMENT AND MATERIAL TO BE CSA CERTIFIED. WHERE THERE IS NO ALTERNATIVE TO SUPPLYING EQUIPMENT WHICH IS NOT CSA CERTIFIED, OBTAIN SPECIAL APPROVAL FROM ELECTRICAL SAFETY AUTHORITY.

5 CONDUITS:

- RIGID PVC CONDUIT.

6 COORDINATION:

- INFORMATION INVOLVING ACCURATE DIMENSIONING OF THE SITE AND BUILDING SHALL BE TAKEN FROM SITE BY CONTRACTOR.
- DRAWINGS ARE IN DIAGRAMMATIC FORM, INTENDED TO CONVEY THE SCOPE OF WORK AND GENERAL ARRANGEMENT FOR EQUIPMENT. COORDINATE PHYSICAL LOCATION OF ALL EQUIPMENT WITH OTHER TRADES AND ALLOW FOR ANY ADDITIONAL CONDUIT, WIRING, FITTINGS, SUPPORTS, ETC., IN ORDER TO AVOID INTERFERENCE AND FACILITATE THE WORK.
- CONTRACTOR TO MAKE ANY NECESSARY MODIFICATIONS OR ADDITIONS, WITHOUT CHARGE, TO ACCOMMODATE SITE CONDITIONS AND COORDINATION.

EXTERIOR LIGHTING CONTROL SCHEDULE

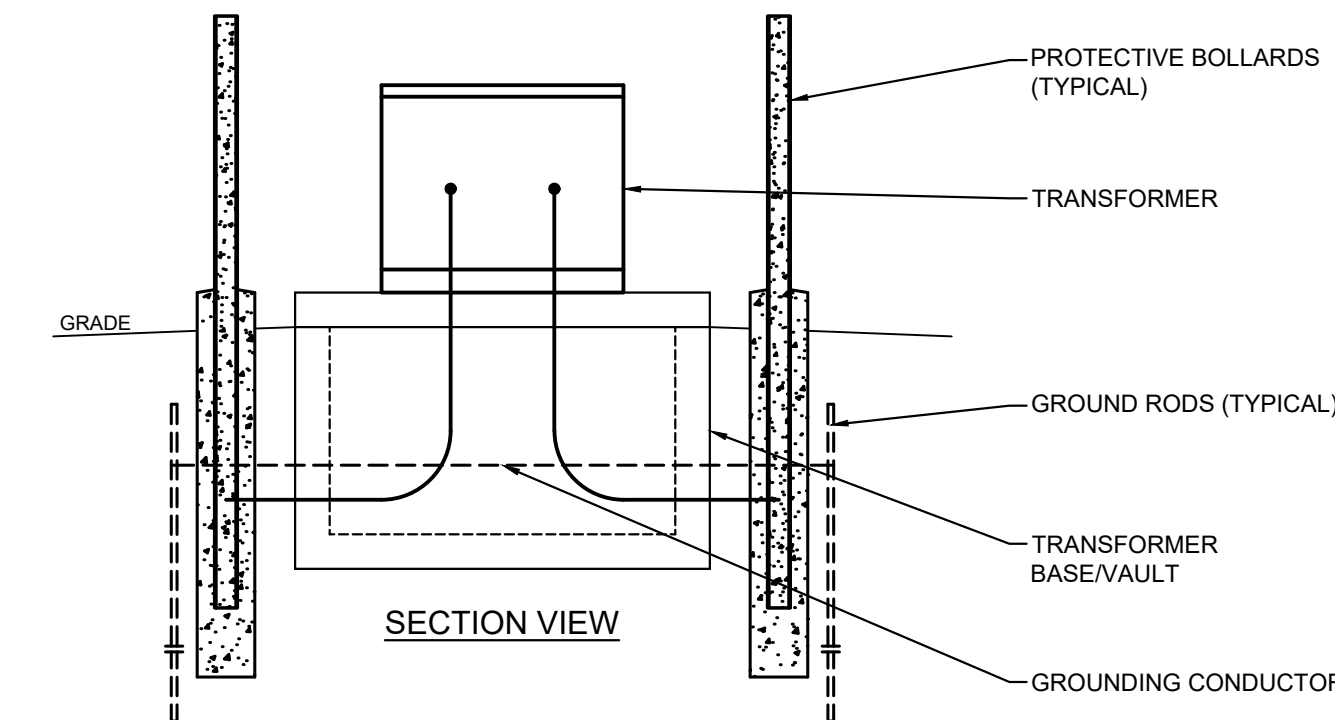
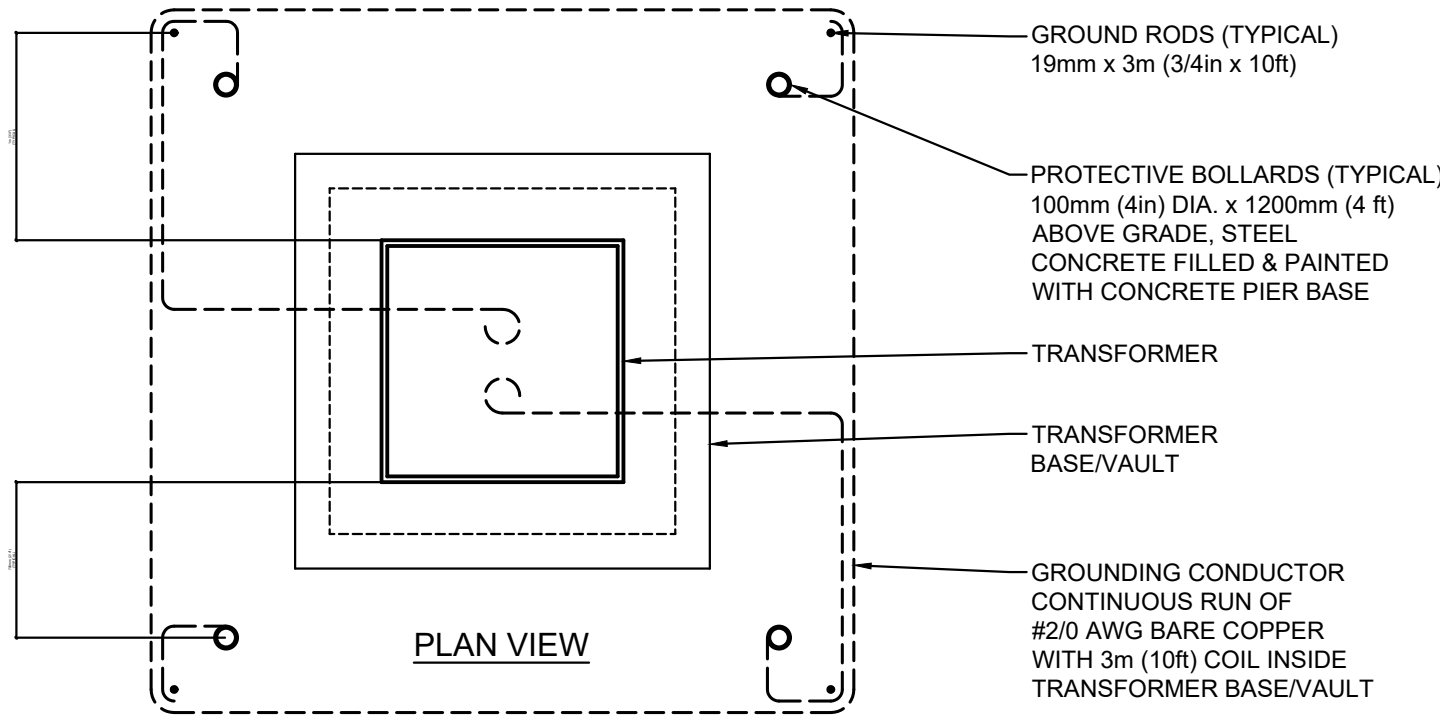
	DESCRIPTION	ELECTRICAL	ACCEPTABLE PRODUCT	NOTES
	LIGHTING CONTACTOR	24V / 208V	SCHNEIDER CLASS 8903 MULTI-POLE LIGHTING CONTACTOR	CONTACTOR RATING - 20 AMPS TUNG/RES, 30 AMPS 12 POLE DEVICE TYPE 1 ENCLOSURE SPECIFIED FOR 347 VOLTS 60 HZ POWER SYSTEM FUSED CONTROL TRANSFORMER SELECTED WITH 24V 60HZ COIL 208 VOLT PRIMARY 24 VOLT SECONDARY HAND-OFF-AUTO SELECTOR SWITCH CONNECTION WITH PHOTOCELL, TIMECLOCK AND BACS SYSTEM
	TIMECLOCK DIGITAL	120V	INTERMATIC #ET8215C	7-DAY ELECTRONIC BATTERY BACK-UP
	PHOTOCELL	120V	INTERMATIC #EK4236S	SIDE LENS SWIVEL ARM

LIGHT FIXTURE SCHEDULE

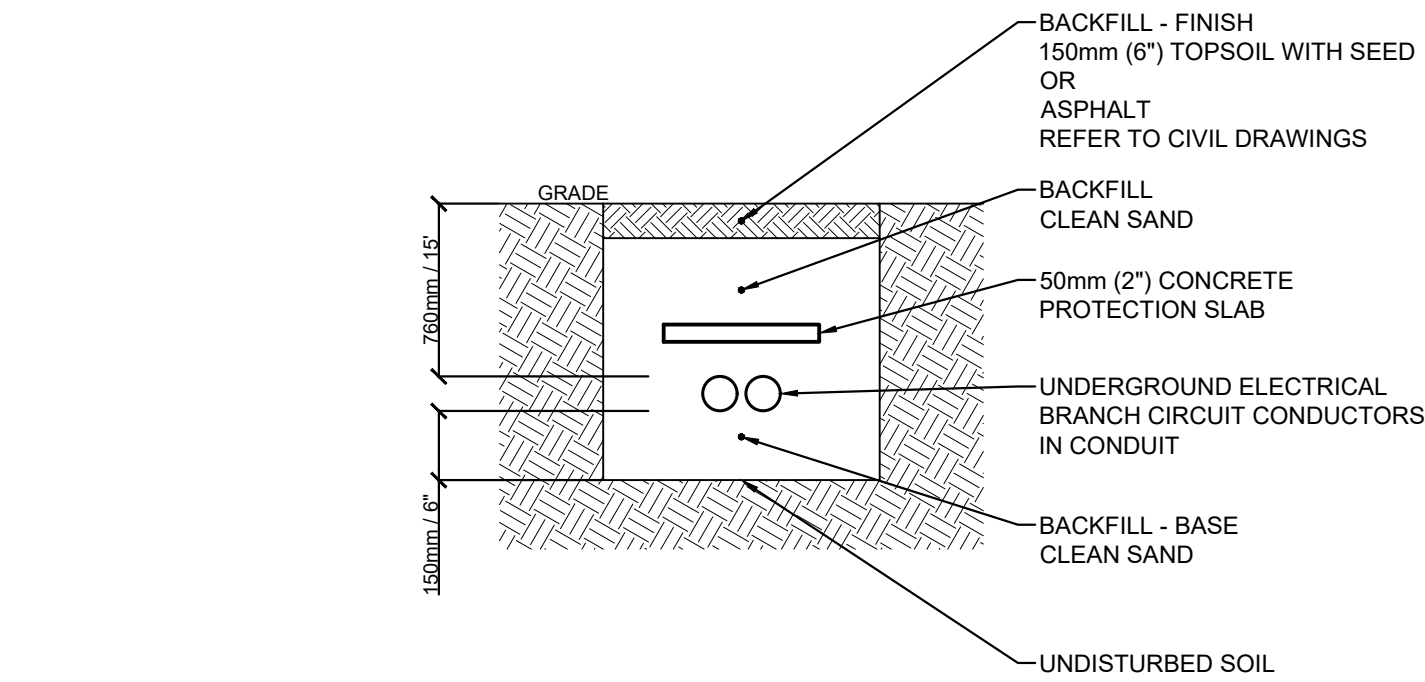
UNIT	DESCRIPTION	NOM. DIMN (in)	LAMP	LENS	COLOUR TEMP (K)	WATTS	MEAN LUMENS	VOLTAGE	ACCEPTABLE PRODUCT	NOTES
LE1	CANOPY EAVE RECESSED ROUND WIDE BEAM	8 IN DIA	LED		5000 SELECTABLE	60 SELECTABLE	5000 SELECTABLE	208	HALO #HCD	EXTERIOR USE FULL CUT-OFF (NO UPLIGHT) WET LOCATION
LE2	WALL PACK	W - 8.7 H - 9.3 DP - 4.3	LED		3500 SELECTABLE	25 SELECTABLE	2600	208	RENO #W/P	EXTERIOR USE FULL CUT-OFF (NO UPLIGHT) WET LOCATION
LE3	WALL PACK	W - 13.8 H - 9.3 DP - 4.3	LED		5000 SELECTABLE	120 SELECTABLE	16100	208	RENO #W/P	EXTERIOR USE FULL CUT-OFF (NO UPLIGHT) WET LOCATION

LIGHT FIXTURE SCHEDULE - SITE

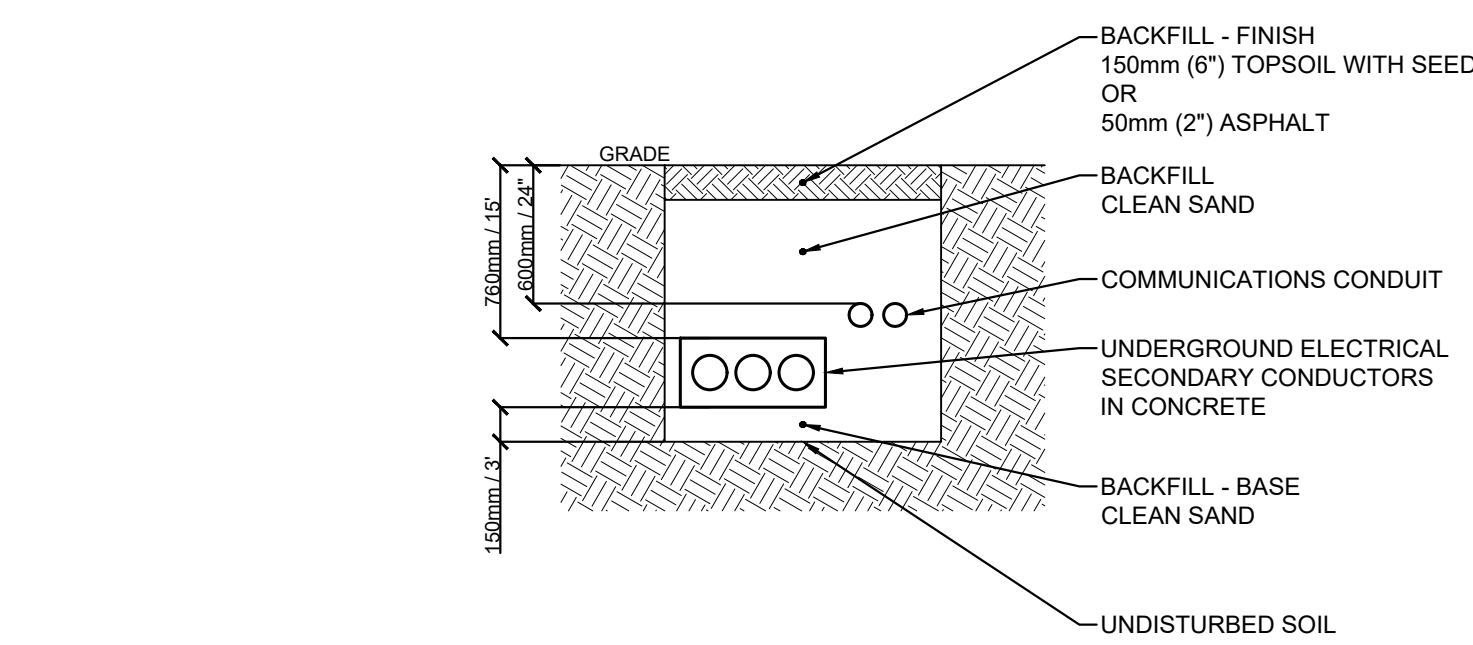
UNIT	DESCRIPTION	LAMP	WATTS	MEAN LUMENS	VOLTAGE	ACCEPTABLE PRODUCT	NOTES
LS1	LED POLE MOUNTED	LED	150	26160	208	LIGHT FIXTURE: RENO #SB	FULL CUT-OFF (NO UPLIGHT) SHIELDED ON LOT AND STREET LINES
						POLE BASE: PRECAST CONCRETE 45 MPa at 28 DAYS, 5-8% AIR ENTRAINMENT EXPOSED CONCRETE FINISH 22" (560 mm) DIA 9' (2.7 m) HEIGHT 36" (914mm) ABOVE GRADE GALV. STEEL ANCHOR BOLTS BOLT CIRCLE DIA. TO SUIT POLE WITH CONDUIT/DUCT ENTRY	TO MINIMIZE THROW BEYOND LINE
						POLE: DYNAPOLE	STEEL POLE 20 ft (6.1 m) MOUNTING HEIGHT



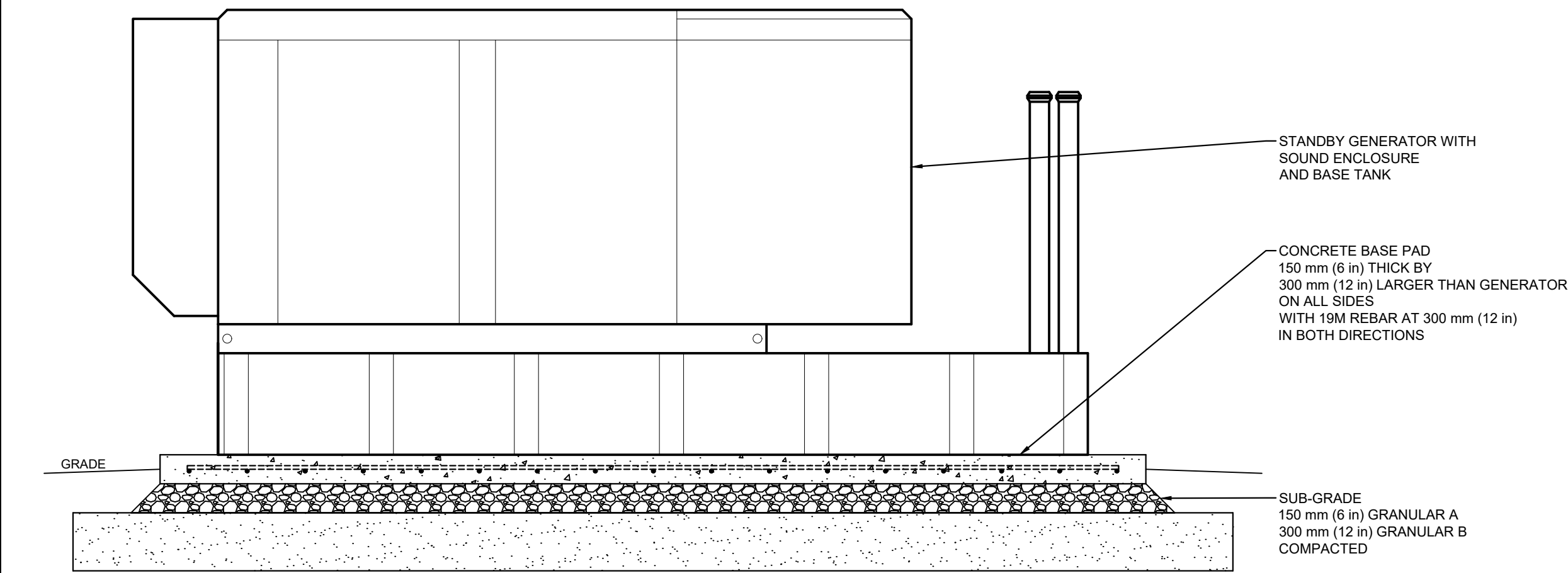
1	TRANSFORMER DETAIL
ES01	SCALE: NOT TO SCALE



3	TRENCH DETAIL
ES01	SCALE: NOT TO SCALE



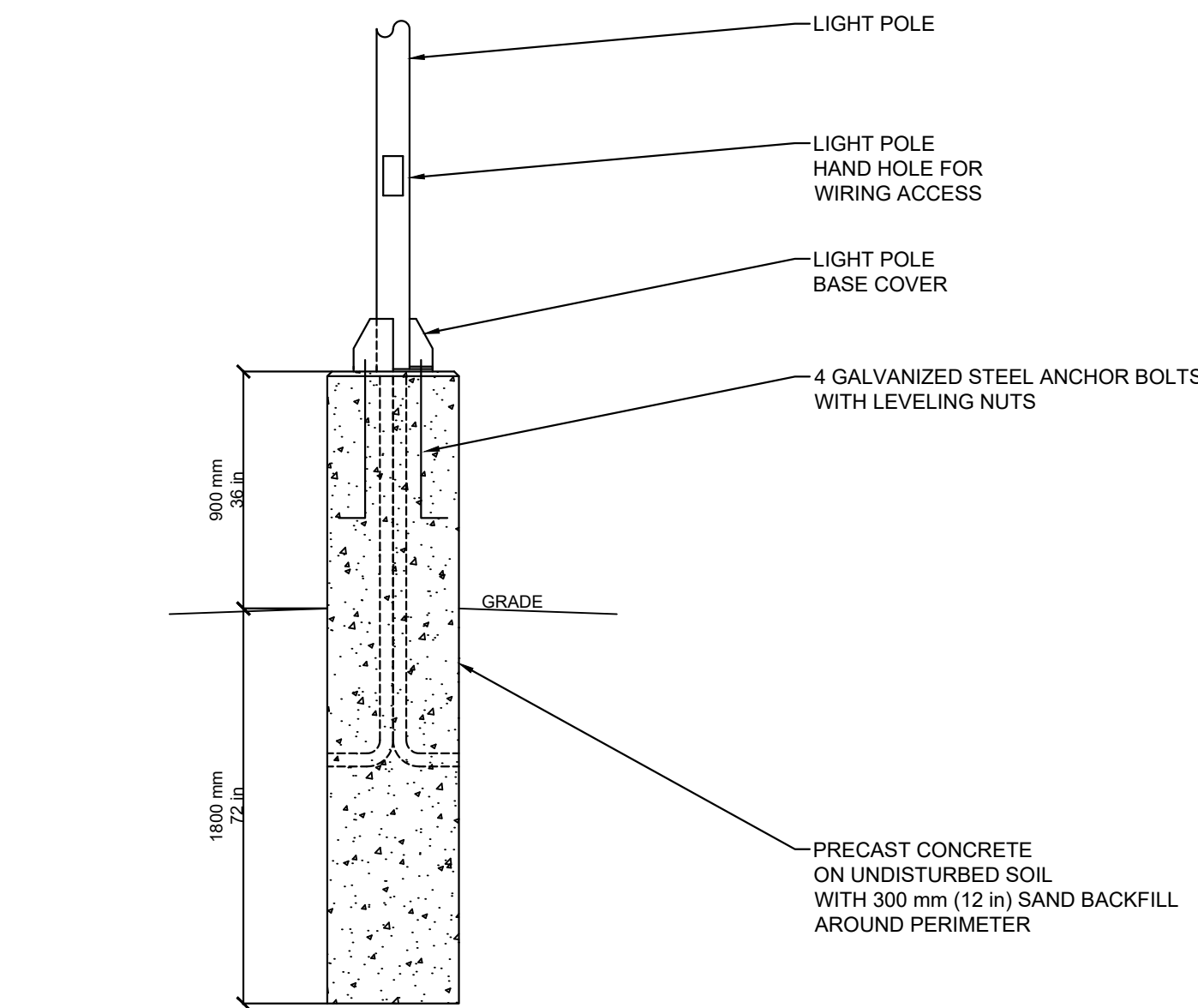
2	TRENCH DETAIL - WITH CONCRETE
ES01	SCALE: NOT TO SCALE



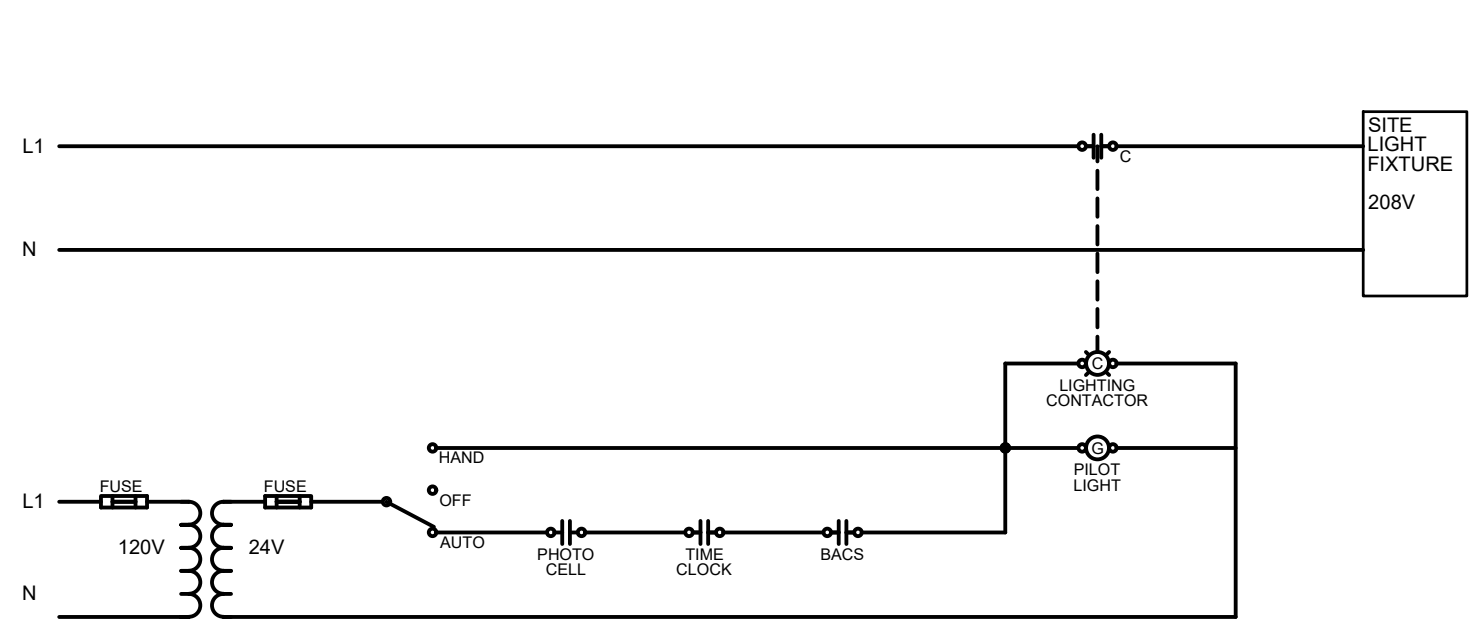
4	GENERATOR & BASE DETAIL
ES01	SCALE: NOT TO SCALE

SITE LIGHTING REQUIREMENTS:

- CONTRACTOR SHALL PROVIDE A DETAILED PHOTOMETRIC LAYOUT OF EXTERIOR BUILDING AND SITE LIGHTING WITH THE LIGHT FIXTURE SHOP DRAWING SUBMISSION.
- THE PHOTOMETRIC LAYOUT SHALL INDICATE THAT THERE IS ZERO LIGHT LEVEL AT THE PROPERTY LINE (0 LUX).
- ALL EXTERIOR BUILDING AND SITE LIGHT FIXTURES SHALL BE FULL CUT-OFF TYPE, SO THAT THEY ARE DARK SKY COMPLIANT.



5	POLE LIGHT DETAIL
ES01	SCALE: NOT TO SCALE

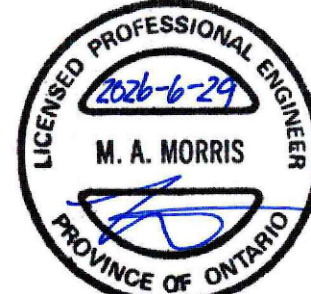
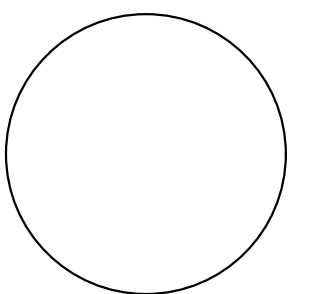


6	EXTERIOR/SITE LIGHTING CONTROL
ES01	SCALE: NOT TO SCALE

MORRIS Engineering Ltd.

Brockville, Ontario

(613)349-0555



7	2026-06-29	ISSUED FOR TENDER/PERMIT/CONSTRUCTION
6	2026-05-20	FINAL REVIEW
5	2026-03-16	99% REVIEW
4	2026-03-09	FINAL REVIEW
3	2026-02-19	REVISED
2	2026-01-31	FOR REVIEW
1	2025-12-22	REVISED, FOR REVIEW
0	2025-09-26	FOR REVIEW
NO.	DATE	REVISION

CLIENT:

COLBOURNE & KEMBEL ARCHITECTS INC. Kingston, ON

PROJECT:

LOYALIST AMBULANCE Loyalist Business Park

DRAWING:

ELECTRICAL

Site Plan Notes and Details

DESIGN BY: M. MORRIS

DRAWN BY: A.M.

DATE: AUG 2025

PROJECT No.: 892

SCALE: AS SHOWN

ES01

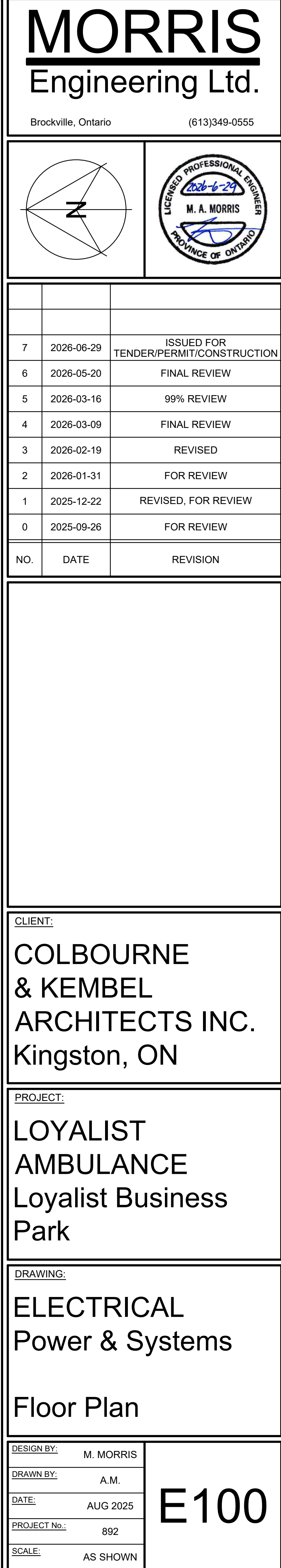
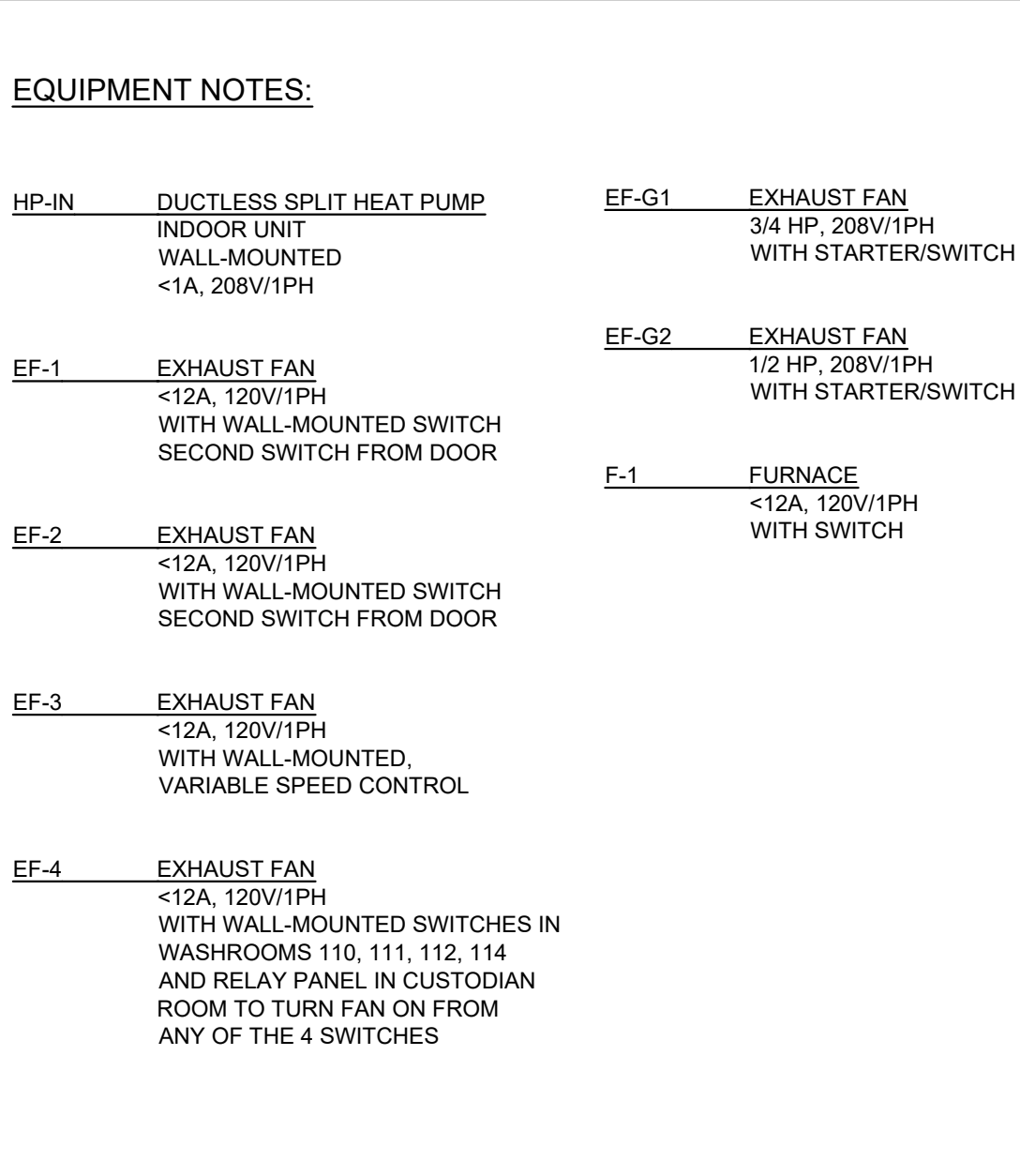
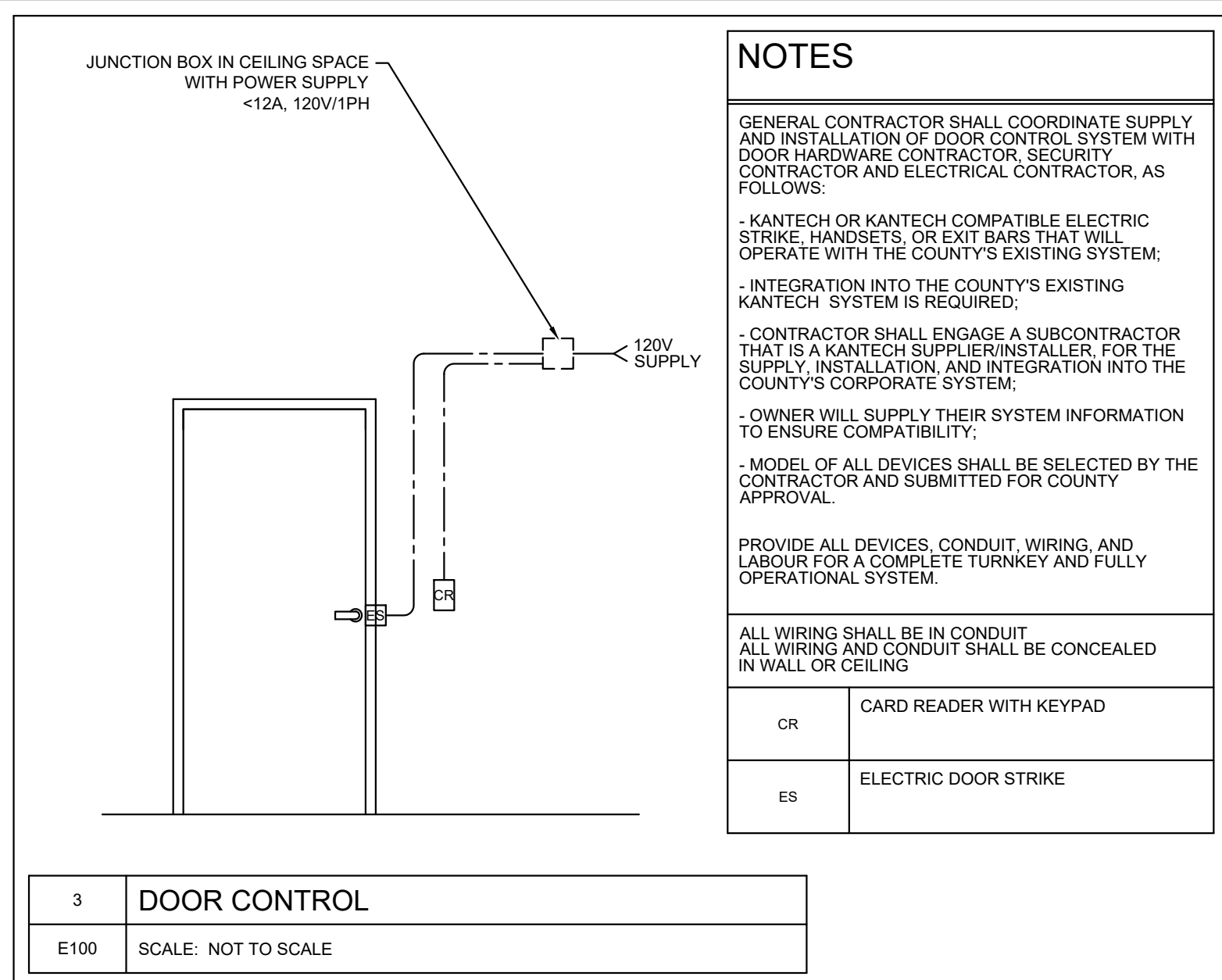


PROJECT:

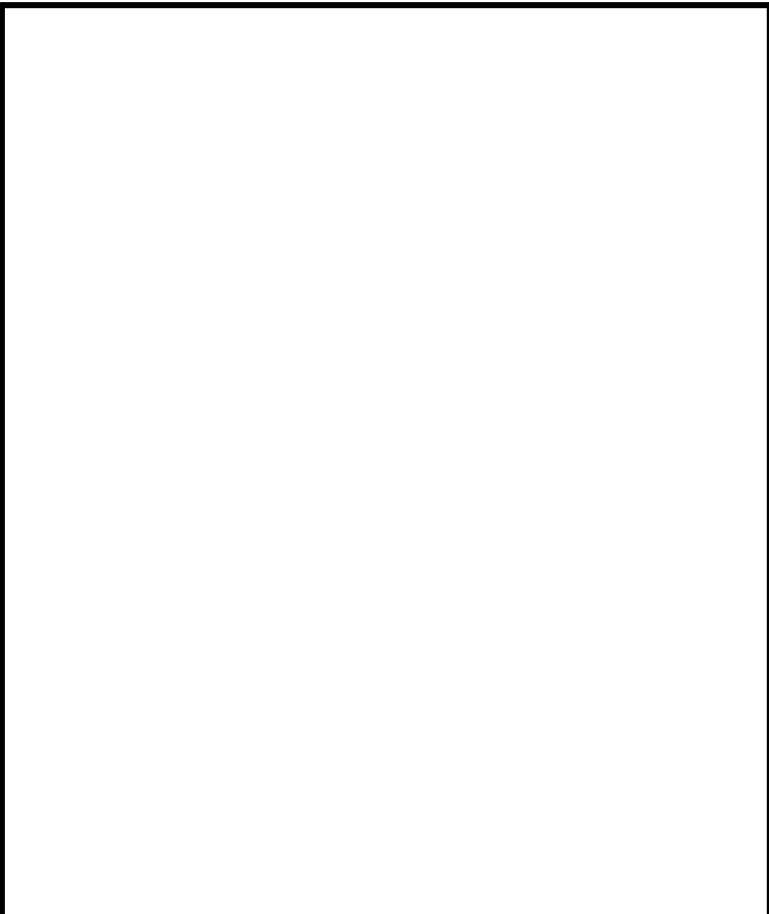
LOYALIST
AMBULANCE
Loyalist Business
Park

<u>DESIGN BY:</u>	M. MORRIS	ES02
<u>DRAWN BY:</u>	A.M.	
<u>DATE:</u>	AUG 2025	
<u>PROJECT No.:</u>	892	
<u>SCALE:</u>	AS SHOWN	





NO.	DATE	REVISION
7	2026-06-29	ISSUED FOR TENDER/PERMIT/CONSTRUCTION
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5	2026-03-16	99% REVIEW
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0	2025-09-26	FOR REVIEW



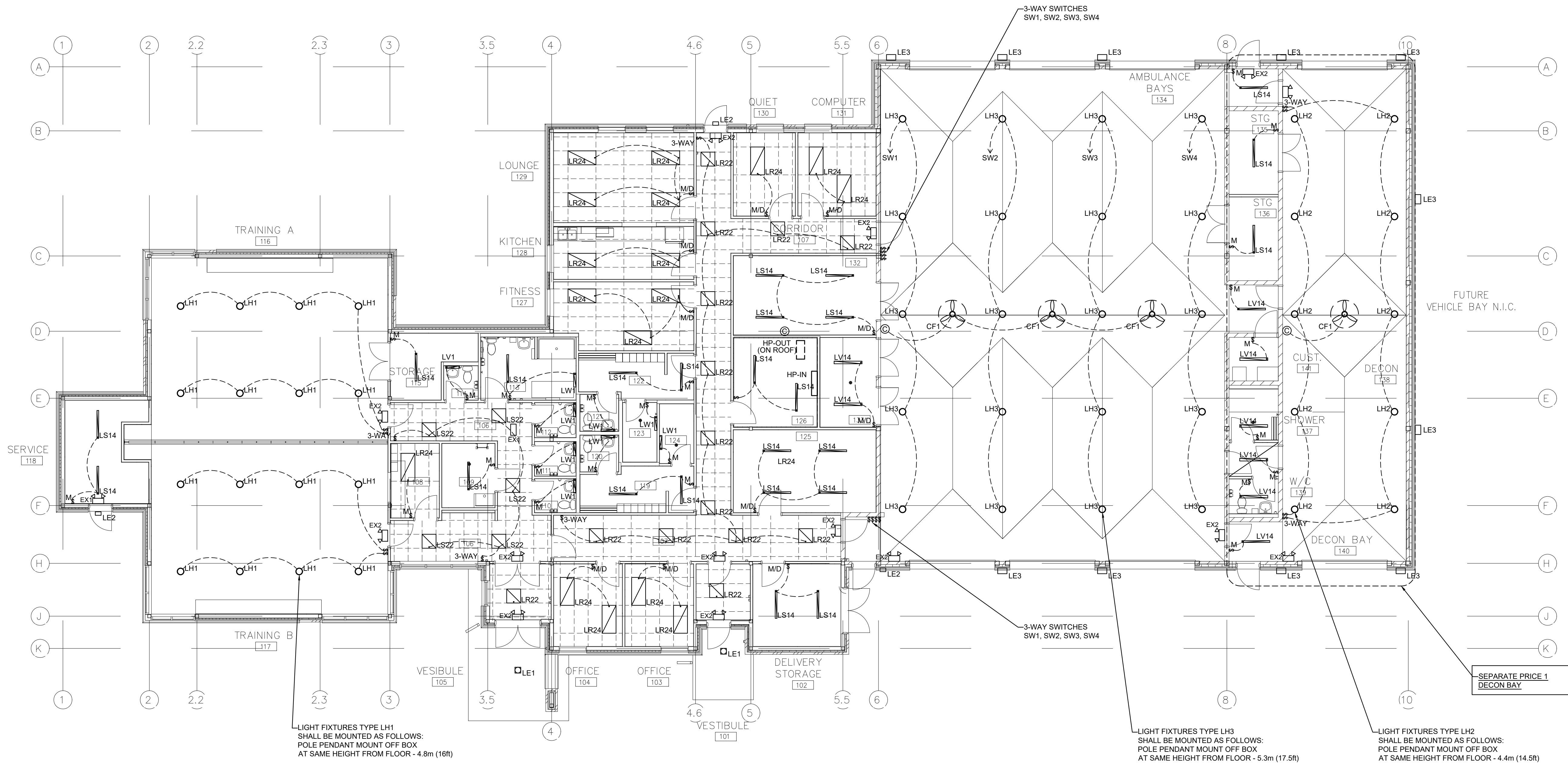
CLIENT:
**COLBOURNE
& KEMBEL
ARCHITECTS INC.**
Kingston, ON

PROJECT:
**LOYALIST
AMBULANCE**
Loyalist Business
Park

DRAWING:
**ELECTRICAL
Lighting**

Floor Plan

DESIGN BY:	M. MORRIS	E101
DRAWN BY:	A.M.	
DATE:	AUG 2025	
PROJECT No.:	892	
SCALE:	AS SHOWN	



1	FLOOR PLAN
E101	SCALE: 1 : 100

EQUIPMENT NOTES:

VERIFY ELECTRICAL REQUIREMENTS WITH UNIT
SHOP DRAWINGS AND RATING PLATES
PRIOR TO CIRCUIT INSTALLATION

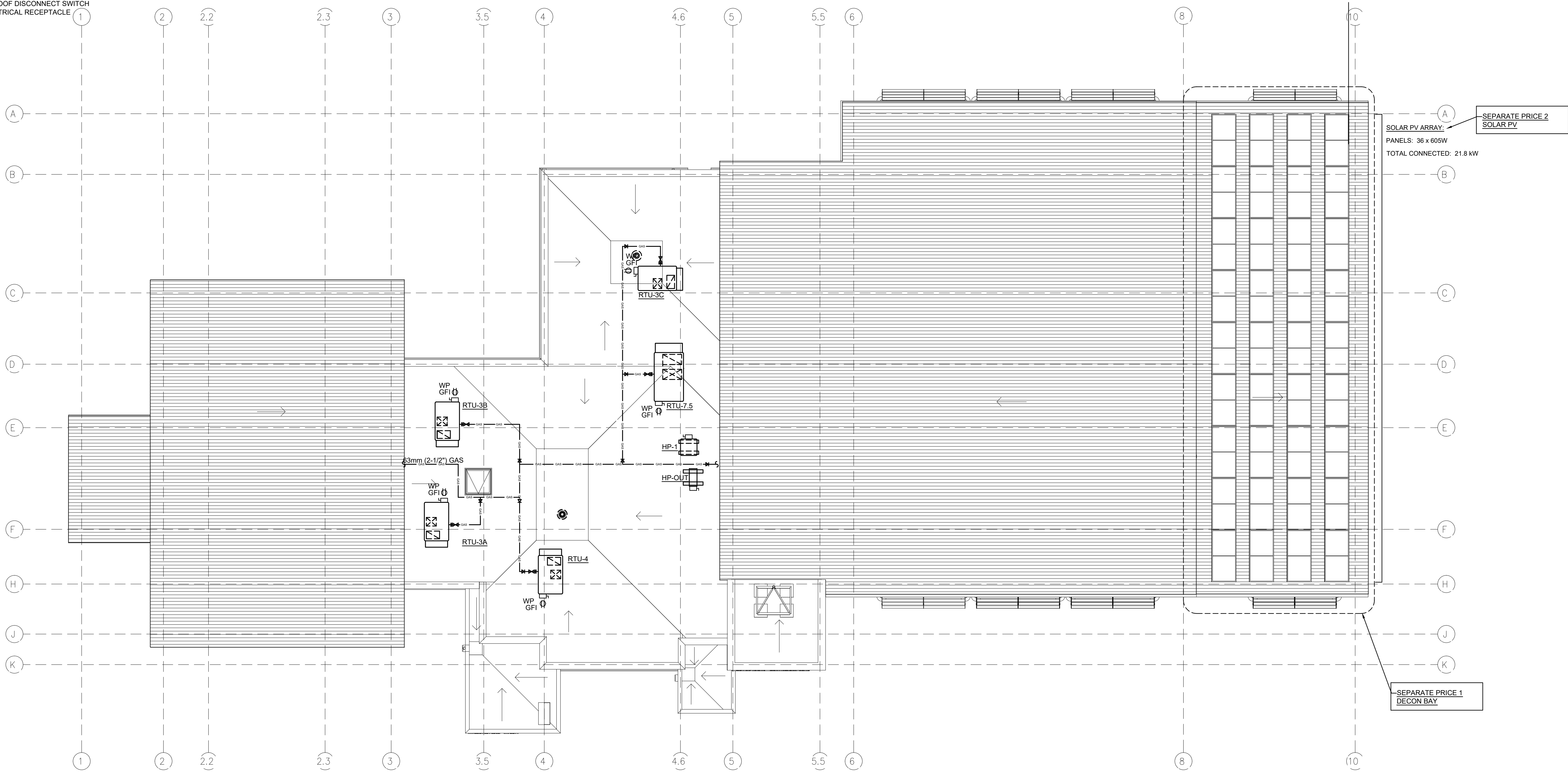
RTU-3A ROOFTOP HVAC UNIT (HYBRID)
RTU-3B, 3C HEAT PUMP WITH NATURAL GAS BACK-UP HEAT
23 MCA, 30A MOCP, 208V/3PH
WITH WEATHERPROOF DISCONNECT SWITCH
AND DUPLEX ELECTRICAL RECEPTACLE

HP-OUT DUCTLESS SPLIT HEAT PUMP
OUTDOOR UNIT
15 MCA, 20A MOCP, 208V/1PH
WITH WEATHERPROOF DISCONNECT SWITCH

RTU-4 ROOFTOP HVAC UNIT (HYBRID)
HEAT PUMP WITH NATURAL GAS BACK-UP HEAT
27 MCA, 40A MOCP, 208V/3PH
WITH WEATHERPROOF DISCONNECT SWITCH
AND DUPLEX ELECTRICAL RECEPTACLE

HP-1 HEAT PUMP
18 MCA, 25A MOCP, 208V/1PH
WITH WEATHERPROOF DISCONNECT SWITCH

RTU-7.5 ROOFTOP HVAC UNIT (HYBRID)
HEAT PUMP WITH NATURAL GAS BACK-UP HEAT
43 MCA, 50A MOCP, 208V/3PH
WITH WEATHERPROOF DISCONNECT SWITCH
AND DUPLEX ELECTRICAL RECEPTACLE

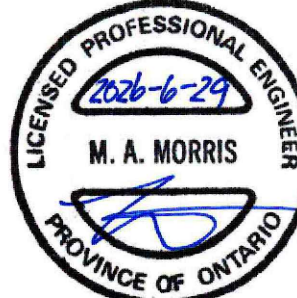
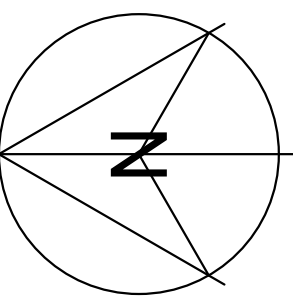


1	ROOF PLAN
E102	SCALE: 1 : 100

MORRIS
Engineering Ltd.

Brockville, Ontario

(613)349-0555



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CLIENT:
**COLBOURNE
& KEMBEL
ARCHITECTS INC.**
Kingston, ON

PROJECT:
**LOYALIST
AMBULANCE**
Loyalist Business
Park

DRAWING:
ELECTRICAL

Roof Plan

DESIGN BY: M. MORRIS
DRAWN BY: A.M.
DATE: AUG 2025
PROJECT No.: 892
SCALE: AS SHOWN

E102