1. GENERAL

1.1 INTENT

.1 THE INTENT OF THIS SPECIFICATION AND THE DRAWINGS IS TO PROVIDE A COMPLETE AND FULLY OPERATING MECHANICAL SYSTEM IN COMPLETE ACCORD WITH APPLICABLE CODES. THE MECHANICAL CONTRACTOR SHALL MAKE PROVISIONS FOR LABOUR, MATERIAL, AND EQUIPMENT NECESSARY TO COMPLETE THE MECHANICAL WORK.

.2 DRAWINGS AND SPECIFICATIONS ARE COMPLEMENTARY TO EACH OTHER AND WHAT IS CALLED FOR IN ONE IS BINDING AS IF CALLED FOR BY BOTH. SHOULD ANY DISCREPANCY APPEAR BETWEEN DRAWINGS AND SPECIFICATIONS WHICH LEAVES DOUBT AS TO THE TRUE INTENT AND MEANING, OBTAIN A RULING FROM THE CONSULTANT TEN (10) DAYS BEFORE SUBMITTING TENDER. FAILING THIS, ALLOW FOR MOST EXPENSIVE ALTERNATIVE.

.3 CONTRACT DOCUMENTS ARE DIAGRAMMATIC ONLY. THEY ARE TO ESTABLISH SCOPE, MATERIAL AND QUALITY. THEY ARE NOT DETAILED INSTALLATION DRAWINGS. MINOR DETAILS USUALLY NOT SHOWN OR SPECIFIED AND ANY INCIDENTAL ACCESSORIES REQUIRED FOR PROPER INSTALLATION OF THE SYSTEM ARE TO BE INCLUDED IN THE WORK.

.4 CONTRACTOR IS TO ENSURE THAT ALL INTENDED EQUIPMENT WILL FIT WITHIN GIVEN SPACES. MAKE REFERENCE TO THE ELECTRICAL, MECHANICAL, ARCHITECTURAL AND STRUCTURAL DRAWINGS, WHEN SETTING OUT WORK AND BEFORE ORDERING EQUIPMENT.

.5 THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO TENDER AND VERIFY EXISTING CONDITIONS. NEW PIPING, DUCTWORK AND INSULATION STANDARDS SHALL AT LEAST MATCH THE EXISTING INSTALLATION OR BE HIGHER IF SPECIFIED HEREIN.

.6 CONSULTANT IS DEFINED AS THE AME REPRESENTATIVE ADMINISTERING THE PROJECT.

1.2 CODE COMPLIANCE

.1 ALL WORK SHALL CONFORM TO CURRENT EDITION OF NATIONAL, PROVINCIAL AND MUNICIPAL CODES, STANDARDS AND ACTS; AND WILL MEET THE REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION.

1.3 LIABILITY

.1 ASSUME RESPONSIBILITY FOR LAYOUT OF WORK; AND FOR ANY DAMAGE CAUSED TO THE OWNER OR OTHER TENANTS BY IMPROPER EXECUTION OF WORK.

.2 PROTECT FINISHED AND UNFINISHED WORK FROM DAMAGE.

.3 TAKE RESPONSIBILITY FOR CONDITION OF MATERIALS AND EQUIPMENT SUPPLIED AND PROTECT UNTIL WORK IS COMPLETED AND ACCEPTED. COORDINATE DELIVERIES WITH THE GENERAL CONTRACTOR.

1.4 CERTIFICATES

.1 GIVE NOTICES, OBTAIN PERMITS AND APPROVALS, AND PAY FEES SO WORK SPECIFIED MAY BE CARRIED OUT. FURNISH CERTIFICATES IF REQUESTED, AS EVIDENCE THAT WORK CONFORMS WITH LAWS AND REGULATIONS OF THE AUTHORITIES HAVING JURISDICTION.

1.5 CUTTING AND PATCHING

.1 ALL WORK SHALL BE CO-ORDINATED WITH OTHER TRADES ESPECIALLY THAT RELATED TO CUTTING AND PATCHING OF REQUIRED OPENINGS; AND LOCATIONS AND INSTALLATION OF SLEEVES, INSERTS, SUPPORT, CURBS, FRAMES AND ACCESS DOORS.

1.8 ALTERNATIVE MATERIALS AND EQUIPMENT

.1 CONTRACT PRICE SHALL BE BASED ON MATERIALS AND EQUIPMENT SPECIFIED. APPROVAL BY CONSULTANT OF EQUIPMENT SUBMITTED BY THE MECHANICAL TRADE AS EQUAL TO THAT SPECIFIED DOES NOT RELIEVE THE MECHANICAL TRADE OF ANY RESPONSIBILITY.

.2 REVISIONS REQUIRED TO ADAPT ACCEPTED EQUALS AND ALTERNATIVES SHALL BE INCLUDED IN THE CONTRACT PRICE. NO INCREASE IN THE CONTRACT PRICE WILL BE CONSIDERED TO ACCOMMODATE THE USE OF EQUIPMENT OTHER THAN THAT SPECIFIED.

.3 CERTAIN ITEMS OF EQUIPMENT AND ITEMS OF WORK (SUCH AS BALANCING, WATER TREATMENT) MAY NOT HAVE AN APPROVED EQUAL DUE TO THE NEED TO HAVE A CONSISTENT TYPE OR SOURCE OF MAINTENANCE. REFER TO SPECIFIC CLAUSES IN THIS SPECIFICATION.

1.9 SHOP DRAWINGS

.1 SUBMIT FOUR (4) SETS OF SHOP DRAWINGS TO CONSULTANT FOR ALL EQUIPMENT SPECIFIED IN THE SPECIFICATION OR DRAWINGS FOR REVIEW. DO NOT ORDER EQUIPMENT OR MATERIALS UNTIL CONSULTANT HAS REVIEWED SHOP DRAWINGS.

1.10 GUARANTEE

.1 PROVIDE THE OWNER WITH A WRITTEN GUARANTEE THAT THE EQUIPMENT INSTALLED AND WORK PERFORMED SHALL REMAIN IN SERVICEABLE CONDITION FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF FINAL ACCEPTANCE BY THE OWNER. THE WARRANTY SHALL COVER MATERIAL AS WELL AS LABOUR.

1.11 STANDARD OF MATERIALS AND WORKMANSHIP

.1 MAKE AND QUALITY OF MATERIALS USED ARE SUBJECT TO APPROVAL BY THE CONSULTANT. REMOVE UNACCEPTABLE MATERIALS AND INSTALL SUITABLE MATERIALS IN THEIR PLACE.

.2 MATERIALS SHALL BE NEW AND OF UNIFORM PATTERN THROUGHOUT, UNLESS NOTED OTHERWISE.

.3 EMPLOY ONLY TRADESMEN PROPERLY LICENSED TO PERFORM THE SPECIFIC WORK. THE CONSULTANT MAY PERFORM SPOT CHECKS FOR TRADE TICKETS AND ACCREDITATION.

1.12 RECORD DRAWINGS

.1 KEEP ON SITE AN EXTRA SET OF WHITE PRINTS AND SPECIFICATIONS, RECORDING CHANGES AND DEVIATIONS DAILY. THESE DRAWINGS SHALL BE MADE AVAILABLE ON A WEEKLY BASIS FOR REVIEW BY THE CONSULTANT.

.2 UPON COMPLETION OF WORK, SUBMIT FINAL RECORD DRAWINGS TO THE CONSULTANT. THESE MUST BE SUBMITTED WITHIN TWO (2) WEEKS AFTER ACCEPTANCE OF WORK. FAILURE TO SUBMIT DRAWINGS WILL RESULT IN THE WORK BEING DONE BY THE OWNER AND THE COST DEDUCTED FROM THE FINAL PAYMENT.

.3 THE COST OF TRANSFERRING AS-BUILTS ONTO REPRODUCIBLE MEDIA AND AUTOCAD FILES ARE THIS CONTRACTOR'S RESPONSIBILITY.

.4 IF THE CONTRACTOR CHOOSES TO RETAIN THIS CONSULTANT TO PRODUCE AS-BUILTS, ALLOW $300/SHEET TO COVER COSTS OF DRAFTING AND PRINTING AS-BUILTS.

1.13 SUBSTANTIAL COMPLETION INSPECTION

.1 ADVISE CONSULTANT FIVE (5) DAYS PRIOR TO THE DATE INSPECTION IS DESIRED. ALL SYSTEMS TO BE FULLY OPERATIONAL AND ANY DEFICIENCIES SHOULD BE NOTED TO THE CONSULTANT.

.2 ALL DEFICIENCIES SHALL BE COMPLETED WITHIN TWO (2) WEEKS AFTER SUBSTANTIAL COMPLETION AND LETTER SUBMITTED TO CONSULTANT WITHIN THAT TIME ADVISING THAT THE WORK IS COMPLETE. FAILURE TO COMPLETE WORK WILL RESULT IN WORK BEING DONE BY THE OWNER AND THE COSTS DEDUCTED FROM FINAL PAYMENT.

.3 THE FOLLOWING SHALL BE AN OUTLINE CHECKLIST OF THE MINIMUM REQUIREMENTS TO BE MET BY THE CONTRACTOR PRIOR TO THE CONSULTANTS' SUBSTANTIAL PERFORMANCE BY THE CONTRACTOR.

INSPECTION:

☐ SEISMIC ENGINEERS INSPECTION OF ALL SEISMIC RESTRAINTS AND SCHEDULE C LETTERS OF ASSURANCE

☐ VIBRATION ISOLATION SUPPLIER'S INSPECTION REPORT

☐ FINAL AS-BUILT DRAWINGS READY FOR REVIEW

☐ MAINTENANCE AND OPERATION MANUALS, READY FOR REVIEW

1.14 EXAMINATION OF WORK

.1 THIS PROJECT INVOLVES RENOVATIONS TO EXISTING BUILDING, THEREFORE, EXAMINE THE SITE AND LOCAL CONDITIONS TO DETERMINE THE DIFFICULTIES IN CARRYING OUT THE WORK INDICATED AND SPECIFIED PRIOR TO SUBMITTING FINAL PRICE. EXTRAS WILL NOT BE CONSIDERED BASED ON THE GROUNDS OF DIFFERENCES ON SITE.

1.15 COORDINATION WITH ELECTRICAL DIVISION

.1 CONTRACTOR SHALL REVIEW ALL EQUIPMENT REQUIRING ELECTRICAL HOOK-UP WITH ELECTRICAL CONTRACTOR AND ELECTRICAL DRAWINGS PRIOR TO ORDERING EQUIPMENT. ENSURE PROPER ELECTRICAL CHARACTERISTICS ARE DETERMINED FOR ALL AFFECTED AND RELATED WORK. THIS IS PART OF THE CONTRACTORS SHOP DRAWING REVIEW AND NO EXTRAS WILL BE CONSIDERED FOR DIV. 16/16 POWER MISMATCHES.

1.16 PAINTING AND IDENTIFICATION

.1 IDENTIFY PIPING WITH LABELS AND FLOW ARROWS. PROVIDE IDENTIFICATION AT 50 FT. 15 M MAXIMUM INTERVALS, BEFORE AND AFTER PIPES PASSING THROUGH WALLS, AT ALL SIDES OF TEES, BEHIND ACCESS DOORS. USE BRADY B-500 VINYL CLOTH LABELS FOR NON INSULATED PIPES AND B-350 FOR INSULATED PIPES.

.2 PROVIDE 3/4" 20 MM DIAMETER BRASS TAGS, SECURE TO VALVE STEMS WITH KEY CHAIN. PROVIDE TYPED VALVE DIRECTORIES AT ALL MECHANICAL ROOMS IN ADDITION TO COMPUTER COPY AS INTEGRATED INTO CONTROLS.

1.17 SEISMIC CONTROL

.1 PROVIDE SEISMIC RESTRAINT ON ALL PIPING, DUCTWORK AND EQUIPMENT TO SATISFY ALL CODES AND AUTHORITIES HAVING JURISDICTION.

.2 SUBMIT SHOP DRAWINGS OF ALL SEISMIC RESTRAINT DETAILS PREPARED AND SEALED BY A PROFESSIONAL ENGINEER. PRIOR TO SUBSTANTIAL COMPLETION, THIS PROFESSIONAL ENGINEER FOR SEISMIC DESIGN SHALL VISIT THE SITE TO VERIFY SEISMIC RESTRAINT INSTALLATION AND PROVIDE A LETTER OF CONFORMANCE IN ACCORDANCE WITH THE APPLICABLE BUILDING CODE.

.3 PIPING DUCTWORK AND EQUIPMENT SHALL BE RESTRAINED IN ACCORDANCE WITH THE LATEST EDITION OF THE SEISMIC RESTRAINTS MANUAL FOR MECHANICAL SYSTEMS PRODUCED BY SMACNA, AND THE LATEST EDITION OF THE ASHRAE APPLICATION HANDBOOK CHAPTER 49, SEISMIC RESTRAINTS.

.4 THE CONTRACTOR SHALL OBTAIN APPROVAL FOR THE LOCATION OF ALL RESTRAINT FIXING POINTS FROM THE STRUCTURAL ENGINEER, ON SITE, PRIOR TO INSTALLATION.

.5 WHERE EQUIPMENT IS MOUNTED ON SPRING OR R.I.S. MOUNTS FOR VIBRATION ISOLATION IT SHALL BE THE RESPONSIBILITY OF THE MANUFACTURER OF THE MOUNT TO INCORPORATE SEISMIC RESTRAINT. THESE RESTRAINTS SHALL BE MULTI-DIRECTIONAL AS DESCRIBED IN THE GUIDELINES SPECIFIED ABOVE. PROVIDE STEEL FRAME BASES WHERE NECESSARY TO ACHIEVE THIS AND ALSO AVOID OVERTURNING. THE MANUFACTURER SHALL SUPPLY CERTIFICATES, SIGNED BY A PROFESSIONAL ENGINEER REGISTERED WITHIN THE JURISDICTION, VERIFYING THE DESIGN OF THE SEISMIC RESTRAINTS IN ACCORDANCE WITH THIS SECTION.

.6 WHERE EQUIPMENT IS LOCATED WITHOUT VIBRATION ISOLATION FITTINGS ALL SUCH EQUIPMENT SHALL BE RIGIDLY FIXED WITH HOLDING DOWN BOLTS OF SUFFICIENT STRENGTH TO RESTRAIN SEISMIC ACTION. HOLDING DOWN BOLTS SHALL BE PACKED WITHIN SLOTS TO PREVENT MOVEMENT PRIOR TO RESTRAINT COMMENCING. BOLTS SHALL BE OF SUFFICIENT STRENGTH TO WITHSTAND OVERTURNING OF THE EQUIPMENT DURING SEISMIC DISTURBANCE.

1.18 METRIC CONVERSION

.1 ALL UNITS IN THIS DIVISION ARE EXPRESSED IN SI UNITS. SOFT METRIC CONVERSIONS ARE USED THROUGHOUT.

.2 EQUIVALENT NOMINAL DIAMETERS OF PIPES - METRIC AND IMPERIAL.

.1 WHERE PIPES ARE SPECIFIED WITH METRIC DIMENSIONS AND ONLY IMPERIAL SIZED PIPES ARE AVAILABLE, PROVIDE EQUIVALENT NOMINAL IMPERIAL SIZED PIPE AS INDICATED IN THE TABLE, AND PROVIDE AT NO EXTRA COST ADAPTERS TO ENSURE COMPATIBLE CONNECTIONS TO ALL METRIC SIZED FITTINGS, EQUIPMENT AND PIPING.

.2 WHEN CSA APPROVED SI METRIC PIPES ARE AVAILABLE AND ARE PROVIDED, THE CONTRACTOR SHALL PROVIDE AT NO EXTRA COST ADAPTERS TO ENSURE COMPATIBLE CONNECTIONS BETWEEN THE SI METRIC PIPES AND ALL NEW AND EXISTING PIPES, FITTINGS AND EQUIPMENT.

EQUIVALENT NOMINAL DIAMETERS OF PIPE

MM	INCH	MM	INCH	MM	INCH
3	1/8	50	2	300	12
6	1/4	65	2½	375	15
10	3/8	75	3	450	18
15	1/2	100	4	500	20
20	3/4	125	5	600	24
25	1	150	6	750	30
30	1¼	200	8		
40	1½	250	10		

.3 METRIC DUCT SIZES

.1 THE METRIC DUCT SIZES ARE EXPRESSED AS 25 MM = 1 INCH.

2. GENERATOR PIPING

2.1 GENERAL GENERATOR PIPING INSTALLATION

.1 SUPPLY AND INSTALLATION OF VENT PIPING FROM BELLY TANK(S) TO OUTDOORS ALONG WITH ALL SAFETY DEVICES.

.2 SUPPLY AND INSTALLATION OF GENERATOR EXHAUST PIPE(S) FROM EXHAUST MANIFOLD TO SILENCER(S) AND FROM SILENCER(S) TO TERMINATION POINT AS SHOWN ON DRAWINGS. NUMBER OF EXHAUST PIPES AND SIZES TO BE CONFIRMED BY ENGINE MANUFACTURER BEFORE INSTALLATION.

.3 INSTALLATION OF FLEXIBLE CONNECTOR(S) AND SILENCER(S)

.4 SUPPLY AND INSTALLATION OF ALL INTAKE AND RELIEF VENTILATION DUCTWORK INCLUDING FLEXIBLE DUCT CONNECTOR(S) AT RADIATOR DISCHARGE AND CONTROL DAMPERS.

.5 SUPPLY AND INSTALLATION OF ALL ASSOCIATED CONTROLS RELATED TO THE ROOM VENTILATION AND HEATING.

.6 CONTRACTOR SHALL BE RESPONSIBLE FOR RETAINING A COMPANY SPECIALIZING IN EXPANSION COMPENSATION TO DESIGN AND SUPPLY THE EXPANSION COMPENSATION SYSTEM FOR THE GENERATOR EXHAUST SYSTEM AS A WHOLE. DETAILED SHOP DRAWINGS SHOWING DESIGN CALCULATIONS AND SYSTEM COMPONENTS SHALL BE PROVIDED TO THE CONSULTANT FOR REVIEW PRIOR TO INSTALLATION.

2.2 EXHAUST PIPE

.1 STEEL PIPE: TO ASTM A53-87 GRADE B AS FOLLOWS:

.1 TO NPS 10, SCHEDULE 80, GALVANIZED.

.2 TO NPS 12 AND OVER, 9.5 MM SCHEDULE 40.

2.3 EXPANSION COMPENSATORS

.1 MINIMUM REQUIREMENTS:

.1 MULTI-PLY T321 STAINLESS STEEL BELLOWS CONSTRUCTION.

.2 TELESCOPING STAINLESS STEEL INTERNAL LINER.

.3 RATED FOR MINIMUM 3000 MOVEMENT CYCLES.

.4 125# WELDED PLATE STEEL FLANGES.

.5 MINIMUM 75 MM (3") AXIAL MOVEMENT.

.6 SUITABLE FOR CONTINUOUS OPERATION AT MAXIMUM SYSTEM PRESSURE, TEMPERATURE, AND VELOCITY.

.7 SUITABLE FOR CONTINUOUS EXPOSURE TO EXHAUST GASES.

.8 MINIMUM CLEAR INSIDE DIAMETER TO MATCH EXHAUST PIPE I.D.

.2 STANDARD OF ACCEPTANCE: FLEXTECH INDUSTRIES INC. MODEL FBXL-PP-SC-TL. SUBMIT SHOP DRAWINGS WITH DETAILED DESIGN INFORMATION PROVIDED BY MANUFACTURER'S REPRESENTATIVE SPECIALIZING IN EXPANSION COMPENSATION.

2.4 EXHAUST PIPING

.1 WELD ALL EXHAUST PIPING NPS 2-1/2 AND OVER.

.2 USE LONG RADIUS ELBOWS.

.3 SUPPORT EXHAUST PIPING AND SILENCER(S) FROM STRUCTURE WITH ROLLER TYPE SPRING HANGERS FOR FREE MOVEMENT WITH THERMAL EXPANSION.

.4 INSTALL ALL PIPING SYSTEMS WITH DUE REGARD AND PROVISION FOR EXPANSION AVOIDING STRAIN OR DAMAGE TO GENERATOR(S).

.5 PROVIDE ANCHORS AND GUIDES, AS REQUIRED BY THE EXPANSION COMPENSATION DESIGNER AND SUPPLIER. ANCHORS AND GUIDES SHALL BE FABRICATED FROM MILD STEEL PLATE AND STRUCTURAL STEEL ANGLE AND CHANNEL SECTIONS, IN ACCORDANCE WITH ANSI B.31.

.6 CHECK INSTALLATION WHEN PIPING IS HOT AND COLD TO ENSURE PROPER FUNCTION OF EXHAUST.

.7 PROVIDE SEISMIC RESTRAINTS ON THE EXHAUST PIPING AND THE SILENCER(S).

.8 EXHAUST PIPING TO BE SIZED TO ENSURE THAT THE BACK PRESSURE ON THE ENGINE DOES NOT EXCEED THE LEVEL RECOMMENDED BY THE ENGINE MANUFACTURER.

3. PIPING

3.1 PIPE MATERIAL

.1 SERVICE: CONDENSATE.
MATERIAL: STEEL SCHEDULE 40.

3.2 PIPE CONNECTIONS

.1 SCREWED JOINT STEEL PIPING UP TO AND INCLUDING 1½" 40 MM. WELD PIPING 2½" 65 MM AND LARGER INCLUDING BRANCH CONNECTIONS. SCREW 2" 50 MM PIPING FOR LIQUID SYSTEMS, WELD 2" 50 MM PIPING FOR AIR OR GAS SYSTEMS. USE DIELECTRIC TYPE COUPLINGS WHEN JOINING DISSIMILAR METAL PIPES.

3.3 PIPE HANGERS AND SUPPORTS

.1 ALL PIPING SHALL BE FIRMLY SUPPORTED AND SECURELY BRACED. PROVIDE COPPER PLATED HANGERS AND SUPPORTS FOR COPPER PIPING AND GALVANIZED HANGERS AND SUPPORTS FOR GALVANIZED PIPING.

.2 USE OF PERFORATED STRAPS IS NOT PERMITTED FOR PIPE HANGERS.

.3 PROVIDE RING TYPE HANGERS FOR PIPING UP TO 1½" 40 MM AND CLEVIS TYPE HANGERS FOR PIPING OVER 1½" 40 MM.

3.4 PIPE SUPPORT SPACING

PIPE SIZE		ROD DIAMETER		SPACING	
(IN.)	(MM)	(IN.)	(MM)	(FT.)	(M)
1/2	15	3/8	9	6	1.8
3/4 TO 1½	20-40	3/8	9	8	2.4
2 TO 2½	50-65	3/8	9	10	3.0
3 TO 4	75-100	5/8	16	12	3.6
6 TO 12	150-300	7/8	22	14	4.3

3.5 EXPANSION COMPENSATION

.1 PROVIDE EXPANSION COMPENSATORS, GUIDE AND ANCHORS WHERE REQUIRED AND WHERE INDICATED.

4. INSULATION

4.1 GENERAL

.1 INSTALL IN ACCORDANCE WITH THERMAL INSULATION ASSOCIATION OF CANADA (TIAC) NATIONAL STANDARDS.

.2 COMPLY WITH MANUFACTURER'S WRITTEN RECOMMENDATIONS OR SPECIFICATIONS, INCLUDING PRODUCT TECHNICAL BULLETINS, HANDLING, STORAGE AND INSTALLATION INSTRUCTIONS, AND DATASHEET.

.3 PRESSURE TESTING OF PIPING SYSTEMS AND ADJACENT EQUIPMENT TO BE COMPLETE, WITNESSED AND CERTIFIED PRIOR TO INSULATION INSTALLATION.

.4 USE TWO LAYERS OF PREFORMED INSULATION WITH STAGGERED JOINTS WHEN THE REQUIRED NOMINAL WALL THICKNESS EXCEEDS 75 MM.

.5 MAINTAIN UNINTERRUPTED CONTINUITY AND INTEGRITY OF VAPOUR RETARDER JACKET AND FINISHES.

.6 INSTALL HANGERS, SUPPORTS OUTSIDE VAPOUR RETARDER JACKET.

.7 APPLY HIGH COMPRESSIVE STRENGTH INSULATION, SUITABLE FOR SERVICE, AT OVERSIZED SADDLES AND SHOES WHERE INSULATION SADDLES HAVE NOT BEEN PROVIDED.

.8 ENSURE INSULATION IS CONTINUOUS THROUGH INSIDE WALLS. PACK AROUND PIPES WITH FIRE PROOF SELF-SUPPORTING INSULATION MATERIAL, PROPERLY SEALED.

.9 INSULATE PIPING, FITTINGS AND VALVES. DO NOT INSULATE UNIONS, FLANGES (EXCEPT ON FLANGED VALVES), "VICTAULIC" COUPLINGS, STRAINERS, FLEXIBLE CONNECTIONS AND EXPANSION JOINTS. TERMINATE INSULATION NEATLY WITH PLASTIC MATERIAL TROWELLED ON A BEVEL.

.10 LOCATE INSULATION OR COVER SEAMS IN LEAST VISIBLE LOCATIONS. LOCATE SEAMS ON PIPING IN CEILING SPACES ON THE UNDERSIDE OF THE PIPE.

.11 TERMINATE INSULATION 75 MM (3") BACK FROM ALL UNINSULATED FITTINGS TO PROVIDE WORKING CLEARANCE. TERMINATE INSULATION AT 90°, FINISH WITH REINFORCED SCRIM CLOTH AND VAPOUR BARRIER MASTIC SYSTEM OR USE VAPOUR BARRIER MASTIC AND PRE-FORMED FITTING COVER OVER.

.12 ON VERTICAL PIPES OVER 3 NPS PROVIDE INSULATION SUPPORTS WELDED OR BOLTED TO PIPE, DIRECTLY ABOVE THE LOWEST PIPE FITTING. PROVIDE SUPPORTS ON 4.5 M (15') CENTRES.

4.2 INSTALLATION HOT APPLICATION - HIGH TEMPERATURE (315C - 815C)

.1 PIPING: USE DOUBLE LAYER INSULATION METHOD. BUTT ALL JOINTS (LONGITUDINAL AND CIRCUMFERENTIAL) TIGHTLY AND MECHANICALLY HELD IN PLACE USING A COMBINATION OF 1.6MM (16GA) TYPE 304 STAINLESS STEEL WIRE AND TYPE 304 STAINLESS STEEL BANDS AND CLIPS ON MAXIMUM 300MM (12") CENTERS. PROVIDE METAL JACKETING FOR PIPING SYSTEMS IN EXPOSED AND CORROSIVE ENVIRONMENTS, AND PIPING SYSTEMS IN MECHANICAL EQUIPMENT ROOMS.

.2 FLANGED FITTINGS, COUPLINGS AND VALVE BONNETS: PROVIDE OVER SIZED PIPE INSULATION SIZED TO PROVIDE THE SAME INSULATION THICKNESS AS THE PIPE.

.3 INSTALL IN ACCORDANCE WITH THERMAL INSULATION ASSOCIATION OF CANADA (TIAC) NATIONAL STANDARDS.

4.3 FINISHES

.1 CONCEALED PIPING SHALL BE LEFT AS FACTORY FINISHED, TIAC STANDARD CPF/2.

.1 EXPOSED PIPING INDOOR (CANVAS) CPF/1:

.2 THE FACTORY APPLIED INTEGRAL ALL SERVICE JACKET SHALL BE NEATLY APPLIED TO RECEIVE THE FABRIC JACKET. APPLY A JACKET WITH A FIRE RESISTIVE LAGGING COATING. APPLY A FINISHING COAT OF FIRE RESISTIVE LAGGING COATING.

.2 EXPOSED PIPING OUTDOOR (METAL JACKET) CPF/3

.1 APPLY METAL JACKETING WITH A 60MM OVERLAP AT 3 O'CLOCK USING NECESSARY FASTENINGS ON APPROXIMATELY 150MM CENTERS.

.2 OVER INSULATED FITTINGS, VALVE BODIES, VALVE BONNETS, STRAINERS AND FLANGES APPLY METAL JACKET OR PREFORMED METAL FITTING COVERS TO PROVIDE A COMPLETE JACKET SYSTEM. SECURE WITH NECESSARY FASTENINGS.

4.4 FINISHES

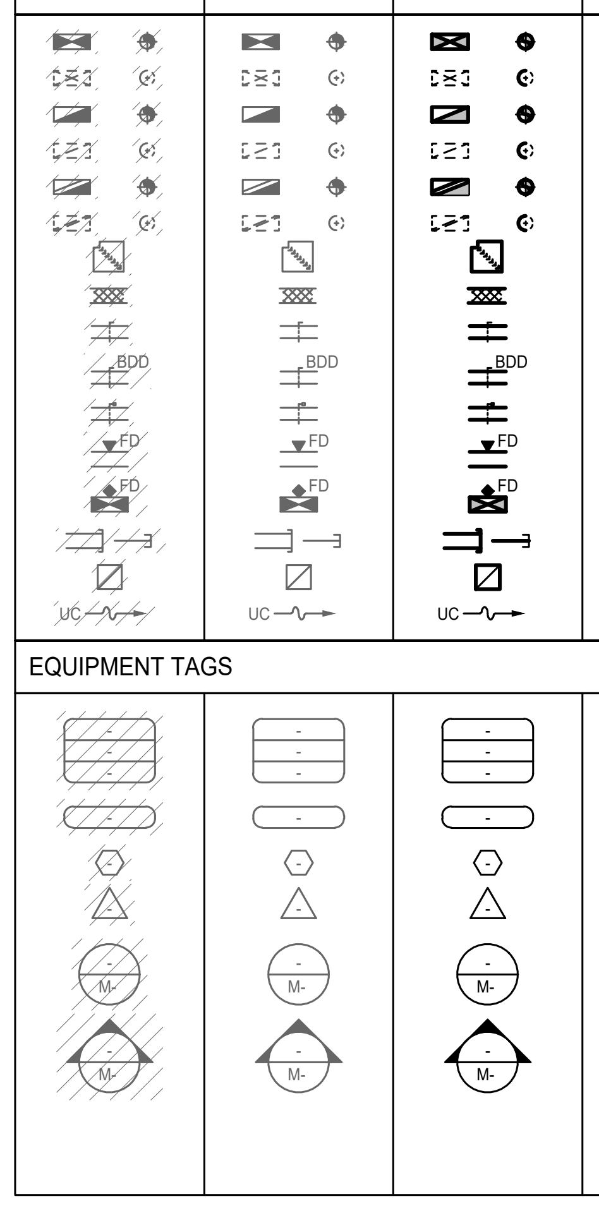
.1 GENERATOR EXHAUST PIPE & SILENCER >600°C INSULATION THK. 75MM

END OF SECTION

SYMBOL SCHEDULE

DUCTWORK

DEMOLITION | EXISTING | NEW



SUPPLY OR OUTDOOR AIR DUCT UP
SUPPLY OR OUTDOOR AIR DUCT DOWN
RETURN AIR DUCT UP
RETURN AIR DUCT DOWN
EXHAUST AIR DUCT UP
EXHAUST AIR DUCT DOWN
TURNING VANES
ACOUSTIC INSULATION
BALANCING DAMPER (BD)
BACKDRAFT DAMPER (BDD)
MOTORIZED DAMPER (MD)
FIRE DAMPER - VERTICAL (FD)
FIRE DAMPER - HORIZONTAL (FD)
DUCT OR PIPE CAP-OFF
RETURN OR EXHAUST AIR GRILLE
UNDER-CUT DOOR

EQUIPMENT TAGS

GRILLE TYPE
NECK / GRILLE SIZE
AIR VOLUME (L/s)
EQUIPMENT / FIXTURE TYPE
GENERAL NOTE
DRAWING REVISION
DETAIL NUMBER
DRAWING NUMBER
SECTION NUMBER
DRAWING NUMBER

MECHANICAL ABBREVIATIONS

AD	AREA DRAIN	MECH	MECHANICAL
AFF	ABOVE FINISHED FLOOR	NIC	NOT IN CONTRACT
AHU	AIR HANDLING UNIT	NC	NORMALLY CLOSED
ARCH	ARCHITECTURAL	NO	NORMALLY OPEN
BDD	BACKDRAFT DAMPER	NTS	NOT TO SCALE
BHP	BREAK HORSEPOWER	O/A	OUTDOOR AIR
BTUH	BRITISH THERMAL UNIT / HOUR	OBD	OPPOSED BLADE DAMPER
CD	CONTROL DAMPER	OED	OPEN ENDED DUCT
CFM	CUBIC FEET PER MINUTE	OD	OUTSIDE DIAMETER
CLG	CEILING	R/A	RETURN AIR
C/W	COMPLETE WITH	RF	RETURN FAN
CONT	CONTINUATION	RM	ROOM
CTE	CONNECT TO EXISTING	RPM	REVOLUTIONS PER MINUTE
DDC	DIRECT DIGITAL CONTROL	RWL	RAIN WATER LEADER
DIA	DIAMETER	S/A	SUPPLY AIR
DN	DOWN	SF	SUPPLY FAN
DWG	DRAWING	SS	STAINLESS STEEL
E/A	EXHAUST AIR	SP	STATIC PRESSURE
EAT	ENTERING AIR TEMPERATURE	SPEC	SPECIFICATION
EF	EXHAUST FAN	ST	STORM MAIN
ELEC	ELECTRICAL	T/A	TRANSFER AIR
ESP	EXTERNAL STATIC PRESSURE	TAD	TRANSFER AIR DUCT
EXH	EXHAUST	TBC	TO BE CONFIRMED
FLA	FULL LOAD AMPS	TBD	TO BE DETERMINED
FLR	FLOOR	THRU	THROUGH
FPM	FEET PER MINUTE	TSP	TOTAL STATIC PRESSURE
FT	FEET/FOOT	TYP	TYPICAL
HP	HORSEPOWER	V	VENT
INV	INVERT	VFD	VARIABLE FREQUENCY DRIVE
KW	KILOWATT	VTR	VENT THROUGH ROOF
LAT	LEAVING AIR TEMPERATURE	W	WATER MAIN
LBS	POUNDS	WB	WET BULB
MH	MANHOLE	WCO	WALL CLEANOUT
MBH	1000 BRITISH THERMAL UNITS/HOUR	WG	WATER GAUGE
MD	MOTORIZED DAMPER		

MECHANICAL GENERAL NOTES:

1. THE MECHANICAL SYSTEM AND ALL OTHER SYSTEMS SHALL CONSIST OF ALL WORK SHOWN ON THE DRAWINGS, DIAGRAMS, AND AS DESCRIBED IN THE SPECIFICATIONS.
2. CONTRACTOR SHALL HAVE A THOROUGH KNOWLEDGE OF ALL DRAWINGS, SPECIFICATIONS AND EXISTING CONDITIONS PRIOR TO BID. NO ADDITIONAL COMPENSATION SHALL BE ALLOWED DUE TO THE CONTRACTOR`S FAILURE TO BECOME FAMILIAR WITH EXISTING CONDITIONS.
3. ALL WORK AND MATERIALS SHALL CONF0RM TO THE REQUIREMENTS AS SET OUT IN THE BASE BUILDING TENANT DESIGN AND CONSTRUCTION MANUAL.
4. CONTRACTOR TO DISPOSE OF ALL EQUIPMENT THAT ARE NOT KEPT BY OWNER.
5. ALL CORING AND DRILLING MUST BE APPROVED IN WRITING BY CONTRACTOR HIRED STRUCTURAL ENGINEER PRIOR TO WORK COMMENCING. APPROVALS TO BE SUBMITTED TO CONSULTANT AND INCLUDED IN OPERATION AND MAINTENANCE MANUALS.
6. CONTRACTOR SHALL IDENTIFY IN WRITING TO THE ENGINEER ANY EXISTING SERVICES DEEMED TO BE UNACCEPTABLE PRIOR TO COMMENCEMENT OF WORK.
7. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY INTERRUPTIONS TO SERVICES AND SHALL REPAIR ANY DAMAGES TO THE EXISTING SYSTEMS CAUSED BY OPERATION.
8. CONTRACTOR TO INCLUDE AS A PART OF THE BID ALL COSTS ASSOCIATED WITH CUTTING AND PATCHING THAT IS REQUIRED TO INSTALL ALL NEW MECHANICAL SYSTEMS AS REQUIRED TO MEET THE SITE CONDITIONS AS SHOWN ON THE DRAWINGS. PATCHING SHALL MEET THE AESTHETIC CONDITIONS WHICH WERE IN PLACE PRIOR TO ANY CUTTING BEING PERFORMED.
9. ALL TEST PROCEDURES SHALL BE IN ACCORDANCE WITH APPLICABLE PORTIONS OF ASHRAE, CSA, NFPA, SMACNA, ETC.
10. CONTRACTOR TO COORDINATE ALL MECHANICAL WORK WITH THAT OF OTHER TRADES TO ENSURE PROPER AND ADEQUATE INTERFACE WITH THE WORK OUTLINED FOR THIS PROJECT.
11. CONTRACTOR MUST TAKE ACTUAL MEASUREMENTS BEFORE ORDERING MATERIALS AND EQUIPMENT. FAILURE TO COMPLY WITH THIS REQUIREMENT WILL MAKE THE CONTRACTOR FULLY RESPONSIBLE FOR REPLACING SUCH MATERIALS OR EQUIPMENT AT NO EXTRA COST TO THE CONTRACT.
12. ALL DUCTWORK SHALL BE DELIVERED TO SITE IN A CLEAN CONDITION AND REMAIN CLEAN. DURING INSTALLATION ALL OPEN ENDS OF DUCTWORK SHALL BE CAPPED AND KEPT CLEAN.
13. MODIFY THE SIZE AND ROUTING OF NEW DUCTWORK AS REQUIRED TO SUIT THE SITE CONDITION WITHOUT EXTRA COST TO THE OWNER. PROVIDE ADEQUATE OFFSETS, AND TRANSITIONS ON NEW DUCTWORK AS REQUIRED TO SUIT SITE CONDITIONS.
14. CONTRACTOR TO PROVIDE SEISMIC RESTRAINTS FOR ALL NEW DUCTWORK AND EQUIPMENT TO SATISFY ALL CODES AND AUTHORITIES HAVING JURISDICTION.
15. SUBMIT SHOP DRAWINGS TO CONSULTANT ON ALL EQUIPMENT SPECIFIED FOR REVIEW AND DO NOT ORDER EQUIPMENT OR MATERIALS UNTIL CONSULTANT HAS REVIEWED SHOP DRAWINGS.

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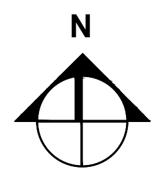

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D	REQUEST FOR PROPOSAL	1/29/2021
C	ISSUED FOR PERMIT	1/7/2021
B	ISSUED FOR 90% REVIEW	12/21/2020
A	ISSUED FOR CLIENT REVIEW	10/30/2020

STATUS:

CLIENT:

CITY OF COQUITLAM
(640 POIRIER ST, COQUITLAM, BC,
V3J 6B1)

PROJECT NAME/ADDRESS:

CITY OF COQUITLAM GENERATOR REPLACEMENT

COQUITLAM CITY HALL
3000 GUILFORD WAY, COQUITLAM, BC, V3B 7N2

DRAWING TITLE:

SITE PLAN, MECHANICAL NOTES & SYMBOL SCHEDULE

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PROJECT NO:	DRAWING NO:		REVISION:
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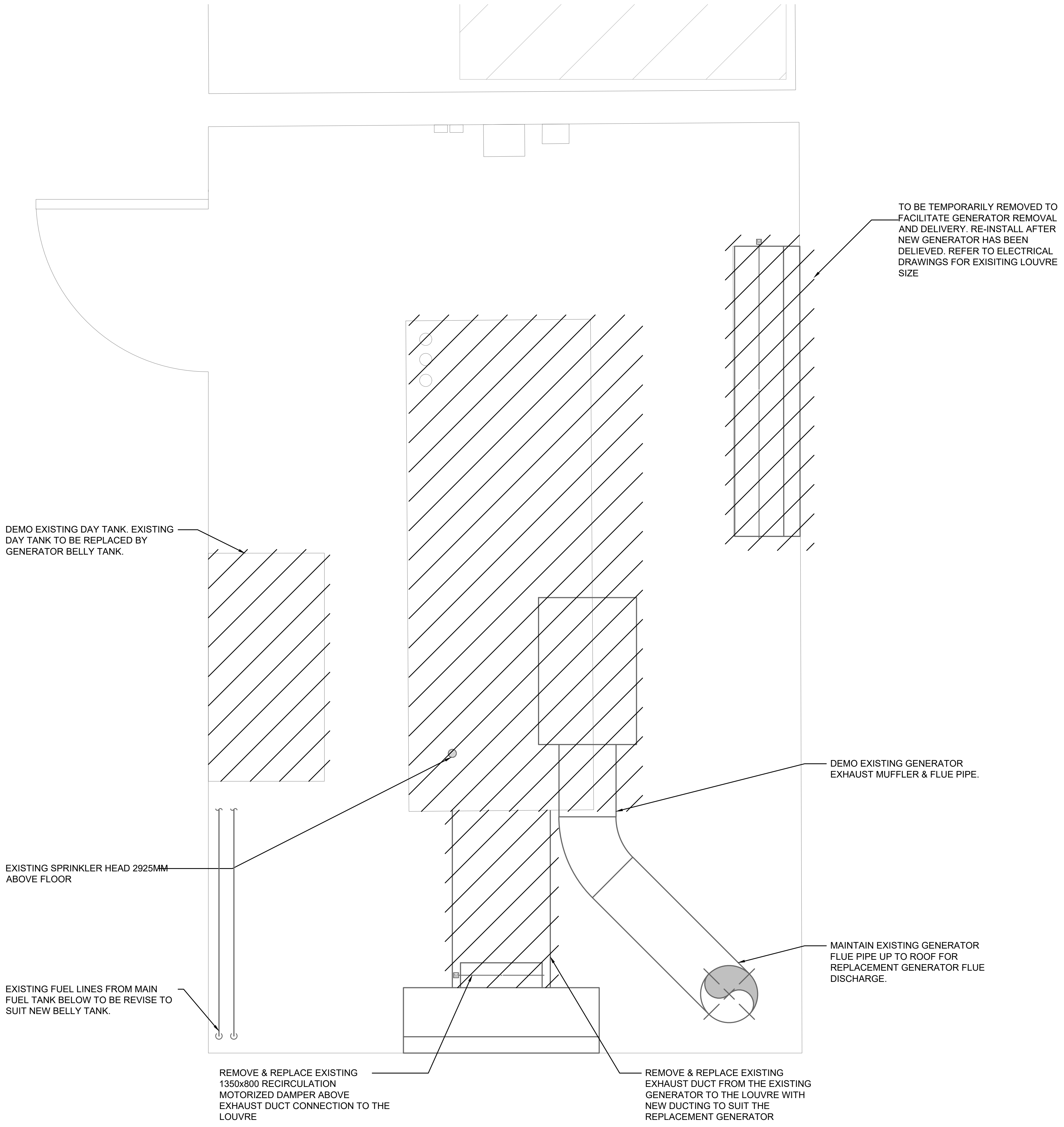
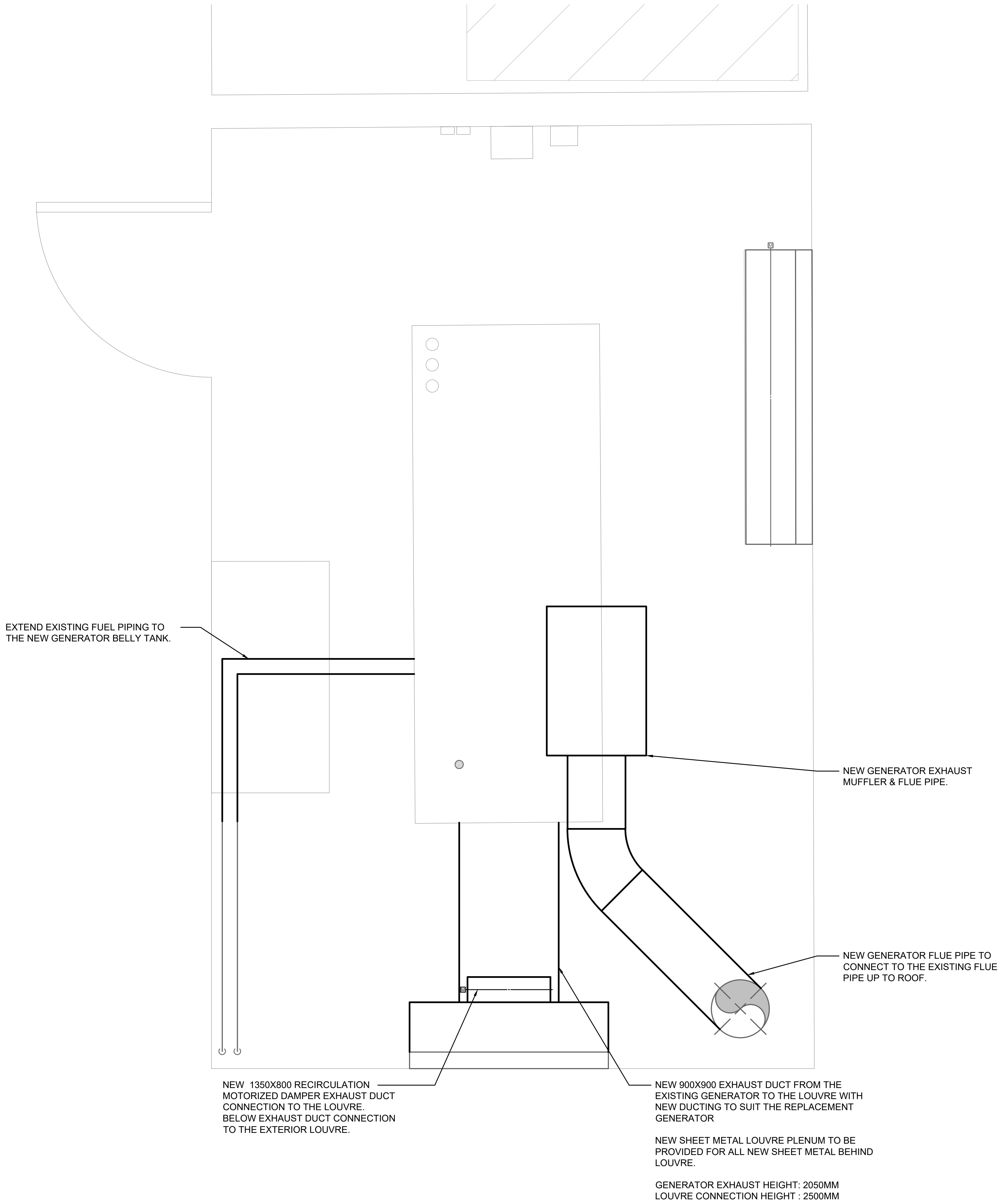


1
M2.0
ELECTRICAL ROOM 233 - DEMO
SCALE: 1:20



2
M2.0
ELECTRICAL ROOM 233 - RENO
SCALE: 1:20

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3000 GUILFORD WAY, COQUITLAM, BC, V3B 7N2

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MECHANICAL PLAN

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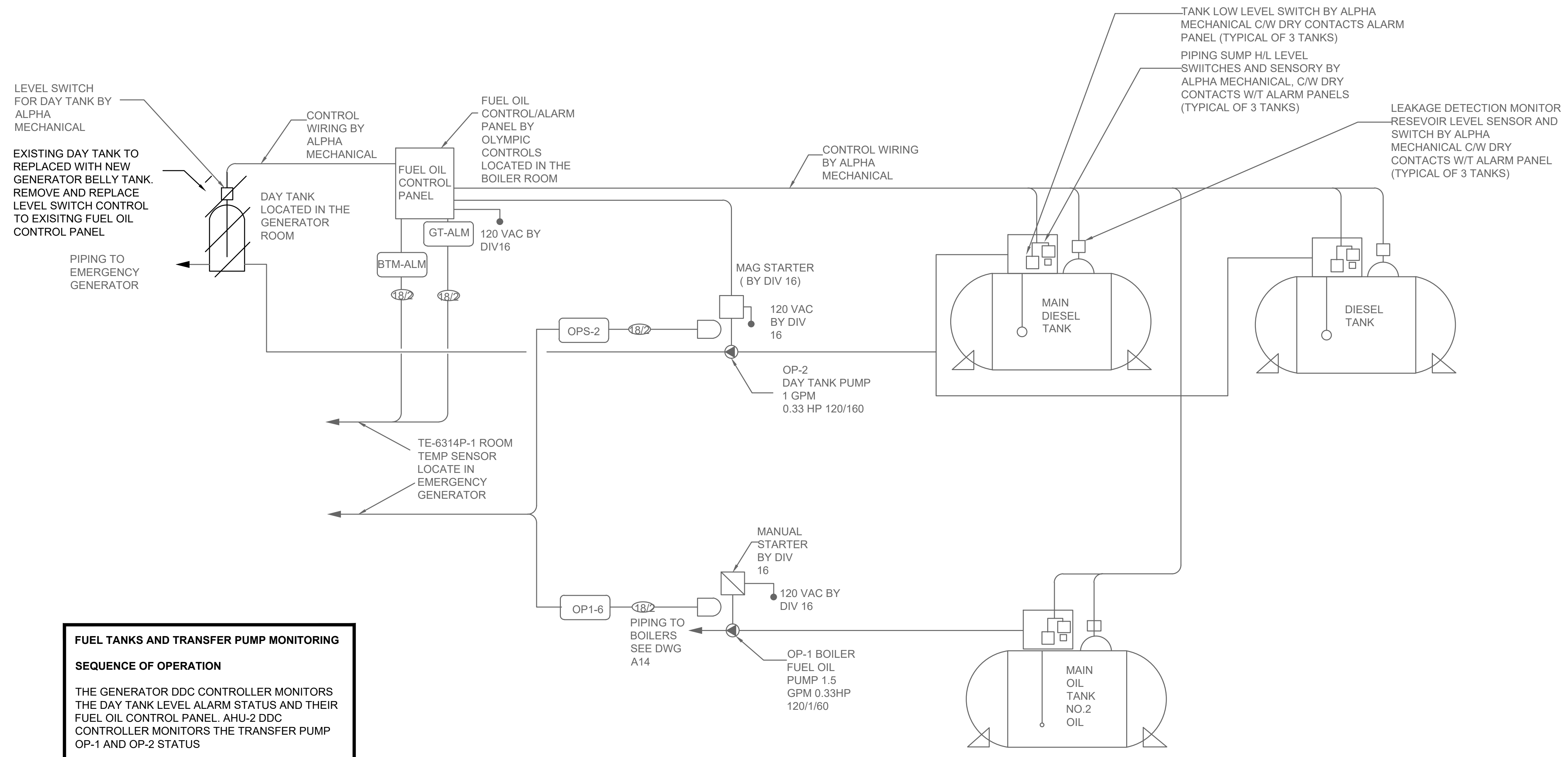


FUEL TANKS AND TRANSFER PUMP MONITORING

SEQUENCE OF OPERATION

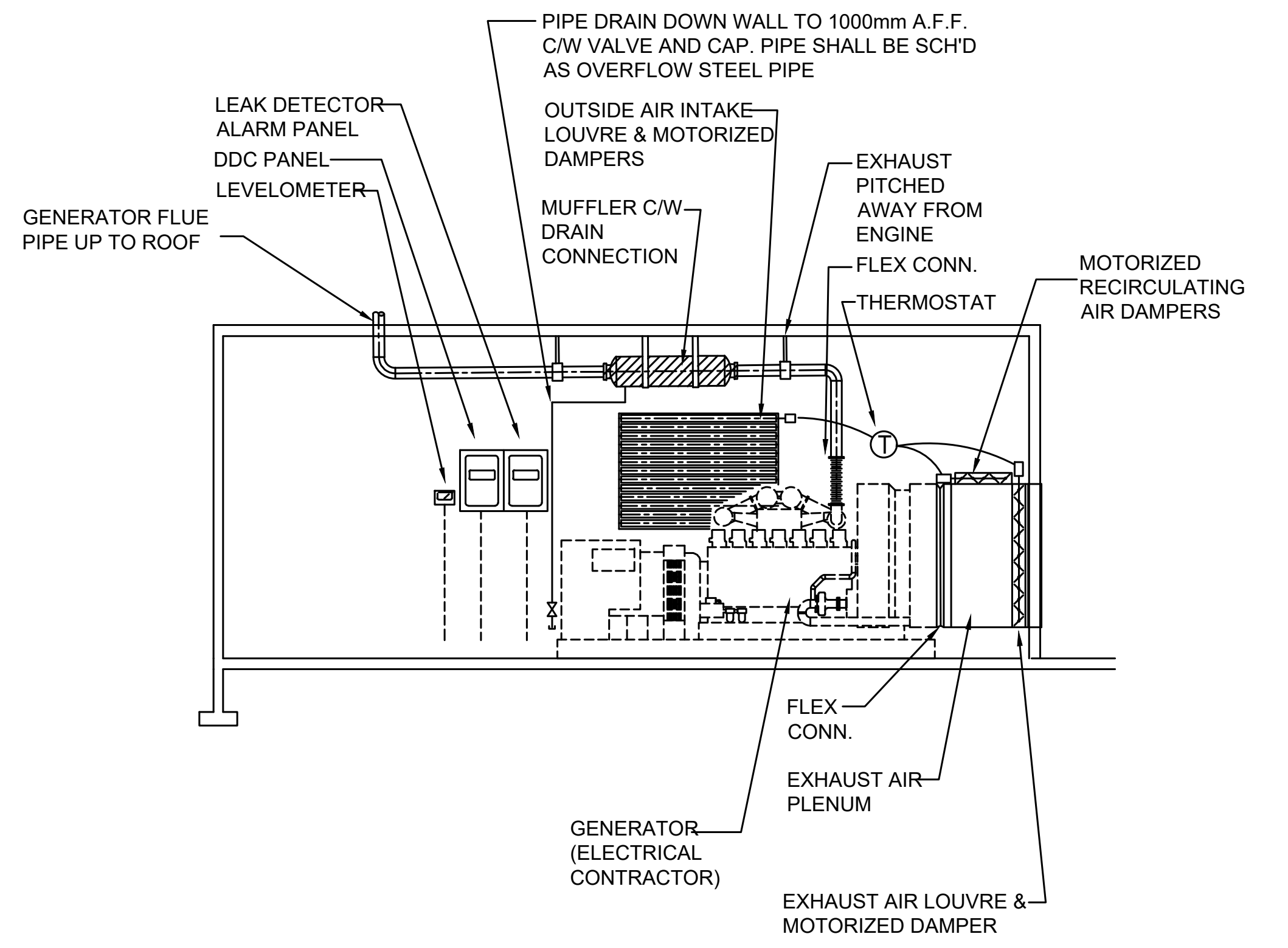
THE GENERATOR DDC CONTROLLER MONITORS THE DAY TANK LEVEL ALARM STATUS AND THEIR FUEL OIL CONTROL PANEL. AHU-2 DDC CONTROLLER MONITORS THE TRANSFER PUMP OP-1 AND OP-2 STATUS

THE OIL TRANSFER PUMP OP-1 IS CONTROLLED BY A MANUAL SWITCH PROVIDED BY DIVISION 16.

THE OIL TRANSFER PUMP OP-2 IS CONTROLLED BY THE HI/LOW LEVEL SWITCH FROM THE DAY TANK THROUGHT THE FUEL OIL CONTROL PANEL.

1 M3.0 FUEL TANKS AND TRANSFER PUMPS SYSTEM SCHEMATICS

SCALE: NOT TO SCALE

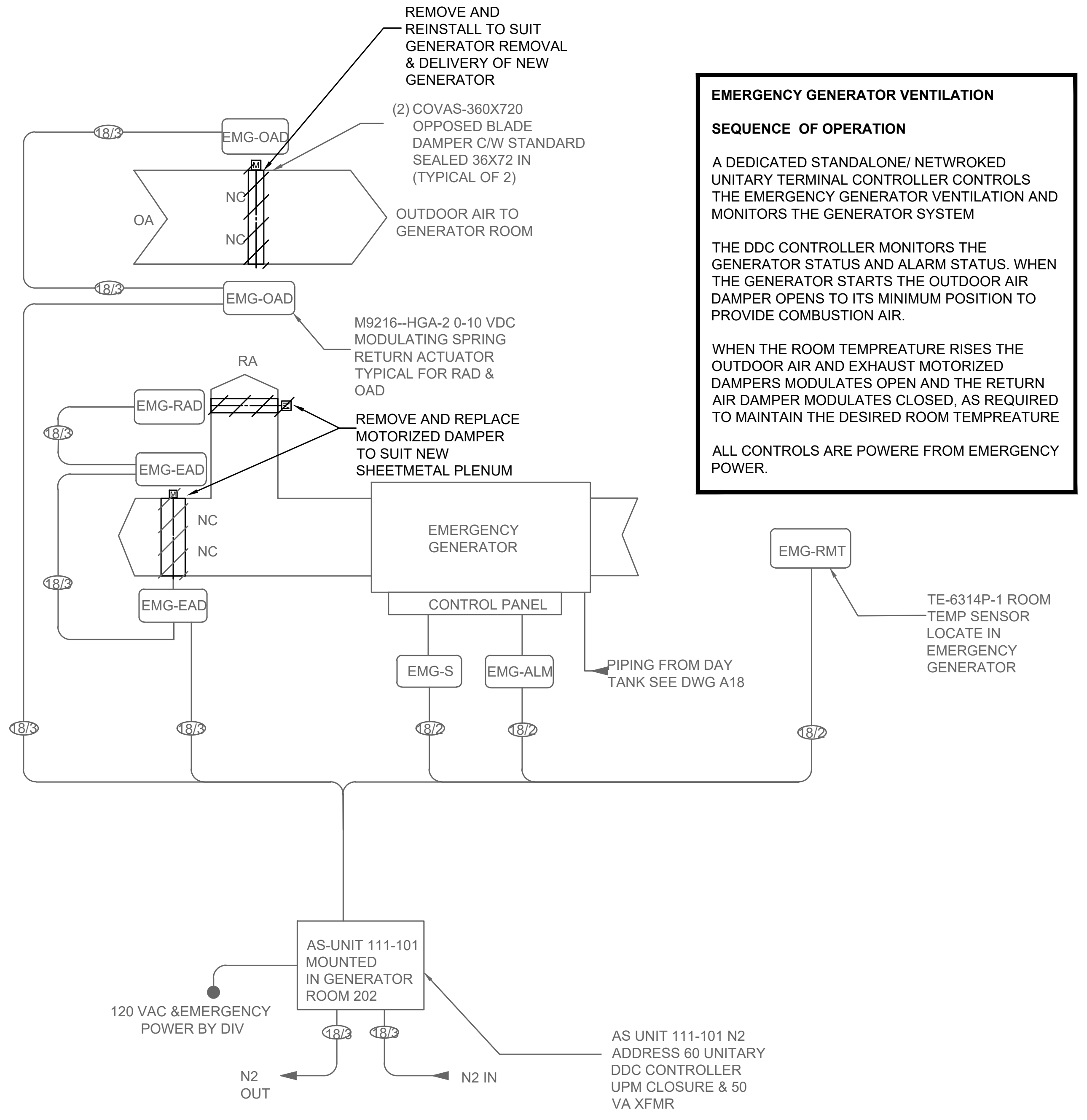


DETAIL NOTES

1. REVISE EXISTING SPRINKLER SYSTEMS WITHIN GENERATOR ROOM TO SUIT REPLACEMENT GENERATOR.
2. RE & RE EXISTING OIL SUPPLY PUMP OPERATION TO SUIT NEW BELLY TANK
3. MOTORIZED DAMPER TO BE PROPORTIONAL CONTROL TYPE, REFER TO SPEC. FOR SEQUENCE OF OPERATION
4. OIL SUCTION LINE TO GENERATOR TO BE C/W FUSIBLE LINK ISOLATION VALVE
5. ALL BURIED OIL PIPING TO BE DOUBLE WALL FLEXIBLE TYPE (IF APPLICABLE)
6. PROVIDE PROTECTIVE STEEL PIPE COVER OVER OIL PIPES ON GENERATOR ROOM FLOOR OR IN FLOOR TRENCH C/W METAL PLATE COVER
7. BELLY TANK SUPPLIED BY ELECTRICAL CONTRACTOR. FLOAT SWITCH, INDICATION GAUGE BY MECHANICAL CONTRACTOR
8. EXHAUST PIPE, MUFFLER, FLEXIBLE CONNECTION & EXPANSION JOINTS TO BE COMPLETELY INSULATED. SEE SPECIFICATIONS

2 M3.0 GENERATOR SCHEMATIC

SCALE: NOT TO SCALE



EMERGENCY GENERATOR VENTILATION

SEQUENCE OF OPERATION

A DEDICATED STANDALONE/ NETWROKED UNITARY TERMINAL CONTROLLER CONTROLS THE EMERGENCY GENERATOR VENTILATION AND MONITORS THE GENERATOR SYSTEM

THE DDC CONTROLLER MONITORS THE GENERATOR STATUS AND ALARM STATUS. WHEN THE GENERATOR STARTS THE OUTDOOR AIR DAMPER OPENS TO ITS MINIMUM POSITION TO PROVIDE COMBUSTION AIR.

WHEN THE ROOM TEMPREATURE RISES THE OUTDOOR AIR AND EXHAUST MOTORIZED DAMPERS MODULATES OPEN AND THE RETURN AIR DAMPER MODULATES CLOSED, AS REQUIRED TO MAINTAIN THE DESIRED ROOM TEMPREATURE

ALL CONTROLS ARE POWERE FROM EMERGENCY POWER.

3 M3.0 EMERGENCY GENERATOR VENTILATION SYSTEM SCHEMATIC

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4 M3.0 CITY HALL GENERATOR ROOM SCOPE OF WORK

SCALE: NOT TO SCALE

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