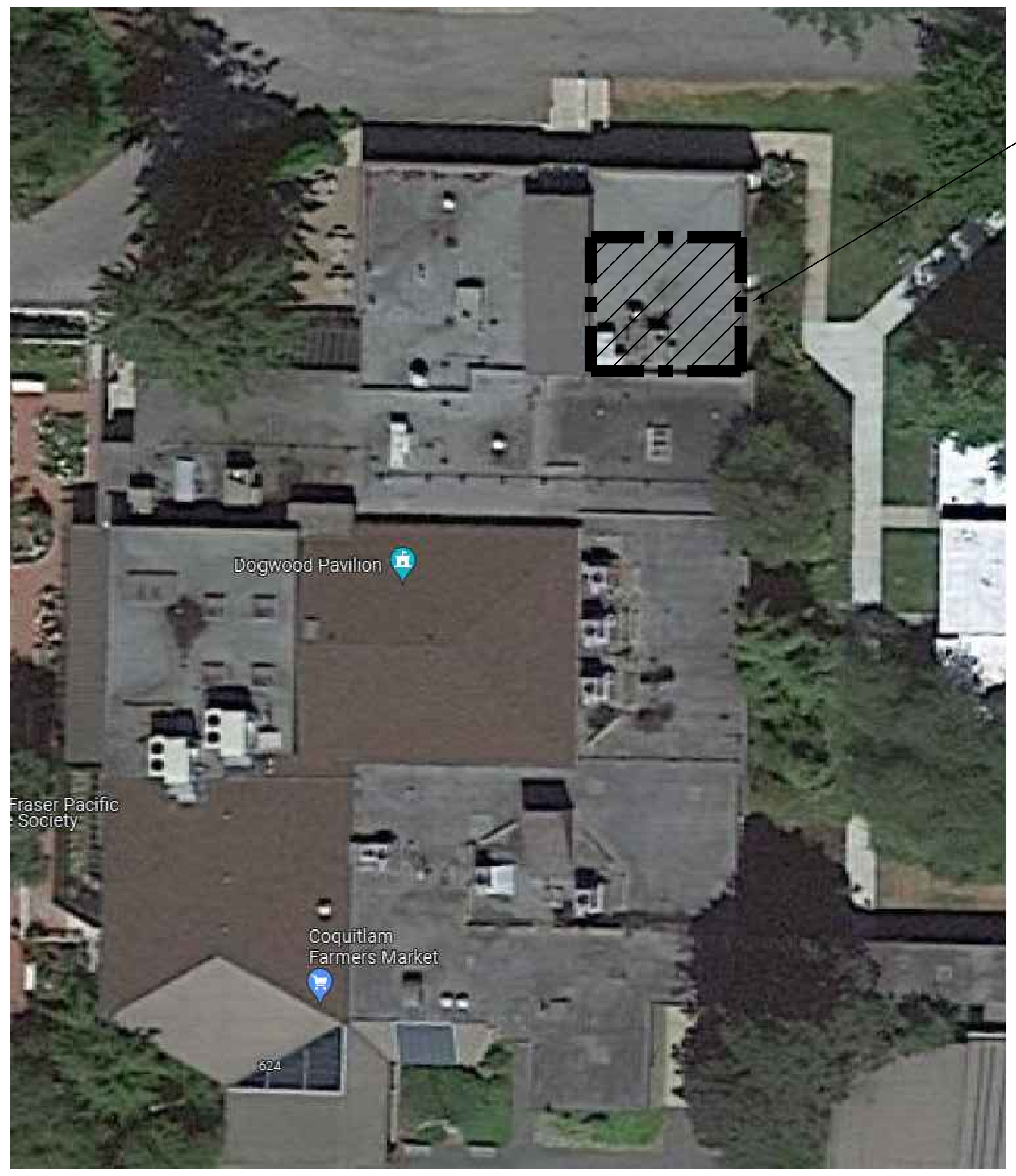
CITY OF COQUITLAM - DOGWOOD PAVILION - DUST EXTRACTION REPLACEMENT

1655 WINSLOW AVENUE, COQUITLAM, BC



APPROXIMATE SCOPE OF WORK AREA

1 / M0.00 **SITE PLAN**
SCALE: NTS

PROJECT NORTH

AIR RECEIVER TANK

EQUIPMENT TAG	MANUFACTURER	MODEL	TANK SIZE (GALLONS)	DIMENSIONS (DIAxL) (IN)	NOTES
AT-1	INGERSOLL RAND	38020012	30	16x38	ALL

NOTES:
1 VERTICAL TANK
2 STEEL TANK
3 COMPLETED WITH DRAIN PAN BELOW

DUST COLLECTOR

EQUIPMENT TAG	LOCATION	MANUFACTURER	MODEL	AIRFLOW (CFM)	E.S.P. (IN. WG)	POWER (HP)	NOTES
DC-1	STORAGE	DONALDSON TORIT	UMA 250	2500	9	10	ALL

NOTES:
1 FILTER, STARTER, CATRIDGE, AND BARRELS PACKAGE TO BE PROVIDER BY SUPPLIER
2 NEOPRENE GASKET BELOW UNIT IS TO BE INSTALLED

AUTOMATIC BLAST GATE

EQUIPMENT TAG	MANUFACTURER	MODEL	SIZE	OVERALL DIMENSIONS (IN)	VOLT/PH./Hz	NOTES
ABG-1	NORDFAB	NFES 3245	3	16x6.38x5.50	120/1/60	ALL
ABG-2	NORDFAB	NFES 3245	4	16x6.30x5.50	120/1/60	ALL
ABG-3	NORDFAB	NFES 3245	5	17.5x7.50x5.25	120/1/60	ALL
ABG-4	NORDFAB	NFES 3245	6	20.5x8.66x5.25	120/2/60	ALL

NOTES:
1 GALVANIZED STEEL GATES
2 14 GAUGE
3 COMPLETED PACKAGE CONTROL PROVIDED BY SUPPLIER.

AIR COMPRESSOR

EQUIPMENT TAG	MANUFACTURER	MODEL	MAX. PRESS. (PSI)	TANK CAPACITY (GALLONS)	POWER (HP)	VOLT/PH./Hz	DIMENSIONS (LxWxH) (IN)	WEIGHT (LBS)	NOTES
AC-1	SWAN	DA-103	115	10	3.0	120/1/60	28x16x27	99	ALL

NOTES:
1 DRAIN PAN BELOW THE COMPRESSOR IS TO BE PROVIDED
2 C/W F35IG FILTER

MECHANICAL DRAWING LIST

DRAWINGS NO.	DESCRIPTION	SCALE
M0.00	COVER PAGE	N.T.S.
M1.00	DEMOLITION PLAN	AS NOTED
M1.01	RENOVATION PLAN	AS NOTED
M2.00	MECHANICAL SPECIFICATIONS	N.T.S.

MECHANICAL GENERAL NOTES

1. THE MECHANICAL SYSTEM SHALL CONSIST OF ALL WORK SHOWN ON THE DRAWINGS, DIAGRAMS, SCHEMATICS AND AS DESCRIBED IN THE SPECIFICATIONS.
2. THE MECHANICAL PLANS ARE DIAGRAMMATIC IN NATURE AND DO NOT ATTEMPT TO SHOW ALL REQUIRED OFFSETS. REFER TO ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR ADDITIONAL CONSTRUCTION DETAILS.
3. COORDINATE THE DRAWINGS WITH THE SPECIFICATIONS AND IN CASES WHERE CONFLICTS OCCUR THE MOST STRINGENT REQUIREMENT SHALL APPLY.
4. CONTRACTOR TO COORDINATE ALL MECHANICAL WORK WITH THAT OF OTHER TRADES TO ENSURE PROPER AND ADEQUATE INTERFACE WITH THE WORK OUTLINED FOR THIS PROJECT.
5. CONTRACTOR TO PROVIDE HORIZONTAL AND VERTICAL CLEARANCE REQUIREMENTS AS PER CEC (CANADIAN ELECTRICAL CODE) FOR ALL INSTALLED EQUIPMENT. OFFSET MECHANICAL WORK AS REQUIRED TO MEET THIS REQUIREMENT.
6. MECHANICAL EQUIPMENT SHALL NOT BE USED FOR TEMPORARY HEATING DURING THE CONSTRUCTION PROCESS. A WRITTEN LETTER FROM THE OWNER IS REQUIRED TO DO SO.
7. ALL DUCTWORK SIZES ARE SHOWN AS INSIDE CLEAR. ADD APPROPRIATE DIMENSION FOR INSULATION OR DUCT LINER TO OBTAIN "TOTAL DUCT SIZE".
8. CONTRACTOR TO ALLOW AND PROVIDE FOR METAL DUCTWORK TRANSITIONS BETWEEN ALL EQUIPMENT AND DUCT CONNECTIONS.
9. COORDINATE EXACT LOCATIONS OF ALL ROOM THERMOSTATS AND/OR ROOM TEMPERATURE SENSORS WITH THE DESIGN ARCHITECT BEFORE FINAL INSTALLATION.

MECHANICAL RENOVATION NOTES

1. THE CONTRACTOR SHALL BE REQUIRED TO ATTEND A PRE-INVESTIGATION WALK THROUGH TO ENSURE A PROPER UNDERSTANDING OF THE MECHANICAL SCOPE OF WORK.
2. CONTRACTOR IS RESPONSIBLE FOR REVIEWING AND VERIFYING ACTUAL ON-SITE CONDITIONS AND EQUIPMENT LOCATIONS PRIOR TO ANY AND ALL DEMOLITION WORK AND/OR EQUIPMENT REMOVAL.
3. CONTRACTOR TO INCLUDE AS A PART OF THE PROPOSAL 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 WAS THE CONDITION PRIOR TO ANY CUTTING BEING PREFORMED.
4. CONTRACTOR TO PROPERLY SEAL AND REPAIR ANY AND ALL DAMAGE THAT IS A RESULT OF REMOVAL OR DEMOLITION OF MECHANICAL EQUIPMENT. THIS INCLUDES BUT IS NOT LIMITED TO WALL, DOOR, CEILINGS, ETC.
5. THE EXISTING FACILITIES MECHANICAL SYSTEMS SHALL REMAIN OPERATIONAL DURING THE CONSTRUCTION AND RENOVATION PERIOD. CONTRACTOR TO COORDINATE CONSTRUCTION ACTIVITIES AND PHASING WITH OWNER TO MINIMIZE DISRUPTIONS TO OWNERS OPERATIONS AND ACCESS, AND TO ENSURE SAFETY OF THE USERS. PROVIDE ALL MEASURES REQUIRED TO PREVENT HAZARDS TO PEOPLE AND DAMAGE TO ITEMS REMAINING INCLUDING BUT NOT LIMITED TO DAMAGE FROM DUST AND HEAT.
6. THE EXISTING DRAWINGS HAVE BEEN PREPARED, IN PART, ON THE BASIS OF INFORMATION COMPILED AND FURNISHED BY OTHERS. AS A RESULT, THE ENGINEER WILL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH HAVE BEEN INCORPORATED INTO THIS DOCUMENT.
7. DURING REMOVAL OF ITEMS SO INDICATED, CAUTION SHOULD BE USED TO PREVENT DAMAGE TO ANY EQUIPMENT HAVING SALVAGE VALUE. ALL REUSABLE SALVAGED MATERIAL SHALL REMAIN THE PROPERTY OF THE OWNER AND BE RETAINED FOR THEIR INSPECTION. ONLY ITEMS AGREED BY THE OWNER SHALL BE DISPOSED OF BY THE CONTRACTOR.
8. CONTRACTOR SHALL COORDINATE AND SCHEDULE WORK WITH FACILITY TO LIMIT INTERFERENCE WITH OPERATIONS.

ROOFTOP UNIT SCHEDULE

TAG	RTU-1
LOCATION	ROOF
SERVICE	WOODWORKING
MANUFACTURER	ENGINEERED AIR
MODEL	DJE20/O/R
VOLT (V/PH/CYC)	208/3/60
MCA	8.1
SUPPLY FAN	
NORMAL VOLUME (CFM)	2,000
EXTERNAL STATIC (INCH)	1.30
FAN TYPE	BELT DRIVE
FAN SPEED (RPM)	1,934
MOTOR (HP)	0.78
HEATING SECTION	
INPUT CAPACITY (MBH)	200
OUTPUT CAPACITY (MBH)	160
TURNDOWN RATIO	15:1
TEMPERATURE RISE (DEG. F)	74
FILTERS	
MAIN FILTER	MERV 8
DIMENSIONS	
L x W x H (IN)	82 x 67 x 33
WEIGHT (LBS)	1,200
NOTES	

NOTES:
1. SINGLE POINT POWER CONNECTION TO UNIT
2. BOTTOM SUPPLY AND BOTTOM RETURN
3. NEW UNIT TO SIT ON EXISTING ROOF CURB

MECHANICAL ABBREVIATIONS

AD	AREA DRAIN
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
ARCH	ARCHITECTURAL
BB	BASEBOARD HEATER
BDD	BACKDRAFT DAMPER
BF	BOTTLE FILLER
BFP	BACKFLOW PREVENTER
BHP	BREAK HORSEPOWER
BMS	BUILDING MANAGEMENT SYSTEM
BT	BATH TUB
CB	CATCH BASIN
CFM	CUBIC FEET PER MINUTE
CLG	CEILING
CO	CLEANOUT
CONN	CONNECTION
C/W	COMPLETE WITH
CONT	CONTINUATION
CTE	CONNECT TO EXISTING
DB	DRY BULB
DCVA	DOUBLE CHECK VALVE ASSEMBLY
DDC	DIRECT DIGITAL CONTROL
DEG	DEGREE
DF	DRINKING FOUNTAIN
DIA	DIAMETER
DN	DOWN
DUC	DUAL CHECK VALVE
DW	DISH WASHER
DWG	DRAWING
E/A	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EF	EXHAUST FAN
EFF	EFFICIENCY
ELEC	ELECTRICAL
ENT	ENTERING
ESP	EXTERNAL STATIC PRESSURE
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
FA	FROM ABOVE
FB	FROM BELOW
FD	FLOOR DRAIN
FE	FIRE EXTINGUISHER
FFD	FUNNEL FLOOR DRAIN
FLA	FULL LOAD AMPS
FLR	FLOOR
FPM	FEET PER MINUTE
GPM	GALLONS PER MINUTE
GWB	GYPSUM WALL BOARD
HD	HUB DRAIN
HB	HOSE BIBB
HP	HORSEPOWER
ID	INSIDE DIAMETER
INV	INVERT
JS	JANITOR SINK
KW	KILOWATT
KS	KITCHEN SINK
LV	LAVATORY
LAT	LEAVING AIR TEMPERATURE
LWT	LEAVING WATER TEMPERATURE
MAU	MAKE-UP AIR UNIT
MAX	MAXIMUM
MH	MANHOLE
MBH	1000 BRITISH THERMAL UNITS/HOUR
MD	MOTORIZED DAMPER
MECH	MECHANICAL
MIN	MINIMUM
NFHB	NON FREEZE HOSE BIB
NIC	NOT IN CONTRACT
NC	NOISE CRITERIA/NORMALLY CLOSED
NO	NORMALLY OPEN
NTS	NOT TO SCALE
O/A	OUTDOOR AIR
OBD	OPPOSED BLADE DAMPER
OED	OPEN ENDED DUCT
OD	OUTSIDE DIAMETER
POC	POINT OF CONNECTION
PRV	PRESSURE REDUCING VALVE
PSI	POUNDS PER SQUARE INCH
R/A	RETURN AIR
RF	RETURN FAN
RM	ROOM
RPM	REVOLUTIONS PER MINUTE
RWL	RAIN WATER LEADER
S/A	SUPPLY AIR
SF	SUPPLY FAN
SH	SHOWER
SK	SINK
SS	STAINLESS STEEL
SP	STATIC PRESSURE
SPEC	SPECIFICATION
ST	STORM
T/A	TRANSFER AIR
TA	TO ABOVE
TB	TO BELOW
TBC	TO BE CONFIRMED
TBD	TO BE DETERMINED
TD	TRENCH DRAIN
THRU	THROUGH
TS	TAMPER SWITCH
TSP	TOTAL STATIC PRESSURE
TYP	TYPICAL
UR	URINAL
VFD	VARIABLE FREQUENCY DRIVE
VTR	VENT THROUGH ROOF
W	WATER MAIN
WB	WET BULB
WC	WATER CLOSET
WG	WATER GAUGE

SYMBOL SCHEDULE

PIPING SYSTEMS

— · —	DOMESTIC COLD WATER (DCW)
— · · —	DOMESTIC HOT WATER (DHW)
— · · · —	DOMESTIC HOT WATER RECIRC. (DHWR)
– – V – –	SANITARY VENT
—SAN—	SANITARY SEWER ABOVE GRADE
– –SAN– –	SANITARY SEWER BELOW GRADE
—ST—	STORM SEWER ABOVE GRADE
– –ST– –	STORM SEWER BELOW GRADE
– X – – X –	DRAIN TILE
— IR —	IRRIGATION
— G —	GAS
—C—	CONDENSATE DRAIN
— HWS —	HEATING WATER SUPPLY
– –HWR– –	HEATING WATER RETURN
—CHWS—	CHILLED WATER SUPPLY
– –CHWR– –	CHILLED WATER RETURN
—CONDS—	CONDENSER WATER SUPPLY
– –CONDR– –	CONDENSER WATER RETURN
— RS —	REFRIGERANT SUCTION(GAS)
– – RL – –	REFRIGERANT LIQUID

FITTINGS AND VALVES

—►—	DIRECTION OF FLOW
	PIPE DROP
—○	PIPE RISE
—○—	PIPE TEE UP
	PIPE TEE DOWN
	PIPE UNION
	PIPE CLEAN-OUT
	PIPE CLEAN-OUT TO GRADE
	PIPE CAP-OFF
—⋈—	ISOLATION VALVE
	ISOLATION VALVE (NORMALLY CLOSED)
	CHECK VALVE
	2-WAY CONTROL VALVE
	3-WAY CONTROL VALVE
S	SOLENOID VALVE
—◆—	BALANCING VALVE
	CIRCUIT SETTER VALVE
	PRESSURE REDUCING VALVE
	PRESSURE INDEPENDENT VALVE
	STRAINER
	RELIEF VALVE
	BACKFLOW PREVENTOR
	AUTOMATIC AIR VENT
	SEISMIC GAS SHUT-OFF VALVE
—×—	PIPE ANCHOR
	EXPANSION JOINT
	FLEX COUPLING
	PIPE SLEEVE
	HEAT TRACING

OUTLETS AND DRAINS

	OPEN DRAIN
	HOSE-BIBB
	FLOOR DRAIN
	FUNNEL FLOOR DRAIN
⊙	ROOF DRAIN
	AREA DRAIN
	P-TRAP
V	VENT TO ABOVE

MECHANICAL EQUIPMENT

	PUMP
	CABINET FAN
	PROPELLER FAN
	UNIT HEATER
	FORCE FLOW HEATER
	REHEAT COIL

SYSTEM MONITORING AND CONTROLS

Ⓣ	ROOM TEMPERATURE SENSOR
RⓉ	REVERSE ACTING TEMPERATURE SENSOR
Ⓢ	TEMPERATURE SENSOR
Ⓗ	HUMIDITY SENSOR
CO_2	CO_2 SENSOR
Ⓣ	PIPE TEMPERATURE SENSOR
Ⓟ	PRESSURE GUAGE
	THERMOMETER
F/S	FLOW SWITCH
—GM—	GAS METER
—WM—	WATER METER
	CONTROL WIRING

DUCTWORK

	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
BDD	BACKDRAFT DAMPER
M	MOTORIZED DAMPER
	FIRE DAMPER - VERTICAL
	FIRE DAMPER - HORIZONTAL
⊗	FIRE/SMOKE DAMPER
	DUCT CAP-OFF
▨	RETURN OR EXHAUST AIR GRILLE
UC	UNDER-CUT DOOR

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THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AND REPORT ALL ERRORS AND OMISSIONS TO THE CONSULTANT PRIOR TO COMMENCING THE WORK.

THESE DRAWINGS ARE NOT TO BE SCALED.

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2.	2024.08.28	ISSUED FOR RFP
3.	2024.09.10	ISSUED FOR ADDENDUM 1
4.	2024.09.23	ISSUED FOR ADDENDUM 2

CONSULTANT:

SEAL:

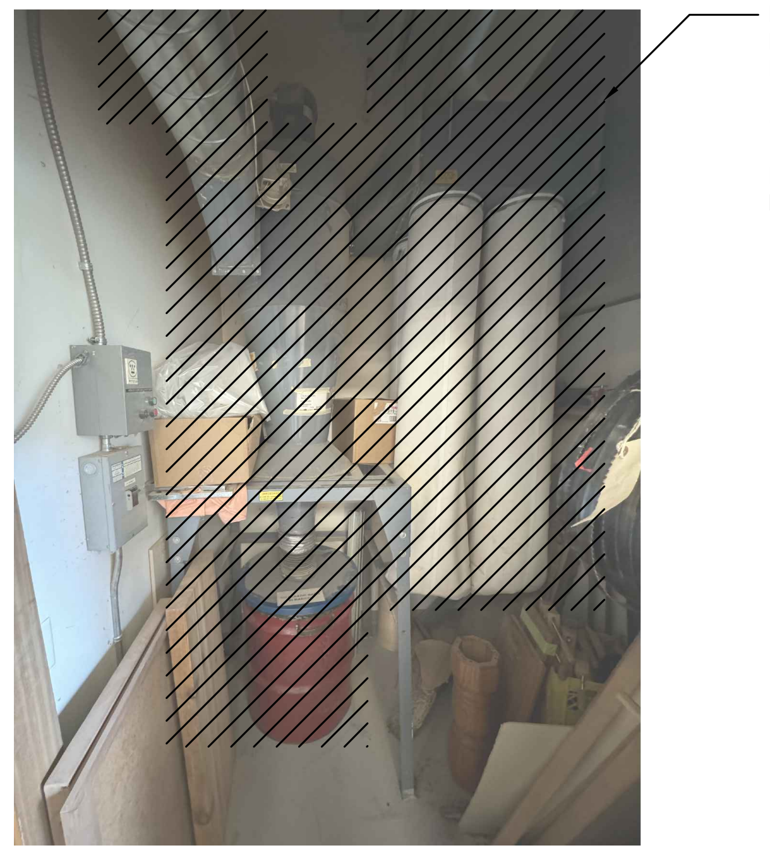
PROJECT TITLE:
DOGWOOD PAVILION - DUST EXTRACTION REPLACEMENT

PROJECT ADDRESS:
1655 WINSLOW AVE
COQUITLAM, BC
V3J 6B1

DRAWN BY	JH
CHECKED BY	MC
SCALE	N.T.S.
DATE	SEPTEMBER 23, 2024

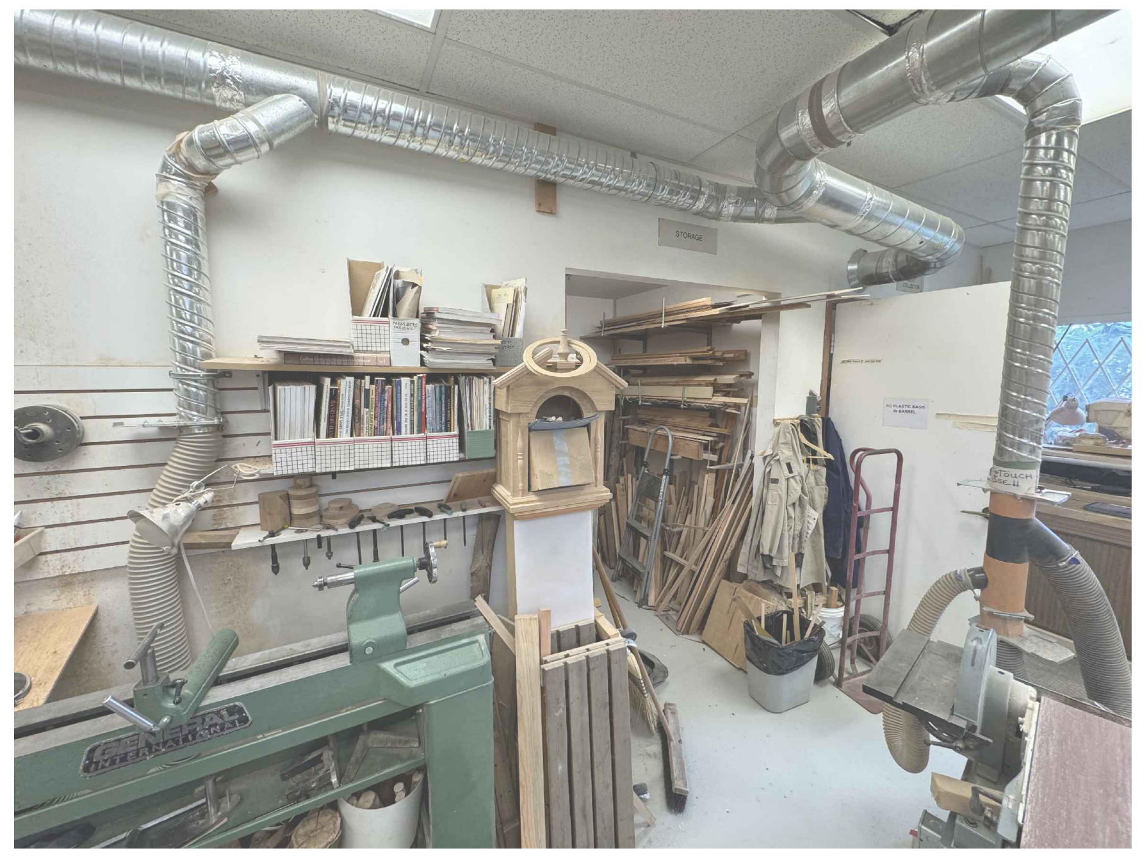
DRAWING TITLE:
COVER PAGE

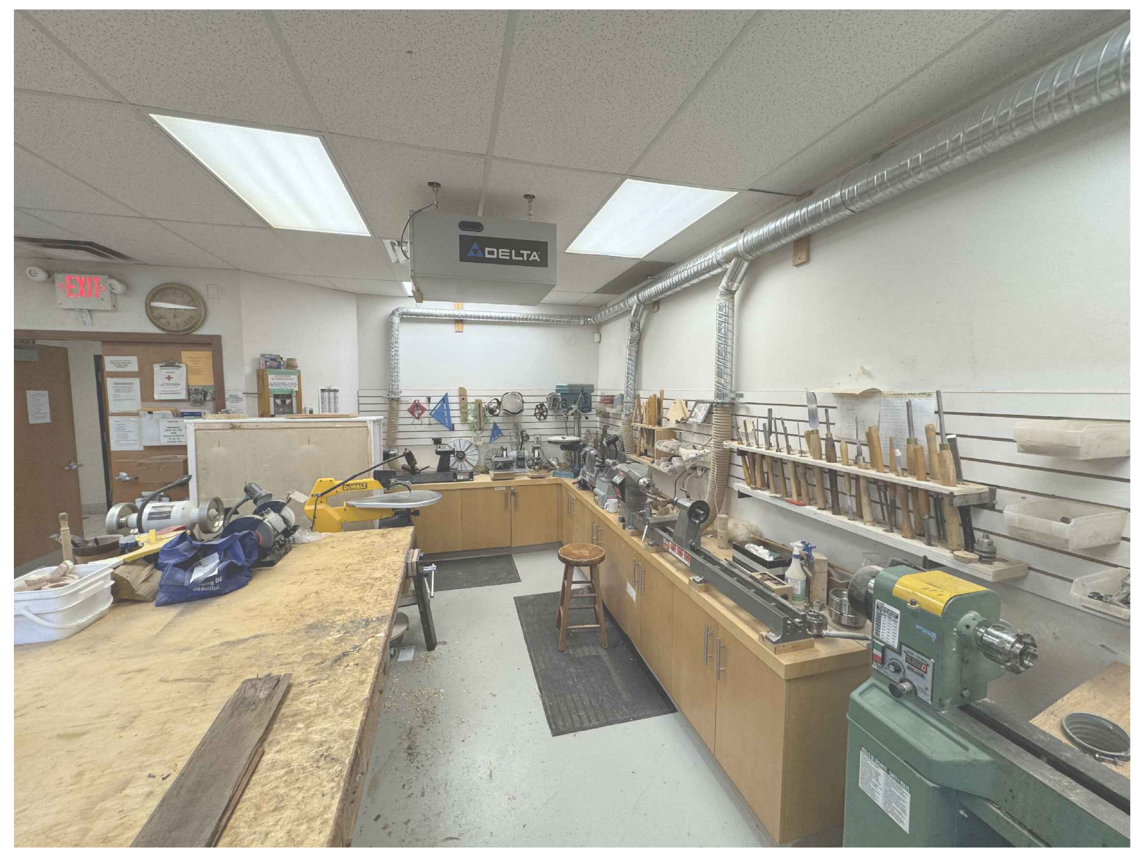
PROJECT NO. 025b-009-24
DRAWING NO. M0.00



DEMOLISH EXISTING DUST COLLECTION EQUIPMENT AND ALL ASSOCIATED COMPONENTS.

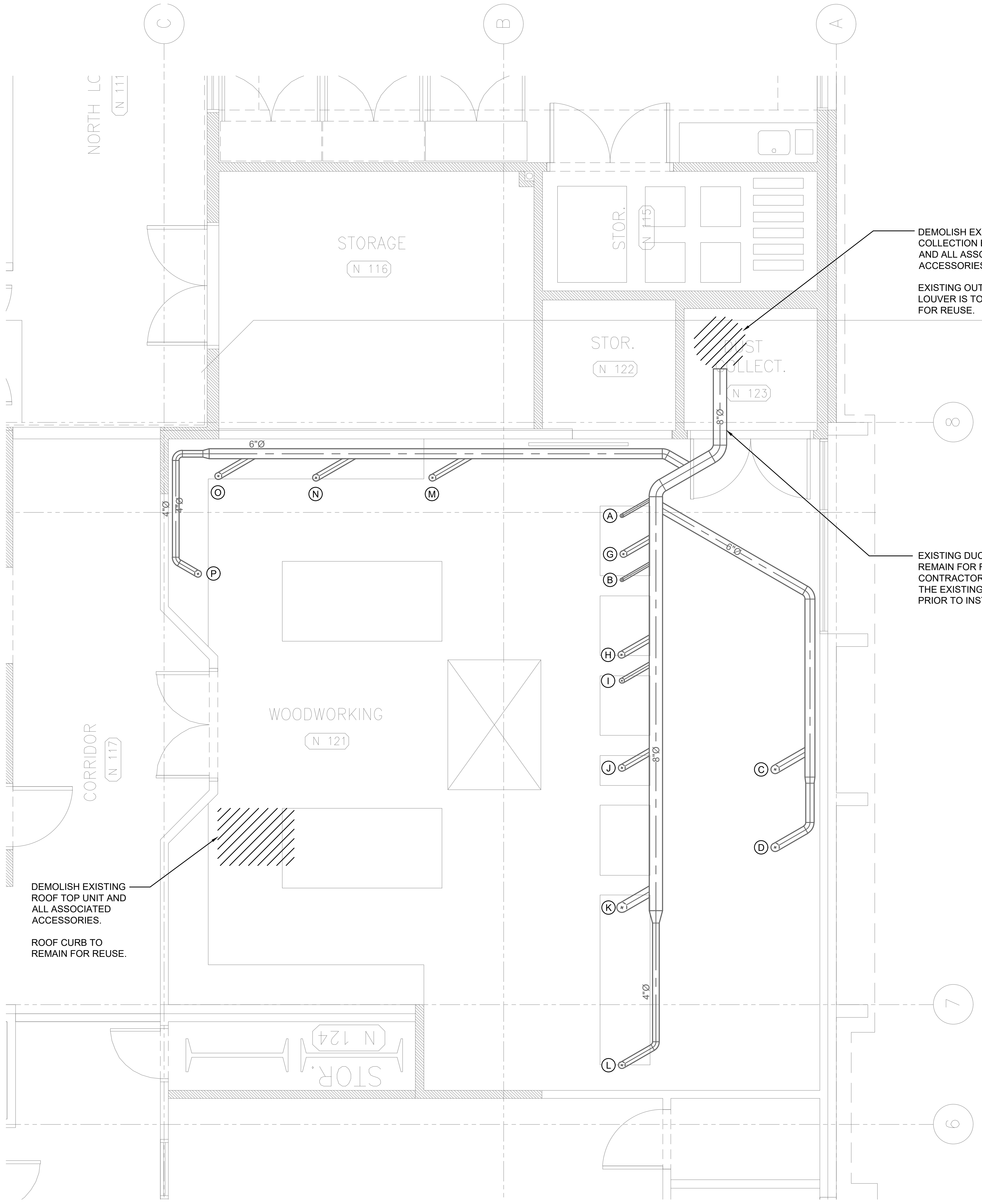
EXISTING OUTDOOR LOUVER IS TO REMAIN FOR REUSE.





DEMOLISH EXISTING RTU

EXISTING ROOF CURB AND CONNECTIONS TO REMAIN FOR REUSE



DEMOLISH EXISTING DUST COLLECTION EQUIPMENT AND ALL ASSOCIATED ACCESSORIES.

EXISTING OUTDOOR LOUVER IS TO REMAIN FOR REUSE.

EXISTING DUCTWORK TO REMAIN FOR REUSE. CONTRACTOR TO VERIFY THE EXISTING CONDITION PRIOR TO INSTALLATION.

DEMOLISH EXISTING ROOF TOP UNIT AND ALL ASSOCIATED ACCESSORIES.

ROOF CURB TO REMAIN FOR REUSE.

1
M1.00

DEMOLITION PLAN

SCALE: 1/4" = 1'-0"

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Vancouver BC, V6B 1E3
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CONSULTANT:

SEAL:

PROJECT TITLE:
DOGWOOD PAVILION - DUST EXTRACTION REPLACEMENT

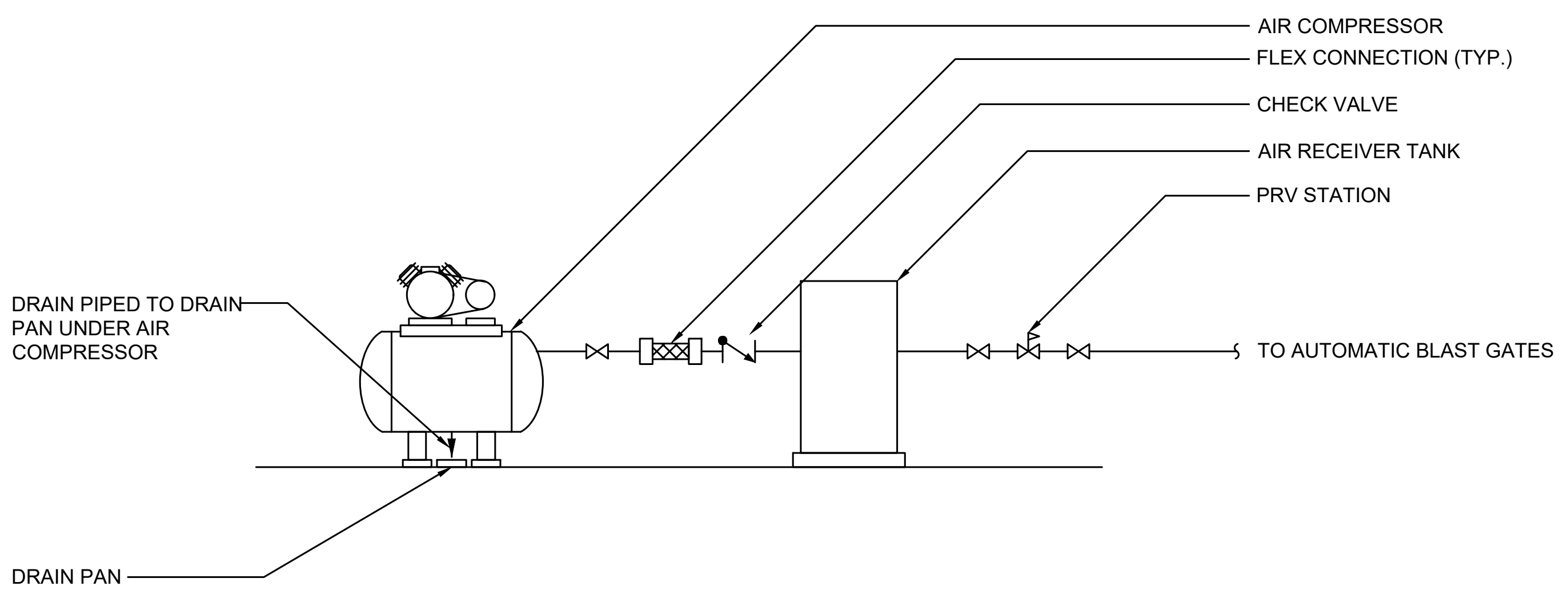
PROJECT ADDRESS:
1655 WINSLOW AVE
COQUITLAM, BC
V3J 6B1

DRAWN BY	JH
CHECKED BY	MC
SCALE	AS NOTED
DATE	SEPTEMBER 23, 2024

DRAWING TITLE:
DEMOLITION PLAN

PROJECT NO.
025b-009-24

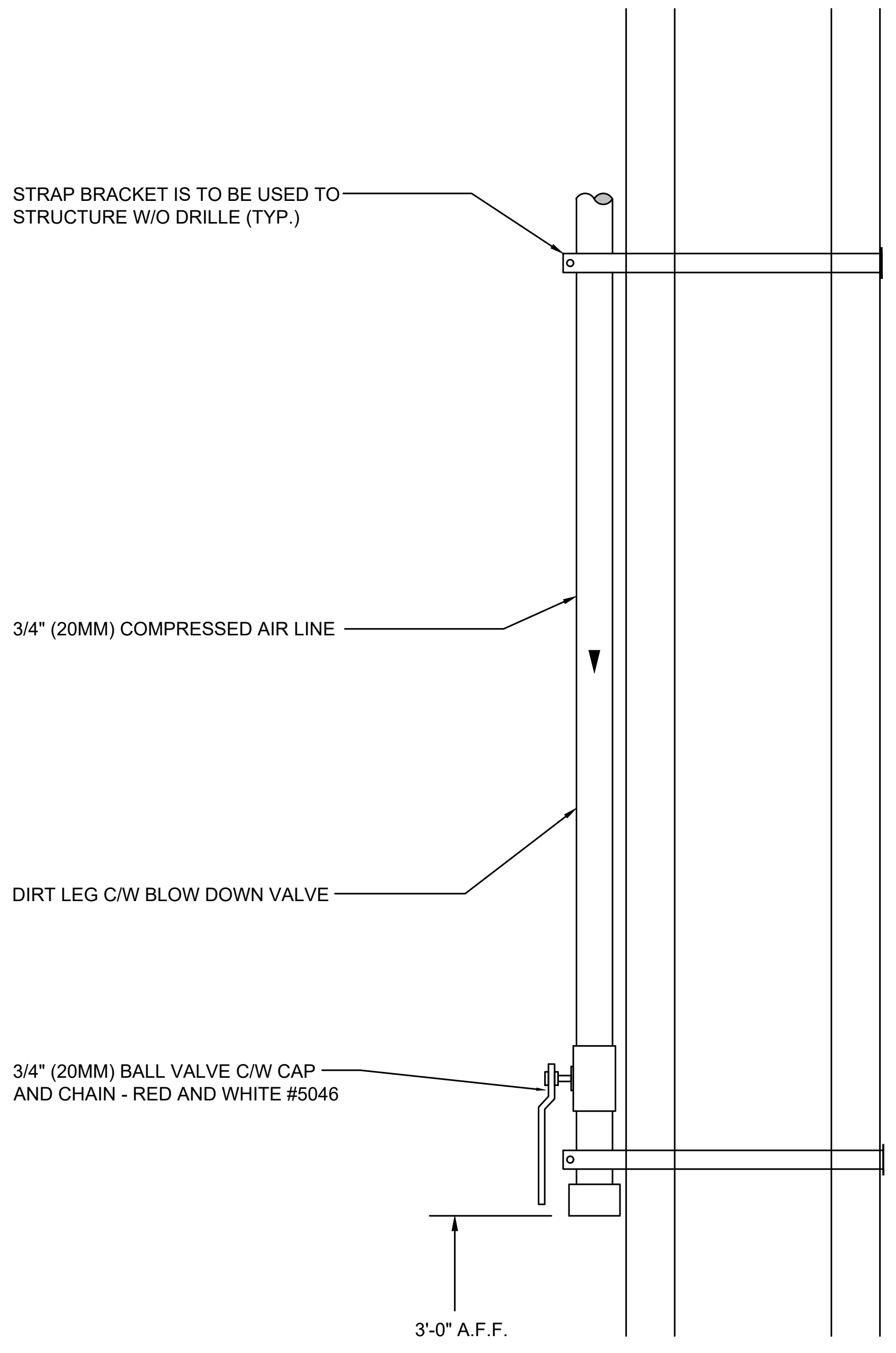
DRAWING NO.
M1.00



DETAIL NOTES
1. ALL TAKE OFFS TO COME OFF THE TOP OF THE MAIN AND DOWN.
2. ALL AIR LINES TO SLOPE TO THE FURTHEST POINT.
3. REFER TO DRAWINGS FOR ALL PIPE SIZES.
4. AIR COMPRESSOR SERVES AUTOMATIC BLAST GATES.
5. DRAIN PAN TO BE INSTALLED UNDER AIR COMPRESSOR. AIR COMPRESSOR DRAIN PIPED TO DRAIN PAN.

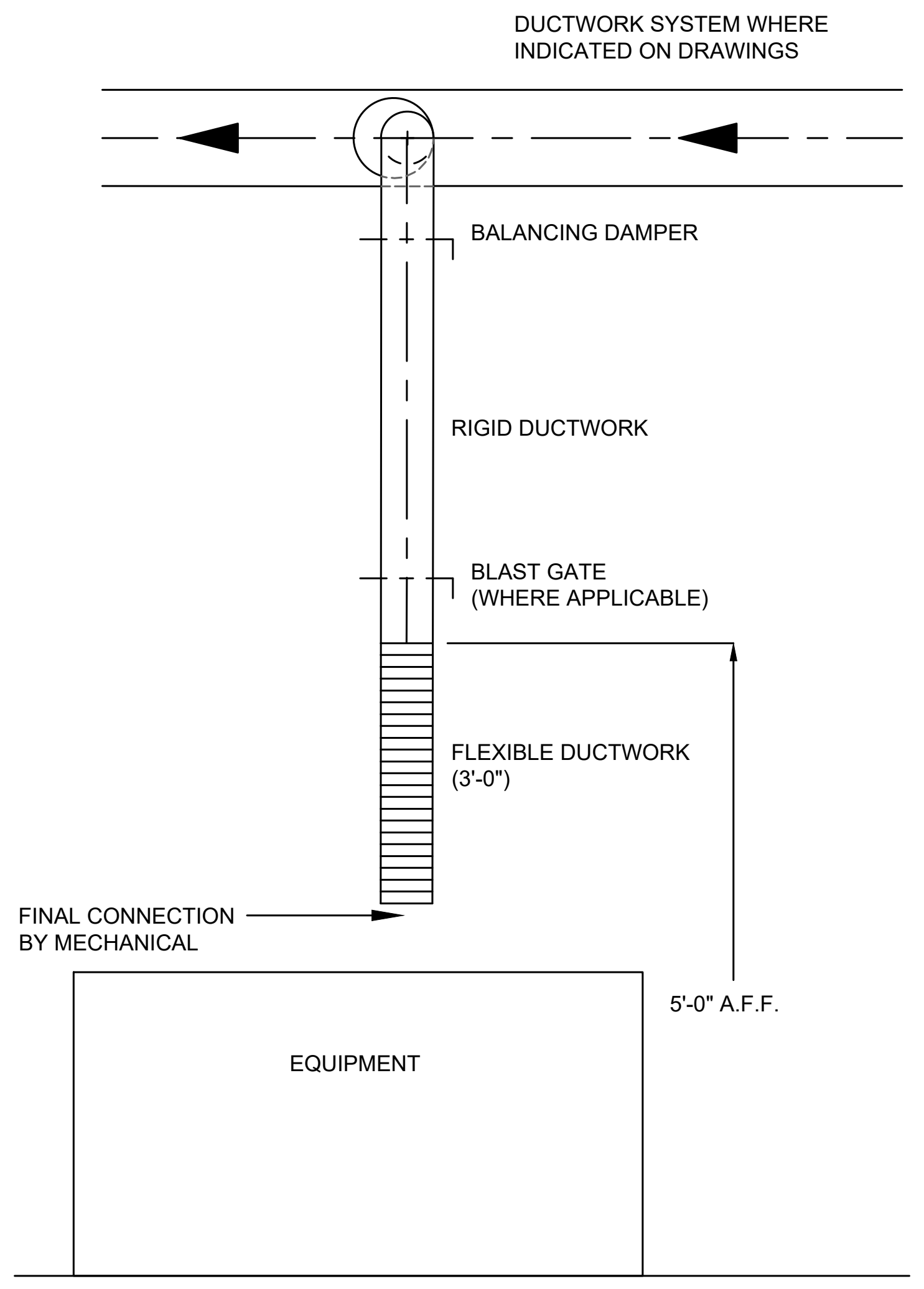
2 M1.01 COMPRESSED AIR SYSTEM SCHEMATIC - HORIZONTAL

SCALE: NTS



3 M1.01 COMPRESSED AIR DRIP LEG

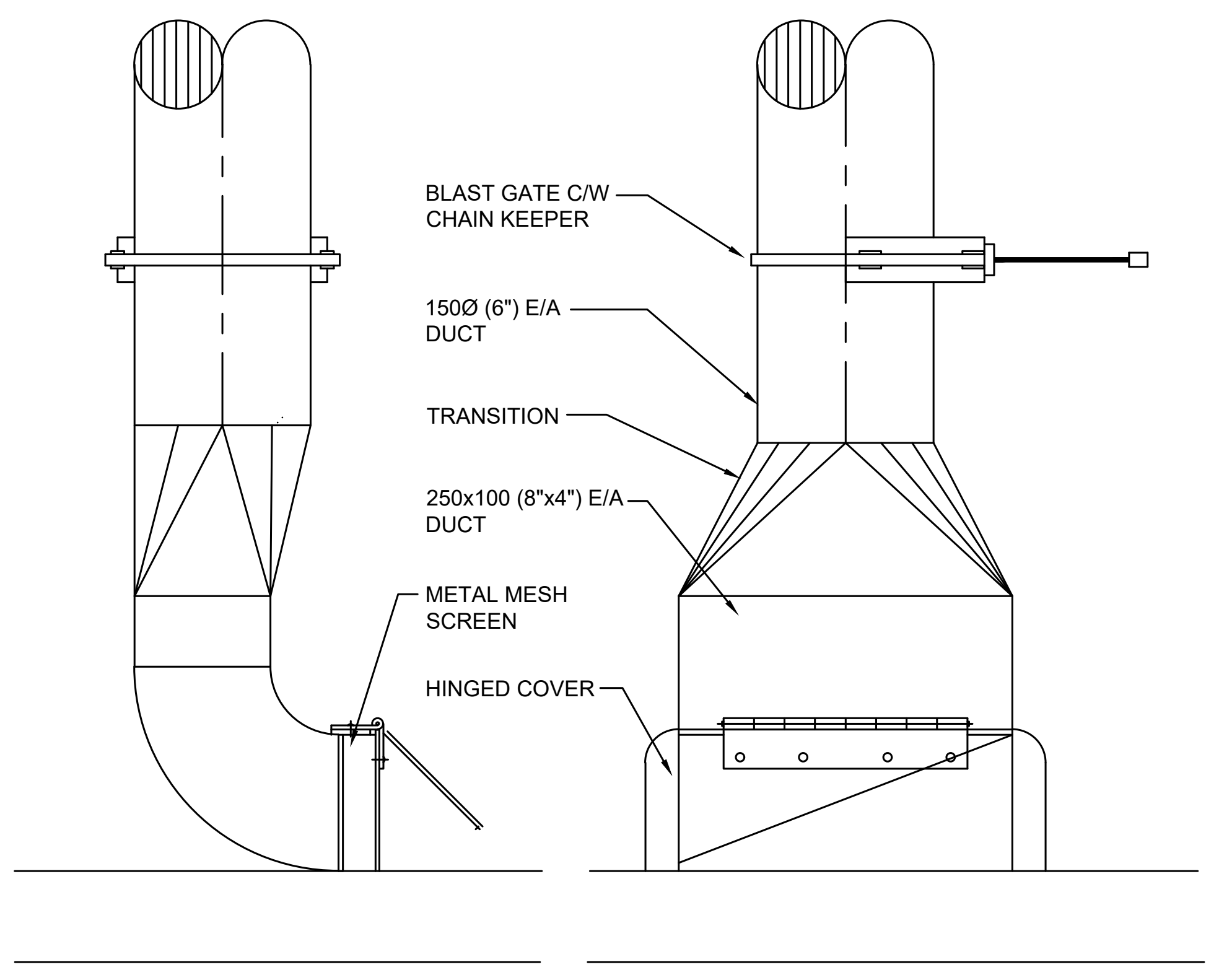
SCALE: NTS



DETAIL NOTES
1. FLEXIBLE DUCT TO BE FLEXHAUST FLEX-TUBE EF, FLEXMASTER TRIPLE LOCK, OR APPROVED ALTERNATE.

4 M1.01 EXHAUST TAKE OFF DETAIL

SCALE: NTS

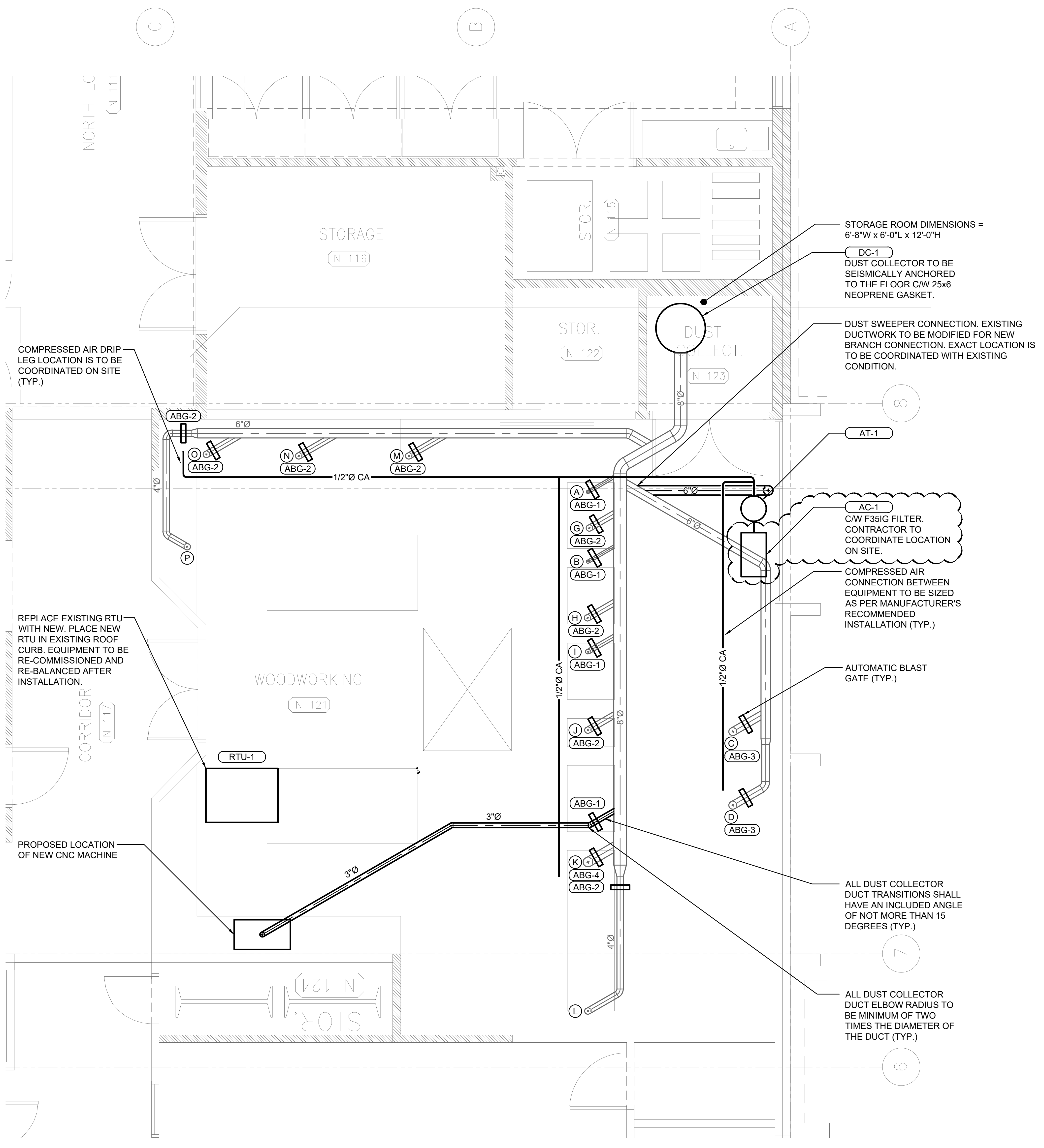


DETAIL NOTES
1. FLOOR SWEEP TO BE CONSTRUCTED OF 1.3mm (16 Ga.) SHEET METAL
2. ALL JOINTS TO BE CONTINUOUSLY WELDED AND GROUND TO A SMOOTH FINISH
3. HOOD & DUCTWORK SHALL BE PAINTED OFF WHITE BAKED ENAMEL FINISH UNLESS NOTED OTHERWISE

TYPE OF DUST: FINE
FACE VELOCITY (Min.): 14.23 m/s (2800 FPM)
TOTAL EXHAUST VOLUME: 378 l/s (800 CFM)
BRANCH DIAMETER: 150 (6Ø)

5 M102 FLOOR SWEEP

SCALE: NTS



1 M1.01 RENOVATION PLAN

SCALE: 1/4" = 1'-0"

TOOL	DESCRIPTION	DUCT SIZE	FLOW (CFM)
A	SMALL COMBINATION SANDER	2"	100
B	SPINDLE SANDER	2"	100
C	CHOP SAW	5"	550
D	RADIAL ARM SAW	5"	550
E	DRILL PRESS	N/A	0
F	LARGE COMBINATION SANDER	4" + 3"	550
G	JOINTER	4"	350
H	LARGE BANDSAW	4"	350
I	SMALL BANDSAW	3"	200
J	TABLE SAW	4"	350
K	PLANER	6"	800
L	ROUTER TABLE	4"	350
M	LATHE	4"	350
N	LATHE	4"	350
O	LATHE	4"	350
P	LATHE	4"	350
		TOTAL	5650

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CONSULTANT:

SEAL:

PROJECT TITLE:
DOGWOOD PAVILION - DUST EXTRACTION REPLACEMENT

PROJECT ADDRESS:
1655 WINSLOW AVE
COQUITLAM, BC
V3J 6B1

DRAWN BY	JH
CHECKED BY	MC
SCALE	AS NOTED
DATE	SEPTEMBER 23, 2024

DRAWING TITLE:
RENOVATION PLAN

PROJECT NO.
025b-009-24

DRAWING NO.
M1.01

COMMON WORKS

1. GENERAL

1.1 GENERAL SCOPE

'PROVIDE' SHALL MEAN SUPPLY AND INSTALL.

'CONSULTANT' SHALL MEAN AME GROUP CONSULTING PROFESSIONAL ENGINEERS

PROVIDE COMPLETE, FULLY TESTED AND OPERATIONAL SYSTEMS TO MEET THE REQUIREMENTS DESCRIBED HEREIN AND IN COMPLETE ACCORD WITH APPLICABLE CODES AND ORDINANCES.

CONTRACT DOCUMENTS AND DRAWINGS ARE DIAGRAMMATIC. THEY ESTABLISH SCOPE, MATERIAL AND INSTALLATION QUALITY BUT ARE NOT DETAILED INSTALLATION INSTRUCTIONS.

FOLLOW MANUFACTURERS' RECOMMENDED INSTALLATION INSTRUCTIONS, DETAILS AND PROCEDURES FOR EQUIPMENT, SUPPLEMENTED BY REQUIREMENTS OF THE CONTRACT DOCUMENTS.

BEFORE SUBMITTING PROPOSAL, VISIT AND EXAMINE THE SITE AND NOTE ALL CHARACTERISTICS AND FEATURES AFFECTING THE WORK. NO ALLOWANCES WILL BE MADE FOR ANY DIFFICULTIES ENCOUNTERED OR ANY EXPENSES INCURRED BECAUSE OF ANY CONDITIONS OF THE SITE OR ITEM EXISTING THEREON, WHICH IS VISIBLE OR KNOWN TO EXIST AT THE TIME OF PROPOSAL SUBMISSION.

CLARIFICATIONS OR REQUESTS FOR ALTERNATE MATERIALS OR EQUIPMENT MUST BE SUBMITTED IN WRITING TO THE CONSULTANT NO LATER THAN SEVEN (7) WORKING DAYS PRIOR TO THE MECHANICAL TRADES' PROPOSAL CLOSING DATE. APPROVAL OF REQUESTS SHALL ONLY BE GIVEN BY ADDENDUM.

CONSULT WITH RESPECTIVE DIVISIONS IN SETTING OUT LOCATIONS FOR DUCTWORK, EQUIPMENT, AND PIPING, SO THAT CONFLICTS ARE AVOIDED AND SYMMETRICAL EVEN SPACING IS MAINTAINED. JOINTLY WORK OUT ALL CONFLICTS ON SITE BEFORE FABRICATING OR INSTALLING ANY MATERIALS OR EQUIPMENT.

1.2 CODE COMPLIANCE, PERMITS AND FEES

ALL WORK SHALL COMPLY WITH CURRENT EDITIONS OF THE NATIONAL, PROVINCIAL AND MUNICIPAL CODES, STANDARDS, ACTS AND BYLAWS AND WILL MEET THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.

OBTAIN ALL PERMITS AND PAY ALL FEES APPLICABLE TO THE SCOPE OF WORK. CONTRACTOR SHALL ARRANGE FOR INSPECTIONS OF THE WORK BY THE AUTHORITIES HAVING JURISDICTION AND SHALL PROVIDE CERTIFICATES INDICATING FINAL APPROVAL.

1.3 QUOTATION PRICE BREAKDOWN

SUBMIT A PROPOSAL QUOTATION PRICE BREAKDOWN WITHIN THIRTY (30) DAYS OF PROPOSAL CLOSING AND BEFORE FIRST PROGRESS CLAIM, IN A FORMAT AGREED TO WITH THE CONSULTANT. AS A MINIMUM INCLUDE EQUIPMENT, MATERIALS AND LABOUR FOR MECHANICAL, PLUMBING, SHEET METAL, FIRE PROTECTION AND CONTROLS.

1.4 SUBMITTALS

COMPLY WITH DIVISION 1 - SUBMISSION AND CLOSEOUT PROCEDURES AND IN ADDITION THE FOLLOWING:

CONTRACTOR SHALL PROVIDE AND SUBMIT TO THE CONSULTANT ASSURANCE OF PROFESSIONAL DESIGN AND COMMITMENT FOR FIELD REVIEW SCHEDULE B AND ASSURANCE OF PROFESSIONAL FIELD REVIEW AND COMPLIANCE SCHEDULE S-B FOR SEISMIC ENGINEERING.

SHOP DRAWINGS: PROVIDE SHOP DRAWINGS FOR ALL EQUIPMENT AS ELECTRONIC FILES (FILE FORMAT: .DWG, .DXF, PDF, OR COMPARABLE). WHEN MANUFACTURER'S CUT SHEETS APPLY TO A PRODUCT SERIES RATHER THAN A SPECIFIC PRODUCT, THE DATA SPECIFICALLY APPLICABLE TO THE PROJECT SHALL BE HIGHLIGHTED OR CLEARLY INDICATED BY OTHER MEANS. EACH SUBMITTED PIECE OF LITERATURE AND DRAWINGS SHALL CLEARLY REFERENCE THE SPECIFICATION AND/OR DRAWING THAT THE SUBMITTAL IS TO COVER. GENERAL CATALOGS SHALL NOT BE ACCEPTED AS CUT SHEETS TO FULFILL SUBMITTAL REQUIREMENTS.

OPERATION AND MAINTENANCE MANUAL APPROVED BY, AND FINAL COPICLOSEOUT SUBMITTALS: PROVIDE A MINIMUM OF TWO (2) MECHANICAL OPERATION AND MAINTENANCE MANUALS AND ONE DIGITAL COPY, PREPARED BY THE TAB CONTRACTOR.

ES DEPOSITED WITH THE CONSULTANT A MINIMUM OF 7-DAYS BEFORE FINAL INSPECTION.

OPERATION AND MAINTENANCE MANUAL TO INCLUDE BUT NOT LIMITED TO: LAYMAN'S DESCRIPTION OF THE SYSTEMS AND ASSOCIATED CONTROLS; OPERATIONAL INSTRUCTIONS, SERVICING, MAINTENANCE, OPERATION AND TROUBLE-SHOOTING INSTRUCTIONS FOR EACH ITEM OF EQUIPMENT; WARRANTIES; EQUIPMENT MANUFACTURER'S PERFORMANCE DATASHEETS INDICATING POINT OF OPERATION AS LEFT AFTER COMMISSIONING IS COMPLETE; TESTING, ADJUSTING AND BALANCING REPORTS.

RECORD DRAWINGS: CONSULTANT WILL PROVIDE 1 SET OF WHITE PRINTS AT CONTRACTORS COST TO MARK CHANGES AS WORK PROGRESSES AND AS CHANGES OCCUR. USE DIFFERENT COLOUR WATERPROOF INK FOR EACH SERVICE. DO NOT USE PENCIL OR BLACK INK. TRANSFER INFORMATION WEEKLY TO SHOW WORK AS ACTUALLY INSTALLED. DRAWINGS SHALL BE AVAILABLE ON A WEEKLY BASIS FOR REVIEW BY THE CONSULTANT.

IDENTIFY EACH DRAWING IN LOWER RIGHT HAND CORNER IN LETTERS AT LEAST 12 MM HIGH AS FOLLOWS: - "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (SIGNATURE OF CONTRACTOR) (DATE).

SUBMIT TO CONSULTANT FOR APPROVAL AND MAKE CORRECTIONS AS DIRECTED.

SUBMIT COMPLETED CAD RECORD DRAWINGS WITH FINAL OPERATING AND MAINTENANCE MANUALS WITHIN TWO (2) WEEKS OF SUBSTANTIAL COMPLETION. FAILURE TO SUBMIT DRAWINGS WILL RESULT IN THE WORK BEING UNDERTAKEN BY THE OWNER AND DEDUCTED FROM THE CONTRACTOR'S HOLD BACK AMOUNT. COST TO TRANSFER RECORD INFORMATION ONTO REPRODUCIBLE MEDIA & AUTO-CAD DISKS ARE THIS CONTRACTOR'S RESPONSIBILITY. CONSULTANT WILL RELEASE DRAWINGS TO CONTRACTOR AFTER SIGNING A COPYRIGHT FORM. SHOULD THE CONTRACTOR CHOOSE TO UTILISE THIS CONSULTANT FOR TRANSFERRING AS BUILT INFORMATION, ALLOW $400 / SHEET FOR ALL DRAWINGS IN THE CONSTRUCTION SET. THIS WILL COVER COSTS FOR DRAFTING TIME & PRINTING COSTS.

1.5 QUALITY OF WORK

ALL WORK SHALL BE BY QUALIFIED TRADESMEN WITH VALID PROVINCIAL TRADE QUALIFICATION CERTIFICATES. SPOT CHECKS WILL BE MADE BY THE CONSULTANT. WORK WHICH DOES NOT CONFORM TO STANDARDS MAY BE REJECTED BY THE CONSULTANT. THE CONTRACTOR SHALL REDO REJECTED WORK TO THE ACCEPTED STANDARD AT NO COST TO THE OWNER.

1.6 DRAWINGS AND SPECIFICATIONS

SHOULD ANY DISCREPANCY APPEAR BETWEEN DRAWINGS AND SPECIFICATIONS OBTAIN WRITTEN CLARIFICATION FROM THE CONSULTANT DURING THE PROPOSAL PERIOD. WITHOUT A WRITTEN CLARIFICATION THE BETTER QUALITY AND/OR GREATER QUANTITY OF WORK OR MATERIALS SHALL BE ESTIMATED, PERFORMED AND FURNISHED WITHIN THE PROPOSED PRICE.

1.7 CUTTING, PATCHING AND CORING

PROVIDE HOLES AND SLEEVES, CUTTING AND FITTING REQUIRED FOR MECHANICAL WORK. RELOCATE IMPROPERLY LOCATED HOLES AND SLEEVES. ALL WORK SHALL BE COORDINATED WITH OTHER TRADES.

OBTAIN WRITTEN APPROVAL FROM THE STRUCTURAL CONSULTANT BEFORE CUTTING OR BURNING STRUCTURAL MEMBERS.

PROVIDE X-RAY OF ALL REQUIRED PENETRATIONS OF THE FLOOR. X-RAY USE FOR LOCATING IN FLOOR REBAR AND CONDUIT TO BE DONE AFTER NORMAL WORKING HOURS. TAKE NECESSARY PRECAUTIONS TO PROTECT COMPUTER EQUIPMENT WHEN X-RAYING FLOORS. COORDINATE WITH OWNER.

1.8 INSTALLATION OF EQUIPMENT

PIPE ALL EQUIPMENT DRAINS TO BUILDING DRAINS OR SPECIFIED DRAIN METHOD EXCEPT SYSTEMS CONTAINING GLYCOL.

UNIONS AND FLANGES SHALL BE PROVIDED IN PIPING OR DUCTWORK TO PERMIT EASY REMOVAL OF EQUIPMENT.

MAINTAIN PERMANENT ACCESS TO EQUIPMENT FOR MAINTENANCE.

1.9 CONNECTIONS TO EXISTING SERVICES

MAINTAIN LIAISON WITH THE OWNER AND PROVIDE A MUTUALLY ACCEPTABLE SCHEDULE TO INTERRUPT, REROUTE, OR CONNECT TO EXISTING BUILDING SERVICES WITH THE MINIMUM OF INTERRUPTION OF THOSE SERVICES.

1.10 SELECTIVE DEMOLITION

REMOVE FROM SITE ALL EQUIPMENT, DUCTING OR PIPING WHICH IS NO LONGER REQUIRED BECAUSE OF WORK UNDER THIS CONTRACT. EXCEPT AS OTHERWISE STATED, SALVAGEABLE MATERIALS FROM AREA OF DEMOLITION SHALL BECOME THE PROPERTY OF THE OWNER AT HIS DISCRETION.

THE INTENT IS FOR A HAZ-MAT CONTRACTOR TO REMOVE ALL ASBESTOS CONTAINING MATERIAL PRIOR TO THE PROPOSED PROJECT WORK TAKING PLACE. NOTIFY THE CONSULTANT IF ASBESTOS CONTAINING MATERIAL IS SUSPECTED TO REMAIN ON SITE.

1.11 EQUIPMENT AND MATERIALS

WHERE TWO OR MORE PRODUCTS OF THE SAME TYPE ARE REQUIRED, PRODUCTS SHALL BE OF THE SAME MANUFACTURER.

NOTIFY THE CONSULTANT IN WRITING TEN (10) DAYS PRIOR TO THE PROPOSAL SUBMISSION, ANY MATERIALS OR EQUIPMENT SPECIFIED WHICH IS NOT CURRENTLY AVAILABLE OR WILL NOT BE AVAILABLE FOR USE AS CALLED FOR HEREIN. FAILING THIS, THE CONTRACT WILL ASSUME THAT THE MOST EXPENSIVE ALTERNATE HAS BEEN INCLUDED IN THE PROPOSED PRICE.

APPROVED EQUIVALENTS AND/OR ALTERNATIVES TO SPECIFIED PRODUCTS SHALL BE EQUAL TO THE SPECIFIED PRODUCT IN EVERY RESPECT, OPERATE AS INTENDED, AND MEET THE SPACE, CAPACITY, AND NOISE REQUIREMENTS OUTLINED.

THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY ADDITIONAL LABOUR AND MATERIALS REQUIRED BY ANY TRADES OR OTHER CONTRACTORS TO ACCOMMODATE THE USE OF OTHER THAN SPECIFIED MATERIALS OR EQUIPMENT. THE CONTRACTOR SHALL BEAR ANY AND ALL COSTS FOR DESIGN/SYSTEM MODIFICATIONS TO ACCOMMODATE THE "ALTERNATE" EQUIPMENT. EXTRAS WILL NOT BE APPROVED TO COVER SUCH WORK.

1.12 DELIVERY, STORAGE AND HANDLING

STORE MATERIALS AND EQUIPMENT IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS IN A CLEAN, DRY, WELL-VENTILATED AREA.

REPLACE DEFECTIVE OR DAMAGED MATERIALS WITH NEW.

1.13 FIRESTOPPING AND SMOKE SEALS

PROVIDE FIRESTOPPING SYSTEM(S) TO PROVIDE AND MAINTAIN A FIRE RESISTANCE RATING, AS INDICATED ON DRAWINGS AND IN ACCORDANCE WITH UL, WH, ULC, CUL OR FM DESIGN DETAILS FOR ALL MECHANICAL WORK IN DIVISIONS 21, 22, 23 AND 25

FOR RENOVATION PROJECTS, IN ADDITION TO THE NECESSARY NEW PENETRATIONS, PROVIDE THE FIRESTOPPING FOR ALL EXISTING MECHANICAL ASSEMBLIES WHERE FIRESTOPPING IS DAMAGED, DISCONTINUED OR ABSENT WITHIN THE CONSTRUCTION AREA.

ALL FIRESTOP SYSTEM INSTALLATIONS MUST MEET THE REQUIREMENTS OF CAN4-S115-M OR ULC S-115-M TESTED ASSEMBLIES THAT PROVIDE A FIRE RATING

A MANUFACTURER'S DIRECT REPRESENTATIVE (NOT DISTRIBUTOR OR AGENT) SHALL BE ON-SITE DURING THE INITIAL INSTALLATION OF FIRESTOP SYSTEMS TO TRAIN APPROPRIATE CONTRACTOR PERSONNEL IN CORRECT SELECTION AND INSTALLATION PROCEDURES. THIS WILL BE DONE PER MANUFACTURER'S WRITTEN RECOMMENDATIONS PUBLISHED IN THEIR LITERATURE AND DRAWING DETAILS.

1.14 ACCESS DOORS

PROVIDE ACCESS DOORS FOR MAINTENANCE OR ADJUSTMENT OF ALL PARTS OF THE MECHANICAL SYSTEM.

PROVIDE 300 MM X 300 MM MINIMUM SIZE FOR INSPECTION AND HAND ACCESS.

600 MM X 600 MM MINIMUM SIZE, LARGER IF INDICATED ON DRAWINGS, WHERE ENTRY IS REQUIRED AND ACCESS IS DIFFICULT.

1.15 ESCUTCHEONS AND PLATES

PROVIDE ESCUTCHEONS AND PLATES ON ALL PIPING AND DUCTWORK PASSING THROUGH FINISHED WALLS, FLOORS, AND CEILINGS.

1.16 GUARANTEE / WARRANTY

FURNISH A WRITTEN GUARANTEE STATING THAT ALL WORK EXECUTED IN THIS CONTRACT WILL BE FREE FROM DEFECTIVE WORKMANSHIP AND MATERIALS FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF SUBSTANTIAL PERFORMANCE.

1.17 BALANCING

THE APPROVED BALANCING AGENCIES ARE: WESTERN MECHANICAL; K.D. ENGINEERING, FLOTECH MECHANICAL, BLUE COLLAR GROUP.

BALANCE EQUIPMENT AND AIR OUTLETS TO AIR QUANTITIES INDICATED ON THE DRAWINGS AND IN THIS SPECIFICATION. WHERE OUTLET QUANTITIES ARE NOT INDICATED, DIVIDE CAPACITY EQUALLY AMONG ALL OUTLETS.

SUBMIT A PDF COPY OF THE REPORT TO THE CONSULTANT WITHIN TWO (2) WEEKS AFTER SUBSTANTIAL COMPLETION. FAILURE TO SUBMIT THE REPORT WITHIN THE SPECIFIED TIME WILL RESULT IN THE WORK BEING DONE BY THE OWNER AND THE COSTS DEDUCTED FROM FINAL PAYMENT.

BALANCING SHALL BE PERFORMED TO THE FOLLOWING:

AIR-TERMINAL OUTLETS	±10%
AIR-CENTRAL EQUIPMENT	±5%

PROVIDE A DROP TEST OF ALL FIRE DAMPERS AND A LETTER/CERTIFICATE CONFIRMING THIS WORK.

COOPERATE WITH THE BALANCING AGENCY AND MAKE ANY CORRECTIONS AS REQUIRED BY BALANCING AGENCY.

PROVIDE BALANCING VALVES AND DAMPERS, PULLEYS, SHEAVES ETC. AS REQUESTED BY THE BALANCING AGENCY AND/OR NECESSARY TO PROPERLY ADJUST OR CORRECT THE SYSTEMS TO DESIGN FLOWS, WITHOUT ADDITIONAL COST TO OWNER.

1.18 COMMISSIONING AND DEMONSTRATION

BE RESPONSIBLE FOR THE PERFORMANCE AND COMMISSIONING OF ALL EQUIPMENT SUPPLIED AND RE-USED UNDER DIVISIONS 22 AND 23.

CONFIRM OPERATION AND REVIEW CONDITION OF ALL EXISTING EQUIPMENT AND ASSOCIATED CONTROL DEVICES IN THE RENOVATED AREA. SUBMIT REPORT NOTING ANY REMEDIAL WORK REQUIRED.

AT THE CONCLUSION OF COMMISSIONING, DEMONSTRATE THE OPERATION OF THE SYSTEMS TO THE CONSULTANT AND THEN TO THE OWNER'S OPERATING STAFF.

AT THE COMPLETION OF THE COMMISSIONING, TESTING, BALANCING AND DEMONSTRATION SUBMIT TO THE CONSULTANT A LETTER CERTIFYING THAT ALL WORK SPECIFIED UNDER THIS CONTRACT IS COMPLETE, CLEAN AND OPERATIONAL IN ACCORDANCE WITH THE SPECIFICATION AND DRAWINGS.

1.19 FLASHING AND ROOF CURBS

PROVIDE CURBS, FLASH AND COUNTER FLASH AS REQUIRED WHERE MECHANICAL EQUIPMENT PASSES THROUGH WEATHER OR WATERPROOFED WALLS, FLOORS AND ROOFS.

PROVIDE FACTORY ROOF CURBS FOR ALL ROOF MOUNTED EQUIPMENT UNLESS NOTED OTHERWISE.

1.20 SEISMIC CONTROL

PROVIDE SEISMIC RESTRAINTS FOR ALL REQUIRED EQUIPMENT, PIPING, AND DUCTWORK 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.

THE CONTRACTOR SHALL RETAIN THE SERVICES OF A QUALIFIED PROFESSIONAL SEISMIC ENGINEER (SEISMIC ENGINEER) REGISTERED IN THE PROVINCE OF BRITISH COLUMBIA. THE SEISMIC ENGINEER SHALL DESIGN AND REVIEW THE INSTALLATION OF ALL SEISMIC RESTRAINTS AS WELL AS MECHANICAL EQUIPMENT AND MECHANICAL SYSTEM SUPPORTS. THE RESTRAINTS AND SUPPORTS SHALL BE SPECIFICALLY DESIGNED TO FASTEN TO THE STRUCTURE INDICATED IN THE CONTRACT DOCUMENTS AND INSTALLED IN THE FIELD. THE COMPLETE DESIGN FOR THESE SYSTEMS SHALL COMPLY WITH ALL APPLICABLE BUILDING CODE REQUIREMENTS.

SEISMIC ENGINEER SHALL PROVIDE AND SUBMIT TO THE OWNER'S CONSULTANT ASSURANCE OF PROFESSIONAL DESIGN AND COMMITMENT FOR FIELD REVIEW SCHEDULE B AND ASSURANCE OF PROFESSIONAL FIELD REVIEW AND COMPLIANCE SCHEDULE S-B FOR SEISMIC ENGINEERING.

SUBMIT SHOP DRAWINGS OF ALL SEISMIC RESTRAINT DETAILS PREPARED AND SEALED BY THE SEISMIC ENGINEER. PRIOR TO SUBSTANTIAL COMPLETION, THE SEISMIC ENGINEER SHALL VISIT THE SITE AND VERIFY THE SEISMIC RESTRAINT INSTALLATION AS REQUIRED TO SATISFY THE ASSURANCE OF PROFESSIONAL FIELD REVIEW AND COMPLIANCE SCHEDULE S-B OF THE BUILDING CODE.

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

WHERE EQUIPMENT IS MOUNTED ON SPRING OR RESILIENT MOUNTS FOR VIBRATION ISOLATION IT SHALL BE THE RESPONSIBILITY OF THE MANUFACTURER OF THE MOUNT TO INCORPORATE SEISMIC RESTRAINT. 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 IS IN ACCORDANCE WITH THIS SECTION.

1.21 VIBRATION ISOLATION

PROVIDE NEOPRENE ISOLATORS FOR DEFLECTIONS 6MM (1/4") AND UNDER.

PROVIDE EITHER NEOPRENE OR STEEL SPRING ISOLATORS FOR DEFLECTIONS BETWEEN 6MM AND 12MM (½").

PROVIDE STEEL SPRING ISOLATORS FOR DEFLECTIONS OF 12MM (½") AND OVER.

PROVIDE ADJUSTABLE LIMIT STOPS FOR SPRING ISOLATION MOUNTS ON EQUIPMENT WITH OPERATING WEIGHTS SUBSTANTIALLY DIFFERENT FROM THE INSTALLED WEIGHTS

ALL SPRING ISOLATORS SHALL BE "OPEN SPRING" UNLESS OTHERWISE STATED. SEISMICALLY RATED HOUSED SPRING ISOLATORS MAY BE USED IN LIEU PROVIDED THAT THEY MEET THIS PROJECT'S REQUIREMENTS FOR SEISMIC RESTRAINT.

SELECT ISOLATORS IN ACCORDANCE WITH EQUIPMENT WEIGHT DISTRIBUTION TO ALLOW FOR AN AVERAGE DEFLECTION MEETING OR EXCEEDING THE SPECIFIED DEFLECTION REQUIREMENTS AND SO THAT NO ISOLATOR HAS A DEFLECTION LESS THAN 80% OF THE STATIC DEFLECTION SPECIFIED. A MINIMUM OF 4 ISOLATORS ARE REQUIRED FOR EACH PIECE OF EQUIPMENT, UNLESS SPECIFIED OTHERWISE.

1.22 SUBSTANTIAL AND TOTAL PERFORMANCE

PRIOR TO REQUESTING AN INSPECTION FOR SUBSTANTIAL PERFORMANCE, PROVIDE A COMPLETE LIST OF ITEMS, WHICH ARE DEFICIENT.

A CERTIFICATE OF SUBSTANTIAL PERFORMANCE WILL NOT BE GRANTED UNLESS THE FOLLOWING ITEMS ARE COMPLETED AND AVAILABLE TO THE OWNER'S CONSULTANT:

FINAL PLUMBING INSPECTION CERTIFICATE FROM THE AUTHORITY HAVING JURISDICTION.

SCHEDULE S-B FOR SEISMIC ENGINEERING.

FINAL BACKFLOW PREVENTION TEST REPORTS FOR ALL BACKFLOW DEVICES.

FIRE STOPPING AND FIRE DAMPER TEST LETTER

DRAFT OPERATING/MAINTENANCE MANUALS HAVE BEEN SUBMITTED FOR REVIEW.

ALL MECHANICAL SYSTEMS HAVE BEEN COMMISSIONED AND ARE CAPABLE OF OPERATION WITH ALARM CONTROLS FUNCTIONAL AND AUTOMATIC CONTROLS IN OPERATION.

AIR AND WATER SYSTEMS HAVE BEEN BALANCED WITH DRAFT REPORT SUBMITTED TO THE CONSULTANT.

OPERATING AND MAINTENANCE DEMONSTRATIONS HAVE BEEN PROVIDED TO THE OWNER.

RECORD DRAWINGS HAVE BEEN SUBMITTED.

ALL PREVIOUSLY IDENTIFIED DEFICIENCIES HAVE BEEN CORRECTED AND ACCEPTED.

PRIOR TO A TOTAL PERFORMANCE INSPECTION PROVIDE DECLARATION IN WRITING THAT SUBSTANTIAL PERFORMANCE DEFICIENCIES HAVE BEEN CORRECTED AND FINAL TAB REPORTS AND O&M MANUALS HAVE BEEN SUBMITTED.

THE CONSULTANT SHALL PROVIDE ONE (1) VISITATION FOR THE PURPOSE OF TOTAL PERFORMANCE INSPECTION. SUBSEQUENT VISITATIONS IF REQUIRED SHALL BE AT THE EXPENSE OF THE CONTRACTOR.

2. PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

LISTED MANUFACTURERS ARE ACCEPTABLE FOR THEIR ABILITY TO MEET THE GENERAL DESIGN INTENT, QUALITY AND PERFORMANCE CHARACTERISTICS OF THE SPECIFIED PRODUCT. THE LIST DOES NOT ENDORSE THE ACCEPTABILITY OF ALL PRODUCTS AVAILABLE FROM THE LISTED MANUFACTURERS/SUPPLIERS.

IT REMAINS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THE PRODUCTS SUPPLIED ARE EQUAL TO THE SPECIFIED PRODUCTS IN EVERY RESPECT, OPERATE AS INTENDED, AND MEET THE PERFORMANCE SPECIFICATIONS AND PHYSICAL DIMENSIONS OF THE SPECIFIED PRODUCT.

THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY ADDITIONAL WORK OR MATERIALS, TO ACCOMMODATE THE USE OF EQUIPMENT FROM THE ACCEPTABLE MANUFACTURERS AND SUPPLIERS LISTED.

2.2 FIRESTOPPING AND SMOKE SEALS

USE THE SAME MANUFACTURER THROUGHOUT THE PROJECT AND COMPATIBLE MATERIALS FOR RESTORATION WORK.

PROVIDE FILL MATERIAL COMPONENTS FOR EACH FIRESTOPPING SYSTEM AS NEEDED. USE ONLY COMPONENTS SPECIFIED BY THE FIRESTOPPING MANUFACTURER FOR THE DESIGNATED FIRE-RESISTANCE-RATED SYSTEMS.

ACCEPTABLE MANUFACTURERS: 3M, HILTI, AD FIREBARRIER, TREMCO

2.3 PIPE HANGERS AND SUPPORTS

PROVIDE HANGERS AND SUPPORTS TO SECURE EQUIPMENT IN PLACE, PREVENT VIBRATION, PROTECT AGAINST DAMAGE FROM EARTHQUAKE, MAINTAIN GRADE, PROVIDE FOR EXPANSION AND CONTRACTION, AND ACCOMMODATE INSULATION.

PROVIDE GALVANIZED HANGERS AND SUPPORTS FOR ALL PIPING EXCEPT HANGERS AND SUPPORTS SHALL BE COPPER PLATED OR EPOXY COATED FOR COPPER PIPING.

TOGGLE HANGERS AND/OR STRAP HANGERS SHALL NOT BE USED FOR PIPE HANGERS.

POWER ACTUATED FASTENERS AND "DROP-IN" ANCHORS SHALL NOT BE USED.

PROVIDE RING TYPE HANGERS FOR PIPING UP TO NPS 1½ AND CLEVIS TYPE HANGERS FOR PIPING OVER NPS 1½.

2.4 ACCESS DOORS

DRYWALL SURFACE: EXTRUDED ALUMINUM FRAME WITH GYPSUM BOARD INLAY AND STRUCTURAL CORNER ELEMENTS. HINGE TO BE CONCEALED 2-POINT HINGE, NON-CORRODING WITH SCREWDRIVER OPERATED CAM LATCH.

TILE SURFACE: UNIVERSAL DESIGN, STAINLESS STEEL DOOR (16GA) AND STAINLESS STEEL FRAME (18GA), DOOR FLUSH TO FRAME, ROUNDED SAFETY CORNERS, CONTINUOUS CONCEALED HINGE, SCREWDRIVER OPERATED CAM LATCH, #4 SATIN STAINLESS STEEL FINISH.

PLASTER WALLS AND CEILING: STEEL DOOR (14GA) AND STEEL FRAME (14GA), DOOR FLUSH TO FRAME EDGE, EXPANSION CASING BEAD AND 75 MM WIDE GALVANIZED LATH SURROUND RECESSED 18 MM TO RECEIVE PLASTER, CONTINUOUS CONCEALED HINGE, SCREWDRIVER OPERATED CAM LATCH, PRIME COAT GREY PAINTED FINISH.

FIRE RATED WALLS NON-COMBUSTIBLE CONSTRUCTION: UNINSULATED STEEL DOOR (16GA) AND STEEL FRAME (16GA), DOOR FLUSH TO FRAME EDGE, 25MM MOUNTING FRAME WITH MASONRY ANCHOR STRAPS, CONCEALED SELF-CLOSING HINGE, FLUSH KEY LATCH, PRIME COAT GREY PAINTED FINISH, ULC RATED 2 HOUR 'B' LABEL.

FIRE RATED WALLS COMBUSTIBLE CONSTRUCTION: INSULATED STEEL DOOR (20GA) FOR MAXIMUM 250°C RISE AFTER 30 MINUTES AND STEEL FRAME (16GA), DOOR FLUSH TO FRAME EDGE, 25MM MOUNTING FRAME WITH MASONRY ANCHOR STRAPS, CONCEALED SELF-CLOSING HINGE, FLUSH KEY LATCH, PRIME COAT GREY PAINTED FINISH, ULC RATED 1-1/2 HOUR 'B' LABEL.

FIRE RATED CEILINGS: 50MM INSULATED STEEL DOOR (16GA) AND STEEL FRAME (16GA), DOOR FLUSH TO FRAME EDGE, 25MM MOUNTING FRAME WITH MASONRY ANCHOR STRAPS, CONCEALED UPSWING SELF-CLOSING HINGE, L HANDLE LATCH, WHITE BAKED ENAMEL FINISH, SIZE 600MM X 600MM (24" X 24") ULC RATED 2 HOUR 'B' LABEL.

DUCTWORK: ULTRA LOW LEAKAGE TYPE, FLAT OVAL DESIGN, GALVANIZED STEEL FRAME (22GA), DOUBLE SKIN GALVANIZED STEEL DOOR (22 GA) WITH 25MM INSULATION FULLY ENCLOSED IN PANEL, BULB TYPE SEAL INTEGRALLY FASTENED TO DOOR, LEVER CAM LOCKS. PROVIDE STAINLESS STEEL IN LIEU OF GALVANIZED STEEL IN STAINLESS STEEL DUCTWORK.

ACCEPTABLE MANUFACTURERS: MAXAM, ACUDOR, MILCOR, CAN.AQUA, MIFAB, BILCO, BAUCOPLUS

2.5 IDENTIFICATION

IDENTIFY PIPING WITH LABELS AND FLOW ARROWS. PROVIDE IDENTIFICATION AT 15M (50FT) 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.

PROVIDE 20MM (3/4") DIAMETER BRASS TAGS, SECURE TO VALVE STEMS WITH KEY CHAIN. PROVIDE A VALVE DIRECTORY AT ALL MECHANICAL ROOMS, IN THE O&M MANUALS AND A DIGITAL COPY CROSS REFERENCED WITH ANY ASSOCIATED CONTROLS NOMENCLATURE.

EACH PIECE OF EQUIPMENT SHALL BE IDENTIFIED WITH ITS EQUIPMENT SCHEDULE IDENTIFICATION, E.G. SUPPLY FAN SF-1, COOLING COIL CC-1, PUMP P-1 WITH LAMACOID PLATES HAVING 6MM (1/4") MINIMUM LETTER SIZE.

ACCEPTABLE MANUFACTURERS: BRADY

2.6 VIBRATION ISOLATION

NEOPRENE WASHER/BUSHING: A ONE PIECE MOLDED BRIDGE BEARING NEOPRENE WASHER/BUSHING. THE BUSHING SHALL SURROUND THE ANCHOR BOLT AND HAVE A FLAT WASHER FACE TO AVOID METAL TO METAL CONTACT. USE WASHER/BUSHING ONLY ON LIGHT-WEIGHT EQUIPMENT.

ACCEPTABLE MANUFACTURER: MASON HG HEMI GROMMET OR EQUAL

NEOPRENE PAD ISOLATORS: NEOPRENE OR NEOPRENE / STEEL / NEOPRENE PAD ISOLATORS. MINIMUM STATIC DEFLECTION 2.5 MM (0.1") OR GREATER.

ACCEPTABLE MANUFACTURER: MASON WMSW OR EQUAL

RUBBER FLOOR MOUNTS: BRIDGE BEARING NEOPRENE MOUNTINGS. MINIMUM STATIC DEFLECTION OF 5MM (0.2") OR GREATER AND ALL DIRECTIONAL SEISMIC CAPABILITY.

ACCEPTABLE MANUFACTURER: MASON RAA OR ND OR EQUAL

SPRING FLOOR MOUNTS: SPRING ISOLATORS BUILT INTO A DUCTILE IRON OR STEEL HOUSING TO PROVIDE ALL DIRECTIONAL SEISMIC SNUBBING. THE SNUBBER SHALL BE ADJUSTABLE VERTICALLY AND ALLOW A MAXIMUM OF 6MM (1/4") TRAVEL IN ALL DIRECTIONS BEFORE CONTACTING THE RESILIENT SNUBBING COLLARS. MOLDED NEOPRENE CUP OR 1/4" (6MM) NEOPRENE ACOUSTICAL FRICTION PAD BETWEEN THE BASEPLATE AND THE SUPPORT. SPRING DIAMETERS SHALL BE NO LESS THAN 0.8 OF THE COMPRESSED HEIGHT OF THE SPRING AT RATED LOAD. SPRINGS SHALL HAVE A MINIMUM ADDITIONAL TRAVEL TO SOLID EQUAL TO 50% OF THE RATED DEFLECTION.

ACCEPTABLE MANUFACTURER: MASON SSLFH OR EQUAL

SPRING HANGERS: HANGERS SHALL CONSIST OF RIGID STEEL FRAMES CONTAINING MINIMUM 32MM (1 1/4") THICK NEOPRENE ELEMENTS AT THE TOP AND A STEEL SPRING SEATED IN A STEEL WASHER REINFORCED NEOPRENE CUP ON THE BOTTOM. PROVIDE A COMBINATION RUBBER AND STEEL REBOUND WASHER AS THE SEISMIC UPSTOP FOR SUSPENDED PIPING, DUCTWORK AND EQUIPMENT. RUBBER THICKNESS SHALL BE A MINIMUM OF 6MM (1/4"). COLOUR CODED SPRINGS, RUST RESISTANT, PAINTED BOX TYPE HANGERS. TO MAINTAIN STABILITY THE BOXES SHALL NOT BE ARTICULATED AS CLEVIS HANGERS NOR THE NEOPRENE ELEMENT STACKED ON TOP OF THE SPRING.

ACCEPTABLE MANUFACTURER: MASON HD, HS OR EQUAL

ALTERNATE VIBRATION ISOLATION ACCEPTABLE MANUFACTURERS, KORFUND, VIBRO-ACOUSTICS

3. EXECUTION

3.1 PAINTING REPAIRS AND RESTORATION

DO PAINTING IN ACCORDANCE WITH DIVISION 09 - INTERIOR PAINTING. PRIME AND TOUCH UP MARRED FINISHED PAINTWORK TO MATCH ORIGINAL. RESTORE TO NEW CONDITION, FINISHES WHICH HAVE BEEN DAMAGED.

CLEAN EXPOSED BARE METAL SURFACES SUPPLIED UNDER DIVISIONS 21, 22, 23 AND 25. APPLY AT LEAST ONE COAT OF CORROSION RESISTANT PRIMER PAINT TO ALL SUPPORTS AND EQUIPMENT FABRICATED FROM FERROUS METAL.

3.2 DEMONSTRATION

SUPPLY TOOLS, EQUIPMENT, PERSONNEL TO DEMONSTRATE AND INSTRUCT THE OPERATING, AND MAINTENANCE PERSONNEL IN OPERATING, CONTROLLING, ADJUSTING, TROUBLE-SHOOTING, AND SERVICING OF ALL SYSTEMS AND EQUIPMENT DURING REGULAR WORK HOURS, PRIOR TO ACCEPTANCE.

3.3 FIRESTOPPING AND SMOKE SEALS

THE OWNER'S CONSULTANT SHALL CONDUCT MANDATORY DESTRUCTIVE REVIEWS FOR EACH TYPE OF INSTALLATION. DESTRUCTIVE TESTING SHALL BE AT THE DISCRETION OF THE OWNER'S CONSULTANT AND AUTHORITY HAVING JURISDICTION

ALLOW FOR DESTRUCTIVE TESTING OF 5% OF FIRE STOPPING APPLICATIONS. SHOULD INSTALLATIONS NOT CONFORM TO MANUFACTURER'S LISTED ASSEMBLY, AN ADDITIONAL 25% OF INSTALLATIONS MAY BE DESTRUCTIVELY TESTED AND SHOULD THERE BE MORE FAILURES, THE CONTRACTOR WILL BE RESPONSIBLE TO REMOVE ALL FIRE STOPPING PRODUCTS AND REINSTALL PRODUCTS CORRECTLY, AT NO ADDITIONAL COST TO THE PROJECT..

TAG ALL PENETRATIONS AND EVERY 3 METERS OF JOINT SEAL WITH PRINTED TAGS. TAGS SHALL INDICATE PRODUCT, SYSTEM #, DATE INSTALLED, INSTALLED BY: (NAME AND PHONE NUMBER OF SUBCONTRACTOR) AND RE-PENETRATED BY & DATE.

TAGS SHALL STATE: CAUTION! FIRESTOP - DO NOT REMOVE, PUNCTURE OR DISCONTINUE UNLESS PREPARED TO RE-SEAL IMMEDIATELY WITH SPECIFIED PRODUCT

COMPLY WITH MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION OF THROUGH-PENETRATION JOINT MATERIALS. WHERE POSSIBLE, USE METAL SLEEVES FOR FLOOR PENETRATIONS TO PREVENT/MITIGATE THE CONSEQUENCES OF LEAKAGE OR FLOODING.

PERFORM UNDER THIS SECTION PATCHING AND REPAIRING OF FIRESTOP CAUSED BY CUTTING OR PENETRATING OF EXISTING FIRESTOP SYSTEMS ALREADY INSTALLED BY OTHER TRADES.

3.4 PIPE HANGERS AND SUPPORTS

PIPE SUPPORT SPACING AND HANGER ROD DIAMETER SHALL BE:

PIPE SIZE: NPS 1/2 SPACING 1.8M (6')	ROD DIAMETER 9MM (3/8"),
PIPE SIZE: NPS 3/4 TO 1½ SPACING 2.4M (8')	ROD DIAMETER 9MM (3/8"),
PIPE SIZE: NPS 2 TO 2½ SPACING 3M (10')	ROD DIAMETER 9MM (3/8"),
PIPE SIZE: NPS 3 TO 4 SPACING 3.6M (12')	ROD DIAMETER 16MM (5/8"),
PIPE SIZE: NPS 6 TO 12 SPACING 4.3M (14')	ROD DIAMETER 22MM (7/8"),

3.5 PIPE PRESSURE TESTING

ADVISE CONSULTANT OR PROJECT MANAGER 48 HOURS MINIMUM PRIOR TO PERFORMANCE OF PRESSURE TESTS.

HYDROSTATIC TEST: 150% OF WORKING PRESSURE, BUT NOT LESS THAN 860 KPA (125 PSIG). MAINTAIN TEST PRESSURE WITHOUT LOSS FOR 4 HOURS MINIMUM UNLESS SPECIFIED FOR LONGER PERIOD OF TIME IN RELEVANT MECHANICAL SECTIONS.

FOR PP-R PIPING, DO NOT EXCEED 1034 KPA (150 PSI). FOR PEX PIPING, DO NOT EXCEED 690 KPA (100 PSI).

PRIOR TO TESTS, ISOLATE EQUIPMENT AND OTHER PARTS WHICH ARE NOT DESIGNED TO WITHSTAND TEST PRESSURE OR MEDIA.

CONDUCT TESTS IN PRESENCE OF CONSTRUCTION MANAGER OR PROJECT MANAGER.

EXAMINE ALL JOINTS FOR LEAKS AND REMAKE ALL LEAKING JOINTS WITH NEW MATERIALS. PAY COSTS FOR REPAIRS OR REPLACEMENT, RETESTING, AND MAKING GOOD. CONSULTANT TO DETERMINE WHETHER REPAIR OR REPLACEMENT IS APPROPRIATE.

INSULATE OR CONCEAL WORK ONLY AFTER APPROVAL AND CERTIFICATION OF TESTS BY AUTHORITIES.

SUBMIT COPIES OF PRESSURE TEST REPORTS FOR ALL SECTIONS OF PIPING.

3.6 ACCESS DOORS

PROVIDE ALL ACCESS DOORS REQUIRED TO ACCESS WORK INSTALLED BY DIVISIONS 21, 22, 23 AND 25. BE RESPONSIBLE FOR COORDINATING LOCATIONS, CUTTING OPENING AND INSTALLING PANELS. ANY SECONDARY SUPPORTS, BLOCKING ETC. WILL BE BY THE CEILING OR WALL CONTRACTOR. ENSURE THAT EQUIPMENT IS WITHIN VIEW AND ACCESSIBLE FOR OPERATING, INSPECTING, ADJUSTING, SERVICING WITHOUT USING SPECIAL TOOLS.

3.7 VIBRATION ISOLATION

NEOPRENE WASHER/BUSHING: ISOLATE VARIABLE FREQUENCY DRIVE CONTROLLER USING NEOPRENE WASHER/BUSHING ISOLATORS OR SOFT GROMMETS SUCH THAT STRUCTURE BORNE NOISE TRANSMISSION TO OCCUPIED SPACE IS LESS THAN AIRBORNE NOISE TRANSMISSION.

RUBBER FLOOR MOUNTS: MOUNT IN-LINE PUMPS ON TWO (2) RUBBER FLOOR MOUNT ISOLATORS UNDER EACH SUPPORT FOOT. FOR EQUIPMENT MOUNTED ON A SLAB ON GRADE MOUNT ON RUBBER FLOOR MOUNT ISOLATORS UNLESS OTHERWISE SPECIFIED. PROVIDE PROTECTION OF THE RUBBER ELEMENT FROM CONTACT WITH OIL IN THE MECHANICAL ROOM.

SPRING FLOOR MOUNTS: ISOLATE ALL FLOOR OR PIER MOUNTED EQUIPMENT ON SPRING FLOOR MOUNT ISOLATORS, UNLESS OTHERWISE SPECIFIED.

SPRING HANGERS: LOCATE ISOLATION HANGERS AS NEAR TO THE OVERHEAD SUPPORT STRUCTURE AS POSSIBLE. INSTALLATION SHALL PERMIT HANGER BOX OR ROD TO MOVE THROUGH A 30 DEGREES ARC WITHOUT METAL TO METAL CONTACT. ALL DISCHARGE DUCTWORK RUNS FOR A DISTANCE OF 15M (50') FROM THE CONNECTED EQUIPMENT SHALL BE ISOLATED FROM THE BUILDING STRUCTURE BY MEANS OF SPRING HANGERS. SPRING DEFLECTION SHALL BE A MINIMUM OF 19MM (0.75").

DIVISION 23 HVAC

1. GENERAL

1.1 SYSTEM CLEANING AND CHEMICAL TREATMENT

EMPLOY SERVICES OF THE EXISTING BUILDING'S WATER TREATMENT FIRM OR IF THERE IS NOT ONE, A FIRM SPECIALIZING IN HYDRONIC SYSTEM CHEMICAL TREATMENT. THIS FIRM SHALL SUBMIT A SCHEDULE OF WORK TO BE PERFORMED, CHEMICAL TYPES AND QUANTITY TO BE USED. AT THE COMPLETION OF THE CHEMICAL TREATMENT A REPORT SHALL BE SUBMITTED TO OUTLINE THE WORK PERFORMED AND DETAILS OF PROCEDURES TO BE USED BY THE BUILDING OPERATOR FOR CONTINUED WATER QUALITY TESTING AND CHEMICAL TREATMENT.

PROVIDE TEST KITS AS REQUIRED ALONG WITH ADEQUATE CHEMICALS AND REAGENTS FOR ONE YEAR OF TESTING. APPROPRIATE TEST KITS WILL BE PROVIDED TO PROPERLY TEST EACH SYSTEM INSTALLED UNDER THIS CONTRACT.

CLEAN AND FLUSH ALL NEW HOT AND COLD CLOSED LOOP WATER SYSTEM PIPING. PROVIDE A CERTIFICATE FOR THIS WORK.

1.2 GRILLES, LOUVERS AND DIFFUSERS

AIRFLOW TESTS AND SOUND LEVEL MEASUREMENT SHALL BE MADE IN ACCORDANCE WITH APPLICABLE ADC EQUIPMENT TEST CODES, ASHRAE STANDARDS AND AMCA STANDARDS.

MANUFACTURER SHALL CERTIFY CATALOGUED PERFORMANCE AND ENSURE CORRECT APPLICATION OF AIR OUTLET TYPES.

OUTSIDE LOUVERS SHALL BEAR AMCA SEAL FOR FREE AREA AND WATER PENETRATION.

PROJECT CONDITIONS: REVIEW REQUIREMENTS OF OUTLETS AS TO SIZE, FINISH AND TYPE OF MOUNTING PRIOR TO SUBMITTING SHOP DRAWINGS AND SCHEDULES OF OUTLETS. POSITIONS INDICATED ARE APPROXIMATE ONLY. CHECK LOCATIONS OF OUTLETS AND MAKE NECESSARY ADJUSTMENTS IN POSITION TO CONFORM WITH ARCHITECTURAL FEATURES, SYMMETRY, AND LIGHTING ARRANGEMENT.

2. PRODUCTS

2.1 DUCTWORK AND ACCESSORIES

PROVIDE DUCTWORK CONSTRUCTED, REINFORCED, SEALED, AND INSTALLED TO WITHSTAND 1-½ TIMES THE WORKING STATIC PRESSURE.

PROVIDE LOW PRESSURE DUCTWORK 500 PA (2" W.G.) FOR SUPPLY DUCTWORK AND PLENUMS ON SYSTEMS WITHOUT TERMINAL MIXING BOXES OR AIR VALVES, SUPPLY DUCTWORK DOWNSTREAM FROM TERMINAL MIXING BOXES OR AIR VALVES, OUTDOOR AIR DUCTWORK AND PLENUMS, RETURN AIR DUCTWORK AND PLENUMS, EXHAUST AND RELIEF AIR DUCTWORK AND PLENUMS, UNLESS NOTED OTHERWISE.

LOW PRESSURE INSULATED FLEXIBLE DUCTWORK SHALL BE EQUAL TO THERMAFLEX TYPE M-KC.

PROVIDE MEDIUM PRESSURE DUCTWORK TO 1000 PA (4"W.G.) FOR SUPPLY AIR DUCTWORK DOWNSTREAM FROM SUPPLY AIR HANDLING UNITS DISCHARGE, TO TERMINAL MIXING BOXES OR AIR VALVES, EXHAUST AND RETURN AIR DUCTWORK DOWNSTREAM OF RETURN/EXHAUST AIR VALVES TO THE RETURN/EXHAUST FANS AND DISCHARGE DUCTWORK FROM THE RETURN/EXHAUST FANS TO THE AIR HANDLING UNITS AND/OR RELIEF OPENING.

WHERE FLEXIBLE AIR DUCTS ARE USED TO CONNECT TERMINAL MIXING BOXES OR AIR VALVES TO METAL DUCTS, THE FLEXIBLE AIR DUCTS SHALL BE RATED FOR 30.5 M/S (6000 FPM) VELOCITY AND 2500 PA (10" W.G.). MAXIMUM STRETCHED LENGTH OF FLEXIBLE AIR DUCT SHALL BE 300 MM (12"). DO NOT USE FLEXIBLE DUCT TO CHANGE DIRECTION. WHERE FLEXIBLE AIR DUCTS ARE ATTACHED TO METAL INSULATED DUCT, FURNISH FLEXIBLE AIR DUCTS WITH FIBERGLASS WOOL INSULATION AND METALIZED JACKET. THERMAFLEX M-KC OR EQUAL.

2.2 DUCT SEALING

DUCT SEALING LOW PRESSURE DUCTWORK 500 PA (2" W.G.) AND UNDER SHALL BE SMACNA SEAL CLASS A. SEAL ALL SUPPLY, RETURN AND EXHAUST DUCT JOINTS, LONGITUDINAL AS WELL AS TRANSVERSE JOINTS AS FOLLOWS:

SLIP JOINTS: APPLY HEAVY BRUSH-ON HIGH PRESSURE DUCT SEALANT. APPLY SECOND APPLICATION AFTER THE FIRST APPLICATION HAS COMPLETELY DRIED OUT. WHERE METAL CLEARANCE EXCEEDS 1.5 MM (1/16") USE HEAVY MASTIC TYPE SEALANT.

FLANGED JOINTS: SOFT ELASTOMER BUTYL OR EXTRUDED FORM OF SEALANT BETWEEN FLANGES FOLLOWED BY AN APPLICATION OF HEAVY BRUSH-ON HIGH PRESSURE DUCT SEALANT.

OTHER JOINTS: HEAVY MASTIC TYPE SEALANT.

DUCT SEALING MEDIUM PRESSURE DUCTWORK TO 1000 PA (4"W.G.) SHALL BE THE SAME AS 500 PA DUCTWORK EXCEPT PROVIDE A COMBINATION OF WOVEN FABRICS AND SEALING COMPOUND FOLLOWED BY AN APPLICATION OF HIGH PRESSURE DUCT SEALANT.

DUCT TAPES AS A SEALING METHOD ARE NOT PERMITTED, EXCEPT ON RESIDENTIAL DUCTWORK - MINIMUM 2 WRAPS OF 2" WIDE (50MM) FOIL DUCT TAPE IS ACCEPTABLE.

DO NOT INSULATE ANY SECTION OF THE DUCTWORK UNTIL IT HAS BEEN INSPECTED AND APPROVED OF DUCT SEALANT APPLICATION, BY THE CONSULTANT.

2.3 DUCT HANGERS AND SUPPORTS

HANGERS AND SUPPORTS TO SMACNA STANDARDS.

STRAP HANGERS: OF SAME MATERIAL AS DUCT BUT NEXT SHEET METAL THICKNESS HEAVIER THAN DUCT.

MAXIMUM SIZE DUCT SUPPORTED BY STRAP HANGER: 500 MM.

HANGERS: GALVANIZED STEEL ANGLE WITH GALVANIZED STEEL RODS TO SMACNA.

TOGGLE HANGERS AND/OR STRAP HANGERS SHALL NOT BE USED.

POWER ACTUATED FASTENERS AND "DROP-IN" ANCHORS SHALL NOT BE USED.

2.4 DUCT AND BREECHING INSULATION

EXPOSED RECTANGULAR DUCTS: EXTERNAL RIGID INSULATION, SERVICE TEMPERATURE 5°C TO 232°C (41°F TO 450°F), MINERAL FIBER BOARD FOR LOW AND MEDIUM TEMPERATURE APPLICATIONS, ALL SERVICE ALUMINUM FOIL-SCRIM KRAFT (FSK) VAPOUR BARRIER JACKET WITH GLASS FIBRE REINFORCEMENT, FACTORY APPLIED. DENSITY 36KG/M3 (2.25 PCF), MINIMUM RSI 0.76/25MM (R 4.3/IN)

ROUND DUCTS AND CONCEALED RECTANGULAR DUCTS: EXTERNAL FLEXIBLE INSULATION, SERVICE TEMPERATURE 5°C TO 232°C (41°F TO 450°F), GLASS FIBER OR MINERAL FIBER FLEXIBLE BLANKET FOR LOW AND MEDIUM TEMPERATURE APPLICATIONS, ALL SERVICE ALUMINUM FOIL-SCRIM KRAFT (FSK) VAPOUR BARRIER JACKET WITH GLASS FIBRE REINFORCEMENT, FACTORY APPLIED. DENSITY 12KG/M3 (0.75PCF), MINIMUM RSI 0.49/25MM (R 2.8/IN) (INSTALLED)

ACOUSTIC LINING DUCTS: INTERNAL FLEXIBLE DUCT LINER, FLEXIBLE MINERAL FIBER BLANKET, FOR LOW AND MEDIUM TEMPERATURE ACOUSTICAL APPLICATIONS, AIRSTREAM SURFACE FACED WITH A BLACK MAT BONDED TO THE FIBREGLASS SUBSTRATE, AIR VELOCITY RATING 25.4 M/S (5,000 FT/MIN). DENSITY 24KG/M3 (1.5 PCF), MINIMUM RSI 0.74/25MM (R 4.2/IN)

ACOUSTIC LINING PLENUMS: INTERNAL RIGID DUCT LINER, RIGID MINERAL FIBER BOARD, FOR LOW AND MEDIUM TEMPERATURE ACOUSTICAL APPLICATIONS, AIRSTREAM SURFACE FACED WITH A BLACK MAT BONDED TO THE FIBREGLASS SUBSTRATE, AIR VELOCITY RATING 25.4 M/S (5,000 FT/MIN). DENSITY 48KG/M3 (3 PCF), MINIMUM RSI 0.76/25MM (R 4.3/IN)

BREECHING INSULATION: EXTERNAL SEMI-RIGID INSULATION, SERVICE TEMPERATURE UP TO 538°C (1000°F), GLASS FIBER OR MINERAL FIBER FLEXIBLE BLANKET FOR HIGH TEMPERATURE APPLICATIONS. DENSITY 25KG/M3 (1.6PCF), MINIMUM RSI 0.25/25MM (R 1.4/IN)

2.5 DUCTWORK FINISH JACKETS

THERMOCANVAS JACKET: FIRE RATED, 170G (6 OZ) FIRE RETARDANT CANVAS JACKET FOR COVERING MECHANICAL INSULATION INDOORS, 25/50 FIRE CLASS, PLAIN WAVE COTTON, NO DYES.

UTILITY FINISH: OVER RIGID INSULATION FOR RECTANGULAR DUCTWORK AND FLEXIBLE INSULATION FOR ROUND DUCTWORK. APPLY CONTINUOUS METAL CORNER BEAD TO ALL CORNERS. ADHERE VAPOR RETARDER TAPE OVER ALL JOINTS AND BREAKS IN VAPOR RETARDER, AND AT ALL CORNERS.

ALUMINUM JACKET: 51 MIL (22 GA.) THICK STUCCO OR SMOOTH ALUMINUM JACKETING WITH LONGITUDINAL SLIP JOINTS AND 50MM (2") END LAPS WITH FACTORY APPLIED PROTECTIVE LINER ON INTERIOR SURFACE.

2.6 GRILLES, LOUVERS AND DIFFUSERS

ACCEPTABLE MANUFACTURES FOR AIR TERMINALS: E.H. PRICE, TITUS, ANEMOSTAT, NAILOR.

ACCEPTABLE MANUFACTURERS FOR LOUVERS: AIROLITE, PENN, AIRSTREAM, WEST VENT, NAILOR, RUSKIN.

PROVIDE BAFFLES TO DIRECT AIR AWAY FROM WALLS, COLUMNS OR OTHER OBSTRUCTIONS WITHIN THE RADIUS OF DIFFUSER OPERATION.

PROVIDE PLASTER FRAME FOR DIFFUSERS LOCATED IN PLASTER SURFACES AND ANTI-SMUDGE FRAMES OR PLAQUES ON DIFFUSERS LOCATED IN ROUGH TEXTURED SURFACES SUCH AS ACOUSTICAL PLASTER.

PROVIDE 30 MM MARGIN FRAME ON GRILLES WITH [COUNTERSUNK SCREW HOLES] [CONCEALED FASTENING].

PROVIDE OPPOSED BLADE BALANCE DAMPER, ACCESSIBLE FROM GRILLE FACE ON ALL GRILLES LOCATED IN DRYWALL CEILINGS OR BULKHEADS.

ALL GRILLES AND DAMPERS SHALL BE ALUMINUM IN WET AREAS (I.E. SHOWERS, AQUATIC AREAS, DISHWASHING ETC.)

IN GYMNASIUM, AQUATIC CENTRES, FRONT BLADES SHALL BE FRONT PIVOTED, WELDED IN PLACE OR SECURELY FASTENED TO BE IMMOBILE.

FABRICATE GOOSENECKS OF MINIMUM 1.3 MM (18 GA.) GALVANIZED STEEL. MOUNT ON MINIMUM 300 MM (12 IN.) HIGH CURB BASE WHERE SIZE EXCEEDS 225 MM X 225 MM (9 IN. X 9 IN).

REFER TO GRILLES AND DIFFUSER SCHEDULE FOR TYPES AND CAPACITIES.

2.7 EQUIPMENT

ALL EQUIPMENT SHALL BE CSA APPROVED FOR ITS INTENDED USE.

3. EXECUTION

3.1 DUCTWORK AND ACCESSORIES

FABRICATE DUCTWORK IN ACCORDANCE WITH SMACNA DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE, NFPA 90A STANDARD FOR THE INSTALLATION OF AIR-CONDITIONING AND VENTILATING SYSTEMS, AND NFPA 90B STANDARD FOR THE INSTALLATION OF WARM AIR HEATING AND AIR-CONDITIONING SYSTEMS

PRIOR TO FABRICATION OF DUCTWORK, CHECK ALL CEILING SPACES AND HEIGHTS AND CONFLICTS WITH OTHER TRADES.

DUCT SIZES INDICATED ARE INSIDE CLEAR DIMENSIONS. FOR ACOUSTICALLY LINED OR INTERNALLY INSULATED DUCTS ALLOW FOR INSULATION THICKNESS AND MAINTAIN INTERIOR CLEAR DIMENSIONS INDICATED.

CONNECT OUTLET TERMINALS TO LOW PRESSURE DUCTS WITH 900MM (36") MAXIMUM LENGTH OF STRETCHED FLEXIBLE DUCT. HOLD IN PLACE WITH STRAP OR CLAMP, CAULK SEALED. DO NOT USE FLEXIBLE DUCT TO CHANGE DIRECTIONS.

PROVIDE A FLEXIBLE CONNECTION WHERE LOW PRESSURE DUCTS ARE CONNECTED TO FAN EQUIPMENT, TERMINAL BOXES OR ANY OTHER APPARATUS. JOINT SHALL BE SCREWED OR BOLTED FLEXIBLE GASKETED JOINT, MINIMUM 50MM (2") WIDE.

PROVIDE FIRE DAMPERS WHERE DUCTS CROSS FIRE SEPARATIONS. FIRE DAMPERS SHALL BE ULC LISTED AND "DYNAMIC"; RATED TO CLOSE UNDER AIRFLOW. REFER TO ARCHITECTURAL DRAWINGS FOR FIRE SEPARATION RATINGS AND LOCATIONS.

PROVIDE BALANCING DAMPERS WHERE INDICATED ON DRAWINGS AND AT POINTS ON LOW PRESSURE SUPPLY, RETURN AND EXHAUST DUCTS WHERE BRANCHES ARE TAKEN FROM LARGER DUCTS.

MODIFY CEILING SYSTEM WHERE REQUIRED TO ACCOMMODATE GRILLES AND DIFFUSERS.

SIZE ROUND DUCTS, INSTALLED IN PLACE OF RECTANGULAR DUCTS, FROM ASHRAE TABLE OF EQUIVALENT RECTANGULAR AND ROUND DUCTS. NO VARIATION OF DUCT CONFIGURATION OR SIZES PERMITTED EXCEPT BY PERMISSION FROM THE CONSULTANT.

EXPOSED ROUND DUCTWORK TO BE SPIRAL LOCK SEAM TYPE ONLY.

PROVIDE DUCT HANGERS AND SUPPORTS IN ACCORDANCE WITH SMACNA MANUALS.

CONFIRM THE EXISTING BASE BUILDING STANDARDS PRIOR TO SUBMITTING PROPOSAL.

DUCTWORK SHALL BE GALVANIZED STEEL UNLESS NOTED OTHERWISE.

3.2 DUCT HANGERS AND SUPPORTS

DUCT SUPPORT SHALL BE:

UP TO 750MM DUCT SIZE: ANGLE SIZE 25X25X3 MM WITH 6MM ROD SIZE

751 TO 1050MM DUCT SIZE: ANGLE SIZE 40X40X3 MM WITH 6MM ROD SIZE

1051 TO 1500MM DUCT SIZE: ANGLE SIZE 40X40X3 MM WITH 10MM ROD SIZE

1501 TO 2100MM DUCT SIZE: ANGLE SIZE 50X50X3 MM WITH 10MM ROD SIZE

2101 TO 2400MM DUCT SIZE: ANGLE SIZE 50X50X5 MM WITH 10MM ROD SIZE

2401 AND OVER DUCT SIZE: ANGLE SIZE 50X50X6 MM WITH 10MM ROD SIZE

UPPER HANGER ATTACHMENTS SHALL BE:

FOR CONCRETE: MANUFACTURED CONCRETE INSERTS.

FOR STEEL JOIST: MANUFACTURED JOIST CLAMP.

FOR STEEL BEAMS: MANUFACTURED BEAM CLAMPS.

3.3 DUCT AND PLENUM INSULATION

INSTALL ALL DUCTWORK INSULATION TO THE THERMAL INSULATION ASSOCIATION OF CANADA BEST PRACTICES GUIDE.

3.4 GRILLES, LOUVERS AND DIFFUSERS

PAINT DUCTWORK VISIBLE BEHIND AIR OUTLETS MATTE BLACK.

ALL AIR OUTLETS MOUNTED IN A T-BAR CEILING SHALL BE SEISMICALLY RESTRAINED BY EITHER SECURE ATTACHMENT TO SOLID DUCTWORK, WHICH IS BRACED AT THE OUTLET OR WIRE HANGERS ATTACHED TO STRUCTURE. WIRE HANGERS SHALL BE A MINIMUM OF TWO (2) PER OUTLET AND ONE PER 1200 MM LENGTH.

AIR OUTLETS OTHER THAN T-BAR MOUNTING MUST BE SECURELY ATTACHED TO THE BUILDING ELEMENTS.

DIVISION 25 INTEGRATED AUTOMATION

1. GENERAL

1.1 SECTION SCOPE

PROVIDE A COMPLETE SYSTEM OF AUTOMATIC CONTROLS TO MATCH THE BASE BUILDING STANDARD WITH REGARD TO CONTROL DEVICES, COMPONENTS, WIRING AND MATERIALS. ALL CONTROL WORK ASSOCIATED WITH THE WORK OF DIVISIONS 22 AND 23.

1.2 RELATED REQUIREMENTS

THIS SECTION OF THE SPECIFICATION FORMS PART OF THE CONTRACT DOCUMENTS AND IS TO BE READ, INTERPRETED AND COORDINATED WITH ALL OTHER PARTS. FOR GENERAL CONDITIONS REFER TO HEATING, VENTILATION AND AIR CONDITIONING (HVAC) SECTION.

1.3 CODE COMPLIANCE

ALL WORK SHALL COMPLY WITH CURRENT EDITIONS OF THE NATIONAL, PROVINCIAL AND MUNICIPAL CODES, STANDARDS, ACTS AND BYLAWS AND WILL MEET THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.

1.4 ACCEPTABLE CONTRACTORS

ALL CONTROLS WORK IS TO BE DONE BY THE BASE BUILDING CONTRACTOR(FILL IN NAME).

1.5 EXAMINATION OF EXISTING SYSTEM

THIS PROJECT INVOLVES RENOVATION TO AN EXISTING CONTROL SYSTEM. THE CONTRACTOR SHALL INSPECT THE SYSTEM PRIOR TO PROPOSAL SUBMISSION AND INCLUDE IN HIS PROPOSAL ALL CONTROL COMPONENTS REQUIRED TO PROVIDE A FULLY OPERATIONAL SYSTEM INCLUDING REPLACEMENT OF EXISTING DEFECTIVE COMPONENTS WHERE NOTED IN THE PROJECT DOCUMENTS.

1.6 DESIGN REQUIREMENTS

DESIGN AND PROVIDE CONDUIT AND WIRING LINKING ELEMENTS OF SYSTEM TO THE EXISTING BUILDING ENERGY MONITORING AND CONTROL SYSTEM EMCS.

SUPPLY SUFFICIENT PROGRAMMABLE CONTROLLERS OF TYPES TO MEET PROJECT REQUIREMENTS. QUANTITY AND POINTS CONTENTS AS REVIEWED BY CONSULTANT PRIOR TO INSTALLATION.

PROVIDE UTILITY POWER TO EMCS AS INDICATED.

RETAIN THE SERVICES OF A QUALIFIED ELECTRICIAN TO PROVIDE POWER AND DATA CABLING TO EACH BUILDING AUTOMATION SYSTEM (BMS) CONTROL PANEL. POWER WIRING AND CONDUIT AS WELL AS DATA CABLING AND CONDUIT SHALL COMPLY WITH THE ELECTRICAL SPECIFICATIONS FOR THIS PROJECT. REFER TO ELECTRICAL DRAWINGS FOR ELECTRICAL PANELBOARD AND COMMUNICATION ROOM LOCATIONS. MAKE ALL NECESSARY ALLOWANCES FOR BRANCH BREAKERS REQUIRED TO BMS PANELS.

2. PRODUCTS

2.1 THERMOSTATS

RELOCATE AND RECONNECT EXISTING THERMOSTATS AS SHOWN ON THE DRAWINGS.

PROVIDE NEW THERMOSTATS WHERE INDICATED OF BUILDING STANDARD TYPE. ENSURE OPERATING CHARACTERISTICS ARE COMPATIBLE WITH CONTROL COMPONENTS (I.E. DIRECT/REVERSE ACTING).

ALL THERMOSTATS TO BE WALL OR COLUMN MOUNTED [TO MATCH EXISTING BASE BUILDING MOUNTING HEIGHT] [AT 1200MM ABOVE FINISHED FLOOR] UNLESS SPECIFICALLY NOTED OTHERWISE.

ALL THERMOSTATS, EXISTING AND NEW, ARE TO BE CALIBRATED PRIOR TO AIR BALANCING. CONTACT BUILDING OWNER IF AN EXISTING THERMOSTAT NEEDS REPLACING.

2.2 CONTROL COMPONENTS

PROVIDE CONTROL VALVES AND DAMPER ACTUATORS AS REQUIRED TO MEET THE SEQUENCE OF OPERATION AND MEET THE DESIGN INTENT. VALVES AND ACTUATORS SHALL MATCH THE BASE BUILDING STANDARD UNLESS NOTED OTHERWISE.

CONTROL VALVES FOR NEW MECHANICAL EQUIPMENT SHALL BE PROVIDED BY CONTROLS CONTRACTOR FOR INSTALLATION BY THE MECHANICAL CONTRACTOR.

WHERE EXISTING DEVICES ARE RE-USED, VERIFY OPERATION AND RE-CALIBRATE AS REQUIRED.

VERIFY CORRECT OPERATION OF CONTROLLED DEVICES INCLUDING EXISTING [AIR VALVE ACTUATORS], CONTROL VALVES, ETC. WITHIN THE AREA OF RENOVATION.

CONTROL VALVES AND ACTUATORS TO BE COMPATIBLE WITH BASE BUILDING STANDARD UNLESS NOTED OTHERWISE. NEW CONTROL VALVE OPERATION TO BE COMPATIBLE WITH EXISTING.

REPORT ANY EXISTING CONTROL DEVICE WHICH NEED REPLACEMENT. REPLACEMENT WILL BE BY BUILDING MANAGEMENT OR VIA CHANGE ORDER, AT THE DISCRETION OF THE OWNER.

3. EXECUTION

3.1 GENERAL

IN GENERAL ALL CONTROLS PROVIDED SHALL BE STAND ALONE CONTROLS. CONTRACTOR TO PROVIDE ALL REQUIRED CONTROL DEVICES, THERMOSTATS, WIRING, AND CONTROLLERS TO MEET DESIGN INTENT.

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THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AND REPORT ALL ERRORS AND OMISSIONS TO THE CONSULTANT PRIOR TO COMMENCING THE WORK.

THESE DRAWINGS ARE NOT TO BE SCALED.

REV.	DATE	DESCRIPTION
1.	2024.08.21	ISSUED FOR REVIEW
2.	2024.08.28	ISSUED FOR RFP
3.	2024.09.10	ISSUED FOR ADDENDUM 1
4.	2024.09.23	ISSUED FOR ADDENDUM 2

CONSULTANT:

SEAL:

PROJECT TITLE:
DOGWOOD PAVILION - DUST EXTRACTION REPLACEMENT

PROJECT ADDRESS:
1655 WINSLOW AVE
COQUITLAM, BC
V3J 6B1

DRAWN BY	JH
CHECKED BY	MC
SCALE	N.T.S.
DATE	SEPTEMBER 23, 2024

DRAWING TITLE:
MECHANICAL SPECIFICATIONS

PROJECT NO.
025b-009-24

DRAWING NO.
M2.00