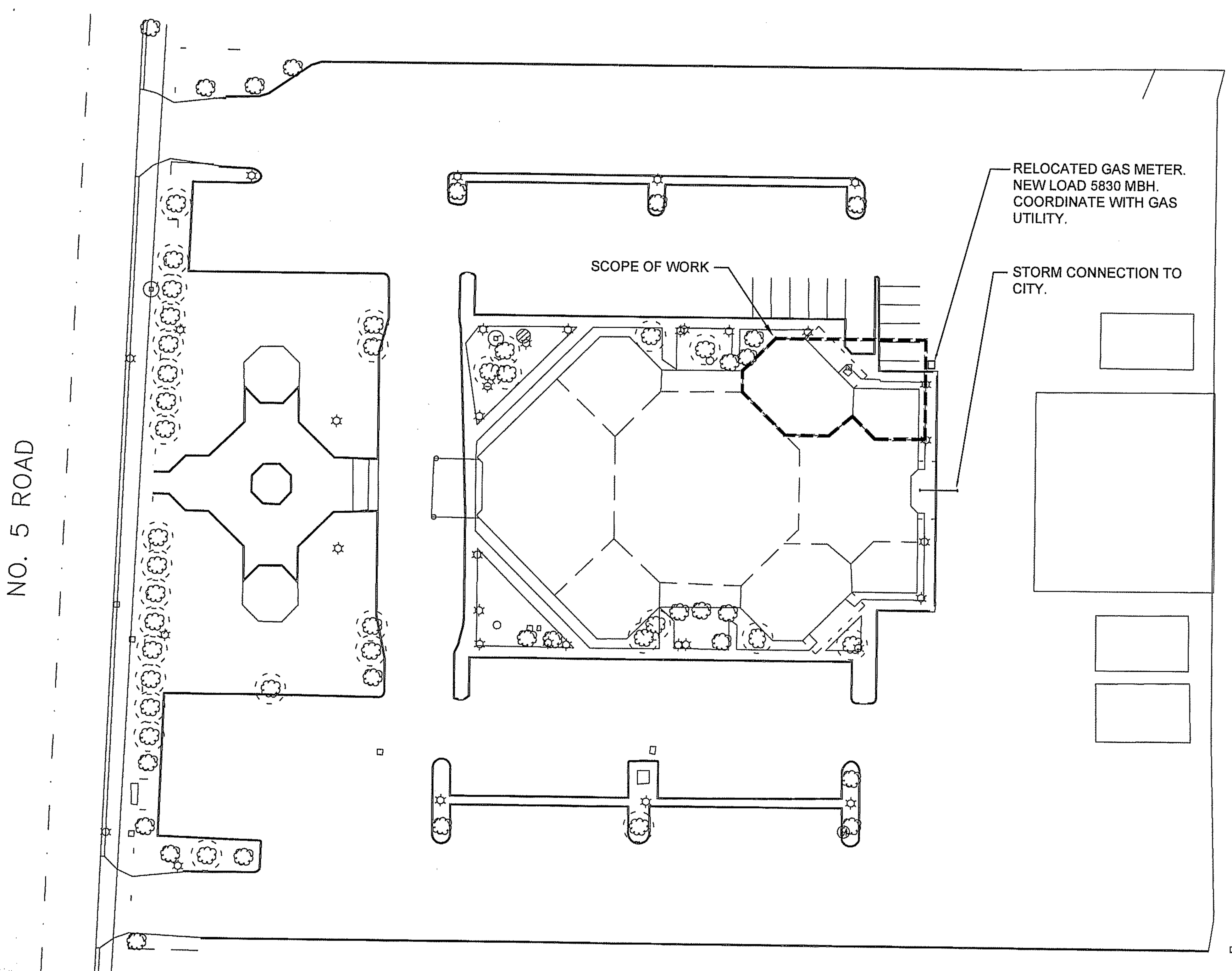

1 / M0.01 **SITE PLAN**
SCALE: N.T.S

MECHANICAL GENERAL NOTES

GENERAL:

1. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE PROJECT SPECIFICATIONS.
2. THE MECHANICAL SYSTEMS CONSIST OF ALL WORK INDICATED ON THE DRAWINGS, SCHEMATICS, DIAGRAMS, AND AS DESCRIBED IN THE SPECIFICATIONS.
3. REFER TO ARCHITECTURAL DRAWINGS FOR SPECIFIC DIMENSIONS, BENCHMARKS, ELEVATIONS AND SETBACKS.
4. THE MECHANICAL DRAWINGS ARE DIAGRAMMATIC IN NATURE AND DO NOT ATTEMPT TO SHOW ALL REQUIRED OFFSETS. REFER TO ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR ADDITIONAL CONSTRUCTION DETAILS.
5. WHERE THERE IS A CONFLICT BETWEEN THE DRAWINGS AND THE SPECIFICATIONS THE MOST STRINGENT REQUIREMENT SHALL APPLY.
6. COORDINATE ALL MECHANICAL WORK WITH OTHER TRADES TO ENSURE PROPER AND ADEQUATE INTERFACE WITH THE WORK OUTLINED FOR THIS PROJECT.
7. PROVIDE CANADIAN ELECTRICAL CODE (CEC) REQUIRED CLEARANCES FOR ALL INSTALLED EQUIPMENT. OFFSET MECHANICAL WORK AS REQUIRED TO SUIT THIS REQUIREMENT.
8. INSTALL MECHANICAL WORK AS HIGH AS POSSIBLE, TIGHT TO STRUCTURE AND SQUARE TO BUILDING LINES.
9. COORDINATE EXACT MOUNTING HEIGHTS AND LOCATIONS OF ALL PLUMBING FIXTURES WITH CASEWORK AND ARCHITECTURAL DRAWINGS.
10. COORDINATE EXACT LOCATIONS OF ALL WALL OR CEILING MOUNTED SENSORS WITH THE ARCHITECT BEFORE FINAL ROUGH-IN.

FIRESTOPPING:

1. ALL FIRESTOPPING AND FIRESTOPPING SYSTEMS TO COMPLY WITH BC BUILDING CODE 2018.
2. ALL PENETRATIONS OF FIRE RATED SEPARATIONS WILL BE FIRESTOPPED. ALL FIRESTOP SYSTEMS WILL REQUIRE 'F' RATED FIRESTOPPING IN ACCORDANCE WITH THE GRADE OF FIRE SEPARATION BEING PENETRATED.

SEISMIC RESTRAINTS:

1. THE MECHANICAL CONTRACTOR SHALL RETAIN THE SERVICES OF A PROFESSIONAL ENGINEER, REGISTERED IN THE PROVINCE OF BRITISH COLUMBIA, TO PROVIDE A COMPLETE DESIGN, SIZING AND DETAILING OF ALL ANCHORS, SUPPORTS AND SEISMIC RESTRAINT FOR ALL MECHANICAL, PLUMBING AND FIRE SUPPRESSION SYSTEMS. THE CONTRACTOR'S ENGINEER WILL BE THE "REGISTERED PROFESSIONAL OF RECORD" FOR THE SEISMIC RESTRAINT SYSTEMS. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
2. POST-INSTALLED DROP-IN OR POWER DRIVEN ANCHORS ARE NOT PERMITTED.

DUCTWORK:

1. ALL DUCTWORK SIZES NOTED ON DRAWINGS ARE INSIDE CLEAR DIMENSIONS. ADD APPROPRIATE DIMENSIONS FOR DUCT LINER TO OBTAIN OUTSIDE DUCT DIMENSIONS.
2. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS AND ELEVATIONS FOR EXACT LOCATION AND ELEVATION OF DIFFUSERS AND GRILLES.
3. MAXIMUM FLEXIBLE DUCT LENGTH SHALL BE NO LONGER THAN 1.2M (4 FT) UNLESS NOTED OTHERWISE FOR SPECIFIC APPLICATION. DO NOT USE FLEXIBLE DUCT FOR CHANGES IN DIRECTION GREATER THAN 60°. ENSURE FLEXIBLE DUCTWORK IS SUPPORTED WITHOUT SAGGING.
4. PROVIDE SIMILAR TYPE DUCT CONSTRUCTION FOR ALL EXPOSED APPLICATIONS. FLANGE TYPE AND SNAP-LOCK DUCTWORK ARE PROHIBITED IN EXPOSED AREAS.
5. PROVIDE METAL DUCTWORK TRANSITIONS BETWEEN ALL EQUIPMENT AND DUCT CONNECTIONS.
6. PROVIDE DIFFUSERS AND GRILLES COMPATIBLE WITH ARCHITECTURAL CEILING TYPES. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS.
7. PROVIDE BALANCING DAMPERS FOR EACH SUPPLY, RETURN AND EXHAUST DUCT WITH TWO OR MORE OPENINGS OR BRANCH LINES. REFER TO DRAWINGS FOR ADDITIONAL BALANCING DAMPER LOCATIONS AND REQUIREMENTS.
8. PROVIDE 25 MM THICK DUCT LINER ON ALL TRANSFER DUCTS, UNLESS SPECIFICALLY NOTED OTHERWISE ON THE DRAWINGS.
9. REFER TO SPECIFICATION FOR DUCT PRESSURE CLASSIFICATIONS. WHERE DUCT PRESSURE CLASSIFICATIONS ARE NOT NOTED FOR A SPECIFIC APPLICATION, CONFIRM WITH THE MECHANICAL CONSULTANT DURING TENDER.
10. ALL DUCTWORK AND PLENUMS SHALL BE CONSTRUCTED TO SEAL CLASS A. REFER TO SPECIFICATIONS FOR DETAILS.
11. LEAK TEST REPRESENTATIVE SECTION OF DUCTWORK DESIGNED TO OPERATE IN EXCESS OF 750 PA AND ALL OUTDOOR DUCTWORK. REFER TO SPECIFICATIONS FOR DETAILS.

PIPING:

1. ALL PIPING SHALL BE INSTALLED ON THE WARM SIDE OF THE BUILDING INSULATION AND VAPOUR BARRIER.
2. MAINTAIN MINIMUM 1 M (3 FT) COVER OVER ALL WATER PIPING.
3. PROVIDE TRAP PRIMERS ON ALL FLOOR DRAINS UNLESS NOTED OTHERWISE. TRAP PRIMER LOCATIONS ARE NOT NOTED ON THE DRAWINGS. CONTRACTOR TO DETERMINE SUITABLE LOCATIONS AND NOTE ON THE RECORD DRAWINGS.
4. PROVIDE VENTS FOR ALL NATURAL GAS REGULATORS TO THE EXTERIOR OF THE BUILDING.

PENETRATION & CONDUIT:

1. FOR ALL DEVICES IN EXPOSED LOCATIONS, ALL CONDUIT MUST BE CONCEALED WITHIN STRUCTURE. EXPOSED CONDUIT RUNS WILL NOT BE ACCEPTED.

ON-SITE SERVICES:

1. PRIOR TO COMMENCING WORK, THE CONTRACTOR SHALL EXERCISE PROPER PRECAUTIONS TO VERIFY THE ROUTING, INVERT LEVELS AND SLOPES SHOWN ON THE DRAWING AND BE RESPONSIBLE FOR ERRORS AND ALL EXTRA COSTS OF EXTRA WORK RESULTING FROM FAILURE TO EXERCISE SUCH PRECAUTIONS. RIM ELEVATIONS SHOWN FOR REFERENCE ONLY. REFER TO ARCH. DWGS. FOR FINAL GRADES.
2. REPORT TO THE ENGINEER ANY DISCREPANCIES WHICH WILL PREVENT THE WORK FROM BEING INSTALLED AS SHOWN.

FIRE PROTECTION NOTES

SCOPE OF WORK:

1. THE FIRE SUPPRESSION SYSTEM INFORMATION ON THESE DRAWINGS ARE FOR GENERAL SCOPE OF WORK AND COORDINATION DURING DESIGN. THE SYSTEM IS A DESIGN BUILD CONTRACT AS OUTLINED ON THE DRAWINGS AND SPECIFICATIONS.
2. THE SPRINKLER CONTRACTOR SHALL PROVIDE A COMPLETE FIRE SUPPRESSION SYSTEM FOR THE BUILDING IN ACCORDANCE WITH THE MECHANICAL SPECIFICATION, NFPA 13-2013, NFPA 14-2010 STANDARDS AND THE BRITISH COLUMBIA BUILDING CODE 2018.
3. THE BUILDING CODE REPORT FORMS AN INTEGRAL PART OF THE FIRE SUPPRESSION SYSTEM REQUIREMENTS AND SHALL FORM PART OF THE SPRINKLER CONTRACTOR'S SCOPE OF WORK RELATED TO THE FIRE SUPPRESSION SYSTEM.

SYSTEM DESIGN:

1. THE SPRINKLER CONTRACTOR SHALL RETAIN, ON BEHALF OF THE OWNER, A PROFESSIONAL ENGINEER REGISTERED IN THE PROVINCE OF BRITISH COLUMBIA TO PROVIDE A COMPLETE DESIGN IN ACCORDANCE WITH ALL APPLICABLE CODES AND STANDARDS. THE SPRINKLER CONTRACTOR'S ENGINEER WILL BE THE "REGISTERED PROFESSIONAL OF RECORD" FOR THE FIRE SUPPRESSION SYSTEMS (PART 5 OF THE LETTERS OF ASSURANCE).
2. INCORPORATE ALL EQUIVALENCY REQUIREMENTS CONTAINED IN THE CODE CONSULTANTS REPORT.
3. THE SPRINKLER CONTRACTOR'S ENGINEER WILL PROVIDE FIELD REVIEWS AND WRITTEN REPORTS ON A MONTHLY BASIS THROUGHOUT THE PROJECT.
4. REVIEW ARCHITECTURAL, STRUCTURAL, MECHANICAL AND ELECTRICAL DRAWINGS FOR DETAILS. COORDINATE ROUTING OF ALL PIPING WITH SUB-TRADES BEFORE START OF SPRINKLER SHOP DRAWINGS.

SHOP DRAWINGS:

1. SUBMIT PRELIMINARY PIPE AND SPRINKLER LAYOUT TO CONSULTANT FOR REVIEW BEFORE START OF HYDRAULIC CALCULATIONS.
2. SPRINKLER CONTRACTOR SHALL PREPARE SHOP DRAWINGS FOR SPRINKLER PERMIT APPLICATION. THESE DRAWINGS SHALL INDICATE ALL RELEVANT INFORMATION REQUIRED BY APPLICABLE NFPA STANDARDS AND TO THE CITY OF SURREY BUILDING & FIRE DEPARTMENT REQUIREMENTS. SUBMIT DRAWINGS TO THE CONSULTANT FOR REVIEW PRIOR TO SUBMITTAL TO THE CITY OF SURREY.

COORDINATION AND INSTALLATION:

1. ALL SYSTEM COMPONENTS (PIPING, FITTINGS, DEVICES, ETC.) SHALL BE U.L. APPROVED AND U.L.C. LISTED.
2. PROVIDE SEISMIC SWAY BRACING IN ACCORDANCE WITH NFPA 13 & 14 AND THE BRITISH COLUMBIA BUILDING CODE.
3. DO NOT INSTALL SPRINKLER PIPING UNTIL SHOP DRAWINGS HAVE BEEN REVIEWED BY THE ARCHITECT.
4. COORDINATION OF PIPE ROUTING, SLEEVING, CORING AND DRILLING IS THE RESPONSIBILITY OF THE SPRINKLER CONTRACTOR.
5. COORDINATE PIPE ROUTING WITH THE MECHANICAL CONTRACTOR AND OTHER SUBTRADES ON SITE TO AVOID CONFLICT WITH OTHER SERVICES.
6. SPRINKLER PIPING LOCATIONS SHALL NOT BE MODIFIED WITHOUT THE APPROVAL OF THE ARCHITECT. PROCEED ONLY AFTER SHOP DRAWINGS HAVE BEEN REVIEWED BY THE CONSULTANT AND ARCHITECT. WHERE PIPING IS EXPOSED, DO NOT DEVIATE FROM REVIEWED SHOP DRAWINGS WITHOUT WRITTEN CONSENT FROM THE ARCHITECT.
7. ROUTE SPRINKLER LINES IN DROP CEILINGS & BULKHEADS. REFER TO ARCHITECTURAL RCP DRAWINGS FOR EXTENT OF DROP CEILINGS & BULKHEADS.
8. PROVIDE ALL ANCILLARY DEVICES AND BAFFLES REQUIRED TO MEET NFPA STANDARDS.
9. EXPOSED PIPING SHALL BE MADE READY FOR PAINTING AS SPECIFIED IN THE PAINTING SPECIFICATIONS.
10. PROVIDE DRAIN AND TEST LOCATIONS FOR EACH SPRINKLER ZONE.

SPRINKLER HEADS:

1. ALL SPRINKLER HEADS USED ON THE PROJECT SHALL BE QUICK-RESPONSE, UNLESS NOTED OTHERWISE.
2. PROVIDE INTERMEDIATE TEMPERATURE SPRINKLER HEADS IN ALL SKYLIGHTS, ELEVATOR MACHINE ROOMS, AND OTHER LOCATIONS AS REQUIRED BY NFPA 13.
3. SPRINKLER HEADS USED ON THIS PROJECT SHALL BE AS NOTED ON THE DRAWINGS AND SPECIFICATIONS PROVIDED. ANY ALTERNATES SHALL BE REVIEWED AND ACCEPTED BY THE CONSULTANT PRIOR TO INSTALLATION.
4. WHERE SPRINKLER HEADS ARE SHOWN ON THE DRAWINGS, CHANGES IN LOCATION REQUIRE APPROVAL FROM THE ARCHITECT.
5. SPRINKLER HEADS ARE TO BE COORDINATED WITH ACCESS PANELS AND LIGHTING IN AREAS WITH NO T-BAR CEILING. PROVIDE SHOP DRAWINGS FOR ACCESS PANELS INCLUDING LOCATION WITH RESPECT TO SPRINKLERS, LIGHTING AND DIFFUSERS / GRILLES.

FIRE EXTINGUISHERS:

1. PROVIDE FIRE EXTINGUISHERS TO NFPA 10 AND THE BRITISH COLUMBIA FIRE CODE. FIRE EXTINGUISHERS TO BE INSTALLED IN FULLY RECESSED CABINETS. COORDINATE LOCATIONS AND MOUNTING DETAILS WITH THE ARCHITECT.
2. VERIFY HYDRANT TEST FLOW DATA RESULTS. DESIGN SYSTEM WITH A MINIMUM 70 KPA (10 PSI) SAFETY FACTOR.

GREASE INTERCEPTOR 1 (GI-1)

SINK 1	EXITING DISH WASHER PRE-RINSE SINK	
WIDTH	24	INCH
LENGTH	24	INCH
DEPTH	12	INCH
CAPACITY (TOTAL)	29.92	US GAL
DIVERSITY	1	
USEABLE VOLUME	29.92	US GAL
SINK 2	NEW 2 COMPARTMENT POT WASH SINK	
WIDTH	50	INCH
LENGTH	24	INCH
DEPTH	12	INCH
CAPACITY (TOTAL)	62.34	US GAL
DIVERSITY	1	
USEABLE VOLUME	62.34	US GAL

DESIGN CALCULATION

TOTAL DRAIN DOWN VOLUME	92.26	US GAL
DRAIN DOWN TIME	60	SECONDS
DESIGN FLOW RATE	92.26	US GPM
SELECTED GREASE INTERCEPTOR	100	US GPM

GREASE INTERCEPTOR 1 (GI-2)

SINK 1	NEW POT SINK	
WIDTH	48	INCH
LENGTH	48	INCH
DEPTH	21.50	INCH
CAPACITY (TOTAL)	214.44	US GAL
DIVERSITY	1	
USEABLE VOLUME	214.44	US GAL

DESIGN CALCULATION

TOTAL DRAIN DOWN VOLUME	214.44	US GAL
DRAIN DOWN TIME	60	SECONDS
DESIGN FLOW RATE	214.44	US GPM
SELECTED GREASE INTERCEPTOR	250	US GPM

Pipe Material	Nom Pipe Size (inches)	Cold Water				Hot Water (<= 140°F)			
		FU	L/S	GPM	Velocity (ft/s)	FU	L/S	GPM	Velocity (ft/s)
Copper - Type K	0.5	3.5	0.21	3.4	5.0	3.0	0.17	2.7	4.0
Copper - Type K	0.75	8.5	0.43	6.8	5.0	7.0	0.34	5.4	4.0
Copper - Type K	1	17.0	0.76	12.1	5.0	13.0	0.61	9.7	4.0
Copper - Type K	1.25	28.5	1.20	19.0	5.0	22.0	0.96	15.2	4.0
Copper - Type K	1.5	45.0	1.69	26.8	5.0	33.0	1.36	21.5	4.0
Copper - Type K	2	115.0	2.96	47.0	5.0	78.5	2.37	37.6	4.0
Copper - Type K	2.5	238.0	4.58	72.6	5.0	165.5	3.66	58.1	4.0
Copper - Type K	3	392.0	6.53	103.4	5.0	289.0	5.22	82.7	4.0
Copper - Type K	4	835.0	11.49	182.1	5.0	618.0	9.19	145.7	4.0

PLUMBING FIXTURES

FD-1

1. WATTS DRAINAGE PRODUCFTS FD-100-C EPOXY COATED CAST IRON FLOOR DRAIN WITH ANCHOR FLANGE, REVERSIBLE MEMBRANE CLAMP WITH PRIMARY AND SECONDARY WEEPHOLES, 1/2" THICK (SPECIFY DIAMETER) ADJUSTABLE NICKEL BRONZE STRAINER AND NO HUB OUTLET.

RD-1

2. WATTS DRAINAGE PRODUCTS RD-100 EPOXY COATED CAST IRON ROOF DRAIN WITH DEEPS SUMP, WIDE SERRATED FLASHING FLANGE, FLASHING CLAMP DEVICE WITH INTEGRAL GRAVEL STOP AND SELF-LOCKING POLYETHYLENE (STANDARD) DOME STRAINER.

KITCHEN HOOD

KH-1

CAPTIVEAIRE 5424 ND-2, 9'-0" LONG, 2250 CFM EXHAUST FLOW, 430 SS HOOD CONSTRUCTION (WHERE EXPOSED), 6 @ CAPTRATE SOLO GREASE FILTERS (SINGLE STAGE), 85% FILTER EFFICIENY (@ 7 MICRONS) AND COMPLETE WITH 3 LIGHTS. CAPTRATE FILTERS ARE IN COMPLIANCE WITH NFPA #96, NSF STANDARD #2, UL STANDARD #1046, INT. MECH CODE (IMC) AND ULC-S649. HOOD IS NSF TESTED, ETL LISTED AND BUILT IN ACCORDANCE WITH NFPA # 96.

MECHANICAL ABBREVIATIONS

AD	AREA DRAIN	ID	INSIDE DIAMETER
AFF	ABOVE FINISHED FLOOR	IE	INVERT ELEVATION
ARCH	ARCHITECTURAL	IN	INCH
BFP	BACKFLOW PREVENTER	INV	INVERT
BHP	BREAK HORSEPOWER	MAX	MAXIMUM
CB	CATCH BASIN	MH	MANHOLE
CO	CLEANOUT	MBH	1000 BRITISH THERMAL UNITS/HOUR
COG	CLEANOUT AT GRADE	MIN	MINIMUM
CONN	CONNECTION	NTS	NOT TO SCALE
C/W	COMPLETE WITH	POC	POINT OF CONNECTION
CONT	CONTINUATION	PRV	PRESSURE REDUCING VALVE
CTE	CONNECT TO EXISTING	PSI	POUNDS PER SQUARE INCH
DCW	DOMESTIC COLD WATER	RWL	RAIN WATER LEADER
DEG	DEGREE	SPEC	SPECIFICATION
DN	DOWN	SR	SANITARY RISER
EAT	ENTERING AIR TEMPERATURE	ST	STORM MAIN
F	FIRE MAIN	TA	TO ABOVE
FA	FROM ABOVE	TB	TO BELOW
FB	FROM BELOW	TBC	TO BE CONFIRMED
FD	FLOOR DRAIN	TBD	TO BE DETERMINED
FLR	FLOOR	TD	TRENCH DRAIN
FT	FEET/FOOT	THRU	THROUGH
GAL	GALLONS	TYP	TYPICAL
GPM	GALLONS PER MINUTE	V	VENT
HD	HUB DRAIN	W	WATER MAIN
HB	HOSE BIBB	WG	WATER GAUGE

SYMBOL SCHEDULE

PIPING (NEW)

- 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
- PIPE CLEAN-OUT
- PIPE CLEAN-OUT TO GRADE

FITTINGS AND VALVES

- DIRECTION OF FLOW
- PIPE DROP
- PIPE RISE
- PIPE TEE UP
- PIPE TEE DOWN
- PIPE UNION
- NO — ISOLATION VALVE (NORMALLY OPEN)
- NC — ISOLATION VALVE (NORMALLY CLOSED)
- CHECK VALVE
- PRESSURE REDUCING VALVE (PRV)
- STRAINER
- RELIEF VALVE
- BACKFLOW PREVENTOR (BFP)
- TEMPERATURE GAUGE
- PRESSURE GAUGE
- THERMOMETER
- PUMP

OUTLETS AND DRAINS

- FLOOR DRAIN (FD)
- FUNNEL FLOOR DRAIN
- ROOF DRAIN (RD)
- AREA DRAIN

SYSTEM MONITORING (NEW)

- T — ROOM TEMPERATURE SENSOR
- S — DUCT THERMOSTAT

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 (BD)
- BDD — BACKDRAFT DAMPER (BDD)
- MOTORIZED DAMPER (MD)
- FD — FIRE DAMPER - VERTICAL (FD)
- FD — FIRE DAMPER - HORIZONTAL (FD)
- DUCT OR PIPE CAP-OFF
- RETURN OR EXHAUST AIR GRILLE

EQUIPMENT TAGS

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

MECHANICAL DRAWING LIST

DRAWINGS NO.	DESCRIPTION	SCALE
M0.01	SITE PLAN, DRAWING NOTES AND SYMBOL SCHEDULE	NOT TO SCALE
M0.02	SCHEDULES	NOT TO SCALE
M1.01	FOUNDATION DEMOLITION PLAN	1/4" = 1'-0"
M1.02	FOUNDATION RENOVATION PLAN	1/4" = 1'-0"
M1.03	ROOF DEMOLITION AND RENOVATION PLAN	1/4" = 1'-0"
M2.01	PLUMBING AND FIRE PROTECTION DEMOLITION PLAN	1/4" = 1'-0"
M2.02	PLUMBING AND FIRE PROTECTION RENOVATION PLAN	1/4" = 1'-0"
M3.01	HVAC DEMOLITION PLAN	1/4" = 1'-0"
M3.02	HVAC RENOVATION PLAN	1/4" = 1'-0"
M4.01	DETAILS 1	AS NOTED
M4.02	DETAILS 2	AS NOTED
M5.01	MECHANICAL SPECIFICATION 1	NOT TO SCALE
M5.02	MECHANICAL SPECIFICATIONS 2	NOT TO SCALE

CIVIC ADDRESS

INDIA CULTURAL CENTRE OF CANADA
GURDWARA NANAK NIWAS
8600 NO. 5 ROAD, RICHMOND, BC V6Y 2V4

LEGAL ADDRESS

LOT 19 SEC 19 BLK 4N RG 5W PL NWP39242 LOT 19,
BLOCK 4N, PLAN NWP39242, SECTION 19, RANGE 5W, NEW
WESTMINSTER LAND DISTRICT, EXCEPT PLAN EPP6 1660

* KITCHEN HOOD FIRE SUPPRESSION TO BE DESIGN BUILD. DETAILED PERMIT PLANS AND SPECIFICATIONS TO BE SUBMITTED SEPARATELY FOR HOOD FIRE SUPPRESSION SYSTEM PRIOR TO INSPECTIONS.

• ANNUNCIATE AS SEPARATE ZONE ON FIRE ALARM.

City of Richmond Building Approvals
City review of documents stamped:
Permit No.: 19 875824

1. does not relieve the Owner of Lands referred to in this document from full responsibility for work being carried out in compliance with City and Provincial enactments:
2. is subject to terms and conditions printed on the permit and prescribed in the City bylaws.

Reviewed by: [signature] Date: FEB 2 0 2020

CITY OF RICHMOND
FEB 1 9 2020
RECEIVED

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CALGARY T. 403-252-2333 F. 403-253-3324 710 - 1122 4TH STREET SW CALGARY, AB T2R 1M1

seal

PROFESSIONAL ENGINEER T. V. WALDHAUS # 39013 BRITISH COLUMBIA
FEB 0 4 2020

issued

1. ISSUED FOR FINAL DRAFT 2019/09/17
2. ISSUED FOR BP 2019/09/20
3. ISSUED FOR REVIEW 2019/10/15
4. ISSUED FOR TENDER 2019/11/13
5. RE-ISSUED FOR BP 2019/11/14
6. RE-ISSUED FOR BP 2020/02/04

revisions

key plan

The city has relied exclusively on the undersigned registered professional for the adequacy of the plans in conformance with the current edition of the B.C. Building Code in reviewing the plans submitted with this application for a building permit.

T.V. WALDHAUS
Registered Professional

Permit Issued by Date

project title

INDIA CULTURAL CENTRE OF CANADA

8600 NO. 5 ROAD,
RICHMOND, B. C.

drawing title

SITE PLAN, SYMBOL SCHEDULE, NOTES

drawn: AFI	project north
checked: JY	
scale: NTS	
drawing date: 2020/02/04	printed: 2020/02/04
project no.: 316b-001-19	drawing no.: M0.01
rev.	

THESE PLANS MUST BE KEPT ON THE JOB SITE FOR INSPECTIONS

DIFFUSERS AND GRILLES

EQUIPMENT TAG	DESCRIPTION/TYPE	MANUFACTURER	SERVICE	MODEL NUMBER	NOTES
EG-1	LOUVRE FACED EXHAUST AIR GRILLE	EH PRICE	EXHAUST	530 / F / L / A / B12	1
SD-1	PERFORATED FACE DIFFUSER	EH PRICE	SUPPLY	PCFD / RAL	1
SD-2	SQUARE CONE DIFFUSER	EH PRICE	SUPPLY	SCD / 31 / B12	1

NOTES:

1 PROVIDE DIFFUSERS AND GRILLES WITH BORDER STYLES THAT ARE COMPATIBLE WITH ADJACENT WALLS AND CEILING SYSTEMS. REFER TO ARCHITECTURAL DRAWINGS. TO ARCHITECTURAL DRAWINGS.

GREASE INTERCEPTOR

UNIT TAG	DESCRIPTION	LOCATION	MANUFACTUPER	MODEL	SIZE	INLET SIZE (IN)	WATER CAPACITY (GAL)	GREASE CAPACITY (GAL)	FLOW RATE (GPM)	NOTES
GI-1	BURIED GREASE INTERCEPTOR	OUTSIDE	ZURN	GMC	100	3	100	42	100	1,2
GI-2	BURIED GREASE INTERCEPTOR	OUTSIDE	ZURN	GMC	250	3	250	119	250	1,2

NOTES:

1 TO BE SUPPILED WITH 3 INCH INLET AND OUTLET

2 FILL WITH CLEAN WATER PRIOR TO START-UP OF SYSTEM.

FANS

EQUIPMENT TAG	QTY	SERVICE	LOCATION	TYPE	MANUFACTURER	MODEL	AIR FLOW (CFM)	E. S. P. (IN.WG)	FAN (RPM)	DRIVE TYPE	SOUND LEVEL (SONES)	WEIGHT (LBS)	NOTES
SF-1	1	KITCHEN MAKE UP	ROOF	FORWARD CURVE CENTRIF	GREENHECK	RSF-150	3,520	0.5	565	BELT	13.2	376	1
SF-2	1	KITCHEN MAKE UP	ROOF	FORWARD CURVE CENTRIF	GREENHECK	RSF-150	3,520	0.5	565	BELT	13.2	376	1
EF-7	1	KITCHEN EXHAUST	ROOF	CENTRIF UPFLOW EXHAUST FAN	GREENHECK	CUBE-240	4,800	1.1	834	BELT	15.2	146	1,2
EF-9	1	KITCHEN EXHAUST	ROOF	CENTRIF UPFLOW EXHAUST FAN	GREENHECK	CUBE-240	4,800	1.1	834	BELT	15.2	146	1,2
EF-13	1	EXISTING RANGEHOOD EXHAUST	ROOF	CENTRIF UPFLOW EXHAUST FAN	GREENHECK	CUBE-141	2,100	1.0	1,547	BELT	12.5	83	1,2
EF-14	1	NEW RANGEGHOOD EXHAUST	ROOF	CENTRIF UPFLOW EXHAUST FAN	CAPTIVEAIRE	DU85HFA	2,250	1.0	1,520	BELT	19.1	97	1,2

NOTES:

1 REFER TO MOTORLIST FOR ELECTRICAL REQUIREMENTS

2 COMPLETE WITH GREASE TRAP, VENTILATED CURB, SHAFT HEAT SLINGER AND UL/CUL 762 OPTION.

ENERGY RECOVERY UNIT VENTILATOR SCHEDULE

EQUIPMENT TAG	QTY	LOCATION	MANUFACTURER	MODEL	SERVICE	EXHAUST SIDE AIR FLOW (L/S)	EXHAUST SIDE HP	EXHAUST SIDE ESP (Pa)	SUPPLY SIDE AIR FLOW (L/S)	SUPPLY SIDE HP	SUPPLY SIDE ESP (Pa)	WINTER EFFECTIVENESS	ELEC (V/Ph/Hz)	WEIGHT (LBS)	NOTES
ERV-1	1	KITCHEN	DAIKIN	VAM300GVJU	TOILET AND STORAGE	170	-	0.6	170	-	0.6	-	208/1/60	71	ALL

NOTES:

1. PROVIDE ECM MOTORS FOR SUPPLY AND EXHAUST
2. INTERLOCKED MOTORIZED ISOLATION DAMPERS FOR BOTH AIRSTREAMS
3. C/W SPEED CONTROL, TIME CLOCK (WALL MOUNTED)
4. PIPE CONDENSATE TO DRAIN C/W P-TRAP
5. VIBRATION ISOLATION
6. INDEPENDENT BLOWER CONTROL

MAKEUP AIR UNIT

EQUIPMENT TAG	DESCRIPTION/TYPE	MANUFACTURER	MODEL NUMBER	SUPPLY FAN VOLUME (CFM)	O/A (CFM)	ESP (IN. W.G.)	SPEED (RPM)	MCA	MOTOR SUPPLY (HP)	POWER SUPPLY (V/PH/HZ)	HEATING SECTION INPUT (MBH)	OUTPUT (MBH)	E.A.T. DB (DEG F)	L.A.T. DB (DEG F)	UNIT WEIGHT (LBS)	NOTES
MUA-1	GAS FIRED MAKE UP AIR UNIT	ENGINEERED AIR	DJS60/O	6225	6225	0.5	-	33.5	5	208/60/3	500	405	15	75	1800	1

NOTES:

1 SINGLE POINT CONNECTION TO UNIT

MECHANICAL MOTORLIST

UNIT NUMBER	QTY	UNIT DESCRIPTION	UNIT LOCATION	STANDBY PWR (YES/NO)	EMERGENCY POWER VP	DVP	CP	NP	ELECTRICAL LOAD MCA	FLA	KW	HP	VOLT	PH	EQUIPMENT S	I	C	STARTER S	I	C	TYPE	DISCONNECT S	I	C	CONTROL S	I	C	TYPE	NOTES
		FAN																											
SF-1	1	KITCHEN MAKE UP	ROOF	NO						4.6		1	208	3	M	M	E	E	E	E	MAG	E	E	E	M	M	M	WS	1,2
SF-2	1	KITCHEN MAKE UP	ROOF	NO						4.6		1	208	3	M	M	E	E	E	E	MAG	E	E	E	M	M	M	WS	1,2
EF-7	1	KITCHEN EXHAUST	ROOF	NO						7.5		2	208	3	M	M	E	E	E	E	MAG	E	E	E	M	M	M	WS	1,2
EF-9	1	KITCHEN EXHAUST	ROOF	NO						7.5		2	208	3	M	M	E	E	E	E	MAG	E	E	E	M	M	M	WS	1,2
EF-13	1	EXISTING RANGHOOD EXHAUST	ROOF	NO						4.6		1	208	3	M	M	E	E	E	E	MAG	E	E	E	M	M	M	WS	1,2
EF-14	1	NEW RANGEGHOOD EXHAUST	ROOF	NO						6.5		1	230	1	M	M	E	E	E	E	MAG	E	E	E	M	M	M	WS	1,2
		MAKE-UP AIR UNIT																											
MUA-1	1	GAS FIRED MAKE UP AIR UNIT	ROOF	NO					33.5				208	5	M	M	E	E	E	E	MAG	E	E	E	M	M	M	PCS	1,2
		ENERGY RECOVIERY VENTILATOR																											
ERV-1	1	ENERGY RECOVERY VENTILATOR	KITCHEN	NO					1.6				208	1	M	M	E	E	E	E	MAG	E	E	E	M	M	M	TC	
		MISCELLANEOUS																											
		CONTROLS											120	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

SUPPLIER / INSTALL / WIRE CODES:
MECH = MECHANICAL
ELEC = ELECTRICAL
G = GENERAL CONTRACTOR
S = SUPPLIED BY
I = INSTALLED BY
C = CONNECTED BY

STARTER CODES:
MAN = MANUAL STARTER
HOA = MAGNETIC STARTER W/ HAND/OFF/AUTO SWITCH W/ AUX. CONTACTS
MAG = MAGNETIC STARTER C/W AUX STATUS CONTACTS
MRR = MOTOR RATED RELAY, 24 VAC COIL & MOTOR PROTECTION SWITCH
PCS = PACKAGED CONTROL SYSTEM
VFD = VARIABLE FREQUENCY DRIVE
RVS = REDUCED VOLTAGE STARTER
WS = WALL SWITCH
CP = CONTROL PANEL

CONTROL DEVICE CODES:
AQUA = PUMP CONTROLLED BY AQUASTAT
BMS = BLDG MANAGEMENT SYSTEM
ES = END SWITCH
ET = LINE VOLTAGE T'STAT
FA = FIRE ALARM
FAP = FIRE ALARM PANEL
FS = FLOW SWITCH
GS = GAS SENSOR
H = HUMIDITY SENSOR
I = INTERLOCK, SEE NOTES
LIGHT = WIRED TO LIGHT SWITCH
LS = LEVEL SWITCH
OS = OCCUPANT SENSOR
PS = PRESSURE SWITCH
R. STAT = REVERSE ACTING THERMOSTAT
TC = TIME CLOCK
T = LOW VOLTAGE T'STAT OR SENSOR
TS = TAMPER SWITCH
VS = VARIABLE SPEED SWITCH
WS = WALL SWITCH

ELECTRICAL LOAD CODES:
BHP = BREAK HORSEPOWER
FLA = UNIT FULL LOAD AMPS
HP = UNIT OR MOTOR HORSE POWER
PH = POWER PHASE
MCA = MINIMUM CIRCUIT AMPS
VOLT = REQUIRED SUPPLY VOLTAGE

MISCELLANEOUS CODES:
FFCP = FIRE FIGHTERS CONTROL PANEL
FRAC = FRACTIONAL HORSEPOWER
INT = INTEGRAL PART OF UNIT

GENERAL NOTES:
A. ALL FIRE ALARM DEVICES WIRED BY ELECTRICAL
B. CONTROL PANELS ARE SHIPPED LOSS & REQUIRE FIELD WIRING
C. PCS EQUIPMENT REQUIRES SINGLE SOURCE POWER CONNECTION, UNLESS NOTED OTHERWISE
D. CP, VFD EQUIPMENT REQUIRES POWER WIRING TO AND FROM CONTROL PANEL TO CONTROLLED EQUIPMENT

NOTES:
1. EF-7 AND EF-9 INTERLOCKED WITH OPERATION OF SF-1, SF-2 AND MUA-1.
2. CONTROLLED VIA SWITCH

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PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA T. WALDHAUS # 39013
FEB 04 2020

issued
1. ISSUED FOR FINAL DRAFT 2019/09/17
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revisions

key plan

project title

INDIA CULTURAL CENTRE OF CANADA

8600 NO. 5 ROAD, RICHMOND, B. C.

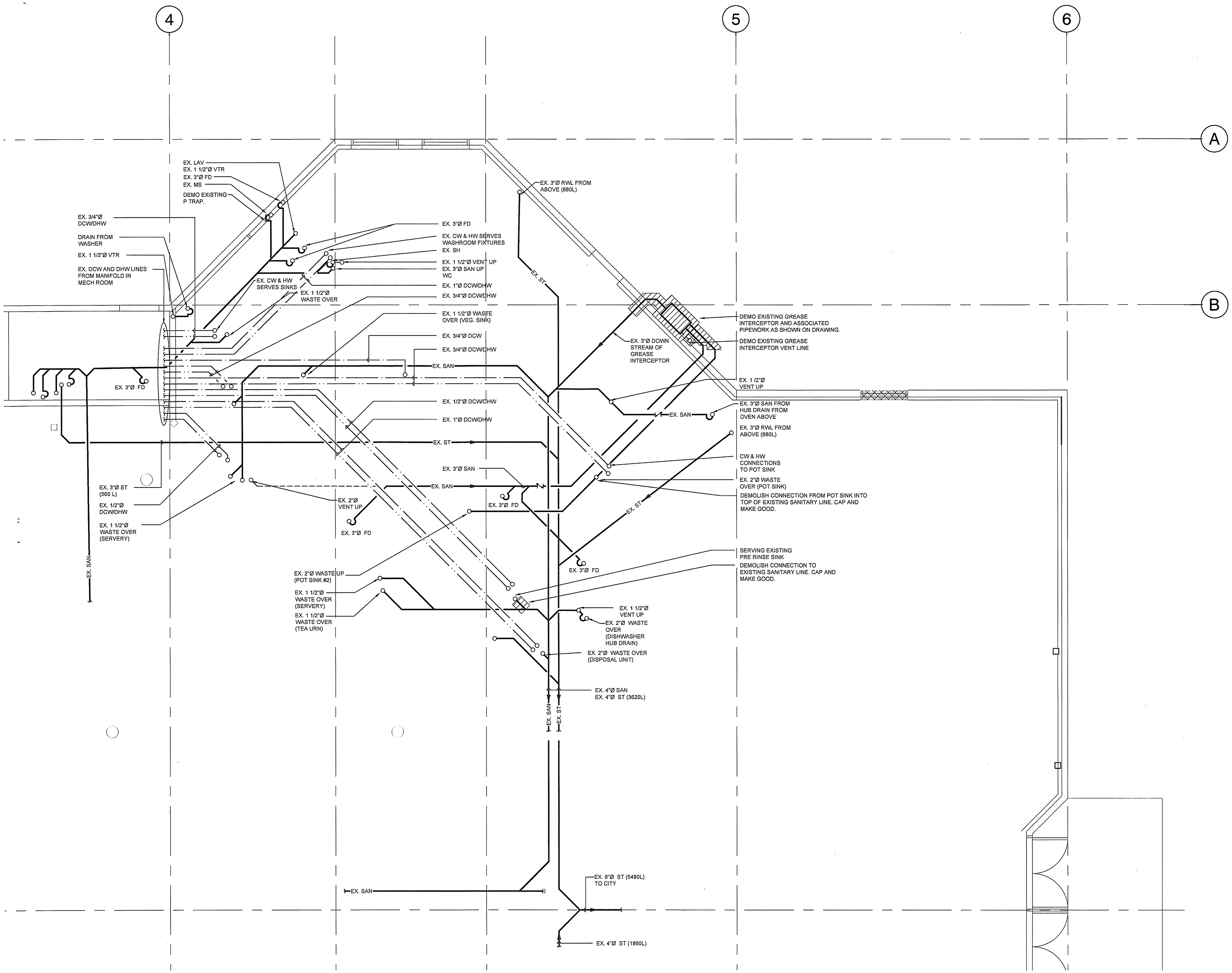
drawing title

SCHEDULES

19 875824

drawn AF
checked JY
scale NTS
drawing date 2020/02/04
printed 2020/02/04
project no. 316b-001-19
rev.
project north
drawing no. M0.02

THESE PLANS MUST BE KEPT ON THE JOB SITE FOR INSPECTIONS



1 / M1.01 FOUNDATION DEMOLITION PLAN
SCALE: 1/4" = 1' - 0"

FOUNDATION GENERAL NOTES

1. CONTRACTOR TO REVIEW EX. CONDITIONS BEFORE PRICING & START OF WORK AND NOTIFY THE ENGINEER PRIOR TO COMMENCING WORK IF THERE ARE ANY DISCREPANCIES.
2. CONTRACTOR TO COORDINATE ALL PLUMBING WORK WITH THAT OF THE ARCHITECT AND OTHER TRADES TO ENSURE PROPER AND ADEQUATE INTERFACE WITH THE WORK OUTLINED IN THE PROJECT.
3. THE MECHANICAL PLUMBING SYSTEM SHALL CONSIST OF ALL WORK SHOWN ON THE DRAWINGS AND SPECIFICATIONS AS WELL AS ALL EXISTING CONDITIONS, ESPECIALLY THAT WITHIN THE FOUNDATION.
4. CONTRACTOR TO ALLOW TO DETERMINE THE INVERT OF ALL EXISTING SANITARY AND STORM CONNECTION
5. CONTRACTOR IS RESPONSIBLE FOR VERIFYING INVERTS OF EXISTING AND NEW MAIN CONNECTIONS FROM THE CITY PRIOR TO INSTALLATION OF ANY NEW PIPING. NEW PIPING INVERTS AND LAYOUTS TO BE ADJUSTED AS REQUIRED TO MEET ANY INVERT CHANGES AND TO BE INCLUDED WITHIN THE SCOPE OF WORK.
6. CONTRACTOR TO REVIEW WITH STRUCTURAL ENGINEERING PRIOR TO ANY SAW CUTTING. CONTRACTOR TO SCAN AREAS PRIOR TO SAW CUTTING.

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FEB 04 2020

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revisions

key plan

project title

INDIA CULTURAL CENTRE OF CANADA

8600 NO. 5 ROAD, RICHMOND, B. C.

drawing title

FOUNDATION DEMOLITION PLAN

19 875824

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checked JY	
scale 1/4" = 1'-0"	
drawing date 2020/02/04	printed 2020/02/04
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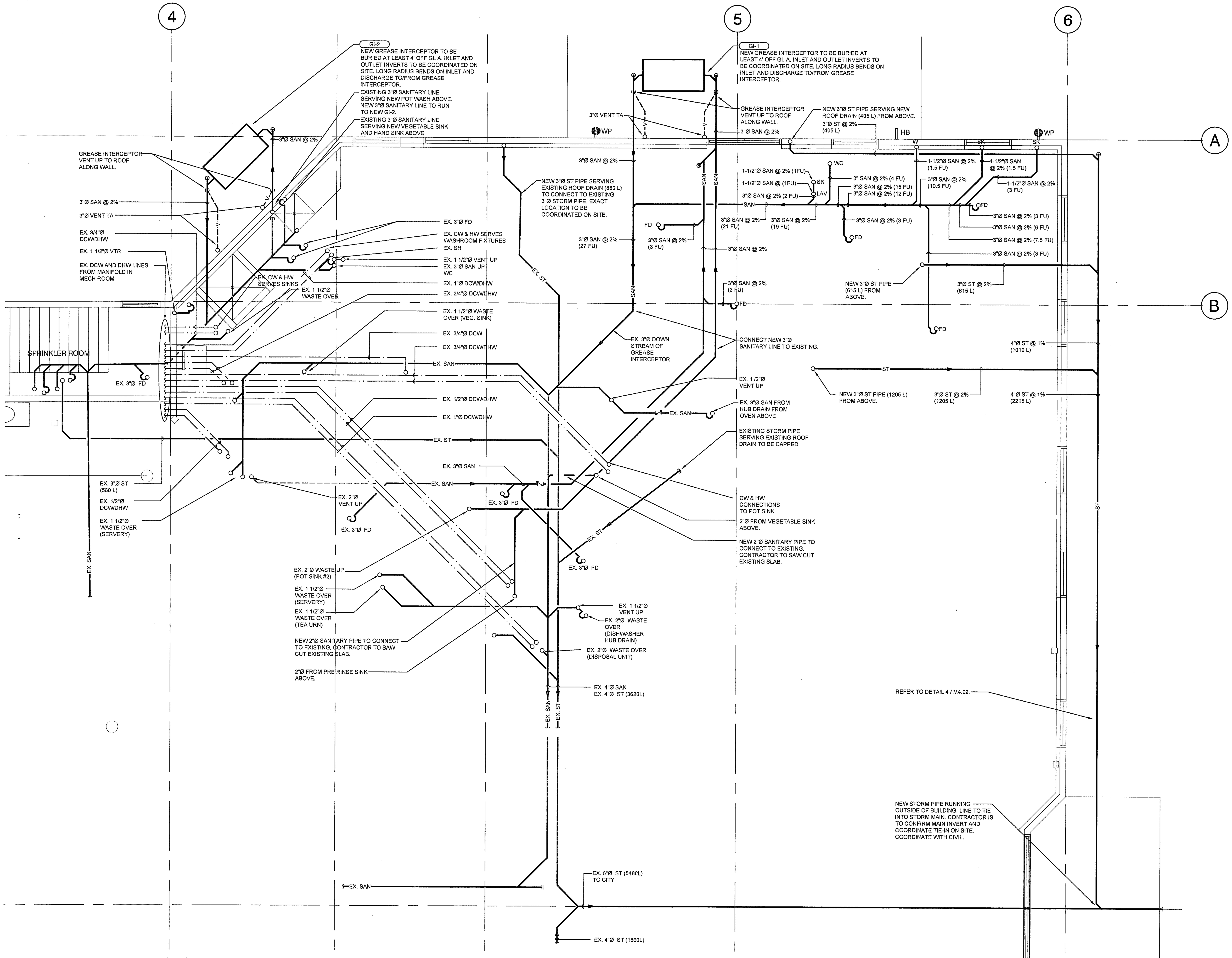

1 / M1.02 FOUNDATION RENOVATION PLAN
SCALE: 1/4" = 1' - 0"

FOUNDATION GENERAL NOTES

1. CONTRACTOR TO REVIEW EX. CONDITIONS BEFORE PRICING & START OF WORK AND NOTIFY THE ENGINEER PRIOR TO COMMENCING WORK IF THERE ARE ANY DISCREPANCIES.
2. CONTRACTOR TO COORDINATE ALL PLUMBING WORK WITH THAT OF THE ARCHITECT AND OTHER TRADES TO ENSURE PROPER AND ADEQUATE INTERFACE WITH THE WORK OUTLINED IN THE PROJECT.
3. THE MECHANICAL PLUMBING SYSTEM SHALL CONSIST OF ALL WORK SHOWN ON THE DRAWINGS AND SPECIFICATIONS AS WELL AS ALL EXISTING CONDITIONS, ESPECIALLY THAT WITHIN THE FOUNDATION.
4. CONTRACTOR TO DETERMINE THE INVERT OF ALL EXISTING SANITARY AND STORM CONNECTIONS REQUIRED FOR NEW SERVICE TIE-INS.
5. CONTRACTOR IS RESPONSIBLE FOR VERIFYING INVERTS OF EXISTING AND NEW MAIN CONNECTIONS PRIOR TO INSTALLATION OF ANY NEW PIPING. CONTRACTOR IS TO INFORM THE ENGINEER IF THE PROPOSED FOUNDATION ROUTING AND INVERTS CANNOT BE MAINTAINED AND AWAIT WRITTEN INSTRUCTION BEFORE PROCEEDING.
6. CONTRACTOR TO REVIEW WITH STRUCTURAL ENGINEERING PRIOR TO ANY SAW CUTTING. CONTRACTOR TO SCAN AREAS PRIOR TO SAW CUTTING.

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revisions

key plan

project title

INDIA CULTURAL CENTRE OF CANADA

8600 NO. 5 ROAD,
RICHMOND, B. C.

drawing title

FOUNDATION RENOVATION PLAN

19 875824

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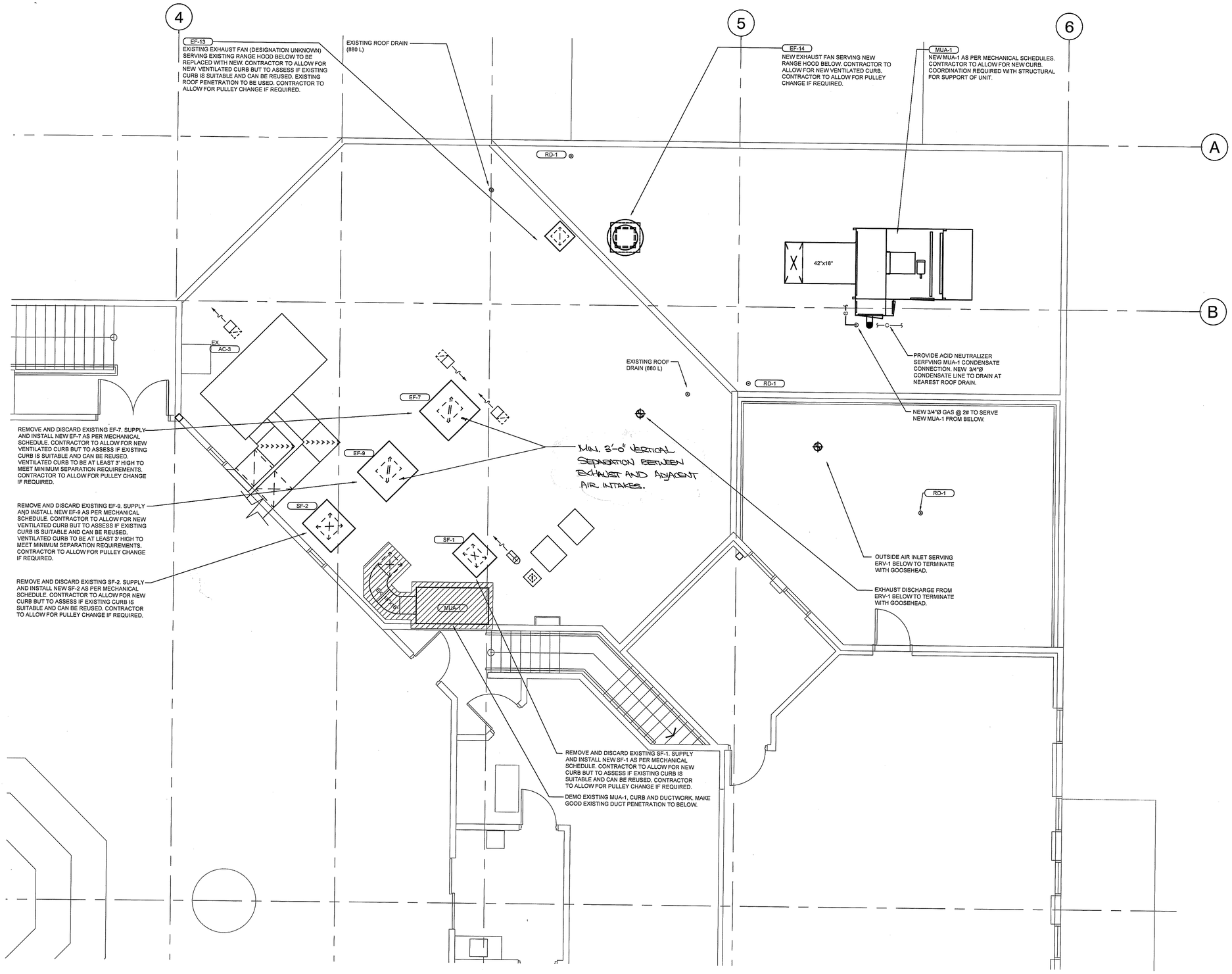
scale: 1/4" = 1'-0"	
drawing date: 2020/02/04	printed: 2020/02/04
project no.: 316b-001-19	drawing no.: M1.02
rev. △	



1 / M1.03 ROOF DEMOLITION & RENOVATION PLAN

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

ROOF PLAN GENERAL NOTES

1. CONTRACTOR TO REVIEW EX. CONDITIONS BEFORE PRICING & START OF WORK AND NOTIFY THE ENGINEER PRIOR TO COMMENCING WORK IF THERE ARE ANY DISCREPANCIES.
2. LOCATIONS OF EXISTING EQUIPMENT ARE INDICATIVE ONLY. CONTRACTOR TO CONFIRM EXACT LOCATIONS ON SITE.

CITY OF RICHMOND

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key plan

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INDIA CULTURAL CENTRE OF CANADA

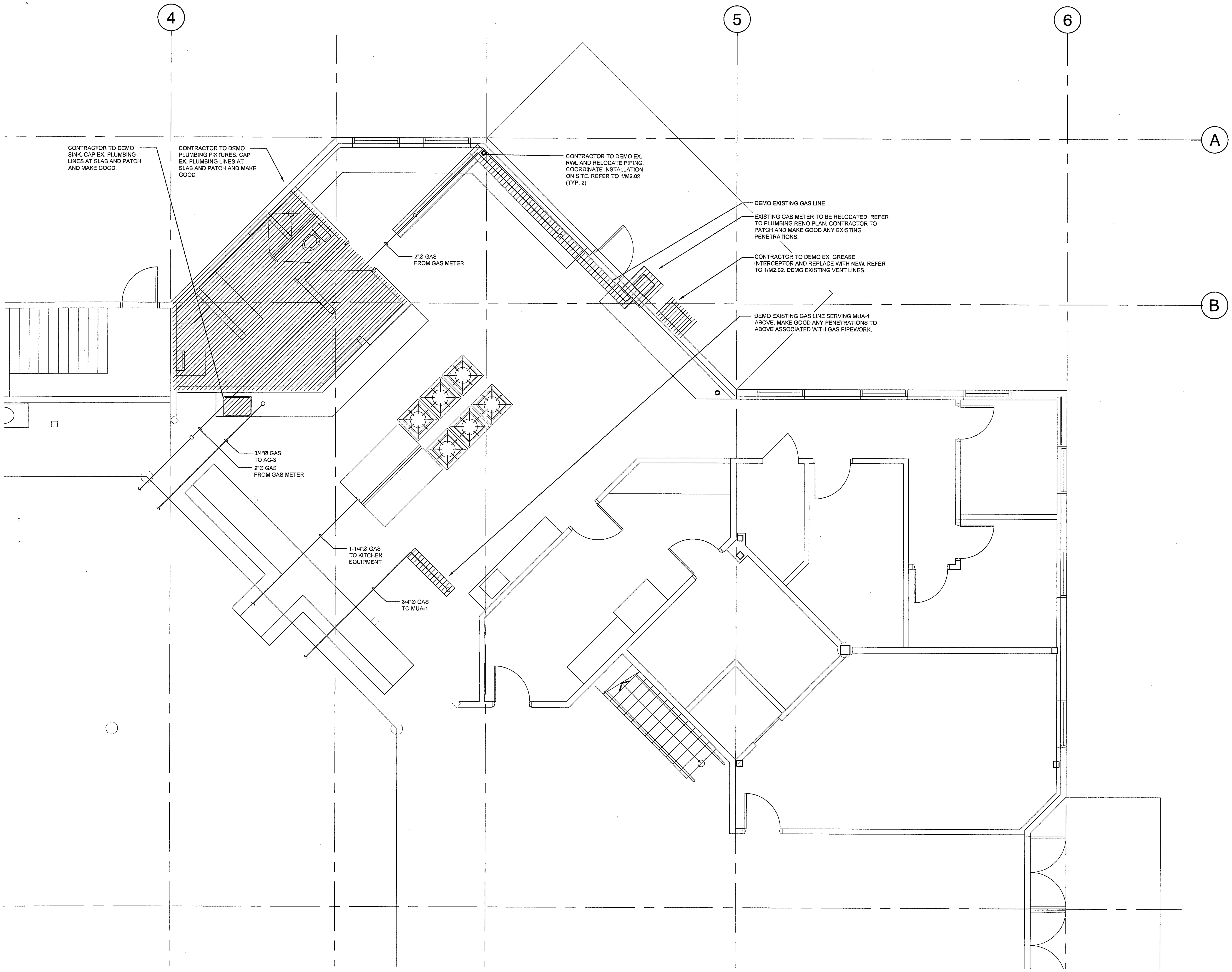
8600 NO. 5 ROAD, RICHMOND, B. C.

drawing title

ROOF DEMOLITION AND RENOVATION PLAN

19 875824

drawn: IAF	project north
checked: JY	
scale: 1/4" = 1'-0"	
drawing date: 2020/02/04	printed: 2020/02/04
project no.: 316b-001-19	drawing no.: M1.03
rev.	



1 M2.01 PLUMBING & FP DEMOLITION PLAN
SCALE: 1/4" = 1'-0"

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revisions

All measurements must be checked on the drawings by the contractor.
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key plan

project title

INDIA CULTURAL CENTRE OF CANADA

8600 NO. 5 ROAD, RICHMOND, B. C.

drawing title

PLUMBING & FP DEMOLITION PLAN

19 875824

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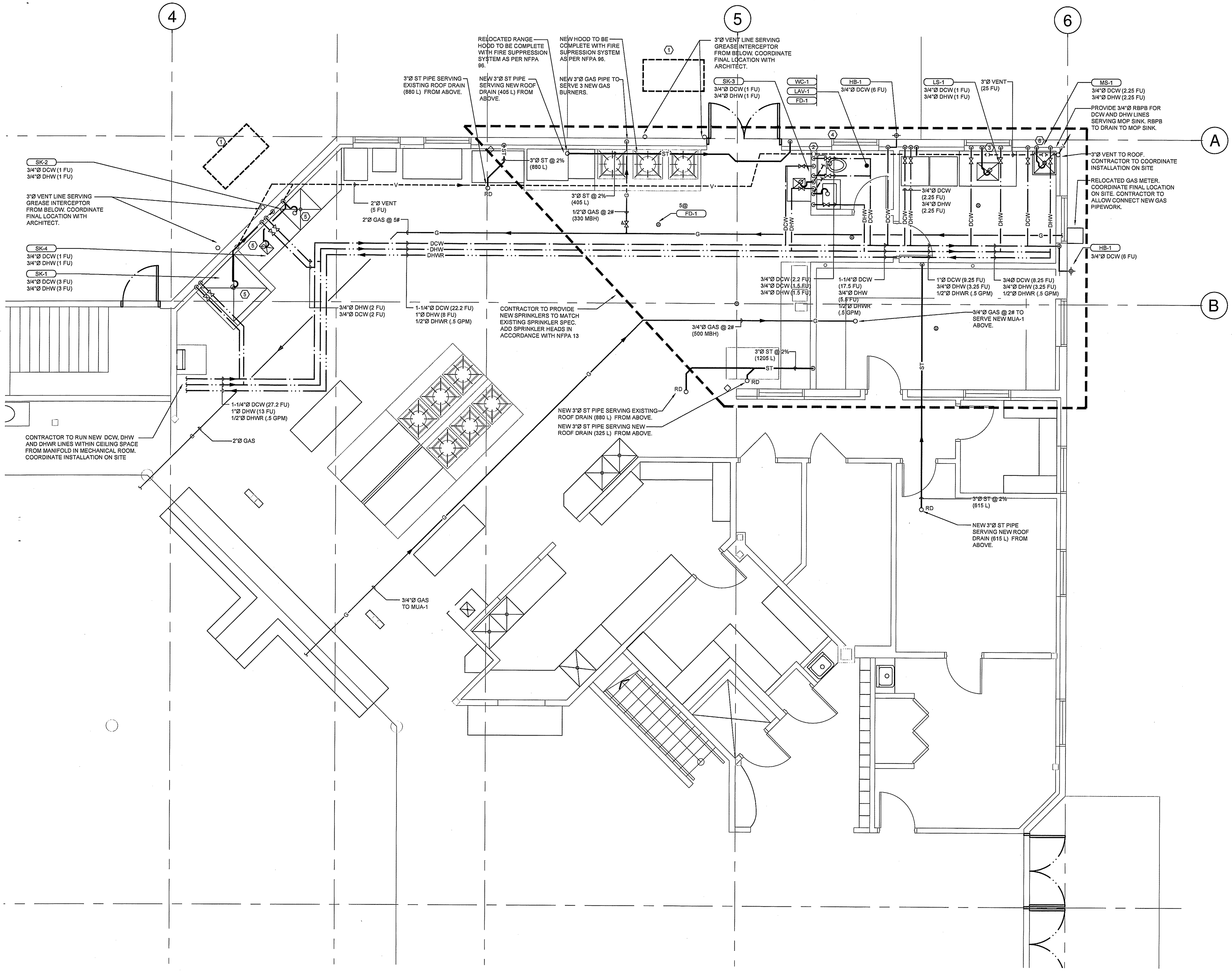

1 / M2.02 PLUMBING & FP RENOVATION PLAN

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

PLUMBING GENERAL NOTES

1. CONTRACTOR TO REVIEW EX. CONDITIONS BEFORE PRICING & START OF WORK AND NOTIFY THE ENGINEER PRIOR TO COMMENCING WORK IF THERE ARE ANY DISCREPANCIES.
2. PLUMBING FIXTURES PROVIDED BY OWNER. CONTRACTOR SHALL ENSURE THE INSTALLATION OF ALL THE PLUMBING FIXTURES WITH MECHANICAL CONNECTIONS.
3. CONTRACTOR TO COORDINATE ALL PLUMBING WORK WITH THAT OF THE ARCHITECT AND OTHER TRADES TO ENSURE PROPER AND ADEQUATE INTERFACE WITH THE WORK OUTLINED IN THE PROJECT.
4. THE MECHANICAL PLUMBING SYSTEM SHALL CONSIST OF ALL WORK SHOWN ON THE DRAWINGS AND SPECIFICATIONS AS WELL AS ALL EXISTING CONDITIONS, ESPECIALLY THAT WITHIN THE FOUNDATION.
5. CONTRACTOR IS RESPONSIBLE FOR VERIFYING INVERTS OF EXISTING AND NEW MAIN CONNECTIONS FROM THE CITY PRIOR TO INSTALLATION OF ANY NEW PIPING. NEW PIPING INVERTS AND LAYOUTS TO BE ADJUSTED AS REQUIRED TO MEET ANY INVERT CHANGES AND TO BE INCLUDED WITHIN THE SCOPE OF WORK
6. REFER TO SPEC FOR ALL INSULATION REQUIREMENTS.
7. ALL PIPES TO RUN CONCEALED WITHIN PLENUM SPACE AND WALLS UNLESS OTHERWISE INDICATED. CONTRACTOR TO COORDINATE EXACT ROUTING ON SITE W/ ALL TRADES
8. ALL PENETRATIONS THROUGH FIRE RATED AND SMOKE RATED WALLS TO C/W FIRE STOPPING. REF TO ARCH FOR WALL LOCATIONS

FIRE PROTECTION GENERAL NOTES

1. FIRE PROTECTION SCOPE OF WORK IS TO BE DESIGN BUILD CONTRACT AS OUTLINED ON THE DRAWINGS AND SPECIFICATIONS.
2. ADJUST, RELOCATE OR ADD SPRINKLER HEADS TO SUIT NEW LAYOUT IN ACCORDANCE WITH NFPA 13.
3. PROVIDE FIRE SUPPRESSION SYSTEM FOR KITCHEN EXHAUST HOOD AS PER NFPA 96.
4. PROVIDE FIRE EXTINGUISHER IN ACCORDANCE WITH NFPA 10. FIRE EXTINGUISHER TO BE TYPE K.

KEY NOTES

1. ACCESS HATCH OF NEW GREASE INTERCEPTOR LOCATION
2. VENT FROM WATER CLOSET, CONTRACTOR TO ROUTE VENT TO UP NEAREST WALL, COORDINATE ON SITE
3. VENT FROM LAUNDRY SINK. CONTRACTOR TO ROUTE VENT TO UP NEAREST WALL, COORDINATE ON SITE
4. GREASE INTERCEPTOR VENT RUN ALONG FACE OF WALL AND TERMINATE ABOVE NEAR HEIGHT OF ROOF. CONTRACTOR TO COORDINATE INSTALLATION ON SITE
5. CONTRACTOR TO ENSURE THAT THE SANITARY LINES OF SK-1, SK-2 AND SK-4 ARE TIED INTO EXISTING 3"Ø SANITARY LINES SERVING EXISTING FLOOR DRAIN AND SHOWER FLOOR DRAIN.
6. VENT FROM MOP SINK. CONTRACTOR TO ROUTE VENT TO UP NEAREST WALL, COORDINATE ON SITE

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PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA T.V. WALDHAUS # 39013

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revisions

key plan

project title

INDIA CULTURAL CENTRE OF CANADA

8600 NO. 5 ROAD, RICHMOND, B. C.

drawing title

PLUMBING AND FIRE PROTECTION RENOVATION PLAN

19 875824

drawn AF	project north
checked JY	
scale 1/4" = 1'-0"	
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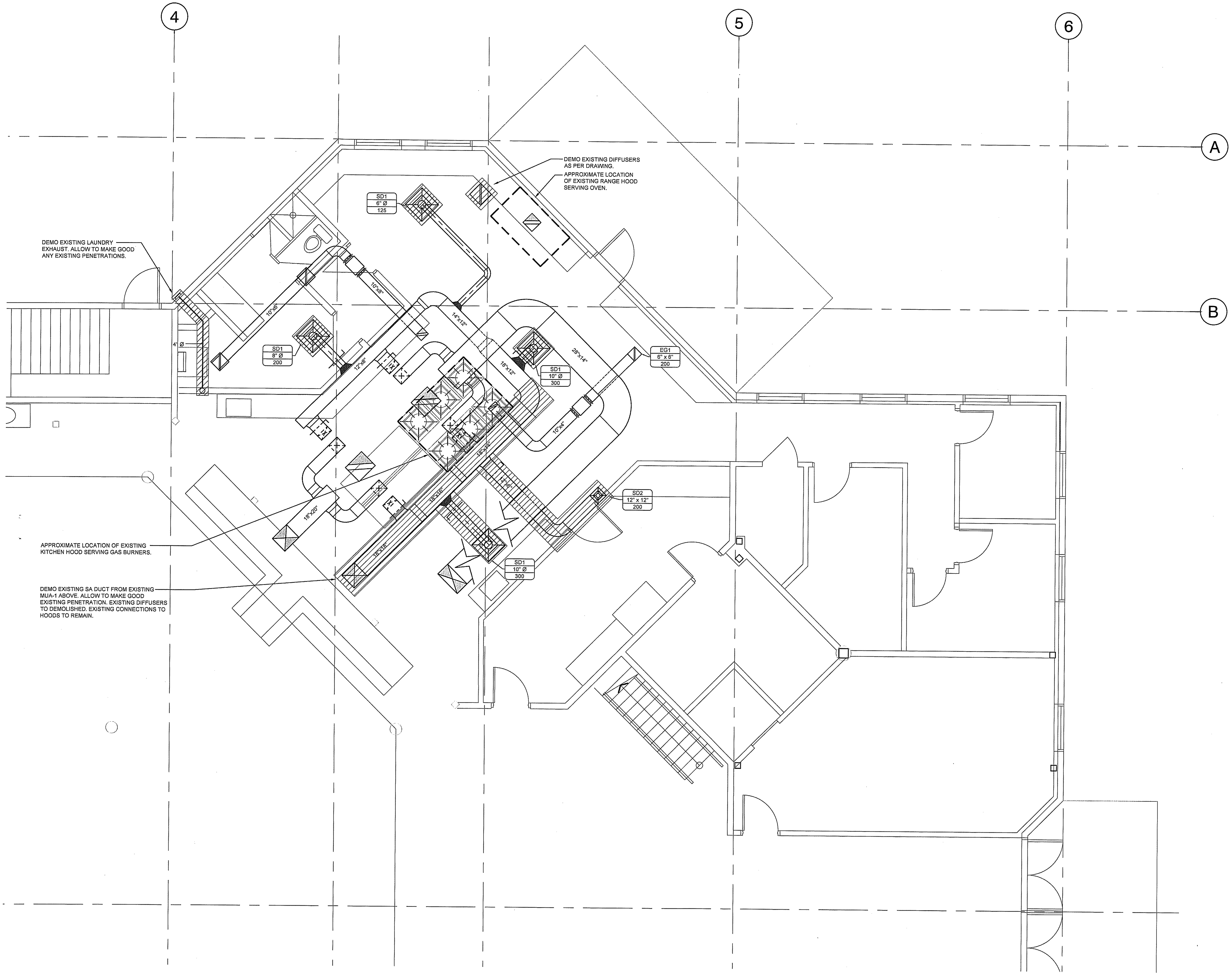
project no. 316b-001-19	drawing no. M2.02
rev.	



1
M3.01

HVAC DEMOLITION PLAN

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

DEMOLITION NOTES

1. THIS IS AN EXISTING SITE AND EXISTING EQUIPMENT, DUCTWORK AND SERVICES ARE SHOWN AS APPROXIMATE. CONTRACTOR TO CONFIRM ALL EXISTING SERVICES ON SITE.

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PROVINCE OF BRITISH COLUMBIA
T. V. WALDHAUS
39013
FEB 0 4 2020

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key plan

project title

INDIA CULTURAL CENTRE OF CANADA

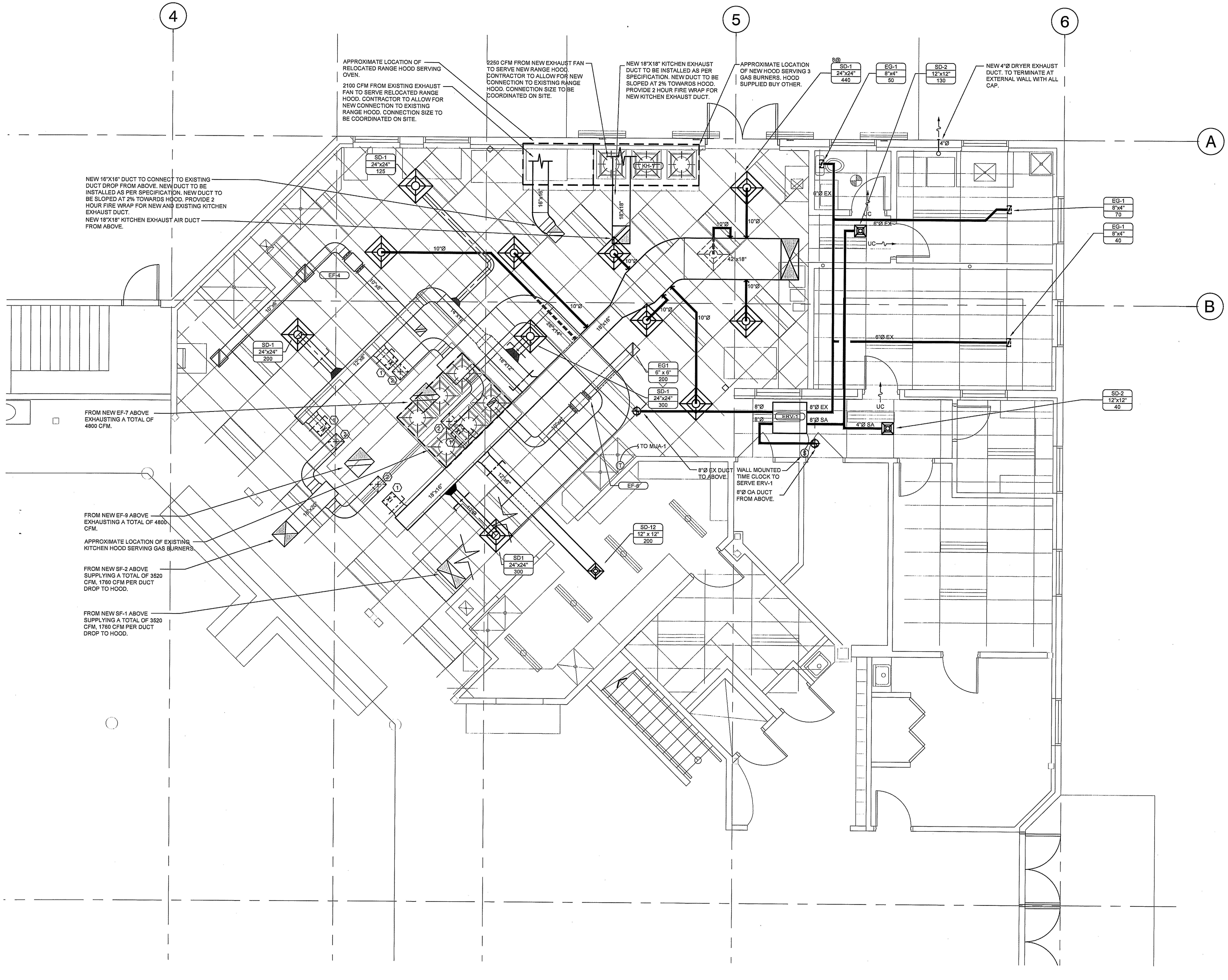
8600 NO. 5 ROAD,
RICHMOND, B. C.

drawing title

HVAC
DEMOLITION PLAN

19 875824

drawn: AFI
checked: JY
scale: 1/4" = 1'-0"
drawing date: 2020/02/04
project no.: 316b-001-19
rev.: △
project north
printed: 2020/02/04
drawing no.: M3.01



1 HVAC RENOVATION PLAN
M3.02 SCALE: 1/4" = 1' - 0"

HVAC GENERAL NOTES

1. CONTRACTOR TO REVIEW EX. CONDITIONS BEFORE PRICING & START OF WORK AND NOTIFY THE ENGINEER PRIOR TO COMMENCING WORK IF THERE ARE ANY DISCREPANCIES.
2. ALLOW FOR BLADE DAMPERS ON ALL BRANCH TAKE OFFS.
3. MODIFY THE SIZE AND ROUTING OF THE NEW DUCTWORK AS REQUIRED TO SUITE THE NEW SITE CONDITIONS AT NO ADDITIONAL COST TO THE OWNER. PROVIDE ADEQUATE OFFSETS AND TRANSITIONS ON NEW DUCTWORK AS REQUIRED TO SUIT SITE CONDITIONS.
4. COORDINATE EXACT DIFFUSER LOCATION WITH ARCHITECTURAL PLANS.
5. CONTRACTOR TO ALLOW TO REBALANCE AIRSIDE OF SYSTEM.
6. INSTALL KITCHEN EXHAUST DUCT AS PER NFPA 96.

KEY NOTES

(1) 400 CFM OF HEATING OUTSIDE AIR TO SERVE KITCHEN HOOD.

(2) 1760 CFM OF UNHEATED OUTSIDE AIR TO SERVE KITCHEN HOOD.

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seal

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA T.V. WALDHAUS # 39013
FEB 0 4 2020

issued
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5. RE–ISSUED FOR BP 2019/11/14
6. RE–ISSUED FOR BP 2020/02/04

revisions

All measurements must be checked on the drawings by the contractor.
This drawing is not to be used for construction purposes unless countersigned.

key plan

project title

INDIA CULTURAL CENTRE OF CANADA

8600 NO. 5 ROAD,
RICHMOND, B. C.

drawing title

HVAC
RENOVATION PLAN

19 875824

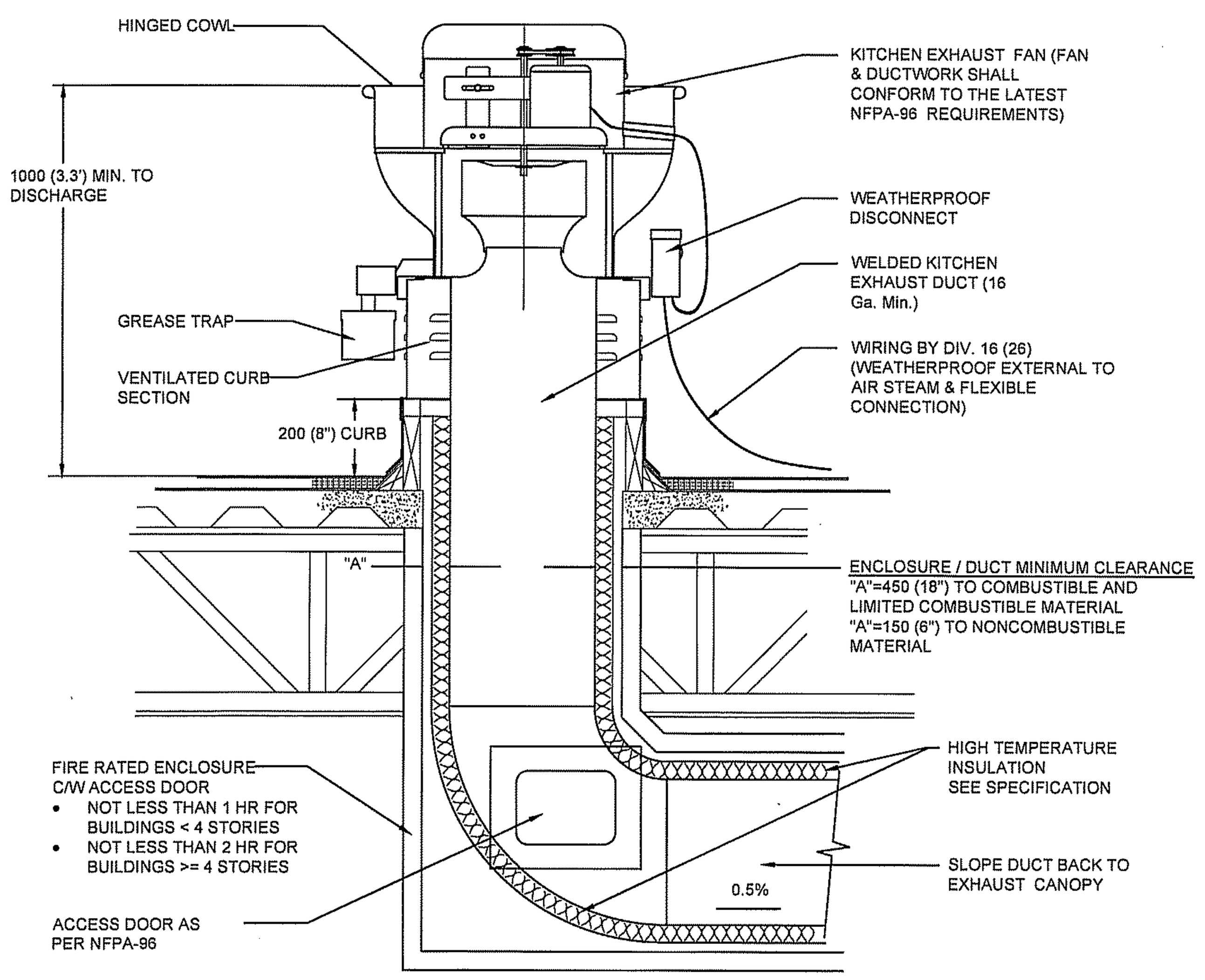
drawn AF	project north
checked JY	
scale 1/4" = 1'–0"	
drawing date 2020/02/04	printed 2020/02/04
project no. 316b–001–19	drawing no. M3.02
rev. △	

CITY OF RICHMOND

FEB 19 2020

RECEIVED

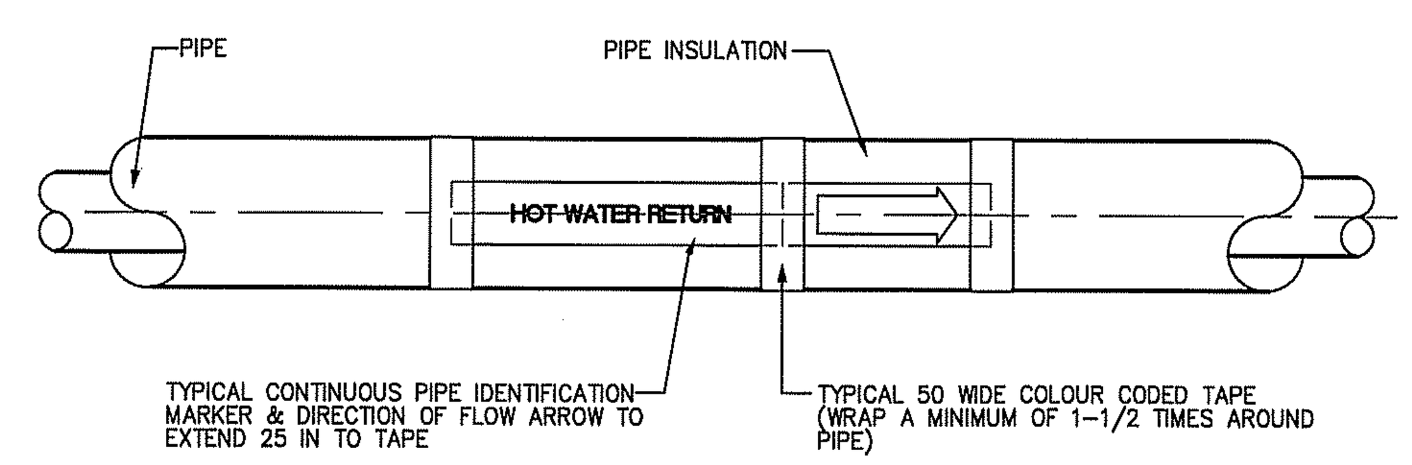
THESE PLANS MUST BE KEPT ON THE JOB SITE FOR INSPECTIONS



DETAIL NOTES

1. A MINIMUM CLEARANCE OF 1000 (40") MUST BE PROVIDED BETWEEN THE ROOF AND THE FAN DISCHARGE.
2. DUCTS TO BE WELDED LIQUID/AIR TIGHT, REFER TO SPECIFICATION FOR DUCT GAUGE REQUIREMENTS. DUCTS MUST EXTEND A MINIMUM OF 450 (18") ABOVE ROOF SURFACE.
3. MINIMUM AIR VELOCITY THROUGH ALL DUCTS IS 7.2m/s (1500 FPM), WITH A MAXIMUM OF 12.7m/s (1800 FPM).
4. KITCHEN EXHAUST FAN WIRING TO BE EXTERNAL (WIRING MUST NOT BE INSTALLED IN THE AIRSTREAM)
5. INSTALLATION MUST INCLUDE MEANS FOR INSPECTING, CLEANING, AND SERVICING THE EXHAUST FAN.
6. NO DAMPERS ARE TO BE INSTALLED IN THE EXHAUST SYSTEM

8 / M4.01 **KITCHEN EXHAUST FAN**
SCALE: NTS



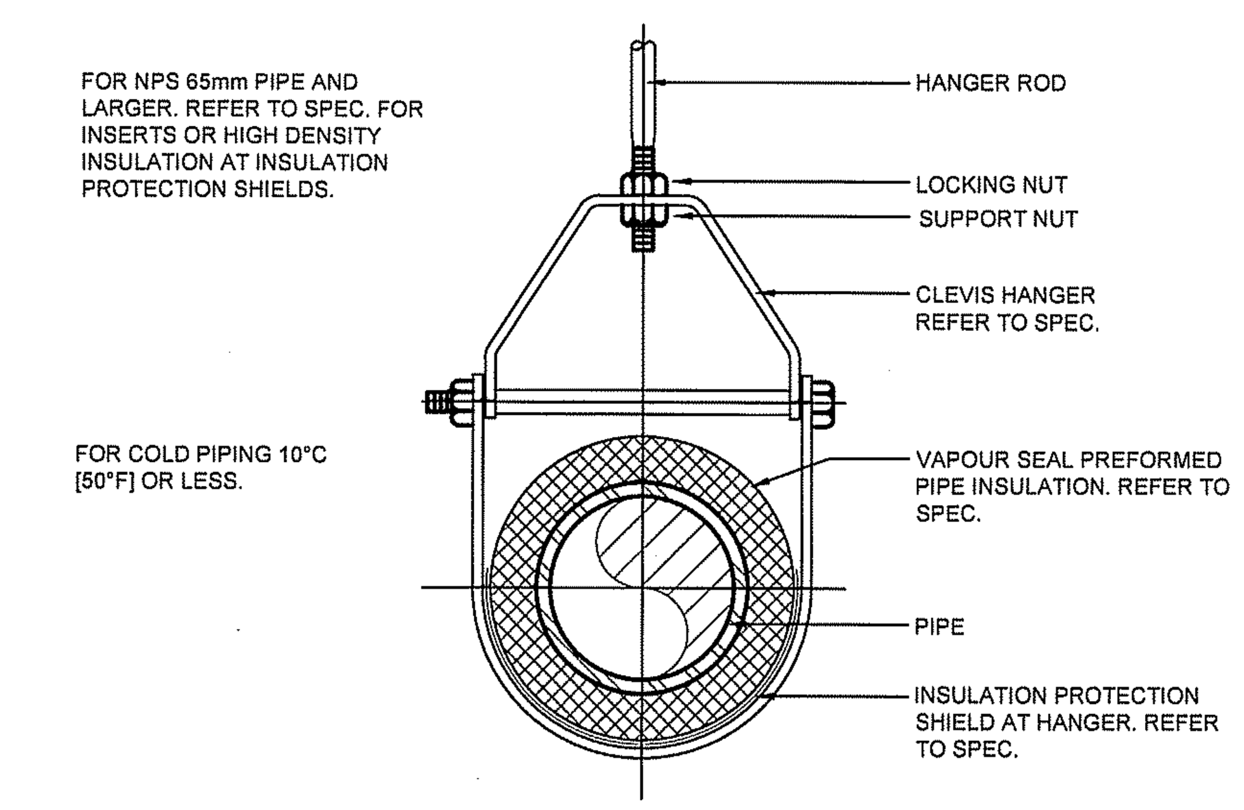
NOTES

APPLY A CONTINUOUS COATING OF CONTACT CEMENT TO THE LABEL TO ENSURE PERMANENT ADHESION

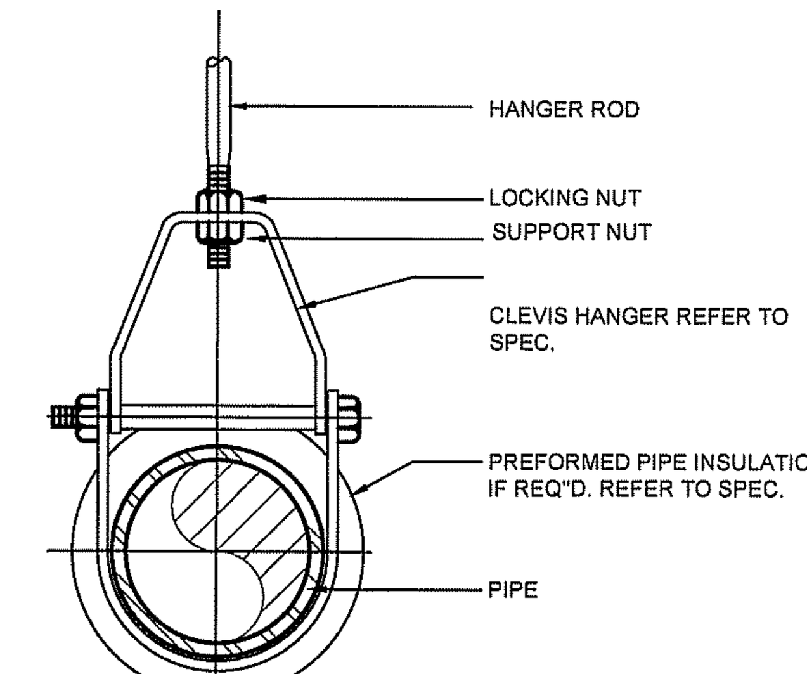
REFER TO SPECIFICATION FOR COLOUR CODING OF SERVICES

INSTALL AT 15000 INTERVALS (MAXIMUM) AND AT EACH CHANGE DIRECTION.

7 / M4.01 **PIPE IDENTIFICATION**
SCALE: NTS

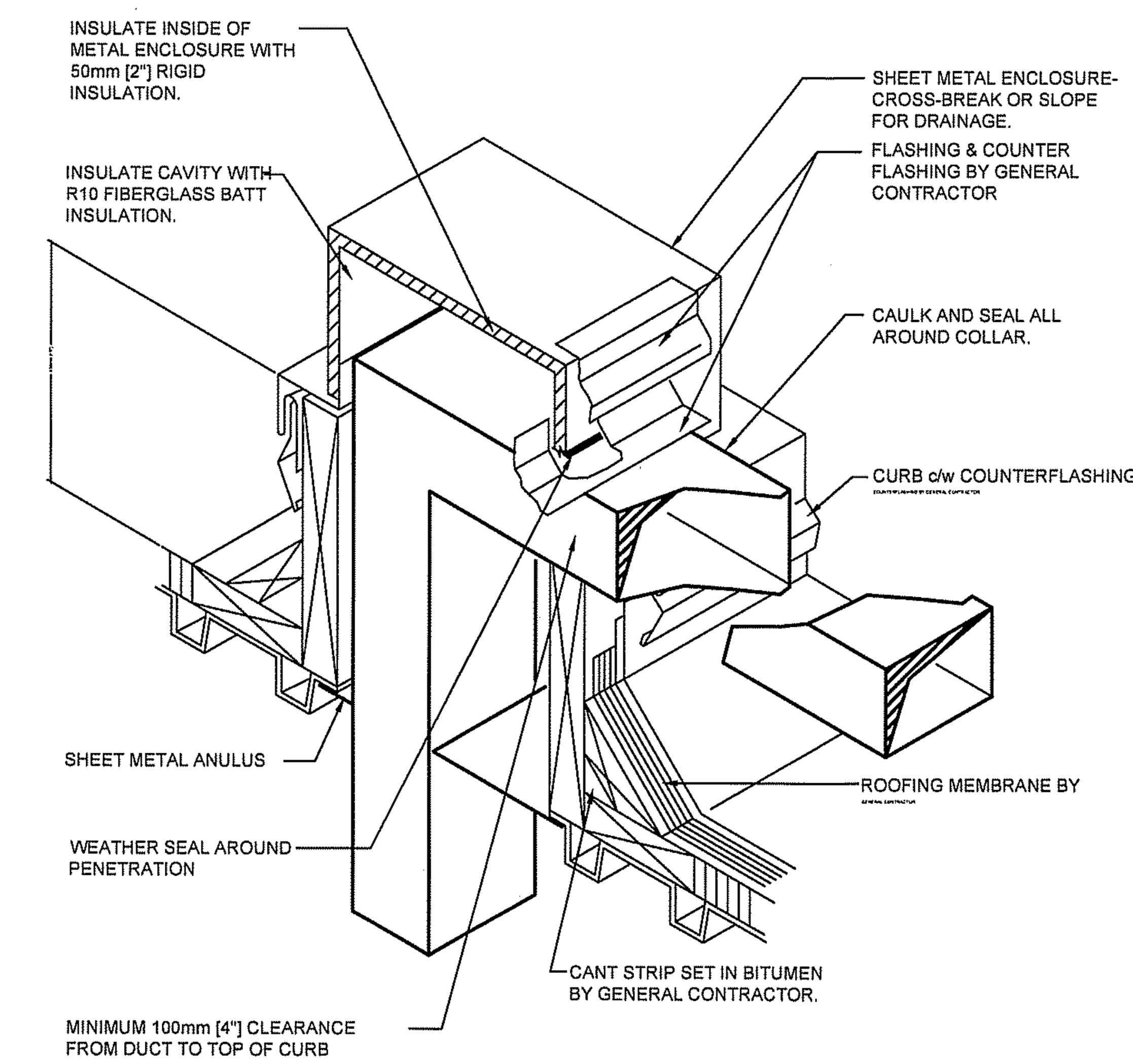


HANGER DETAIL FOR PIPING WITH VAPOUR SEALED INSULATION



HANGER DETAIL FOR INSULATED HOT PIPING UP TO NPS 3 (75mm) OR ALL SIZES OF BARE PIPE

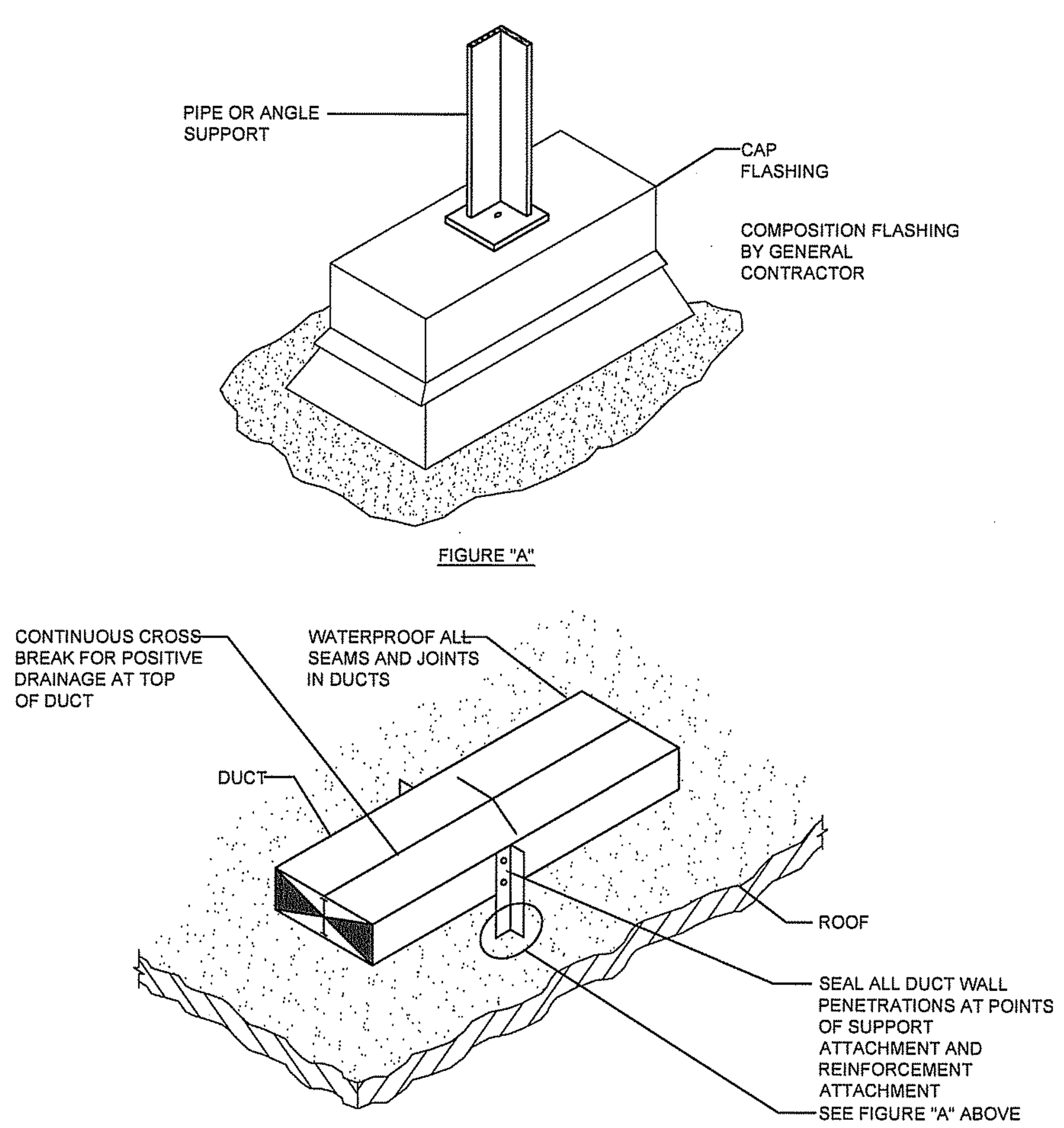
6 / M4.01 **PIPE HANGERS**
SCALE: NTS



DETAIL NOTES

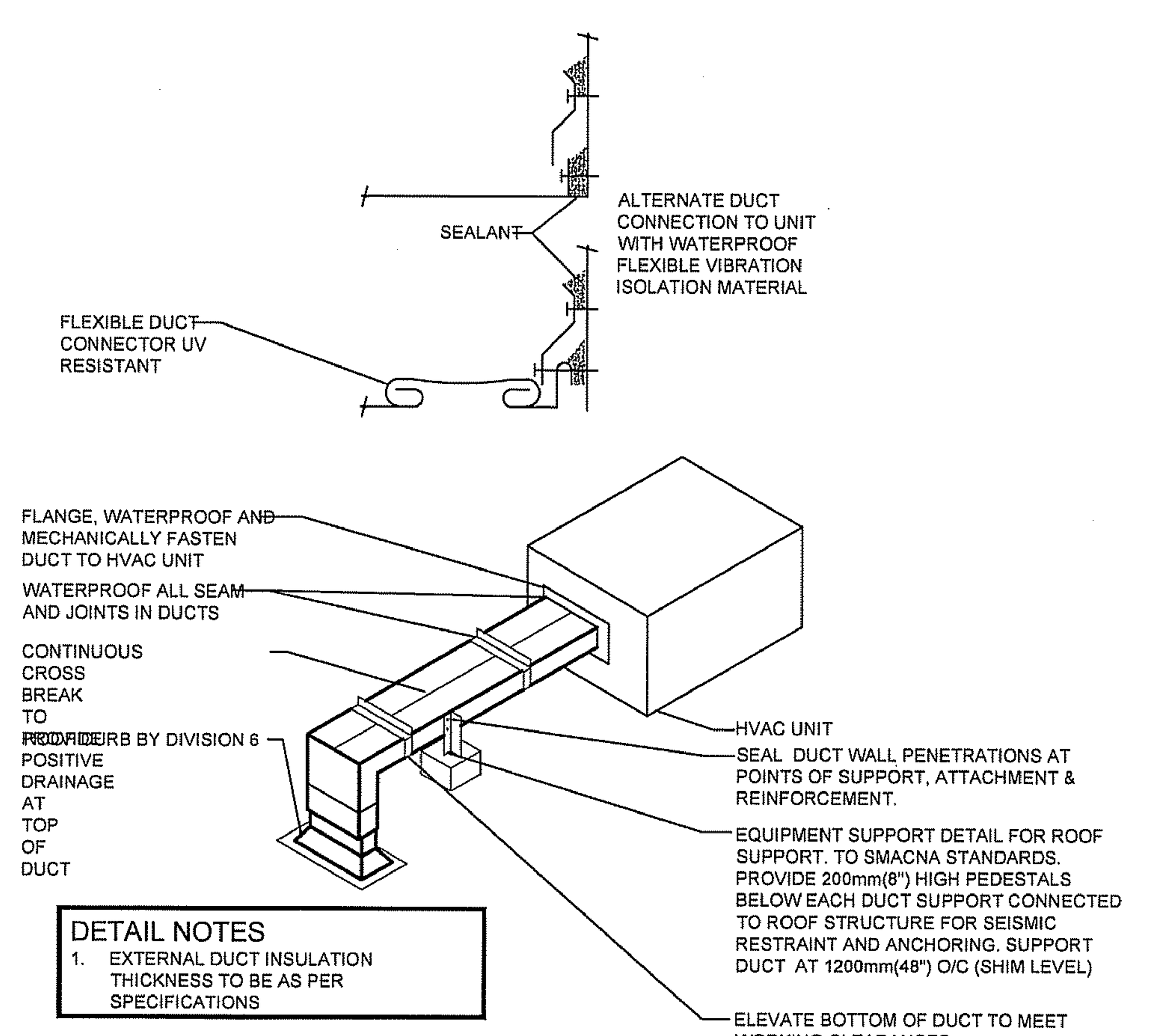
1. ALL WORK BY MECH., UNLESS OTHERWISE NOTED.
2. ALL FLASHING BY GENERAL CONTRACTOR.

5 / M4.01 **DUCTING THROUGH ROOF**
SCALE: NTS



PROVIDE INTERNAL SUPPORT RODS @ 48"(1220mm) O.C. TO MAINTAIN HIGH POINT FOR DRAINAGE

4 / M4.01 **DUCT SUPPORT OF ROOF DETAIL**
SCALE: NTS

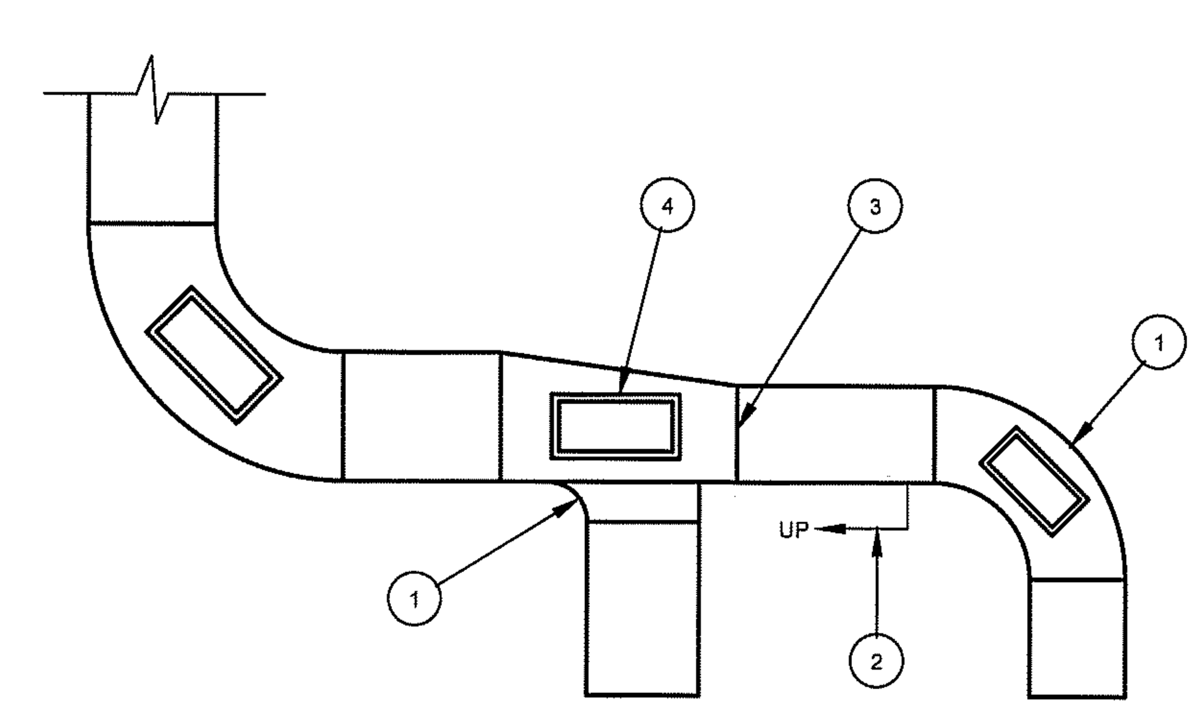


WIDTH OF EQUIPMENT	HEIGHT ABOVE ROOF SURFACE
UP TO 600mm(24")	350mm(14")
625mm(25") TO 900mm(36")	450mm(18")
925mm(37") TO 1200mm(48")	600mm(24")
1225mm(49") TO 1500mm(60")	750mm(30")
1525mm(61") AND WIDER	1200mm(48")

DETAIL NOTES

1. EXTERNAL DUCT INSULATION THICKNESS TO BE AS PER SPECIFICATIONS

3 / M4.01 **ROOFTOP DUCT INSTALLATION DETAIL**
SCALE: NTS



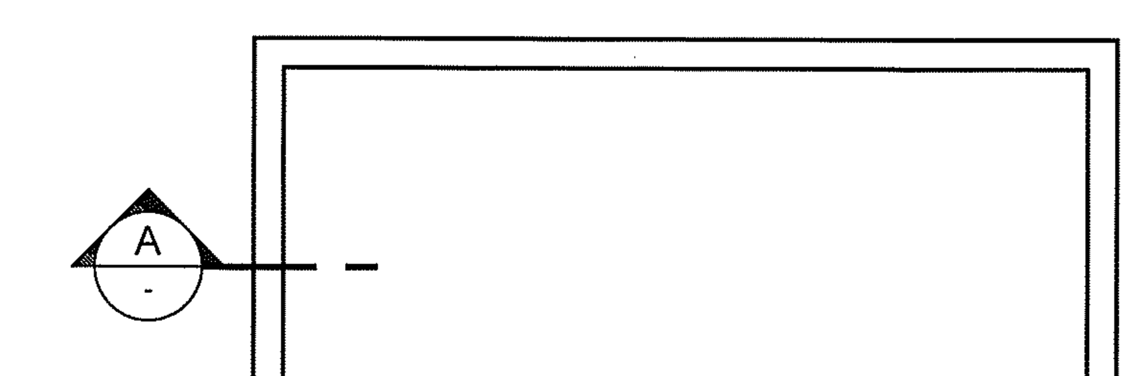
KEY NOTES

1. RADIUS ALL ELBOWS.
2. GRADE DUCT UP IN DIRECTION OF FLOW AT ALL TIMES. DUCT SHALL NOT FORM DRIPS OR TRAPS.
3. CONTINUOUS WELDED JOINTS.
4. ACCESS PANEL (TYPICAL) SHALL BE:
   - GREASE TIGHT
   - 40MM [1-1/2"] MINIMUM FROM BOTTOM OF DUCT
   - IN DUCT SIDES
   - SAME GAUGE AS DUCT (MINIMUM)
   - AT ALL DIRECTION/SIZE CHANGES
   - ~~6M [20 FT]~~ 12FT MAXIMUM SPACED IN HORIZONTAL RUNS

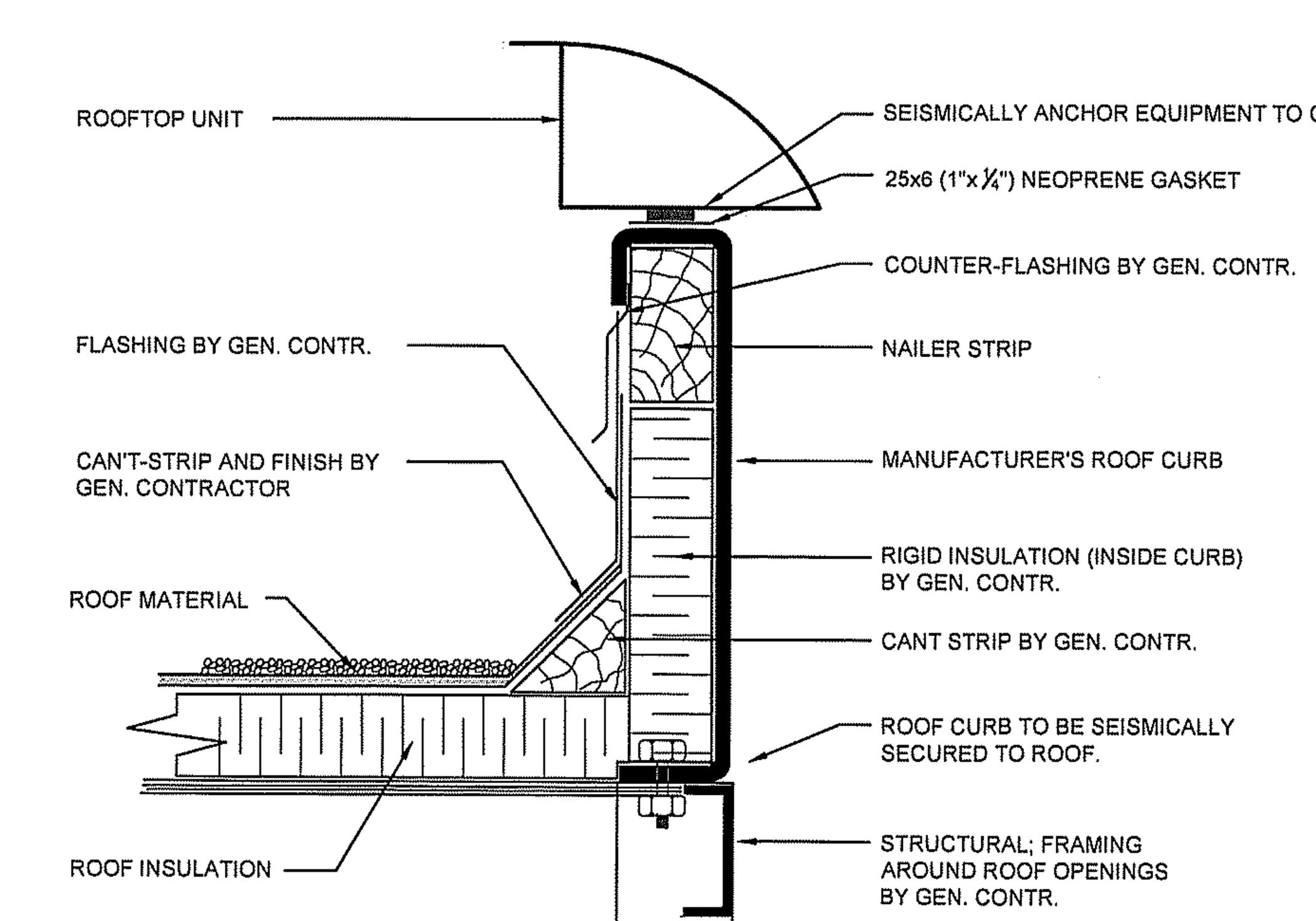
DETAIL NOTES

1. WITHIN THE CONFINES OF THE BUILDING STRUCTURE, MAINTAIN 150MM [6"] MINIMUM CLEARANCE TO NON COMBUSTIBLES AND 460MM [18"] MINIMUM CLEARANCE TO LIMITED-COMBUSTIBLES (UNLESS OTHERWISE SPECIFICALLY INDICATED).
2. REFER TO SPECIFICATION FOR DUCT GAUGE.

2 / M4.01 **KITCHEN EXHAUST DUCT**
SCALE: NTS



EQUIPMENT ROOF CURB PLAN



SECTION 'A'

1 / M4.01 **EQUIPMENT ROOF CURB**
SCALE: NTS

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consultant

AME Group
consulting mechanical engineers

seal

T. WOLFHAUS 33013

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6. RE-ISSUED FOR BP 2020/02/04

revisions

key plan

project title

INDIA CULTURAL CENTRE OF CANADA

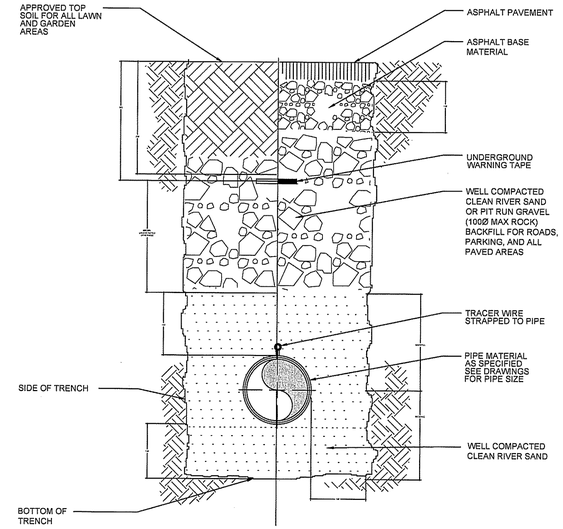
8600 NO. 5 ROAD, RICHMOND, B.C.

drawing title

DETAILS 1

9 875824

drawn	AF	project north	
checked	JY		
scale	AS NOTED		
drawing date	2020/02/04	printed	2020/02/04
project no.	316b-001-19	drawing no.	M4.01
rev.			

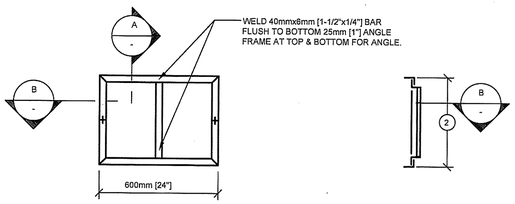


DETAIL NOTES

1. ALL DIMENSIONS IN MM.
2. REFER TO DRAWINGS FOR SIZE AND INVERT.
3. EXACT LOCATION AND DEPTH OF ROCK PIT SHALL BE COORDINATED WITH CIVIL AND SOILS CONSULTANT PRIOR TO INSTALLATION.
4. SAND MUST BE CLEAN AND NOT CONTAIN ANY SHARP MATERIAL WHICH MAY SCORE PIPE.
5. USE APPROVED WELL COMPACTED BACKFILL MATERIAL FOR ALL LOAWN AND NO TRAFFIC AREAS.
6. ALL BEDDING AND BACKFULL AROUND PIPE TO BE PLACED IN 150 MM. LIFTS AND ARE TO BE COMPACTED TO 98% PROCTOR.

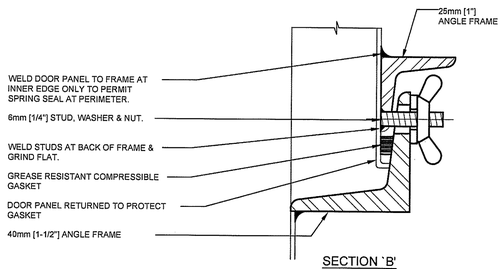
4 / M4.02 — STORM PIPE BEDDING-B

SCALE: NTS



ELEVATION

SECTION 'A'



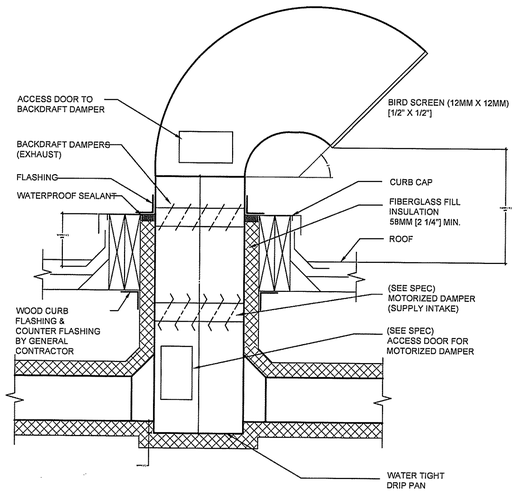
SECTION `B'

DETAIL NOTES

1. REFER TO SPEC. SECTION 23 31 14 FOR DUCT MATERIAL & CONSTRUCTION. FABRICATE DOOR PANEL OF SAME MATERIAL AS DUCT.
2. FABRICATE FRAME TO FULL HEIGHT OF DUCT TO A MAXIMUM OF 600MM [24"]. TRANSFORM DUCT AS NECESSARY TO PROVIDE A MINIMUM HEIGHT OF 300MM [12"].
3. MITRE & WELD BOTH FRAMES.
4. ALL WELDS CONTINUOUS. WELD ON BEARING SURFACES TO BE GROUND FLAT.
5. WHEN OPEN LAY ACCESS PANEL INSIDE DUCT TO KEEP GREASE OFF BLDG. SURFACES.
6. ACCESS SHALL INCLUDE SIGNAGE STATING "ACCESS PANEL - DO NOT OBSTRUCT"

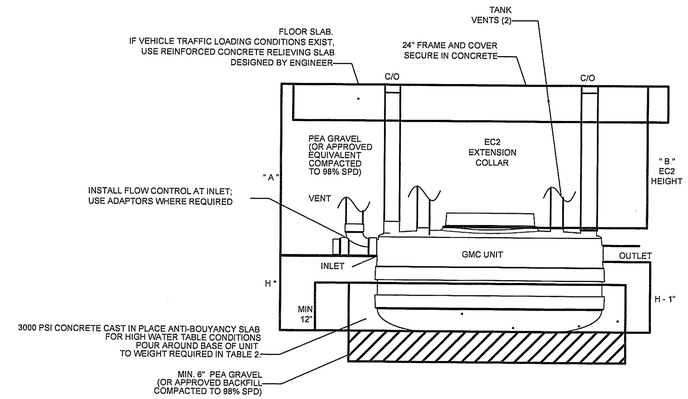
3 / M4.02 — ACCESS PANEL FOR KITCHEN EXHAUST DUCT

SCALE: NTS



2 / M4.02 — GOOSENECK EXHAUST OR INTAKE

SCALE: NTS



BURIAL DEPTH	A	B
Max.	6' 8"	6 ft.
Min.with Traffic	44"	36"
Min. no Traffic **	20"	12"

IF B > 6 FT; FACTORY REINFORCEMENT OF TANK IS REQUIRED
** ESTIMATED MINIMUM TO FIT VENT ELBOWS UNDER FLOOR SLAB

SEPARATOR MODEL	INLET INVERT TO TANK BOTTOM (H")	WEIGHT OF BUOYANCY SLAB (LBS)	DRY WEIGHT OF TANK
GMC 100 PDI-HPMO	20"	1246	150 lbs
GMC 150 PDI-HPMO	28"	1682	175 lbs
GMC 200 PDI-HPMO	36"	2036	205 lbs
GMC 250 PDI-HPMO	44"	2400	230 lbs
GMC 300 PDI-HPMO	52"	2780	255 lbs

DETAIL NOTES

1. THIS IS AN REPRESENTATION OF AN INSTALLED TANK
2. SEE INSTALLATION INSTRUCTION FOR COMPLETE DETAILS.

1 / M4.02 — GREASE INTERCEPTOR DETAIL

SCALE: NTS

CITY OF RICHMOND

FEB 19 2020

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seal

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA T. LUNDGAUS 29013 ENGINEER FEB 07 2020

issued

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revisions

key plan

project title

INDIA CULTURAL CENTRE OF CANADA

8600 NO. 5 ROAD, RICHMOND, B. C.

drawing title

DETAILS 2

19 875824

drawn	AF
checked	JY
scale	AS NOTED
drawing date	2020/02/04
printed	2020/02/04
project no.	316b-001-19
drawing no.	M4.02
rev.	△

project north

OMMON WORKS

I K General

.1 Genera Scope

Provide' shall mean supply and install.

Consultant' shall mean AME Group Consulting Professional Engineers

rovide complete, fully tested and operational systems to meet the requirements described herein and in complete accord with applicable codes and ordinances.

ontract documents and drawings are diagrammatic. They establish scope, material and installation quality but are not detailed installation instructions.

ollow manufacturers' recommended installation instructions, details and procedures for equipment, supplemented by requirements of the Contract Documents.

efore submitting tender, visit and examine the site and note all characteristics and features affecting the work. No allowances will be made for any difficulties encountered or ny expenses incurred because of any conditions of the site or item existing thereon, which is visible or known to exist at the time of tender.

larifications 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' losing tender date. Approval of requests shall only be given by addendum.

ake reference to electrical, mechanical, structural and architectural drawings when setting out work. Consult with respective Divisions in setting out locations for ductwork, quipment, 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 aterials or equipment.

.2 Code Compliance, Permits and Fees

ll 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 urisdiction.

btain 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 ertificates indicating Final Approval.

.3 Tender Price Breakdown

ubmit a tender price breakdown within thirty (30) days of tender closing and before first progress claim, in a format agreed to with the Consultant. As a minimum include quipment, materials and labour for Mechanical, Plumbing, Sheet Metal, Fire Protection and Controls.

.4 Submittals

omply with Division 1 - Submission and Closeout Procedures and in addition the following:

ontractor shall provide and submit to the Consultant Assurance of Professional Design and Commitment for Field Review Schedule B and Assurance of Professional Field eview and Compliance Schedule C-B for seismic engineering.

hop 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 ather 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 rawings 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 equirements.

loseout Submittals: Provide a minimum of two (2) mechanical operation and maintenance manuals and one digital copy, prepared by the TAB Contractor.

peration and maintenance manual approved by, and final copies deposited with the Consultant a minimum of 7-days before final inspection.

peration and maintenance manual to include but not limited to: Layman's description of the systems and associated controls; Operational instructions, servicing, maintenance, peration and trouble-shooting instructions for each item of equipment; Warranties; Equipment manufacturer's performance datasheets indicating point of operation as left after ommissioning is complete; Testing, adjusting and balancing reports.

ecord 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 r 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 onsultant.

lentify 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 IECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (date).

ubmit to Consultant for approval and make corrections as directed.

ubmit completed CAD record drawings with final Operating and Maintenance Manuals within two (2) weeks of substantial completion. Failure to submit drawings will result in ne 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 re this contractor's responsibility. Consultant will release drawings to contractor after signing a copyright form. Should the Contractor choose to utilise this consultant for ansferring as built information, allow $400 / sheet for all drawings in the construction set. This will cover costs for drafting time & printing costs.

.5 Quality of Work

ll 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 andards may be rejected by the Consultant. The Contractor shall redo rejected work to the accepted standard at no cost to the Owner.

.6 Metric Conversion

ll units are expressed in SI units. On all submittals (shop drawings etc.) use the same SI units as stated in the specification.

/here pipes are specified with metric dimensions and imperial sized pipes are available, provide equivalent nominal Imperial sized pipe as indicated in the table, and provide at o extra cost adapters to ensure compatible connections to all metric sized fittings, equipment and piping.

/hen CSA approved SI Metric pipes are provided, the Contractor shall provide at no extra cost adapters to ensure compatible connections between the SI Metric pipes and all ew and existing pipes, fittings, and equipment.

QUIVALENT NOMINAL DIAMETER OF PIPES

5mm = NPS ½

0mm = NPS ¾

5mm = NPS 1

0mm = NPS 1-1/4

0mm = NPS 1-1/2

0mm = NPS 2

5mm = NPS 2-1/2

5mm = NPS 3

00mm = NPS 4

50mm = NPS 6

00mm = NPS 8

he Metric duct sizes are expressed as 25 mm = 1 inch.

.7 Drawings and Specifications

hould any discrepancy appear between drawings and specifications obtain written clarification from the Consultant during the tender period. Without a written clarification the etter quality and/or greater quantity of work or materials shall be estimated, performed and furnished within the tendered price.

.8 Cutting, Patching and Coring

rovide holes and sleeves, cutting and fitting required for mechanical work. Relocate improperly located holes and sleeves. All work shall be coordinated with other trades.

btain written approval from the Structural Consultant before cutting or burning structural members.

rovide 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 rotect computer equipment when X-raying floors. Coordinate with Owner.

.9 Connections to Existing Services

laintain 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 ose services.

.10 Selective Demolition

emove 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 f demolition shall become the property of the Owner at his discretion.

he 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 aterial is suspected to remain on site.

.11 Equipment and Materials

/here two or more products of the same type are required, products shall be of the same manufacturer.

otify the Consultant in writing ten (10) days prior to the tender close, any materials or equipment specified which is not currently available or will not be available for use as alled for herein. Failing this, the contract will assume that the most expensive alternate has been included in the tender price.

ll equipment installed on this project shall comply with the National Energy Code of Canada for Buildings - 2011, ASHRAE Standard 90.1 - 2010 and the City of Vancouver uilding By-Law Energy Utilization Requirements.

.12 Delivery, Storage and Handling

tore materials and equipment in accordance with the manufacturer's recommendations in a clean, dry, well-ventilated area.

eplace defective or damaged materials with new.

.13 Firestopping and Smoke Seals

rovide 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 echanical work in Divisions 21, 22, 23 and 25

or renovation projects, in addition to the necessary new penetrations, provide the firestopping for all existing mechanical assemblies where firestopping is damaged, iscontinued or absent within the construction area.

ll firestop system installations must meet the requirements of CAN4-S115-M or ULC S-115-M Tested assemblies that provide a fire rating.

ontractor shall provide and submit to the Consultant Assurance of Professional Design and Commitment for Field Review Schedule B and Assurance of Professional Field eview and Compliance Schedule C-B for fire stopping.

.14 Access Doors

rovide access doors for maintenance or adjustment of all parts of the mechanical system.

rovide 300 mm x 300 mm minimum size for inspection and hand access.

00 mm x 600 mm minimum size, larger if indicated on drawings, where entry is required and access is difficult.

.15 Escutcheons and Plates

rovide escutcheons and plates on all piping and ductwork passing through finished walls, floors, and ceilings.

.16 Guarantee / Warranty

urnish 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 ubstantial Performance.

.17 Balancing

he approved balancing agencies are: Western Mechanical; K.D. Engineering, Flotech Mechanical, Blue Collar Group.

alance terminal boxes, exhaust fans and air outlets to air quantities indicated on the drawings and in this specification. Where outlet quantities are not indicated, divide box apacity equally among all outlets.

ubmit two (2) copies 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 eing done by the Owner and the costs deducted from final payment.

alancing shall be performed to the following:

ir-Terminal Outlets ±10%

ir-Central Equipment ± 5%

ydronic-Pumps and Central Equipment ± 5%

rovide a drop test of all fire dampers and a letter/certificate confirming this work.

ooperate with the Balancing Agency and make any corrections as required by Balancing Agency.

rovide 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, ithout additional cost to Owner.

.18 Flashing and Roof Curbs

rovide curbs, flash and counter flash as required where mechanical equipment passes through weather or waterproofed walls, floors and roofs.

rovide factory roof curbs for all roof mounted equipment unless noted otherwise.

.19 Seismic Control

rovide seismic restraints for all required equipment, piping, and ductwork in accordance with the latest edition of the Seismic Restraints Manual for Mechanical Systems roduced by SMACNA, and the latest edition of the ASHRAE Application Handbook Chapter 49, Seismic Restraints.

he 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 C-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 C-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.

1.20 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.

1.21 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.

Final Gas Inspection Certificate from the Authority having Jurisdiction.

Schedule C-B for Fire Suppression and Fire Sprinkler Materials and Test Certificate.

Schedule C-B for seismic engineering.

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.

1.22 Materials and Equipment

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.

O K 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.

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

P K 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	Rod Diameter 9mm (3/8"), Spacing 1.8m (6')
Pipe Size: NPS 3/4 to 1½	Rod Diameter 9mm (3/8"), Spacing 2.4m (8')
Pipe Size: NPS 2 to 2½	Rod Diameter 9mm (3/8"), Spacing 3m (10')
Pipe Size: NPS 3 to 4	Rod Diameter 16mm (5/8"), Spacing 3.6m (12')

3.5 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.

3.6 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 22 PLUMBING

N K GENERAL

1.1 Section Scope

Piping, valves and specialties serving building water distribution systems to 1m (36") outside the building and sanitary and storm drain waste and vent piping, equipment and accessories between plumbing fixtures to 1m (36") from the building.

1.2 Cleanouts

Provide sanitary and storm piping cleanouts at all changes in direction, at the ends of all horizontal runs, at the base of every stack, where drains leave the building; where shown on the drawings and in compliance with the local plumbing code, bylaws and ordinances.

Provide caulked or threaded type cleanouts extended to finished floor wall surface.

Provide bolted cover plate clean outs on vertical rainwater leaders only. Ensure ample clearance at clean out for rodding of drainage system.

O K PRODUCTS

2.1 Pipe and Fittings

Sanitary and Storm Drainage, and Vent (above grade) shall be DWV Copper or cast iron class 4000.

Sanitary and Storm Drainage and Vent (below grade inside building to 1m outside) shall be cast iron class 4000, PVC-DWV schedule 40 or ABS-DWV (solid core) schedule 40.

Domestic Water (above grade inside building) shall be type "K" hard copper for hot and type "L" hard copper for cold water. Domestic Water (below grade inside building to 1m outside) shall be type "K" Soft Copper to 4 NPS diameter or PVC C900 DR18 from 4 NPS to 12 NPS (adapt to approved non-plastic material prior to penetration through the floor slab.

Natural Gas; Propane shall be Steel Schedule 40, A53 Grade B.

2.2 Valves

Wherever possible all valves shall be of one manufacturer.

Grooved valves shall be of the same manufacturer as the adjoining couplings.

Provide valves with manufacturer's name and pressure rating clearly marked on outside of body. All valves must be suitable in all respects for service used.

All valves shall have a Provincial CRN number which is current.

Ball Valves 2 NPS and under shall be low lead forged brass body, 2 piece body, full port, chrome plated ball, PTFE seats, blow out proof stem, adjustable packing nut, for domestic water service, class 4140 kPa (600 psi) W.O.G.

Gate Valves 2 NPS and under shall be lead free bronze body, solid wedge disc, bronze or stainless steel trim, non-rising stem, for domestic water service, Class 1380 kPa (200 psi) W.O.G.

Globe Valves 2 NPS and under shall be lead free bronze body, swivel type stainless steel disc, union bonnet, for domestic water service, class 1380 kPa (200 psi) W.O.G.

Check Valves 2 NPS and smaller shall be lead free bronze swing check with bronze disc capable of being reground, Y pattern, suitable for domestic water use, class 1380 kPa (200 psi) W.O.G.

Circuit Setter Valve (for domestic hot water recirculation) shall be screwed, lead free brass, regulating valve suitable for potable water, combination P/T test points with EPT inserts/check valves, drain port, memory stop handle with graduated markings, positive shut off, 1035 kPa @ 93°C (150 psi @ 200°F) rating.

Pressure Reducing Valve NPS 1 and smaller shall be lead free copper silicon alloy body or low lead bronze body, SS integral strainer, renewable SS seat, serviceable inline, built in bypass check valve, suitable for hot and cold water potable water. Rated at maximum inlet pressure of 2100 kPa (305 psi) and 82°C (180°F) temperature.

Pressure Reducing Valve NPS 1-¼ NPS to NPS 2 shall be pilot operated with low flow bypass, diaphragm actuated globe valve, lead free, bronze body or ductile iron to ASTM A536. Lead free bronze, stainless steel or ductile iron internals. All ductile iron components including body and cover shall be lined and coated with epoxy coating.

Strainers shall be ¼ - 2 NPS threaded ends, bronze body, 1034 kPa (150 psi) rating.

Water Hammer Arrestors shall be bellows type with welded stainless steel nesting bellows or piston style and stainless steel casing. Air chambers are unacceptable.

2.3 Preformed Pipe Insulation

Preformed insulation, fine fibrous glass or formed mineral fibre pipe insulation with all service jacket vapour retarder (ASJ). ASJ shall be re-enforced with glass fibre, factory applied with pressure sensitive lap closure. Maximum "K" value at 38°C (100°F) = 0.035 W/m.°C (0.24 Btu.in/hr.ft2.°F). Acceptable manufacturers: Manson Insulation, Knauf, Roxul, Johns Manville, Fibrex

Thermocanvas finishing jacket: fire rated, 170g (6 oz.) fire retardant canvas jacket for covering mechanical insulation indoors, 25/50 fire class, plain wave cotton, no dyes.

PVC finishing jacket: white, UV resistant, for indoor or outdoor applications, 25/50 fire class, minimum 0.50 mm (0.02") thick.

Aluminum finishing jacket: 0.51 mm (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.

2.4 Cleanouts

Floor - Unfinished Area: Cast iron floor level cleanout assembly with extra heavy duty, round, adjustable, scoriated, secured cast iron top and no-hub outlet. Suitable for heavy traffic

Floor - Finished Area: General areas shall be cast iron cleanout with extra heavy duty round, adjustable, scoriated, secured nickel bronze top, and no-hub outlet. Foot traffic areas with sheet goods flooring shall be cast iron floor level cleanout assembly with a square adjustable nickel bronze top with 6mm (1/8") tile recess, and no-hub outlet. Carpeted floor area subject to foot traffic shall be cast iron floor level cleanout assembly with round, adjustable, scoriated, nickel bronze top and carpet clamping frame.

Wall - Finished Area shall be concealed drainage line in a finished wall: Cast iron cleanout tee and cast iron countersunk plug with stainless steel round cover and screw.

2.5 Trap Seal Primers

Provide flow actuated type priming device, vacuum breaker ports and internal back-flow protection, lead free brass body, stainless steel screen, factory pre-set, activation by a minimum flow rate of 0.03l/s @ 138 kPa (0.5 GPM @ 20 psi). ½ NPS inlet and outlet, capable of serving 1 to 4 traps.

2.6 Safes, Flashing and Vent Terminals

Metal Flashing: 26 gage galvanized steel. Metal Counter flashing: 22 gage galvanized steel.

Lead Flashing: Waterproofing: 5 lb./sq ft sheet lead

Flexible Flashing: 47 mil thick sheet butyl; compatible with roofing.

Floor Drain Flashing: 40 mil thick chlorinated polyethylene (CPE), equivalent to Chloraloy.

Caps: Steel, 22 gauge minimum; 16 gauge at fire resistant elements.

P K EXECUTION

3.1 Piping

Pipe connections NPS 1½ and less shall be soldered or screwed joint unless noted otherwise.

Pipe connections NPS 2 shall be screwed joint for liquid systems unless noted otherwise.

Pipe connections NPS 2½ and larger shall be welded or flanged unless noted otherwise.

Gas pipe connections inside building - screw or weld 2 NPS and under. Weld 2-½ NPS and over.

Gas service in ceiling plenums - weld all sizes.

Gas service outside building - weld all sizes below ground.

Use dielectric type couplings when joining dissimilar metal pipes.

Use lead free solder for soldering domestic water copper pipe.

3.2 Gas Distribution Piping

Ream pipe ends. Clean scale and dirt, inside and outside before and after assembly.

During construction, protect all openings in piping and equipment, by capping or plugging to prevent entry of dirt.

Connect to equipment in accordance with manufacturer's instruction unless otherwise indicated.

Slope piping down in direction of flow to low points.

Use eccentric reducers at pipe size change installed to provide positive drainage.

Use dielectric type fittings where buried service enters and connects to building piping.

3.3 Valves

Install all valves in accordance with manufacturer's recommendations.

Install valves in accessible locations with stems upright or angled 45° above horizontal unless approved otherwise. Valves must be accessible without removing adjacent piping.

Install control valves with their stems upright unless approved otherwise and with adequate clearance for removal of actuators.

Provide stem extensions on all insulated valves.

Provide full port ball valves in piping 50 mm (2") and smaller and butterfly valves in piping 65 mm (2-½") and larger for shut-off, equipment isolation, throttling, bypass or manual flow control services.

Throttling valves are not to be used for shut-off; additional valves shall be installed for isolation purposes.

Provide isolation valves at branch take-offs, to isolate each piece of equipment, upstream of all meters, gauges, automatic air vents, and as indicated.

Use silent check valves on discharge of pumps and in vertical pipes with downward flow, and as indicated.

Use circuit setting globe valves complete with lock shield to control flow in circuits, except where balancing cocks are specifically specified.

Install balancing valves in return piping connections to each terminal heating and cooling unit - e.g. radiators, unit heaters, fan coil units, heating and cooling coils, and radiant panels.

3.4 Piping Insulation Minimum Thickness Schedule (ASHRAE 90.1)

Above grade exterior:

- Runouts up to NPS 1 = 40mm minimum thickness
- Pipe diameters NPS 1 to 2 = 65mm minimum thickness
- Pipe diameters NPS 2½ to 4 = 75mm minimum thickness
- Pipe diameters NPS 6 and larger = 90 mm minimum thickness

Hot water 61°C to 93°C (142-200°F):

- Pipe diameters up to NPS 1¼ = 40mm minimum thickness
- Pipe diameters NPS 1-½ and larger = 50mm minimum thickness

Hot water 41°C to 60°C (106-141°F):

- Pipe diameters up to NPS 1¼ = 25mm minimum thickness
- Pipe diameters NPS 1-½ and larger = 40mm minimum thickness

Cold water above 5°C (41°F):

- All pipe diameters = 25mm minimum thickness

Cold water below 5°C (41°F):

- Pipe diameters up to NPS 6 = 25mm minimum thickness
- Pipe diameters NPS 8 and larger = 40mm minimum thickness

Note: Where the thermal conductivity of a proposed insulation is greater than specified, the thickness will be increased by the ratio of U2/U1.

U2 = proposed insulation "k" value at the table mean rating temperature.

U1 = upper range limit "k" value from the table above.

3.5 Piping Finish Schedule

Indoors concealed; factory finish

Indoors exposed in mechanical room and elsewhere; canvas jacket

Indoors, exposed in utility areas, parkade, etc.; PVC jacket

Outdoors; metal jacket

3.6 Safes, Flashing and Vent Terminals

Provide flexible flashing and metal counter flashing where piping penetrates weather or waterproofed walls and floors.

CPE, Chloraloy 240 lining or lead material may be used at floor drains and cleanouts. Chloraloy shall be solvent welded to manufacturer's installation instructions. Lead shall not be used on roofs where the roofing material is applied by a torch-on method.

Flash floor drains in floors with topping over occupied areas with lead or CPE membrane, a minimum of 300mm (12") clear on sides with minimum 900mm x 900mm (36" x 36") sheet size. Fasten flashing to drain clamp device.

DIVISION 23 HVAC

N K GENERAL

1.1 Grilles, Louvres 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.

O K 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.

Fabricate Kitchen exhaust ductwork in accordance with NFPA 96 Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations. Minimum 1.52 mm (16ga) carbon steel, welded at seams and joints. Provide residue traps at base of vertical risers with provisions for cleanout. Provide access doors for duct cleaning at every change of direction and every 4 m (12') of duct run.

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, Louvres and Diffusers

Acceptable Manufactures for Air Terminals: E.H. Price, Titus, Anemostat, Nailor.

Acceptable Manufacturers for Louvres: 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.

P K 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 tender.

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.

CITY OF RICHMOND

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THESE PLANS MUST BE KEPT ON THE JOB SITE FOR INSPECTIONS

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PROFESSIONAL ENGINEER, PROVINCE OF BRITISH COLUMBIA, T.V. WALDHAUS, 39013

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key plan

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INDIA CULTURAL CENTRE OF CANADA

8600 NO. 5 ROAD,
RICHMOND, B.C.

drawing title

MECHANICAL SPECIFICATION 1

19 875824

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scale: NTS	
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3.3 Duct and Breeching Insulation

Install all ductwork insulation to the Thermal Insulation Association of Canada Best Practices Guide.

Duct Insulation Minimum Thickness Table (ASHRAE 90.1 Zone 5 and 6)

Rigid Exterior Duct Insulation				
Duty	**Plenum(4)**	**Duct Location**		
		Interior		**Exterior**
		Conditioned Space	Unconditioned Space	
	Minimum Insulation Thickness in mm (in.)			
Cooling Only Air Supply	25 (1")	25 (1")	40 (1-1/2")	50 (2")
Heating or H/C Air Supply	25 (1")	25 (1")	40 (1-1/2")	75 (3")
Outdoor Air Supply	40 (1-1/2")	40 (1-1/2")	40 (1-1/2")	0
Combustion Air	40 (1-1/2")	40 (1-1/2")	40 (1-1/2")	0
Return Air	0	0	40 (1-1/2")	75 (3")
Exhaust Air (1)(2)	0	0	25 (1")	25 (1")
Grease Hood Exhaust (5)	N/A	40 (1-1/2")	40 (1-1/2")	0
Tempered Air Supply or Makeup Air	0	0	40 (1-1/2")	75 (3")
Mixed Air (3)	25 (1")	25 (1")	40 (1-1/2")	75 (3")
See note (6) for factory installed duct and plenums				

Flexible Exterior Duct Insulation				
Duty	**Plenum(4)**	**Duct Location**		
		Interior		**Exterior**
		Conditioned Space	Unconditioned Space	
	Minimum Insulation Thickness in mm (in.)			
Cooling Only Air Supply	25 (1")	25 (1")	56 (2-3/16")	75 (3")
Heating or H/C Air Supply	25 (1")	25 (1")	56 (2-3/16")	115 (4.5")
Outdoor Air Supply	50 (2")	50 (2")	56 (2-3/16")	0
Combustion Air	50 (2")	50 (2")	56 (2-3/16")	0
Return Air	0	0	56 (2-3/16")	115 (4.5")
Exhaust Air (1)(2)	0	0	40 (1-1/2")	40 (1-1/2")
Grease Hood Exhaust (5)	N/A	40 (1-1/2")	40 (1-1/2")	0
Tempered Air Supply or Makeup Air	0	0	56 (2-3/16")	115 (4.5")
Mixed Air (3)	40 (1-1/2")	40 (1-1/2")	56 (2-3/16")	115 (4.5")
See note (6) for factory installed duct and plenums				

Note (1): Air temperatures 15°C to 49°C (60°F to 120°F).

Note (2): Provide 38mm (1-½") flexible duct insulation on all exhaust air ductwork from outside wall or roof to damper but a minimum of 1.5 m (5 ft.) inside building.

Note (3): Mixed Air includes tempered air downstream of heat recovery units.

Note (4): Plenums located outside the building shall be insulated to the values listed in the exterior column.

Note (5): Provides 1 hour fire rating. Thickness shall be doubled for 2 hour applications.

Note (6): Factory installed ductwork and plenums provided with equipment need not comply with this table provided they meet the requirements of the relevant CSA Standard for that equipment and is insulated to RSI 0.58 (R3.3) or greater. Refer to NECB article 5.2.12.1 for relevant CSA Standards.

1.1 Duct Finishes Table

ndoors concealed; factory finish

ndoors exposed in mechanical room and elsewhere; canvas jacket as per TIAC standard CRF/1 - CRD/1

ndoors, exposed in utility areas, parkade, etc.; Utility finish as per TIAC code CRF/2 - CRD/2

ndoor exposed in utility areas, parkade, etc. provide a utility finish as per TIAC code CRF/2 and CRD/2

Outdoors; aluminum jacket as per TIAC code CRF/3 - CRD/3

1.2 Grilles, Louvres 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

K General

.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.

.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.

.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.

.4 Acceptable Contractors

All controls work is to be done by the base building contractor.

.5 Examination of Existing System

This project involves renovation to an existing control system. The contractor shall inspect the system prior to tender close and include in his bid all control components required to provide a fully operational system including replacement of existing defective components where noted in the project documents.

.6 Design Requirements

esign and provide conduit and wiring linking elements of system to the existing building Energy Monitoring and Control System EMCS.

upply sufficient programmable controllers of types to meet project requirements. Quantity and points contents as reviewed by Consultant prior to installation.

rovide utility power to EMCS as indicated.

K Products

.1 Thermostats

rovide new thermostats where indicated of building standard type. Ensure operating characteristics are compatible with control components (i.e. direct/reverse acting).

ll thermostats to be wall or column mounted to match existing base building mounting height unless specifically noted otherwise.

ll thermostats, existing and new, are to be calibrated prior to air balancing. Contact building owner if an existing thermostat needs replacing.

2 Control Components

rovide 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 andard unless noted otherwise.

ontrol valves for new mechanical equipment shall be provided by Controls Contractor for installation by the Mechanical Contractor.

here existing devices are re-used, verify operation and re-calibrate as required.

erify correct operation of controlled devices including existing air valve actuators, control valves, etc. within the area of renovation.

ontrol valves and actuators to be compatible with base building standard unless noted otherwise. New control valve operation to be compatible with existing.

eport any existing control device which need replacement. Replacement will be by building management or via change order, at the discretion of the owner.

K EXECUTION

1 Kitchen Exhaust System (EF-7, EF-9, EF-13, EF-14, SF-1, SF-2 and MUA-1)

- .1 General
  - .1 Exhaust fans shall operate to provide kitchen canopy exhaust.
- .2 Run conditions
  - .1 The fan shall operate via a manual wall mounted start switch (existing).
- .3 Fan
  - .1 The existing controller shall monitor the fan status.
- .4 Interlocks
  - .1 The controller shall interlock with the building fire alarm system.
  - .2 The controller shall shut down the exhaust fan from a signal from the kitchen hood fire suppression system, if required by extinguishing system. If not required, exhaust fans to remain on.
  - .3 The controller shall interlock the fan operation with the gas supply to the kitchen appliance.
  - .4 The controller shall interlock the fan operation with non-gas operated appliance located under the kitchen hood.
  - .4 The controller shall interlock with the make-up air system such that the make up air system will not start until the exhaust fan operation is proven.
- .5 Temperature setpoint
  - .1 Temperature sensor located in space to send signal to MUA-1 to modulate supply air temperature.
- .6 Fan energy
  - .1 Monitor fan runtime to software calculated fan energy.
- .7 Alarms
  - .1 Fan failure: Commanded on but the status is off.
- .8 Fire alarm:
  - .1 Shut-off supply fans (SF-1 and SF-2) and make up air unit (MUA-1) via the BMS when a fire event is registered at the BMS control panel. Exhaust fans to continue to run unless required by the extinguishing system.

1.2 Energy Recovery Ventilator (ERV-1)

- .1 General
  - .1 ERV-1 to be provided with wall mounted time clock.

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