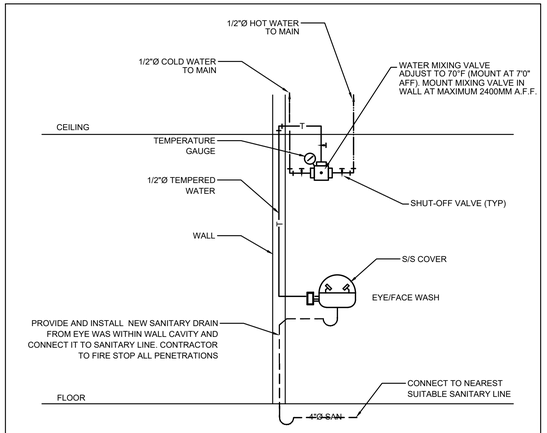
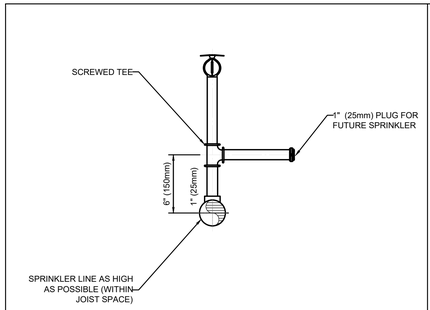
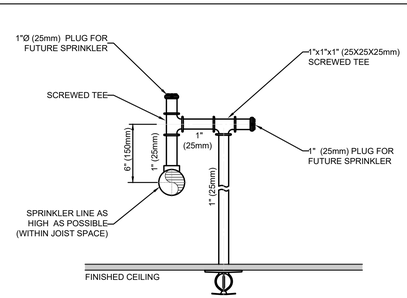


1 M000 SCHEMATIC DIAGRAM OF EMERGENCY EYEWASH

SCALE: N.T.S



UPRIGHT SPRINKLER HEAD DETAIL



PENDANT SPRINKLER HEAD DETAIL

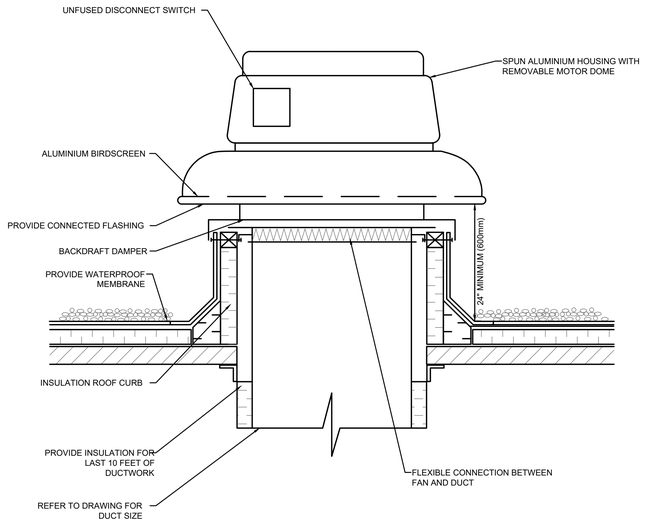
(CONCEALED SPRINKLER HEAD TO MATCH DETAIL WITH REVISED HEAD)

2 M000 TYPICAL SPRINKLER HEAD INSTALLATION

SCALE: N.T.S

DRAWING LIST

DRAWING No.	DESCRIPTION	SCALE
M000	LEAD SHEET	N.T.S.
M001	SCHEDULES	N.T.S.
M002A	SPECIFICATIONS	N.T.S.
M002B	SPECIFICATIONS	N.T.S.
M100	MECHANICAL FLOOR PLAN - PD	1/4"=1'-0"
M200	MECHANICAL FLOOR PLAN - HVAC	1/4"=1'-0"
M300	MECHANICAL FLOOR PLAN - FP	1/4"=1'-0"
MD100	MECHANICAL DEMOLITION FLOOR PLAN - PD	1/4"=1'-0"
MD101	MECHANICAL DEMOLITION FLOOR PLAN - HVAC	1/4"=1'-0"
MD102	MECHANICAL DEMOLITION FLOOR PLAN - FP	1/4"=1'-0"



NOTES:

1. FANS AND CURBS SHALL BE BY THE SAME MANUFACTURER. COORDINATE CURB LOCATION AND ROOF OPENING WITH GC ROOFING CONTRACTOR AND STRUCTURAL TRADE.
2. HIRE BASE BUILDING ROOFING CONTRACTOR TO PERFORM ALL ROOFING WORK.
3. REFER TO ARCH AND STRUCTURAL PLANS FOR DETAILS - MAY NOT BE AS SHOWN. ROOFING MAY NOT BE AS SHOWN.

3 M000 ROOF MOUNTED DOWNBLAST EXHAUST FAN

SCALE: N.T.S

GENERAL CONDITIONS:

1. BE ADVISED THAT THE REMOVAL OF ALL REDUNDANT ELECTRICAL EQUIPMENT AND ASSOCIATED COMPONENTS SHALL BE INCLUDED IN THE CONTRACT. CONFIRM IN ADVANCE OF REMOVAL WITH THE CONSULTANT ANY COMPONENT THAT CONTRACTOR HAS CONCERN OR QUESTIONS AS TO ITS STATUS AND OR CONDITION.
2. BASE BUILDING TRADE TO BE CARRIED FOR THERMOSTAT RELOCATIONS, VAV BOX / AIR BALANCING:
   HONEYWELL MOISES ASENCIO - MOISES.ASENCIO@HONEYWELL.COM OR AYUSH SAXENA AYUSH.SAXENA@HONEYWELL.COM
3. SENECA REQUIRES THE AS-BUILT DRAWINGS IN THE FOLLOWING FORMATS, ONE SET IN AUTOCAD FORMAT AND ONE PDF SET SAVED ON A USB.
4. HOT WORK PERMIT FORM TO BE SUBMITTED TO SENECA 48 HOURS PRIOR TO THE FOLLOWING WORK BEING COMPLETED. SPRINKLER DRAIN DOWN, SMOKE ALARM BYPASS, SHUT OFF ISOLATION VALVE, FIRE STANDPIPE DRAIN DOWN OR OTHER.
5. WET SPRINKLER GENERAL NOTES:
   5.1. THE BUILDING IS SPRINKLERED. CONTRACTOR TO ADD AND OR RELOCATE SPRINKLER HEADS WHERE REQUIRED OR AS PER DRAWINGS TO SUIT NEW CEILING AND PARTITION LAYOUTS.
   5.2. FOR SPRINKLER RELOCATIONS, REUSE EXISTING SPRINKLER PIPES WHERE APPLICABLE AND PROVIDE NEW SPRINKLER HEADS AT NEW LOCATIONS. DO NOT REUSE SPRINKLER HEADS AT NEW LOCATIONS.
   5.3. ALL IN THE TENDER PRICE SPRINKLER HEAD VARIANCE OF UP TO (10) (WILL VARY DEPENDING ON PROJECT) HEADS. THE PROPOSED SPRINKLER LAYOUT SHOWN ON THIS DRAWING IS FOR GENERAL INTENT AND PRICING ONLY, IT IS THE RESPONSIBILITY OF THE SUCCESSFUL CONTRACTOR TO DESIGN AND BUILD A COMPLETE SPRINKLER SYSTEM TO SUIT THE NEW LAYOUT AND COMPLY WITH THE REQUIREMENTS OF THE NFPA-13 LATEST EDITION.
   5.4. HYDRAULIC CALCULATIONS ARE REQUIRED FOR THE PROJECT.
   5.5. CONTRACTOR SHALL READ THIS DRAWING THOROUGHLY AND IN CONJUNCTION WITH ALL OTHER DRAWINGS, ESPECIALLY ARCHITECTURAL AND INTERIOR DESIGN DRAWINGS, ADD LOCATE HEADS AS REQUIRED TO SUIT SITE CONDITIONS AND/OR INTERIOR DESIGN FEATURES. SUBMIT ALL CHANGES AND / OR EXTRAS WITH MARKED-UP DRAWINGS FOR REVIEW PRIOR TO STARTING THE WORK. IF NO CHANGES ARE SUBMITTED, THE CONTRACTOR IS ACKNOWLEDGING THE SPRINKLER TENDER LAYOUT IS PROPER AND WILL BUILD THE SYSTEM ACCORDINGLY. NO EXTRAS WILL BE ENTERTAINED AFTER THE WORK IS STARTED. IF CONTRACTOR MUST MODIFY THE WORK AS DEEMED NECESSARY BY THE INSPECTOR DURING FINAL INSPECTIONS THIS SHALL BE COMPLETED AT NO EXTRA COST TO SENECA.
   5.6. ALL SPRINKLER WORK MUST BE PERFORMED BY THE BASE BUILDING SPRINKLER CONTRACTOR.
   5.7. SPRINKLER CONTRACTOR TO PROVED STAMPED COMPLETION CERTIFICATE AFTER COMPLETION OF THE WORK TO THE SATISFACTION OF THE FIRE MARSHAL AND LOCAL AUTHORITIES HAVING JURISDICTION. INCLUDE FOR ALL NECESSARY HYDRAULIC CALCULATIONS.
6. CLOSE OUT DOCUMENTATION REQUIRED BY THE CLIENT:
   - PROVIDE THE FOLLOWING DOCUMENTATION TO SENECA, GC AND ENGINEER UPON COMPLETION OF THE PROJECT.
   - ONE PDF AND CAD FILE OF "AS-BUILT" DRAWINGS.
   - WRITTEN GUARANTEE.
7. MANDATORY TRADES TO BE ENGAGED
   - BASE BUILDING CONTROLS, SPRINKLER, FIRE ALARM - EACH SITE HAS DIFFERENT VENDORS CHECK WITH SENECA PROJECT MANAGER FOR COMPANY AND CONTACT.

GENERAL NOTES:

1. ALL DEMOLITION SHALL BE IN ACCORDANCE WITH BASE BUILDING STANDARDS.
2. REFER TO RFP DOCUMENTS & ISSUED FOR TENDER DRAWING SET DURING THE TENDERING PROCESS PRIOR TO SUBMITTING BID, INCLUDE ALL REQUIREMENTS AS REQUESTED.
3. REFER TO ARCHITECTURAL, STRUCTURAL AND ELECTRICAL DRAWINGS FOR FURTHER PROJECT SCOPE NOTES.
4. COORDINATE MECHANICAL SCOPE WITH ALL OTHER DISCIPLINES PRIOR TO COMMENCING INSTALLATION. MECHANICAL SHALL TAKE LEAD ROLLS ON PREPARING COORDINATION DRAWINGS WITH ALL OTHER DISCIPLINES.
5. THESE DRAWINGS ARE NOT INTENDED TO DEPICT ALL EXISTING CONDITIONS. NOT ALL EXISTING INFORMATION HAS BEEN SHOWN FOR CLARITY PURPOSES. SITE VERIFY EXISTING CONDITIONS PRIOR TO SUBMITTING BIDS AND INCLUDE IN BID ALL MATERIAL AND LABOUR REQUIRED TO SUIT EXISTING CONDITIONS.
6. NOTIFY ENGINEER/ TENANT OF ANY DEFICIENCIES IN EXISTING SYSTEMS PRIOR TO COMMENCING WORK.
7. ALL EXISTING BASE BUILDING SYSTEMS WHICH ARE ARE NOT INCLUDED IN THE SCOPE OF WORK SHALL REMAIN AS IS AND BE PROTECTED FROM DAMAGE FOR THE DURATION OF THE CONSTRUCTION.
8. THE MECHANICAL CONTRACTOR SHALL REVIEW THE EXISTING CONDITIONS PRIOR TO SUBMITTING THEIR BID AND INCLUDE FOR MATERIAL AND LABOR AS REQUIRED TO TO PROVIDE A CODE COMPLIANT SYSTEM.
9. THE SPRINKLER CONTRACTOR SHALL REVIEW THE EXISTING CONDITIONS PRIOR TO SUBMITTING THEIR BID AND INCLUDE FOR MATERIAL AND LABOR AS REQUIRED TO PROVIDE A FULLY NFPA 13 CODE COMPLIANT SPRINKLER SYSTEM AS PART OF THEIR SCOPE OF WORK. THE SCOPE OF WORK SHOWN IS SCHEMATIC IN NATURE AND DOES NOT DEPICT ALL EXISTING CONDITIONS. THE SPRINKLER ENGINEER SHALL PROVIDE AN NFPA 13 SIGN OFF LETTER AT THE COMPLETION OF THE PROJECT.
10. MAKE ALL PENETRATION WATER TIGHT. WHERE PENETRATING A FIRE RATED SEPARATION, FIRE PROOF THE SEPARATION TO MATCH THE EXISTING SEPARATION RATING. PROVIDE ALL PLUMBING SYSTEMS IN ACCORDANCE WITH LOCAL PLUMBING CODES AND BY_LAWS.
11. HIRE BASE BUILDING SPRINKLER CONTRACTOR TO PERFORM ALL WORK. INCLUDE THEIR COST IN MECHANICAL BID.
12. PROVIDE FULL SCOPE AND LOCATE INCLUDING CONDITION AUDIT OF EXISTING SANITARY PIPING WITHIN THE SCOPE OF WORK AREA NOTING ANY DEFECTIVE PIPING OR AREAS OF RATING. INCLUDE FOR FLUSH OF THE SYSTEM TO REMOVE ALL DEBRIS.
13. MAKE GOOD ALL MATERIALS, AND FINISHES WHERE DISTURBED AND WHERE ALTERATIONS OCCUR REFER TO ALL DRAWINGS FOR FULL EXTENT OF WORK REQUIRED. NOTE THAT MAKING GOOD INCLUDES WORK ASSOCIATED WITH THE INSTALLATION OF SERVICES ETC., SHOWN ON ALL DRAWINGS; REFER TO STRUCTURAL, MECHANICAL AND ELECTRICAL FOR ALL ASSOCIATED DEMOLITION WORK.
14. ALL WORK AFFECTING ADJACENT TENANTS SHALL BE DONE AFTER HOURS.
15. COORDINATE TIMING OF ALL DEMOLITION ON SITE WITH OWNER AND GENERAL CONTRACTOR. ALLOW FOR ANY/ALL DEMOLITION TO BE COMPLETED AFTER HOURS IF REQUIRED.
16. ALL EXISTING BASE BUILDING SYSTEMS WITHIN THE SPACE SHALL REMAIN AS IS AND BE PROTECTED FROM DAMAGE FOR THE DURATION OF THE CONSTRUCTION.
17. PROVIDE ALL AS-BUILT AND CLOSE OUT INFORMATION TO THE CLIENT FOR RECORD PURPOSE.

LEGEND

	VALVE
	HOSE-END DRAIN VALVE
	CHECK VALVE
	PRESSURE REDUCING VALVE
	REDUCER
	CIRCUIT BALANCING VALVE
	SAFETY RELIEF VALVE
	BUTTERFLY VALVE
	PIPE UP
	PIPE DOWN
	DIRECTION OF FLOW
	CAPPED PIPE
	UNION
	STRAINER
	PUMP
	PRESSURE GAUGE
	STARTER
	FAN SPEED CONTROLLER
	THERMOMETER
M	METER
T	THERMOSTAT
	TO DRAIN
	NEW CONTROL WIRE
	SUPPLY OR OUTSIDE AIR DUCT
	RETURN OR EXHAUST AIR DUCT
	SUPPLY DUCT DOWN
	RETURN DUCT DOWN
	SUPPLY AIR GRILL
	SUPPLY AIR DIFFUSER
	ROUNDED SUPPLY AIR DIFFUSER
S - T FLOW	SIZE-TYPE FLOW (CFM)
	AIRFLOW
BD	MANUAL BALANCING DAMPER
HB	HOSE BIB
FD	FLOOR DRAIN
RD	ROOF DRAIN
CO	DRAIN WITH CLEANOUT IN CEILING SPACE
	DRAIN WITH CLEANOUT UP TO FLOOR
	DRAIN WITH CLEANOUT UP TO FLOOR
	P- TRAP
	UPRIGHT SPRINKLER HEAD
	CONCEALED SPRINKLER HEAD
FE	FIRE EXTINGUISHER
	NEW DOMESTIC COLD WATER
	NEW DOMESTIC HOT WATER
	NEW DOMESTIC HOT WATER RECIRCULATION
	EXISTING DOMESTIC COLD WATER
	EXISTING DOMESTIC HOT WATER
	EXISTING DOMESTIC HOT WATER RECIRCULATION
T	NEW DOMESTIC TEMPERED WATER
SAN	NEW SANITARY DRAIN
SAN	EXISTING SANITARY DRAIN
SAN	DEMO SANITARY DRAIN
SAN	NEW BURIED SANITARY DRAIN
SAN	EXISTING BURIED SANITARY DRAIN
SAN	DEMO BURIED SANITARY DRAIN
ST	NEW STORM DRAIN
ST	EXISTING STORM DRAIN
ST	DEMO STORM DRAIN
ST	NEW BURIED STORM DRAIN
ST	EXISTING BURIED STORM DRAIN
ST	DEMO BURIED STORM DRAIN
	MECHANICAL DEMOLITION EQUIPMENT
	MECHANICAL EXISTING EQUIPMENT
	MECHANICAL NEW EQUIPMENT

PROJECT NORTH / TRUE NORTH

NO	REVISIONS	DATE
4	ISSUED FOR TENDER	04/12/2024
3	ISSUED FOR PERMIT	04/03/2024
2	ISSUED FOR COORDINATION	04/01/2024
1	ISSUED FOR COORDINATION	03/27/2024
NO	ISSUED	DATE

SENECA ENGINEERING LAB AT NH K3170

SENECA COLLEGE, NEWNHAM CAMPUS
1750 FINCH AVE E., TORONTO

Seneca

LEAD SHEET

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31 PLYMBRIDGE CRESCENT, TORONTO, ON M2P 1P4
TEL: 416-414-7095
EMAIL: DIANA@ARTIFACTDEVELOPMENT.CA

SCALE: AS INDICATED	PROJECT: 24-018-007
DATE: 03/22/2024	
DRAWN BY: A.N.-T./M.M.	DRAWING: M000
CHECKED BY: D.J	

AIR TERMINAL SCHEDULE

ITEM	MANUFACTURER	TYPE	MODEL	SIZE	MOUNTING	FINISH	FRAME/BORDER	COMMENTS
A	E.H. PRICE	ROUND CONE DIFFUSER	RCD	AS NOTED	DUCT	WHITE POWDER FINISH	N/A	
B	E.H. PRICE	EGGCRATE FACE RETURN	80SR	600MMx600MM	T-BAR	WHITE POWDER FINISH	SURFACE	

NOTES: - VERIFY QUANITY AND ADDITIONAL SIZE INFORMATION ON DRAWINGS
- ALL FINISHING AND MOUNTINGS SHALL BE COORDINATED WITH ARCHITECTURAL DRAWINGS.
- ALL SCREW HOLES WHERE APPLICABLE TO BE COUNTER SUNK

FAN SCHEDULE

ITEM	SERVICE	LOCATION	MANUFACTURER	MODEL	TYPE	CAPACITY		EXTERNAL STATIC PRESSURE		MOTOR POWER		FAN	VFD	VARIABLE FLOW	ELECTRICAL	WEIGHT		CONTROLS	COMMENTS
						(CFM)	(L/S)	(IN.H2O)	(PA)	(HP)	(KW)	(RPM)	(Y/N)	(Y/N)	(V/PH/HZ)	(LBS)	(KG)		
EF-1	CAPSTONEs & MAKER SPACES	ROOF	COOK	101C17D (VF)	ACE-D	650	307	0.50	124.42	0.13	0.1	1641	N	N	120/1/60	53	24	TIED INTO BAS	C/W GALVANAIZED STEEL ROOF CURB

NOTES: - PROVIDE LOCAL DISCONNECTS AND STARTERS FOR ALL FANS.
- FANS TO BE COMPLETE WITH BACKDRAFT DAMPERS.
- PROVIDE ALL SUPPORTS FOR INDOOR FANS AS REQUIRED INCLUDING VIBRATION ISOLATION.

Haws® Since 1906

model 7360BT-7460BT

AXION® MSR Wall Mount Eye/Face Wash

FEATURES & BENEFITS

QUALITY CONTROL
Eye/face wash and valve assembly is pre-built and fully water/pressure tested to ensure no leaks and proper function which ultimately reduces installation time and gives the end contractor an added peace of mind. Unit also ships with pre-assembled cast-aluminum wall bracket to assist in the installation process.

BOWL
The 11" (27.9 cm) round stainless steel receptor is supplied with a No. 2L bright finish on its exterior.

BALL VALVE
Valve is designed to make the flushing of fluid occur with the push of a stainless steel flag, and is equipped with a stainless steel ball and stem to provide added protection against corrosion and breakage.

IN-LINE FILTER
Chrome-plated brass in-line 50 x 50 mesh water strainer prevents debris from reaching the eyewash so the unit stays functioning at its best. Strainer is easily serviceable.

EYE/FACE WASH HEAD
AXION® MSR eye/face wash head uses an inverted directional laminar flow to sweep contaminants away from the vulnerable nasal cavity.

DETECTION/INSPECTION
8" x 10-3/4" (20.3 x 27.3 cm) universal emergency sign make the unit easily detected in an emergency. Test card to record weekly checks helps maintain the units best working quality.

SPECIFICATIONS

Model 7360BTWC barrier-free wall mounted eye/face wash shall include a stainless steel 11" (27.9 cm) round bowl, an AXION® MSR eye/face wash head shall feature inverted directional laminar flow which achieves Zero Vertical Velocity™ supplied by an integral 3.7 gpm flow control, wheelchair accessibility, chrome-plated brass stay-open ball valve equipped with stainless steel ball and stem, chrome-plated brass in-line 50 x 50 mesh water strainer, and chrome-plated brass trap and tailpiece. Unit shall also include 16 gauge stainless steel wall bracket, universal sign, 1/2" NPT inlet, and 1-1/4" NPT waste.

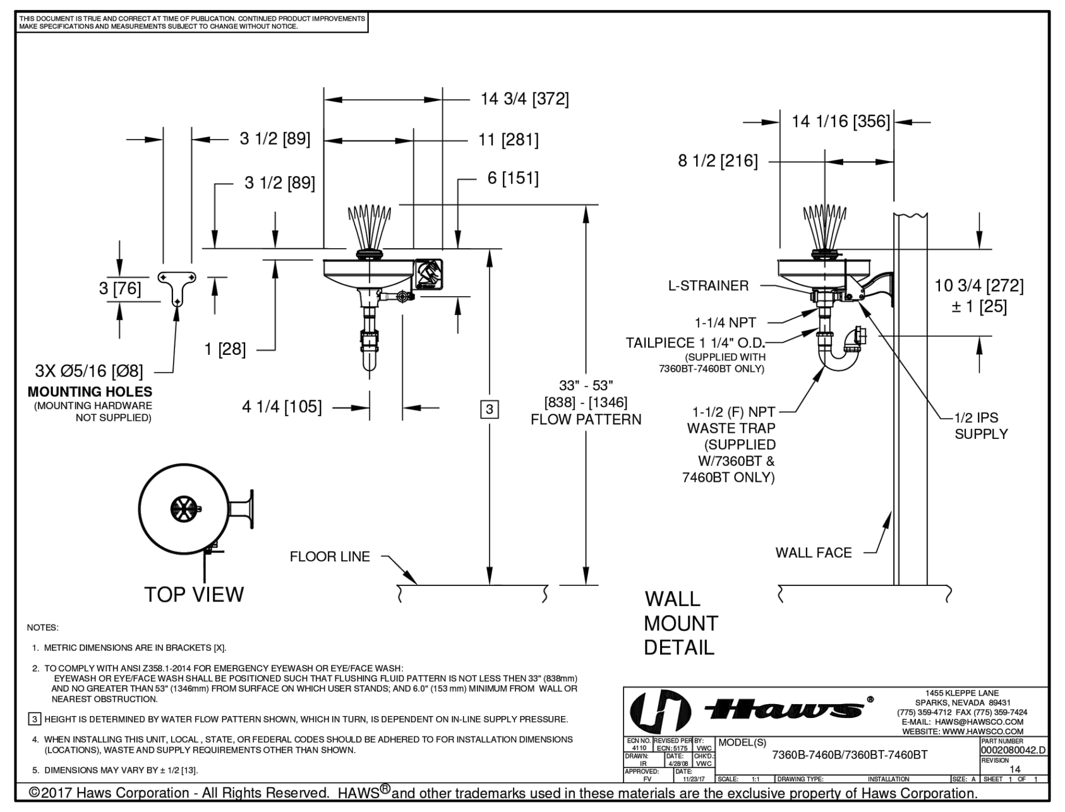
OPTIONS

- Scald Protect Bleed Valve: Model SP157A, stainless steel scald protection bleed valve. Automatic thermal actuator bleed valve opens when internal water temperature reaches 98° F (36.7° C) and closes at 95° F (35° C).
- Thermostatic Mixing Valve: Model 9201EW AXION® Emergency Tempering Valve thermostatically mixes hot and cold water to provide a safe fluid supply for a single emergency eye/face wash, with a flow rate of 10 gpm (38.8 L).
- Emergency Alarm System : Model 9001.5, 1/2" 120 VAC emergency alarm and light system. Buzzer and flashing light are activated by a 1/2" IPS double pole, double throw flow switch.
- Dust Cover: Model 9102 is a stainless steel cover that protects the eyewash heads as well as the bowl.

APPLICATIONS

Where the eyes and face of any person may be exposed to injurious or corrosive materials, suitable facilities for quick flushing of the eyes and face be provided within the work area for immediate emergency use. Emergency eye/face wash facilities shall be in unobstructed and accessible locations that require no more than 10 seconds for the injured person to reach. Model 7360BTWC is certified by CSA to meet the ANSI/ISEA Z358.1 Standard for Emergency Eyewash and Shower Equipment.

For more information, visit www.hawsco.com or call (888) 640-4297.



Haws® Since 1906

model TWBS.EWE

AXION® Thermostatic Mixing Valves

FEATURES & BENEFITS

HAWS ORIGINAL
Designed and assembled with domestic and foreign parts in the US by Haws.

BYPASS
Best-in-class cold water bypass flow (83% of rated tempered water flow) means continued protection under adverse conditions.

POSITIVE SHUT OFF
Actively suspends hot water flow when cold water supply is lost to protect against scalding.

PRESSURE DROP
Lowest internal pressure drop for this valve class – essential where supply pressure is low.

OPERATING RANGE
Minimal outlet temperature variation is achieved by having the best minimum flow rate in the industry.

SHUTTLE DESIGN
Superior shuttle design combined with premium material selection eliminates valve binding and reduces maintenance costs.

MIXING CHAMBER
Innovative funnel design generates turbulent flow to ensure consistent temperature blending across entire flow range.

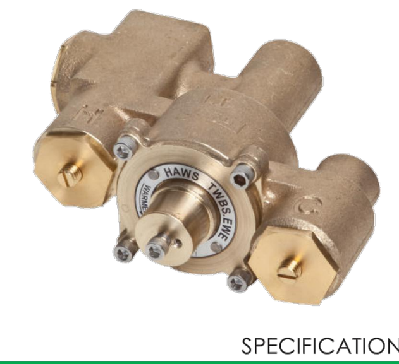
LOW LEAD DESIGN
Certified to NSF61 and California Health and Safety Code 116875 (AB 1953-2006).

FLOW RATES
Flow range of 1 to 12 GPM (45.4 L) provides service for one or two safety eyewashes to reduce hardware costs.

ANTI-SCALD PROTECTION
Redundant anti-scald protection with internal cold water bypass ensures reliable protection. Main tempering valve provides primary protection while backup shutoff valve provides secondary high-temp protection. Internal cold water bypass supplies cold water if hot water supply or main tempering valve fails.

MEDICALLY SUPERIOR RESPONSE
AXION's superior design and technology provide a complete safety solution for increased victim comfort.

EXTENDED WARRANTY
3-year extended warranty based on superior engineering and best-in-class material selection means reliable protection you can trust for the long term.



SPECIFICATIONS

Model TWBS.EWE - Thermostatic Mixing Valve (patent pending)

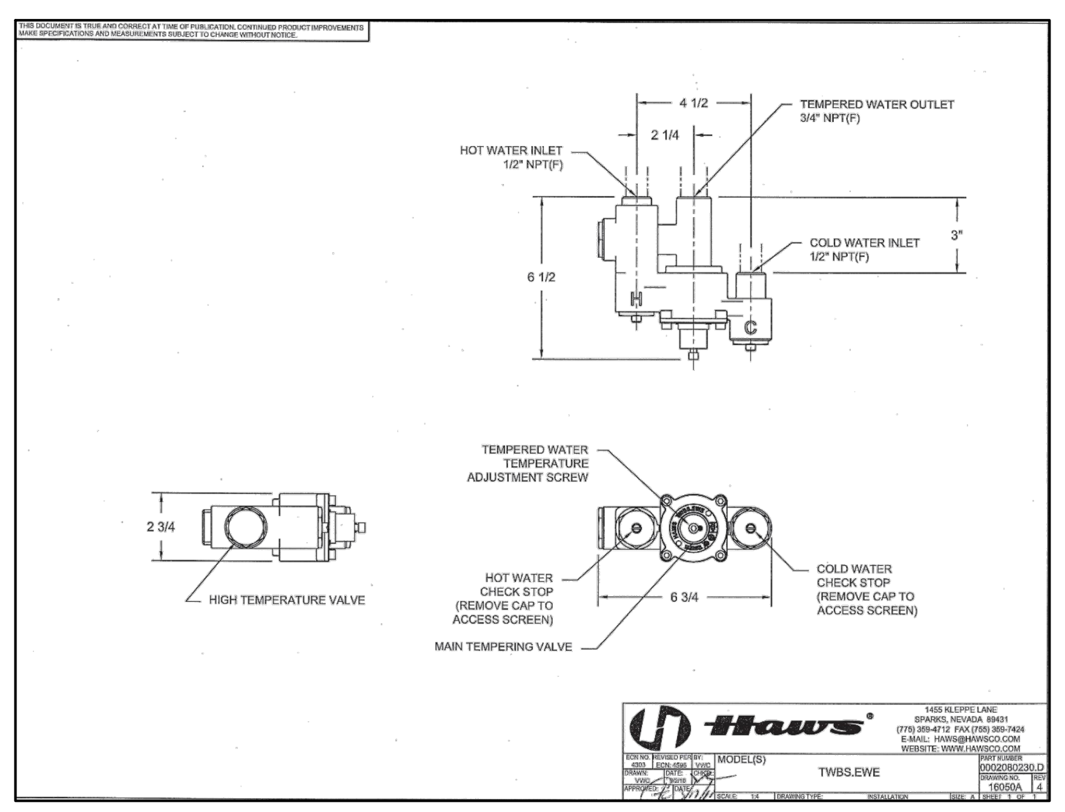
	MAXIMUM		MINIMUM	
Flow Rate	12 GPM	45.4 LPM	1 GPM	4 LPM
Hot Inlet Temperature	180° F	82° C	120° F	49° C
Recommended Hot Inlet Temperature	140° F	60° C		
Cold Inlet Temperature	70° F	21° C	40° F	4° C
Adjustable Outlet Temperature Range	90° F	32° C	60° F	16° C
Operating Pressure	125 PSI	8.6 BAR		
Factory Temperature Set Point	85° F	29° C		
Cold Water Bypass	10 GPM	37.8 LPM @ 30 PSID		

Inlet Ports: 1/2" NPT(f) Outlet Port: 3/4" NPT(F)
Maximum Inlet Pressure Differential: +/- 10%
Listings: ASSE 1071, ANSI Z358.1, CSA B125.3, NSF/ANSI 61-section 8, NSF/ANSI 372, California Health and Safety Code 116875 (AB 1953-2006).

FLOW CAPACITIES

MODEL	INLET	OUTLET	MINIMUM FLOW	INTERNAL COLD WATER BY-PASS AT 30PSI DROP	PRESSURE DROP							
					5	10	15	20	30	45	60	PSI
TWBS.EWE	1/2"	3/4"			.345	.689	1.03	1.38	2.07	3.10	4.13	BAR
			1	10	4.9	6.9	8.5	9.8	12	14.7	17	GPM
			4	38	18.5	26.1	32.2	37.1	45	55.6	64.4	L/MIN

ASSE 1071
LLC
NSF/ANSI 61



PROJECT NORTH
TRUE NORTH

NO	REVISIONS	DATE
4	ISSUED FOR TENDER	04/12/2024
3	ISSUED FOR PERMIT	04/03/2024
2	ISSUED FOR COORDINATION	04/01/2024
1	ISSUED FOR COORDINATION	03/27/2024
NO	ISSUED	DATE

DRAWINGS ARE NOT TO BE SCALED. CONTRACTOR MUST CHECK AND VERIFY ALL DIMENSIONS AND CONDITIONS ON THE PROJECT; AND MUST REPORT ANY DISCREPANCIES TO THE CONSULTANTS BEFORE PROCEEDING WITH THE WORK. THE USE OF THIS DRAWING OR PART THEREOF IS FORBIDDEN WITHOUT THE WRITTEN APPROVAL OF THE CONSULTANTS.

SENECA ENGINEERING LAB AT NH K3170

SENECA COLLEGE, NEWNHAM CAMPUS
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Seneca

SCHEDULES

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SCALE: AS INDICATED	PROJECT: 24-018-007
DATE: 03/22/2024	
DRAWN BY: A.N.-T./M.M.	DRAWING: M001
CHECKED BY: D.J	

MECHANICAL SPECIFICATION

1. GENERAL

1.1. COMPLY WITH ALL REQUIREMENTS OF DIVISION 1, OWNER, PROJECT MANAGER AND/OR CONSTRUCTION MANAGER.

1.2. PERFORM ALL MECHANICAL WORK DETAILED ON THESE DRAWINGS IN ACCORDANCE WITH THE MOST STRINGENT INDUSTRY STANDARDS TO PROVIDE A COMPLETE AND FULLY OPERATIONAL SYSTEM TO THE SATISFACTION OF THE OWNER AND/OR MECHANICAL CONSULTANT.

1.3. WORK SPECIFIED ON THESE DRAWINGS IS INTENDED TO SHOW OVERALL MECHANICAL SCOPE. DIVISION OF RESPONSIBILITY BETWEEN MECHANICAL CONTRACTOR AND THEIR SUB-TRADES IS THE RESPONSIBILITY OF THE PRIME MECHANICAL CONTRACTOR.

1.4. NO SYSTEM SHALL BE CONCEALED/BURIED/COVERED PRIOR TO INSPECTION BY MECHANICAL CONSULTANT AND LOCAL AUTHORITIES HAVING JURISDICTIONS. THIS CONTRACTOR SHALL CONTACT HAMMERSCHLAG & JOFFE INC. (416-444-9263) A MINIMUM OF 5 BUSINESS PRIOR TO REQUIRED INSPECTION DATE. WHEN SYSTEMS HAVE BEEN CONCEALED/BURIED/COVERED PRIOR TO THIS INSPECTION WITHOUT WRITTEN CONSENT BY THE MECHANICAL CONSULTANT, THE MECHANICAL CONTRACTOR SHALL UNCOVER/EXPOSE ALL SUCH SYSTEMS AT NO ADDITIONAL COST.

1.5. THE MOST RIGOROUS OF THIS SPECIFICATION AND BASE BUILDING STANDARDS SHALL FORM THE BASIS FOR THIS CONSTRUCTION. COMPLY WITH BUILDING OWNER'S OR LANDLORD'S REQUIREMENTS FOR MECHANICAL SYSTEM INSTALLATIONS AND EXISTING SYSTEM SHUTDOWN AND CONNECTION.

1.6. OBTAIN AND PAY FOR ALL REQUIRED PERMITS AND FEES TO PERFORM THE WORK WITHIN THESE DOCUMENTS. ADHERE TO ALL CODES, STANDARDS AND BYLAWS. ARRANGE AND PAY FOR ALL REQUIRED INSPECTIONS FROM LOCAL AUTHORITY'S HAVING JURISDICTION. INCLUDE ALL COSTS ASSOCIATED TO THIS IN TENDER AMOUNT. ANY DEFICIENCIES NOTES BY AUTHORITY'S HAVING JURISDICTION SHALL BE IMMEDIATELY REPORTED TO THE MECHANICAL CONSULTANT INCLUDING REQUIRED CORRECTIVE MEASURES.

1.7. THIS CONTRACTOR SHALL VISIT THE SITE TO REVIEW EXISTING CONDITIONS PRIOR TO SUBMITTING TENDER PRICING. INCLUDE IN THE TENDER AMOUNT ALL REQUIRED LABOUR AND MATERIALS TO SUIT EXISTING CONDITIONS. NO EXTRAS WILL BE AWARDED TO SUIT EXISTING CONDITIONS.

1.8. CUTTING, PATCHING AND CORE DRILLING REQUIRED BY THIS TRADE SHALL BE PAID FOR BY THIS CONTRACTOR. ARRANGE AND PAY TO X-RAY AND SCAN EXISTING CONCRETE STRUCTURES IN ACCORDANCE WITH OWNER/LANDLORD STRUCTURAL ENGINEER'S REQUIREMENTS. PROVIDE DETAILS OF NEW OPENINGS THROUGH STRUCTURAL COMPONENTS FOR BASE BUILDING STRUCTURAL ENGINEER'S APPROVAL AT MECHANICAL CONTRACTORS COST.

1.9. PROVIDE ALL REQUIRED FIRE STOPPING FOR MECHANICAL SYSTEMS THROUGH RATED PARTITIONS (INCLUDING 0-HOUR RATED PARTITIONS.) FIRE STOP SHALL BE ULC LISTED FOR THE REQUIRED SEPARATION AND BE INSTALLED INC ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTION. ALL FIRE STOPPING SHALL BE REVIEWED BY MANUFACTURER'S REP. ACCEPTABLE MANUFACTURERS: 3M, HILTI.

1.10. ON COMPLETION OF THE FIRE STOPPING SCOPE OF WORK, SUBMIT A LETTER OF ASSURANCE BY THE MANUFACTURER OF THE FIRESTOP PRODUCTS, AND A SEPARATE LETTER FROM THE MECHANICAL CONTRACTOR, CERTIFYING THAT THE FIRE STOPPING OF ALL MECHANICAL SYSTEMS HAS BEEN INSTALLED IN ACCORDANCE WITH LOCAL CODE REQUIREMENTS AND THE ULC LISTINGS OF THE MANUFACTURER OF THE PRODUCT.

1.11. MEET CONSTRUCTION SPECIFICATION AS PREPARED BY ARCHITECT/GENERAL CONTRACTOR/OWNER INCLUDING ALL PHASING.

1.11.1. INCLUDE ALL PREMIUM LABOUR TO SUIT REQUIREMENTS AS LISTED WITHIN THESE DOCUMENTS, AND TO MEET PROJECT SCHEDULING. CONFIRM WITH OWNER/LANDLORD FOR SUITABLE AFTER-HOURS WORK SCHEDULE.

1.12. FLASHING AND COUNTER FLASHING FOR EXTERIOR PENETRATIONS OR WATER-PROOFED FLOORS SHALL BE PROVIDED BY MECHANICAL CONTRACTOR'S SUB-CONTRACTOR AND INCLUDED IN MECHANICAL TENDER PRICE. USE PREFABRICATED ALUMINUM OR PVC FLASHINGS FOR ROOF, AND MEMBRANE OR COPPER FOR WALLS AND FLOORS. ENSURE ALL OPENINGS THROUGH VERTICAL AND HORIZONTAL BUILDING SURFACES ARE WEATHER PROOF AND WATER PROOF, USING AN APPROVED FLEXIBLE SEALANT.

1.13. PROVIDE SHOP DRAWINGS FOR ALL MECHANICAL EQUIPMENT. SHOP DRAWINGS SHALL BE COMPLETE WITH CONTRACTORS REVIEWED STAMP. SUBMIT SHOP DRAWINGS IN PDF FORMAT. ALLOW ONE (1) WEEK FOR ENGINEERS REVIEW.

1.14. ALL EQUIPMENT SHALL FROM A MANUFACTURER LISTED WITHIN THESE DOCUMENTS AS BEING BASIS OF DESIGN OR APPROVED. WHERE A LIST OF APPROVED MANUFACTURERS IS NOT PROVIDED, PROVIDE EQUIPMENT FROM MANUFACTURER LISTED ON THE DOCUMENTS. REQUESTS FOR EQUIPMENT SUBSTITUTION SHALL BE PROVIDED IN WRITING INCLUDING PROPOSED COST SAVINGS FOR SAID EQUIPMENT. THE QUALITY AND PERFORMANCE CHARACTERISTICS OF SUBSTITUTED PRODUCT SHALL BE EQUIVALENT TO THE SPECIFIED PRODUCT. ALL SUBSTITUTE PRODUCTS SHALL BE APPROVED BY CONSULTANTS. ANY ADDITIONAL COSTS INCURRED BY ANY TRADE (ARCHITECTURAL, STRUCTURAL, ELECTRICAL) FOR SUBSTITUTED EQUIPMENT INSTALLATION MUST BE INCURRED BY THE MECHANICAL CONTRACTOR.

1.15. ALL CONTROLS WORK SHALL BE PERFORMED BY OWNER'S/LANDLORD'S APPROVED CONTRACTOR AND INCLUDED IN MECHANICAL TENDER PRICE. ENSURE CONTROLS CONTRACTOR INCLUDES ALL LABOUR AND MATERIAL REQUIRED TO COMPLETE THE CONTROLS SCOPE OF WORK DETAILED ON THESE DRAWINGS. PROVIDE ALL CONTROLS WIRING AND CONDUIT TO PERFORM SAID WORK. INCLUDE ALL HIGH VOLTAGE POWER WIRING AND TRANSFORMERS AS REQUIRED TO COMPLETE THIS WORK, WHICH IS NOT EXPRESSLY CALLED FOR ON ELECTRICAL DRAWINGS.

1.16. ACCESS DOORS SHALL BE PROVIDED IN ALL HARD SURFACES TO ALLOW FOR INSPECTION/MAINTENANCE OF MECHANICAL SYSTEMS. ACCESS DOOR FINISHES SHALL BE AS PER ARCHITECT'S/DESIGNER'S/ENGINEER'S REQUIREMENTS. PROVIDE ACCESS DOORS WITH SUITABLE RECESS TO ACCEPT WALL FINISHES (TILE, CARPET, ETC.) PROVIDE FIRE RATED ACCESS DOORS IN FIRE RATED PARTITIONS.

1.17. PROVIDE ONE YEAR LABOUR AND MATERIAL WARRANTY FOR THE COMPLETE MECHANICAL INSTALLATION FROM DATE OF SUBSTANTIAL COMPLETION.

1.18. SUBMIT OPERATING AND MAINTENANCE MANUALS IN PDF FORMAT FOR REVIEW. ONCE APPROVED SUBMIT FINAL PDF COPY AND THREE (3) HARD COPIES OF DOCUMENTS TO OWNER. INCLUDE ALL APPROVED SHOP DRAWINGS, WARRANTY LETTERS, AIR AND WATER BALANCING REPORTS, OPERATING INSTRUCTIONS, MAINTENANCE PROCEDURES, CONTRACTOR AND SUB-CONTRACTOR CONTACT INFORMATION, INSPECTION REPORTS FROM THIRD PARTY INSPECTION AGENCIES AND AUTHORITIES HAVING JURISDICTION AND ALL OTHER PERTINENT INFORMATION. FINAL HARD-COPY SHOP DRAWINGS SHALL BE SEPARATED WITH DIVIDERS IN A NEAT AND ORDERLY FASHION COMPLETE WITH TABLE OF CONTENTS. ALLOW A MINIMUM OF 5% OF CONTRACT VALUE TO BE HELD UNTIL SUCH TIME THAT OPERATING AND MAINTENANCE MANUALS ARE ACCEPTED AND RECEIVED BY OWNER IN HARD COPY.

1.19. AS-BUILT DRAWINGS SHALL BE COMPLETED USING AUTOCAD/REVIT. RECORD ACCURATELY INSTALLED WORK ON SITE AND TRANSFER INFORMATION TO AUTOCAD/REVIT. SUBMIT BOTH PDF AND AUTOCAD/REVIT COPIES OF AS-BUILTS. ALLOW A MINIMUM OF 5% OF CONTRACT VALUE TO BE HELD UNTIL SUCH TIME THAT AS-BUILT DRAWINGS ARE APPROVED.

1.20. CHANGE NOTICE QUOTATIONS SHALL BE SUBMITTED COMPLETE WITH DETAILED COST BREAKDOWN OF LABOUR AND MATERIALS. FAILURE TO PROVIDE DETAILED BREAKDOWNS WILL RESULT IN REJECTION. ALL MECHANICAL CHANGE NOTICES SHALL BE PRICED IN ACCORDANCE WITH "MECHANICAL CONTRACTORS ASSOCIATION" (MCA) LABOUR UNITS AND MARK UPS (NOT TO EXCEED 20%). ALL MATERIAL SHALL BE IDENTIFIED INCLUDING ALLPRISER LIST PRICE, AND A MINIMUM OF 25% DISCOUNT.

1.21. TEMPORARY FILTERS 25MM (1 IN.) SHALL BE PROVIDED AT ALL BASE BUILDING RETURN AIR OPENINGS WHICH REMAIN OPERATIONAL DURING CONSTRUCTION. FILTERS TO BE REPLACED WHEN 50% USABLE LIFT REMAINS OR WEEKLY (WHICHEVER COMES FIRST). REMOVE UPON CONSTRUCTION COMPLETION.

1.22. RETURN ALL BASE BUILDING MECHANICAL COMPONENTS TO LANDLORD/OWNER AS DIRECTED. COORDINATE REQUIREMENTS WITH OWNER/LANDLORD PRIOR TO COMMENCEMENT OF DEMOLITION. RELOCATE ALL COMPONENTS ANYWHERE WITHIN THE PROPERTY AS PER LANDLORD/OWNER'S DIRECTION.

1.23. THE MECHANICAL CONTRACTOR SHALL BE SOLELY RESPONSIBLE TO KEEP ALL AREAS PERTAINING TO HIS WORK, INCLUDING CONSTRUCTION AREA, STORAGE AND STAGING CLEAN AND TIDY. ALL AREAS SHALL BE FREE OF SURPLUS DEBRIS AND RUBBISH.

1.24. DO NOT ALLOW MATERIAL/EQUIPMENT TO BE STORED IN EXCESS OF BUILDING STRUCTURE LIMITATION.

1.25. MECHANICAL CONTRACTOR SHALL PROTECT ALL EXISTING PROPERTY AND ADJACENT PROPERTIES FROM DAMAGE, INCLUDING WORK COMPLETED BY OTHER TRADES WITHIN THE PROJECT SCOPE OF WORK. MECHANICAL CONTRACTOR SHALL BE FULLY RESPONSIBLE TO PAY FOR CORRECTIVE MEASURES TO ALL DAMAGE CAUSED BY THEM, THEIR PERSONNEL OR THEIR SUB-TRADES.

1.26. DIVISION 15 CONTRACTORS ARE RESPONSIBLE TO ENSURE THAT THEIR EMPLOYEES AND SUB-TRADES OBSERVE ALL SAFETY REGULATIONS, SECURITY REGULATIONS AND FIRE SAFETY RULES, INCLUDING CONDUCT THEIR WORK WITHIN ACCORDANCE WITH LOCAL WORKPLACE HEALTH AND SAFETY REGULATIONS.

1.27. ALL MATERIALS SHALL BE NEW, (UNLESS SPECIFICALLY STATED AS BEING REUSED) AND FREE OF DEFECT. ALL MATERIALS AND EQUIPMENT SHALL BARE THE APPROVAL OF LOCAL AUTHORITIES (INCLUDING CSA, ULC ETC.) AND BE ACCEPTABLE FOR USE IN CANADA.

1.28. ALL EQUIPMENT SHALL MEET THE MINIMUM PERFORMANCE REQUIREMENTS SPECIFIED IN THESE DOCUMENTS INCLUDING SPATIAL PROPERTIES. SUPPLY EQUIPMENT FROM THE BASIS OF DESIGN, OR APPROVED ALTERNATE MANUFACTURERS AS LISTED ON THESE DOCUMENTS. BASE BID PRICE SHALL INCLUDE EQUIPMENT AS SPECIFIED ON THESE DRAWINGS WITH OPTIONAL EQUIPMENT SUBSTITUTIONS LISTED AS COST SAVINGS.

1.29. REQUESTS FOR ALTERNATE EQUIPMENT MANUFACTURERS SHALL BE PROVIDED IN WRITING AND INCLUDE ALL RELEVANT PERFORMANCE AND CONSTRUCTION INFORMATION. INCLUDE IN REQUEST COST SAVINGS TO OWNER OFFERED TO USE ALTERNATE EQUIPMENT. DO NOT PROCEED WITH AN ALTERNATE MANUFACTURER WITHOUT WRITTEN APPROVAL FROM CONSULTANT/OWNER.

1.30. ADHERE TO ALL BASE BUILDING STANDARDS FOR NEW EQUIPMENT. OBTAIN OWNER/LANDLORD APPROVAL FOR ALL NEW EQUIPMENT.

1.31. PROVIDE ALL REQUIRED SUPPORTS, HANGERS, RODS, FRAMES, MISCELLANEOUS METALS AND OTHER MATERIAL REQUIRED TO ADEQUATELY SUPPORT AND INSTALL NEW EQUIPMENT. ALL SUPPORTS SHALL BE DESIGNED AND STAMPED BY A STRUCTURAL ENGINEERING LICENSED IN THE PROVIDE OF THE PROJECT. SUBMIT ALL STAMPED SUPPORT SHOP DRAWINGS FOR REVIEW PRIOR TO ORDERING EQUIPMENT.

1.32. INSTALL SUPPORTS TO MEET REQUIREMENTS OF APPLICABLE CODES, AND TO SUITABLE SUPPORT THE EQUIPMENT WITHOUT UNDER STRESS/STRAIN TO THE EQUIPMENT AND ASSOCIATED SYSTEMS.

1.33. ALL EQUIPMENT SHALL BE SUPPORTING FROM BUILDING STRUCTURES. DO NOT SUPPORT EQUIPMENT FROM OTHER EQUIPMENT/PIPES/DUCTS OR THEIR SUPPORT SYSTEMS.

1.34. PROVIDE LAMACOID NAME PLATES ON ALL NEW AND EXISTING MECHANICAL EQUIPMENT SHOWING VOLTAGE, DESIGNATION, CRU# AND USE. NUMBERS AND LETTERS TO BE 3/8" (10MM) HIGH. NAME PLATES SHALL BE PERMANENT AND NOT FADE OVER TIME.

1.35. IDENTIFY ALL VALVES WITH TAGS. PROVIDE A FRAMED LIST OF VALVES, INDICATING THEIR LOCATION AND USE, SUPPLY TO OWNER/TENANT. PROVIDE NEW (OR UPDATED) VALVE TAG LOCATION MAP ON FRAMES 11X17 PRINTS. PROVIDE PDF COPIES TO OWNER.

1.36. THIS MECHANICAL CONTRACTOR SHALL BARE THE RESPONSIBILITY TO COORDINATE ALL NEW MECHANICAL EQUIPMENT AND SYSTEMS WITH OTHER CONTRACTORS INCLUDING, BUT NOT LIMITED TO, ARCHITECTURAL, STRUCTURAL, LEED, ELECTRICAL, AND CIVIL DISCIPLINES.

1.37. MECHANICAL CONTRACTOR SHALL BE FULLY RESPONSIBLE AND TAKE THE LEAD ROLE IN PROVIDING INTERFERENCE DRAWINGS FOR ALL TRADES. OBTAIN ALL INFORMATION FROM OTHER TRADES AND PREPARE ONE COMBINED SET OF INTERFERENCE DRAWINGS. SITE VERIFY ALL EXISTING INFORMATION INCLUDING ALL DIMENSIONS OF EXISTING STRUCTURE AND EQUIPMENT AND INCLUDE IN INTERFERENCE DRAWINGS.

1.38. MECHANICAL CONTRACTOR SHALL REVIEW AVAILABLE POWER ON SITE AND WITH ELECTRICAL CONTRACTOR/DRAWINGS PRIOR TO ORDERING ANY NEW MECHANICAL EQUIPMENT. ORDER AND SUPPLY EQUIPMENT TO SUIT AVAILABLE SITE POWER, AND IN COORDINATION WITH THE MECHANICAL DRAWINGS.

1.39. ALL MECHANICAL FINISHES AND LOCATIONS SHALL BE REVIEWED AND APPROVED BY ARCHITECTURAL DIVISION AND/OR OWNER INCLUDING, BUT NOT LIMITED TO, AIR TERMINALS, THERMOSTATS/CONTROLS, EXPOSED INSULATION/DUCTWORK. WHERE A DISCREPANCY EXISTS BETWEEN MECHANICAL AND ARCHITECTURAL DRAWINGS AS TO THE LEVEL OF FINISHED REQUIRED, THE MOST STRINGENT/COSTLY REQUIREMENTS SHALL BE CARRIED IN THE TENDER AMOUNT. OBTAIN CLARIFICATION FOR FINAL FINISH PRIOR TO ORDERING.

1.40. ALL MECHANICAL EQUIPMENT WEIGHTS, SUPPORTS, AND OPENING SHALL BE REVIEWED AND APPROVED BY A STRUCTURAL ENGINEER. WHEN APPLICABLE, HIRE BASE BUILDING STRUCTURAL ENGINEER TO PERFORM ALL SUCH REVIEWS. MECHANICAL CONTRACTOR SHALL PAY FOR ALL SUCH REVIEWS AND INCLUDE COST IN TENDER AMOUNTS.

2. SEISMIC RESTRAINTS

2.1. THE MECHANICAL CONTRACTOR SHALL PROVIDE ALL SEISMIC RESTRAINTS REQUIRED FOR MECHANICAL SYSTEMS IN ACCORDANCE WITH LOCAL CODES.

2.2. THE MECHANICAL CONTRACTOR SHALL HIRE A SEISMIC ENGINEER LICENSED IN THE PROVINCE OF INSTALLATION TO REVIEW ALL MECHANICAL SYSTEMS AND DESIGN SEISMIC SUPPORTS. SUBMIT SEISMIC SUPPORT DESIGN AS A SHOP DRAWING. ALL SEISMIC SUPPORTS DESIGNS SHALL BE STAMPED THE ENGINEER.

2.3. THE SEISMIC ENGINEER SHALL REVIEW THE INSTALLATION OF ALL SEISMIC SUPPORTS THROUGHOUT THE PROJECT AND PROVIDE A STAMPED SEISMIC SUPPORT CONFORMANCE LETTER AT THE COMPLETION OF THE PROJECT. PROVIDE LETTER TO THE CONSULTANT AND INCLUDE WITHIN CLOSE OUT DOCUMENTS.

2.4. COORDINATE THE INSTALLATION OF SEISMIC SUPPORTS ON SITE WITH ALL OTHER TRADES AND EXISTING CONDITIONS.

1. EQUIPMENT START-UP AND BALANCING

1.1. PROVIDE START UP REPORTS FOR ALL NEW MECHANICAL EQUIPMENT. START UP REPORT SHALL BE PREPARED BY A FACTORY TRAINED REPRESENTATIVE AND SHOW THAT THE EQUIPMENT IS IN GOOD CONDITION.

1.2. PROVIDE ALL TEMPORARY POWER, GAS, AND OTHER UTILITIES AS REQUIRED TO PERFORM START UP OF EQUIPMENT.

1.3. PERFORM BALANCING OF MECHANICAL SYSTEMS ONCE ALL COMPONENTS ARE INSTALLED AND PRESSURE TESTED.

1.4. PERFORM BALANCING TO SUIT PROJECT SCHEDULE. IF REQUIRED PAY AND PROVIDE ALL TEMPORARY POWER AND UTILITIES IF EQUIPMENT IS REQUIRED TO BE BALANCED PRIOR TO SAID SERVICES BEING IN PLACE TO SUIT PROJECT SCHEDULE.

1.5. WHERE START UP OF EQUIPMENT OCCURS WHILE THE BUILDING IS STILL IN CONSTRUCTION, REPLACE ALL FILTERS AND STRAINERS AFTER START UP.

1.6. GENERALLY SPEAKING ALL CEILINGS, WALLS, DOORS, WINDOWS, PLENUMS, SHEET METAL, AND OTHER BUILDING COMPONENTS AFFECTING THE PERFORMANCE OF A UNIT SHALL BE FULLY COMPLETE PRIOR TO THE BALANCING.

1.7. ALL BALANCING SHALL BE COMPLETED BY A SINGLE FIRM INCLUDING BOTH AIR AND WATER SYSTEMS. THE FOLLOWING SYSTEMS SHALL BE BALANCED:

1.7.1. AIR SYSTEM BALANCING

1.7.1.1. AIR SYSTEMS SHALL BE TESTED ONCE THE DUCTWORK SYSTEMS ARE COMPLETE AND SEALED, FILTERS ARE CLEAN, FAN ROTATION HAS BEEN VERIFIED TO BE IN THE CORRECT DIRECTION, ALL CONTROL ELEMENTS INCLUDING THERMOSTATS, SMOKE DETECTORS, AND DUCT MOUNTED SENSORS ARE INSTALLED, COILS ARE CLEAN, DUCT ACCESS DOORS ARE CLOSED, ALL FIRE/SMOKE/CONTROL DAMPERS ARE INSTALLED AND FUNCTIONAL.

1.7.1.2. TEST ALL AIR SYSTEMS TO BE +/- 5% OF THE DESIGN VALUES.

1.7.1.3. PERFORM RE-BALANCING OF SYSTEMS AS MANY TIMES AS REQUIRED TO OBTAIN SUITABLE READINGS.

1.7.1.4. BALANCING DAMPERS WHICH EXHIBIT VIBRATION AND OR NOISE SHALL BE REPLACED AND THE SYSTEM SHALL BE RE-BALANCED.

1.7.1.5. ONCE AIR SYSTEMS ARE BALANCED, ALLOW SYSTEMS TO CONTINUE TO RUN FOR FIVE DAYS. AFTER RUNNING, REPLACE ALL FILTERS, INSPECT ALL MOVING COMPONENTS AND CONFIRM SYSTEM OPERATION. PRODUCE ALL ADDITIONAL NOISE/VIBRATION CONTROL ELEMENTS TO ELIMINATE EXCESS NOISE/VIBRATION. LUBRICATE ALL MOVING PART AND REPAIR ANY NOTICEABLE DEFECTS IN THE SYSTEM.

1.7.2. WATER SYSTEM BALANCING

1.7.2.1. WATER SYSTEMS SHALL BE TESTED ONCE ALL PIPE WORK IS COMPLETE, FILLED, PRESSURE TESTED, VENTED AND VOID OF AIR, PUMPS PROVEN TO OPERATE IN CORRECT DIRECTION, STRAINERS IN PLACE AND CLEANED, ALL VALVES AND CIRCUIT BALANCING VALVES ARE INSTALLED AND SYSTEMS ARE COMPLETE.

1.7.2.2. TEST ALL WATER SYSTEMS TO BE +/- 5% OF THE DESIGN VALUES

1.7.2.3. PERFORM RE-BALANCING OF SYSTEMS AS MANY TIMES AS REQUIRED TO OBTAIN SUITABLE READINGS.

1.8. SUBMIT PDF COPIES OF BALANCING REPORTS ONCE SYSTEMS MEET THRESHOLDS NOTED ABOVE. INCLUDE APPROVED BALANCING REPORTS IN CLOSEOUT DOCUMENTS.

1.9. TEST ALL CONTROL SYSTEMS INCLUDING FUNCTION OF THERMOSTATS AND READINGS OF CONTROLS POINTS.

2. COMPLETION OF CONTRACT

2.1. THE MECHANICAL CONTRACTOR SHALL PROVIDE ALL LABOUR AND MATERIAL TO INSTALL ALL SYSTEMS SHOWN AND/OR IMPLIED ON THESE DRAWINGS IN GOOD WORKING ORDER. THESE SYSTEMS SHALL BE FULLY OPERATIONAL, TESTED, BALANCED, VERIFIED, CLEAN AND FREE OF DEBRIS AT COMPLETION OF CONTRACT.

2.2. PROGRESS BILLING

3.2.1 PROVIDE COMPLETE BREAKDOWN OF MATERIAL, LABOUR AND GENERAL COSTS WHEN SUBMITTING PROGRESS DRAW REQUESTS.

3.2.2 PROVIDE SEPARATE BILLING SECTION FOR EACH SYSTEM INSTALLED AS PART OF THE PROJECT. SEPARATE SECTIONS SHALL INCLUDE, HOWEVER NOT BE LIMITED TO THE FOLLOWING: HVAC, GAS, PLUMBING, DRAWINGS, FIRE PROTECTION, COMPRESSED AIR, PROJECT CLOSEOUT.

3.2.3 INCLUDE A LINE ITEM AS PART OF BILLING STRUCTURE FOR 'PROJECT CLOSEOUT' TO BE BILLED ONLY ONCE ALL PROJECT CLOSE OUT DOCUMENTS ARE PROVIDED AND ACCEPTED (INCLUDING AS BUILT DRAWINGS) AS PER THE FOLLOWING PRICING STRUCTURE:
UP TO $100,000 -> $5,000
UP TO $500,000 -> $7,500
UP TO $1,000,000 -> $10,000
GREATER THAN $1,000,000 -> 1%

2.3. AT THE COMPLETION OF THE PROJECT PROVIDE THE FOLLOWING INFORMATION TO THE CONSULTANT FOR REVIEW:

2.3.1. WARRANTY LETTERS
2.3.2. AS BUILT DRAWINGS IN AUTOCAD AND PDF FORMAT
2.3.3. CLOSE OUT DOCUMENTS INCLUDING A BINDER OF APPROVED SHOP DRAWINGS, TAB REPORTS, AND O&M MANUALS.
2.3.4. NFPA 13 SIGN OFF LETTER IF APPLICABLE

2.4. SCHEDULE WORK TO MEET PROJECT SCHEDULE. ARRANGE TO PROVIDE CLOSE OUT DOCUMENTS PRIOR TO SCHEDULE COMPLETION TO ENSURE NO DELAY IN PROJECT CLOSE.

2.5. ALL SYSTEMS SHALL BE COMPLETED AND FULLY FUNCTIONAL AT PROJECT COMPLETION. REPLACE ALL FILTERS AND STRAINERS AT PROJECT COMPLETION. ENSURE ALL TEMPORARY CONSTRUCTION AIDS, AND OR CONSTRUCTION DEBRIS IS REMOVED FROM SITE. WHERE WORKING IN EXISTING BUILDING, ALL EXISTING FINISHES TO REMAIN SHALL BE IN AS NEW CONDITION.

1. DEMOLITION

1.1. COMPLY WITH THE REQUIREMENTS OF DIVISION 01, THE OWNER/LANDLORD, PROJECT MANAGER AND CONSTRUCTION MANAGER WITH ALL REGARDS TO DEMOLITIONS.

1.2. INCLUDE FOR ALL PERMITS AND FEES TO PERFORM THE EXTENT OF THE DEMOLITION WORK IN THESE DOCUMENTS, INCLUDING FEES AND TAXES ASSOCIATED WITH THE DISPOSAL OF HAZARDOUS SUBSTANCES. ARRANGE AND PAY FOR A WASTE GENERATION NUMBER FOR THE PROPERTY TO ALLOW FOR THE REMOVAL OF SAID ITEMS.

1.3. PROVIDE ALL DEMOLITION OF MECHANICAL SYSTEMS AS SHOWN ON THESE DRAWINGS AND REFERRED TO ON ARCHITECTURAL DRAWINGS.

1.4. PERFORM ALL DEMOLITION WORK IN ACCORDANCE WITH THE REQUIREMENTS OF CAN/CSA-S350 - CODE OF PRACTICE FOR SAFETY IN DEMOLITION OF STRUCTURES, ONTARIO BUILDING CODE, ONTARIO FIRE CODE, OCCUPATION HEALTH AND SAFETY ACT, AND ALL LOCAL CODES, BY-LAWS AND REGULATION IN THE JURISDICTION OF THE WORK FOR THE REMOVAL OF SYSTEMS AND WASTE.

1.5. PROVIDE ALL NECESSARY SUPPORTS, LIFTS, PLATFORMS, HOISTS, AND/OR INFRASTRUCTURE REQUIRED TO DEMOLISH SYSTEMS AS NOTED.

1.6. NOTE TO REMOVE OR DEMOLISH A PIECE OF EQUIPMENT, SYSTEMS, OR MECHANICAL INFRASTRUCTURE SHALL BE READ TO IMPLY REMOVAL OF THE SYSTEM IN ITS ENTIRETY INCLUDING ALL SUPPORTS, ACCESSORIES AND OTHER ITEMS THAT ARE NO LONGER REQUIRED. WHERE DOUBT EXISTS TO THE EXTENT OF THE REMOVAL OBTAIN WRITTEN CLARIFICATION FROM CONSULTANT.

1.7. WHERE REMOVAL OF MATERIAL WILL BE CARRIED OUT BY OTHER TRADES, CUT, CAP AND MAKE SAFE ALL MECHANICAL SYSTEMS TO ALLOW FOR THIS REMOVAL INCLUDING DRAINING AND DISPOSING OF ANY SYSTEM CONTENTS.

1.8. PROVIDE DEMOLITION WORK SCHEDULE TO THE OWNER AND CONSULTANT IMMEDIATELY UPON CONTRACT AWARD. DEMOLITION SCHEDULE SHOW INCLUDE AREAS OF WORK, TIME OF WORK, SYSTEM DOWN TIMES, SYSTEM TIE-OVER TIMES AND GENERAL LOCATION OF WORK.

1.8.1. ALL EQUIPMENT SHUT DOWNS SHALL ONLY BE STARTED AFTER RECEIVING WRITTEN APPROVAL FROM OWNER. PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE FOR SHUT-DOWN OF EXISTING SYSTEMS.

1.8.2. ALL DOWNTIME TO SYSTEMS SERVING OCCUPIED AREAS OF THE BUILDING SHALL BE LIMITED TO AFTER HOURS TIME. INCLUDE ALL ASSOCIATE AFTER HOURS LABOUR AS REQUIRED IN THE BID PRICE.

1.9. THIS CONTRACTOR SHALL PROTECT ALL BUILDING SYSTEMS IN THE AREA OF THE MECHANICAL DEMOLITION WORK FOR THE FULL DURATION OF THIS PROJECT. ANY BUILDING SYSTEMS DAMAGED BY MECHANICAL DEMOLITION CREWS SHALL BE REPAIRED AT NO ADDITIONAL COST TO THE OWNER BY THE RELEVANT BASE BUILDING TRADE ASSOCIATED WITH THE DAMAGED SYSTEM. ALL DAMAGE SHALL BE NOTIFIED TO THE OWNER AND CONSULTANT IMMEDIATELY UPON OCCURRING.

1.10. CONTRACTOR SHALL NOTE THAT THIS IS A RENOVATION TO AN EXISTING BUILDING AND SHALL THOROUGHLY INVESTIGATE THE EXISTING MECHANICAL INSTALLATION AND CONDITIONS PRIOR TO SUBMITTING BID.

1.10.1. CONTRACTORS ARE REQUIRED TO VISIT THE SITE AND ENSURE THAT ALL WORK ASSOCIATED WITH THE ELECTRICAL INSTALLATION REQUIRED TO BE REMOVED OR RELOCATED IS ALLOWED FOR IN THE TENDER PRICE. ALSO CONTRACTORS SHALL ENSURE THAT THE WORK CAN BE CARRIED OUT AS INDICATED ON THE DRAWINGS OR SHALL ADVISE THE ENGINEER IMMEDIATELY OF ANY ANTICIPATED PROBLEMS

1.10.2. NO EXTRA WILL BE SUBSEQUENTLY PERMITTED TO COVER ANY SUCH ERROR, OMISSION AND/OR OVERSIGHT FOR NOT HAVING MADE A THOROUGH INSPECTION OF THE GROUNDS, EXISTING CONDITIONS, DRAWINGS, SPECIFICATIONS AND DESIGN INTENT, OR THE INFORMATION FOUND ON OTHER DISCIPLINES DRAWINGS INCLUDING ARCHITECTURAL, STRUCTURAL AND ELECTRICAL.

1.10.3. THE MECHANICAL CONTRACTOR SHALL NOTE THAT THE EXISTING BUILDING WILL REMAIN IN OPERATION THROUGHOUT THIS SCOPE OF WORK. THE CONTRACTOR SHALL ACCORDINGLY ALLOW FOR ANY WORK REQUIRED IN EXISTING TENANTS SPACES OR WHICH IS DISRUPTIVE DUE TO NOISE, VIBRATION, DUST ODOUR, OR FUMES TO BE COMPLETED AFTER HOURS OR AT A TIME AS INDICATED BY THE OWNER/BUILDING MANAGEMENT. PROVIDE TEMPORARY SERVICES AS REQUIRED TO ENSURE CONTINUED OPERATION OF THE BUILDING AT ALL TIMES.

1.11. SITE VERIFY EXACT SIZE AND QUANTITY OF MECHANICAL SYSTEMS BEING REMOVED.

1.12. REFER TO DRAWINGS OF OTHER DISCIPLINES INCLUDING ARCHITECTURAL, STRUCTURAL AND ELECTRICAL TO DETERMINE THE FULL EXTENT OF THE PROJECT DEMOLITION AS WELL AS NEW SYSTEMS BEING INSTALLED TO ENSURE THAT MECHANICAL DEMOLITION SCOPE IS FULLY COORDINATED WITH OTHER DISCIPLINES.

1.13. PROVIDE ALL REQUIRED VALVES TO FACILITATE THE REMOVAL OF SYSTEMS WITH PORTIONS REMAINING.

1.13.1. INCLUDE FOR ALL PIPE FREEZING AND SYSTEM DRAINING TO FACILITATE PARTIAL REMOVAL OF SYSTEMS.

1.13.2. WHERE SYSTEMS ARE DRAINED TO ALLOW FOR PARTIAL REMOVAL, INCLUDE ALL REQUIRED LABOUR AND MATERIAL TO FILL SYSTEMS AT THE COMPLETION OF THE WORK. HIRE BASE BUILDING CHEMICAL TREATMENT FIRM TO BRING SYSTEM CHEMICAL TREATMENT BACK UP TO PRE-CONSTRUCTION LEVELS EACH TIME SYSTEMS IS DRAINED AND REFILLED.

1.14. WHERE REMOVAL OF MECHANICAL SYSTEMS REQUIRED ELECTRICAL, ARCHITECTURAL OR STRUCTURAL WORK TO PERFORM A FULL AND COMPLETE REMOVAL, HIRE SAID TRADES TO PERFORM SAID WORK.

1.15. WHERE REMOVING EXISTING VALVES, REMOVE ALL VALVE TAGS AND UPDATE VALVE TAG CHART IN MECHANICAL ROOMS.

1.16. WHERE DEMOLITION OCCURS IN EXISTING BUILDING TO REMAIN, PERFORM ALL WORK TO MINIMIZED DISRUPTION TO OPERATING AREAS OF THE BUILDING. ONLY USE CORRIDORS, BUILDING ENTRANCES, ELEVATORS, ESCALATORS, STAIRWELLS, AND LOADING AREAS AS APPROVED BY THE OWNER. WHERE PASSAGE IS REQUIRED THROUGH OPERATING SECTIONS OF THE BUILDING, PERFORM SAID WORK AFTER HOURS AND ARRANGE AND PAY FOR FULL CLEAN UP OF AREAS BE BASE BUILDING CLEANING STAFF PRIOR TO THE START OF THE NEXT BUSINESS DAY.

1.17. WHERE DEMOLITION WORK IS REQUIRED IN ACTIVE AREAS OF THE BUILDING, ARRANGE AND PAY FOR SECURITY TO PRESENT FOR FULL DURATION OF THE DEMOLITION. INCLUDE ALL TEMPORARY PROTECTION OF BUILDING SURFACES AND TENANT MERCHANDISE AS REQUIRED TO ALLOW FOR THE WORK TO CONTINUE. ALL SAID SPACES SHALL BE CLEANED AND REINSTATED A MINIMUM OF 1 HOUR BEFORE THE NEXT BUSINESS DAY.

1.18. ALL MATERIAL SHALL BE REMOVED FROM SITE AND DISPOSED OF IN ACCORDANCE WITH LOCAL JURISDICTIONS. RECYCLE ALL CONTENT SUITABLE FOR RECYCLING. DO NOT STORE DEMOLISHED EQUIPMENT/MATERIAL ON SITE.

1.19. ALL EQUIPMENT/MATERIAL SCHEDULED TO BE RETURNED TO THE OWNER SHALL BE RELOCATED ANYWHERE WITHIN THE PROPERTY FOR SUITABLE STORAGE. PROTECT EQUIPMENT/MATERIAL FOR THE FULL DURATION OF THE PROJECT.

1.20. INCLUDE FOR THE REMOVAL OF ALL HAZARDOUS WASTE SUCH AS THAT FOUND WITHIN DRAINAGE PITS, INTERCEPTORS, AND THE LIKE.

1.21. OBTAIN THE BUILDING HAZARDOUS SUBSTANCE REPORT FROM THE OWNER PRIOR TO COMMENCEMENT OF WORK. ADHERE TO ALL REQUIREMENTS OF THE HAZARDOUS SUBSTANCE GUIDELINES FOR THE BUILDING. WHERE HAZARDOUS SUBSTANCES ARE FOUND ON SITE, INCLUDING BUT NOT LIMITED TO ASBESTOS AND/OR MOLD, IMMEDIATELY STOP WORK AND NOTIFY OWNER AND CONSULTANT. DO NOT RETURN TO AREA OF WORK UNTIL SUCH TIME AS SAID SUBSTANCE HAS BEEN ABATED AND REMOVED FROM SITE BY SPECIALIZED ABATEMENT FIRM.

1.22. RECLAIM AND DISPOSE OF ALL REFRIGERANT IN ACCORDANCE WITH LOCAL BY-LAWS, STANDARDS AND REGULATIONS.

1.23. WHERE MECHANICAL SYSTEMS BEING REMOVED RUN THROUGH WALLS/FLOOR/ROOVES/EXTERIOR SURFACES, MAKE GOOD ALL SURFACES.

1.23.1. HIRE BASE BUILDING ROOFING AND WATERPROOFING CONTRACTORS TO MAKE GOOD ALL PENETRATIONS THROUGH BUILDING EXTERIOR.

1.23.2. WHERE REMOVING ROOF TOP EQUIPMENT ON CURBS, REMOVE ASSOCIATED CURB AND MAKE GOOD ROOF.

HVAC

1. GENERAL

1.1. COMPLY WITH ALL REQUIREMENTS OF DIVISION 1, OWNER, PROJECT MANAGER AND/OR CONSTRUCTION MANAGER.

1.2. COORDINATE THE WORK OF THIS TRADE WITH ALL OTHER TRADES. INCLUDE FOR ALL MATERIAL AND LABOUR TO INSTALL THESE SYSTEMS TO SUIT THE EXISTING AND NEW SYSTEMS OF OTHER TRADES.

2. DUCTWORK

2.1. UNLESS OTHERWISE SPECIFIED, CONSTRUCT AND INSTALL ALL DUCTWORK IN ACCORDANCE WITH ANSI/SMACNA HVAC DUCT CONSTRUCTION STANDARDS USING A MINIMUM PRESSURE CLASSIFICATION OF POSITIVE OR NEGATIVE 500 PA (2" W.C) AND A MINIMUM VELOCITY OF 10 M/S (2000 FPM) SUCH THAT THE DUCTWORK DOES NOT DRUM.

2.2. FOR DUCTWORK SUBJECTED TO MORE THAN 500 PA (2" W.C.) POSITIVE/NEGATIVE PRESSURE, CONSTRUCT DUCTWORK TO MEET ANSI/SMACNA DUCT STANDARD TO SUIT APPLICABLE PRESSURE CLASSIFICATION PLUS 10% FACTOR OF SAFETY.

2.3. STANDARD DUCTWORK SHALL BE CONSTRUCTED FROM GALVANIZED STEEL SHEETS, HOT DIPPED IN ACCORDANCE WITH ASTM A653. GALVANIZING FOR BARE UNCOVERED DUCTS TO BE FINISH PAINTED TO BE G60. ALL OTHER GALVANIZING TO BE G90.

2.4. PROVIDE ALUMINUM DUCTWORK AS SHOWN ON DRAWINGS AND FOR ALL SYSTEMS IN HIGH HUMIDITY AREAS OR FOR ALL SYSTEMS SERVING SYSTEMS WITH HIGH WATER CONTENT OR HUMIDITY.

2.4.1. ALUMINUM DUCTWORK SHALL BE CONSTRUCTED FROM ALLOY 3003 TEMPER H14 ALUMINUM, ASTM B209, AND BE FABRICATED TO BE WATER TIGHT WITH METAL GAUGES AND FABRICATION IN ACCORDANCE WITH ANSI/SMACNA HVAC DUCT CONSTRUCTION STANDARDS.

2.4.2. SLOPE DUCTWORK TO ENSURE THAT ALL MOISTURE DRAINS TO SYSTEM LOW POINTS. PROVIDE VALVED AND CAPPED DRAIN CONNECTIONS AT SYSTEM LOW POINTS.

2.5. FABRICATE AND INSTALL DUCTWORK TO ENSURE INTERIOR SURFACE IS SMOOTH AND FREE OF OBSTRUCTIONS, AND THAT DUCTWORK DOES NOT VIBRATE OR CREATE NOISE ONCE SYSTEMS ARE IN OPERATION.

2.6. DUCTWORK HANGERS SHALL BE FABRICATED AND INSTALLED IN ACCORDANCE WITH THE LATEST SMACNA STANDARDS AS A MINIMUM. INCLUDE ALL ADDITIONAL SUPPORTS AS REQUIRED TO SUIT SYSTEMS SPECIFICS AND ENSURE A FULLY OPERATIONAL AND VIBRATION FREE DUCTWORK SYSTEM.

2.7. FLEXIBLE DUCTWORK SHALL BE SPIRALLY WOUND, SEMI-RIGID, SELF SUPPORTING CORRUGATED ALUMINUM DUCT WITH CONTINUOUS TRIPLE LOCK SEAMS, ULC-S110 LISTED AND LABELED AS A CLASS 1 AIR DUCT, CONSTRUCTED OF DEAD SOFT ALUMINUM STRIP FACTORY COVERED WITH 40 MM (1-1/2"), 12 KG/M^3 (0.75 LB/FT^3) DENSITY FIBERGLASS INSULATION WITH VINYL JACKET MEETING FLAME AND SMOKE DEVELOPMENT REQUIREMENTS OF CAN/ULC S-102. BASIS OF DESIGN SHALL BE NOVAFLEX GROUND T/L-A TRIPLE LOCK ACOUSTIC DUCT.

2.8. FLEXIBLE DUCTS SERVING DIFFUSERS/GRILLES SHALL HAVE A MAX LENGTH OF 2400 MM (8'-0"). FLEXIBLE DUCTS SERVING TERMINAL CONTROL UNITS (VAV/FAN POWERED VAV) SHALL HAVE A MAXIMUM LENGTH 12000 MM (4'-0") AND A MINIMUM OF 3 DUCT DIAMETERS OF STRAIGHT LENGTH.

2.9. ALL FLEXIBLE DUCTWORK SHALL BE INSTALLED WITHOUT EXCESS LENGTH AND SUPPORTED IN ACCORDANCE WITH ANSI/SMACNA HVAC DUCT CONSTRUCTION STANDARDS.

2.10. FIRE DAMPERS SHALL BE INSTALLED IN ALL DUCTWORK PASSING FIRE RATED PARTITIONS. DAMPERS SHALL BE CURTAIN BLADE TYPE, DYNAMIC, GALVANIZED STEEL FUSIBLE LINK DAMPERS, ULC CLASSIFIED TO STANDARD CAN/ULC-S112 AND IN ACCORDANCE WITH NFPA 90A.

2.11. DAMPERS SHALL BE OUT OF STREAM TYPE UNLESS SIZE OR LOCATIONS DICTATES THE USE OF IN STREAM DAMPERS.

2.12. FIRE DAMPERS SHALL BE SELECTED IN ACCORDANCE WITH THE RATING OF THE PARTITION AND LOCAL CODES (OBC). MINIMUM DAMPER RATING SHALL 1.5 HOURS WITH 74C (165F) FUSIBLE LINK (UNLESS APPLICATION REQUIRED HIGHER TEMPERATURE RATING.

2.13. PROVIDE ACCESS DOORS IN DUCTS AND HARD SURFACES AS REQUIRED TO ACCESS AND MAINTAIN FIRE DAMPERS.

2.14. PROVIDE CURTAIN OR PARALLEL BLADE TYPE DAMPERS TO MAINTAIN FIRE RATING INTEGRITY OF MEMBRANE BEING PIERCED. MINIMUM RATING TO BE 1-1/2 HOURS WITH {100OC} [212OF] FUSIBLE LINK. PROVIDE MULTIPLE DAMPERS WHERE SIZES EXCEED CODE LIMITATION.

2.15. FIRE DAMPERS SHALL BE MANUFACTURED BY NAILOR INDUSTRIES INC, GREENHECK FAN CORP, NCA MANUFACTURING OR RUSKIN CO. SELECT DAMPERS TO SUIT ORIENTATION, SIZE, REQUIRED RATING, AND ALL OTHER FACTORS REQUIRED.

2.16. PROVIDE FLEXIBLE DUCT CONNECTIONS BETWEEN ALL AIR HANDLING EQUIPMENT AND SYSTEM DUCTWORK. FLEXIBLE DUCT CONNECTIONS SHALL BE 0.68 mm (0.027") THICK WOVEN FIBERGLASS WITH POLYCHLOROPRENE COATING MEETING NFPA 90A/90B, NFPA-701 AND CAN/ULC S109-03. DURODYNE NEOPRENE FLEXIBLE CONNECTOR (OR APPROVED EQUAL.)

2.17. PROVIDE ALL MANUAL BALANCING DAMPERS AS SHOWN ON DRAWINGS AND AS REQUIRED TO PROVIDE FULLY BALANCED HVAC SYSTEMS. PROVIDE BALANCING DAMPERS IN EXISTING DUCTWORK AS REQUIRED TO BALANCED SYSTEM TO PERFORMANCE LEVELS SHOWN ON THE DRAWINGS. BALANCING CONTRACTOR SHALL BE A MEMBER IN GOOD STANDING OF AABC OR NEBC. SUBMIT BALANCING REPORT IN PDF FORMAT TO THE CONSULTANT FOR REVIEW. BALANCING REPORT SHALL INCLUDE LEGIBLE DRAWINGS INDICATED TERMINAL LOCATION. ALL BALANCING SHALL BE COMPLETED WITHIN +/- 3% OF VALUES LISTED WITHIN DOCUMENTS. REPLACE/ADJUST FAN SHEAVES, BELTS AND PULLEYS AS REQUIRED TO OBTAIN DESIGN AIR QUANTITIES. INDICATE DESIGN AND ACTUAL PERFORMANCE OF EACH EQUIPMENT AND TERMINAL. PROVIDE TEN (10) ADDITIONAL HOURS OF BALANCING WORK AFTER INITIAL APPROVED BALANCING TO SUIT TENANT COMFORT BALANCING. THIS WORK SHALL BE PERFORMED AFTER THE TENANT HAS MOVED IN, AS MAY BE REQUIRED FOR COMFORT BALANCING. WHERE REQUIRED HIRE BASE BUILDING TESTING/BALANCING CONTRACTOR AND INCLUDE COST WITHIN MECHANICAL TENDER.

2.18. BALANCING DAMPERS SHALL BE BY NAILOR INDUSTRIES, TAMCO, GREENHECK, NCA OR GREENHECK.

2.19. ALL DUCT DIMENSIONS SHOWN ON DRAWINGS ARE CLEAR INSIDE DIMENSIONS. WHERE ACOUSTIC INSULATION IS ADDED, INCREASE DUCT FABRICATION DIMENSIONS AS REQUIRED TO SUIT.

1. EXHAUST FANS

GENERAL

1.1. SUBMIT SHOP DRAWINGS FOR ALL FANS LISTED ON THESE DRAWINGS INCLUDING ALL DIMENSIONS, FAN CURVES, ELECTRICAL PERFORMANCE, AND OPTIONS.

1.2. BASIS OF DESIGN SHALL BE AS SPECIFIED ON DRAWINGS AND FAN SCHEDULE. ACCEPTABLE MANUFACTURERS: LOREN COOK, CARNES, GREENHECK, PENNBARRY, AND TWIN CITY.

1.3. PROVIDE ENGRAVED ALUMINUM NAME PLATE ON EACH FAN SHOWING DESIGN CFM, STATIC PRESSURE AND FAN RPM.

1.4. PROVIDE ALL STARTERS AND CONTROLS FOR EXHAUST FANS. ALL FANS TO BE COMPLETE WITH BACKDRAFT DAMPERS, UNLESS MOTORIZED DAMPER IS SPECIFIED ON THE DRAWINGS. PROVIDE FAN MOUNTED FACTORY WIRED NEMA 3 DISCONNECTS. ALL FANS SHALL BE SUPPLIED WITH ELECTRONICALLY COMMUTATED MOTORS RATED FOR CONTINUOUS DUTY.

1.5. PROVIDE PROOF CURBS FOR ALL ROOF MOUNTED FANS. COORDINATE SCHEDULE OF INSTALLATION WITH GENERAL CONTRACTOR. MECHANICAL CONTRACTOR SHALL INSTALL CURB TO SUIT ROOFING CONTRACTOR'S SCHEDULE. CURB SHALL BE 18 GAUGE GALVANIZED STEEL WITH CONTINUOUSLY WELDED CORNERS, AND COMPLETE WITH 1-1/2” 3 LBS DENSITY INSULATION. PROVIDE WOOD NAILER ON TOP OF ROOF CURB. CURBS SHALL BE MINIMUM OF 24” TALL.

2. ROOF MOUNTED DOWNBLAST

2.1. FAN SHALL BE SPIN ALUMINUM ROOF MOUNTED DIRECT OR BELT DRIVEN CENTRIFUGAL EXHAUST FAN AS SCHEDULED.

2.2. WHEEL SHALL BE CENTRIFUGAL BACKWARD INCLINED. AN AERODYNAMIC INLET CONE SHALL BE PROVIDED FOR MAXIMUM PERFORMANCE AND EFFICIENCY.

2.3. STRUCTURAL COMPONENTS SHALL BE CONSTRUCTED OF MINIMUM 16 GAUGE MARINE ALLOY ALUMINUM, BOLTED TO A RIGID ALUMINUM SUPPORT STRUCTURE. THE ALUMINUM BASE SHALL HAVE CONTINUOUSLY WELDED CURB CAP CORNERS FOR MAXIMUM LEAK PROTECTION.

2.4. AN INTEGRAL CONDUIT CHASE SHALL BE PROVIDED THROUGH THE CURB CAP AND INTO THE MOTOR COMPARTMENT TO FACILITATE WIRING CONNECTIONS. THE MOTOR SHALL BE ENCLOSED IN A WEATHER-TIGHT COMPARTMENT, SEPARATED FROM THE EXHAUST AIRSTREAM. MOTOR SHALL BE NEMA DESIGN B WITH CLASS B INSULATION. MOTOR MOUNTING PLATE SHALL BE MANUFACTURER FROM 10 GAUGE STEEL.

2.5. ALL FANS MUST BE PROVIDED WITH LIFTING LUGS, AS WELL AS STAINLESS STEEL LATCHES ON THE TOP CAP OF THE FAN TO FACILITATE INSTALLATION AND SERVICE.

2.6. PROVIDE HINGED FAN BASE TO ALLOW FOR EASY ACCESS TO INLET OF THE FAN FOR ANY FAN OVER 500 CFM.

3. INSTALLATION

3.1. INSTALL FANS AS SHOWN. COORDINATE ROOF OPENING WITH GENERAL CONTRACTOR AND STRUCTURAL CONTRACTOR.

3.2. PROVIDE ALL VIBRATION ISOLATION MEASURES TO PREVENT VIBRATION FROM BEING TRANSFERRED TO THE STRUCTURE, AND TO PREVENT NOISE.

3.3. PROVIDE FLEXIBLE DUCT CONNECTIONS FROM DUCTWORK TO FAN.

3.4. PROTECT MOTORS AND FANS SURGING CONSTRUCTION AND ROTATE FANS, BY HAND, EVERY 2 WEEKS BETWEEN DELIVERY AND SUBSTANTIAL PERFORMANCE.

3.5. PROVIDE ALL CONTROLS AS SHOWN ON DRAWINGS TO PROVIDE FULLY FUNCTIONAL FAN SYSTEMS.

3.6. PROVIDE AIR BALANCING REPORT FOR EACH FAN INSTALLED ON SITE WITHIN +/- 3% DEVIATION FROM SCHEDULED PERFORMANCE.

PLUMBING AND DRAINAGE

1. GENERAL

1.1. PROVIDE ALL PLUMBING AND DRAINAGE SYSTEMS COMPLETE WITH ALL EQUIPMENT, PIPING, CONNECTIONS, SUPPORTS, HANGERS AND ACCESSORIES TO PROVIDE A FULLY COMPLETE AND FUNCTIONAL SYSTEM. PROVIDE ALL SYSTEMS BETWEEN UTILITY CONNECTIONS (WATER AND DRAINAGE) AND EQUIPMENT AND/OR CAPPED PROVISIONS.

1.2. PROVIDE ALL PLUMBING FIXTURES INCLUDING ALL REQUIRED TRIM AND SUPPORTS. COORDINATE FIXTURE FINISHES AND ACCESSORIES WITH ARCHITECTURAL DIVISION.

1.3. ROUGH-IN AND PROVIDE FINAL CONNECTION TO ALL EQUIPMENT.

1.4. PROVIDE ALL REQUIRED FIRE EXTINGUISHERS IN ACCORDANCE WITH OBC, OFC AND NFPA STANDARDS.

1.5. PRESSURE TEST ALL PIPING SYSTEMS IN ACCORDANCE WITH LOCAL & PROVINCIAL CODES FOR LEAKS, BEFORE INSULATION IS ADDED. SUBMIT REPORT TO THE OWNER AND A COPY TO THE ENGINEER.

1.6. PROVIDE ALL TRENCHING AND BACKFILLING REQUIRED FOR DIVISION 15 WORK.

1.7. ALL PLUMBING FIXTURES SHALL BE VENTED IN ACCORDANCE WITH LOCAL PLUMBING CODES. CONNECT NEW VENTING TO EXISTING SYSTEMS OR PROVIDE NEW VENTING SYSTEMS WHERE EXISTING ARE NOT SUFFICIENT.

1.8. PRIME ALL TRAPS AS REQUIRED TO MEET CODE REQUIREMENTS AND REQUIREMENTS OF LOCAL AUTHORITIES. PROVIDE NEW TRAP SEAL PRIMERS AS NECESSARY.

1.9. ALL PLUMBING FIXTURES SHALL BE INSTALLED IN CONFORMANCE WITH MANUFACTURER'S RECOMMENDATIONS.

1.10. FOR UNDERGROUND INSTALLATIONS, PROVIDE SUITABLE BEDDING, COVERAGE AND SLOPE TO EASE DRAINAGE.

1.11. PROVIDE TEMPORARY CAPS AND/OR SCREEN ON ALL SYSTEMS DURING CONSTRUCTION TO PREVENT DEBRIS FROM ENTERING. AT THE COMPLETION OF CONSTRUCTION, FLUSH ALL SYSTEMS TO REMOVE DEBRIS.

1.12. SEPARATE DISSIMILAR METALS BY MEANS OF GASKETS, DI-ELECTRIC UNIONS OR COUPLINGS THAT PREVENT ELECTROLYTIC ACTION. (E.G. BRASS BETWEEN COPPER AND STEEL).

1.13. COORDINATE THE INSTALLATION OF ALL PLUMBING AND DRAINAGE SYSTEMS WITH OTHER TRADES. INSTALL SYSTEMS AS HIGH AS POSSIBLE. SUPPORT ALL SYSTEMS FROM BUILDING STRUCTURE.

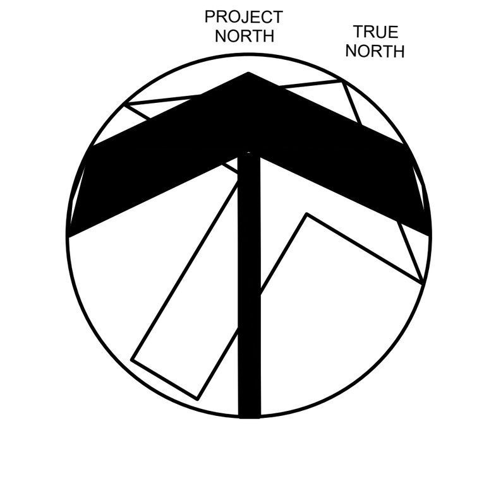
1.14. PROVIDE SUITABLE DRAIN DOWN LOCATIONS FOR ALL SYSTEMS. INSTALL SYSTEMS TO ALLOW THEM TO BE DRAINAGE TO BUILDING DRAINAGE.

1.15. PROVIDE ALL POINT OF USE CSA APPROVED BACKFLOW PREVENTERS AT EQUIPMENT AS REQUIRED BY CODE AND AS SHOWN ON THESE DRAWINGS. ALL BACKFLOW PREVENTER SHALL DRAIN TO SUITABLE HUB DRAIN AND BE INSTALLED TO ALLOW FOR INSPECTION.

1.16. PROVIDE SLEEVES FOR ALL PIPES PASSING THROUGH WALLS, FLOORS AND CEILINGS. SLEEVES SHALL BE SCHEDULE 40 BLACK STEEL AND PACKED TO ENSURE A WATER TIGHT INSTALLATION. PROVIDE 3M OR EQUAL FIRE SEAL.

1.17. ALL SYSTEMS SHALL BE SUPPORTED FROM BUILDING STRUCTURE (SUPPORTS FROM OTHER EQUIPMENT OR DAISY-CHAINED SUPPORTS WILL NOT BE ACCEPTED.) SUPPORTS AND HANGERS SHALL BE INSTALLED ON THE EXTERIOR OF INSULATION COMPLETE WITH SADDLES.

1.18. EXISTING SANITARY DRAIN LOCATIONS AND INVERT ELEVATIONS SHALL BE VERIFIED ON SITE PRIOR TO COMMENCEMENT OF WORK.



NO	REVISIONS	DATE
4	ISSUED FOR TENDER	04/12/2024
3	ISSUED FOR PERMIT	04/03/2024
2	ISSUED FOR COORDINATION	04/01/2024
1	ISSUED FOR COORDINATION	03/27/2024
NO	ISSUED	DATE

SENECA ENGINEERING LAB AT NH K3170

SENECA COLLEGE, NEWNHAM CAMPUS
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Seneca

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SCALE: AS INDICATED
DATE: 03/22/2024
DRAWN BY: A.N.-T./M.M.
CHECKED BY: D.J
PROJECT: 24-018-007
DRAWING: M002A

MECHANICAL SPECIFICATION

2. PIPING MATERIALS:

2.1. SANITARY AND STORM DRAINAGE AND VENT PIPE ABOVE GROUND:

2.2.1. 2-1/2" AND SMALLER TO BE DWV COPPER WITH DWV DRAINAGE FITTINGS WITH 95/5 TIN/ANTIMONY SOLDER JOINTS..
2.2.2. 3" AND LARGER TO BE CSA CLASS 4000 CAST IRON PIPE AND FITTINGS WITH MECHANICAL JOINTS.
2.2.3. FOR ABOVE GROUND SANITARY, STORM AND VENT PIPE, WHERE ACCEPTED BY CODE, AT THE CONTRACTOR'S OPTION, 25/50 FLAME AND SMOKE RATED RIGID SCHEDULE 40 IPS PVC PLENUM RATED PIPING (XFR PIPING) FOR ANY PIPE THAT IS INTALLED IN A CEILING PLENUM, OR WHERE A FUTURE CEILING PLENUM MAY BE INSTALLED. WHERE ACCEPTABLE BY CODE, AT THE CONTRACTOR'S OPTION, 25 FLAME SPREAD RATED, RIGID IPS PVC PIPING (SYSTEM 15). THE CONTRACTOR SHALL REVIEW THE INSTALLATION WITH THE PIPE MANUFACTURER TO ENSURE CODE COMPLIANCE OF THE INSTALLATION. NO ALTERNATE TO IPEX ARE ACCEPTED.

2.3. SANITARY AND STORM DRAINAGE AND VENT PIPE BELOW GROUND:

2.3.1. 2-1/2" AND SMALLER TO BE PVC SEWER PIPE AND FITTINGS WITH SOLVENT WELDED FITTINGS.
2.3.2. 3" AND LARGER TO BE IPEX RING-TITE SDR35 CSA CERTIFIED TO B182.2 PVC GASKETTED SEWER PIPE.

2.3. DOMESTIC HOT COLD AND RECIRCULATION PIPING TO BE TYPE L HARD COPPER WITH WROUGHT IRON COPPER FITTING WITH 95/5 TIN/ANTIMONY SOLDER JOINTS.

2.4. BURIED DOMESTIC COLD AND HOT WATER PIPING TO BE TYP. 'K' SOFT COOPER FREE OF ANY BURIED FITTING WITHIN PVC CONDUIT. PROVIDE TRANSITION/FITTING ABOVE GROUND COMPLETE WITH UNIONS.

2.5. PROVIDE NEW KITZ FIG 44 200 PSI SOLDERED GATE VALVES.

2.6. PUMPED SANITARY AND STORM PIPING TO BE :

2.6.1. 2" AND SMALLER TO BE TYPE 'L' COPPER WITH 50/50 LEAD/TIN SOLDER JOINTS.
2.6.2. 2.5" AND LARGER TO BE SCHEDULE 40 GALVANIZED STEEL WITH THREADED 150 LBS GALVANIZED MALLEABLE IRON FITTINGS.
2.6.3. ALL PUMPED SANITARY SYSTEMS SHALL BE SUITABLE OF HANDLING THE MAX SYSTEM PRESSURE WITH 25% FACTOR OF SAFETY

FIRE PROTECTION

1. GENERAL

1.1. PROVIDE ALL LABOUR, MATERIAL, EQUIPMENT, ENGINEERING, AND SERVICES REQUIRED TO SUPPLY A CODE COMPLIANT FIRE PROTECTION SYSTEM IN ACCORDANCE WITH THESE DOCUMENTS.

1.2. THESE DOCUMENTS ARE INTENDED TO SHOW A GENERAL SCOPE OF WORK RELATED TO FIRE PROTECTION. ALL SYSTEMS SHALL BE IN STRICT ACCORDANCE WITH:

1.2.1. NFPA 10

1.2.2. NFPA 13

1.2.3. NFPA 14

1.2.4. NFPA 20

1.2.5. ONTARIO BUILDING CODE (OBC)

1.2.6. ONTARIO FIRE CODE (OFC)

1.2.7. LOCAL FIRE MARSHALL'S REQUIREMENTS

1.2.8. OWNER'S INSURANCE PROVIDERS REQUIREMENTS

1.3. FIRE PROTECTION CONTRACTOR SHALL PROVIDE THE FOLLOWING SCOPE OF WORK INCLUDED IN THEIR TENDER AMOUNT:

1.3.1. HYDRAULICALLY DESIGN ALL NEW AND MODIFICATIONS OF EXISTING FIRE PROTECTIONS SYSTEM BY A QUALIFIED SPRINKLER ENGINEER LICENSED TO PRACTICE IN THE PROVINCE OF INSTALLATION.

1.3.2. THE SPRINKLER CONTRACTOR'S ENGINEER SHALL BECOME THE SPRINKLER ENGINEER OF RECORD AND SUBMIT ALL REQUIRED DESIGN TO THE CITY BUILDING DEPARTMENT, FIRE MARSHALL AND BUILDING INSURANCE PROVIDER.

1.3.3. PROVIDING FIRE PROTECTION ZONING IN ACCORDANCE WITH EXISTING BUILDING ZONING AND AS PER THESE DOCUMENTS.

1.3.4. PROVIDE SPRINKLER SYSTEM HYDRAULIC PERFORMANCE TO SUIT THE HAZARD CLASSIFICATION OF THE SPACE.

1.3.5. ADHERE TO ALL FM GLOBAL REQUIREMENTS WHERE APPROPRIATE.

1.4. PROVIDE ALL REQUIRED SPRINKLER HEADS REQUIRED TO PROVIDE CODE COMPLIANT DESIGN, THESE DOCUMENTS ARE INTENDED TO SHOW THE MINIMUM NUMBER OF SPRINKLER HEADS.

1.5. DESIGN SPRINKLER HEAD AND FIRE HOSE LAYOUT IN CONJUNCTION WITH ARCHITECTURAL DRAWINGS.

1.6. PROVIDE FIRE PROTECTION SIGN OFF LETTER STAMPED BY SPRINKLER ENGINEER OF RECORD STATING THAT INSTALLATION IS IN ACCORDANCE WITH ALL REQUIRED CODES APPLICABLE TO THE INSTALLATION.

1.7. SUBMIT SHOP DRAWINGS AND HYDRAULIC CALCULATION COMPLETE WITH SPRINKLER ENGINEER'S STAMP TO CONSULTANT AND ALL AUTHORITIES FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE ALL SPRINKLER HEADS, MECHANICAL GROOVED COUPLINGS, VALVES, SENSORS, FIRE HOSE CABINETS, FIRE EXTINGUISHERS AND ALL OTHER EQUIPMENT INCLUDED IN FIRE PROTECTION SCOPE OF WORK.

1.8. VERIFY AVAILABLE WATER FLOW AND PRESSURE OF SYSTEM. INCLUDE FOR MUNICIPAL MAIN WATER FLOW AND PRESSURE TESTS AT NEAREST FIRE HYDRANT. PROVIDE TEST RESULTS AS PART OF SHOP DRAWINGS PROCESS.

1.9. ALL SPRINKLER SYSTEM COMPONENTS SHALL BE ULC LISTED AND FM APPROVED, SUITABLE FOR FIRE PROTECTION SYSTEMS. ALL SYSTEM PIPES, VALVES, FITTINGS, JOINTS, DEVICES, AND ACCESSORIES SHALL BE SUITABLE FOR THE MAXIMUM SYSTEM THEY WILL BE SUBJECTED TO INCLUDING A 25% FACTOR OF SAFETY.

1.10. HIRE BASE BUILDING FIRE PROTECTION CONTRACTOR TO PERFORM ALL FIRE PROTECTION WORK. INCLUDE THIS COST IN TENDER AMOUNT.

1.11. ALL SPRINKLER HEADS SHALL BE CENTERED IN CEILING TILES AND IN LINED WITH CEILING COMPONENTS INCLUDING LIGHTS AND DIFFUSERS. HEAD LAYOUT SHALL BE APPROVED BY ARCHITECT PRIOR TO INSTALLATION.

1.12. SPRINKLER PIPING 2" AND SMALLER SHALL BE SCHEDULE 40 BLACK CARBON STEEL, ASTM A53, GRADE B, COMPLETE WITH CLASS 125 CAST IRON SCREWED FITTINGS TO ANSI/ASME B16.4.

1.13. SPRINKLER PIPING 2-1/2" AND LARGER SHALL BE SCHEDULE 40 BLACK CARBON STEEL, ASTM A52, GRADE B COMPLETE WITH BUTT WELDED JOINTS AND CARBON STEEL BUTT WELDED FITTINGS TO ASTM A234, GRADE WPB, LONG SWEEP PATTERN.

1.14. DRY SPRINKLER PIPING SHALL BE GALVANIZED SCHEDULE 40 BLACK STEEL WITH JOINTS AS PER THE ABOVE. REPAIR DAMAGE TO GALVANIC PROCESS DURING INSTALLATION.

1.15. IN LIEU OF THE ABOVE, PROVIDE VICTAULIC FIRELOCK FITTINGS AND VICTAULIC STYLE 005 RIGID COUPLING JOINTS. MECHANICAL GROOVED COUPLINGS BY ANOTHER MANUFACTURER ARE NOT ACCEPTABLE.

1.16. ALL SPRINKLER PIPING SHALL BE RIGID METAL PIPING. NO FLEXIBLE PIPING OR PLASTIC PIPING WILL BE ALLOWED. NO FLEXIBLE HEADS WILL BE ALLOWED.

1.17. ALL SPRINKLER FITTINGS AND JOINTS SHALL BE APPROVED FOR THE MAXIMUM SYSTEM PRESSURE THEY WILL BE SUBJECTED TO WITH A 25% FACTOR OF SAFETY.

1.18. ALL SPRINKLER VALVES SHALL BE PROVIDED BY A SINGLE MANUFACTURER. VALVES SHALL BE INSTALLED SUCH THAT THE MANUFACTURERS NAME, PRESSURE RATING, LISTING, SHALL BE VISIBLE.

1.19. SHUT-OFF VALVES SHALL BE A MINIMUM OF 1205KP (175PSI) RATED FULL PORT BRONZE BODY SCREWED BALL VALVE AND LUG BODY OR GROOVED END TYPE BUTTERFLY VALVES.

1.20. CHECK VALVES SHALL BE A MINIMUM OF 1205 KPA (175PSI) RESILIENT SEAT CHECK VALVE TAPPED FOR SITE INSTALLATION OF A 20MM (3/4") DIAMETER BALL DRIP.

1.21. BALL DRIPS SHALL BE EQUAL TO NATIONAL FIRE EQUIPMENT LTD 3/4" DIAMETER AUTOMATIC BALL DRIP.

1.22. ALL SHUT-OFF VALVES SHALL BE COMPLETE WITH TAMPER-PROOF SUPERVISORY SWITCHES, EACH ARRANGED TO ACTIVATE A FIRE ALARM SYSTEM 'TROUBLE' CONDITION IF THE VALVE IS CLOSED OR TAMPERED WITH. PROVIDE EACH SUPERVISORY VALVE WITH A 150MM (6") SQUARE, ENGRAVED, LAMINATED RED-WHITE PLASTIC TAG TO CORRESPOND WITH SUPERVISED VALVE NUMBER AS PER FIRE ALARM SYSTEM NOMENCLATURE.

1.23. WHERE VICTAULIC SYSTEMS ARE USED, PROVIDE VICTAULIC FIRE PROTECTION VALVES.

1.24. PROVIDE ULC LISTED AND LABELED CLA-VAL PRESSURE REDUCING STATIONS WHERE REQUIRED COMPLETE WITH PRESSURE REDUCING RELIEF VALVE PIPES TO SUITABLE DRAIN, SUPERVISED ISOLATION VALVES, STRAINER, PRESSURE GAUGES, CAST IRON BODY AND BRONZE TRIM WHERE SHOWN ON THESE DRAWINGS. SELECT PRESSURE REDUCING VALVES TO SUIT UPSTREAM AND DOWNSTREAM DESIGN PRESSURES.

1.25. PROVIDE MINIMUM 1205KPA (175PSI) RATED DUAL TORSION THERMOPLASTIC AND STAINLESS STEEL SPRING CHECK VALVE BACKFLOW PREVENTER ASSEMBLY WITH REPLACEABLE SEATS LISTED TO CAN/CSA B64, COMPLETE WITH STAINLESS STEEL BODY, TOP ACCESS COVER, OSY SUPERVISED INLET AND OUTLET SHUT-OFF VALVES AND BY-PASS WATER METER WITH TEST COCKS AND BY-PASS DOUBLE CHECK VALVES.

1.26. PROVIDE FIRE DEPARTMENT CONNECTIONS WHERE SHOWN WITH TWO 65MM (2-1/2") DIAMETER INLETS THREADED TO FIRE DEPARTMENT HOSE REQUIREMENTS AND EQUIPPED WITH CAPS AND CHAINS WITH OUTLET AS PER DRAWINGS. THE FACEPLATE IS TO BE POLISHED BRASS AND COMPLETE WITH "STANDPIPE", "AUTO SPKR" OR AS REQUIRED BY LOCAL FIRE DEPARTMENT CAST-IN RAISED LETTERING. EQUIP FIRE DEPARTMENT CONNECTION WITH CHECK VALVE AND AUTO-BALL DRIP.

1.27. PROVIDE NEW DOUBLE INTERLOCK SELF CONTAINED ULC LISTED AND FM APPROVED PRE-ACTION FIRE PROTECTION SYSTEM FACTORY ASSEMBLED, PIPED, WIRED TESTED AND APPROVED. SYSTEM TO BE COMPLETE WITH INTEGRAL COMPRESSOR, DELUGE VALVE, RELEASE CONTROL PANEL AND ALL ACCESSORIES AND PIPING IN FREE STANDING CABINET. SYSTEM SHALL INCLUDE:
1.27.1. 14 GAUGE STEEL CABINET WITH POWDER COAT FINISH COMPLETE WITH REMOVABLE AND LOCKABLE HINGED FRONT ACCESS DOOR, NEOPRENE GASKETED INDIVIDUAL ACCESS DOORS FOR HYDRAULIC AND ELECTRICAL SECTION, AND THE EMERGENCY RELEASE.

1.27.2. 1725 KPA (250 PSI) RATED RATED DELUGE VALVE COMPLETE WITH TRIP AND ALL REQUIRED ACCESSORIES.

1.27.3. SCHEDULE 40 GALVANIZED STEEL RELEASE TRIM WITH SOLENOID VALVE AND ALL REQUIRED SUPERVISORY AND ALARM DEVICES INCLUDING IDENTIFIED TEST PORTS.

1.27.4. GROOVED END SCHEDULE 40 BLACK STEEL PIPE HEADER SUITABLE FOR LEFT OR RIGHT CONNECTION, 2" DRAIN CONNECTION.

1.27.5. SUPERVISED BUTTERFLY TYPE ISOLATION VALVE ASSEMBLY.

1.27.6. FACTORY WIRED RELEASE PANEL WITH ALL REQUIRED INPUTS AND AUXILIARY ALARM OUTPUTS COMPLETE WITH AN LCD ANNUNICATOR TO DESCRIBE ALL SYSTEM CONDITIONS, AND YELLOW AND RED LED TO IDENTIFY EACH SEPARATE ALARM AND TROUBLE CONDITION, IDENTIFIED CONTROL BUTTONS FOR OPERATION OF VARIOUS PANEL FUNCTION, EMERGENCY BATTERIES AND AUTOMATIC CHARGER SIZED FOR 10 MINUTES OF ALARM AFTER 90 HOURS STAND-BY, THEN 5 MINUTES OF ALARM AND ACTIVATION OF THE SOLENOID VALVE.

1.27.7. FACTORY INSTALLED AIR COMPRESSOR INSTALLED INSIDE CABINET, SIZED TO SUIT SYSTEM REQUIREMENTS WITH FACTORY ADJUSTED PRESSURE REGULATION AND ALL REQUIRED SUPERVISORY TRIM AND ACCESSORIES.

1.27.8. DUAL CHAMBER IONIZATION TYPE SMOKE DETECTORS, EACH COMPLETE WITH A RED LED THAT PULSES DURING NORMAL STANDBY CONDITIONS AND ILLUMINATED STEADILY DURING AN ALARM CONDITION.

1.27.9. SURFACE WALL MOUNTED NON-BREAK GLASS PULL STATION WITH TEST/RESET KEY.

1.27.10. CHECK VALVE

1.27.11. LOW PRESSURE ALARM SWITCH

1.27.12. FLOW ALARM

1.28. SPRINKLER HEADS SHALL BE MANUFACTURED BY TYCO, VICTAULIC, VIKING OR RELIABLE. SUBMIT SAMPLES OF EACH STYLE OF SPRINKLER HEAD.

1.28.1. RECESSED SPRINKLER HEADS SHALL BE COMPLETE WITH WHITE PAINTED COVER PLATE UNLESS OTHERWISE STATED.

1.28.2. UPRIGHT SPRINKLER HEADS SHALL HAVE BRONZE OR BRIGHT CHROME FINISH.

1.28.3. PENDANT TYPE SPRINKLER HEADS TO BE COMPLETE WITH CHROME PLATED SPRINKLER HEAD WITH CHROME PLATED ESCUTCHEON PLATE.

1.28.4. SIDEWALL SPRINKLER HEADS SHALL BRONZE OR CHROME PLATED HEADS LISTED FOR SIDEWALL APPLICATION.

1.28.5. UNLESS OTHERWISE SPECIFIED USE SPRINKLER HEADS LISTED TO 74C (165F) RATED HEADS. WHERE SPRINKLER HEADS ARE SUBJECT TO HIGHER TEMPERATURES, PROVIDE PRESSURE REQUIREMENTS AS REQUIRED TO SUIT APPLICATION.

1.28.6. FLEXIBLE SPRINKLER HEADS WILL NOT BE ALLOWED.

1.29. PROVIDE FIRE EXTINGUISHERS IN ACCORDANCE WITH OBC, OFC AND NFPA 10.

1.30. IN ALL TYPICAL SPACES PROVIDE ABC-100WBA, 4A60BC RATED MULTI-PURPOSE DRY-CHEMICAL FIRE EXTINGUISHER WITH WALL MOUNTING OR MOUNTING CABINET AS REQUIRED BY DRAWINGS.

1.31. IN ALL ELECTRICAL ROOMS PROVIDE C02-150WW 15LB. CARBON DIOXIDE TYPE 10BC RATED FIRE EXTINGUISHER WITH INSULATED HANDLE, HOSE AND HORN DISCHARGE ASSEMBLY WITH WALL MOUNTING BRACKETS.

1.32. IN ALL KITCHENS PROVIDE ULC CLASS-K RATED, 6 LITER CLASS K (POTASSIUM ACETATE) LIQUID FIRE EXTINGUISHERS.

1.33. PROVIDE COMBINATION TEST AND DRAIN FITTINGS WITH ORIFICE SIZED ACCORDING TO INSTALLED SPRINKLER HEADS. TEST AND DRAIN FITTINGS SHALL BE ULC LISTED AND FM APPROVED AND INSTALLED IN ACCESSIBLE AREA.

1.34. PROVIDE ADDITIONAL SPRINKLER HEADS OF EACH TYPE AS REQUIRED BY CODE, INSTALLED IN METAL CABINET IN SPRINKLER ROOM, OR AS DIRECTED BY OWNER, COMPLETE WITH ALL TOOLS REQUIRED TO CHANGE OUT SPRINKLER HEADS.

1.35. EACH SPRINKLER HEAD BRANCH LINE SHALL INCLUDE A 25MM (1") CAPPED CONNECTION FOR FUTURE SPRINKLER HEAD. DESIGN BRANCH LINES TO HANDLE THE GREATER OF 1 ADDITIONAL SPRINKLER HEAD PER BRANCH OR 10% ADDITIONAL SPRINKLER HEADS PER BRANCH.

1.36. INSTALL SPRINKLER SYSTEM AS HIGH AS POSSIBLE AND COORDINATE INSTALLATION WITH ALL OTHER TRADES.

1.37. SLOPE ALL HORIZONTAL SPRINKLER PIPING SO THAT IT CAN BE EASILY AND COMPLETELY DRAINED. PROVIDE CAPPED DRAINS AT ALL LOW POINTS.

1.38. COORDINATE REQUIREMENT OF SPRINKLER SYSTEM FIRE ALARM CONNECTION WITH ELECTRICAL DIVISION AND FIRE ALARM CONTRACTOR. MECHANICAL CONTRACTOR SHALL TAKE LEAD ROLE IN COORDINATED ALL SUCH WORK.

1.39. NO SPRINKLER WORK SHALL BE CONCEALED UNTIL SUCH TIME AS IT HAS BEEN APPROVED BY THE ENGINEER OF RECORD AND THE AUTHORITY HAVING JURISDICTION.

1.40. TEST ALL SPRINKLER SYSTEMS TO NFPA 13 REQUIREMENTS.

1.41. TEST ALL STANDPIPE AND FIRE HOSE SYSTEM TO NFPA 14 REQUIREMENTS.

1.42. TEST ALL SYSTEM IN ACCORDANCE WITH OFC, LOCAL FIRE MARSHAL AND BUILDING OFFICIALS REQUIREMENTS.

1.43. INSTALL ALL TEST AND DRAIN CONNECTION IN ACCORDANCE WITH NFPA 13 REQUIREMENTS. PIPE DRAIN TO NEAREST BUILDING SANITARY DRAINAGE SYSTEMS. DO NOT DRAIN TO OUTDOORS.

1.44. PROVIDE GUARDS FOR SPRINKLER HEAD IN AREAS SUBJECT TO DAMAGE INCLUDING, BUT NOT LIMITED TO, ELEVATOR MACHINE ROOMS, STORAGE ROOMS, ELEVATOR SHAFTS, GARBAGE ROOMS, MECHANICAL ROOMS, LOW HEAD ROOM LOCATION, AND ANY OTHER LOCATION WHERE SPRINKLER HEAD COULD BE DAMAGED.

1.45. PROVIDE PROTECTION OF SPRINKLER HEADS FOR FULL DURATION OF CONSTRUCTION. REPLACE AT NO ADDITIONAL COST ANY SPRINKLER HEAD THAT IS DAMAGED, ALTERED, PAINTED, OR OTHERWISE AFFECTED.

1.46. PROVIDE NFPA SIGN-OFF LETTER AT THE COMPLETION OF PROJECT. LETTER SHALL BE STAMPED BY CONTRACTORS SPRINKLER ENGINEER.

1.47. REMOVE AND REPAIR/REPLACE ANY SYSTEM COMPONENT WHICH DOES NOT PASS INSPECTION/TESTING.

1.48. REMOVE AND REINSTALL ANY SPRINKLER COMPONENT NOT SUITABLE FOR TEST PRESSURES.

1.49. PROVIDE AS BUILT DRAWINGS IN CAD AND PDF FORMAT AT THE COMPLETION OF PROJECT.

1.50. INSTALL ALL BACKFLOW PREVENTERS AS REQUIRED BY CODE WITH PIPED DRAINS TO NEAREST BUILDING SANITARY DRAINAGE SYSTEM. ALL ISOLATION VALVES ON BACKFLOW PREVENTERS SHALL BE SUPERVISED. INSTALL BACKFLOW PREVENTERS TO ENSURE THEIR LISTING, MANUFACTURER NAME AND MODEL NUMBER AND FLOW DIRECTION ARROW ARE VISIBLE.

1. INSULATION

1.1. PROVIDE ALL LABOUR AND MATERIAL REQUIRED TO INSULATE ALL MECHANICAL SYSTEMS AS SPECIFIED WITHIN THIS SECTION AND AS NOTED ON DRAWINGS.

1.2. UNLESS OTHERWISE SPECIFIED, INSULATION THERMAL PERFORMANCE IS TO MEET OR EXCEED THE MORE STRINGENT REQUIREMENTS OF THE LATEST EDITIONS OF THE NATIONAL ENERGY CODE OF CANADA FOR BUILDINGS AND ASHRAE 90.1.

1.3. ALL SYSTEM SUBJECT TO CONDENSATION (INCLUDING COLD AND DUAL TEMPERATURE) SHALL BE INSULATED COMPLETE WITH VAPOUR BARRIER. VAPOUR BARRIER SHALL BE INSTALLED OVER ALL SYSTEM COMPONENTS INCLUDING VALVES. VAPOUR BARRIER SHALL BE COMPLETE AND CONTINUOUS IN ITS ENTIRETY. ANY DAMAGE TO VAPOUR BARRIER SHALL REQUIRE FULL REMOVAL AND REPLACEMENT. DO NOT PATCH NEW VAPOUR BARRIERS INSTALLED AS PART OF THIS CONTRACT.

1.4. INSULATION SHALL ONLY BE APPLIED ONCE SYSTEMS HAVE BEEN TESTED AND REVIEWED BY ENGINEER AND AUTHORITY HAVING JURISDICTION.

1.5. INSTALL INSULATION ON PIPES AND DUCTS WHICH ARE CLEAN AND DRY, AND WITH ENVIRONMENTAL CONDITIONS AS REQUIRED BY THE INSULATION MANUFACTURER.

1.6. STORE ALL INSULATION MATERIAL ON SITE IN A DRY STORAGE AREA AND ENVIRONMENTAL CONDITIONS AS REQUIRED BY THE INSULATION MANUFACTURER.

1.7. ALL INSULATION OF MECHANICAL SYSTEMS SHALL BE INSTALLED BY A SINGLE INSULATION CONTRACTOR.

1.8. ALL INSULATION SHALL HAVE FLAME AND SMOKE SPREAD RATINGS OF 25/50 AND AS REQUIRED BY THE LOCAL BUILDING CODE AND REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION AND AS PER CAN/ULC-S114 AND CAN/ULC-S101.

1.9. ACCEPTABLE INSULATION MANUFACTURERS ARE JOHNS MANVILLE, OWENS CORNING, MANSON INSULATION, AND KNAUF OR AS LISTED BELOW.

1.10. ALL PIPE/DUCT LABELS SHALL BE APPLIED TO OUTSIDE OF INSULATION USING STENCILS OR WITH PIPE WRAP LABELS INSTALLED IN SUCH A WAY AS TO BE VISIBLE FROM THE FLOOR.

1.11. ALL INSULATION BUTT JOINTS SHALL BE FIRMLY CONNECTED JOINED AND INSTALLED IN SUCH A WAY AS TO NOT SEPARATE OVER TIME.

2. PIPING INSULATION

2.10. FOR SYSTEMS UP TO 250 F (121 C) PROVIDE BELFORM INSULATION LTD KOOLPHEN K-BLOCK INSULATED PIPE SUPPORT INSERTS, A MINIMUM OF 6" (150MM) LONG, PRE-MOLDED, RIGID, SECTIONAL PHENOLIC FOAM INSULATION (MATCHING THICKNESS OF ADJACENT INSULATION) WITH REINFORCED FOIL AND KRAFT PAPER VAPOUR JACKET AND A 180 DEGREE CAPTIVE GALVANIZED STEEL SADDLE.

2.11. FOR ABOVE GROUND PIPE PROVIDE PREFORMED MINERAL FIBRE RIGID, SECTIONAL, SLEEVE TYPE INSULATION TO ASTM STANDARD C 547, STANDARD SPECIFICATION FOR MINERAL FIBRE PIPE INSULATION, WITH A FACTORY APPLIED VAPOUR BARRIER JACKET EQUAL TO JOHN MANVILLE INC MICRO-LOK AP-T PLUS, KNAUF FIBER GLASS PIPE INSULATION WITH ASJ-SSL JACKET, MANSON INSULATION INC ALLEY K APT OR OWNES CORNING FIBERGLASS PIPE INSULATION.

2.12. FOR ALL VALVES AND ACCESSORIES IN PIPING SYSTEMS PROVIDE BLANKET MINERAL FIBRE TYPE ROLL INSULATION TO ASTM C553, STANDARD SPECIFICATION FOR MINERAL FIBRE BLANKET THERMAL INSULATION FOR COMMERCIAL AND INDUSTRIAL APPLICATIONS, 24 KG/M^3 (1-1/2 LB./FT/^3) DENSITY WITH A FACTORY APPLIED VAPOUR BARRIER FACING.

2.13. PROVIDE THE FOLLOWING INSULATION THICKNESSES:

2.13.1. DOMESTIC COLD WATER PIPING UP TO AND INCLUDING 4" (100MM) - 1" (25MM) WITH VAPOUR BARRIER

2.13.2. DOMESTIC COLD WATER PIPING LARGER THAN 4" (100 MM) - 1-1/2" WITH VAPOUR BARRIER

2.13.3. DOMESTIC HOT WATER AND RECIRC PIPING UP TO AND INCLUDING 1-1/2" (40MM) - 1" (25MM)

2.13.4. DOMESTIC HOT WATER AND RECIRC PIPING LARGER THAN 1-1/2" - 2" (50MM)

2.13.5. TEMPERED DOMESTIC WATER ALL SIZES - 1" (25MM)

2.13.6. STORM PIPING - 1" (25MM) WITH VAPOUR BARRIER

2.13.7. ABOVE GROUND SANITARY PIPING - 1" (25MM) WITH VAPOUR BARRIER)

2.13.8. STEAM PIPING UP TO AND INCLUDING 2" (50MM) - 2.5" (65MM)

2.13.9. STEAM PIPING LARGER THAN 2" (50MM) - 3" (75MM)

2.13.10. CONDENSATE PIPING - 1" (25MM) WITH VAPOUR BARRIER

2.13.11. CHILLED WATER PIPING UP TO AND INCLUDING 4" (100MM) - 1" (25MM) WITH VAPOUR BARRIER

2.13.12. CHILLED WATER PIPING LARGER THAN 4" (100MM) - 1-1/2" (40MM) WITH VAPOUR BARRIER

2.13.13. CONDENSER WATER PIPING UP TO AND INCLUDING 4" (100MM) - 1" (25MM) WITH VAPOUR BARRIER

2.13.14. CONDENSER WATER PIPING LARGER THAN 4" (100MM) - 1-1/2" (40MM) WITH VAPOUR BARRIER

2.13.15. BUILDING HOT WATER UP TO AND INCLUDING 1-1/2" 40MM - 1" (25MM)

2.13.16. BUILDING HOT WATER LARGER THAN 1-1/2" (40MM) - 2" (50MM)

2.13.17. MECHANICAL SYSTEMS COMPLETE WITH HEAT TRACING OF ALL SIZES - 2" (50MM)

2.14. WRAP ALL EXPOSED INSULATION WITH WHITE SHEET PVC AND FITTING COVERS JACKET. INSTALL JACKET WITH OVERLAPPING LONGITUDINAL AND CIRCUMFERENTIAL JOINTS AND PROVIDE WATER TIGHT INSULATION. PROVIDE SLIP-TYPE JACKET EXPANSION JOINTS WHERE REQUIRED.

2.15. INSULATION SHALL BE APPLIED DIRECTLY TO THE PIPE AND NOT AROUND HANGERS AND SUPPORTS.

2.16. INSTALL ALL INSULATION IN ACCORDANCE WITH MANUFACTURER SPECIFICATIONS.

2.17. PROVIDE PREFORMED INSULATION ON ALL BARRIER FREE LAVATORIES INCLUDING P-TRAP, ANGLE STOPS AND PIPING INSULATION.

2.18. ALL INSULATION SHALL BE CONTINUOUS AND BE EXTENDED THROUGH WALL AND FLOOR OPENINGS. SUPPLY SOUND PROOF AND FIRE PROOF PENETRATIONS TO SUIT.

2.19. INSULATION APPLIED IN TWO LAYERS SHALL HAVE JOINTS STAGGERED.

2.20. INSULATE OVER FLANGES AND MECHANICAL COUPLINGS WITH INSULATION TO MATCH PIPE INSULATION THICKNESS AND OUTSIDE DIAMETER OF FLANGE/COUPLING. FILL THE VOID BETWEEN THE FLANGE/COUPLING INSULATION AND THE PIPE INSULATION WITH THE SAME MATERIAL. ENSURE A CONTINUOUS VAPOUR SEAL ACROSS FULL INSTALLATION.

2.21. DO NOT INSULATE TERMINAL UNIT CONTROL VALVES SO LONG AS THEY ARE SITUATION ABOVE CONDENSATE PAN.

2.22. WHERE INSULATING INLINE COMPONENTS WITH FLEXIBLE INSULATION, DO NOT COMPRESS PRODUCT MORE THAN 50% OF ORIGINAL FACTORY THICKNESS. APPLY LAYERS AS REQUIRED TO ACHIEVE MINIMUM THICKNESS VALUES.

2. SHEET METAL INSULATION
2.1. FOR EXPOSED RECTANGULAR DUCTS PROVIDE PREFORMED BOARD TYPE INSULATION TO ASTM C612, STANDARD SPECIFICATION FOR MINERAL FIBER BOCK AND BOARD THERMAL INSULATION WITH A FACTORY APPLIED REINFORCED ALUMINUM FOIL AND KRAFT PAPER FACING EQUAL TO KNAUF FIBER GLASS INSULATION BOARD WITH FSK FACING, MANSON INSULATION INC AK BOARD FSK, JOHNS MANVILLE INC TYPE 814 SPIN-GLAS OR OWENS CORNING 703, 704.

2.2. FOR EXPOSED ROUND OR OVAL DUCTS PROVIDE ROLL FORM INSULATION TO ASTM C1393 STANDARD SPECIFICATION FOR PERPENDICULARLY ORIENTED FIBER ROLL AND SHEET THERMAL INSULATION FOR PIPES AND TANKS WITH A FACTORY APPLIED VAPOUR BARRIER FACING CONSISTING OF CUT STRIPS OF RIGID MINERAL BOARD INSULATION GLUED TO AN ALUMINUM FOIL AND KRAFT PAPER FACING ACCEPTABLE TO MULTI-GLASS INSULATION LTD MULTI-FLEX MKF, GLASS-CELL FABRICATORS LTD. R-FLEX, OWNS CORNING PIPE AND TANK INSULATION, JOHNS MANVILLE INC PIPE AND TANK INSULATION.

2.3. FOR CONCEALED RECTANGULAR OR OVAL DUCTS PROVIDE BLANKET TYPE ROLL FORM INSULATION TO ASTM STANDARD C553 STANDARD SPECIFICATION FOR MINERAL FIBRE BLANKET THERMAL INSULATION 24 KG/M^3 (1-1/2 LB./FT^3) DENSITY WITH A FACTORY APPLIED VAPOUR BARRIER FACING EQUAL TO KNAUF FIBER GLASS BLANKET INSULATION AND MULTI-PURPOSE FSK FACING, MANSON INSULATION INC ALLEY WRAP FSK, JOHNS MANVILLE INC DUCT WRAP TYPE 150 MICROLITE OR ISOFAB FACED FLEXIBLE FSK INSULATION.

2.4. FOR DUCTS AND PIPES INSTALLED OUTSIDE OF THE BUILDING PROVIDE SHEET OR ROLL FORM CFC FREE CLOSED CELL SELF-ADHERING ELASTOMERIC EPDM RUBBER INSULATION IN ACCORDANCE WITH REQUIREMENTS ASTM C534, STANDARD SPECIFICATION FOR PERFORMED FLEXIBLE ELASTOMERIC CELLULAR THERMAL INSULATION IN SHEET AND TUBULAR FORM WITH ALL REQUIRED INSTALLATION ACCESSORIES EQUAL TO ARMACELL AP/ARMAFLEX SA AND WRAPPED IN ALUMINUM SHEETING WITH ALUMINUM BANDING WITH ALL JOINTS SEALED WITH WEATHERPROOF SEALANT.

2.5. PROVIDE THE FOLLOWING INSULATION THICKNESS:

2.5.1. OUTDOOR AIR INTAKE DUCTS, CASINGS, PLENUMS UP TO MIXING BOXES OR COILS - 1-1/2" (40MM)

2.5.2. PRE-TREATED OUTDOOR AIR DUCTS, CASINGS, PLENUMS - 1-1/2 (40MM)
2.5.3. SUPPLY AIR DUCTS - 1" (25MM)

2.5.4. FINAL 10 FEET OF EXHAUST DUCTS WORK BEFORE BUILDING EXTERIOR - 1" (25MM)

2.5.5. EXPOSED DUCTWORK IN AREAS WHICH IT IS NOT SERVING - 1" (25MM)

2.5.6. DUCTWORK OUTSIDE OF BUILDING - 2" (50MM) WITH ALUMINUM JACKETING.

2.5.7. BLANK-OFF PANELS ON EXTERIOR LOUVERS - 3" (50MM)

2.13. DUCTWORK EXPOSED WITHIN THE SPACE IT SERVES DOES NOT REQUIRE EXTERNAL INSULATION.

2.14. DUCTWORK LINED WITH ACOUSTIC INSULATION CAN SUBTRACT THE THICKNESS OF ACOUSTIC INSULATION FROM THE REQUIRED EXTERNAL INSULATION TO DETERMINE FINAL EXTERNAL INSULATION.

2.15. INSULATION SHALL BE APPLIED DIRECTLY TO THE DUCT AND NOT AROUND HANGERS AND SUPPORTS. PROVIDE RIGID BOARD INSULATION BELOW HANGERS WITH ALUMINUM SADDLE WEAR PLATE BETWEEN INSULATION AND SUPPORTS.

2.16. INSTALL ALL INSULATION IN ACCORDANCE WITH MANUFACTURER SPECIFICATIONS.

2.17. ALL INSULATION SHALL BE CONTINUOUS AND BE EXTENDED THROUGH WALL AND FLOOR OPENINGS. SUPPLY SOUND PROOF AND FIRE PROOF PENETRATIONS TO SUIT.

2.18. INSULATION APPLIED IN TWO LAYERS SHALL HAVE JOINTS STAGGERED.

2.19. INSULATE OVER FLANGES WITH INSULATION TO MATCH PIPE INSULATION THICKNESS AND OUTSIDE DIAMETER OF FLANGE/COUPLING. FILL THE VOID BETWEEN THE FLANGE/COUPLING INSULATION AND THE PIPE INSULATION WITH THE SAME MATERIAL. ENSURE A CONTINUOUS VAPOUR SEAL ACROSS FULL INSTALLATION.

2.20. INSULATION EXPOSED TO THE OUTDOORS SHALL BE WRAPPED IN ALUMINUM JACKET AND SEALED AT ALL ENDS.

2.21. PROVIDE FIRE-RATED DUCT WRAP WHERE SHOWN ON DRAWINGS AND WHERE REQUIRED TO MEET COSTS:

2.21.1. FOR FIRE RATED DUCTS PROVIDE FLEXIBLE NON-COMBUSTIBLE BLANKET TYPE MINERAL FIBRE DUCT WRAP COMPLETELY ENCAPSULATED IN REINFORCED FOIL 1-1/2" (40MM) THICK, SUITABLE FOR INSTALLATION WITH ZERO CLEARANCE TO COMBUSTIBLES, AND ULC TESTED AND LISTED (ULC DESIGNS FRD-3 & 5 FOR VENTILATION DUCTS, ULC DESIGN FRD-4 FOR KITCHEN EXHAUST DUCTS TO FACILITATE A 1 OR 2 HOUR FIRE RESISTANCE RATING EQUAL TO 3M FIRE PROTECTION PRODUCTS FIRE MASTER.

2.21.2. INSTALL FIRE RATED DUCT WRAP IN STRICT ACCORDANCE WITH MANUFACTURER'S AND ULC LISTING REQUIREMENTS FOR KITCHEN EXHAUST OR VENTILATION DUCTWORK AS NECESSARY. DO NOT COVER FIRE WRAP LABELS REGARDLESS OF FINISH. IDENTIFY DUCT SERVICE AND FLOW DIRECTION WITH STENCILED MARKINGS.

2.21.3. ARRANGE AND PAY FOR THE DUCT WRAP SUPPLIER TO EXAMINE THE COMPLETED DUCT WRAP SYSTEM ON SITE AND SUBMIT A LETTER FROM THE SUPPLIER TO CERTIFY THAT THE DUCT WRAP SYSTEM HAS BEEN PROPERLY INSTALLED.

2.21.4. FOR FIRE RATED DUCTS PROVIDE FLEXIBLE NON-COMBUSTIBLE BLANKET TYPE MINERAL FIBRE DUCT WRAP COMPLETELY ENCAPSULATED IN REINFORCED FOIL 1-1/2" (40MM) THICK, SUITABLE FOR INSTALLATION WITH ZERO CLEARANCE TO COMBUSTIBLES, AND ULC TESTED AND LISTED (ULC DESIGNS FRD-3 & 5 FOR VENTILATION DUCTS, ULC DESIGN FRD-4 FOR KITCHEN EXHAUST DUCTS TO FACILITATE A 1 OR 2 HOUR FIRE RESISTANCE RATING EQUAL TO 3M FIRE PROTECTION PRODUCTS FIRE MASTER.

2.21.5. INSTALL FIRE RATED DUCT WRAP IN STRICT ACCORDANCE WITH MANUFACTURER'S AND ULC LISTING REQUIREMENTS FOR KITCHEN EXHAUST OR VENTILATION DUCTWORK AS NECESSARY. DO NOT COVER FIRE WRAP LABELS REGARDLESS OF FINISH. IDENTIFY DUCT SERVICE AND FLOW DIRECTION WITH STENCILED MARKINGS.

2.21.6. ARRANGE AND PAY FOR THE DUCT WRAP SUPPLIER TO EXAMINE THE COMPLETED DUCT WRAP SYSTEM ON SITE AND SUBMIT A LETTER FROM THE SUPPLIER TO CERTIFY THAT THE DUCT WRAP SYSTEM HAS BEEN PROPERLY INSTALLED.

2.22. PROVIDE ACOUSTIC DUCT LINING WHERE NOTED ON DRAWINGS AND AS A MINIMUM THE FIRST 10 FEET ON BOTH SUPPLY AND RETURN DUCTS DOWNSTREAM OF FANS/TERMINAL UNITS PLUS AT LEAST TWO CHANGES OF DIRECTION.

2.23. ACOUSTIC DUCT LINING SHALL BE A MINIMUM OF 1" (25MM) THICK ACOUSTIC LINING MATERIAL MEETING NFPA 90A REQUIREMENTS AND FLAME AND SMOKE SPREAD DEVELOPMENT FIRE HAZARD RATINGS OF CAN/ULC-S102, FLEXIBLE FOR ROUND DUCT, BOARD TYPE FOR RECTANGULAR DUCTS, CONSISTING OF A BONDED FIBERGLASS MAT COATED ON THE INSIDE (AIRSIDE) FACE WITH A BLACK FIRE-RESISTANCE RATING. MATERIAL SHALL HAVE NOISE REDUCTION COEFFICIENT OF 70 OR HIGHER.

2.24. INSTALL LINING IN ACCORDANCE WITH ANSI/SMACNA HVAC DUCT CONSTRUCTION STANDARDS PLUS FOR ALL INSTALLATION REGARDLESS OF VELOCITY AT THE LEADING AND TRAILING EDGES OF DUCT LINER SECTION PROVIDE GALVANIZED STEEL NOSING CHANNEL AS PER ANSI/SMACNA STANDARDS.

1. CONTROLS

1.1. PROVIDE ALL CONTROLS AS SHOWN ON THESE DRAWINGS.

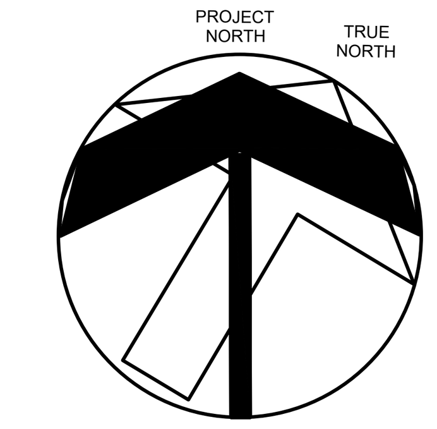
1.2. ALL CONTROLS WORK SHALL BE PROVIDED BY BASE BUILDING CONTROLS CONTRACTOR AND INCLUDED IN MECHANICAL SCOPE OF WORK AND TENDER.

1.3. ALL CONTROLS WIRING SHALL BE PLENUM RATED.

1.4. MECHANICAL CONTRACTOR SHALL PROVIDE ALL 120V AND LOW VOLTAGE WIRING AS REQUIRED TO COMPLETE CONTROLS SCOPE OF WORK. PROVIDE ALL TRANSFORMERS AS REQUIRED TO PROVIDE LOW VOLTAGE CONTROL WIRING. WHERE CONTROLS WORK REQUIRED 120V WIRING, HIRE ELECTRICAL CONTRACTOR TO PERFORM ALL SAID WORK.

1.5. PROVIDE ALL NEW THERMOSTATS TO SUIT BASE BUILDING STANDARDS WHERE APPLICABLE.

1.6. WHERE THERMOSTATS HAVE OCCUPANT INTERACTION, THEY SHALL BE INSTALLED 4'-0" ABOVE FINISHED FLOOR, WITH LOCKING PLEXI-GLASS COVER.



NO	REVISIONS	DATE

NO	ISSUED	DATE
4	ISSUED FOR TENDER	04/12/2024
3	ISSUED FOR PERMIT	04/03/2024
2	ISSUED FOR COORDINATION	04/01/2024
1	ISSUED FOR COORDINATION	03/27/2024

SENECA ENGINEERING LAB AT NH K3170

SENECA COLLEGE, NEWNHAM CAMPUS
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Seneca

SPECIFICATIONS

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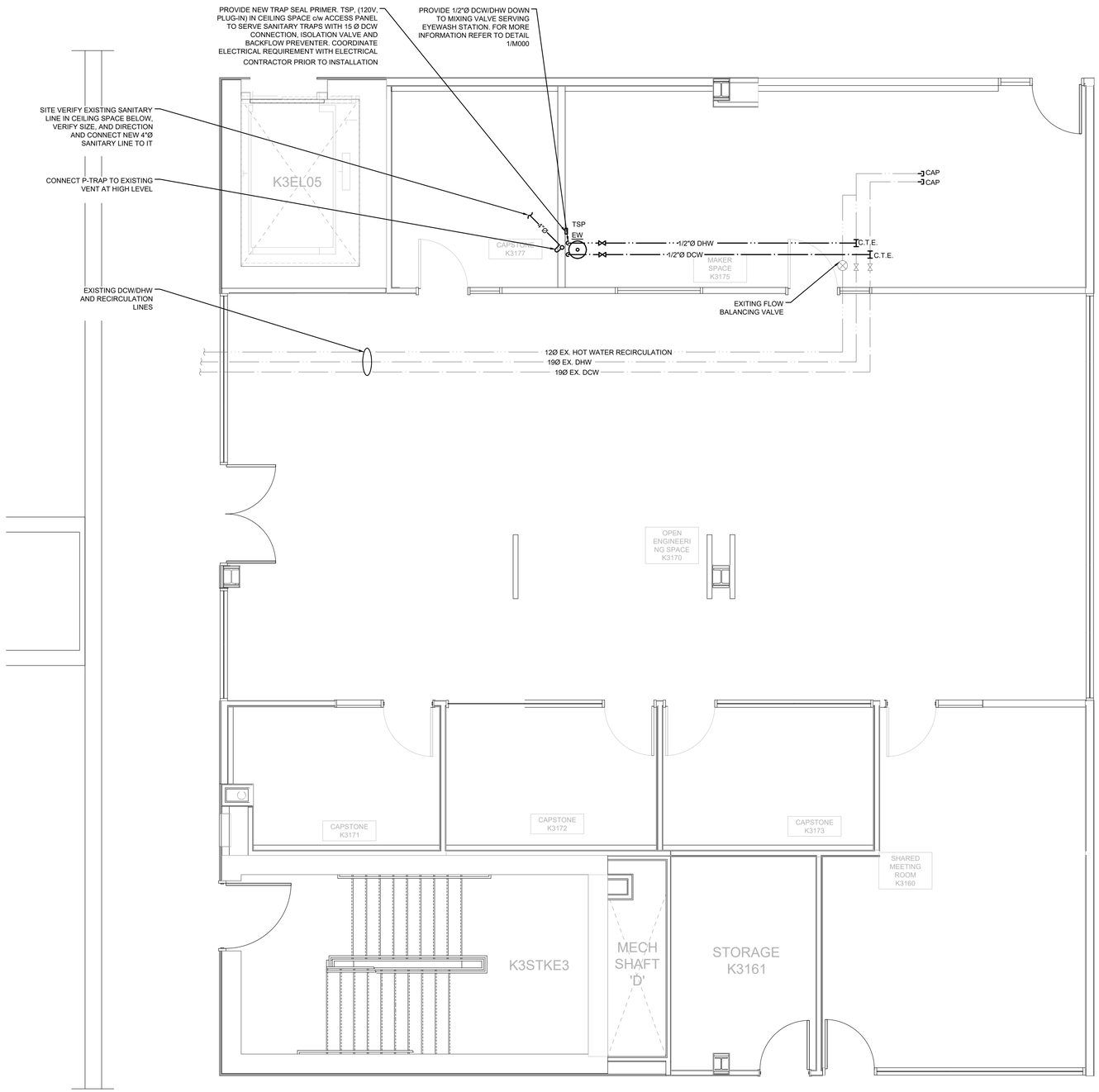
SCALE: AS INDICATED	PROJECT: 24-018-007
DATE: 03/22/2024	
DRAWN BY: A.N.-T./M.M.	DRAWING: M002B
CHECKED BY: D.J	



1 M100 MECHANICAL FLOOR PLAN - PD
SCALE: 1/4"=1'-0"

PROJECT NORTH
TRUE NORTH

NO	REVISIONS	DATE
4	ISSUED FOR TENDER	04/12/2024
3	ISSUED FOR PERMIT	04/03/2024
2	ISSUED FOR COORDINATION	04/01/2024
1	ISSUED FOR COORDINATION	03/27/2024
NO	ISSUED	DATE

SENECA ENGINEERING LAB AT NH K3170

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MECHANICAL FLOOR PLAN - PD

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SCALE: AS INDICATED	PROJECT: 24-018-007
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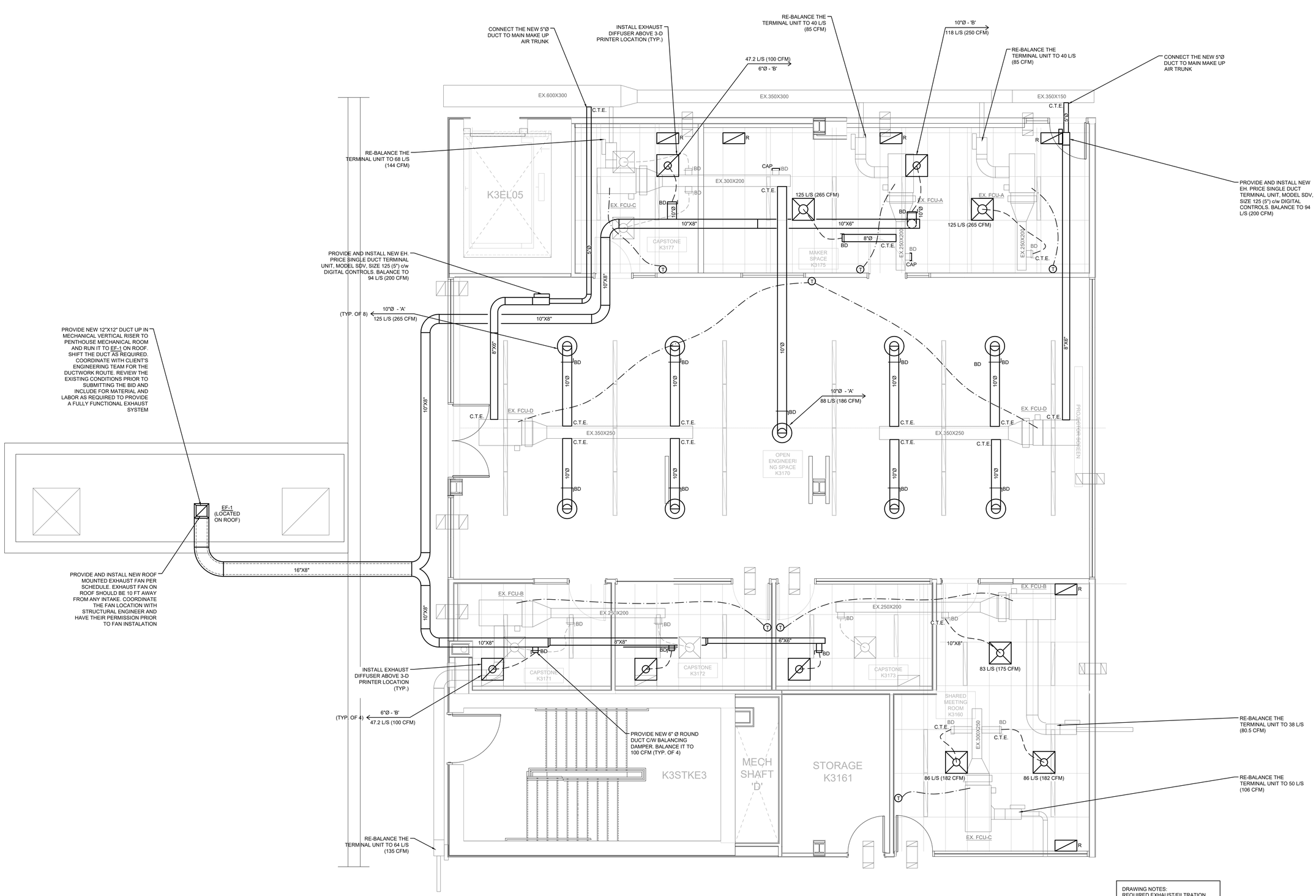
DRAWN BY: A.N.-T./M.M.	DRAWING: M100
CHECKED BY: D.J	



DRAWING NOTES:
REQUIRED EXHAUST/FILTRATION SYSTEM FOR LABS/WORKSHOP SPECIFIC TOOLS WILL BE PROVIDED AND INSTALLED BY THE CLIENT.

1 M200 MECHANICAL FLOOR PLAN - HVAC
SCALE: 1/4"=1'-0"

PROJECT NORTH
TRUE NORTH

NO	REVISIONS	DATE
4	ISSUED FOR TENDER	04/12/2024
3	ISSUED FOR PERMIT	04/03/2024
2	ISSUED FOR COORDINATION	04/01/2024
1	ISSUED FOR COORDINATION	03/27/2024
NO	ISSUED	DATE

SENECA ENGINEERING LAB AT NH K3170

SENECA COLLEGE, NEWNHAM CAMPUS
1750 FINCH AVE E., TORONTO

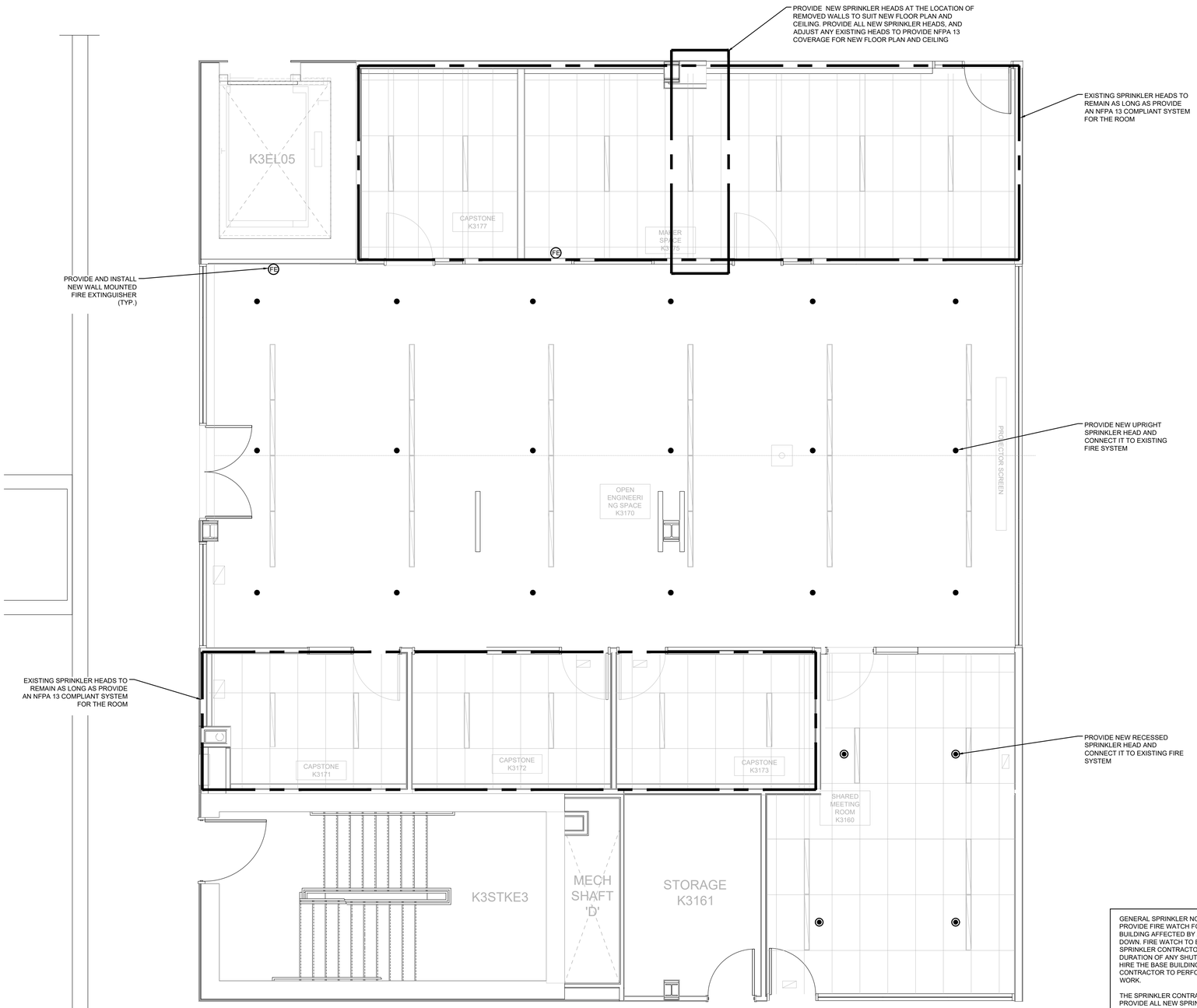
Seneca

MECHANICAL FLOOR PLAN - HVAC

HAMMERSCHLAG & JOFFE INC.
43 Lesmill Road, Toronto, Ontario
Canada M3B 2T8
T: (416) 444.9263
F: (416) 444.1463
E: dwg@hamjof.com

ARTIFACT DESIGN • DEVELOPMENT
31 PLYMBRIDGE CRESCENT, TORONTO, ON M2P 1P4
TEL: 416-414-7095
EMAIL: DIANA@ARTIFACTDEVELOPMENT.CA

SCALE: AS INDICATED	PROJECT: 24-018-007
DATE: 03/22/2024	
DRAWN BY: A.N.-T./M.M.	DRAWING: M200
CHECKED BY: D.J	



GENERAL SPRINKLER NOTES:
PROVIDE FIRE WATCH FOR ANY AREA OF THE BUILDING AFFECTED BY A SPRINKLER SHUT DOWN. FIRE WATCH TO BE PROVIDED BY SPRINKLER CONTRACTOR AND LAST THE FULL DURATION OF ANY SHUT DOWN.
HIRE THE BASE BUILDING SPRINKLER CONTRACTOR TO PERFORM ALL SPRINKLER WORK.

THE SPRINKLER CONTRACTOR SHALL PROVIDE ALL NEW SPRINKLER COVERAGE WHERE
EXISTING COVERAGE IS NOT SUFFICIENT TO PROVIDE NFPA 13 COVERAGE.

PROVID A STAMPED NFPA 13 SIGN OFF LETTER AT THE COMPLETION OF THE PROJECT TO CONFIRM THAT SPRINKLER SYSTEM HAS BEEN LEFT IN ACCORDANCE WITH THE CODE.

SITE VERIFY ALL EXISTING CONDITIONS.

1 / M300 MECHANICAL FLOOR PLAN - FP
SCALE: 1/4"=1'-0"

PROJECT NORTH
TRUE NORTH

NO	REVISIONS	DATE
4	ISSUED FOR TENDER	04/12/2024
3	ISSUED FOR PERMIT	04/03/2024
2	ISSUED FOR COORDINATION	04/01/2024
1	ISSUED FOR COORDINATION	03/27/2024
NO	ISSUED	DATE

DRAWINGS ARE NOT TO BE SCALED. CONTRACTOR MUST CHECK AND VERIFY ALL DIMENSIONS AND CONDITIONS ON THE PROJECT, AND MUST REPORT ANY DISCREPANCIES TO THE CONSULTANTS BEFORE PROCEEDING WITH THE WORK. THE USE OF THIS DRAWING OR PART THEREOF IS FORBIDDEN WITHOUT THE WRITTEN APPROVAL OF THE CONSULTANTS.

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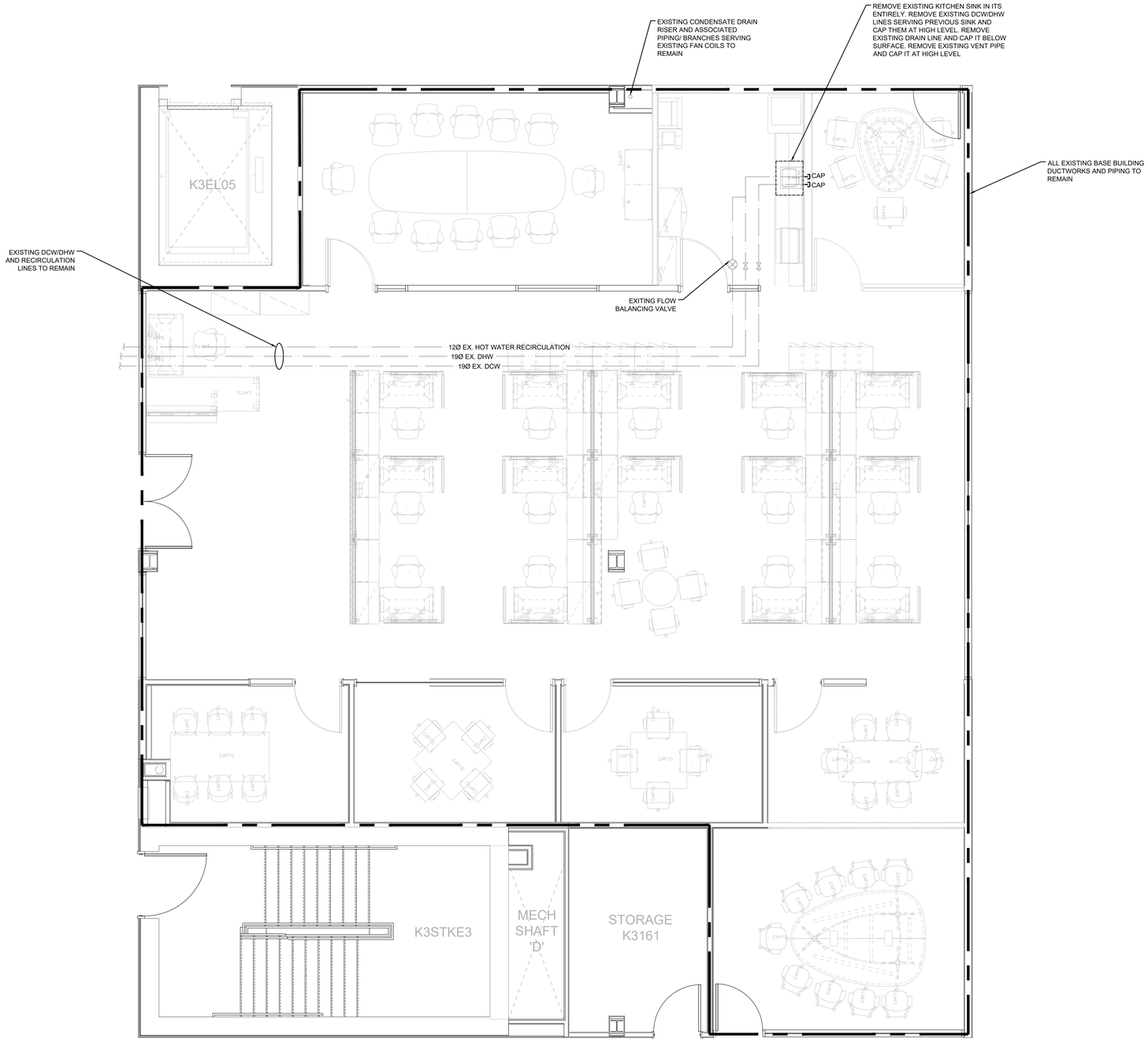
SCALE: AS INDICATED	PROJECT: 24-018-007
DATE: 03/22/2024	
DRAWN BY: A.N.-T./M.M.	DRAWING: M300
CHECKED BY: D.J	



1 MD100 MECHANICAL DEMOLITION FLOOR PLAN - PD
SCALE: 1/4"=1'-0"

PROJECT NORTH
TRUE NORTH

NO	REVISIONS	DATE
4	ISSUED FOR TENDER	04/12/2024
3	ISSUED FOR PERMIT	04/03/2024
2	ISSUED FOR COORDINATION	04/01/2024
1	ISSUED FOR COORDINATION	03/27/2024
NO	ISSUED	DATE

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MECHANICAL DEMOLITION PLAN - PD

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ARTIFACT
DESIGN + DEVELOPMENT
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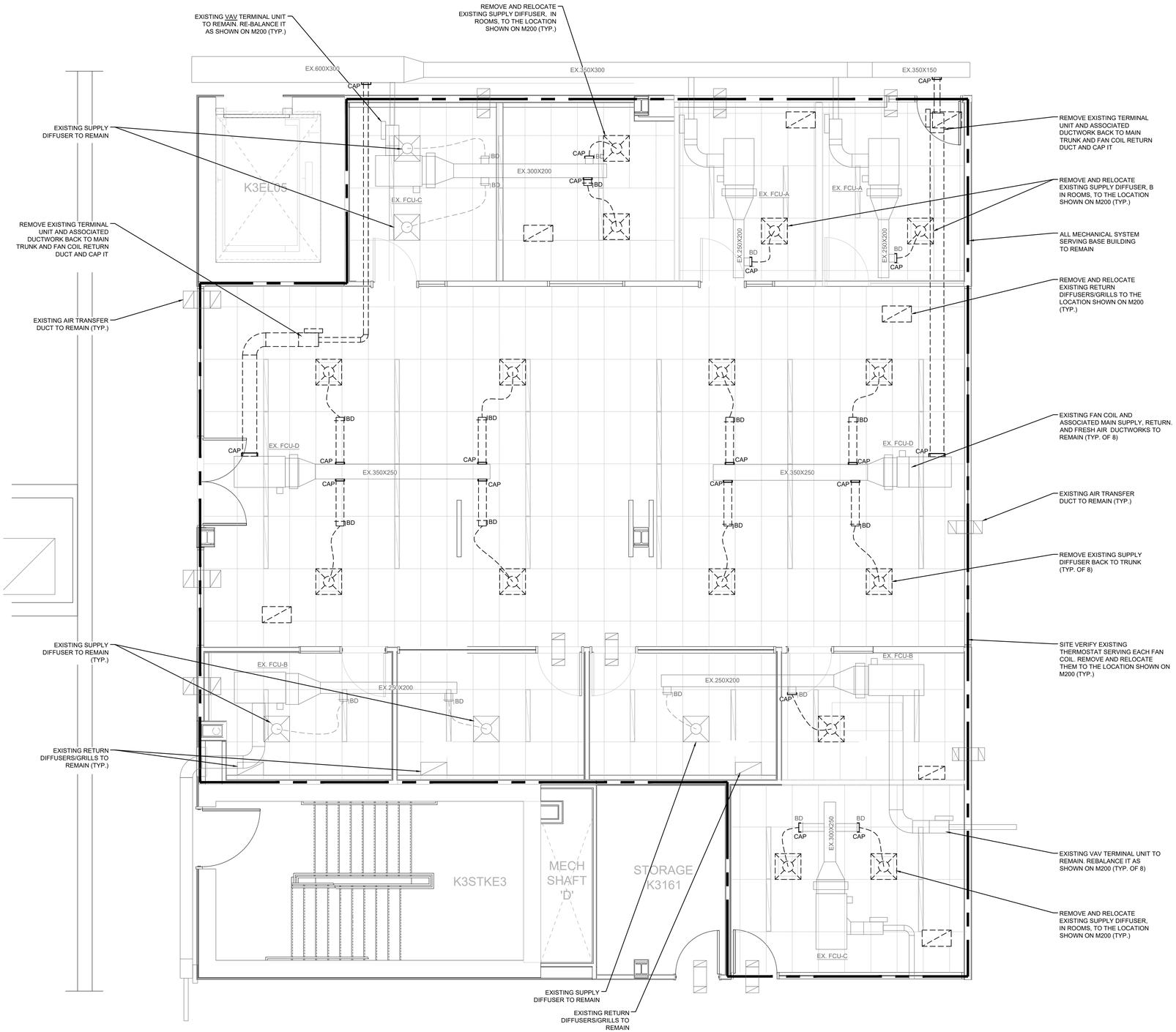
SCALE: AS INDICATED	PROJECT: 24-018-007
DATE: 03/22/2024	
DRAWN BY: A.N.-T./M.M.	DRAWING: MD100
CHECKED BY: D.J	



1 MD101 MECHANICAL DEMOLITION FLOOR PLAN - HVAC
SCALE: 1/4"=1'-0"

PROJECT NORTH
TRUE NORTH

NO	REVISIONS	DATE
4	ISSUED FOR TENDER	04/12/2024
3	ISSUED FOR PERMIT	04/03/2024
2	ISSUED FOR COORDINATION	04/01/2024
1	ISSUED FOR COORDINATION	03/27/2024

NO	ISSUED	DATE

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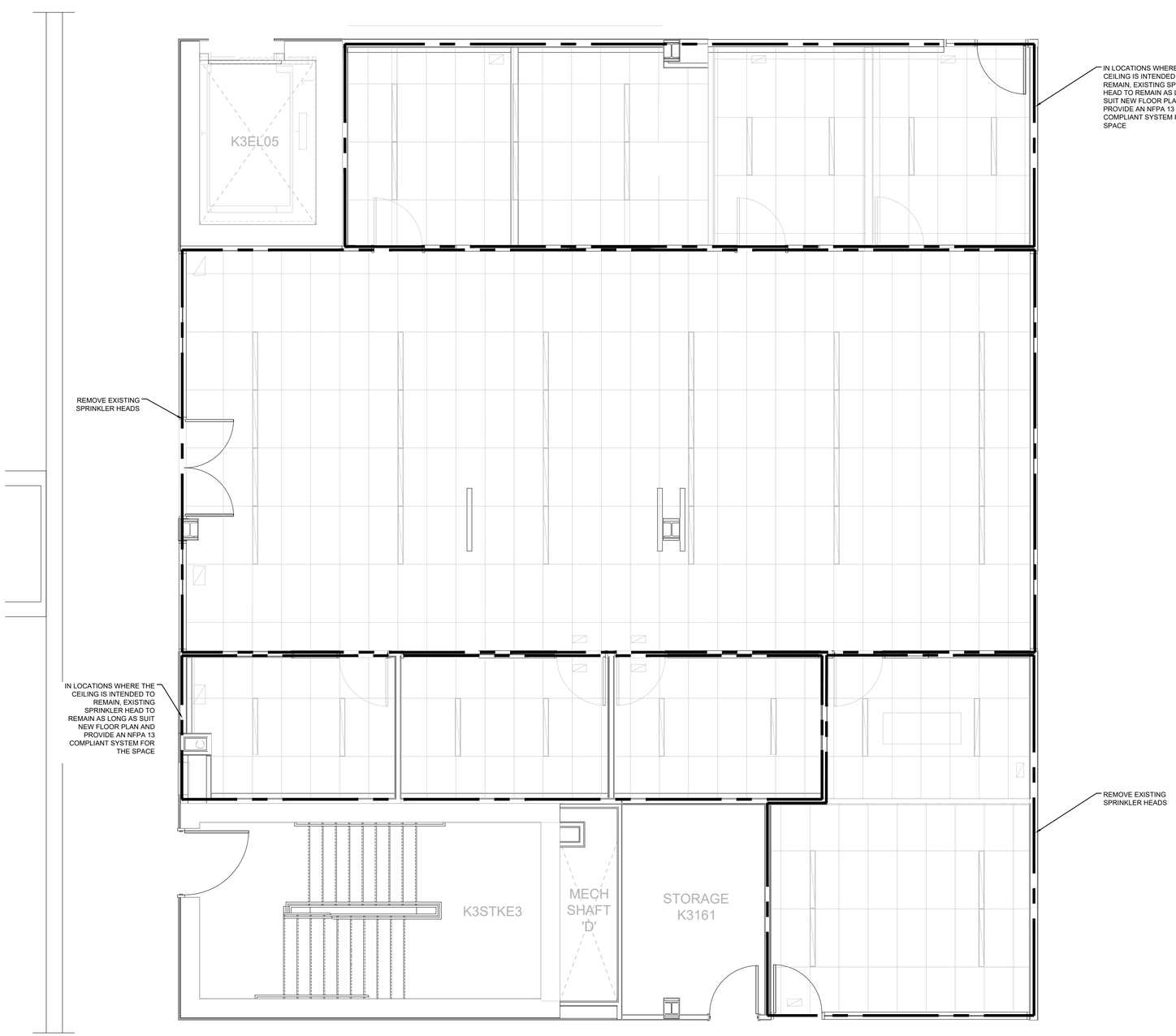
SCALE	PROJECT
AS INDICATED	24-018-007
DATE	
03/22/2024	
DRAWN BY	DRAWING
A.N.-T./M.M.	MD101
CHECKED BY	
D.J	



1 MD102 MECHANICAL DEMOLITION FLOOR PLAN - FP
SCALE: 1/4"=1'-0"

PROJECT NORTH
TRUE NORTH

NO	REVISIONS	DATE
4	ISSUED FOR TENDER	04/12/2024
3	ISSUED FOR PERMIT	04/03/2024
2	ISSUED FOR COORDINATION	04/01/2024
1	ISSUED FOR COORDINATION	03/27/2024
NO	ISSUED	DATE

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SCALE AS INDICATED	PROJECT 24-018-007
DATE 03/22/2024	
DRAWN BY A.N.-T./M.M.	DRAWING MD102
CHECKED BY D.J	