Bora Laskin Building - HVAC Upgrades

ONTARIO BUILDING CODE DATA MATRIX	PART 11 RENOVATION OF EXISTING BUILDING	BUILDING CODE VERSION: O. REG. 332/12	LAST AMMENDMENT: O. REG. 191/14	BUILDING CODE REF.

11.01	PROJECT TYPE	☐ ADDITION ☒ RENOVATION ☐ ADDITION & RENOVATION ☐ CHANGE OF USE DESCRIPTION: University Classroom and Administration Building		[A] 1.1.2
11.02	MAJOR OCCUPANCY CLASSIFICATION	OCCUPANCY: Group A, Division 2, 2 Storeys USE: Classroom and Administration		3.1.2.1.(1)
11.03	SUPERIMPOSED MAJOR OCCUPANCIES	☒ NO ☐ YES DESCRIPTION: "		3.2.2.7
11.04	BUILDING AREA (m²)	DESCRIPTION: / EXISTING / NEW / TOTAL Main Floor Area: 2943.2 m² / 0 m² / 2943.2 m² Second Floor Area: 2943.2 m² / 0 m² / 2943.2 m² 0 / 0 / 0 0 / 0 / 0 TOTAL: 5886.4 m² / 0 / 5886.4 m²		[A] 1.4.1.2
11.05	BUILDING HEIGHT	2 STOREYS ABOVE GRADE; 0 (m) ABOVE GRADE 1 STOREYS BELOW GRADE		[A] 1.4.1.2 & 3.2.1.1
11.06	NUMBER OF STREETS / FIREFIGHTER ACCESS	1 STREET(S)		3.2.2.10 & 3.2.5
11.07	BUILDING SIZE	☐ SMALL ☐ MEDIUM ☒ LARGE ☐ > LARGE		T.11.2.1.1.B-N
11.08	EXISTING BUILDING CLASSIFICATION	CHANGE IN MAJOR OCCUPANCY: ☐ YES ☒ NOT APPLICABLE (NO MAJOR CHANGE OF OCCUPANCY) CONSTRUCTION INDEX: HAZARD INDEX: IMPORTANCE CATEGORY: ☐ LOW ☐ NORMAL ☐ HIGH ☐ POST-DISASTER		11.2.1.1 T11.2.1.1A T11.2.1.1 B TO N 4.2.1.(3) 5.2.2.1.(2)
11.09	RENOVATION TYPE	☒ BASIC RENOVATION ☐ EXTENSIVE RENOVATION		11.3.3.1 11.3.3.2
11.10	OCCUPANT LOAD	FLOOR LEVEL / AREA / OCCUPANCY TYPE / BASED ON / OCCUPANT LOAD 0 / 0 / 0 / 0 0 / 0 / 0 / 0 0 / 0 / 0 / 0 0 / 0 / 0 / 0 Existing, No Change - N/A		3.1.17
11.11	PLUMBING FIXTURE REQUIREMENTS	RATIO: M/F = 1/1 EXCEPT AS OTHERWISE NOTED FLOOR LEVEL / AREA / OCCUPANCY TYPE / BASED ON / OCCUPANT LOAD 0 / 0 / 0 / 0 0 / 0 / 0 / 0 0 / 0 / 0 / 0 0 / 0 / 0 / 0 Existing, No Change - N/A		3.7.4
11.12	BARRIER-FREE DESIGN	☒ NO ☐ YES EXPLANATION: *		11.3.3.2.(2)
11.13	REDUCTION IN PERFORMANCE LEVEL	STRUCTURAL: ☒ NO ☐ YES BY INCREASE IN OCCUPANT LOAD: ☒ NO ☐ YES BY CHANGE OF MAJOR OCCUPANCY: ☒ NO ☐ YES PLUMBING: ☒ NO ☐ YES SEWAGE-SYSTEMS: ☒ NO ☐ YES EXTENSION OF COMBUSTIBLE CONSTRUCTION: ☒ NO ☐ YES		11.4.2.1 11.4.2.2 11.4.2.3 11.4.2.4 11.4.2.5 11.4.2.6
11.14	COMPENSATING STRUCTURE	☐ NO ☐ YES *		11.4.3.1 11.4.3.2 11.4.3.3 11.4.3.4 11.4.3.5 11.4.3.6 11.4.3.7
		STRUCTURAL: ☒ NO ☐ YES *		
		BY INCREASE IN OCCUPANT LOAD: ☒ NO ☐ YES *		
		BY CHANGE OF MAJOR OCCUPANCY: ☒ NO ☐ YES *		
		PLUMBING: ☒ NO ☐ YES *		
		SEWAGE-SYSTEMS: ☒ NO ☐ YES *		
		EXTENSION OF COMBUSTIBLE CONSTRUCTION: ☒ NO ☐ YES *		
11.15	COMPLIANCE ALTERNATIVES PROPOSED	☒ NO ☐ YES		11.5.1
11.16	NOTES	- Floor to Floor Fire Separations = 60 min - Corridor and Stairwell Fire Separations = 60 min - Floors are Rated Assemblies		11.5.1

NOTES: ALL REFERENCES ARE TO DIVISION B OF THE OBC UNLESS PRECEDED BY [A] FOR DIVISION A AND [C] FOR DIVISION C

General Scope of Work

- REPAIR OF EXISTING FLOOR ASSEMBLY SEPARATIONS, CORRIDOR WALL FIRE SEPARATIONS, DOOR REPLACEMENTS, FIRE-RATED ACCESS PANELS, PATCHING, ROOF INFILL AND NEW FIRE RATED SHAFT ENCLOSURES

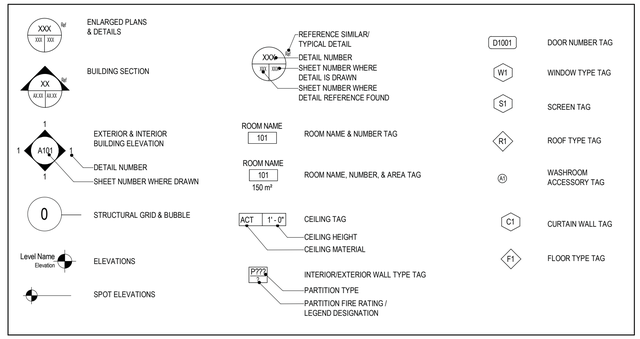
Partition Type Legend

- REFER TO PLANS FOR PARTITION TAGS, NOT ALL PARTITION ASSEMBLIES ARE USED.
- WHERE A PARTITION IS SHOWN WITHOUT A TAG, USE PARTITION TYPE P3, FULL HEIGHT WITH SOUND ATTENUATION.
- WALL AND PARTITION TYPE ARE FOLLOWED BY A LETTER DESIGNATION INDICATING THE FOLLOWING REQUIREMENTS WHERE USED (MORE THAN ONE LETTER MAY BE USED):

*ALL FIRE RATED WALLS ARE FULL HEIGHT, CONTINUOUS

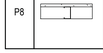
A = NON RATED FIRE SEPARATION
B = 30 MINUTE FIRE SEPARATION
C = 45 MINUTE FIRE SEPARATION
D = 60 MINUTE (1 HR) FIRE SEPARATION
E = 90 MINUTE (1.5 HR) FIRE SEPARATION
F = 120 MINUTE (2 HR) FIRE SEPARATION
G = 180 MINUTE (3 HR) FIRE SEPARATION
H = FULL HEIGHT PARTITION
J = WALL HEIGHT TO MIN. 150MM ABOVE CEILINGS
K = WALL TO FINISH AT U/S CEILING, TAPEABLE L MOLD @ T-BAR, TAPE @ GWB
L = LOAD BEARING WALL
M = WALL HEIGHT TO U/S FLOOR/CEILING JOISTS
N = LOW WALL TO HEIGHT AS INDICATED
P = INFILL CONSTRUCTION TO MATCH EXISTING PARTITION THICKNESS
S = SOUND ATTENUATION INSULATION, ACOUSTIC SEAL TO AND BOTTOM TRACK CONTINUOUS

Symbol Legend

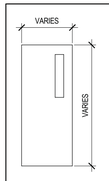


Interior Partition Assemblies - Metal Stud

NOTE: USE 16 (5/8") GYPSUM WALL BOARD ALL ASSEMBLIES UNLESS OTHERWISE NOTED
(GENERIC - REFER TO PLANS FOR RELEVANT ASSEMBLIES USED IN THIS PROJECT)

TAG	VISUAL	UNITS	ASSEMBLY	THICKNESS GWB 16mm (5/8")	THICKNESS GWB 13mm (1/2")	STC	ULC
P3		M	GYPSUM WALL BOARD 92 METAL STUDS @ 400 O/C GYPSUM WALL BOARD	124	118		
		SI	GYPSUM WALL BOARD 3 5/8" METAL STUDS @ 16" O/C GYPSUM WALL BOARD	4 7/8"	4 5/8"		
P8		M	GYPSUM WALL BOARD 64 METAL STUDS @ 400 O/C	76	80		
		SI	GYPSUM WALL BOARD 2 1/2" METAL STUDS @ 16" O/C	3"	3 1/8"		

Door Type Legend

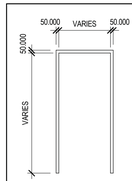


DOOR TYPE 'D1'

NOTE:

1. REFER TO DOOR AND FRAME SCHEDULE FOR DOOR DIMENSIONS.
2. REFER TO SPECIFICATIONS FOR APPROVED MANUFACTURERS. DIMENSIONS MAY VARY TO SUIT FRAME MATERIAL AND PROFILES AVAILABLE.
3. REFER TO DOOR AND FRAME SCHEDULE FOR TYPE OF GLAZING OR INSERTS.
4. REFER TO MECHANICAL DRAWINGS FOR LOCATIONS OF DOOR LOUVERS.
5. REFER TO PLANS AND INTERIOR ELEVATIONS FOR SWING OR OPERATION OF DOOR.

Door Frame Type Legend



FRAME TYPE "F1"

Door Type Legend
Scale = 1 : 50

Door Frame Type Legend
Scale = 1 : 50

Construction Notes

NUMBER	NOTE
CN-01	REMOVE EXISTING BARN DOORS, TRACK AND HARDWARE AND PREPARE OPENINGS FOR NEW PARTITION FRAMING, DOORS AND FRAMES. USE DBL HEAVY GAUGE STUDS AT DOOR JAMBS - FIRESTOP PERIMETER OF NEW PARTITION AT HEAD OF WALL, SIDES AND FLOOR. FIELD VERIFY OPENING DIMENSIONS.
CN-02	OPEN EXISTING T-BAR CEILING AND MODIFY TEES AND HANGERS TO SUIT THE INSTALLATION OF NEW PARTITIONS TO EXTEND MIN. 4" ABOVE EXISTING CEILING TO FACILITATE DUCT INSTALLATION. PROVIDE ACCESS PANELSFOR ACCESS TO NEW FIRE DAMPERS, REFER TO MECH DWGS
CN-03	COORDINATE CUTTING AND REPLACEMENT OF EXISTING CEILING TILE WITH NEW DIFFUSERS, ADD CROSS-TEES WHERE NEEDED TO SUPPORT GRILLE, REFER TO MECH DWGS.
CN-04	COORDINATE CUTTING AND PATCHING OF EXISTING GYPSUM/PLASTER CEILINGS FOR NEW DIFFUSERS. MAKE GOOD CEILING SURFACES - REFER TO MECHANICAL DRAWINGS
CN-05	PROVIDE METAL STUD AND DRYWALL VALANCE ACROSS HEAD OF WINDOWS AT ALL NEW SUSPENDED CEILINGS FOR TERMINATION OF NEW CEILING AT WINDOW LOCATIONS - REFER TO DETAIL
CN-06	PROVIDE METAL STUD AND DRYWALL BULKHEAD TO CONCEAL NEW DUCTWORK, REFER TO MECH DWGS FOR SIZING. PROVIDE TAPABLE L-MOLD AT EXIST'G SURFACES TO MINIMIZE PATCHING
CN-07	NEW SUSPENDED CEILINGS, INSTALL HANGERS TO UNDERSIDE OF EXISTING METAL DECK FLUTES, STRUCTURE OR ALIGNED WITH EXISTING CARRIER CHANNELS IN EXISTING GYPSUM / PLASTER CEILING SYSTEMS. CONFIRM HEIGHTS WITH NEW DUCTOWRK INSTALLATION.
CN-08	NEW SUSPENDED FIRE-RATED GYPSUM CEILINGS IN PLACE OF EXISTING SUSPENDED T-BAR CEILINGS. MAKE FINISH SURFACE FLUSH WITH ADJACENT PLASTER CEILINGS, PATCH AND MAKE GOOD.
CN-09	INFILL EXISTING ROOF OPENING WITH METAL DECK AND STEEL ANGLE. PATCH ROOFING WITH COMPATIBLE VAPOUR BARRIER, INSULATION AND ROOFING, MAKE GOOD AND WEATHER TIGHT.
CN-10	PATCH EXISTING OPENINGS IN PLASTER CEILINGS. PROVIDE CARRIERS ACROSS OPENINGS TO FACILITATE INSTALLATION OF NEW SINGLE-LAYER OF 5/8" TYPE-X GYSPUM BOARD. MAKE CEILINGS GOOD.
CN-11	REMOVE EXISTING BENCH, REDUCE LENGTH TO SUIT (UTLIZING EXISTING BENCH SUPPORT BRACKETS) NEW PARTITION FRAMING AND REINSTALL. COORDINATE WITH NEW FRAMING AND MECH DWGS.
CN-12	NEW METAL STUD AND DRYWALL BULKHEAD AT TRANSITIONS BETWEEN NEW CEILINGS AND EXISTING DOOR FRAMES - REFER TO CEILING PLANS FOR LOCATIONS ANS AS WHERE NEEDED.
CN-13	NEW PARTITION FRAMING, EXTEND ABOVE EXISTING SUSPENDED CEILING. MODIFY CEILING SUSPENSION AND TILE TO SUIT. REFER TO MECH FOR COORDINATION OF CHASE SIZE
CN-14	EXTEND EXISTING PARTITION/SHAFT ENCLOSURE FULL HEIGHT TO U/S OF METAL DECK. PROVIDE TOP OF WALL FIRESTOPPING . UTILIZE 5/8" TYPE-X GYPSUM BOARD ON METAL STUD FRAMING SIZED TO SUIT EXISTING PARTITION/ENCLOSURE THICKNESS. FIRE TAPE OR FIRE CAULK JOINT BETWEEN NEW AND EXISTING GYPSUM BOARD SURFACES.
CN-15	REMOVE AND REPLACE EXISTING NON-RATED CEILING ACCESS PANELS WITH NEW FIRE RATED ACCESS PANELS. PATCH EXISTING OPENINGS IN PLASTER CEILINGS. PROVIDE CARRIERS ACROSS OPENINGS TO FACILITATE INSTALLATION OF NEW SINGLE-LAYER OF 5/8" TYPE-X GYSPUM BOARD. MAKE CEILINGS GOOD.
CN-17	COMPLETE WALL FIRE SEPARATION, EXTEND EXISTING MASONRY WALL WITH SHAFTWALL CONSTRUCTION ALONGSIDE EXISTING WALL. OPEN EXISTING CEILING TO FACILITATE CONSTRUCTION, REPLACE CEILING AFTER COMPLETION. FIRESEAL AT U/S METAL DECK AND AT FACE OF EXISTING BLOCK WALL.
CN-18	REMOVE SECTION OF EXISTING SUSPENDED CEILING TO FACILITATE WORK. RESTORE EXISTING FIRE RATED CEILING. PEEL OFFFIRST ROW OF 12 X 12 TILE BONDED TO EXISTING SUSPENDED PLASTER CEILING. INSTALL NEW CARRYING CHANNELS FOR NEW SUSPENDED 5/8" TYPE-X GYPSUM BOARD CELING. EXTEND NEW CARRIERS MIN. 2'-0" ACCROSS EXISTING CEILING SUPPORT WITH HANGERS @ 4'-0" O/C. INSTALL ADDITIONAL HANGERS TO TO EXPOSED EDGE OF EXISTING CARRYING CHANNELS. LAP JOINT OF NEW AND EXISTING RATED CEILINGS WITH 12" WIDE STRIP OF 5/8" TYPE-X GYPSUM BOARD, FIRE SEAL EDGES ALONG ENTIRE LENGTH. REINSTATE SUSPENDED CEILING AND CEILNG TILE.

Door and Frame Schedule

DOOR NUMBER	ROOM		DOOR							FRAME				FIRE RATING (MIN)	COMMENTS
	NUMBER	NAME	# OF LEAFS	WIDTH	HEIGHT	TYPE	MATERIAL	FINISH	GLAZING	PROFILE	TYPE	MATERIAL	FINISH		
D0001B	0001B	BOILER RM.	2	4'-0"	7'-0"	D1	HM	PTD	DBL GL	WRAP	F1	HM	PTD		
D0001BC	0001BC	ELECTRICAL	2	2'-10"	7'-0"	D1	HM	PTD	DBL GL	WRAP	F1	HM	PTD		

Abbreviations

@	AT	INST	INSTALL
&	AND	INSUL	INSULATION
#	NUMBER, POUND	INT	INTERIOR
AB	AIR BARRIER	IRT	INTEGRATED RUBBER STAIR TREADS & RISERS
ABV	ABOVE		
ACT	ACOUSTIC CEILING TILE	JAN	JANITOR
AFF	ABOVE FINISHED FLOOR	JC	JANITOR'S CLOSET
ALT	ALTERNATE	JT	JOINT
ALUM	ALUMINUM		
AMC	ACOUSTICAL METAL CEILINGS	KP	KICKPLATE
AWC	ACOUSTICAL WOOD CEILINGS		
ANOD	ANODIZED	LAM	LAMINATE
APPROX	APPROXIMATE	LCIB	LUMINOUS CEILINGS - INFUSION BLADES
ARCH	ARCHITECTURAL	LGL	LAMINATED GLASS
AVB	AIR/VAPOUR BARRIER	LIN	LINOLEUM
AVG	AVERAGE	LNDG	LANDING
		LVR	LOUVER
B/O	BOTTOM OF		
BD	BOARD	M	METER
BDRM	BEDROOM	MATL	MATERIAL
BEL	BELOW	MAX	MAXIMUM
BETW	BETWEEN	MECH	MECHANICAL
BF	BARRIER FREE	MED	MEDIUM
BHG	BULKHEAD	MEMB	MEMBRANE
BLDG	BUILDING	MEZZ	MEZZANINE
BOT	BOTTOM	MFR	MANUFACTURER
BSMT	BASEMENT	MIN	MINIMUM
BYND	BEYOND	MM	MILLIMETER
BW	BOTH WAYS	MRD	METAL ROOF DECK
		MTD	MOUNTED
C/C	CENTER TO CENTER	MTL	METAL
C/O	CLEAR OPENING	MUL	MULLION
CDT	CERAMIC DECORATIVE TILE	MWK	MILLWORK
CG	CORNER GUARD		
CHNL	CHANNEL	N	NORTH
CIP	CAST-IN-PLACE	NIC	NOT IN CONTRACT
CJ	CONTROL JOINT	NO	NUMBER
CL	CENTER LINE	NOM	NOMINAL
CLG	CEILING	NTS	NOT TO SCALE
CLO	CLOSET		
CLR	CLEAR	O/C	ON CENTER
CMU	CONCRETE MASONRY UNIT	O/F	OUTSIDE FACE
CNTR	CENTER	OH	OVERHEAD
COL	COLUMN	OPNG	OPENING
COM	COMMON		
CONC	CONCRETE	PLAM	PLASTIC LAMINATE
CONST	CONSTRUCTION	PERIM	PERIMETER
CONT	CONTINUOUS	PERP	PERPENDICULAR
CORR	CORRIDOR	PLYWD	PLYWOOD
CPT	CARPET	PLUMB	PLUMBING
CR	CARD READER	PMF	PRE-FINISHED METAL FLASHING
CT	CERAMIC TILE	PRECAST	PRE-CAST CONCTRETE
CTB	CERAMIC TILE BASE	PREFIN	PRE-FINISHED
CTR	COUNTER, COUNTERTOP	PT	PAINT
CWT	CERAMIC WALL TILE	PTD	PAINTED
		PTL	PRESSURE TREATED LUMBER
D	DATA	PTN	PARTITION
DBL	DOUBLE	PVC	POLYVINYL CHLORIDE
DEMO	DEMOLISH, DEMOLITION	PWT	PERIMETER WEEPING TILE
DEPT	DEPARTMENT		
DET	DETAIL	RAF	RUBBER ATHLETIC FLOORING
DGL	DOUBLE GLAZING	RCP	REFLECTED CEILING PLAN
DIA	DIAMETER	RD	ROOF DRAIN
DIM/DIMS	DIMENSION/DIMENSIONS	RECEP	RECEPTACLE
DN	DOWN	REQD	REQUIRED
DVF	DISSIPATIVE VINYL SHEET FLOORING	RLT	RUBBER STAIR LANDING TILE
DWG/DWGS	DRAWING/DRAWINGS	RM	ROOM
DWP	DEMOUNTABLE WALL PARTITIONS	RO	ROUGH OPENING
		RSV	RIGID SHEET VINYL WALLCOVERING
E	ELECTRICAL RECEPTICAL	RUB	RUBBER BASE
EA	EACH		
EFC	EPOXY FLOOR COATING	SALV	SALVAGE
EFG	ENTRANCE FLOOR GRILLES	SCREEN	SCREEN
EFM	ENTRANCE FLOOR MATTS	SCHED	SCHEDULE
EIFS	EXTERIOR INSULATION AND FINISH SYSTEM	SCW	SOLID CORE WOOD
EJ	EXPANSION JOINT	SD	SCUPPER DRAIN
EL	ELEVATOR	SF	SQUARE FOOT
ELEC	ELECTRICAL	SGL	SAFETY GLASS
ELEV	ELEVATION	SHWR	SHOWER
ENTR	ENTRANCE	SIM	SIMILAR
EPDM	ETHYLENE PROPYLENE DIENE MONOMER	SPEC/SPECS	SPECIFICATIONS
EQ	EQUAL	SPK	SPEAKER
EST	ESTIMATE	SQ	SQUARE
EW	EACH WAY	SPLR	SPRINKLER
EWC	EPOXY WALL COATING	SS	STAINLESS STEEL
EX/EXIST	EXISTING	STC	SOUND TRANSMISSION CLASS
EXP	EXPOSED	STD	STANDARD
EXT	EXTERIOR	STL	STEEL
		STN	STAINED AND SEALED
F/F	FACE TO FACE	STOR	STORAGE
F/O	FACE OF	STRUCT	STRUCTURE, STRUCTURAL
FD	FLOOR DRAIN	STWY	STAIRWAY
FEC	FIRE EXTINGUISHER CABINET	SV	SHEET VINYL FLOORING
FF	FINISHED FACE	SWG	SAFETY WIRED GLASS
FFD	FUNNEL FLOOR DRAIN		
FFL	FINISHED FLOOR LINE	T/O	TOP OF
FGL	FIRE GLASS, CERAMIC GLASS	T&B	TOP AND BOTTOM
FIN	FINISH	T&G	TONGUE AND GROOVE
FIXT	FIXTURE	TEL	TELEPHONE
FLR	FLOOR	TERR	TERRAZZO
FNDN	FOUNDATION	TM	TRANSITION MEMBRANE
FOF	FACE OF FINISH	TRD	TREAD
FOS	FACE OF STUD	TSL	TOP OF SLAB
FPA-R	FALL PROTECTION ANCHOR-ROOF MOUNTED	TST	TOP OF STEEL
FPA-W	FALL PROTECTION ANCHOR-WALL MOUNTED	TV	TELEVISION
FPC	FINISHED POLISHED CONCRETE FLOORS	TYP	TYPICAL
FT	FOOT		
FURN	FURNITURE	U/S	UNDERSIDE
FV	FIELD VERIFY	UNFIN	UNFINISHED
G1S	GOOD ONE SIDE	VAC	VACUUM
GA	GUAGE	VB	VAPOUR
GALV	GALVANIZED	VCT	VINYL COMPOSITION TILE
GB	GRAB BAR	VERT	VERTICAL
GEN	GENERAL	VEST	VESTIBULE
GL	GLASS, GLAZING	VP	VISION PANEL
GR	GROUT	VRF	VINYL RESILIENT SHEET FLOORING
GYP	GYPSUM BOARD	VSF	VINYL SHEET FLOORING
HC	HOLLOW CORE	W/	WITH
HM	HOLLOW METAL	W/O	WITHOUT
HORIZ	HORIZONTAL	WC	WATER CLOSET
HR	HOUR	WD	WOOD
HVAC	HEATING , VENTILATING AND AIR CONDITIONING	WDC	WOOD CEILING
HWP	HYGENIC WALL PANELS	WDP	WOOD PANEL
		WIN	WINDOW
I/F	INSIDE FACE	WR	WASHROOM
IB	INTEGRAL BASE		
IGL	INSULATED GLASS		
IN	INCHES		

TBT ENGINEERING CONSULTING GROUP

architecture
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Project Name

Bora Laskin Building - HVAC Upgrades

Project Address

Lakehead University
Bora Laskin Building
905 Oliver Road
Thunder Bay, ON

Sheet Name

OBC Matrix & General Notes, Door Schedule, Interior Partition Types

Rev. No.	Description	Date
A	ISSUED FOR FINAL REVIEW	25-APR-2018
0	ISSUED FOR CONSTRUCTION	27-APR-2018

Professional Seal

DRAWINGS ARE NOT TO BE USED FOR CONSTRUCTION UNLESS ARCHITECTS SEAL IS AFFIXED, SIGNED AND DATED.

ONTARIO ASSOCIATION OF ARCHITECTS
27-APR-2018
CORY R STECHYSHYN
LICENCE 6223

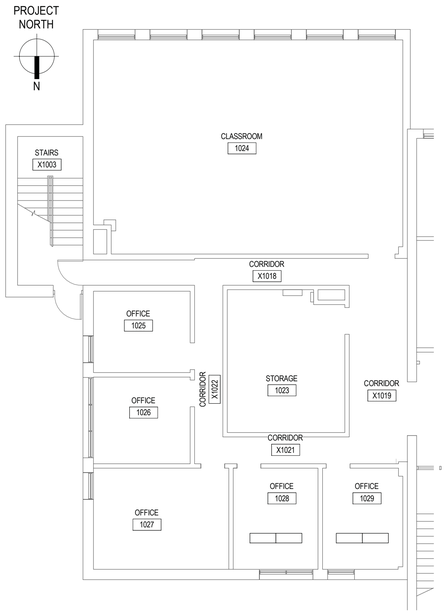
Project No. **2018-27**

Drawn by **JMB**

Scale **As indicated**

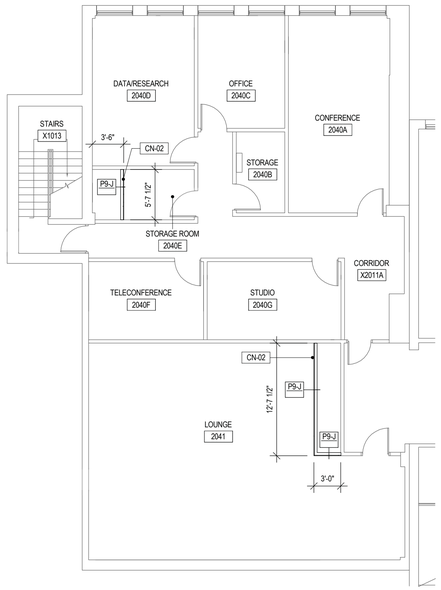
Sheet Number

A1



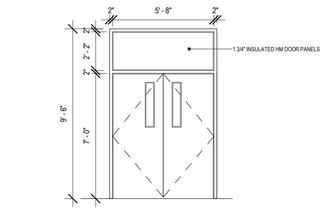
1 A2 Partial Main Floor Plan 'A' Renovation Plan

Scale = 1/8" = 1'-0"



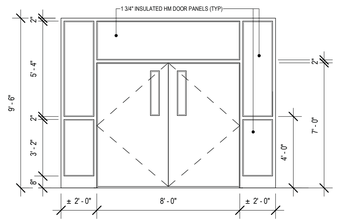
2 A2 Partial Second Floor Plan 'A' Renovation Plan

Scale = 1/8" = 1'-0"



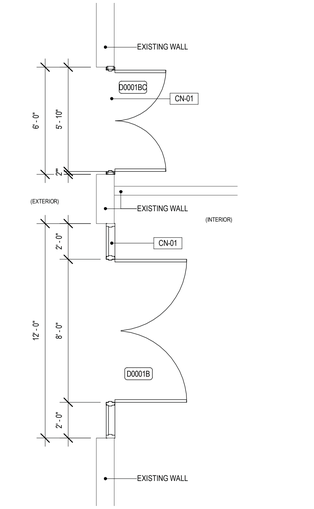
8 A2 Elevation - Door 0001BC

Scale = 1/4" = 1'-0"



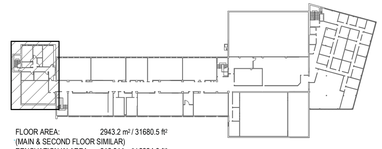
9 A2 Elevagtion - Door 0001B

Scale = 1/4" = 1'-0"



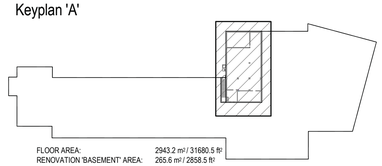
7 A2 PARTIAL BASEMENT FLOOR PLAN

Scale = 1/4" = 1'-0"



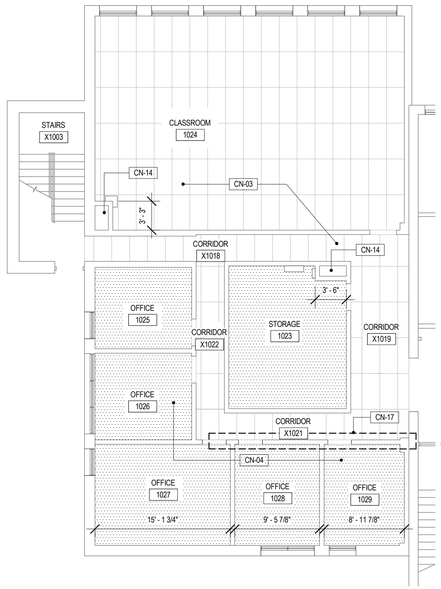
FLOOR AREA: 2943.2 m² / 31680.5 ft²
(MAIN & SECOND FLOOR SIMILAR)
RENOVATION 'A' AREA: 216.914 m² / 2334.8 ft²

Keyplan 'A'



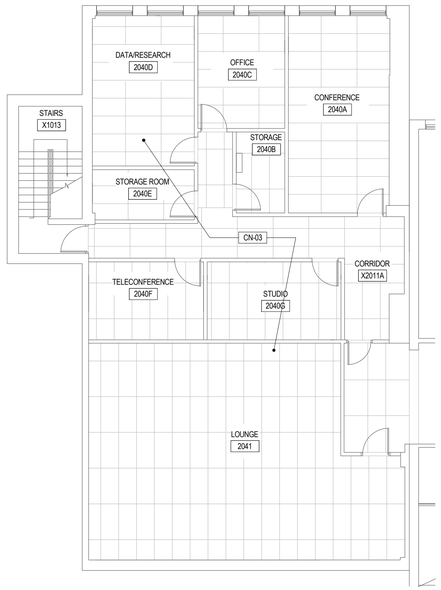
FLOOR AREA: 2943.2 m² / 31680.5 ft²
RENOVATION 'BASEMENT' AREA: 265.6 m² / 2858.5 ft²

Keyplan 'Basement'



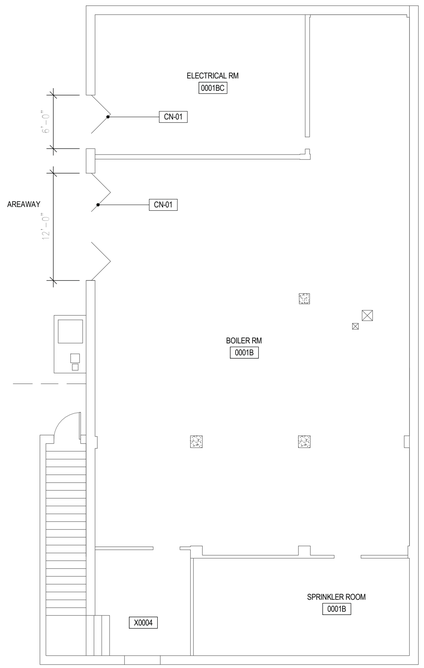
3 A2 Partial Main Floor Plan 'A' - Existing Ceiling

Scale = 1/8" = 1'-0"



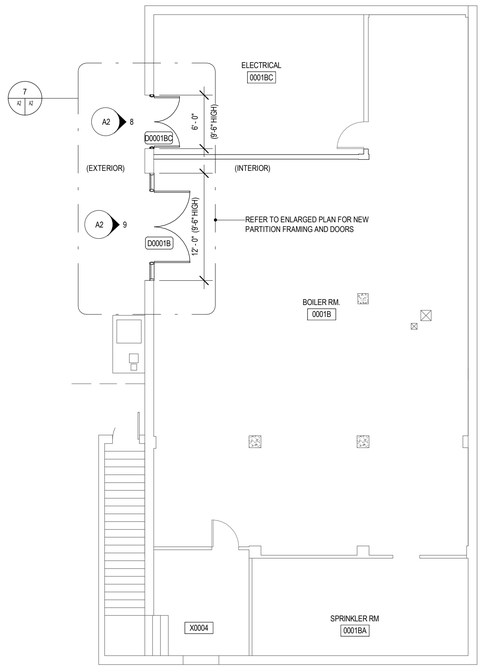
4 A2 Partial Second Floor Plan 'A' - Existing Ceiling

Scale = 1/8" = 1'-0"



5 A2 Basement Floor Plan - Demolition

Scale = 1/8" = 1'-0"



6 A2 Basement Floor Plan - Renovation

Scale = 1/8" = 1'-0"

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Project Name

Bora Laskin Building - HVAC Upgrades

Project Address

Lakehead University
Bora Laskin Building
905 Oliver Road
Thunder Bay, ON

Sheet Name

Plan 'A' Partial Floor Plans + Details, Plan 'Basement' Partial Floor Plans + Details

Rev. No.	Description	Date
A	ISSUED FOR FINAL REVIEW	25-APR-2018
0	ISSUED FOR CONSTRUCTION	27-APR-2018

Professional Seal

DRAWINGS ARE NOT TO BE USED FOR CONSTRUCTION UNLESS ARCHITECTS SEAL IS AFFIXED, SIGNED AND DATED.

ONTARIO ASSOCIATION OF ARCHITECTS
27-APR-2018
CORY R. STECHYSHYN
LICENCE 6223

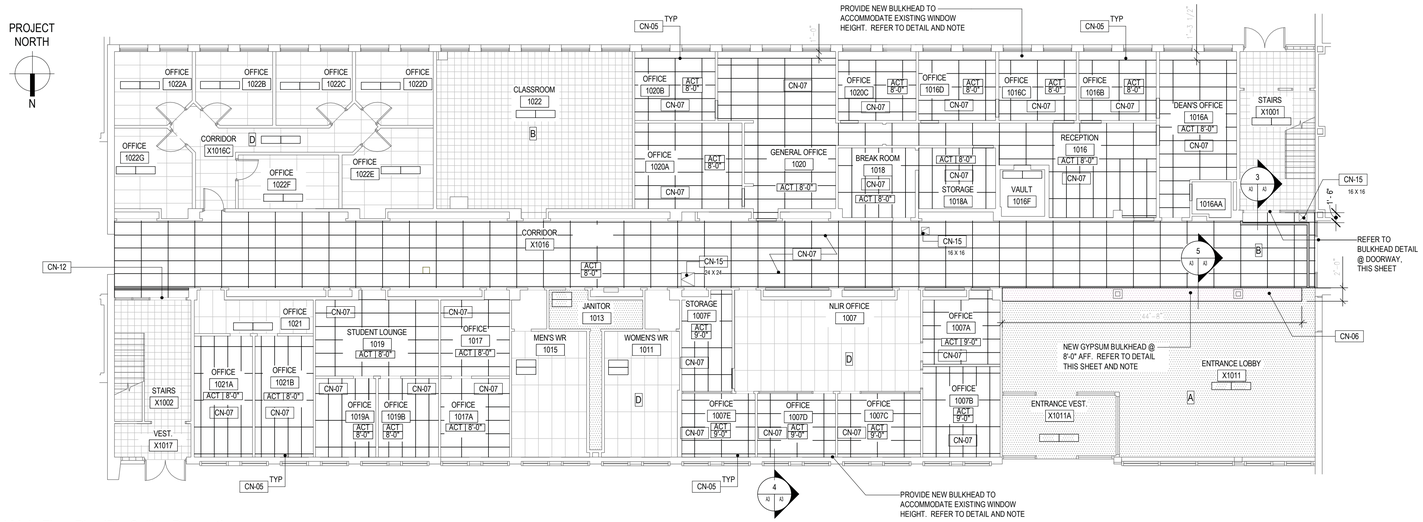
Project No. **2018-27**

Drawn by **JMB**

Scale **As indicated**

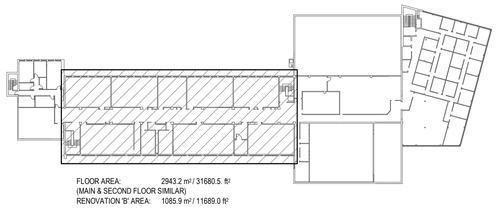
Sheet Number

A2



1 A3 **Partial Main Floor Plan 'B' - Ceiling Renovation**

Scale = 3/32" = 1'-0"

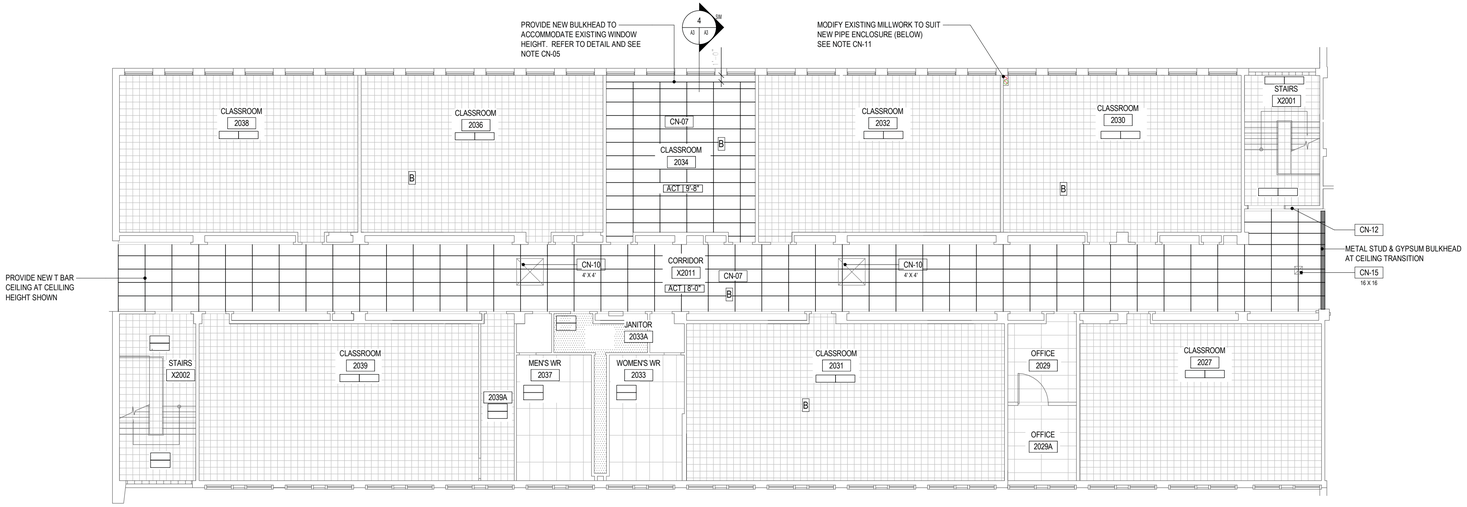


FLOOR AREA: 2943.2 m² / 31680.5. ft²
(MAIN & SECOND FLOOR SIMILAR)
RENOVATION 'B' AREA: 1085.9 m² / 11689.0 ft²

Keyplan 'B'

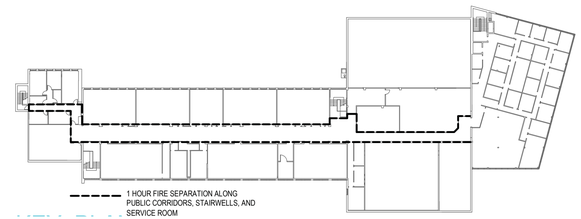
Legend - Ceiling Types

A	EXISTING PLASTER CEILING
B	EXISTING 12 X 12 TILE LAMINATED TO PLASTER SUBSTRATE
C	NEW SUSPENDED ACOUSTIC CEILING DENOTED BY CN-07 AND ACT
D	EXISTING SUSPENDED ACOUSTIC CEILINGS

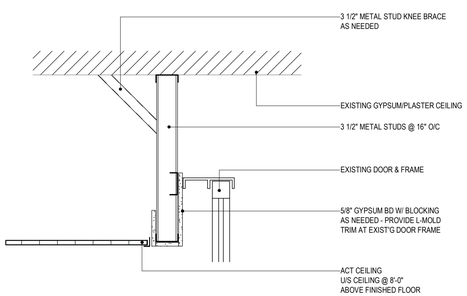


2 A3 **Partial Second Floor Plan 'B' - Ceiling Renovation**

Scale = 3/32" = 1'-0"

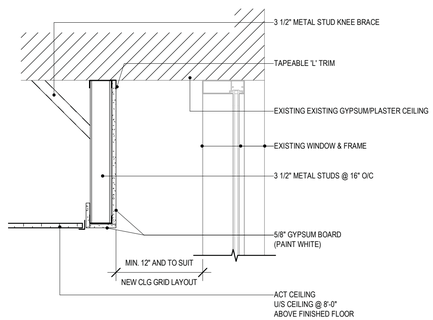


Fire Separation Plan (1ST and Second FLoor Similar)



3 A3 A3 **Bulkhead Detail @ Doorway Openings**

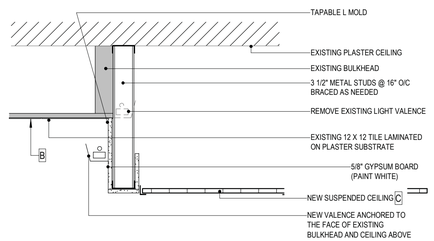
Scale = 1" = 1'-0"



NOTE:
MECHANICALLY FASTEN TO EXISTING CEILING WITH ANCHORS, TO NEW ADJACENT BULKHEADS AND TO FACE OF EXISTING WALLS WHERE APPLICABLE.

4 A3 A3 **Bulkhead Detail @ Window Openings**

Scale = 1" = 1'-0"



5 A3 A3 **Bulkhead Detail @ Corridor**

Scale = 1" = 1'-0"

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Project Name

Bora Laskin Building - HVAC Upgrades

Project Address

Lakehead University
Bora Laskin Building
905 Oliver Road
Thunder Bay, ON

Sheet Name

Plan 'B' Partial Reflected Ceiling Plans + Details

Rev. No.	Description	Date
A	ISSUED FOR FINAL REVIEW	25-APR-2018
0	ISSUED FOR CONSTRUCTION	27-APR-2018

Professional Seal

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ONTARIO ASSOCIATION OF ARCHITECTS
27-APR-2018
CORY R STECHYSHYN
LICENCE | 6223

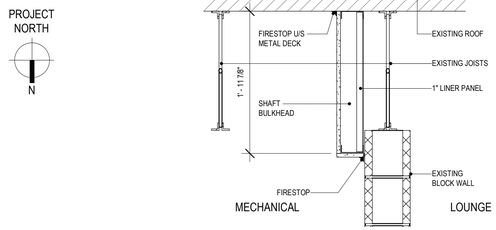
Project No. **2018-27**

Drawn by **JMB**

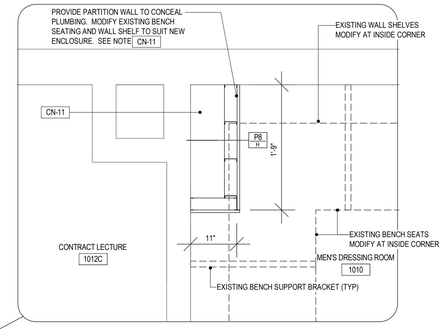
Scale **As indicated**

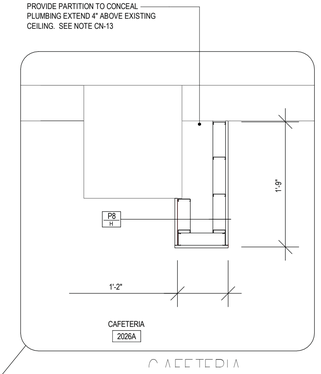
Sheet Number

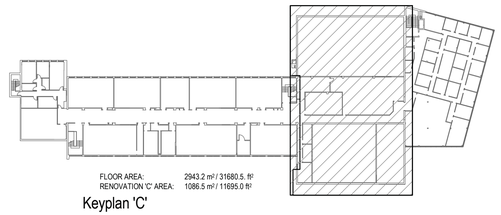
A3



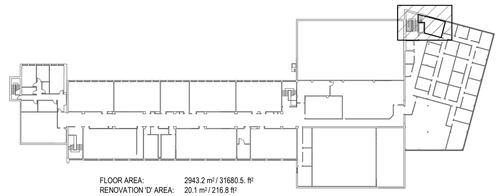
7 A4 A4 Detail - Fire Separation
Scale = 1" = 1'-0" (SIM FOR NOTE CN-17)



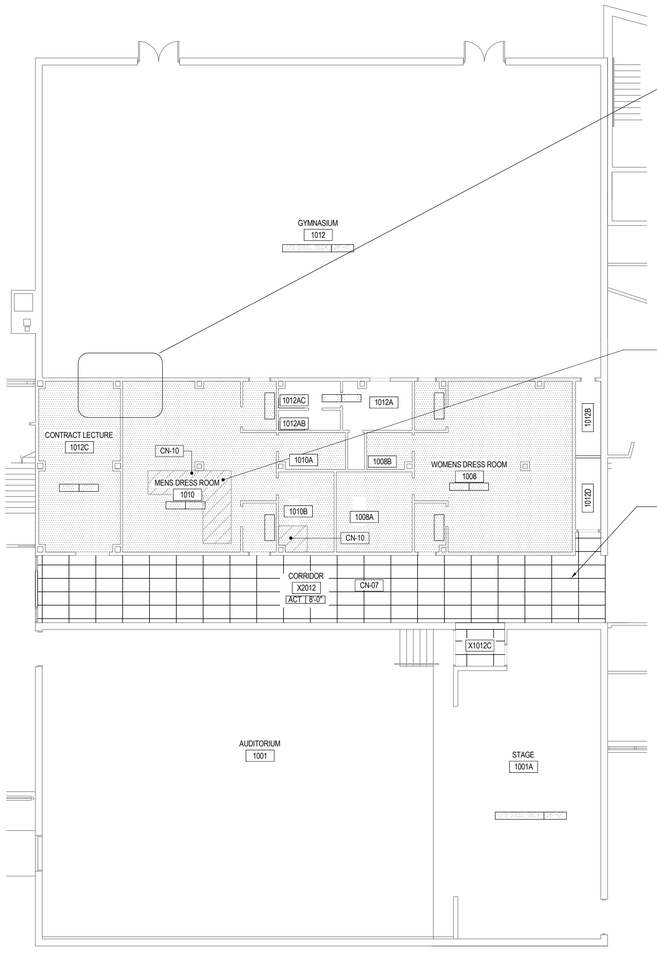




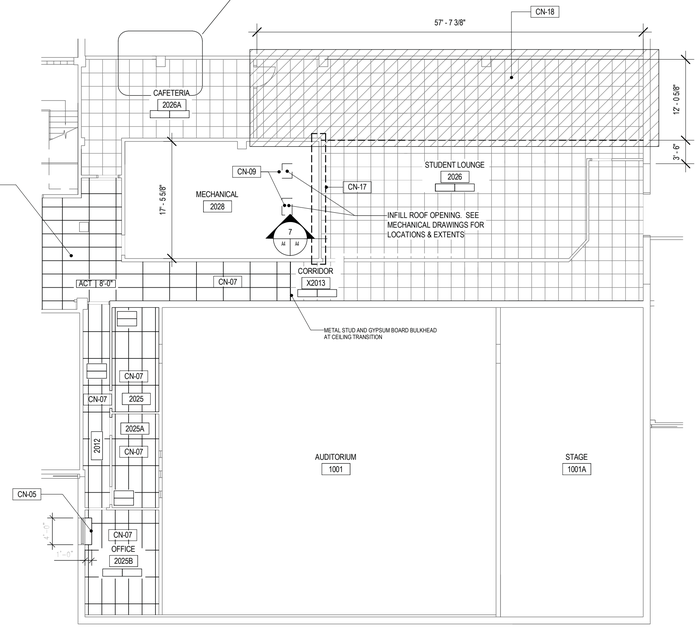
Keyplan 'C'



Keyplan 'D'



1 A4 Partial Main Floor Plan 'C' - Ceiling Renovation
Scale = 3/32" = 1'-0"



2 A4 Partial Second Floor Plan 'C' - Ceiling Renovation
Scale = 3/32" = 1'-0"

3 A4 Partial Second Floor Plan 'D' Existing Ceiling
Scale = 1/8" = 1'-0"

4 A4 Partial Second Floor Plan 'D' Ceiling Renovation
Scale = 1/8" = 1'-0"

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Project Name

Bora Laskin Building - HVAC Upgrades

Project Address

Lakehead University
Bora Laskin Building
905 Oliver Road
Thunder Bay, ON

Sheet Name

Plan 'C' Partial Floor Plans + Details, Plan 'D' Partial Floor Plans + Details

Rev. No.	Description	Date
A	ISSUED FOR FINAL REVIEW	25-APR-2018
0	ISSUED FOR CONSTRUCTION	27-APR-2018

Professional Seal

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ONTARIO ASSOCIATION OF ARCHITECTS
27-APR-2018
CORY R. STECHYSHYN
LICENCE 6223

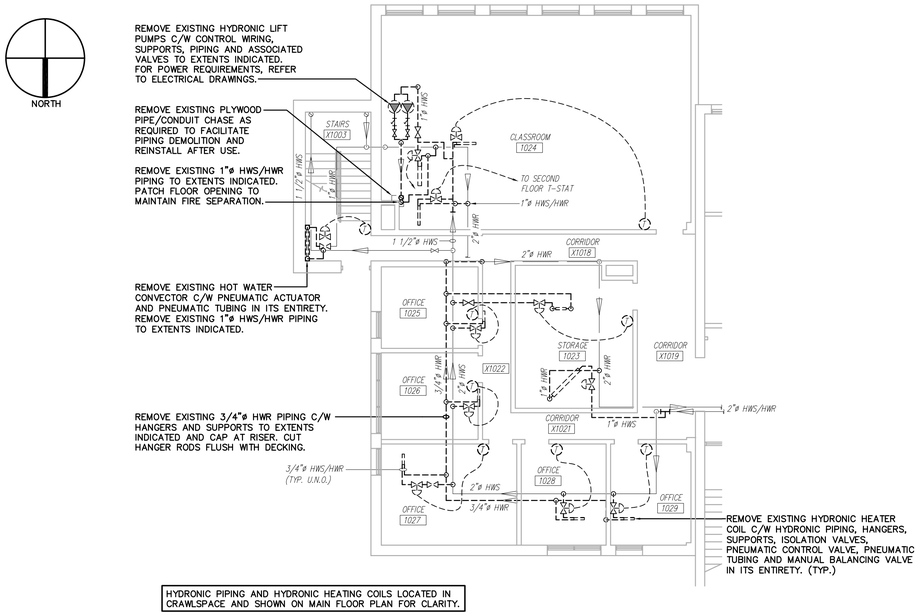
Project No. **2018-27**

Drawn by **JMB**

Scale **As indicated**

Sheet Number

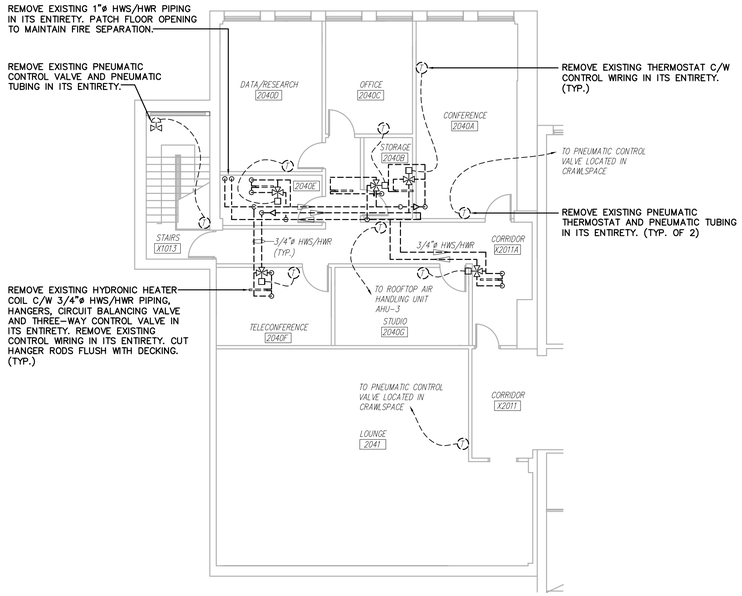
A4



HYDRONIC PIPING AND HYDRONIC HEATING COILS LOCATED IN CRAWLSPACE AND SHOWN ON MAIN FLOOR PLAN FOR CLARITY.

PARTIAL MAIN FLOOR PLAN 'A' - HYDRONIC DEMOLITION

SCALE: 1/8" = 1'-0"



PARTIAL SECOND FLOOR PLAN 'A' - HYDRONIC DEMOLITION

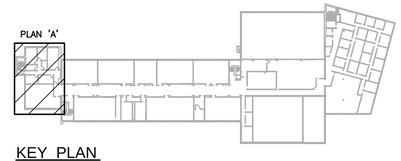
SCALE: 1/8" = 1'-0"

GENERAL HYDRONIC NOTES:

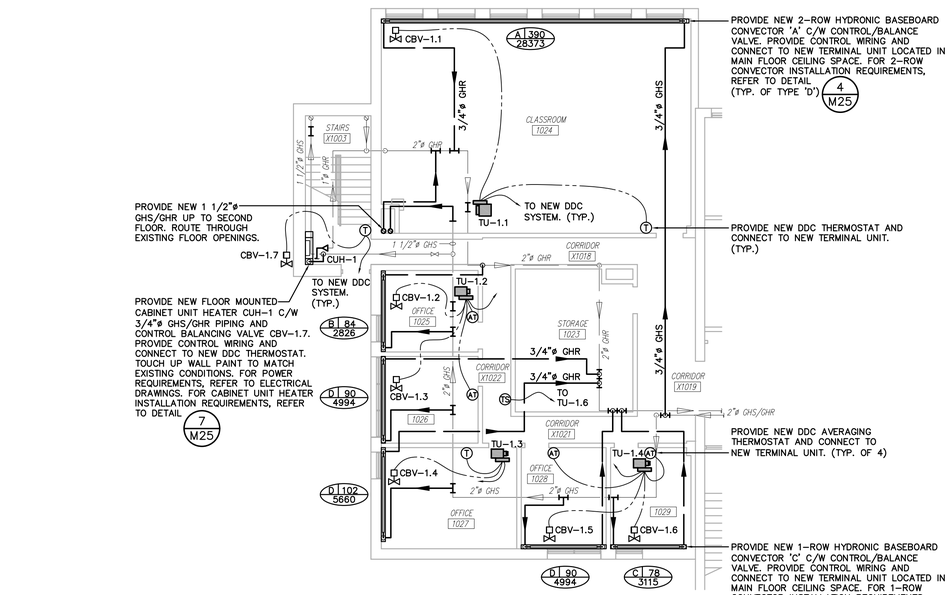
1. FOR MECHANICAL SPECIFICATIONS REFER TO DRAWING M28. FOR SEQUENCE OF OPERATION REFER TO DRAWING M31. FOR EQUIPMENT LIST REFER TO DRAWING M29 & M30.
2. INSULATE HYDRONIC PIPING AS PER SPECIFICATIONS ON DRAWING M28.
3. FOR CONTROL BALANCING VALVES (CBV-X) SIZES AND FLOWS, REFER TO SCHEDULES ON DRAWING M27. PROVIDE REDUCERS TO SUIT VALVE SIZES AS REQUIRED.
4. PROVIDE ADEQUATE SUPPORT FOR ALL EQUIPMENT AND PIPING. PROVIDE SERVICE CLEARANCE FOR ALL EQUIPMENT AS PER MANUFACTURERS RECOMMENDATIONS.
5. ALL PENETRATIONS TO BE SEALED TO MAINTAIN INTEGRITY OF FIRE RATING. PROVIDE ULC LISTED INTUMESCENT FIRESTOP ASSEMBLY FOR PIPING PENETRATIONS AS PER REQUIRED SEPARATIONS

GENERAL NOTES:

1. DISASSEMBLE EXISTING SUSPENDED CEILING SYSTEMS AS REQUIRED TO FACILITATE DEMOLITION AND RENOVATION OF MECHANICAL PIPING. UPON COMPLETION OF WORK, REASSEMBLE CEILING SYSTEMS. REPLACE ALL CEILING TILES AND SUSPENDED CEILING COMPONENTS THAT ARE DAMAGED OR HAVE BEEN DAMAGED DURING CONSTRUCTION.
2. WHERE EXISTING CEILING MOUNTED GRILLES OR DIFFUSERS HAVE BEEN REMOVED, PROVIDE NEW FULL SIZED CEILING TILE. REMOVE ALL REDUNDANT INTERMEDIATE T-BAR COMPONENTS TO ALLOW FOR FULL SIZED TILE INSTALLATION.
3. WHERE WALL MOUNTED THERMOSTATS OR CONTROLS HAVE BEEN REMOVED AND LOCATION IS NOT REUSED, PROVIDE STAINLESS STEEL BLANK COVER PLATE FOR REDUNDANT DEVICE BOX IF PRESENT OR REPAIR AND PATCH WALLS AS REQUIRED. PATCHWORK SHALL MATCH EXISTING CONSTRUCTION AND MAINTAIN INTEGRITY OF FIRE SEPARATION WHERE REQUIRED. PAINT AND FINISH PATCHWORK TO MATCH SURROUNDING AREA. PAINTING OF PATCHWORK TO EXTEND TO NEAREST CHANGE OF DIRECTION.
4. ONCE HYDRONIC RENOVATIONS ARE COMPLETE, TOUCH UP FINISHES ON RADIANT HEATER ENCLOSURES AND SURROUNDING WALL AREAS DAMAGED DURING CONSTRUCTION TO MATCH EXISTING/NEW FINISHES.
5. CONCEAL WIRING IN EXISTING BUILDING CONSTRUCTION WHERE POSSIBLE. ROUTE IN WIRE MOULD CASING WHERE CONCEALMENT IS NOT POSSIBLE.
6. UPON COMPLETION OF DEMOLITION, REPAIR AND PATCH ALL REDUNDANT CEILING, WALL AND FLOOR OPENINGS AS REQUIRED. PATCHWORK SHALL MATCH EXISTING CONSTRUCTION AND MAINTAIN INTEGRITY OF FIRE SEPARATION WHERE REQUIRED. PAINT AND FINISH PATCHWORK TO MATCH SURROUNDING AREA. PAINTING OF PATCHWORK TO EXTEND TO NEAREST CHANGE OF DIRECTION.



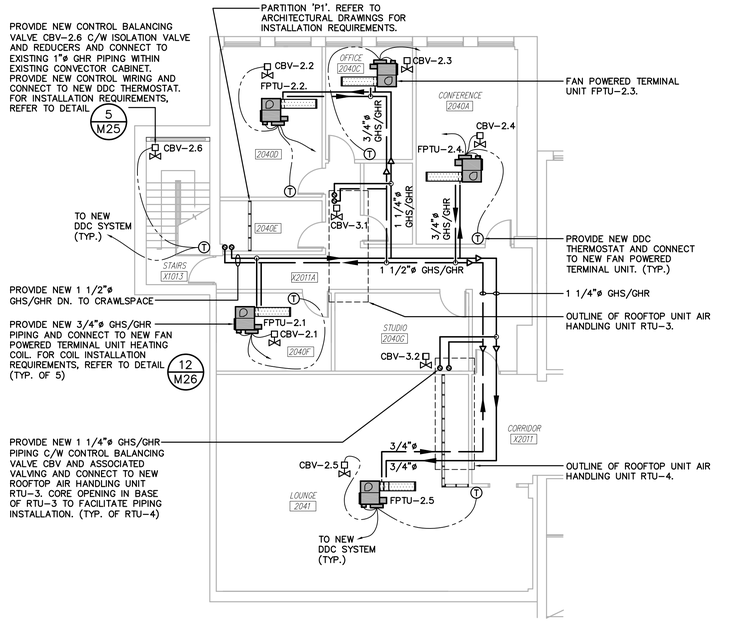
KEY PLAN



HYDRONIC PIPING LOCATED IN CRAWLSPACE AND SHOWN ON MAIN FLOOR PLAN FOR CLARITY.

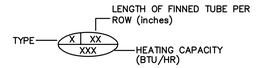
PARTIAL MAIN FLOOR PLAN 'A' - HYDRONIC RENOVATION

SCALE: 1/8" = 1'-0"



PARTIAL SECOND FLOOR PLAN 'A' - HYDRONIC RENOVATION

SCALE: 1/8" = 1'-0"



CONVECTOR NOMENCLATURE

SCALE: N.T.S.

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL AND ELECTRICAL DRAWINGS

No.	Revision	Date	Initial
0	ISSUED FOR CONSTRUCTION	04/27/18	RG
D	ISSUED FOR FINAL CLIENT REVIEW	04/25/18	RG
C	ISSUED FOR 99% CLIENT REVIEW	04/13/18	RG
B	ISSUED FOR 75% CLIENT REVIEW	03/29/18	RG
A	ISSUED FOR 66% CLIENT REVIEW	03/16/18	RG

Notes:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING DIMENSIONS AND EXISTING CONDITIONS AT THE OUTSET OF CONSTRUCTION. REPORT ANY DISCREPANCIES TO THE ENGINEER. DO NOT PROCEED WITHOUT FURTHER WRITTEN DIRECTION FROM THE ENGINEER.
2. DRAWING SHOWS GENERAL ARRANGEMENT ONLY. DO NOT SCALE.

Approved

Approved

LICENSED PROFESSIONAL ENGINEER R. A. GRAU 100181428 APR. 27/18 PROVINCE OF ONTARIO

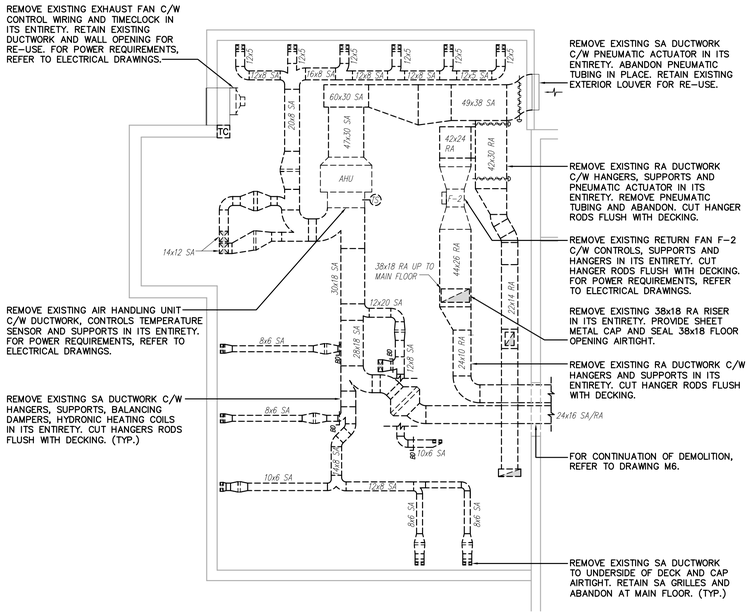
TBT ENGINEERING CONSULTING GROUP
Thunder Bay Phone: (807) 624-5160
E-mail: info@tbte.ca

LAKEHEAD UNIVERSITY

THUNDER BAY ONTARIO

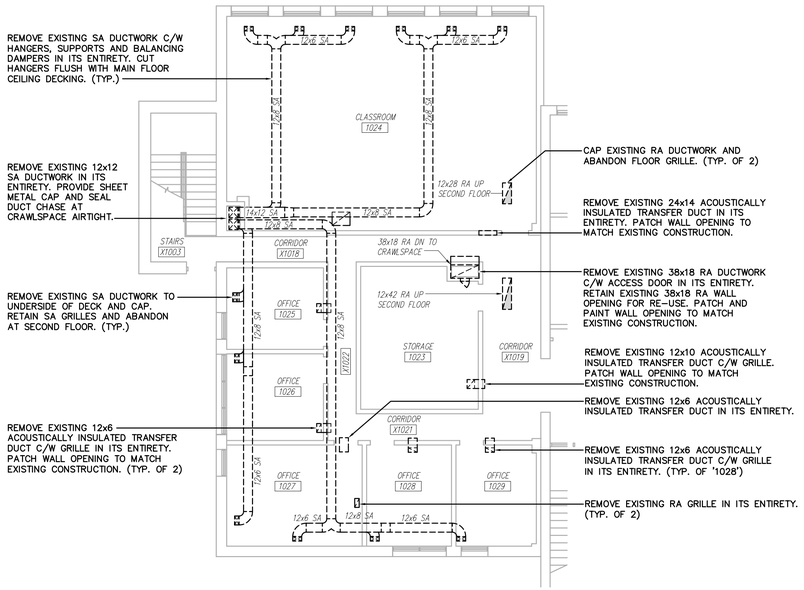
BORA LASKIN BUILDING
PLAN 'A'
MAIN FLOOR AND SECOND FLOOR
HYDRONIC DEMOLITION AND RENOVATION

Scale:	Drawn By: BT	Date: APRIL 2018
1/8" = 1'-0"	Ckd. By: RG	
	Dwg. No.: 18-038-M1	Rev. 0



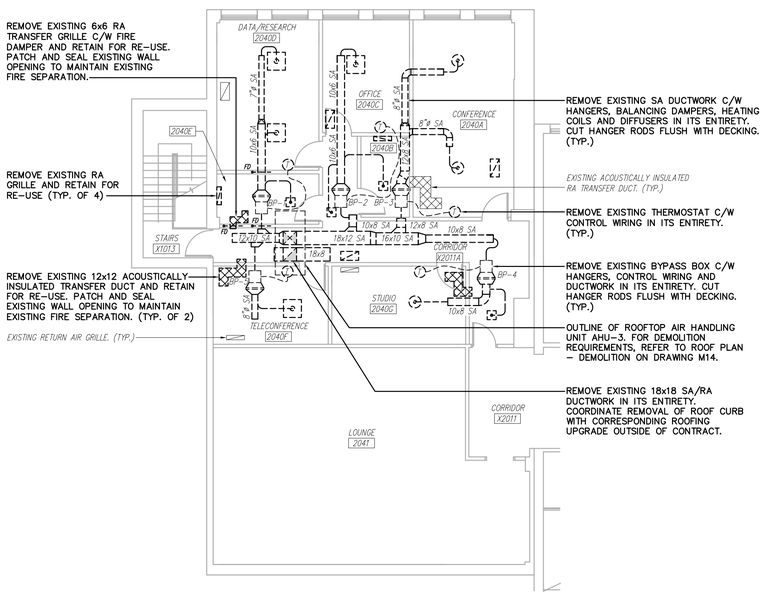
CRAWLSPACE PLAN 'A' - HVAC DEMOLITION

SCALE: 1/8" = 1'-0"



PARTIAL MAIN FLOOR PLAN 'A' - HVAC DEMOLITION

SCALE: 1/8" = 1'-0"



PARTIAL SECOND FLOOR PLAN 'A' - HVAC DEMOLITION

SCALE: 1/8" = 1'-0"

No.	Revision	Date	Initial
0	ISSUED FOR CONSTRUCTION	04/27/18	RG
D	ISSUED FOR FINAL CLIENT REVIEW	04/25/18	RG
C	ISSUED FOR 99% CLIENT REVIEW	04/13/18	RG
B	ISSUED FOR 75% CLIENT REVIEW	03/29/18	RG
A	ISSUED FOR 66% CLIENT REVIEW	03/16/18	RG

Notes:

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2. DRAWING SHOWS GENERAL ARRANGEMENT ONLY. DO NOT SCALE.

Approved

Approved

LICENSED PROFESSIONAL ENGINEER
R. A. GRAU
100181428
APR. 27/18
PROVINCE OF ONTARIO

TBT ENGINEERING
CONSULTING GROUP
Thunder Bay Phone: (807) 624-5160
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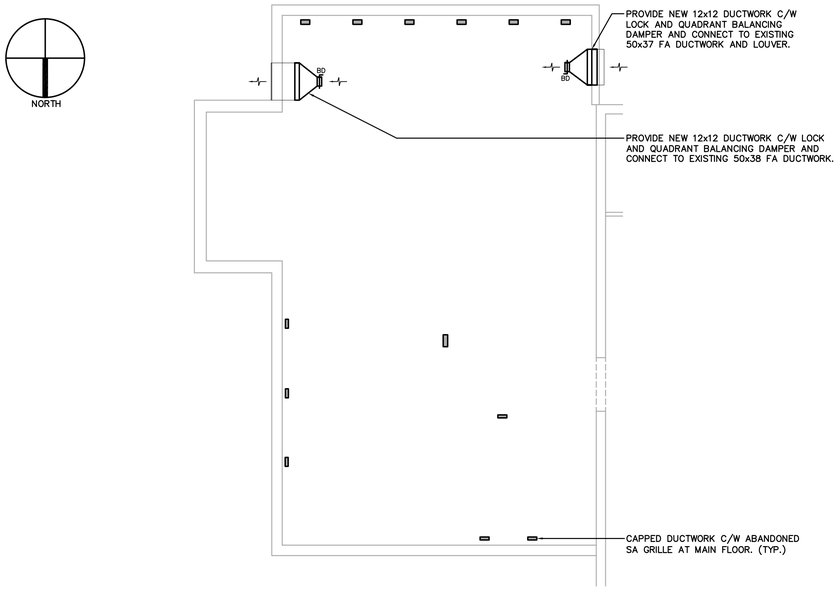
LAKEHEAD UNIVERSITY

THUNDER BAY ONTARIO

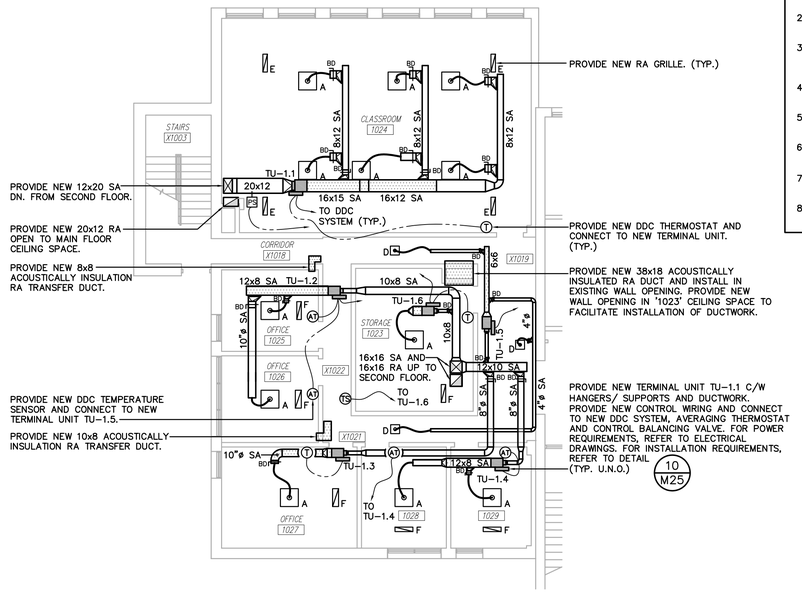
BORA LASKIN BUILDING
PLAN 'A'
CRAWLSPACE, MAIN FLOOR AND SECOND FLOOR
HVAC DEMOLITION

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL AND ELECTRICAL DRAWINGS

Scale:	Drawn By: BT	Date:
1/8" = 1'-0"	Ckd. By: RG	APRIL 2018
	Dwg. No.: 18-038-M2	Rev. 0



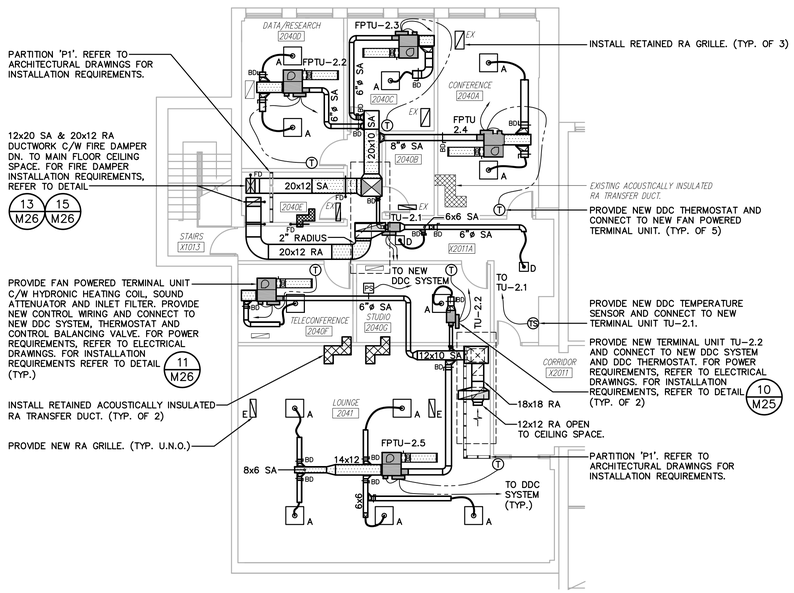
CRAWLSPACE PLAN 'A' - HVAC RENOVATION
SCALE: 1/8" = 1'-0"



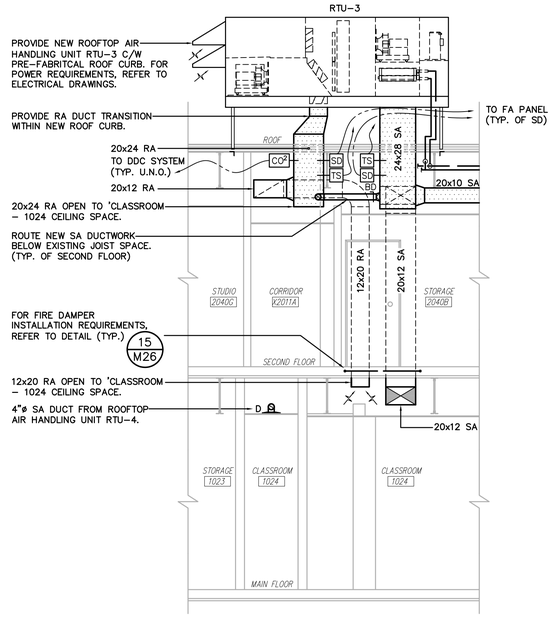
PARTIAL MAIN FLOOR PLAN 'A' - HVAC RENOVATION
SCALE: 1/8" = 1'-0"

GENERAL HVAC NOTES:

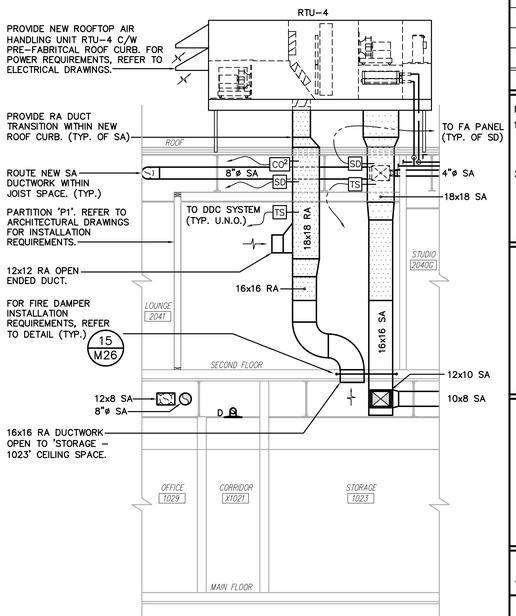
1. FOR MECHANICAL SPECIFICATIONS REFER TO DRAWING M28. FOR SEQUENCE OF OPERATION REFER TO DRAWING M31. FOR EQUIPMENT LIST REFER TO DRAWING M29 & M30.
2. WHERE CEILING IS TO BE USED AS RA PLENUM. ALL MATERIALS IN CEILING SPACE TO BE NON-COMBUSTIBLE.
3. CO-ORDINATE DISTRIBUTION DUCTWORK, DIFFUSERS AND GRILLES WITH LIGHTING LAYOUT, RAIN WATER LEADERS AND REQUIRED CEILING HEIGHTS. INSTALL IN ACCESSIBLE CEILING SPACE WHERE POSSIBLE. REFER TO ELECTRICAL DRAWINGS FOR REFLECTED CEILING PLAN.
4. NOT ALL EXTERNAL INSULATION SHOWN FOR CLARITY. INSULATE DUCTWORK AS PER MECHANICAL SPECIFICATIONS ON DRAWING M26.
5. PROVIDE ADEQUATE SUPPORT FOR ALL EQUIPMENT AND DUCTWORK. PROVIDE SERVICE CLEARANCE FOR ALL EQUIPMENT AS PER MANUFACTURERS RECOMMENDATIONS.
6. NOT ALL EXTERNAL INSULATION SHOWN FOR CLARITY. INSULATE DUCTWORK AS PER SPECIFICATIONS ON DRAWING M28.
7. ALL FIRE DAMPERS TO BE TYPE 'A' UNLESS NOTED OTHERWISE. FOR FIRE DAMPER INSTALLATION REFER TO DETAIL.
8. ALL PENETRATIONS INTO FIRE SEPARATED AREAS TO BE SEALED TO MAINTAIN INTEGRITY OF FIRE RATING. PROVIDE FIRE DAMPER FOR DUCTWORK PENETRATING REQUIRED SEPARATIONS.



PARTIAL SECOND FLOOR PLAN 'A' - HVAC RENOVATION
SCALE: 1/8" = 1'-0"



A M14 SECTION
SCALE: 1/4" = 1'-0"



B M14 SECTION
SCALE: 1/4" = 1'-0"

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL AND ELECTRICAL DRAWINGS

No.	Revision	Date	Initial
0	ISSUED FOR CONSTRUCTION	04/27/18	RG
D	ISSUED FOR FINAL CLIENT REVIEW	04/25/18	RG
C	ISSUED FOR 99% CLIENT REVIEW	04/13/18	RG
B	ISSUED FOR 75% CLIENT REVIEW	03/29/18	RG
A	ISSUED FOR 66% CLIENT REVIEW	03/16/18	RG

Notes:
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2. DRAWING SHOWS GENERAL ARRANGEMENT ONLY. DO NOT SCALE.

Approved

Approved

LICENSED PROFESSIONAL ENGINEER R. A. GRAU 100181428 APR. 27/18 PROVINCE OF ONTARIO

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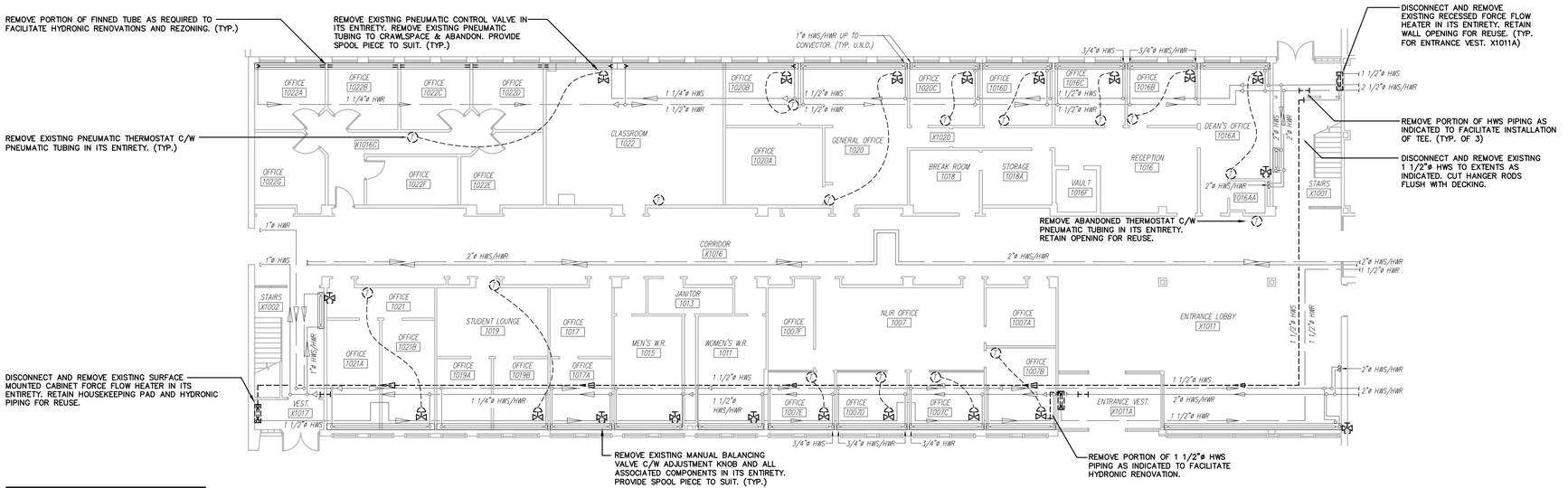
THUNDER BAY ONTARIO

BORA LASKIN BUILDING
PLAN 'A'
CRAWLSPACE, MAIN FLOOR AND SECOND FLOOR HVAC RENOVATION AND SECTIONS

Scale:	Drawn By: BT	Date:
AS NOTED	Ckd. By: RG	APRIL 2018
	Dwg. No.: 18-038-M3	Rev. 0

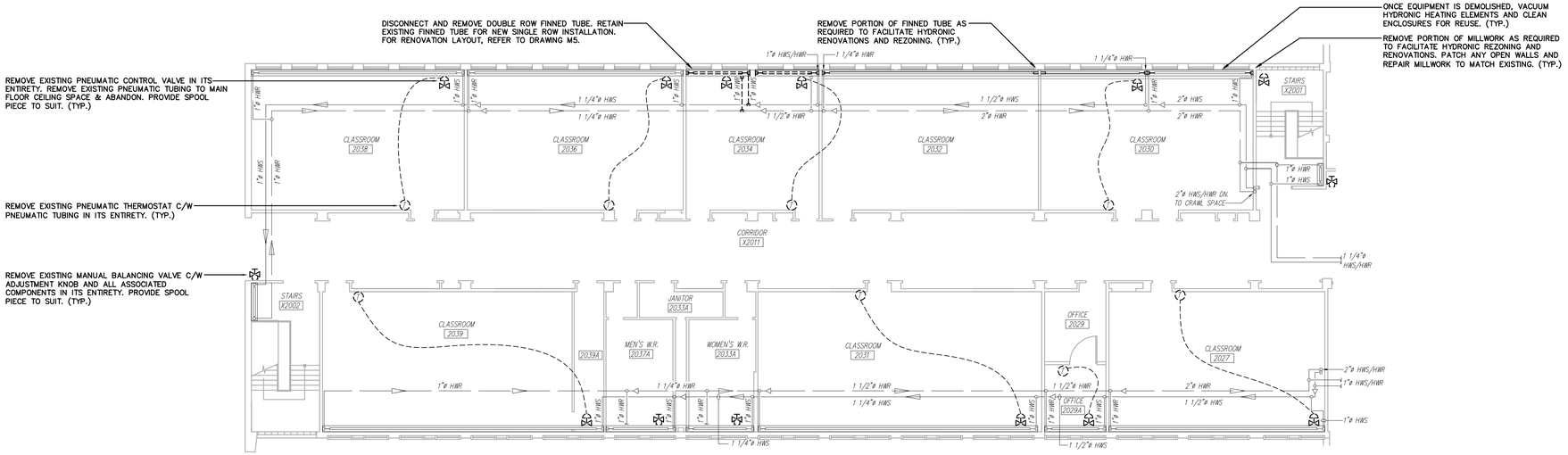
NORTH



HYDRONIC PIPING LOCATED IN CRAWLSPACE AND SHOWN ON MAIN FLOOR PLAN FOR CLARITY.

PARTIAL MAIN FLOOR PLAN 'B' - HYDRONIC DEMOLITION

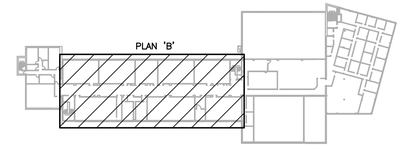
SCALE: 3/32" = 1'-0"



HYDRONIC PIPING LOCATED IN MAIN FLOOR CEILING SPACE AND SHOWN ON SECOND FLOOR PLAN FOR CLARITY.

PARTIAL SECOND FLOOR PLAN 'B' - HYDRONIC DEMOLITION

SCALE: 3/32" = 1'-0"



KEY PLAN

No.	Revision	Date	Initial
0	ISSUED FOR CONSTRUCTION	04/27/18	RG
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A	ISSUED FOR 66% CLIENT REVIEW	03/16/18	RG

Notes:

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2. DRAWING SHOWS GENERAL ARRANGEMENT ONLY. DO NOT SCALE.

Approved

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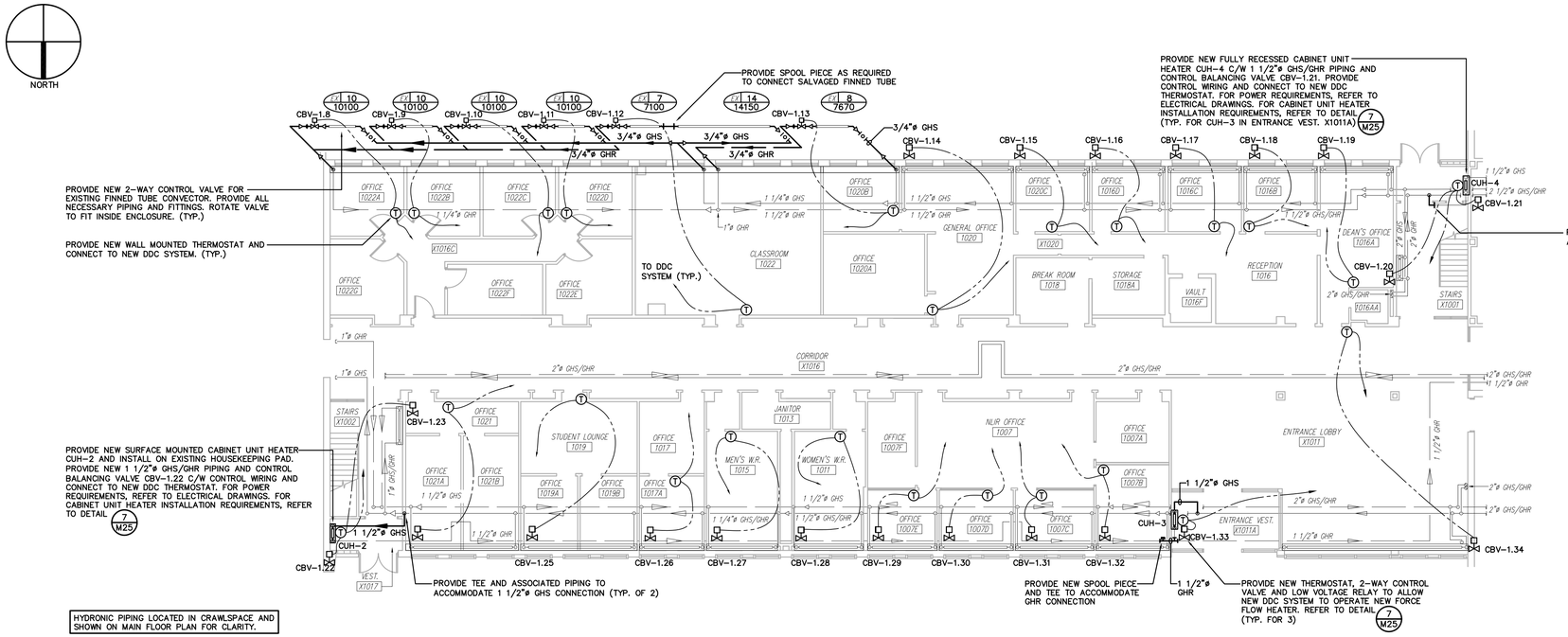
LAKEHEAD UNIVERSITY

THUNDER BAY ONTARIO

BORA LASKIN BUILDING
PLAN 'B'
MAIN FLOOR AND SECOND FLOOR
HYDRONIC DEMOLITION

Scale:	Drawn By: TM	Date:
3/32" = 1'-0"	Ckd. By: RG	APRIL 2018
	Dwg. No.: 18-038-M4	Rev. 0

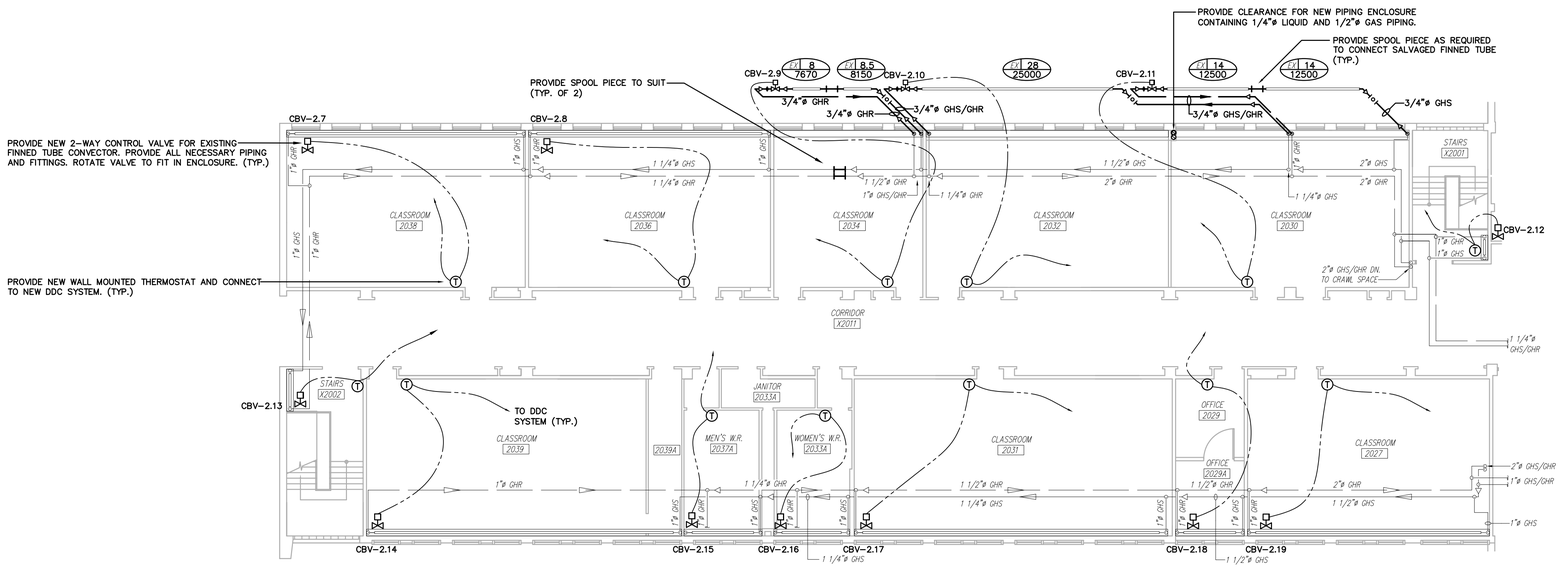
MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL AND ELECTRICAL DRAWINGS



HYDRONIC PIPING LOCATED IN CRAWLSPACE AND SHOWN ON MAIN FLOOR PLAN FOR CLARITY.

PARTIAL MAIN FLOOR PLAN 'B' - HYDRONIC RENOVATION

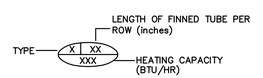
SCALE: 3/32" = 1'-0"



HYDRONIC PIPING LOCATED IN MAIN FLOOR CEILING SPACE AND SHOWN ON SECOND FLOOR PLAN FOR CLARITY.

PARTIAL SECOND FLOOR PLAN 'B' - HYDRONIC RENOVATION

SCALE: 3/32" = 1'-0"



CONVECTOR NOMENCLATURE

SCALE: N.T.S.

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL AND ELECTRICAL DRAWINGS

GENERAL HYDRONIC NOTES:

1. FOR MECHANICAL SPECIFICATIONS REFER TO DRAWING M28. FOR SEQUENCE OF OPERATION REFER TO DRAWING M31. FOR EQUIPMENT LIST REFER TO DRAWING M29 & M30.
2. INSULATE HYDRONIC PIPING AS PER SPECIFICATIONS ON DRAWING M28.
3. FOR CONTROL BALANCING VALVES (CBV-X) SIZES AND FLOWS, REFER TO SCHEDULES ON DRAWING M27. PROVIDE REDUCERS TO SUIT VALVE SIZES AS REQUIRED.
4. PROVIDE MANUAL HIGH POINT AIR VENTS WHERE REQUIRED.
5. PROVIDE ADEQUATE SUPPORT FOR ALL EQUIPMENT AND PIPING. PROVIDE SERVICE CLEARANCE FOR ALL EQUIPMENT AS PER MANUFACTURERS RECOMMENDATIONS.
6. ALL PENETRATIONS TO BE SEALED TO MAINTAIN INTEGRITY OF FIRE RATING. PROVIDE ULC LISTED INTUMESCENT FIRESTOP ASSEMBLY FOR PIPING PENETRATIONS AS PER REQUIRED SEPARATIONS.
7. PROVIDE NON-RATED OR FIRE RATED ACCESS DOORS TO MAINTAIN ACCESS TO MECHANICAL EQUIPMENT AND PIPING WHERE REQUIRED.

GENERAL NOTES:

1. DISASSEMBLE EXISTING SUSPENDED CEILING SYSTEMS AS REQUIRED TO FACILITATE DEMOLITION AND RENOVATION OF DISTRIBUTION DUCTWORK AND MECHANICAL PIPING. UPON COMPLETION OF WORK, REASSEMBLE CEILING SYSTEMS. REPLACE ALL CEILING TILES AND SUSPENDED CEILING COMPONENTS THAT ARE DAMAGED OR HAVE BEEN DAMAGED DURING CONSTRUCTION.
2. ONCE EQUIPMENT IS DEMOLISHED, VACUUM EXISTING DUCTWORK AND CLEAN EXISTING GRILLES AND DIFFUSERS. VACUUM HYDRONIC HEATING ELEMENTS AND CLEAN ENCLOSURES FOR REUSE.
3. WHERE EXISTING CEILING MOUNTED GRILLES OR DIFFUSERS HAVE BEEN REMOVED, PROVIDE NEW FULL SIZED CEILING TILE. REMOVE ALL REDUNDANT INTERMEDIATE T-BAR COMPONENTS TO ALLOW FOR FULL SIZED TILE INSTALLATION.
4. WHERE WALL MOUNTED THERMOSTATS OR CONTROLS HAVE BEEN REMOVED AND LOCATION IS NOT REUSED, PROVIDE STAINLESS STEEL BLANK COVER PLATE FOR REDUNDANT DEVICE BOX IF PRESENT OR REPAIR AND PATCH WALLS AS REQUIRED. PATCHWORK SHALL MATCH EXISTING CONSTRUCTION AND MAINTAIN INTEGRITY OF FIRE SEPARATION WHERE REQUIRED. PAINT AND FINISH PATCHWORK TO MATCH SURROUNDING AREA. PAINTING OF PATCHWORK TO EXTEND TO NEAREST CHANGE OF DIRECTION.
5. ONCE HYDRONIC RENOVATIONS ARE COMPLETE, TOUCH UP FINISHES ON RADIANT HEATER ENCLOSURES AND SURROUNDING WALL AREAS AND MILLWORK DAMAGED DURING CONSTRUCTION TO MATCH EXISTING/NEW FINISHES.
6. CONCEAL WIRING IN EXISTING BUILDING CONSTRUCTION WHERE POSSIBLE. ROUTE IN WIRE MOULD CASING WHERE CONCEALMENT IS NOT POSSIBLE.
7. UPON COMPLETION OF DEMOLITION, REPAIR AND PATCH ALL REDUNDANT WALL, CEILING AND FLOOR OPENINGS AS REQUIRED. PATCHWORK SHALL MATCH EXISTING CONSTRUCTION AND MAINTAIN INTEGRITY OF FIRE SEPARATION WHERE REQUIRED. PAINT AND FINISH PATCHWORK TO MATCH SURROUNDING AREA. PAINTING OF PATCHWORK TO EXTEND TO NEAREST CHANGE OF DIRECTION.

No.	Revision	Date	Initial
0	ISSUED FOR CONSTRUCTION	04/27/18	RG
D	ISSUED FOR FINAL CLIENT REVIEW	04/25/18	RG
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Notes:

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Approved

Approved

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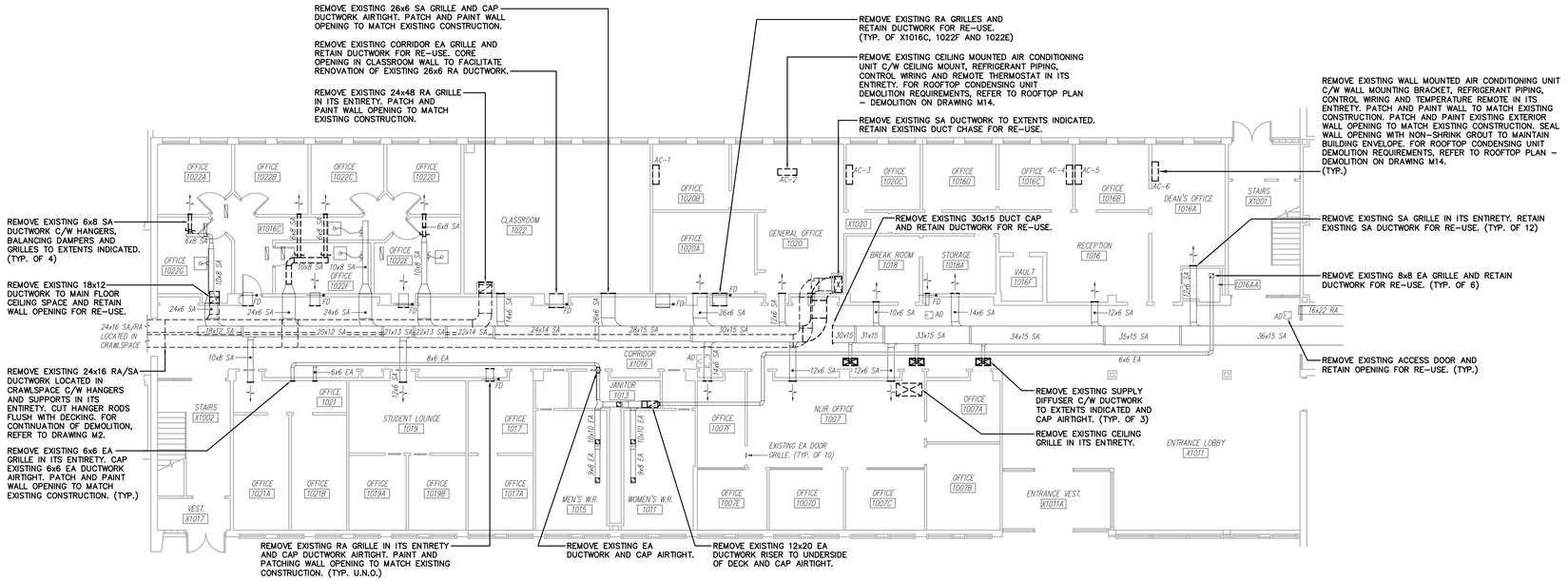
LAKEHEAD UNIVERSITY

THUNDER BAY ONTARIO

BORA LASKIN BUILDING
PLAN 'B'
MAIN FLOOR AND SECOND FLOOR
HYDRONIC RENOVATION

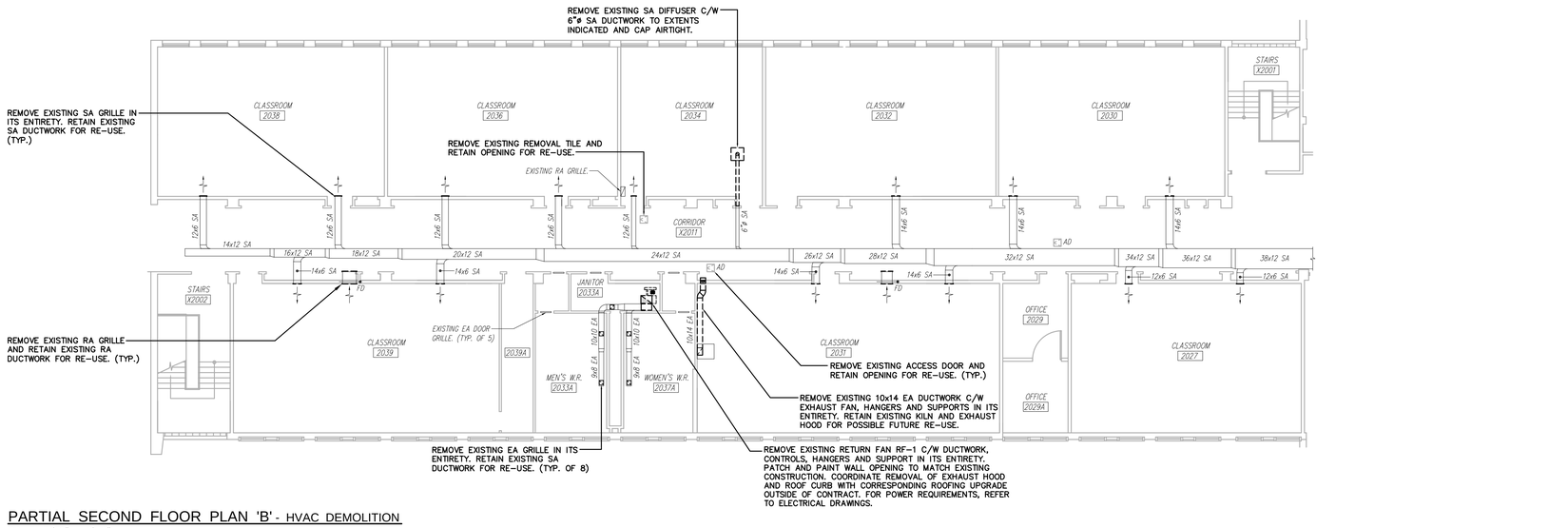
Scale:	Drawn By: TM	Date:
3/32" = 1'-0"	Ckd. By: RG	APRIL 2018
	Dwg. No.: 18-038-M5	Rev. 0

NORTH



PARTIAL MAIN FLOOR PLAN 'B' - HVAC DEMOLITION

SCALE: 3/32" = 1'-0"



PARTIAL SECOND FLOOR PLAN 'B' - HVAC DEMOLITION

SCALE: 3/32" = 1'-0"

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL AND ELECTRICAL DRAWINGS

No.	Revision	Date	Initial
0	ISSUED FOR CONSTRUCTION	04/27/18	RG
D	ISSUED FOR FINAL CLIENT REVIEW	04/25/18	RG
C	ISSUED FOR 99% CLIENT REVIEW	04/13/18	RG
B	ISSUED FOR 75% CLIENT REVIEW	03/29/18	RG
A	ISSUED FOR 66% CLIENT REVIEW	03/16/18	RG

Notes:

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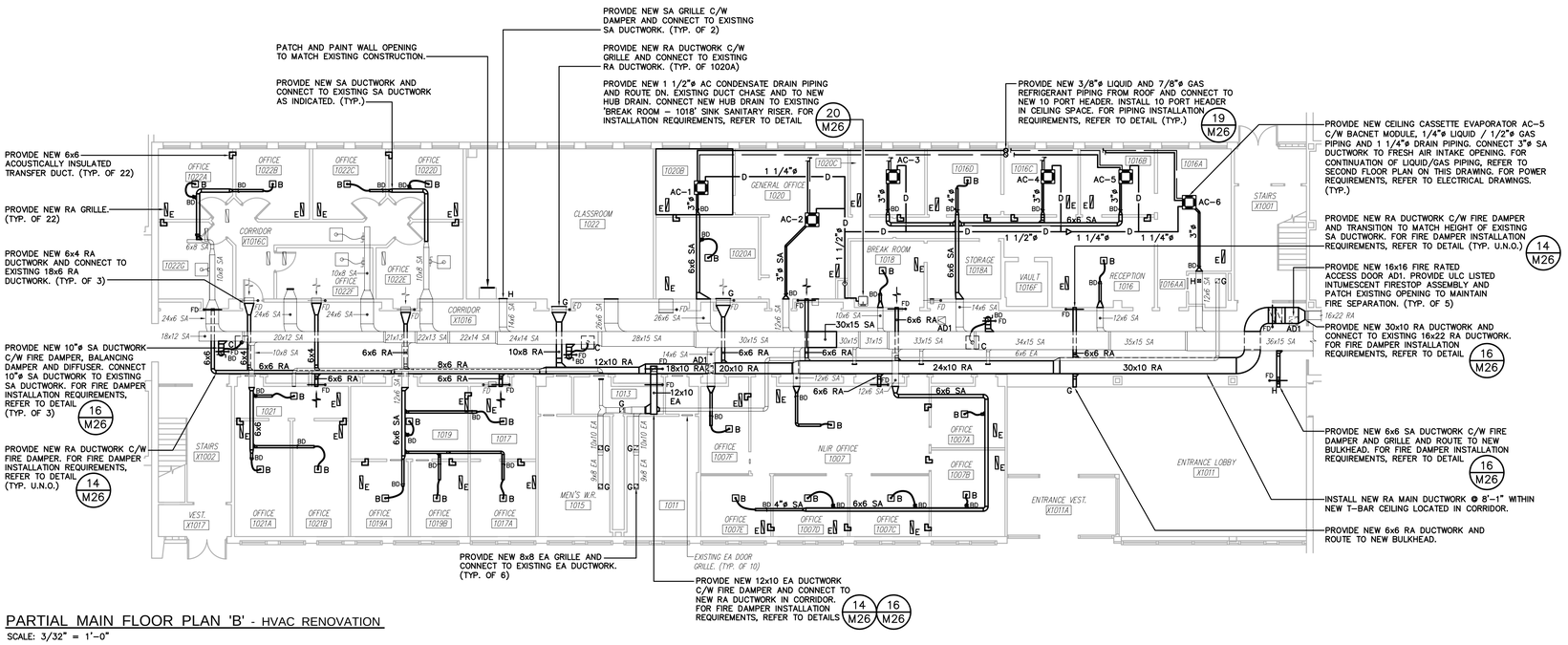
LAKEHEAD UNIVERSITY

THUNDER BAY ONTARIO

BORA LASKIN BUILDING
PLAN 'B'
MAIN FLOOR AND SECOND FLOOR
HVAC DEMOLITION

Scale:	Drawn By: BT	Date:
3/32" = 1'-0"	Ckd. By: RG	APRIL 2018
	Dwg. No.: 18-038-M6	Rev. 0

NORTH



PARTIAL MAIN FLOOR PLAN 'B' - HVAC RENOVATION

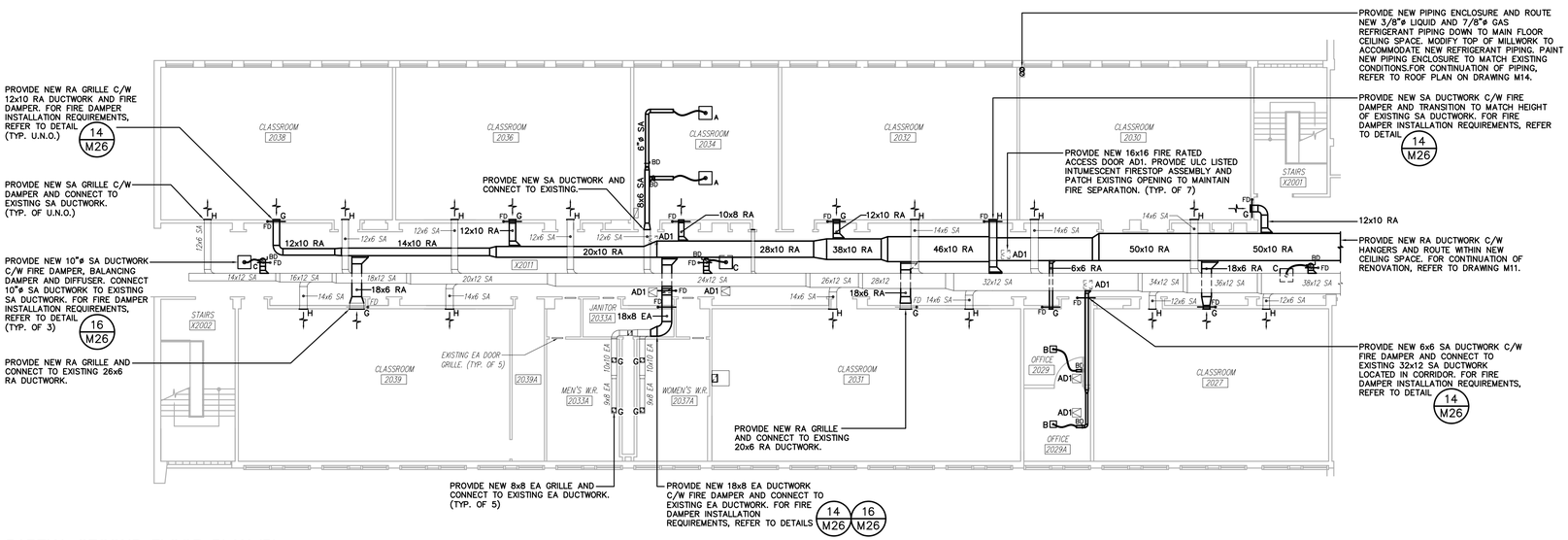
SCALE: 3/32" = 1'-0"

GENERAL HVAC NOTES:

1. FOR MECHANICAL SPECIFICATIONS REFER TO DRAWING M28. FOR SEQUENCE OF OPERATION REFER TO DRAWING M31. FOR EQUIPMENT LIST REFER TO DRAWING M29 & M30.
2. WHERE CEILING IS TO BE USED AS RA PLENUM. ALL MATERIALS IN CEILING SPACE TO BE NON-COMBUSTIBLE.
3. CO-ORDINATE DISTRIBUTION DUCTWORK, DIFFUSERS AND GRILLES WITH DOMESTIC WATER PIPING, SANITARY, LIGHTING LAYOUT, REFRIGERANT AND CONDENSATE PIPING AND REQUIRED CEILING HEIGHTS. INSTALL IN ACCESSIBLE CEILING SPACE WHERE POSSIBLE. PROVIDE ACCESS DOORS WHERE REQUIRED. REFER TO ELECTRICAL DRAWINGS FOR REFLECTED CEILING PLAN.
4. PROVIDE ADEQUATE SUPPORT FOR ALL EQUIPMENT AND DUCTWORK. PROVIDE SERVICE CLEARANCE FOR ALL EQUIPMENT AS PER MANUFACTURERS RECOMMENDATIONS.
5. PROVIDE ISOLATION VALVES ON LIQUID AND GAS REFRIGERANT PIPING SERVING AIR CONDITIONING UNITS AS PER MANUFACTURERS RECOMMENDATIONS TO ALLOW FOR SERVICING OF EQUIPMENT WITHOUT DISCHARGING SYSTEM.
6. INSULATE EXTERIOR AND INTERIOR REFRIGERANT LIQUID AND SUCTION LINES AS PER SPECIFICATIONS ON DRAWING M28.
7. BALANCE ALL FRESH AIR INTAKES TO CEILING MOUNTED AIR CONDITIONING UNITS AS INDICATED. FOR AIR QUANTITIES, REFER TO DIFFUSER/GRILLE SCHEDULE ON DRAWING M25.
8. ALL FIRE DAMPERS TO BE TYPE 'A' UNLESS NOTED OTHERWISE. FOR FIRE DAMPER INSTALLATION REFER TO DETAIL.
9. PROVIDE FIRE RATED ACCESS DOORS TO MAINTAIN ACCESS TO MECHANICAL EQUIPMENT AND PIPING WHERE REQUIRED.
10. IN THE EVENT OF DAMAGED FIRE DAMPERS DISCOVERED DURING CONSTRUCTION, THE MECHANICAL CONTRACTOR IS TO REPORT THE LOCATION OF THE DAMAGED FIRE DAMPER TO THE DESIGN ENGINEER AND PROCEED TO REPAIR THE FIRE DAMPER.
11. PENETRATIONS TO BE SEALED TO MAINTAIN INTEGRITY OF FIRE RATING. PROVIDE FIRE DAMPER OR ULC LISTED INTUMESCENT FIRESTOP ASSEMBLY FOR DUCTWORK AND PIPING PENETRATING REQUIRED SEPARATIONS.

GENERAL NOTES:

1. DISASSEMBLE EXISTING SUSPENDED CEILING SYSTEMS AS REQUIRED TO FACILITATE DEMOLITION AND RENOVATION OF DISTRIBUTION DUCTWORK. UPON COMPLETION OF WORK, REASSEMBLE CEILING SYSTEMS. REPLACE ALL CEILING TILES AND SUSPENDED CEILING COMPONENTS THAT ARE DAMAGED OR HAVE BEEN DAMAGED DURING CONSTRUCTION.
2. ONCE EQUIPMENT IS DEMOLISHED, VACUUM EXISTING DUCTWORK, CLEAN EXISTING GRILLES AND VACUUM HYDRONIC HEATING ELEMENTS.
3. WHERE EXISTING CEILING MOUNTED GRILLES OR DIFFUSERS HAVE BEEN REMOVED, PROVIDE NEW FULL SIZED CEILING TILE. REMOVE ALL REDUNDANT INTERMEDIATE T-BAR COMPONENTS TO ALLOW FOR FULL SIZED TILE INSTALLATION.
4. WHERE WALL MOUNTED THERMOSTATS OR CONTROLS HAVE BEEN REMOVED AND LOCATION IS NOT REUSED, PROVIDE STAINLESS STEEL BLANK COVER PLATE FOR REDUNDANT DEVICE BOX IF PRESENT OR REPAIR AND PATCH WALLS AS REQUIRED. PATCHWORK SHALL MATCH EXISTING CONSTRUCTION AND MAINTAIN INTEGRITY OF FIRE SEPARATION WHERE REQUIRED. PAINT AND FINISH PATCHWORK TO MATCH SURROUNDING AREA. PAINTING OF PATCHWORK TO EXTEND TO NEAREST CHANGE OF DIRECTION.
5. ONCE HYDRONIC RENOVATIONS ARE COMPLETE, TOUCH UP FINISHES ON RADIANT HEATER ENCLOSURES AND SURROUNDING WALL AREAS DAMAGED DURING CONSTRUCTION TO MATCH EXISTING/NEW FINISHES.
6. CONCEAL WIRING IN EXISTING BUILDING CONSTRUCTION WHERE POSSIBLE. ROUTE IN WIRE MOULD CASING WHERE CONCEALMENT IS NOT POSSIBLE.
7. UPON COMPLETION OF DEMOLITION, REPAIR AND PATCH ALL REDUNDANT WALL, CEILING AND FLOOR OPENINGS AS REQUIRED. PATCHWORK SHALL MATCH EXISTING CONSTRUCTION AND MAINTAIN INTEGRITY OF FIRE SEPARATION WHERE REQUIRED. PAINT AND FINISH PATCHWORK TO MATCH SURROUNDING AREA. PAINTING OF PATCHWORK TO EXTEND TO NEAREST CHANGE OF DIRECTION.



PARTIAL SECOND FLOOR PLAN 'B' - HVAC RENOVATION

SCALE: 3/32" = 1'-0"

No.	Revision	Date	Initial
0	ISSUED FOR CONSTRUCTION	04/27/18	RG
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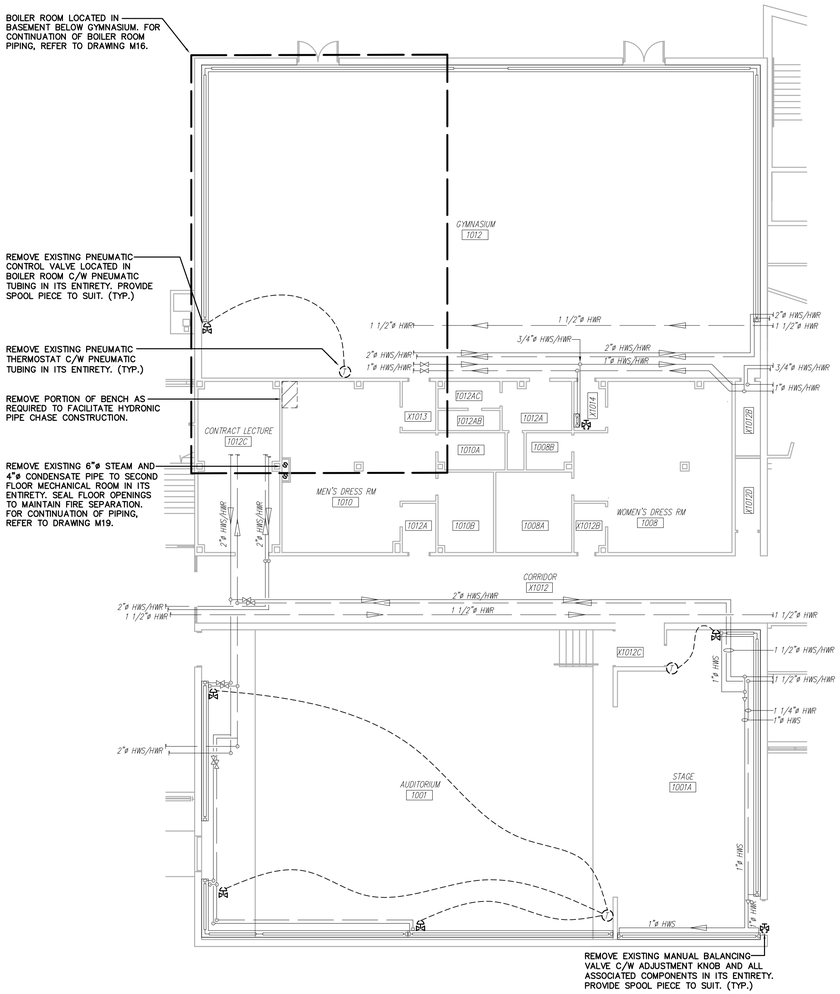
THUNDER BAY ONTARIO

BORA LASKIN BUILDING
PLAN 'B'
MAIN FLOOR AND SECOND FLOOR
HVAC RENOVATION

Scale:	Drawn By: BT	Date:
3/32" = 1'-0"	Ckd. By: RG	APRIL 2018
	Dwg. No.: 18-038-M7	Rev. 0

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL AND ELECTRICAL DRAWINGS

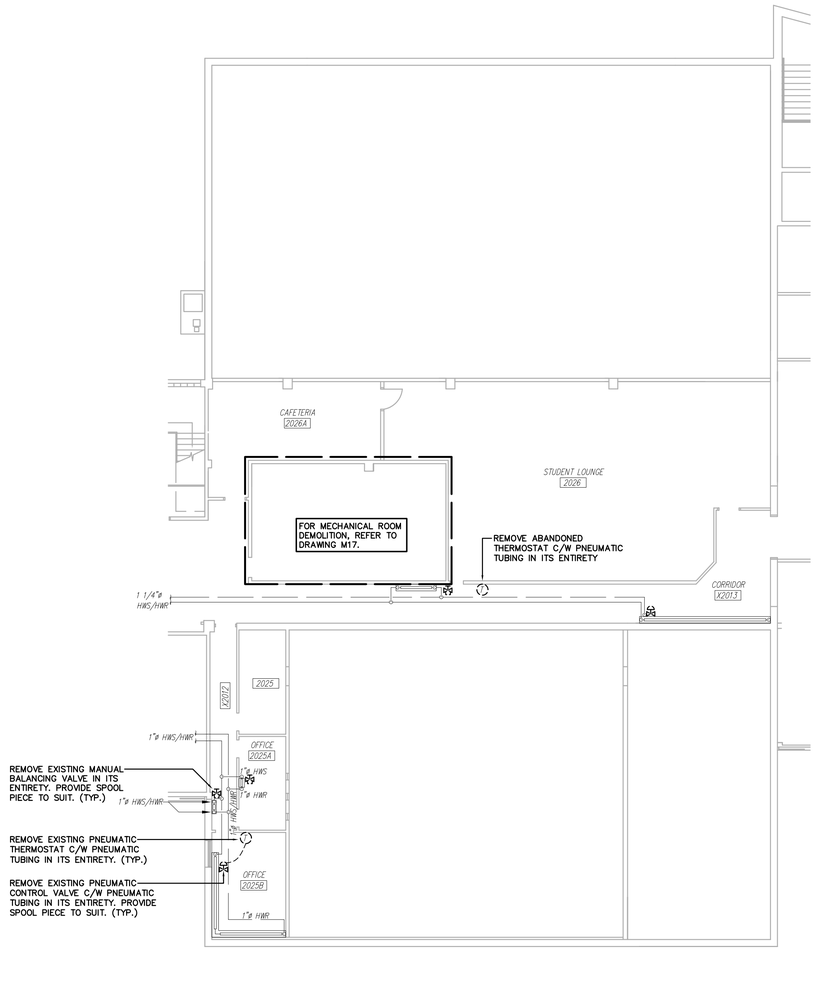
NORTH



HYDRONIC PIPING LOCATED IN CRAWLSPACE AND SHOWN ON MAIN FLOOR PLAN FOR CLARITY.

PARTIAL MAIN FLOOR PLAN 'C' - HYDRONIC DEMOLITION

SCALE: 3/32" = 1'-0"

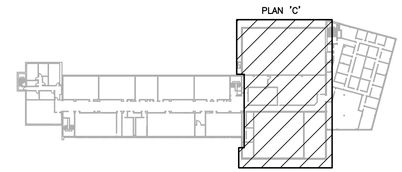


HYDRONIC PIPING LOCATED IN MAIN FLOOR CEILING SPACE AND SHOWN ON SECOND FLOOR PLAN FOR CLARITY.

PARTIAL SECOND FLOOR PLAN 'C' - HYDRONIC DEMOLITION

SCALE: 3/32" = 1'-0"

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL AND ELECTRICAL DRAWINGS



KEY PLAN

No.	Revision	Date	Initial
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D	ISSUED FOR FINAL CLIENT REVIEW	04/25/18	RG
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B	ISSUED FOR 75% CLIENT REVIEW	03/29/18	RG
A	ISSUED FOR 66% CLIENT REVIEW	03/16/18	RG

Notes:

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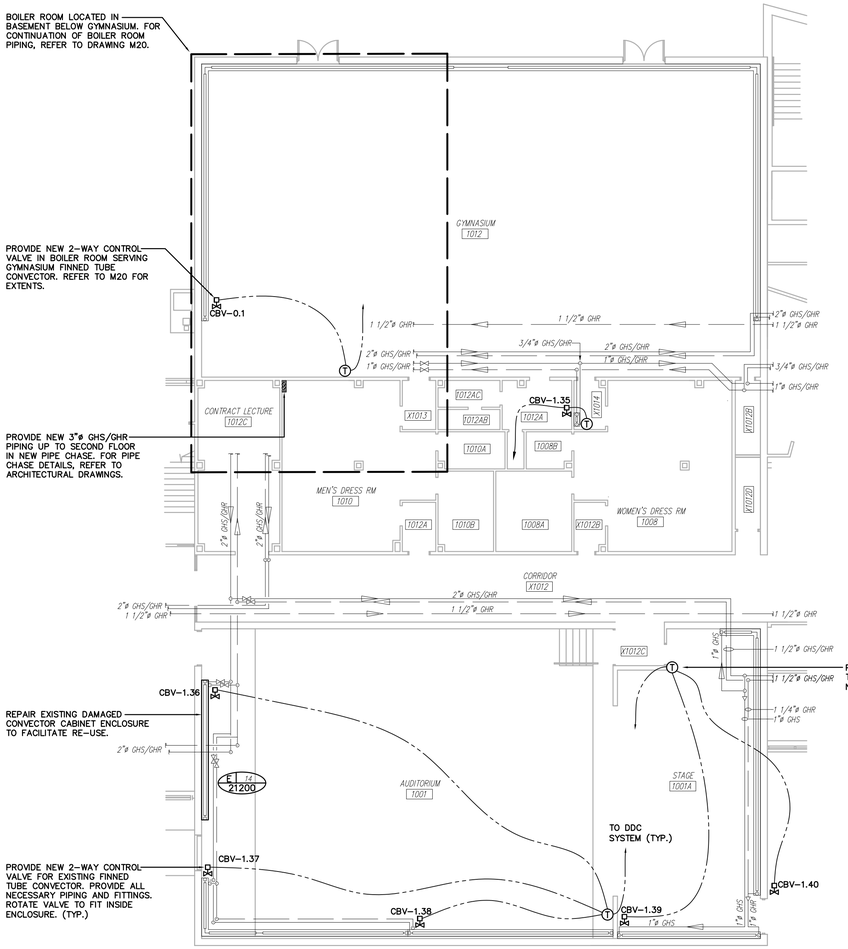
THUNDER BAY ONTARIO

BORA LASKIN BUILDING
PLAN 'C'
MAIN FLOOR AND SECOND FLOOR
HYDRONIC DEMOLITION

Scale:	Drawn By: TM	Date:
3/32" = 1'-0"	Ckd. By: RG	APRIL 2018
	Dwg. No.: 18-038-M8	Rev. 0

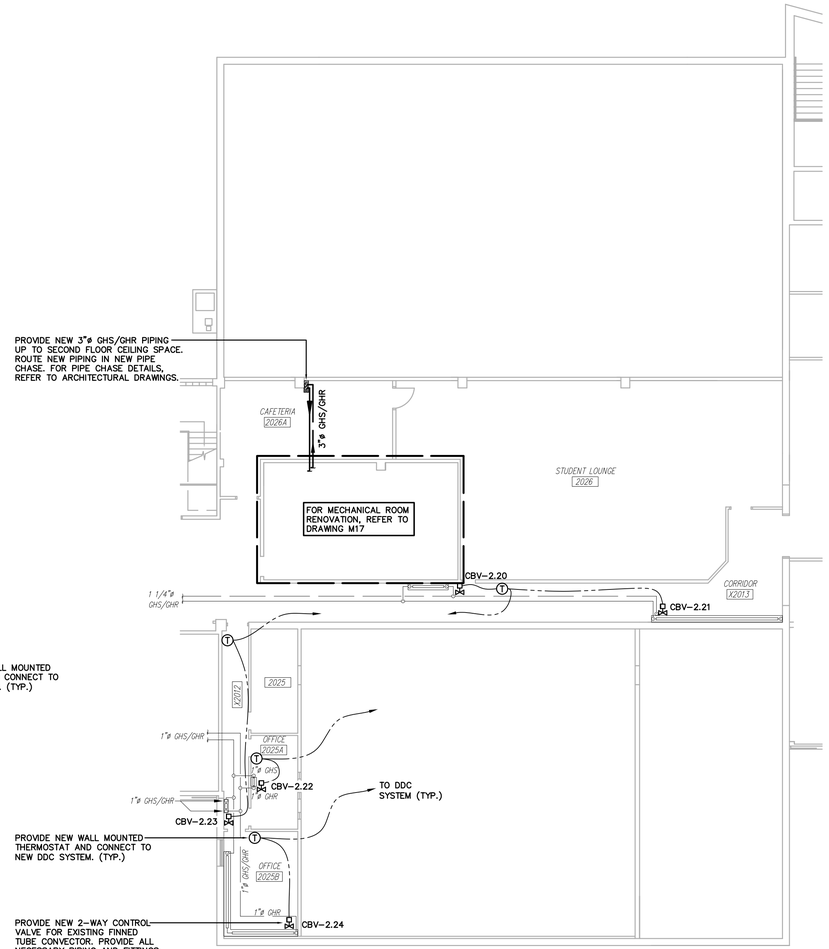
NORTH



HYDRONIC PIPING LOCATED IN CRAWLSPACE AND SHOWN ON MAIN FLOOR PLAN FOR CLARITY.

PARTIAL MAIN FLOOR PLAN 'C' - HYDRONIC RENOVATION

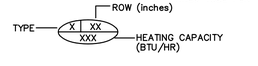
SCALE: 3/32" = 1'-0"



HYDRONIC PIPING LOCATED IN MAIN FLOOR CEILING SPACE AND SHOWN ON SECOND FLOOR PLAN FOR CLARITY.

PARTIAL SECOND FLOOR PLAN 'C' - HYDRONIC RENOVATION

SCALE: 3/32" = 1'-0"



CONVECTOR NOMENCLATURE

SCALE: N.T.S.

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL AND ELECTRICAL DRAWINGS

GENERAL HYDRONIC NOTES:

1. FOR MECHANICAL SPECIFICATIONS REFER TO DRAWING M28. FOR SEQUENCE OF OPERATION REFER TO DRAWING M31. FOR EQUIPMENT LIST REFER TO DRAWING M29 & M30.
2. INSULATE HYDRONIC PIPING AS PER SPECIFICATIONS ON DRAWING M28.
3. FOR CONTROL BALANCING VALVES (CBV-X) SIZES AND FLOWS, REFER TO SCHEDULES ON DRAWING M27. PROVIDE REDUCERS TO SUIT VALVE SIZES AS REQUIRED.
4. PROVIDE MANUAL HIGH POINT AIR VENTS WHERE REQUIRED.
5. PROVIDE ADEQUATE SUPPORT FOR ALL EQUIPMENT AND PIPING. PROVIDE SERVICE CLEARANCE FOR ALL EQUIPMENT AS PER MANUFACTURERS RECOMMENDATIONS.
6. ALL PENETRATIONS TO BE SEALED TO MAINTAIN INTEGRITY OF FIRE RATING. PROVIDE ULC LISTED INTUMESCENT FIRESTOP ASSEMBLY FOR PIPING PENETRATIONS AS PER REQUIRED SEPARATIONS.
7. PROVIDE NON-RATED OR FIRE RATED ACCESS DOORS TO MAINTAIN ACCESS TO MECHANICAL EQUIPMENT AND PIPING WHERE REQUIRED.

GENERAL NOTES:

1. DISASSEMBLE EXISTING SUSPENDED CEILING SYSTEMS AS REQUIRED TO FACILITATE DEMOLITION AND RENOVATION OF DISTRIBUTION DUCTWORK AND MECHANICAL PIPING. UPON COMPLETION OF WORK, REASSEMBLE CEILING SYSTEMS. REPLACE ALL CEILING TILES AND SUSPENDED CEILING COMPONENTS THAT ARE DAMAGED OR HAVE BEEN DAMAGED DURING CONSTRUCTION.
2. ONCE EQUIPMENT IS DEMOLISHED, VACUUM EXISTING DUCTWORK AND CLEAN EXISTING GRILLES AND DIFFUSERS. VACUUM HYDRONIC HEATING ELEMENTS AND CLEAN ENCLOSURES FOR REUSE.
3. WHERE EXISTING CEILING MOUNTED GRILLES OR DIFFUSERS HAVE BEEN REMOVED, PROVIDE NEW FULL SIZED CEILING TILE. REMOVE ALL REDUNDANT INTERMEDIATE T-BAR COMPONENTS TO ALLOW FOR FULL SIZED TILE INSTALLATION.
4. WHERE WALL MOUNTED THERMOSTATS OR CONTROLS HAVE BEEN REMOVED AND LOCATION IS NOT REUSED, PROVIDE STAINLESS STEEL BLANK COVER PLATE FOR REDUNDANT DEVICE BOX IF PRESENT OR REPAIR AND PATCH WALLS AS REQUIRED. PATCHWORK SHALL MATCH EXISTING CONSTRUCTION AND MAINTAIN INTEGRITY OF FIRE SEPARATION WHERE REQUIRED. PAINT AND FINISH PATCHWORK TO MATCH SURROUNDING AREA. PAINTING OF PATCHWORK TO EXTEND TO NEAREST CHANGE OF DIRECTION.
5. ONCE HYDRONIC RENOVATIONS ARE COMPLETE, TOUCH UP FINISHES ON RADIANT HEATER ENCLOSURES AND SURROUNDING WALL AREAS AND MILLWORK DAMAGED DURING CONSTRUCTION TO MATCH EXISTING/NEW FINISHES.
6. CONCEAL WIRING IN EXISTING BUILDING CONSTRUCTION WHERE POSSIBLE. ROUTE IN WIRE MOULD CASING WHERE CONCEALMENT IS NOT POSSIBLE.
7. UPON COMPLETION OF DEMOLITION, REPAIR AND PATCH ALL REDUNDANT WALL, CEILING AND FLOOR OPENINGS AS REQUIRED. PATCHWORK SHALL MATCH EXISTING CONSTRUCTION AND MAINTAIN INTEGRITY OF FIRE SEPARATION WHERE REQUIRED. PAINT AND FINISH PATCHWORK TO MATCH SURROUNDING AREA. PAINTING OF PATCHWORK TO EXTEND TO NEAREST CHANGE OF DIRECTION.

No.	Revision	Date	Initial
0	ISSUED FOR CONSTRUCTION	04/27/18	RG
D	ISSUED FOR FINAL CLIENT REVIEW	04/25/18	RG
C	ISSUED FOR 99% CLIENT REVIEW	04/13/18	RG
B	ISSUED FOR 75% CLIENT REVIEW	03/29/18	RG
A	ISSUED FOR 66% CLIENT REVIEW	03/16/18	RG

Notes:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING DIMENSIONS AND EXISTING CONDITIONS AT THE OUTSET OF CONSTRUCTION. REPORT ANY DISCREPANCIES TO THE ENGINEER. DO NOT PROCEED WITHOUT FURTHER WRITTEN DIRECTION FROM THE ENGINEER.
2. DRAWING SHOWS GENERAL ARRANGEMENT ONLY. DO NOT SCALE.

Approved

Approved

LICENSED PROFESSIONAL ENGINEER
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100181428
APR. 27/18
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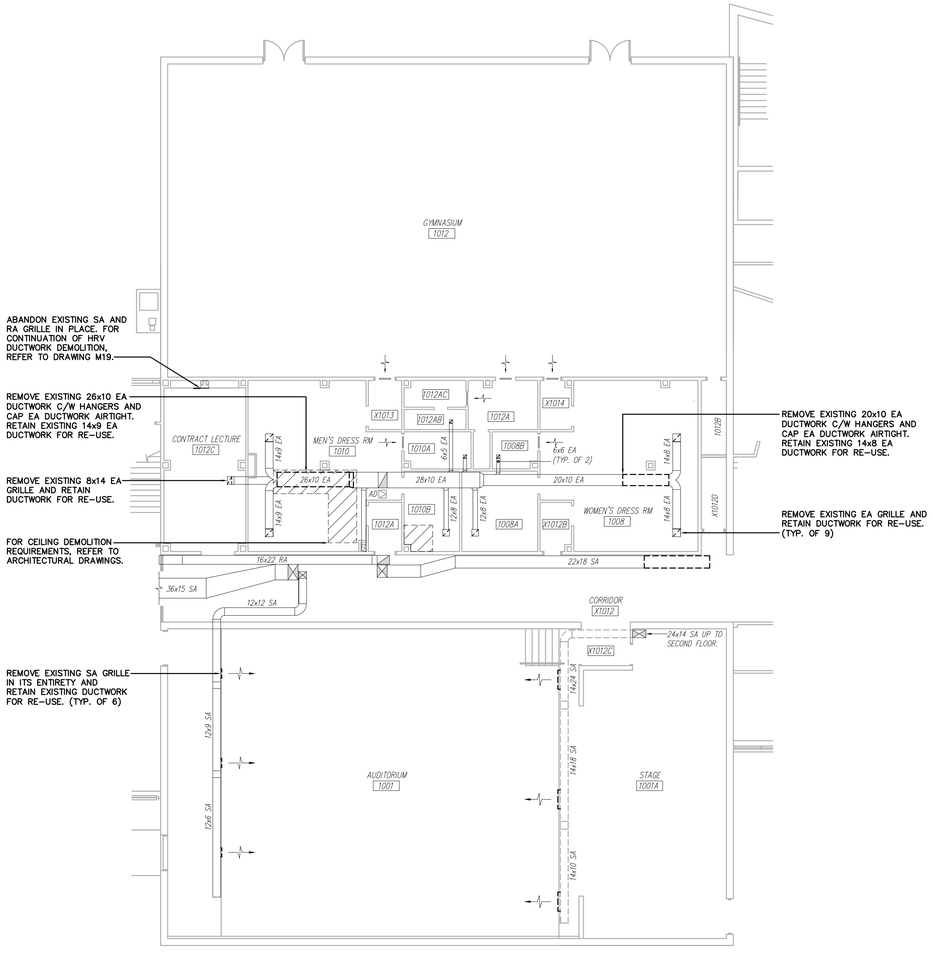
LAKEHEAD UNIVERSITY

THUNDER BAY ONTARIO

BORA LASKIN BUILDING
PLAN 'C'
MAIN FLOOR AND SECOND FLOOR HYDRONIC RENOVATION

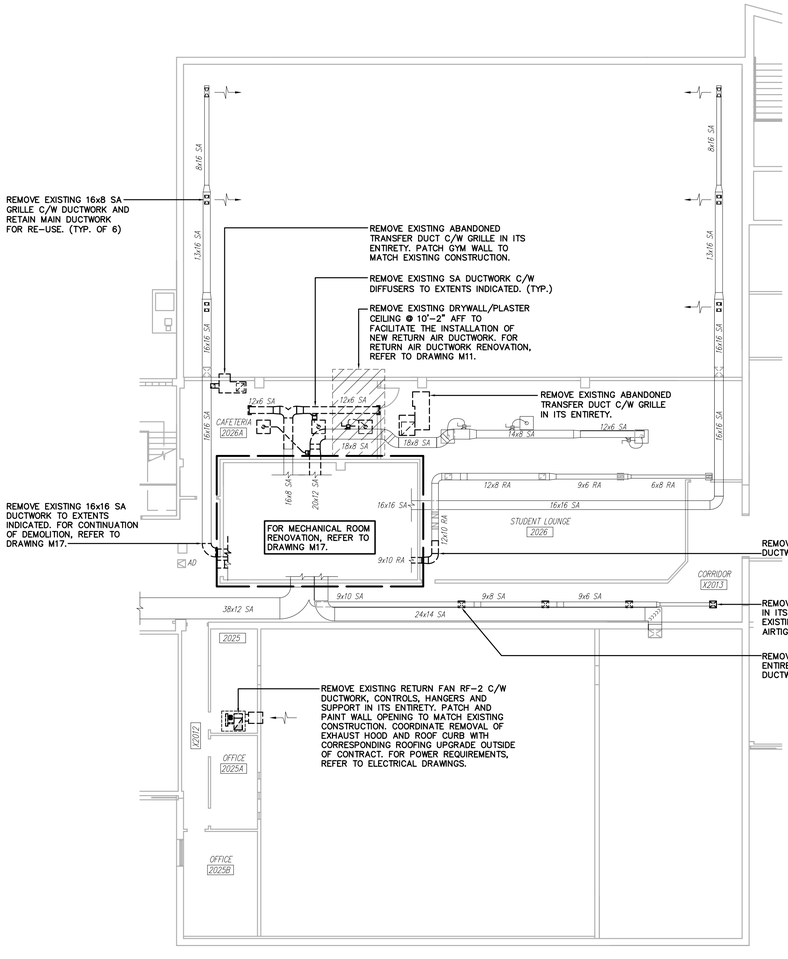
Scale:	Drawn By: TM	Date:
3/32" = 1'-0"	Ckd. By: RG	APRIL 2018
	Dwg. No.: 18-038-M9	Rev. 0

NORTH



PARTIAL MAIN FLOOR PLAN 'C' - HVAC DEMOLITION

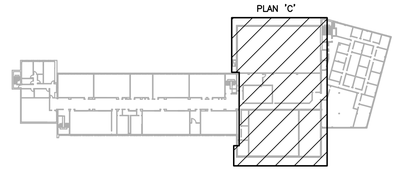
SCALE: 3/32" = 1'-0"



PARTIAL SECOND FLOOR PLAN 'C' - HVAC DEMOLITION

SCALE: 3/32" = 1'-0"

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL AND ELECTRICAL DRAWINGS



KEY PLAN

No.	Revision	Date	Initial
0	ISSUED FOR CONSTRUCTION	04/27/18	RG
D	ISSUED FOR FINAL CLIENT REVIEW	04/25/18	RG
C	ISSUED FOR 99% CLIENT REVIEW	04/13/18	RG
B	ISSUED FOR 75% CLIENT REVIEW	03/29/18	RG
A	ISSUED FOR 66% CLIENT REVIEW	03/16/18	RG

Notes:

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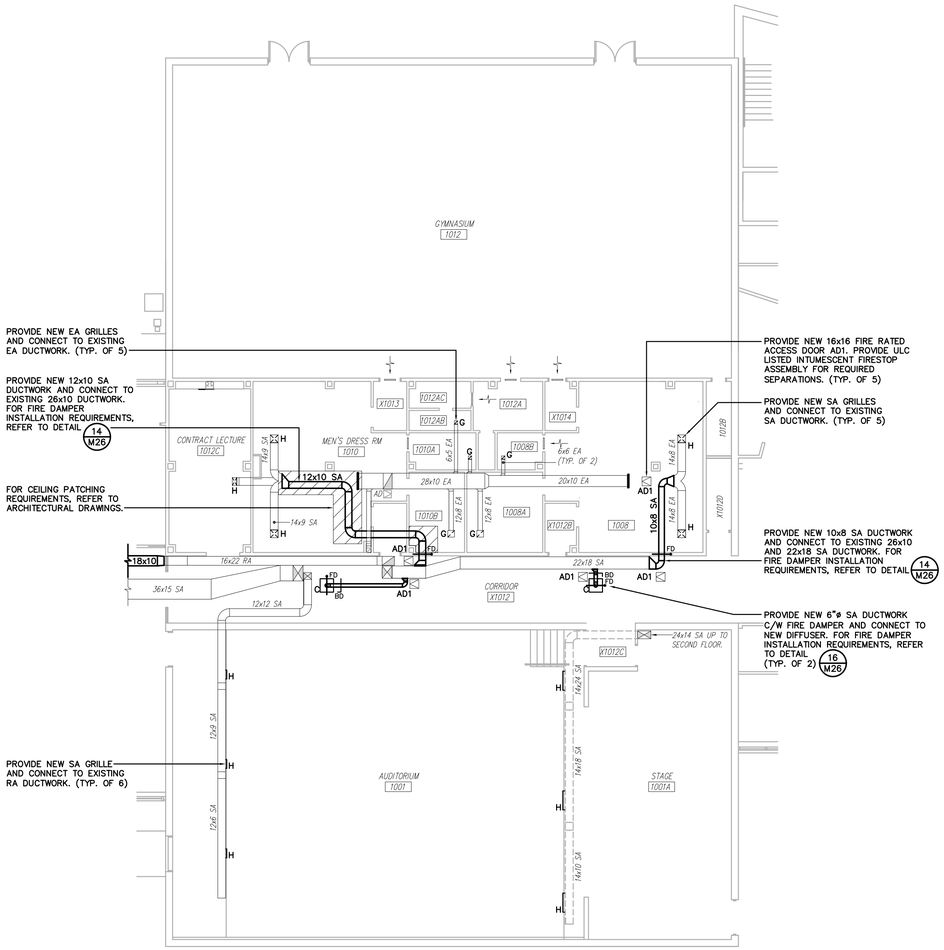
THUNDER BAY ONTARIO

BORA LASKIN BUILDING
PLAN 'C'
MAIN FLOOR AND SECOND FLOOR
HVAC DEMOLITION

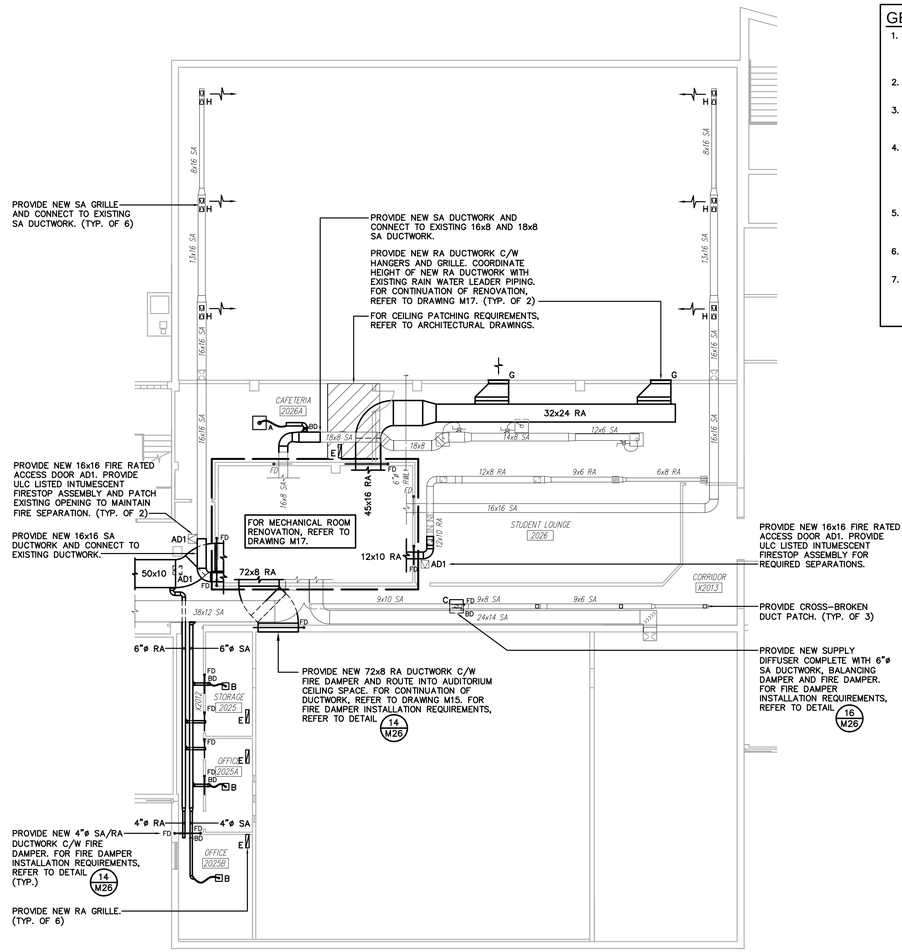
Scale:	Drawn By: BT	Date:
3/32" = 1'-0"	Ckd. By: RG	APRIL 2018
	Dwg. No.: 18-038-M10	Rev. 0

NORTH



PARTIAL MAIN FLOOR PLAN 'C' - HVAC RENOVATION

SCALE: 3/32" = 1'-0"



PARTIAL SECOND FLOOR PLAN 'C' - HVAC RENOVATION

SCALE: 3/32" = 1'-0"

GENERAL HVAC NOTES:

1. FOR MECHANICAL SPECIFICATIONS REFER TO DRAWING M28. FOR SEQUENCE OF OPERATION REFER TO DRAWING M31. FOR EQUIPMENT LIST REFER TO DRAWING M29 & M30.
2. WHERE CEILING IS TO BE USED AS RA PLENUM. ALL MATERIALS IN CEILING SPACE TO BE NON-COMBUSTIBLE.
3. CO-ORDINATE DISTRIBUTION DUCTWORK, DIFFUSERS AND GRILLES WITH RAIN WATER LEADER PIPING, SANITARY, LIGHTING LAYOUT AND REQUIRED CEILING HEIGHTS. INSTALL IN ACCESSIBLE CEILING SPACE WHERE POSSIBLE. PROVIDE ACCESS DOORS WHERE REQUIRED. REFER TO ELECTRICAL DRAWINGS FOR REFLECTED CEILING PLAN.
4. NOT ALL EXTERNAL INSULATION SHOWN FOR CLARITY. INSULATE DUCTWORK AS PER MECHANICAL SPECIFICATIONS ON DRAWING M28.
5. PROVIDE ADEQUATE SUPPORT FOR ALL EQUIPMENT AND DUCTWORK. PROVIDE SERVICE CLEARANCE FOR ALL EQUIPMENT AS PER MANUFACTURERS RECOMMENDATIONS.
6. INSULATE DUCTWORK AS PER SPECIFICATIONS ON DRAWING M28.
7. ALL FIRE DAMPERS TO BE TYPE 'A' UNLESS NOTED OTHERWISE. FOR FIRE DAMPER INSTALLATION REFER TO DETAIL.
8. PROVIDE FIRE RATED ACCESS DOORS TO MAINTAIN ACCESS TO MECHANICAL EQUIPMENT AND PIPING WHERE REQUIRED.
9. IN THE EVENT OF DAMAGED FIRE DAMPERS DISCOVERED DURING CONSTRUCTION, THE MECHANICAL CONTRACTOR IS TO REPORT THE LOCATION OF THE DAMAGED FIRE DAMPER TO THE DESIGN ENGINEER AND PROCEED TO REPAIR THE FIRE DAMPER.
10. PROVIDE FIRE DAMPER OR ULC LISTED INTUMESCENT FIRESTOP ASSEMBLY FOR DUCTWORK AND PIPING PENETRATING REQUIRED SEPARATIONS.

GENERAL NOTES:

1. DISASSEMBLE EXISTING SUSPENDED CEILING SYSTEMS AS REQUIRED TO FACILITATE DEMOLITION AND RENOVATION OF DISTRIBUTION DUCTWORK AND MECHANICAL PIPING. UPON COMPLETION OF WORK, REASSEMBLE CEILING SYSTEMS. REPLACE ALL CEILING TILES AND SUSPENDED CEILING COMPONENTS THAT ARE DAMAGED OR HAVE BEEN DAMAGED DURING CONSTRUCTION.
2. ONCE EQUIPMENT IS DEMOLISHED, VACUUM EXISTING DUCTWORK, CLEAN EXISTING GRILLES AND VACUUM HYDRONIC HEATING ELEMENTS.
3. WHERE EXISTING CEILING MOUNTED GRILLES OR DIFFUSERS HAVE BEEN REMOVED, PROVIDE NEW FULL SIZED CEILING TILE. REMOVE ALL REDUNDANT INTERMEDIATE T-BAR COMPONENTS TO ALLOW FOR FULL SIZED TILE INSTALLATION.
4. WHERE WALL MOUNTED THERMOSTATS OR CONTROLS HAVE BEEN REMOVED AND LOCATION IS NOT REUSED, PROVIDE STAINLESS STEEL BLANK COVER PLATE FOR REDUNDANT DEVICE BOX IF PRESENT OR REPAIR AND PATCH WALLS AS REQUIRED. PATCHWORK SHALL MATCH EXISTING CONSTRUCTION AND MAINTAIN INTEGRITY OF FIRE SEPARATION WHERE REQUIRED. PAINT AND FINISH PATCHWORK TO MATCH SURROUNDING AREA. PAINTING OF PATCHWORK TO EXTEND TO NEAREST CHANGE OF DIRECTION.
5. ONCE HYDRONIC RENOVATIONS ARE COMPLETE, TOUCH UP FINISHES ON RADIANT HEATER ENCLOSURES AND SURROUNDING WALL AREAS DAMAGED DURING CONSTRUCTION TO MATCH EXISTING/NEW FINISHES.
6. CONCEAL WIRING IN EXISTING BUILDING CONSTRUCTION WHERE POSSIBLE. ROUTE IN WIRE MOULD CASING WHERE CONCEALMENT IS NOT POSSIBLE.
7. UPON COMPLETION OF DEMOLITION, REPAIR AND PATCH ALL REDUNDANT WALL, CEILING AND FLOOR OPENINGS AS REQUIRED. PATCHWORK SHALL MATCH EXISTING CONSTRUCTION AND MAINTAIN INTEGRITY OF FIRE SEPARATION WHERE REQUIRED. PAINT AND FINISH PATCHWORK TO MATCH SURROUNDING AREA. PAINTING OF PATCHWORK TO EXTEND TO NEAREST CHANGE OF DIRECTION.

No.	Revision	Date	Initial
0	ISSUED FOR CONSTRUCTION	04/24/18	RG
D	ISSUED FOR FINAL CLIENT REVIEW	04/5/18	RG
C	ISSUED FOR 99% CLIENT REVIEW	04/13/18	RG
B	ISSUED FOR 75% CLIENT REVIEW	03/29/18	RG
A	ISSUED FOR 66% CLIENT REVIEW	03/16/18	RG

Notes:

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Approved

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LAKEHEAD UNIVERSITY

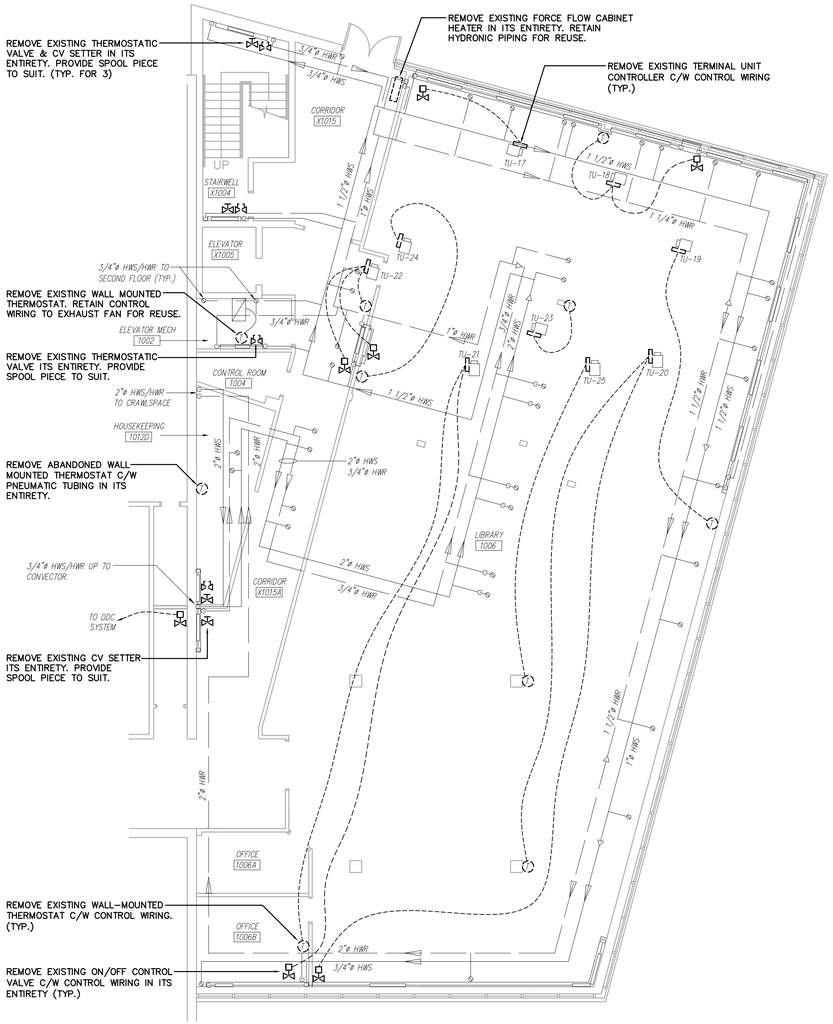
THUNDER BAY ONTARIO

BORA LASKIN BUILDING
PLAN 'C'
MAIN FLOOR AND SECOND FLOOR
HVAC RENOVATION

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL AND ELECTRICAL DRAWINGS

Scale:	Drawn By: BT	Date:
3/32" = 1'-0"	Ckd. By: RG	APRIL 2018
	Dwg. No.: 18-038-M11	Rev. 0

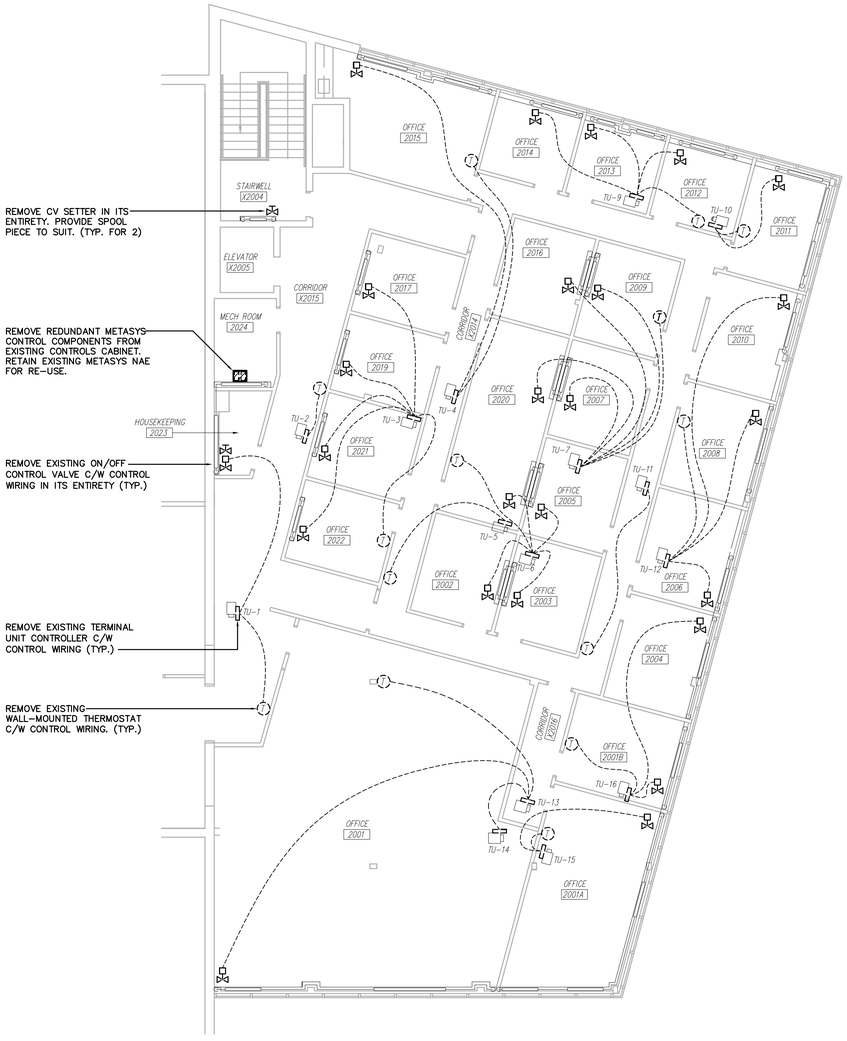
NORTH



HYDRONIC PIPING LOCATED IN MAIN FLOOR CEILING SPACE AND SHOWN ON MAIN FLOOR PLAN FOR CLARITY.

PARTIAL MAIN FLOOR PLAN 'D' - DEMOLITION

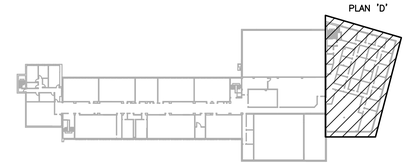
SCALE: 1/8" = 1'-0"



PARTIAL SECOND FLOOR PLAN 'D' - DEMOLITION

SCALE: 1/8" = 1'-0"

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL AND ELECTRICAL DRAWINGS



KEY PLAN

No.	Revision	Date	Initial
0	ISSUED FOR CONSTRUCTION	04/27/18	RG
D	ISSUED FOR FINAL CLIENT REVIEW	04/25/18	RG
C	ISSUED FOR 99% CLIENT REVIEW	04/13/18	RG
B	ISSUED FOR 75% CLIENT REVIEW	03/29/18	RG
A	ISSUED FOR 66% CLIENT REVIEW	03/16/18	RG

Notes:

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2. DRAWING SHOWS GENERAL ARRANGEMENT ONLY. DO NOT SCALE.

Approved

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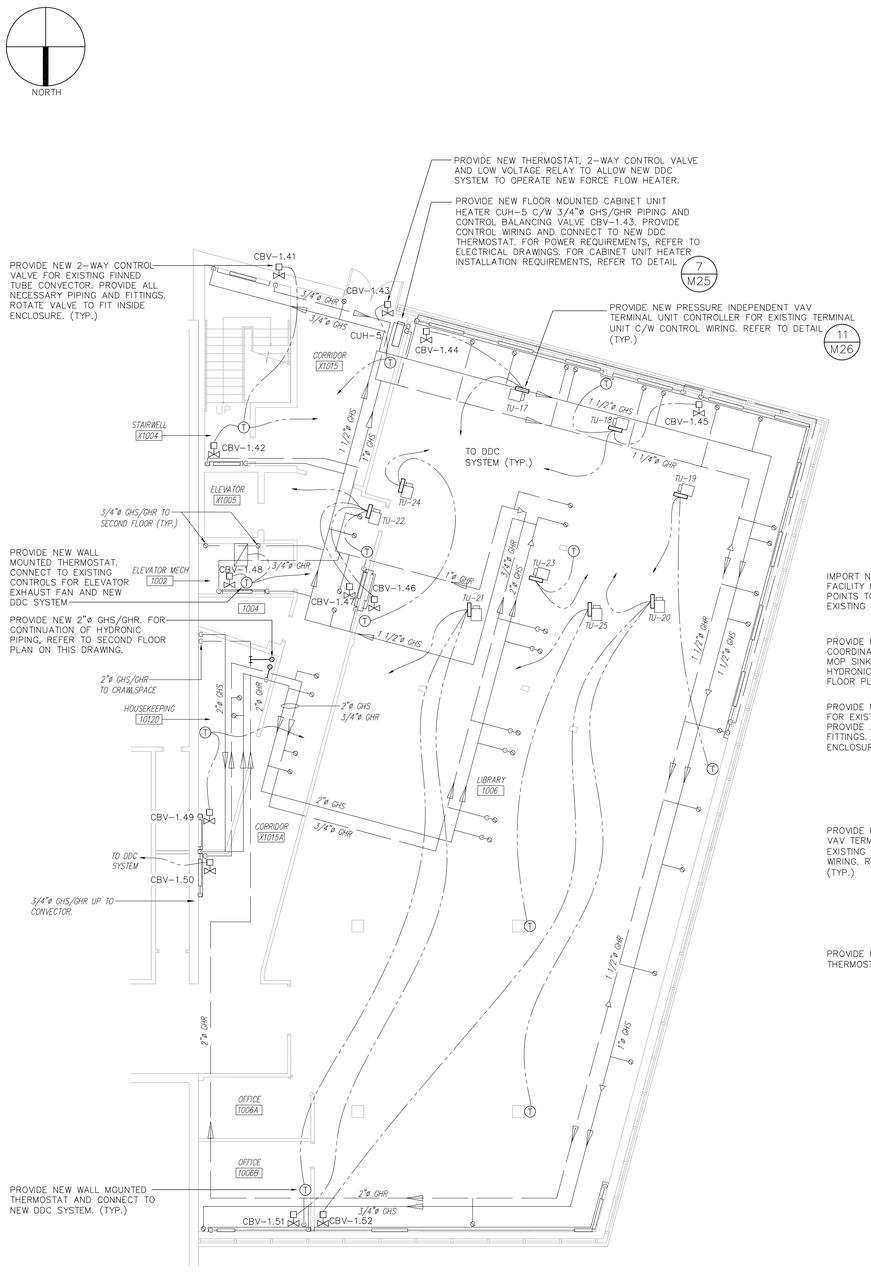
LAKEHEAD UNIVERSITY
THUNDER BAY ONTARIO

BORA LASKIN BUILDING
PLAN 'D'
MAIN FLOOR AND SECOND FLOOR
DEMOLITION

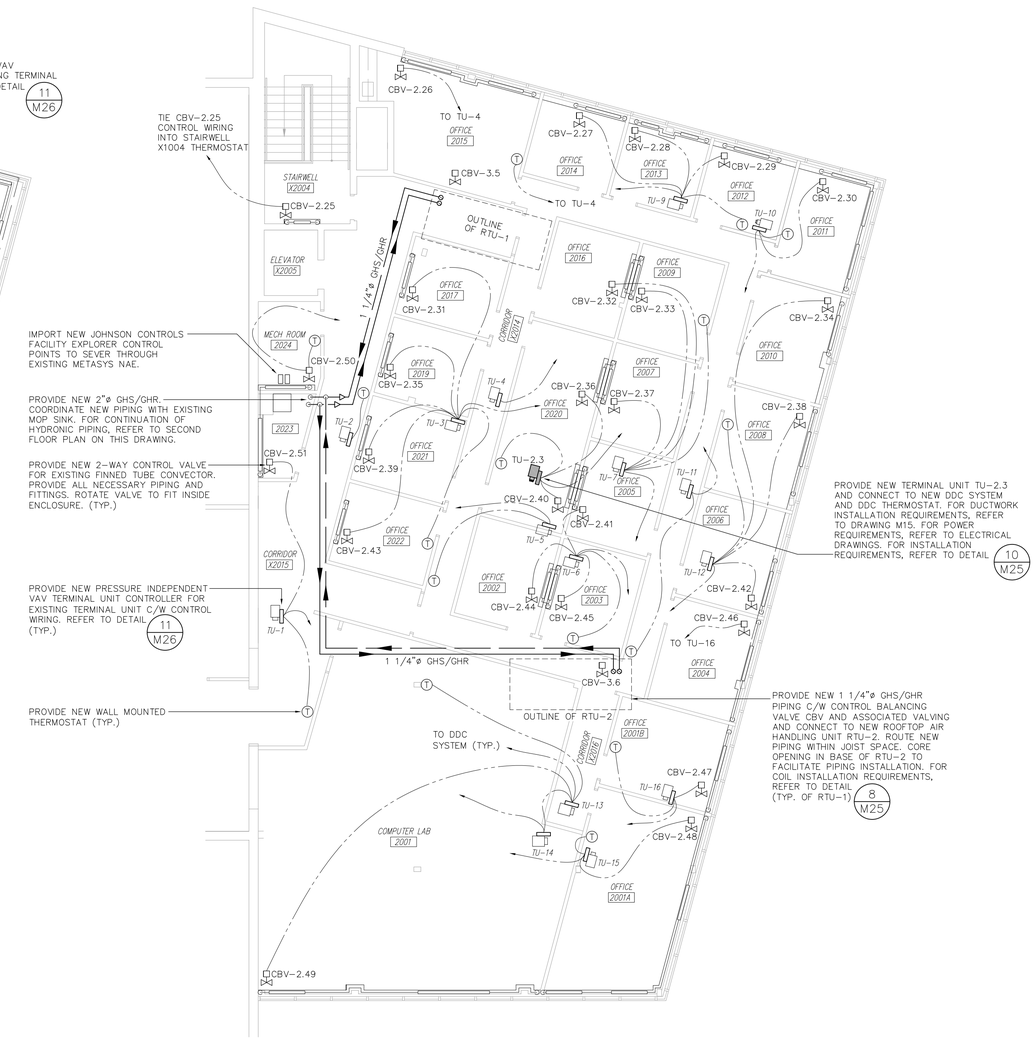
Scale:	Drawn By: TM	Date:
1/8" = 1'-0"	Ckd. By: RG	APRIL 2018
	Dwg. No.: 18-038-M12	Rev. 0



HYDRONIC PIPING LOCATED IN MAIN FLOOR CEILING SPACE AND SHOWN ON MAIN FLOOR PLAN FOR CLARITY.

PARTIAL MAIN FLOOR PLAN 'D' - RENOVATION

SCALE: 1/8" = 1'-0"



PARTIAL SECOND FLOOR PLAN 'D' - RENOVATION

SCALE: 1/8" = 1'-0"

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL AND ELECTRICAL DRAWINGS

GENERAL NOTES:

1. DISASSEMBLE EXISTING SUSPENDED CEILING SYSTEMS AS REQUIRED TO FACILITATE DEMOLITION AND RENOVATION OF DISTRIBUTION DUCTWORK AND MECHANICAL PIPING. UPON COMPLETION OF WORK, REASSEMBLE CEILING SYSTEMS. REPLACE ALL CEILING TILES AND SUSPENDED CEILING COMPONENTS THAT ARE DAMAGED OR HAVE BEEN DAMAGED DURING CONSTRUCTION.
2. ONCE EQUIPMENT IS DEMOLISHED, VACUUM EXISTING DUCTWORK AND CLEAN EXISTING GRILLES AND DIFFUSERS. VACUUM HYDRONIC HEATING ELEMENTS AND CLEAN ENCLOSURES FOR REUSE.
3. WHERE EXISTING CEILING MOUNTED GRILLES OR DIFFUSERS HAVE BEEN REMOVED, PROVIDE NEW FULL SIZED CEILING TILE. REMOVE ALL REDUNDANT INTERMEDIATE T-BAR COMPONENTS TO ALLOW FOR FULL SIZED TILE INSTALLATION.
4. WHERE WALL MOUNTED THERMOSTATS OR CONTROLS HAVE BEEN REMOVED AND LOCATION IS NOT REUSED, PROVIDE STAINLESS STEEL BLANK COVER PLATE FOR REDUNDANT DEVICE BOX IF PRESENT OR REPAIR AND PATCH WALLS AS REQUIRED. PATCHWORK SHALL MATCH EXISTING CONSTRUCTION AND MAINTAIN INTEGRITY OF FIRE SEPARATION WHERE REQUIRED. PAINT AND FINISH PATCHWORK TO MATCH SURROUNDING AREA. PAINTING OF PATCHWORK TO EXTEND TO NEAREST CHANGE OF DIRECTION.
5. ONCE HYDRONIC RENOVATIONS ARE COMPLETE, TOUCH UP FINISHES ON RADIANT HEATER ENCLOSURES AND SURROUNDING WALL AREAS AND MILLWORK DAMAGED DURING CONSTRUCTION TO MATCH EXISTING/NEW FINISHES.
6. CONCEAL WIRING IN EXISTING BUILDING CONSTRUCTION WHERE POSSIBLE. ROUTE IN WIRE MOULD CASING WHERE CONCEALMENT IS NOT POSSIBLE.
7. UPON COMPLETION OF DEMOLITION, REPAIR AND PATCH ALL REDUNDANT WALL, CEILING AND FLOOR OPENINGS AS REQUIRED. PATCHWORK SHALL MATCH EXISTING CONSTRUCTION AND MAINTAIN INTEGRITY OF FIRE SEPARATION WHERE REQUIRED. PAINT AND FINISH PATCHWORK TO MATCH SURROUNDING AREA. PAINTING OF PATCHWORK TO EXTEND TO NEAREST CHANGE OF DIRECTION.
8. FOR MECHANICAL SPECIFICATIONS REFER TO DRAWING M28. FOR SEQUENCE OF OPERATION REFER TO DRAWING M.31. FOR EQUIPMENT LIST REFER TO DRAWING M29 & M.30.
9. INSULATE HYDRONIC PIPING AS PER SPECIFICATIONS ON DRAWING M28.
10. FOR CONTROL BALANCING VALVES (CBV-X) SIZES AND FLOWS, REFER TO SCHEDULES ON DRAWING M27. PROVIDE REDUCERS TO SUIT VALVE SIZES AS REQUIRED.
11. WHERE CEILING IS TO BE USED AS RA PLENUM. ALL MATERIALS IN CEILING SPACE TO BE NON-COMBUSTIBLE.
12. CO-ORDINATE DISTRIBUTION DUCTWORK WITH I-BEAMS, EXISTING DUCTWORK, LIGHTING LAYOUT, AND CEILING HEIGHTS. INSTALL IN ACCESSIBLE CEILING SPACE WHERE POSSIBLE. REFER TO ELECTRICAL DRAWINGS FOR REFLECTED CEILING PLAN.
13. PROVIDE ADEQUATE SUPPORT FOR ALL EQUIPMENT AND DUCTWORK. PROVIDE SERVICE CLEARANCE FOR ALL EQUIPMENT AS PER MANUFACTURERS RECOMMENDATIONS.

No.	Revision	Date	Initial
0	ISSUED FOR CONSTRUCTION	04/27/18	RG
0	ISSUED FOR FINAL CLIENT REVIEW	04/25/18	RG
C	ISSUED FOR 99% CLIENT REVIEW	04/13/18	RG
B	ISSUED FOR 75% CLIENT REVIEW	03/29/18	RG
A	ISSUED FOR 66% CLIENT REVIEW	03/16/18	RG

Notes:

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2. DRAWING SHOWS GENERAL ARRANGEMENT ONLY. DO NOT SCALE.

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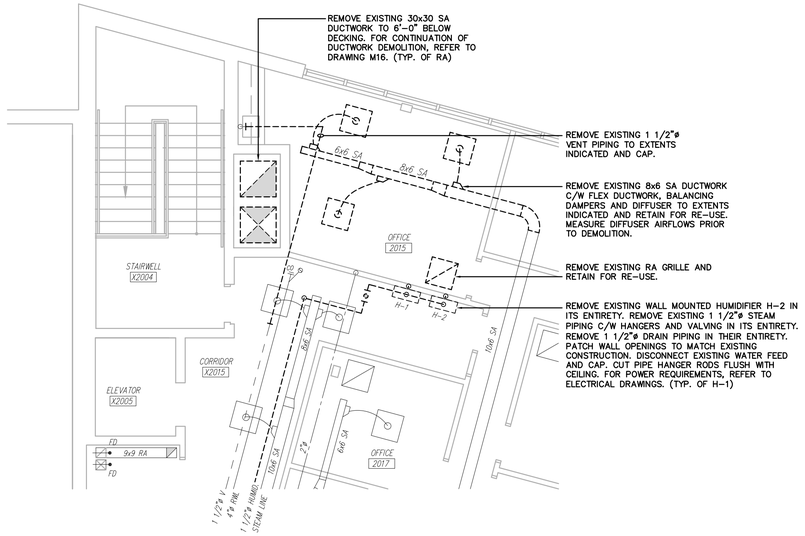
BORA LASKIN BUILDING
PLAN 'D'
MAIN FLOOR AND SECOND FLOOR RENOVATION

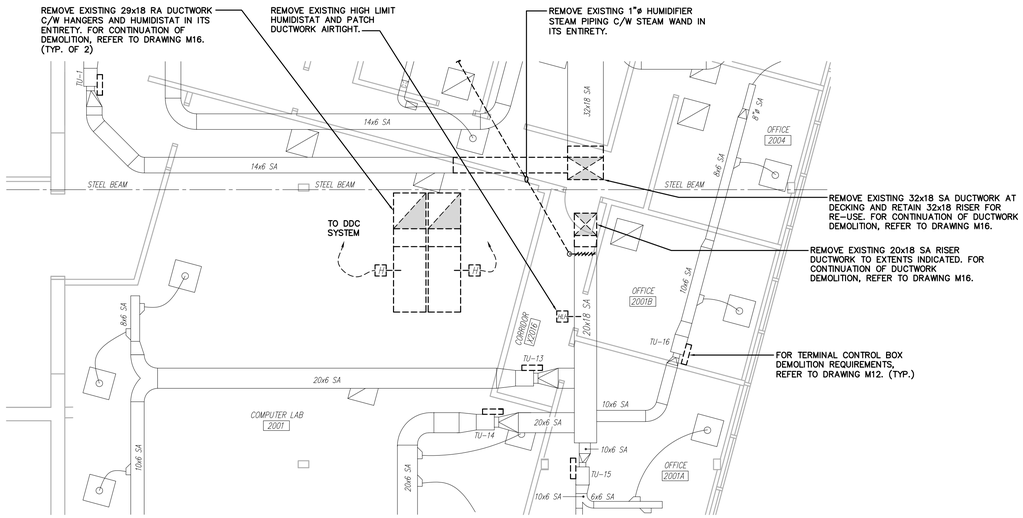
Scale:	Drawn By: BT/TM	Date:
1/8" = 1'-0"	Ckd. By: RG	APRIL 2018
	Dwg. No.: 18-038-M13	Rev. 0

NORTH



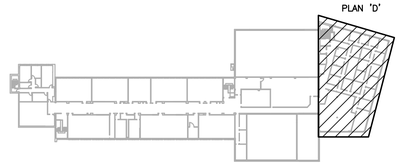
PARTIAL SECOND FLOOR PLAN 'D' - AIR HANDING UNIT RTU-1 DEMOLITION

SCALE: 3/16" = 1'-0"

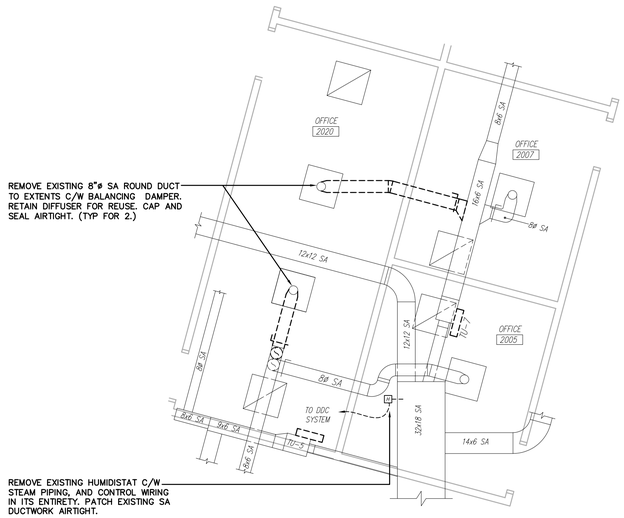


PARTIAL SECOND FLOOR PLAN 'D' - AIR HANDING UNIT RTU-2 DEMOLITION

SCALE: 3/16" = 1'-0"



KEY PLAN



OFFICE 2020 FLOOR PLAN - HVAC DEMOLITION

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

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL AND ELECTRICAL DRAWINGS

No.	Revision	Date	Initial
0	ISSUED FOR CONSTRUCTION	04/27/18	RG
D	ISSUED FOR FINAL CLIENT REVIEW	04/25/18	RG
C	ISSUED FOR 99% CLIENT REVIEW	04/13/18	RG
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A	ISSUED FOR 66% CLIENT REVIEW	03/16/18	RG

Notes:

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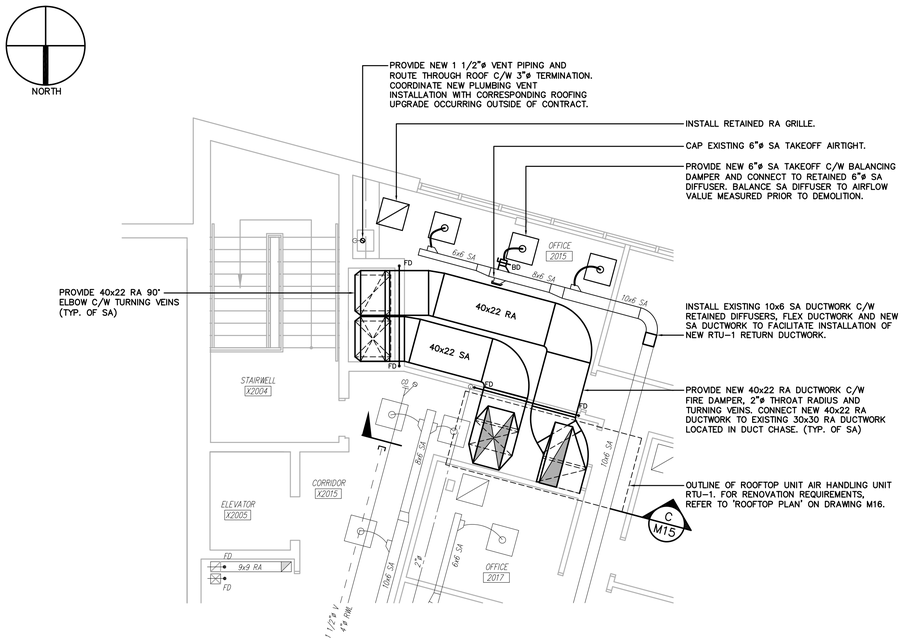
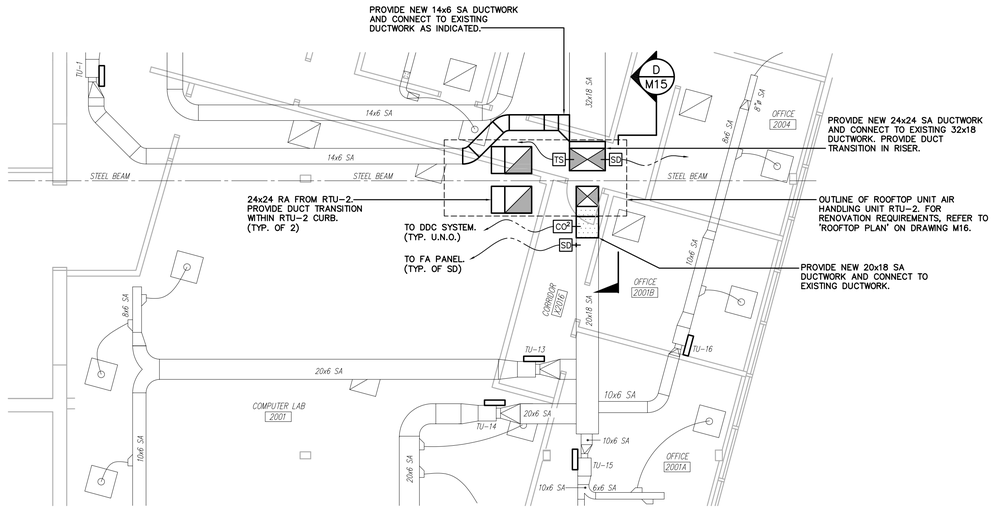
BORA LASKIN BUILDING
PLAN 'D'
PARTIAL SECOND FLOOR
HVAC DEMOLITION

Scale:	Drawn By: BT/TM	Date:
AS NOTED	Ckd. By: RG	APRIL 2018
	Dwg. No.: 18-038-M14	Rev. 0



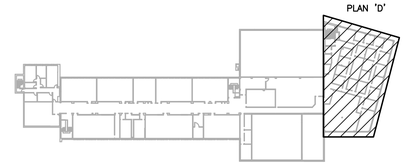
PARTIAL SECOND FLOOR PLAN 'D' - AIR HANDING UNIT RTU-1 RENOVATION

SCALE: 3/16" = 1'-0"



PARTIAL SECOND FLOOR PLAN 'D' - AIR HANDING UNIT RTU-2 RENOVATION

SCALE: 3/16" = 1'-0"



KEY PLAN

No.	Revision	Date	Initial
0	ISSUED FOR CONSTRUCTION	04/27/18	RG
0	ISSUED FOR FINAL CLIENT REVIEW	04/25/18	RG
C	ISSUED FOR 99% CLIENT REVIEW	04/13/18	RG
B	ISSUED FOR 75% CLIENT REVIEW	03/29/18	RG
A	ISSUED FOR 66% CLIENT REVIEW	03/16/18	RG

Notes:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING DIMENSIONS AND EXISTING CONDITIONS AT THE OUTSET OF CONSTRUCTION. REPORT ANY DISCREPANCIES TO THE ENGINEER. DO NOT PROCEED WITHOUT FURTHER WRITTEN DIRECTION FROM THE ENGINEER.
2. DRAWING SHOWS GENERAL ARRANGEMENT ONLY. DO NOT SCALE.

Approved

Approved

LICENSED PROFESSIONAL ENGINEER
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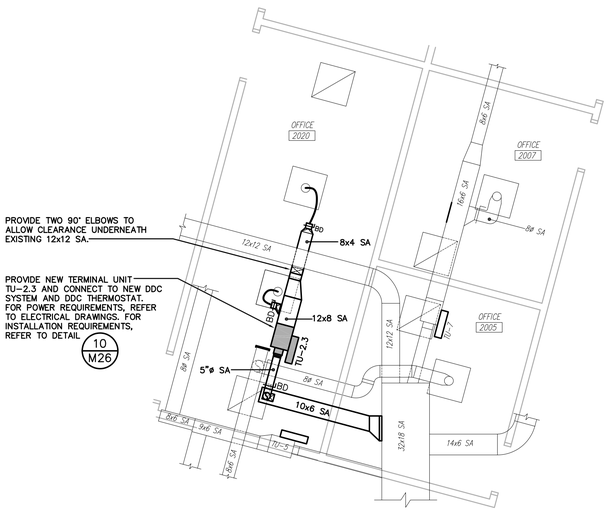
LAKEHEAD UNIVERSITY

THUNDER BAY ONTARIO

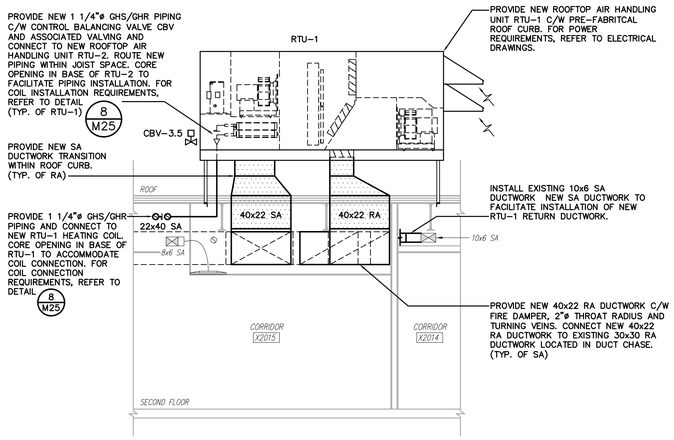
BORA LASKIN BUILDING
PLAN 'D'
PARTIAL SECOND FLOOR PLAN
HVAC RENOVATION AND SECTIONS

Scale:	Drawn By: BT/TM	Date:
AS NOTED	Ckd. By: RG	APRIL 2018
	Dwg. No.: 18-038-M15	Rev. 0



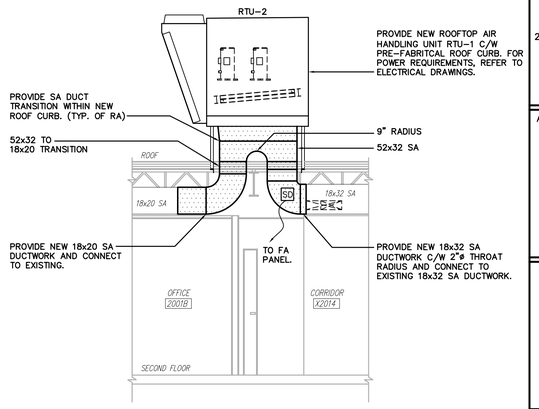
OFFICE 2020 FLOOR PLAN - HVAC RENOVATION

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



C M15 SECTION - RTU-1 SUPPLY / RETURN AIR INSTALLATION

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



D M15 SECTION - RTU-2 SUPPLY AIR INSTALLATION

SCALE: 1/4" = 1'-0" (RETURN AIR SIMILAR ARRANGEMENT)

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL AND ELECTRICAL DRAWINGS

NORTH

REMOVE EXISTING 1 1/2"ø GAS PIPING C/W VALVING AND CAP AT MAIN PIPING LOCATED AT MAIN FLOOR LEVEL.

REMOVE EXISTING ROOFTOP MOUNTED AIR HANDLING UNIT AHU-3 C/W ROOF CURB IN ITS ENTIRETY. COORDINATE REMOVAL OF ROOF CURB WITH CORRESPONDING ROOFING UPGRADE OCCURRING OUTSIDE OF CONTRACT. REPAIR EXISTING ROOF DECK AND FILL VOID WITH INSULATION TO MATCH EXISTING CONDITIONS. SEAL WEATHERTIGHT DURING COORDINATION. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.

REMOVE EXISTING ROOF MOUNTED CONDENSING UNIT C/W REFRIGERANT PIPING, PIPE SLEEVE AND PATIO STONES IN ITS ENTIRETY. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.

REMOVE EXISTING ROOF MOUNTED SPLIT-AIR CONDITIONING UNIT C/W REFRIGERANT PIPING, PIPE SLEEVE AND PATIO STONES IN ITS ENTIRETY. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS. (TYP. OF 2)

REMOVE EXISTING ROOFTOP EXHAUST HOOD C/W ROOF CURB IN ITS ENTIRETY. COORDINATE REMOVAL OF ROOF CURB WITH CORRESPONDING ROOFING UPGRADE OCCURRING OUTSIDE OF CONTRACT. REPAIR EXISTING ROOF DECK AND FILL VOID WITH INSULATION TO MATCH EXISTING CONDITIONS. SEAL WEATHERTIGHT DURING COORDINATION. (TYP. OF 4)

REMOVE EXISTING EXHAUST FAN C/W ROOF CURB, EXHAUST DUCTWORK, CONTROL WIRING AND POWER FEED IN ITS ENTIRETY. COORDINATE REMOVAL OF ROOF CURB WITH CORRESPONDING ROOFING UPGRADE OCCURRING OUTSIDE OF CONTRACT. REPAIR EXISTING ROOF DECK AND FILL VOID WITH INSULATION TO MATCH EXISTING CONDITIONS. SEAL WEATHERTIGHT DURING COORDINATION.FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS. (TYP. OF 2)

1 1/2"ø GAS

RTU-1

1 1/4"ø GAS

EXISTING ROOF ACCESS HATCH

DISCONNECT EXISTING 1 1/4"ø GAS PIPING FROM RTU-1 AND REMOVE IN ITS ENTIRETY. (TYP. OF RTU-2)

1 1/4"ø GAS

3"ø VENT TERMINATION

RTU-2

1 1/4"ø GAS

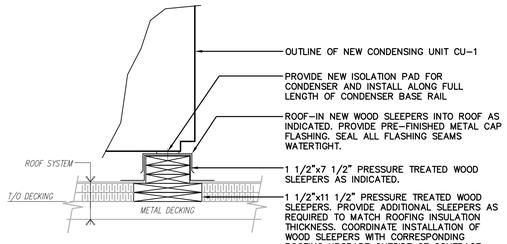
REMOVE EXISTING ROOFTOP AIR HANDLING UNIT RTU-2 C/W ROOF CURB IN ITS ENTIRETY. REMOVE EXISTING DUCTWORK C/W BYPASS DAMPER TO EXTENTS INDICATED. RETAIN EXISTING SUPPLY AIR DUCT STATIC PRESSURE SENSOR C/W CONTROL WIRING FOR RE-USE. COORDINATE REMOVAL OF ROOF CURB WITH CORRESPONDING ROOFING UPGRADE OCCURRING OUTSIDE OF CONTRACT. REPAIR EXISTING ROOF DECK AND FILL VOID WITH INSULATION TO MATCH EXISTING CONDITIONS. SEAL WEATHERTIGHT DURING COORDINATION. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS. (TYP. OF RTU-1)

ROOF PLAN - HVAC DEMOLITION

SCALE: 1/16" = 1'-0"

GENERAL HVAC NOTES:

1. FOR MECHANICAL SPECIFICATIONS REFER TO DRAWING M28. FOR SEQUENCE OF OPERATION REFER TO DRAWING M31. FOR EQUIPMENT LIST REFER TO DRAWING M29 & M30.
2. EVACUATE ROOFTOP EQUIPMENT REFRIGERANT CHARGE PRIOR TO DEMOLITION AND DISPOSE CHARGE IN ACCORDANCE WITH ONTARIO ENVIRONMENTAL PROTECTION ACT REGULATION 189/94 AND FEDERAL REGULATIONS.
3. PROVIDE ADEQUATE SUPPORT FOR ALL EQUIPMENT, DUCTWORK AND PIPING. PROVIDE SERVICE CLEARANCE FOR ALL EQUIPMENT AS PER MANUFACTURERS RECOMMENDATIONS.
4. NOT ALL EXTERNAL INSULATION SHOWN FOR CLARITY. INSULATE DUCTWORK AS PER SPECIFICATIONS ON DRAWING M28.
5. INSULATE EXTERIOR AND INTERIOR REFRIGERANT LIQUID AND SUCTION LINES AS PER SPECIFICATIONS ON DRAWING M28.



1 / M16 DETAIL - CONDENSING UNIT CU-1 SUPPORT SLEEPER INSTALLATION

SCALE: N.T.S.

PROVIDE NEW ROOFTOP UNIT RTU-3 C/W PREFABRICATED INSULATED ROOF CURB. INSTALL NEW ROOF CURBS LEVEL AS PER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS. FRAME NEW SUPPLY AND RETURN OPENINGS WITH 4x4x1/4" STEEL. PROVIDE FORMED ANGLE ROOF CURB SUPPORTS AS REQUIRED AND FASTEN TO ROOF CURB TO ALLOW FOR LEVEL CURB INSTALLATION ON SLOPED ROOF DECKING. ANGLE SUPPORT SHALL BE FABRICATED FROM GALVANIZED STEEL SAME GAUGE AS ROOF CURB. COORDINATE INSTALLATION OF NEW ROOF CURB WITH CORRESPONDING ROOFING UPGRADE OCCURRING OUTSIDE OF CONTRACT. PROVIDE TEMPORARY ROOF TIE-IN AND SEAL WEATHERTIGHT DURING COORDINATION. FOR POWER REQ'MTS REFER TO ELECTRICAL DRAWINGS. FOR AIR HANDLING UNIT DRAINAGE REQUIREMENTS, REFER TO DETAIL 18/M26 (TYP. OF 4)

A/M3

RTU-3

B/M3

RTU-4

PROVIDE 1 1/4"ø GHS/GHR PIPING AND CONNECT TO RTU-3 HEATING COIL CORE OPENING IN NEW AIR HANDLING UNITS BELOW COIL CONNECTION AS REQUIRED TO FACILITATE INSTALLATION OF NEW HYDRONIC PIPING. FOR CONTINUATION OF PIPING REFER TO 'SECOND FLOOR PLAN 'A' - HYDRONIC RENOVATION' ON DRAWING M1. FOR HEATING COIL PIPING REQUIREMENTS REFER TO DETAIL 8/M25 (TYP. OF RTU-4)

EXISTING 6"ø ROOF DRAIN

PROVIDE NEW CONDENSING UNIT CU-1 C/W LIQUID/GAS PIPING, PITCH POCKET, PIPE SLEEVE, SNOW SCREEN AND SLEEPER PAD. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS. FOR PIPING INSTALLATION AND SIZE REQUIREMENTS, REFER TO DETAIL 19/M26

PROVIDE NEW CONDENSING UNIT CU-1 SLEEPER PAD. COORDINATE INSTALLATION OF NEW CONDENSING UNIT SLEEPER PAD WITH CORRESPONDING ROOFING UPGRADE OCCURRING OUTSIDE OF CONTRACT. PROVIDE TEMPORARY ROOF TIE-IN AND SEAL WEATHERTIGHT DURING COORDINATION. FOR INSTALLATION REQUIREMENTS, REFER TO DETAIL 1/M16

CU-1

PROVIDE NEW ROOFTOP ENERGY RECOVERY VENTILATOR ERV-1 C/W PRE-FABRICATED ROOF CURB. COORDINATE INSTALLATION OF ROOF CURB WITH CORRESPONDING ROOFING UPGRADE OCCURRING OUTSIDE OF CONTRACT. PROVIDE TEMPORARY ROOF TIE-IN AND SEAL WEATHERTIGHT DURING COORDINATION. PROVIDE NEW HYDRONIC PIPING AND CONNECT TO HYDRONIC COILS. FOR HEATING COIL PIPING REQUIREMENTS, REFER TO DETAIL 8/M25

PROVIDE NEW FABRICATED FRESH AIR GOOSENECK C/W ROOF CURB AND BIRDSCREEN COORDINATE INSTALLATION OF NEW ROOF CURB WITH CORRESPONDING ROOFING UPGRADE OCCURRING OUTSIDE OF CONTRACT. PROVIDE TEMPORARY ROOF TIE-IN AND SEAL WEATHERTIGHT DURING COORDINATION. FOR GOOSENECK INSTALLATION REQUIREMENTS, REFER TO DETAIL 17/M26 (TYP. OF 2)

3"ø VENT TERMINATION

ERV-1

RTU-1

C/M15

EXISTING ROOF ACCESS HATCH

D/M15

RTU-2

PROVIDE 1 1/4"ø GHS/GHR PIPING AND CONNECT TO RTU-2 HEATING COIL CORE OPENING IN NEW AIR HANDLING UNITS BELOW COIL CONNECTION AS REQUIRED TO FACILITATE INSTALLATION OF NEW HYDRONIC PIPING. FOR CONTINUATION OF PIPING REFER TO 'SECOND FLOOR PLAN 'D' - RENOVATION' ON DRAWING M13. FOR HEATING COIL PIPING REQUIREMENTS REFER TO DETAIL 8/M25 (TYP. OF RTU-1)

ROOF PLAN - HVAC RENOVATION

SCALE: 1/16" = 1'-0"

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL AND ELECTRICAL DRAWINGS

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Notes:

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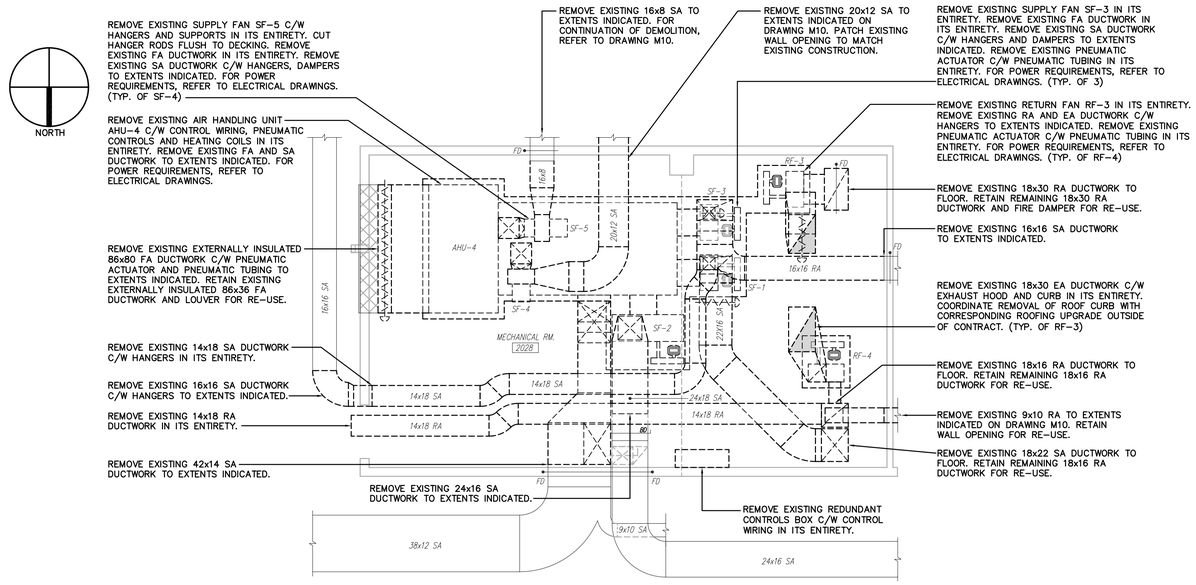
LAKEHEAD UNIVERSITY

THUNDER BAY ONTARIO

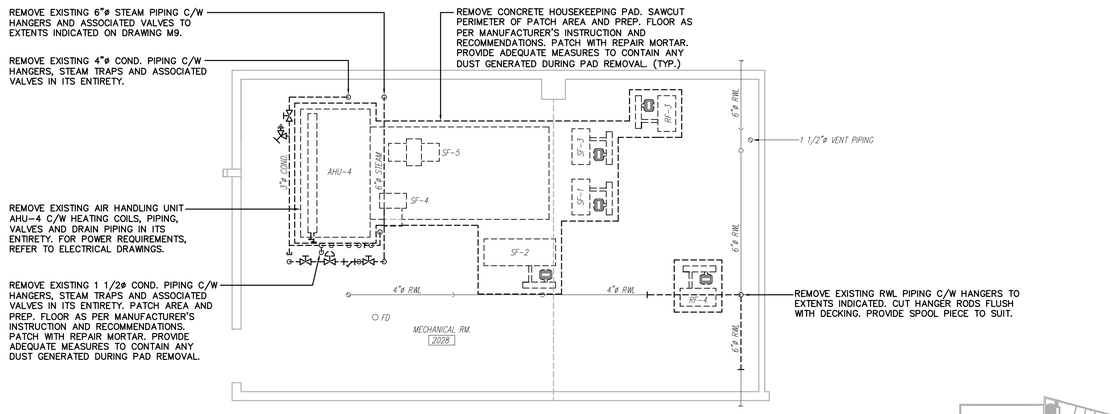
BORA LASKIN BUILDING
ROOF PLAN
HVAC DEMOLITION AND RENOVATION

Scale:	Drawn By: BT	Date:
3/32" = 1'-0"	Ckd. By: RG	APRIL 2018
	Dwg. No.: 18-038-M16	Rev. 0



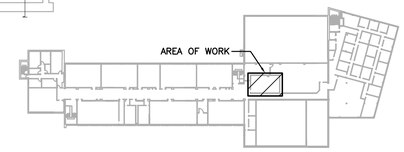
SECOND FLOOR MECHANICAL ROOM - HVAC DEMOLITION

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

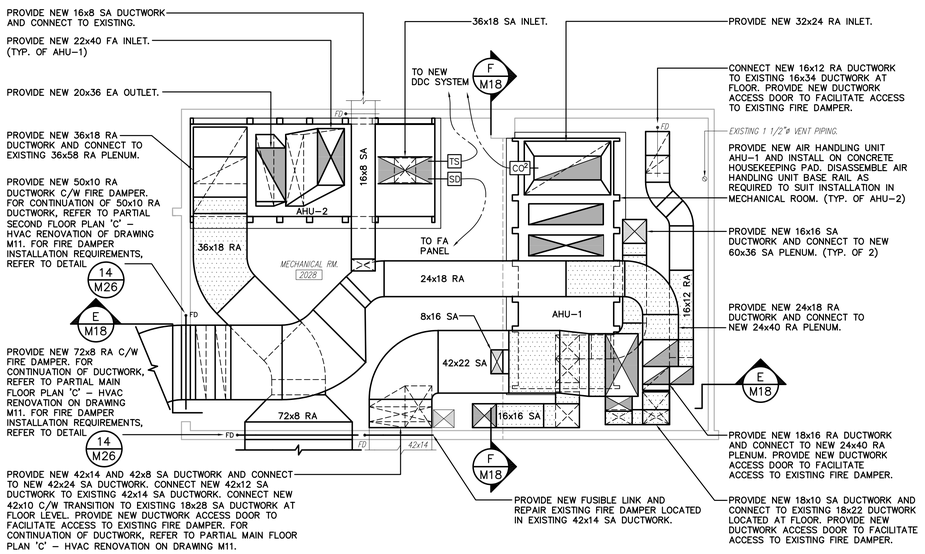


SECOND FLOOR MECHANICAL ROOM - HYDRONIC DEMOLITION

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



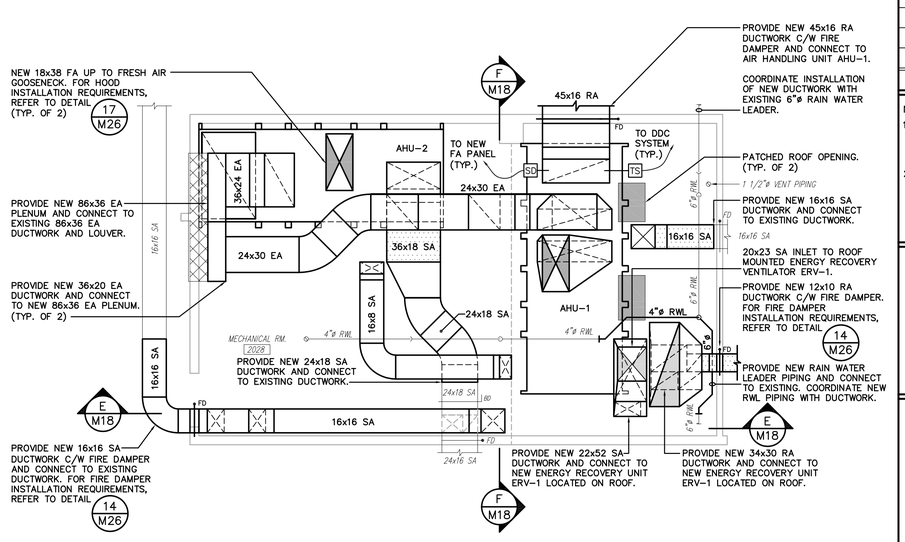
KEY PLAN - SECOND FLOOR MECH. RM.



CONSTRUCTION OF NEW HYDRONIC PIPING TO BE COMPLETE PRIOR TO INSTALLATION OF NEW DUCTWORK.

LOWER SECOND FLOOR MECHANICAL ROOM - HVAC RENOVATION

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



CONSTRUCTION OF NEW HYDRONIC PIPING TO BE COMPLETE PRIOR TO INSTALLATION OF NEW DUCTWORK.

UPPER SECOND FLOOR MECHANICAL ROOM - HVAC RENOVATION

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

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LICENSED PROFESSIONAL ENGINEER R. A. GRAU 100181428 APR. 27/18 PROVINCE OF ONTARIO

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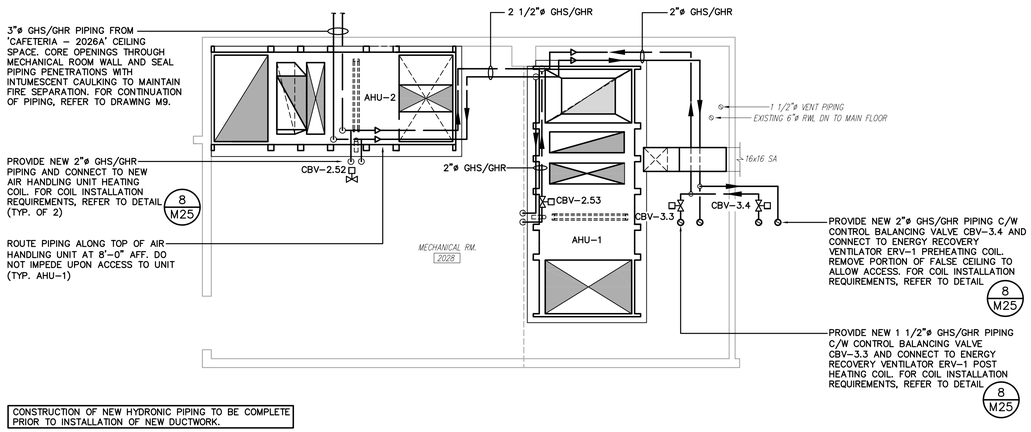
LAKEHEAD UNIVERSITY

THUNDER BAY ONTARIO

BORA LASKIN BUILDING
SECOND FLOOR MECHANICAL ROOM
DEMOLITION AND RENOVATION

Scale:	Drawn By: BT	Date:
1/4" = 1'-0"	Ckd. By: RG	APRIL 2018
	Dwg. No.: 18-038-M17	Rev. 0

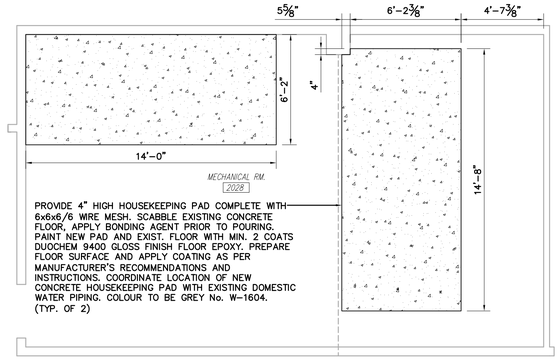
NORTH



CONSTRUCTION OF NEW HYDRONIC PIPING TO BE COMPLETE PRIOR TO INSTALLATION OF NEW DUCTWORK.

SECOND FLOOR MECHANICAL ROOM - HYDRONIC / PLUMBING RENOVATION

SCALE: 1/4" = 1'–0"

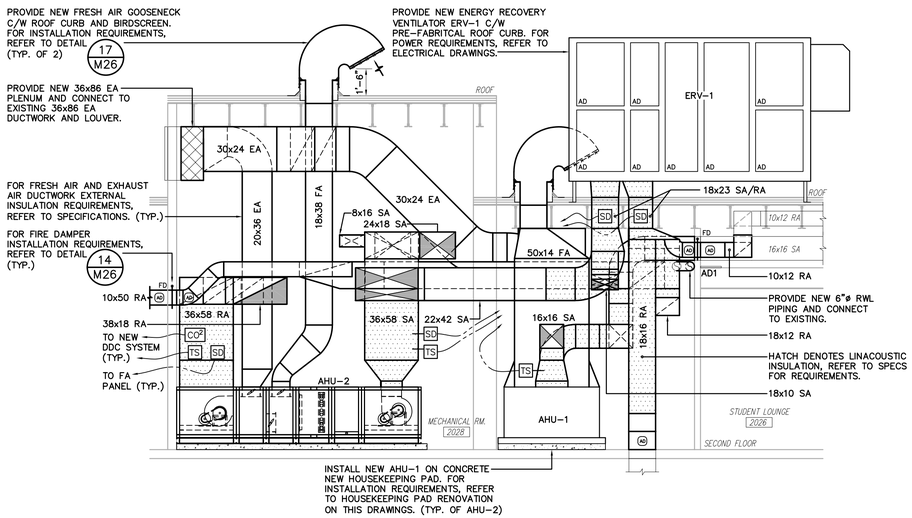


SECOND FLOOR MECHANICAL ROOM - HOUSEKEEPING PAD RENOVATION

SCALE: 1/4" = 1'–0"

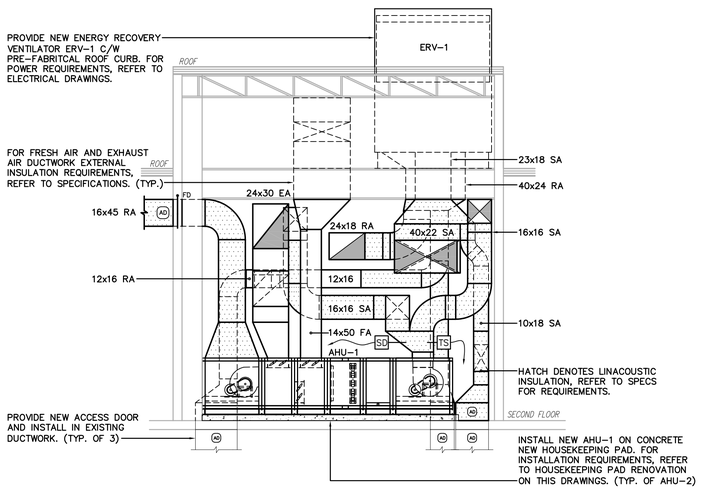
GENERAL HVAC NOTES:

1. FOR MECHANICAL SPECIFICATIONS REFER TO DRAWING M28. FOR SEQUENCE OF OPERATION REFER TO DRAWING M31. FOR EQUIPMENT LIST REFER TO DRAWING M29 & M30.
2. WHERE CEILING IS TO BE USED AS RA PLENUM. ALL MATERIALS IN CEILING SPACE TO BE NON–COMBUSTIBLE.
3. CO–ORDINATE DISTRIBUTION DUCTWORK AND EQUIPMENT WITH DOMESTIC WATER PIPING, SANITARY, RAIN WATER LEADERS, LIGHTING LAYOUT AND REQUIRED CEILING HEIGHTS. PROVIDE ACCESS DOORS WHERE REQUIRED.
4. NOT ALL EXTERNAL INSULATION SHOWN FOR CLARITY. INSULATE DUCTWORK AS PER MECHANICAL SPECIFICATIONS ON DRAWING M28.
5. PROVIDE ADEQUATE SUPPORT FOR ALL EQUIPMENT AND DUCTWORK. PROVIDE SERVICE CLEARANCE FOR ALL EQUIPMENT AS PER MANUFACTURERS RECOMMENDATIONS.
6. NOT ALL EXTERNAL INSULATION SHOWN FOR CLARITY. INSULATE DUCTWORK AS PER SPECIFICATIONS ON DRAWING M28.
7. ALL FIRE DAMPERS TO BE TYPE 'A' UNLESS NOTED OTHERWISE. FOR FIRE DAMPER INSTALLATION REFER TO DETAIL.
8. PROVIDE NON–RATED ACCESS DOORS TO MAINTAIN ACCESS TO MECHANICAL EQUIPMENT WHERE REQUIRED.
9. PENETRATIONS TO BE SEALED TO MAINTAIN INTEGRITY OF FIRE RATING. PROVIDE FIRE DAMPER FOR DUCTWORK PENETRATING REQUIRED SEPARATIONS.



E / M17 SECTION

SCALE: 1/4" = 1'–0"



F / M17 SECTION

SCALE: 1/4" = 1'–0"

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Approved

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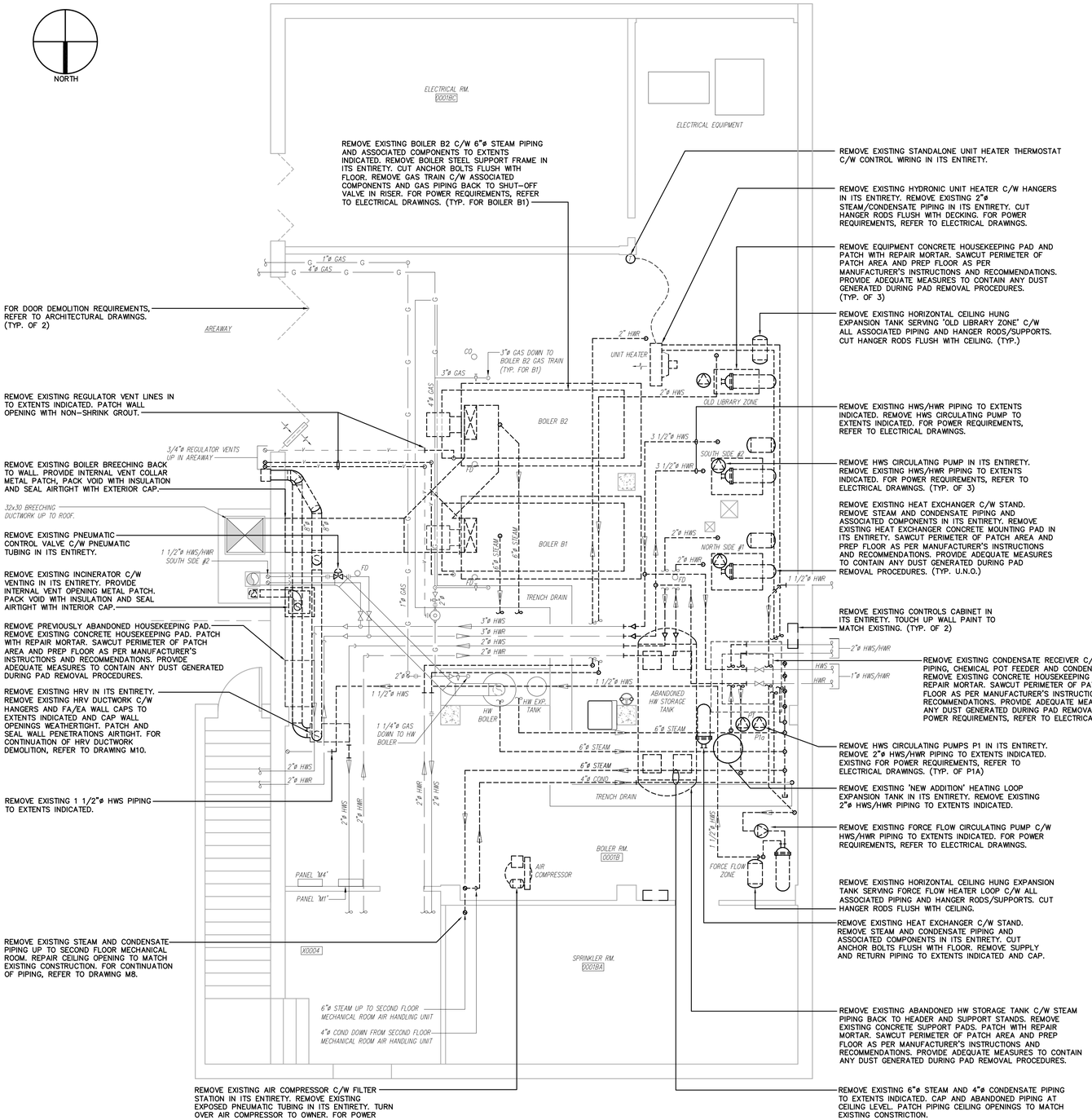
LAKEHEAD UNIVERSITY

THUNDER BAY ONTARIO

BORA LASKIN BUILDING

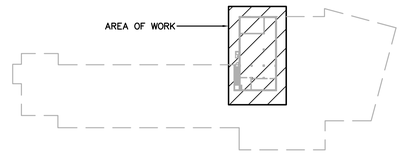
SECOND FLOOR MECHANICAL ROOM RENOVATION, HOUSEKEEPING PAD RENOVATION AND SECTIONS

Scale:	Drawn By: BT	Date:
1/4" = 1'–0"	Ckd. By: RG	APRIL 2018
	Dwg. No.: 18–038–M18	Rev. 0



BASEMENT FLOOR PLAN - DEMOLITION

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



KEY PLAN - BASEMENT

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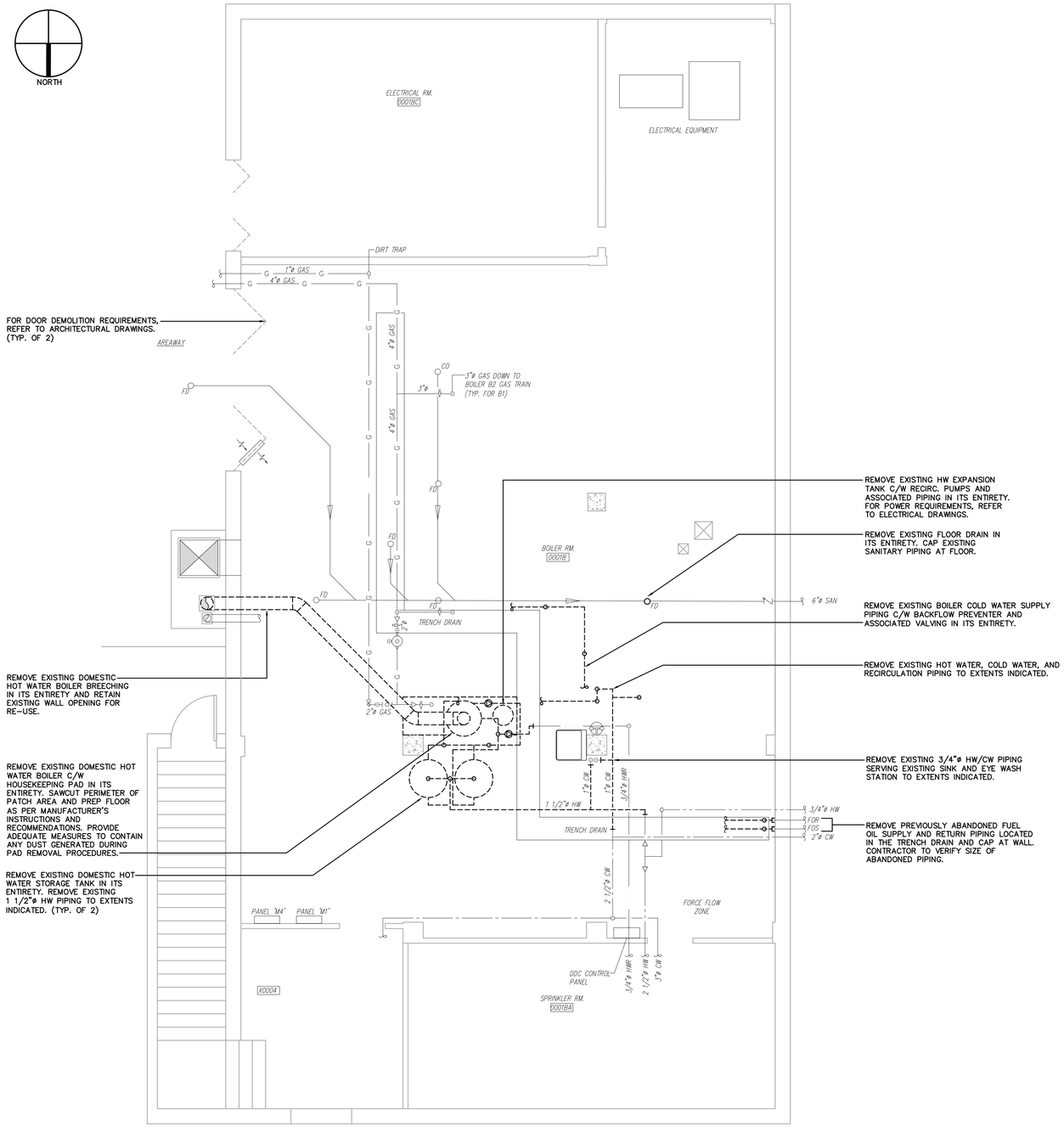
LAKEHEAD UNIVERSITY

THUNDER BAY ONTARIO

BORA LASKIN BUILDING
BOILER ROOM
HYDRONIC AND HVAC
DEMOLITION

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL AND ELECTRICAL DRAWINGS

Scale:	Drawn By: KA / Ckd. By: RG	Date:
1/4 "= 1'-0"	Dwg. No.: 18-038-M19	APRIL 2018 / Rev. 0



BASEMENT FLOOR PLAN - DOMESTIC WATER DEMOLITION

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

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL AND ELECTRICAL DRAWINGS

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A	ISSUED FOR 66% CLIENT REVIEW	03/16/18	RG

Notes:

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2. DRAWING SHOWS GENERAL ARRANGEMENT ONLY. DO NOT SCALE.

Approved

Approved

LICENSED PROFESSIONAL ENGINEER
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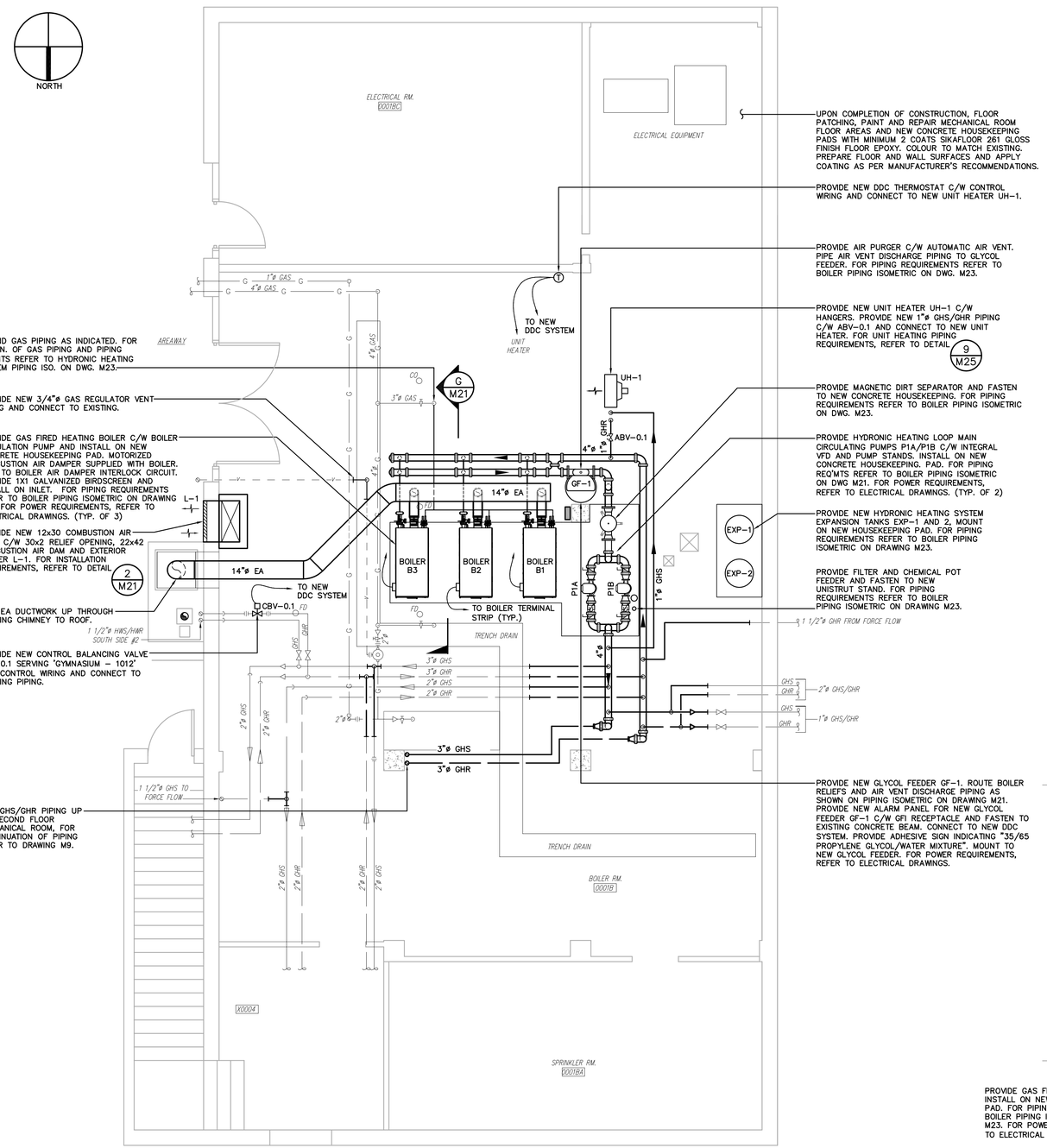
LAKEHEAD UNIVERSITY

THUNDER BAY ONTARIO

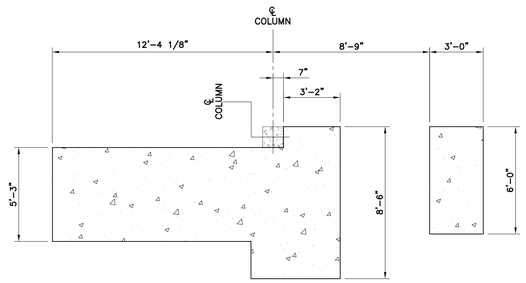
BORA LASKIN BUILDING
BOILER ROOM
PLUMBING
DEMOLITION

Scale:	Drawn By: KA / Ckd. By: RG	Date:
1/4" = 1'-0"	Dwg. No.: 18-038-M20	APRIL 2018 / Rev. 0



BASEMENT FLOOR PLAN - HYDRONIC HEATING RENOVATION

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



NOTE:
PROVIDE 4" HIGH HOUSEKEEPING PAD COMPLETE WITH 6x6x6/6 WIRE MESH. SCABBLE EXISTING CONCRETE BOILER ROOM FLOOR, APPLY BONDING AGENT PRIOR TO POURING. PAINT NEW PAD AND EXIST. FLOOR WITH MIN. 2 COATS DUOCHEM 9400 GLOSS FINISH FLOOR EPOXY. PREPARE FLOOR SURFACE AND APPLY COATING AS PER MANUFACTURER'S RECOMMENDATIONS AND INSTRUCTIONS. COLOUR TO BE GREY No. W-1604.

HOUSEKEEPING PAD LOCATIONS PARTIAL PLAN - RENOVATION

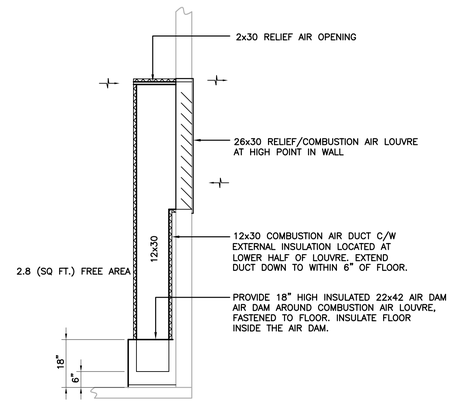
SCALE: 1/4"=1'-0"

G M21 SECTION

SCALE: 3/8"=1'-0"

GENERAL HYDRONIC NOTES:

1. FOR MECHANICAL SPECIFICATIONS REFER TO DRAWING M28. FOR SEQUENCE OF OPERATION REFER TO DRAWING M31. FOR EQUIPMENT LIST REFER TO DRAWING M29 & M30.
2. INSULATE HYDRONIC PIPING AS PER SPECIFICATIONS ON DRAWING M28.
3. COORDINATE HYDRONIC AND GAS PIPING WITH EQUIPMENT, DISTRIBUTION DUCTWORK, ELECTRICAL AND PIPING LAYOUTS.
4. PROVIDE MANUAL HIGH POINT AIR VENTS WHERE REQUIRED.
5. ALL PENETRATIONS TO BE SEALED TO MAINTAIN INTEGRITY OF FIRE RATING. PROVIDE ULC LISTED INTUMESCENT FIRESTOP ASSEMBLY FOR PIPING PENETRATING REQUIRED SEPARATIONS.
6. PROVIDE NON-RATED ACCESS DOORS TO MAINTAIN ACCESS TO MECHANICAL EQUIPMENT AND PIPING WHERE REQUIRED.



2 M21 DETAIL - COMBUSTION AIR INSTALLATION

SCALE: NTS

No.	Revision	Date	Initial
0	ISSUED FOR CONSTRUCTION	04/27/18	RG
D	ISSUED FOR FINAL CLIENT REVIEW	04/25/18	RG
C	ISSUED FOR 99% CLIENT REVIEW	04/13/18	RG
B	ISSUED FOR 75% CLIENT REVIEW	03/29/18	RG
A	ISSUED FOR 66% CLIENT REVIEW	03/16/18	RG

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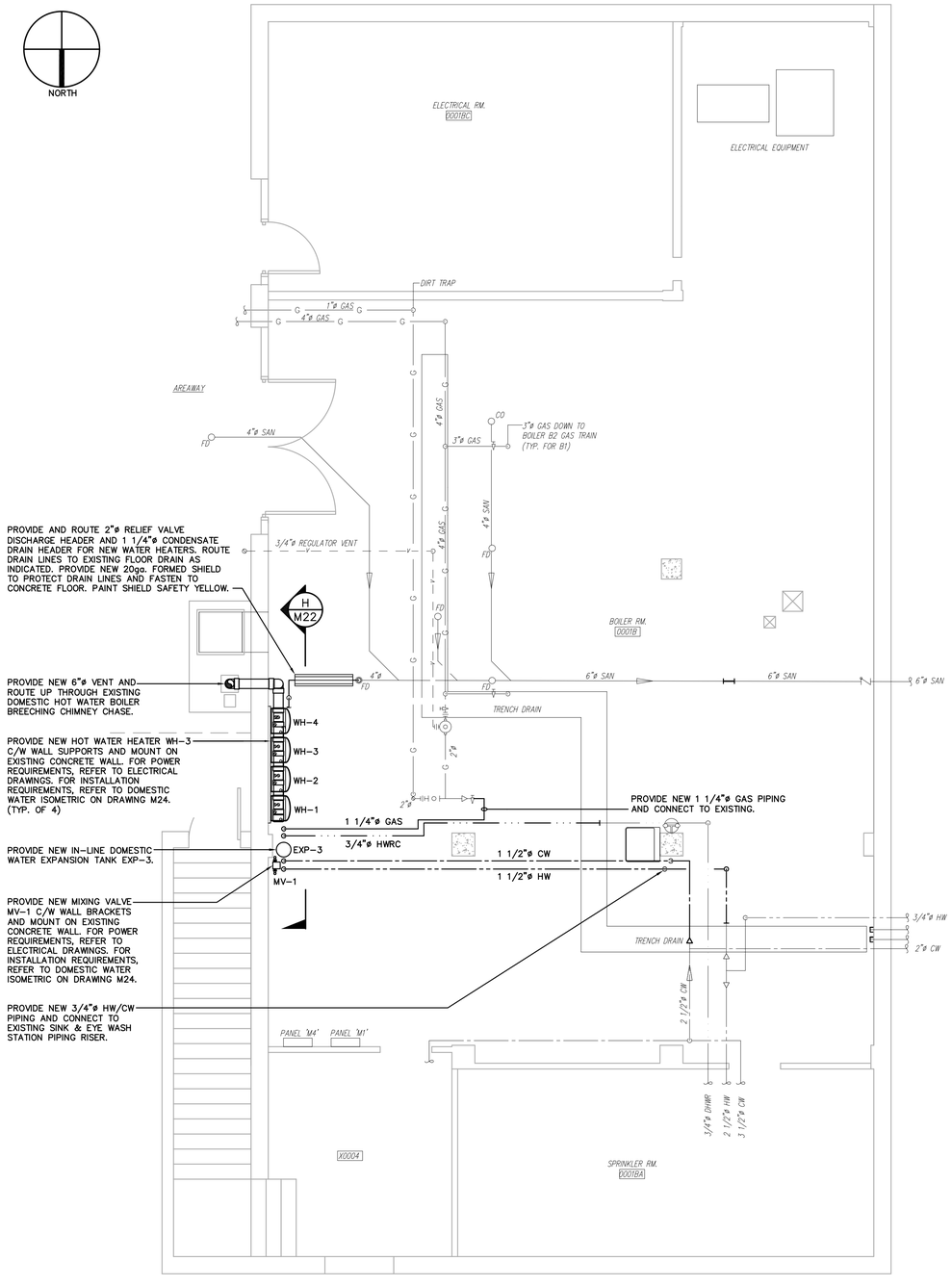
BORA LASKIN BUILDING
BOILER ROOM
HYDRONIC AND HOUSEKEEPING PAD RENOVATION AND SECTION

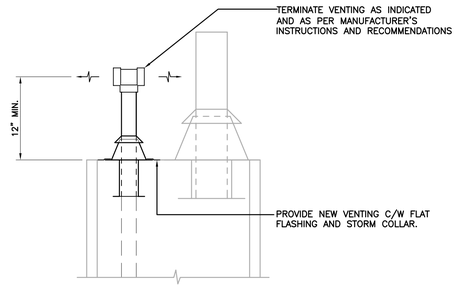
MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL AND ELECTRICAL DRAWINGS

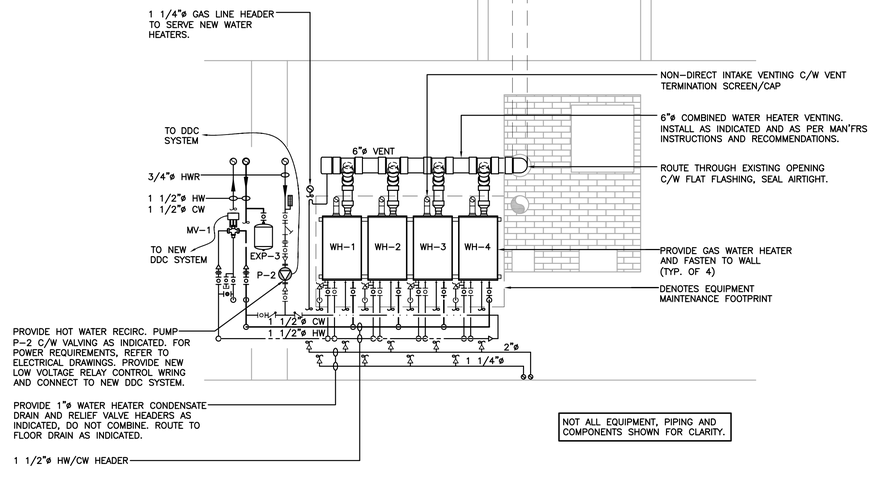
Scale:	Drawn By: KA/BT	Date:
1/4" = 1'-0"	Ckd. By: RG	APRIL 2018
	Dwg. No.: 18-038-M21	Rev. 0



BASEMENT FLOOR PLAN - PLUMBING RENOVATION

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





NOT ALL EQUIPMENT, PIPING AND COMPONENTS SHOWN FOR CLARITY.

H M22 SECTION

SCALE: 3/8"=1'-0"

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL AND ELECTRICAL DRAWINGS

No.	Revision	Date	Initial
0	ISSUED FOR CONSTRUCTION	04/27/18	RG
D	ISSUED FOR FINAL CLIENT REVIEW	04/25/18	RG
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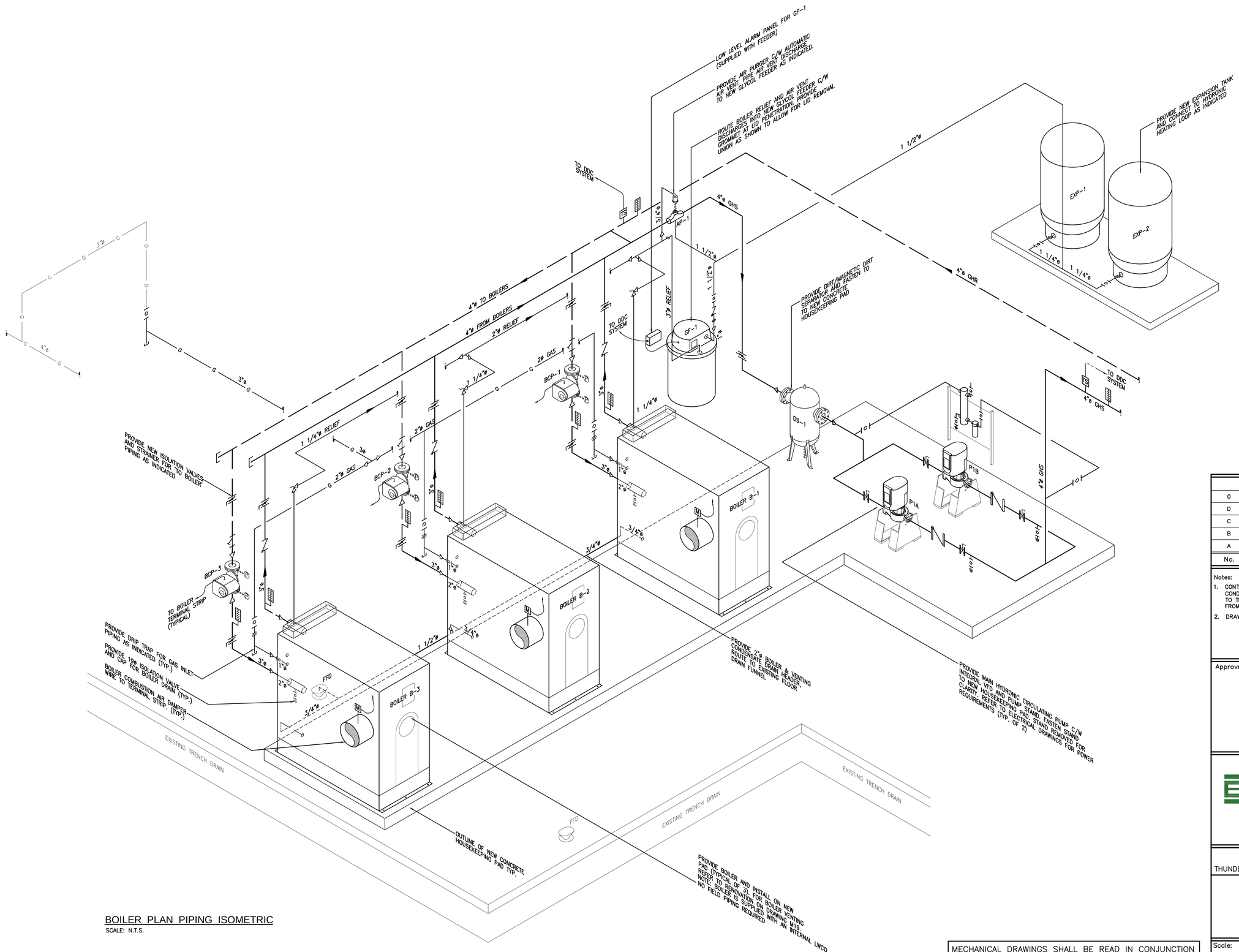
BORA LASKIN BUILDING
BOILER ROOM
PLUMBING RENOVATION.
SECTION AND DETAIL

Scale:	Drawn By: KA/BT	Date:
1/4" = 1'-0"	Ckd. By: RG	APRIL 2018
	Dwg. No.: 18-038-M22	Rev. 0



BOILER PLAN PIPING ISOMETRIC

SCALE: N.T.S.

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL AND ELECTRICAL DRAWINGS

LEGEND

- SHUT OFF VALVE
- CHECK VALVE
- STRAINER
- BUTTERFLY VALVE
- LWCO LOW WATER CUT-OFF
- DRAIN VALVE C/W CAP
- HOSE BIBB –SEE EQUIPMENT LIST
- THERMOMETER
- SAFETY RELIEF VALVE
- UNION
- REDUCER
- PRESSURE GAUGE
- TEMPERATURE/PRESSURE GAUGE
- TEMPERATURE SENSOR
- FLOW SWITCH
- DIFFERENTIAL PRESSURE TRANSDUCER

No.	Revision	Date	Initial
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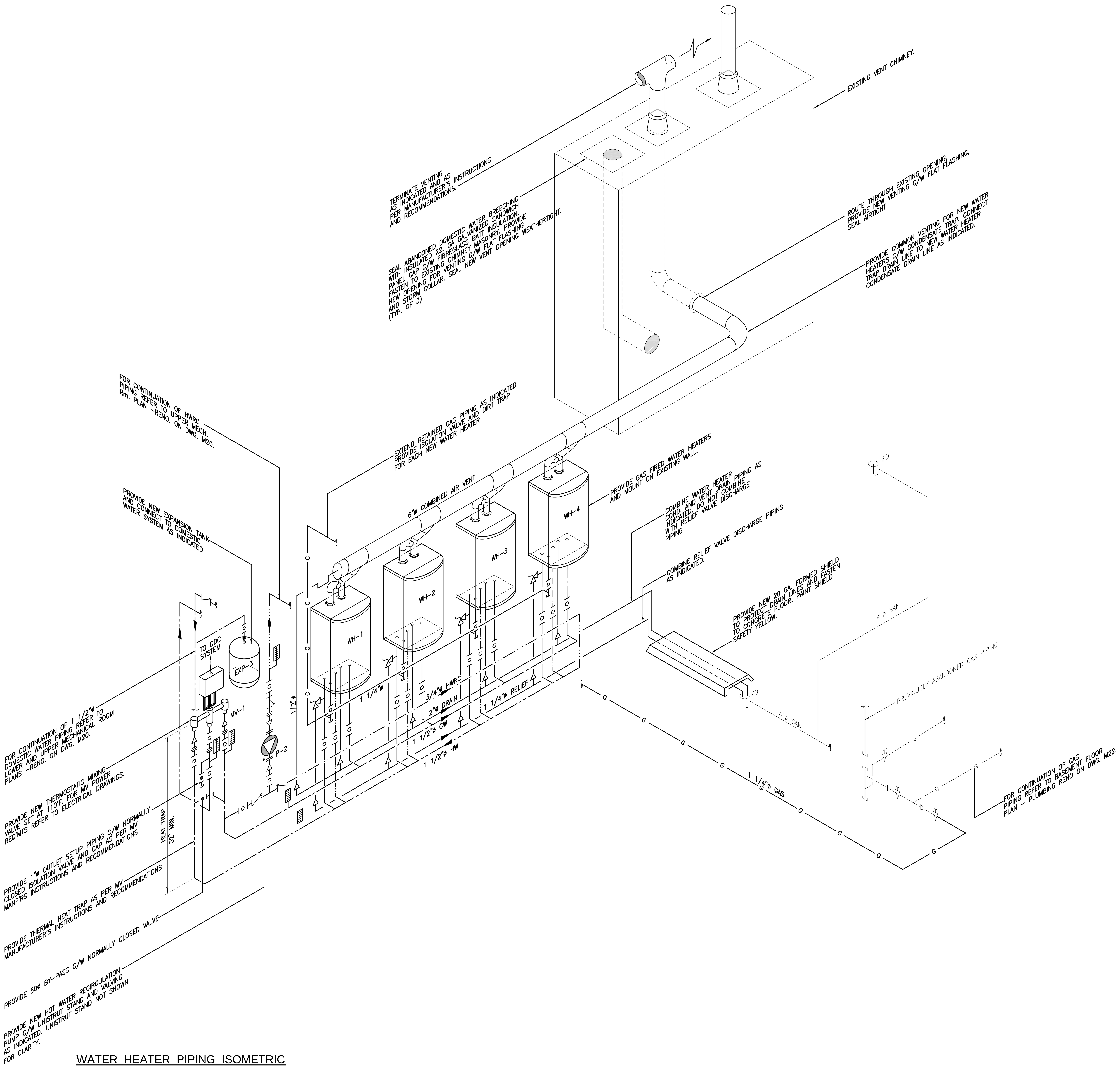
HYDRONIC
PIPING ISOMETRIC

Scale:	Drawn By: KA	Date:
NTS	Ckd. By: RG	APRIL 2018
	Dwg. No.: 18–038–M23	Rev. 0



WATER HEATER PIPING ISOMETRIC

SCALE: N.T.S.

LEGEND

- SHUT OFF VALVE
- CHECK VALVE
- STRAINER
- BUTTERFLY VALVE
- LWCO LOW WATER CUT-OFF
- DRAIN VALVE C/W CAP
- HOSE BIBB
- THERMOMETER
- SAFETY RELIEF VALVE
- UNION
- REDUCER
- PRESSURE GAUGE
- TEMPERATURE/PRESSURE GAUGE
- TEMPERATURE SENSOR
- FLOW SWITCH
- DIFFERENTIAL PRESSURE TRANSDUCER

No.	Revision	Date	Initial
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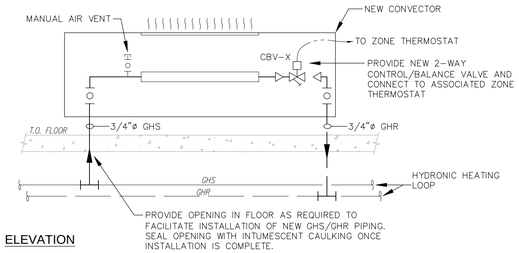
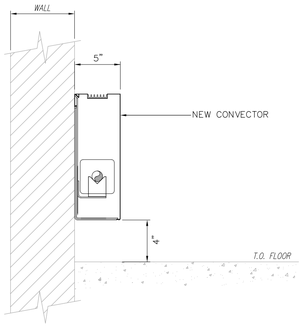
Scale:	Drawn By: KA/BT	Date:
NTS	Ckd. By: RG	APRIL 2018
	Dwg. No.: 18-038-M24	Rev. 0

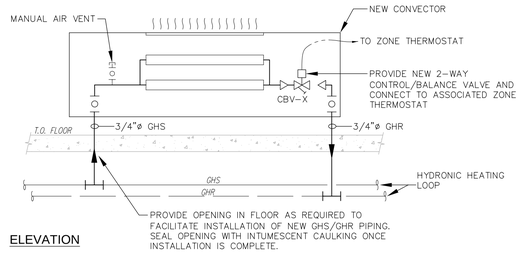


ELEVATION

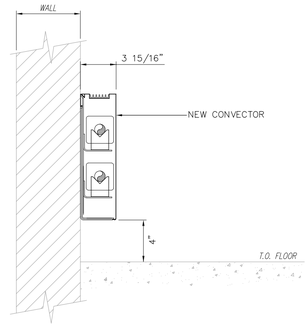


SECTION

3 M1/M5 M9 **DETAIL** -TYPICAL NEW HOT WATER CONVECTOR INSTALLATION
SCALE: NTS

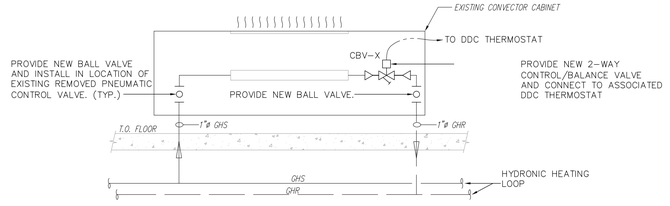


ELEVATION

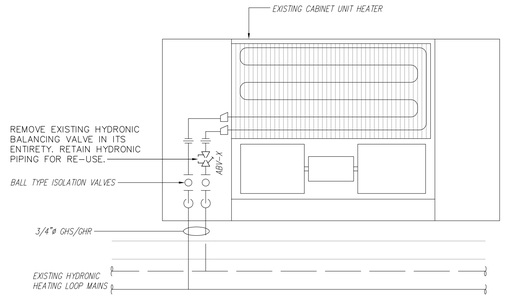


SECTION

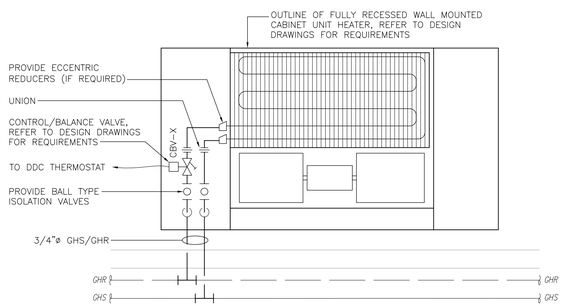
4 M1/M5 M9 **DETAIL** -TYPICAL NEW HOT WATER CONVECTOR INSTALLATION
SCALE: NTS



5 M1/M5 M9/M13 **DETAIL** - 2-WAY CONTROL/BALANCING VALVE INSTALLATION
SCALE: NTS

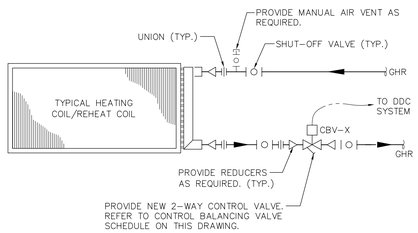


6 M13 **DETAIL** - CABINET UNIT HEATER VALVE DEMOLITION
SCALE: NTS

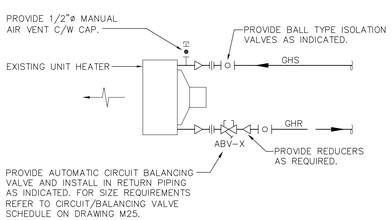


NOTE:
INSTALL ISOLATION AND CONTROL BALANCE VALVE WITHIN CABINET UNIT HEATER VALVE/PIPING ACCESS. REFER TO EQUIPMENT LIST FOR VALVE/PIPING ACCESS HANDING.

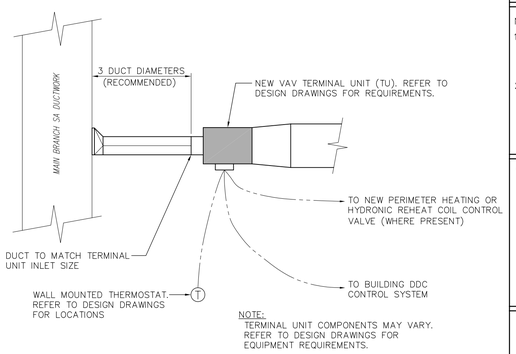
7 M1/M5 **DETAIL** - RECESSED CABINET UNIT HEATER PIPING
SCALE: NTS



8 M1/M16 M15/M18 **DETAIL** -TYPICAL HYDRONIC HEATING COIL PIPING
SCALE: NTS



9 M21 **DETAIL** - TYPICAL UNIT HEATER PIPING
SCALE: NTS



NOTE:
TERMINAL UNIT COMPONENTS MAY VARY. REFER TO DESIGN DRAWINGS FOR EQUIPMENT REQUIREMENTS.

10 M3/M13 M15 **DETAIL** -VAV TERMINAL UNIT TYPICAL INSTALLATION
SCALE: NTS

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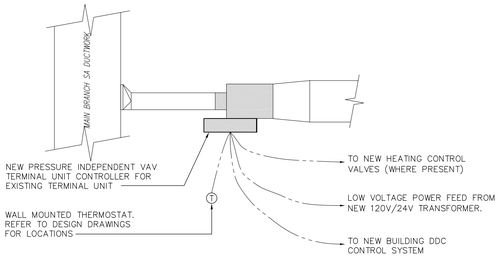
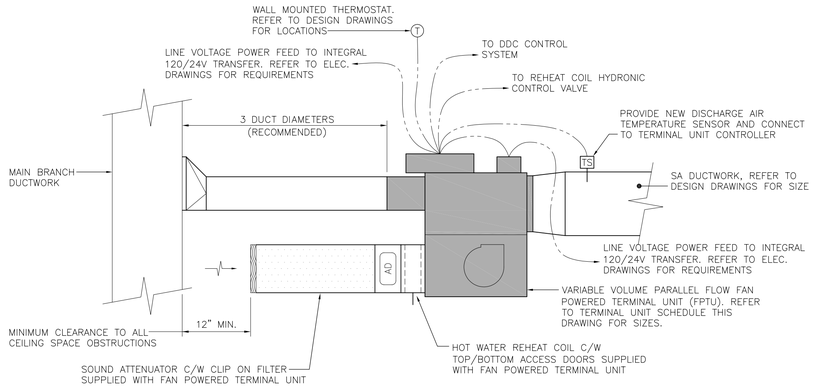
BORA LASKIN BUILDING

DETAILS

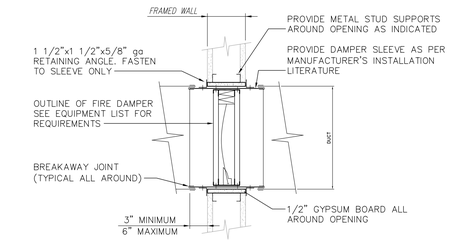
Scale:	Drawn By: BT	Date:
N.T.S.	Ckd. By: RG	APRIL 2018
	Dwg. No.: 18–038–M25	Rev. 0



11 ME13 DETAIL - EXISTING TERMINAL UNIT INSTALLATION
SCALE: NTS (TERMINAL UNIT COMPONENTS MAY VARY)



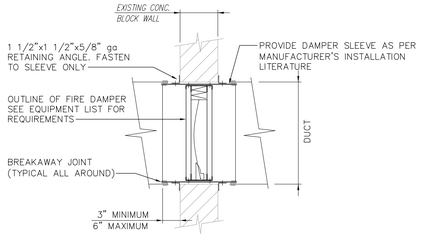
12 M1/M3 DETAIL -FAN POWERED TERMINAL UNIT TYPICAL INSTALLATION
SCALE: NTS



NOTE:

1. FIRE DAMPER SHALL BE MOUNTED AS PER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.
2. FASTEN RETAINING ANGLES TO SLEEVE WITH No.8 SHEET METAL SCREWS AT 8" O.C. DO NOT FASTEN ANGLES TO WALL.
3. ONCE FIRE DAMPER INSTALLATION IS COMPLETE, SEAL RETAINING ANGLE TO WALL AND DUCT SLEEVE AS PER THE CITY OF THUNDER BAY BUILDING SERVICES REQUIREMENTS AND DAMPER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.

13 M3 DETAIL -FIRE DAMPER INSTALLATION
SCALE: NTS



NOTE:

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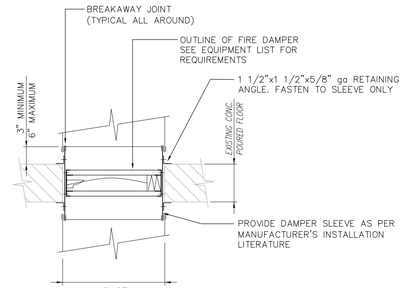
2. FASTEN RETAINING ANGLES TO SLEEVE WITH No.8 SHEET METAL SCREWS AT 8" O.C. DO NOT FASTEN ANGLES TO WALL.
3. ONCE FIRE DAMPER INSTALLATION IS COMPLETE, SEAL RETAINING ANGLE TO WALL AND DUCT SLEEVE AS PER THE CITY OF THUNDER BAY BUILDING SERVICES REQUIREMENTS AND DAMPER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.

14 M3/M7 M11/M17 M18 DETAIL -FIRE DAMPER INSTALLATION
SCALE: NTS



NOTE:

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2. FASTEN RETAINING ANGLES TO SLEEVE WITH No.8 SHEET METAL SCREWS AT 8" O.C. DO NOT FASTEN ANGLES TO WALL.
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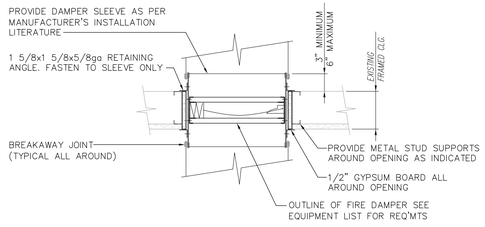
15 M3/M18 DETAIL - FIRE DAMPER INSTALLATION
SCALE: NTS



NOTE:

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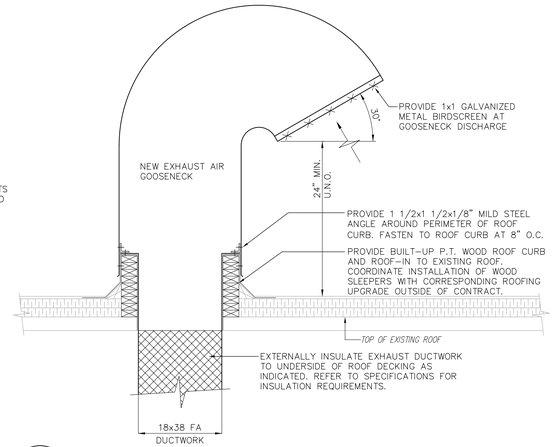
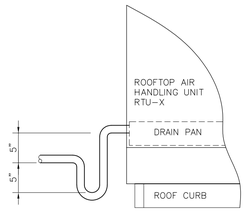
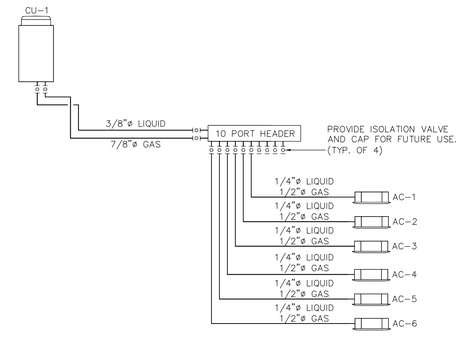
16 M7/M11 DETAIL -FIRE DAMPER INSTALLATION
SCALE: NTS



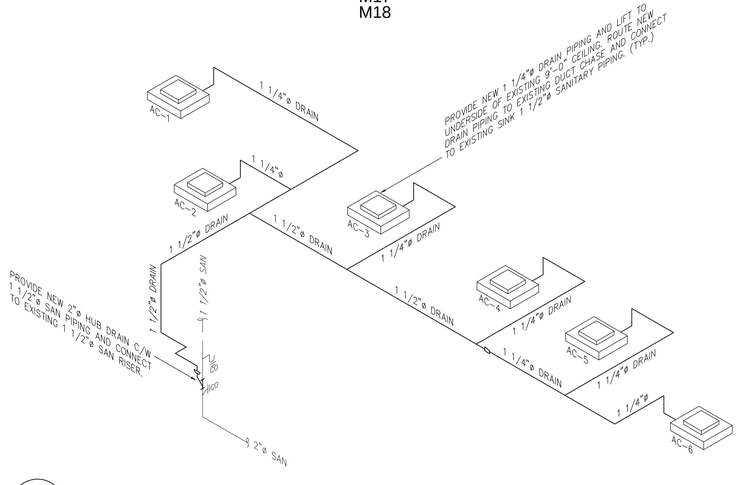
17 M16 M17 M18 DETAIL - GOOSENECK DISCHARGE
SCALE: NTS



18 M16 DETAIL - TYPICAL AHU DRAIN TRAP INSTALLATION
NTS



19 M14 DETAIL - VRF SCHEMATIC DIAGRAM
SCALE: NTS



20 M14 DETAIL - AIR CONDITIONER DRAINAGE SCHEMATIC
SCALE: NTS

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL AND ELECTRICAL DRAWINGS

No.	Revision	Date	Initial
0	ISSUED FOR CONSTRUCTION	04/27/18	RG
D	ISSUED FOR FINAL CLIENT REVIEW	04/25/18	RG
C	ISSUED FOR 99% CLIENT REVIEW	04/13/18	RG
B	ISSUED FOR 75% CLIENT REVIEW	03/29/18	RG
A	ISSUED FOR 66% CLIENT REVIEW	03/16/18	RG

Notes:
1. CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING DIMENSIONS AND EXISTING CONDITIONS AT THE OUTSET OF CONSTRUCTION. REPORT ANY DISCREPANCIES TO THE ENGINEER. DO NOT PROCEED WITHOUT FURTHER WRITTEN DIRECTION FROM THE ENGINEER.
2. DRAWING SHOWS GENERAL ARRANGEMENT ONLY. DO NOT SCALE.

Approved

Approved

LICENSED PROFESSIONAL ENGINEER
R. A. GRAU
100181428
APR. 27/18
PROVINCE OF ONTARIO

TBT ENGINEERING
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LAKEHEAD UNIVERSITY
THUNDER BAY ONTARIO

BORA LASKIN BUILDING

DETAILS

Scale: N.T.S.
Drawn By: BT
Ckd. By: RG
Date: APRIL 2018
Dwg. No.: 18-038-M26
Rev. 0

PLAN 'A' DIFFUSER / GRILLE SCHEDULE

ROOM	EQUIP. No.	SUPPLY AIR				RETURN / EXHAUST AIR			
		TYPE	QTY.	CFM	NECK SIZE	TYPE	QTY.	CFM	NECK SIZE
CORRIDOR – X1018	TU–1.5	D	1	22	4"ø	–	–	–	–
CORRIDOR – X1019	TU–1.5	D	1	23	4"ø	–	–	–	–
CORRIDOR – X1021	TU–1.5	D	1	12	4"ø	–	–	–	–
STORAGE – 1023	TU–1.6	D	1	22	4"ø	F	1	–	24x6
CLASSROOM – 1024	TU–1.1	A	6	269	10"ø	E	4	–	24x8
OFFICE – 1025	TU–1.2	A	1	109	6"ø	F	1	–	24x6
OFFICE – 1026	TU–1.2	A	1	230	10"ø	F	1	–	24x8
OFFICE – 1027	TU–1.3	A	1	246	10"ø	F	1	–	24x8
OFFICE – 1028	TU–1.4	A	1	122	6"ø	F	1	–	24x6
OFFICE – 1029	TU–1.4	A	1	79	6"ø	F	1	–	24x6
CORRIDOR – X2011A	TU–2.1	D	2	24	4"ø	–	–	–	–
CONFERENCE – 2040A	FPTU–2.4	A	2	259	10"ø	E	2	–	24x8
OFFICE – 2040C	FPTU–2.3	A	1	366	10"ø	EX	1	–	24x12
DATA/RESEARCH – 2040D	FPTU–2.2	A	2	201	8"ø	EX	1	–	24x12
TELECONFERENCE – 2040F	FPTU–2.1	A	1	250	10ø	EX	1	–	24x6
STUDIO – 2040G	TU–2.2	A	1	148	8"ø	EX	1	–	24x6
LOUNGE – 2041	FPTU–2.5	A	5	90	6"ø	E	2	–	24x8

PLAN 'C' DIFFUSER / GRILLE SCHEDULE

ROOM	EQUIP. No.	SUPPLY AIR				RETURN / EXHAUST AIR			
		TYPE	QTY.	CFM	NECK SIZE	TYPE	QTY.	CFM	NECK SIZE
AUDITORIUM – 1001	AHU–2	H H	3 3	1000 334	40x10 18x6	–	–	–	–
WOMEN'S DRESS RM – 1008	ERV–1	H	2	217	14x14	–	–	–	–
WOMEN'S SHOWER – 1008A	ERV–1	–	–	–	–	J	1	–	12x12
WOMEN'S WR – 1008B	ERV–1	–	–	–	–	G	1	–	6x6
MEN'S DRESS RM – 1010	ERV–1	H	2	337	14x14	–	–	–	–
MEN'S SHOWER – 1010A	ERV–1	–	–	–	–	J	1	–	12x12
MEN'S WR – 1010B	ERV–1	–	–	–	–	G	1	–	6x6
CORRIDOR – X1012	ERV–1	C	2	100	6"ø	–	–	–	–
GYMNASIUM – 1012	AHU–1	H	6	584	24x8	G	2	–	36x24
STORAGE – 1012AB	ERV–1	–	–	–	–	G	1	–	6x6
CONTRACT LECTURE – 1012C	ERV–1	H	1	45	8x14	–	–	–	–
OFFICE – 2025	ERV–1	B	1	15	4"ø	E	1	–	24x6
OFFICE – 2025A	ERV–1	B	1	15	4"ø	E	1	–	24x6
OFFICE – 2025B	ERV–1	B	1	15	4"ø	E	1	–	24x6
CAFETERIA – 2026A	ERV–1	A	1	100	6"ø	E	1	–	24x6
STUDENT LOUNGE – 2026	ERV–1	EX	3	78	6"ø	EX	3	–	–
CORRIDOR – X2013	ERV–1	C	1	32	6"ø	–	–	–	–

PLAN 'D' DIFFUSER / GRILLE SCHEDULE

ROOM	EQUIP. No.	SUPPLY AIR				RETURN / EXHAUST AIR			
		TYPE	QTY.	CFM	NECK SIZE	TYPE	QTY.	CFM	NECK SIZE
OFFICE – 2020	TU–2.3	EX.	2	145	8"ø	EX.	2	–	24x24

DIFFUSER/GRILLE TYPES SCHEDULE (BASED ON E.H. PRICE)

TYPE	DESCRIPTION
A	(SIZED AS NOTED)/24x24/SCD/3P/31/B12
B	(SIZED AS NOTED)/12x12/SCD/3P/31/B12
C	(SIZED AS NOTED)/24x24/SMD/3P/2S/B12
D	(SIZED AS NOTED)/12x12/SMD/33/2S/B12
E	(SIZED AS NOTED)/80/N/B12
F	(SIZED AS NOTED)/80/F/A/B12
G	(SIZED AS NOTED)/530/F/L/A/B12
H	(SIZED AS NOTED)/510D/F/L/A/B12
J	(SIZED AS NOTED)/630/F/L/A/B12
EX.	EXISTING DIFFUSER/GRILLE

FAN POWERED TERMINAL UNIT SCHEDULE

(BASED ON EH. PRICE FDV)

TERMINAL UNIT No.	SIZE	TYPE	AREA SERVED	MIN./MAX. CFM	HTG. AIR FLOW (CFM)
FPTU–2.1	2006	A	TELECONFERENCE – 2040F	25/250	250*
FTPU–2.2	2006	A	DATA/RESEARCH – 2040D	41/402	250*
FTPU–2.3	2006	A	OFFICE – 2040C	37/366	250*
FTPU–2.4	2008	A	CONFERENCE ROOM – 2040A	52/518	250*
FTPU–2.5	2008	A	LOUNGE – 2041	45/450	250*

REMARKS:

1. TEST/ADJUST/BALANCE (TAB) CONTRACTOR SHALL ASSIST THE CONTROLS CONTRACTOR IN THE SETUP AND CALIBRATION OF THE TERMINAL UNITS.

* – PLACE THE FAN POWERED TERMINAL UNIT RECIRCULATION FAN (HEATING AIR FLOW) IN THE MINIMUM POSITION. MINIMUM AIR FLOW POSITION SHOWN.

A – FAN POWERED TERMINAL UNIT SUPPLIED C/W 1 ROW STANDARD SIZE MULTI CIRCUIT HOT WATER COIL

PLAN 'B' DIFFUSER / GRILLE SCHEDULE

ROOM	EQUIP. No.	SUPPLY AIR				RETURN / EXHAUST AIR			
		TYPE	QTY.	CFM	NECK SIZE	TYPE	QTY.	CFM	NECK SIZE
NUR OFFICES – 1007	ERV–1	B	1	32	4"ø	E	1	–	24x6
OFFICE – 1007A	ERV–1	B	1	16	4"ø	E	1	–	24x6
OFFICE – 1007B	ERV–1	B	1	14	4"ø	E	1	–	24x6
OFFICE – 1007C	ERV–1	B	1	12	4"ø	E	1	–	24x6
OFFICE – 1007D	ERV–1	B	1	12	4"ø	E	1	–	24x6
OFFICE – 1007E	ERV–1	B	1	12	4"ø	E	1	–	24x6
OFFICE – 1007F	ERV–1	B	1	22	4"ø	E	1	–	24x6
ENTRANCE HALLWAY – X1011	ERV–1	H	1	72	6x6	G	1	–	6x6
WOMEN'S WR – 1011	ERV–1	–	–	–	–	G	2	–	8x8
JANITOR – 1013	ERV–1	–	–	–	–	G	1	–	8x8
MEN'S WR – 1015	ERV–1	–	–	–	–	G	2	–	8x8
CORRIDOR – X1016	ERV–1	C	3	285	10"ø	–	–	–	–
CORRIDOR – X1016C	ERV–1	EX	1	12	6"ø	EX	2	–	24x6
RECEPTION – 1016	ERV–1	B	1	22	4"ø	E	1	–	24x6
DEAN'S OFFICE – 1016A	AC–6	–	1	28	3"ø	E	1	–	24x6
DEAN'S WR – 1016AA	ERV–1	B	1	41	4"ø	G	1	–	6x6
OFFICE – 1016B	AC–5	–	1	13	3"ø	G	1	–	24x6
OFFICE – 1016C	AC–4	–	1	13	3"ø	G	1	–	24x6
OFFICE – 1016D	ERV–1	B	1	13	4"ø	G	1	–	24x6
OFFICE – 1017	ERV–1	B	1	12	4"ø	E	1	–	24x6
OFFICE – 1017A	ERV–1	B	1	12	4"ø	E	1	–	24x6
BREAK ROOM – 1018	ERV–1	B	1	60	4"ø	E	1	–	24x6
STUDENT LOUNGE – 1019	ERV–1	B	1	23	4"ø	E	1	–	24x6
OFFICE – 1019A	ERV–1	B	1	12	4"ø	E	1	–	24x6
OFFICE – 1019B	ERV–1	B	1	12	4"ø	E	1	–	24x6
GENERAL OFFICE – 1020	AC–2	–	1	32	3"ø	G	1	–	24x6
OFFICE – 1020A	ERV–1	B	1	23	4"ø	E	1	–	24x6
OFFICE – 1020B	AC–1	–	1	13	3"ø	E	1	–	24x6
OFFICE – 1020C	AC–3	–	1	13	3"ø	G	1	–	24x6
OFFICE – 1021	ERV–1	B	1	11	4"ø	E	1	–	24x6
OFFICE – 1021A	ERV–1	B	1	15	4"ø	E	1	–	24x6
OFFICE – 1021B	ERV–1	H	1	15	6x6	G	1	–	6x6
CLASSROOM – 1022	ERV–1	H	1	344	14x6	G	1	–	26x6
OFFICE – 1022A	ERV–1	B	1	15	4"ø	E	1	–	24x6
OFFICE – 1022B	ERV–1	B	1	15	4"ø	E	1	–	24x6
OFFICE – 1022C	ERV–1	B	1	15	4"ø	E	1	–	24x6
OFFICE – 1022D	ERV–1	B	1	15	4"ø	E	1	–	24x6
OFFICE – 1022E	ERV–1	EX	1	15	6"ø	EX	1	–	24x6
OFFICE – 1022F	ERV–1	EX	1	20	6"ø	EX	1	–	24x6
OFFICE – 1022G	ERV–1	EX	1	16	6"ø	EX	1	–	24x6
CORRIDOR – 2011X	ERV–1	C	3	307	10"ø	–	–	–	–
LECTURE ROOM – 2027	ERV–1	H	2	136	12x6	G	1	–	12x10
OFFICE – 2029	ERV–1	B	1	12	4"ø	G	1	–	6x6
OFFICE – 2029A	ERV–1	B	1	12	4"ø	–	–	–	–
WORK ROOM – 2030	ERV–1	H	2	175	14x6	G	1	–	12x10
CLASSROOM – 2031	ERV–1	H	2	183	14x6	G	1	–	26x6
LECTURE ROOM – 2032	ERV–1	H	2	175	14x6	G	1	–	12x10
WOMEN'S WR – 2033A	ERV–1	–	–	–	–	G	2	–	8x8
LECTURE ROOM – 2034	ERV–1	A	2	128	6"ø	EX	1	–	8x18
JANITOR – 2035	ERV–1	–	–	–	–	G	1	–	8x8
CLASSROOM – 2036	ERV–1	H	2	175	12x6	G	1	–	12x10
MEN'S WR – 2037A	ERV–1	–	–	–	–	G	2	–	8x8
CLASSROOM – 2038	ERV–1	H	2	190	12x6	G	1	–	12x10
CLASSROOM – 2039	ERV–1	H	2	184	14x6	G	1	–	26x6

CONTROL/BALANCING VALVE SCHEDULE (CBV-X)

VALVE No.	AREA SERVED (BASEMENT)	SIZE	FLOW RATE (GPM)
CBV–0.1	GYMNASIUM – 1012	1"ø	14.2

CONTROL/BALANCING VALVE SCHEDULE (CBV-X)

VALVE No.	AREA SERVED (FIRST FLOOR)	SIZE	FLOW RATE (GPM)
CBV–1.1	CLASSROOM – 1024	1/2"ø	2.8
CBV–1.2	OFFICE – 1025	1/2"ø	0.60
CBV–1.3	OFFICE – 1026	1/2"ø	0.60
CBV–1.4	OFFICE – 1027	1/2"ø	0.60
CBV–1.5	OFFICE – 1028	1/2"ø	0.60
CBV–1.6	OFFICE – 1029	1/2"ø	0.60
CBV–1.7	STAIRS – X1003	1/2"ø	2.8
CBV–1.8	OFFICE – 1022A	1/2"ø	0.80
CBV–1.9	OFFICE – 1022B	1/2"ø	0.80
CBV–1.10	OFFICE – 1022C	1/2"ø	0.80
CBV–1.11	OFFICE – 1022D	1/2"ø	0.80
CBV–1.12	CLASSROOM – 1022	1/2"ø	1.90
CBV–1.13	OFFICE – 1020B	1/2"ø	0.80
CBV–1.14	OFFICE – 1020	1/2"ø	1.30
CBV–1.15	OFFICE – 1020C	1/2"ø	1.30
CBV–1.16	OFFICE – 1016D	1/2"ø	1.30
CBV–1.17	OFFICE – 1016C	1/2"ø	0.80
CBV–1.18	OFFICE – 1016B	1/2"ø	0.80
CBV–1.19	OFFICE – 1016A	1/2"ø	1.30
CBV–1.20	STAIRS – X1001	1/2"ø	0.60
CBV–1.21	STAIRS – X1001	1/2"ø	1.30
CBV–1.22	STAIRS – X1002	1/2"ø	1.90
CBV–1.23	STAIRS – X1002	1/2"ø	0.60
CBV–1.24	OFFICE – 1021A + 1021B	1/2"ø	1.30
CBV–1.25	OFFICE – 1019A + 1019B	1/2"ø	1.30
CBV–1.26	OFFICE – 1017A	1/2"ø	0.80
CBV–1.27	OFFICE – 1015	1/2"ø	0.80
CBV–1.28	OFFICE – 1011	1/2"ø	0.60
CBV–1.29	OFFICE – 1007E	1/2"ø	0.60
CBV–1.30	OFFICE – 1007D	1/2"ø	0.60
CBV–1.31	OFFICE – 1007C	1/2"ø	0.60
CBV–1.32	OFFICE – 1007B	1/2"ø	0.60
CBV–1.33	VESTIBULE – X1011A	1/2"ø	1.90
CBV–1.34	LOBBY – X1011	1/2"ø	2.80
CBV–1.35	VESTIBULE – X1014	1/2"ø	0.60
CBV–1.36	AUDITORIUM – 1001	1/2"ø	1.90
CBV–1.37	AUDITORIUM – 1001	1/2"ø	3.60
CBV–1.38	AUDITORIUM – 1001	1/2"ø	2.80
CBV–1.39	STAGE – 1001A	1/2"ø	2.80
CBV–1.40	STAGE – 1001A	1/2"ø	1.90
CBV–1.41	STAIRWELL – X1004	1/2"ø	0.60
CBV–1.42	STAIRWELL – X1004	1/2"ø	0.60
CBV–1.43	CORRIDOR – X1015	1/2"ø	1.90
CBV–1.44	LIBRARY – 1006	1/2"ø	1.30
CBV–1.45	LIBRARY – 1006	1/2"ø	1.90
CBV–1.46	LIBRARY – 1006	1/2"ø	0.60
CBV–1.47	CORRIDOR – X1015A	1/2"ø	0.60
CBV–1.48	ELEVATOR MECH – 1002	1/2"ø	0.60
CBV–1.49	HOUSEKEEPING – 1012D	1/2"ø	0.60
CBV–1.50	CORRIDOR – X1015A	1/2"ø	0.60
CBV–1.51	OFFICE – 1006B	1/2"ø	0.60
CBV–1.52	LIBRARY – 1006	1/2"ø	1.30

CONTROL/BALANCING VALVE SCHEDULE (CBV-X)

VALVE No.	AREA SERVED (SECOND FLOOR)	SIZE	FLOW RATE (GPM)
CBV–2.1	TELECONFERENCE – 2040F	1/2"ø	0.60
CBV–2.2	DATA/RESEARCH – 2040D	1/2"ø	0.60
CBV–2.3	OFFICE – 2040C	1/2"ø	0.60
CBV–2.4	CONFERENCE ROOM – 2040A	1/2"ø	0.60
CBV–2.5	LOUNGE – 2041	1/2"ø	0.60
CBV–2.6	STAIRS – X1013	1/2"ø	0.60
CBV–2.7	CLASSROOM – 2038	1/2"ø	2.80
CBV–2.8	CLASSROOM – 2036	1/2"ø	2.80
CBV–2.9	SEMINAR ROOM – 2034	1/2"ø	1.30
CBV–2.10	CLASSROOM – 2032	1/2"ø	2.80
CBV–2.11	CLASSROOM – 2030	1/2"ø	2.80
CBV–2.12	STAIRS – X2001	1/2"ø	0.60
CBV–2.13	STAIRS – X2002	1/2"ø	0.60
CBV–2.14	CLASSROOM – 2039 + 2039A	1/2"ø	2.80
CBV–2.15	WASHROOM – 2037A	1/2"ø	0.80
CBV–2.16	WASHROOM – 2033A	1/2"ø	0.80
CBV–2.17	CLASSROOM – 2031	1/2"ø	3.60
CBV–2.18	OFFICE – 2029A	1/2"ø	0.80
CBV–2.19	CLASSROOM – 2027	1/2"ø	2.80
CBV–2.20	CORRIDOR – X2013	1/2"ø	0.60
CBV–2.21	CORRIDOR – X2013	1/2"ø	1.90
CBV–2.22	STORAGE – 2025A	1/2"ø	0.60
CBV–2.23	CORRIDOR – X2012	1/2"ø	0.60
CBV–2.24	OFFICE – 2025B	1/2"ø	1.30
CBV–2.25	STAIRS – X2004	1/2"ø	0.60
CBV–2.26	OFFICE – 2015	1/2"ø	0.60
CBV–2.27	OFFICE – 2014	1/2"ø	0.60
CBV–2.28	OFFICE – 2013	1/2"ø	0.60
CBV–2.29	OFFICE – 2012	1/2"ø	0.60
CBV–2.30	OFFICE – 2011	1/2"ø	0.80
CBV–2.31	OFFICE – 2017	1/2"ø	0.60
CBV–2.32	OFFICE – 2016	1/2"ø	0.60
CBV–2.33	OFFICE – 2009	1/2"ø	0.60
CBV–2.34	OFFICE – 2010	1/2"ø	0.60
CBV–2.35	OFFICE – 2019	1/2"ø	0.60
CBV–2.36	OFFICE – 2018	1/2"ø	0.60
CBV–2.37	OFFICE – 2007	1/2"ø	0.60
CBV–2.38	OFFICE – 2008	1/2"ø	0.60
CBV–2.39	OFFICE – 2021	1/2"ø	0.60
CBV–2.40	OFFICE – 2018	1/2"ø	0.60
CBV–2.41	OFFICE – 2005	1/2"ø	0.60
CBV–2.42	OFFICE – 2006	1/2"ø	0.60
CBV–2.43	OFFICE – 2022	1/2"ø	0.60
CBV–2.44	OFFICE – 2002	1/2"ø	0.60
CBV–2.45	OFFICE – 2003	1/2"ø	0.60
CBV–2.46	OFFICE – 2004	1/2"ø	0.60
CBV–2.47	OFFICE – 2001B	1/2"ø	1.30
CBV–2.48	OFFICE – 2001A	1/2"ø	0.60
CBV–2.49	COMPUTER LAB – 2001	1/2"ø	1.30
CBV–2.50	MECH ROOM – 2024	1/2"ø	0.60
CBV–2.51	HOUSEKEEPING – 2023	1/2"ø	0.60
CBV–2.52	AIR HANDLING UNIT 2	1 1/4"ø	26.2
CBV–2.53	AIR HANDLING UNIT 1	1"ø	12

CONTROL/BALANCING VALVE SCHEDULE (CBV-X)

VALVE No.	AREA SERVED (ROOFTOP EQUIPMENT)	SIZE	FLOW RATE (GPM)
CBV–3.1	ROOFTOP UNIT AIR HANDLING UNIT RTU–3	3/4"ø	7.7
CBV–3.2	ROOFTOP UNIT AIR HANDLING UNIT RTU–4	3/4"ø	6.3
CBV–3.3	ENERGY RECOVERY UNIT ERV–1 POST–HEATING	1"ø	13.1
CBV–3.4	ENERGY RECOVERY UNIT ERV–1 PRE–HEATING	1 1/4"ø	24.2
CBV–3.5	ROOFTOP UNIT AIR HANDLING UNIT RTU–3	1"ø	13.1
CBV–3.6	ROOFTOP UNIT AIR HANDLING UNIT RTU–4	1"ø	13.1

TERMINAL UNIT SCHEDULE

(BASED ON EH. PRICE SDV)

TERMINAL UNIT No.	SIZE	CONTROL ASSEMBLY	AREA SERVED	MIN./MAX. CFM
TU–1.1	12	RIGHT HAND	1024	160/1610
TU–1.2	6	LEFT HAND	1025, 1026	40/339
TU–1.3	5	LEFT HAND	1027	25/146
TU–1.4	5	LEFT HAND	1028, 1029	21/201
TU–1.5	4	RIGHT HAND	X1018, X1019	4/39
TU–1.6	4	RIGHT HAND	1023	3/22
TU–2.1	4	RIGHT HAND	2011XA	7/68
TU–2.2	4	RIGHT HAND	2040G	7/68
TU–2.3	5	RIGHT HAND	2020	29/290
TU–1	7	RIGHT HAND	X2015, 2023	52/515
TU–2	7	RIGHT HAND	X2015	52/515
TU–3	7	RIGHT HAND	2017, 2019, 2021, 2022	48/480
TU–4	6	RIGHT HAND	2015	35/345
TU–5	6	RIGHT HAND	X2014	32/320
TU–6	7	RIGHT HAND	2002, 2003. 2005, 2018	58/580
TU–7	7	RIGHT HAND	2007, 2009, 2016	58/580
TU–9	6	RIGHT HAND	2012, 2013, 2014	36/360
TU–10	4	RIGHT HAND	2011	16/155
TU–11	6	RIGHT HAND	X2014	32/320
TU–12	6	RIGHT HAND	2006, 2008, 2010	36/360
TU–13	9	RIGHT HAND	2001	86/855
TU–14	9	RIGHT HAND	2001	86/855
TU–15	6	RIGHT HAND	2001A	37/370
TU–16	6	RIGHT HAND	2001B, 2004, 2008	41/405
TU–17	9	RIGHT HAND	1006	80/800
TU–18	9	RIGHT HAND	1006	80/800
TU–19	9	RIGHT HAND	1006	80/800
TU–20	9	RIGHT HAND	1006	80/800
TU–21	9	RIGHT HAND	1006, 1006A, 1006B	80/800
TU–22	9	RIGHT HAND	X1015	75/750
TU–23	9	RIGHT HAND	1006	76/755
TU–24	9	RIGHT HAND	1006	75/750
TU–25	9	RIGHT HAND	1006	75/750

No.	Revision	Date	Initial
0	ISSUED FOR CONSTRUCTION	04/27/18	RG
D	ISSUED FOR FINAL CLIENT REVIEW	04/25/18	RG
C	ISSUED FOR 99% CLIENT REVIEW	04/13/18	RG
B	ISSUED FOR 75% CLIENT REVIEW	03/29/18	RG
A	ISSUED FOR 66% CLIENT REVIEW	03/16/18	RG

Notes:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING DIMENSIONS AND EXISTING CONDITIONS AT THE OUTSET OF CONSTRUCTION. REPORT ANY DISCREPANCIES TO THE ENGINEER. DO NOT PROCEED WITHOUT FURTHER WRITTEN DIRECTION FROM THE ENGINEER.
2. DRAWING SHOWS GENERAL ARRANGEMENT ONLY. DO NOT SCALE.

Approved

Approved

LICENSED PROFESSIONAL ENGINEER
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LAKEHEAD UNIVERSITY

THUNDER BAY ONTARIO

BORA LASKIN BUILDING

SCHEDULES

Scale:	Drawn By: BT Ckd. By: RG	Date: APRIL 2018
NA	Dwg. No.: 18–038–M27	Rev. 0

MECHANICAL SPECIFICATIONS

GENERAL

1. PROVIDE ALL LABOUR, MATERIAL, EQUIPMENT, FEES, PERMITS AND INSPECTIONS BY OUTSIDE AGENCIES AND CHARGES TO PERFORM ALL OPERATIONS FOR THE COMPLETE INSTALLATION OF THE HVAC AND PLUMBING SYSTEMS AS INDICATED.

2. ALL MATERIALS AND INSTALLATION IS TO COMPLY WITH THE ONTARIO BUILDING CODE, NFPA REGULATIONS, ONTARIO FIRE CODE, GAS UTILIZATION CODE, BUILDING STANDARDS FOR THE HANDICAPPED, ONTARIO HYDRO ELECTRICAL CODE AND THE CITY OF THUNDER BAY ENGINEERING STANDARDS.

3. MAINTAIN INSURANCE TO FULLY PROTECT OWNER, CONSULTANT AND SELF FROM ANY AND ALL CLAIMS DUE TO ACCIDENTS, MISFORTUNES, ETC., TO LIMITS SET DOWN BY THE OWNER.

4. REMOVE ALL WASTE MATERIALS AND CLEAN UP TO OWNER'S SATISFACTION. AT THE END OF THE JOB, CLEAN THE EQUIPMENT AND TOUCH UP FINISH TO RESTORE TO "AS NEW" CONDITION.

5. ONLY FIRST CLASS WORKMANSHIP AND GOOD INSTALLATION PRACTICES WILL BE ACCEPTED. USE QUALIFIED TRADESMEN FOR ALL TYPES OF WORK.

6. PROVIDE ALL NECESSARY HANGERS AND SUPPORT STEEL FOR YOUR WORK. TOUCH UP PAINT ALL CUT ENDS OF HANGER RODS AND UNISTRUT SUPPORTS WITH GALVANIZED PAINT.

7. BE RESPONSIBLE FOR ALL CUTTING AND PATCHING REQUIRED BY YOUR WORK.

8. CONTRACTOR SHALL FULLY PROTECT EXISTING FLOOR SURFACES USING APPROPRIATE COVERING (IE. PLYWOOD) FROM DAMAGE AS A RESULT OF DEMOLITION/INSTALLATION OF EQUIPMENT OR ANY WORK REQUIRED UNDER THE CONTRACT.

9. PROVIDE SHOP DRAWINGS FOR MAJOR EQUIPMENT COMPONENTS FOR REVIEW BY THE ENGINEER.

10. PATCH AND REPAIR ALL OPENINGS, SURFACES, ETC., TO MAINTAIN INTEGRITY OF FIRE SEPARATIONS AND BUILDING ENVELOPE.

11. MECHANICAL DRAWINGS TO BE READ IN CONJUNCTION WITH ARCHITECTURAL AND ELECTRICAL DRAWINGS.

PLUMBING

1. SANITARY AND VENT PIPING ABOVE GROUND TO BE PVC TO CAN/CSA–B181.2–M90. FLAME SPREAD RATING NOT TO EXCEED 25 AND SMOKE DEVELOPED CLASSIFICATION NOT TO EXCEED 50. (IPEX SYSTEM "XFR" OR EQUAL)

2. DOMESTIC WATER PIPING ABOVE GROUND TO BE TYPE 'M' COPPER TO ASTM B88M. INSULATE ABOVE GROUND DOMESTIC WATER PIPING WITH FIBROUS GLASS SPLIT SECTIONAL PIPE INSULATION COMPLETE WITH VAPOUR BARRIER JACKET AND LONGITUDINAL SELF–SEAL LAP JOINT AS FOLLOWS:

SERVICE	NPS	THICKNESS
HOT WATER (HW)	1 1/4" AND UNDER	1"
	1 1/2" AND OVER	1 1/2"
COLD WATER (CW)	1 1/4" AND UNDER	1/2"
	1 1/2" AND OVER	1"

COVER EXPOSED INSULATED PIPING, VALVES AND FITTINGS WITH PVC JACKETING. LABEL LINES TO INDICATE SERVICE AND DIRECTION OF FLOW.

3. STORM DRAINAGE WITHIN BUILDING TO BE PVC–SDR–35. INSULATE RAINWATER LEADERS AND ROOF DRAIN BODIES WITH 1" RIGID MINERAL FIBRE COMPLETE WITH VAPOUR BARRIER, JACKET AND FACING MATERIAL.

4. GAS PIPING TO BE SCHEDULE 40 STEEL PIPE. NPS 1/2" TO 2" SCREWED, NPS 2 1/2" AND OVER, PLAIN END. PAINT ENTIRE GAS SYSTEM YELLOW. VALVES, SUPPORTS AND ATTACHMENTS AS PER CSA INTERNATIONAL NATURAL GAS AND PROPANE INSTALLATION CODE, LATEST EDITION.

5. GLYCOL HEATING:

2" AND UNDER	SCHEDULE 40 CARBON STEEL, SCREWED ENDS.
2 1/2" AND OVER	SCHEDULE 40 CARBON STEEL, ROLLED GROOVED.

6. PIPE FITTINGS NPS 2 1/2" AND OVER, VICTAULIC, 2" AND UNDER, BLACK MALLEABLE SCREWED. INSULATE NEW/EXISTING PIPING WITH FIBROUS GLASS SPLIT SECTIONAL PIPE INSULATION COMPLETE WITH VAPOUR BARRIER JACKET AND LONGITUDINAL SELF–SEAL LAP JOINT OF THE FOLLOWING THICKNESS:

SERVICE	NPS	THICKNESS
INTERIOR GLYCOL HEATING	1 1/4" AND UNDER	1"
	1 1/2" AND OVER	1 1/2"

7. COVER EXPOSED INTERIOR INSULATED PIPING, VALVES AND FITTINGS WITH PVC JACKETING. COVER EXTERIOR INSULATED PIPING WITH 0.040" STUCCO EMBOSSED ALUMINUM JACKETING.

8. LABEL ALL NEW PIPING WITH FLOW ARROWS AND WITH THE FOLLOWING NOTATIONS:

DOMESTIC HOT WATER – HW
DOMESTIC COLD WATER – CW
DOMESTIC HOT WATER RECIRC. – HWRC
GLYCOL HEATING SUPPLY – GHS
GLYCOL HEATING RETURN – GHR

9. HOT WATER HEATING (WITHIN RAD ENCLOSURE) TO BE TYPE 'L' COPPER TO ASTM B88M. INSULATE SUPPLY AND RETURN LINES WITH 1" THICK FIBROUS GLASS SPLIT SECTIONAL PIPE INSULATION COMPLETE WITH VAPOUR BARRIER JACKET AND LONGITUDINAL SELF–SEAL LAP JOINT.

10. REFRIGERANT PIPING TO BE TYPE ACR COPPER TUBING, SOFT ANNEALED OR HARD DRAWN IN SIZES UP TO AND INCLUDING NPS 3/4". USE TYPE ACR HARD DRAWN TUBING FOR SIZES NPS 1" AND LARGER. FITTINGS TO BE HEAVY WROUGHT COPPER, SOLDER JOINT TYPE WITH ADAPTER FITTINGS WHERE SCREWED CONNECTIONS ARE NECESSARY, OR ON SIZES NPS 5/8" AND LESS, FLARELESS COMPRESSION TYPE.

11. INSULATE REFRIGERANT LIQUID AND SUCTION LINES, OUTSIDE AND INSIDE THE BUILDING WITH FIRE RETARDANT ELASTOMERIC CLOSED CELL FOAM OR NEOPRENE TUBING APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTRUCTIONS USING THE RECOMMENDED ADHESIVE. INSULATION THICKNESS AS FOLLOWS:

SERVICE	NPS	THICKNESS
REFRIGERANT PIPING	1 1/4" AND UNDER	1/2"
	1 1/2" AND OVER	1"

12. BOILER CONDENSATE DRAIN LINE TO BE CPVC TO CAN/CSA–B181.2–M90.

13. AIR VENT RELIEF PIPING TO BE TYPE 'M' COPPER TO ASTM B88M.

14. BOILER BREACHING CONDENSATE DRAIN LINE TO BE DWV COPPER TO ANSI B16.29–1980.

15. CONDENSATE DRAIN LINE TO BE DWV COPPER TO ANSI B16.29–1980. INSULATE PIPING WITH 1/2" THICK THICK FIBROUS GLASS SPLIT SECTIONAL PIPE INSULATION COMPLETE WITH VAPOUR BARRIER JACKET AND LONGITUDINAL SELF–SEAL LAP JOINT.

16. SOLDER/BRAZING TO BE LEAD FREE. ACCEPTABLE MATERIAL: CANFIELD WATERSAFE.

17. BALL VALVES: FULL PORT, BRONZE CONSTRUCTION, CHROME PLATED BALL, CONBRACO 70 SERIES OR EQUAL.

18. ALL PLUMBING FIXTURES TO BE CSA APPROVED.

19. VENT ALL PLUMBING FIXTURES TO OBC, PART 7.

20. INSTALL ALL FLOOR DRAINS WITH TRAP SEAL PRIMER AS INDICATED ON DRAWINGS.

21. INSTALL ALL FIXTURES INCLUDING HOT WATER TANKS WITH SHUT–OFF VALVES.

22. FIXTURES ARE TO BE AS PER SCHEDULE ON THE DRAWINGS.

23. CHARGE HYDRONIC HEATING WATER SYSTEMS WITH PROPYLENE GLYCOL/WATER MIXTURE TO INDICATED LEVELS FOR EACH SYSTEM. GLYCOL SHALL BE SUITABLE FOR USE WITH EACH SYSTEM AND APPROVED BY EQUIPMENT MANUFACTURER. BLEED OUT ALL ENTRAINED AIR AS REQUIRED TO PROVIDE A FULLY OPERATIONAL SYSTEM.

MECHANICAL SPECIFICATIONS - CONT'D

VENTILATION

1. ALL DUCTWORK IS TO BE INSTALLED IN ACCORDANCE WITH THE DRAWINGS AND SHALL BE ERECTED IN AN APPROVED, SUBSTANTIAL AND WORKMANLIKE MANNER. DUCTWORK TO BE TO SMACNA STANDARD. REVIEW EXISTING SITE CONDITIONS PRIOR TO FABRICATION OF DUCTWORK SYSTEMS.

2. ALL SPIRAL WOUND DUCTWORK SHALL BE MINIMUM 24ga. GALVANIZED SPIRAL WOUND DUCTWORK OF LOCK FORMING QUALITY TO ASTM A525M. PROVIDE DUCTMATE SPIRALMATE COMPANION FLANGES.

2. SEAL ALL TRANSVERSE JOINTS WITH WATER BASED HIGH PRESSURE DUCT SEALANT

3. ACOUSTICALLY LINE SUPPLY AND RETURN DUCTWORK; MINIMUM DISTANCE: 10'–0" FROM EQUIPMENT INLET AND OUTLET. DUCT SIZE SHOWN ACCOMMODATES FOR 1" THICK LINACOUSTIC INSULATION. DO NOT INCREASE SIZE. EXTERNALLY INSULATE REMAINDER OF SUPPLY AIR DUCTWORK 1 1/2" THICK MINERAL FIBER BLANKET COMPLETE WITH VAPOUR BARRIER.

4. EXTERNALLY INSULATE ALL FRESH AIR AND EXHAUST AIR DUCTWORK FULL LENGTH FROM EXHAUST FAN WITH 1 1/2" THICK MINERAL FIBRE BLANKET COMPLETE WITH VAPOR BARRIER.

5. EXTERNALLY INSULATE ALL NEW SUPPLY AIR DUCTWORK FROM ROOFTOP AIR HANDLING UNITS RTU–1, 2, 3, AND 4 WITH 1 1/2" THICK RIGID MINERAL FIBRE BOARD INSULATION COMPLETE WITH VAPOUR BARRIER. PROVIDE CORNER BEADS TO FINISH INSULATION EDGES. SECURE INSULATION TO DUCTWORK WITH FIRE RESISTIVE ADHESIVE AND IMPALING PINS WITH SPEED CLIPS AT 12" CENTERS. CUT OFF PROTRUDING ENDS OF PINS AND COVER SPEED CLIPS WITH SCRIM FOIL PRESSURE SENSITIVE TAPE. SUPPLY AIR DUCTWORK FROM AIR HANDLING UNIT AHU–1, AHU–2 AND ENERGY RECOVERY UNIT ERV–1 DO NOT REQUIRE EXTERNAL INSULATION.

6. PROVIDE ALL STARTERS, CONTROL TRANSFORMERS AND CONTROLS FOR AIR HANDLING UNITS, INCLUDING THERMOSTATS. MOUNT CENTRE LINE OF THERMOSTATS AT 48" ABOVE THE FINISHED FLOOR. WIRE ALL CONTROLS TO MAKE A COMPLETE AND WORKING SYSTEM.

7. ALL AIR SYSTEMS SHALL BE BALANCED BY TAB CONTRACTOR INDEPENDENT OF CONTRACTORS PERFORMING CONSTRUCTION WORK TO ±5% OF DESIGN VALUES SHOWN ON DRAWINGS. TAB CONTRACTOR SHALL SUBMIT AIR BALANCE REPORT IN TWO FORMATS: TWO (2) BOUND HARD COPIES AND ELECTRONIC FORMAT ON PDF. SUBMIT AIR BALANCE REPORT FOR REVIEW BY THE DESIGN ENGINEER. THE REPORT SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING:

   –FAN AND MOTOR SPEEDS
   –FAN MOTOR OPERATING AMPERAGE
   –AIR FLOWS IN MAIN BRANCH DUCTS
   –TERMINAL UNIT AIR FLOWS
   –FAN POWERED TERMINAL UNIT AIR FLOWS
   –AIR OUTLET FLOWS
   –AIRFLOW TEMPERATURES
   –PRESSURE DROPS ACROSS ALL EQUIPMENT FANS, COILS, FILTERS, ETC.

   TAB CONTRACTOR SHALL PROVIDE NEW SHEAVES AND BELTS AS REQUIRED FOR THE FINAL AIR BALANCE.

8. PROVIDE ALL NECESSARY HANGERS AND SUPPORT STEEL FOR EQUIPMENT, DUCTWORK AND PIPING.

9. INSTALL FIRE DAMPERS WHERE INDICATED AND TO CODE TO MAINTAIN INTEGRITY OF FIRE SEPARATION. PROVIDE ACCESS DOOR FOR ALL FIRE DAMPERS.

10. INSULATED FLEXIBLE DUCTWORK TO BE NON–COLLAPSIBLE WITH 2–PLY POLYESTER LAMINATED INNER CORE PERMANENTLY BONDED TO A SPRING STEEL WIRE HELIX, BLANKET FIBREGLASS INSULATION WITH BLACK POLYETHYLENE OUTER JACKET. FLAME SPREAD RATING NOT TO EXCEED 25 AND SMOKE DEVELOPED RATING NOT TO EXCEED 50. ACCEPTABLE MATERIAL: BOFLEX MEI, MINIMUM LENGTH 3'–0", MAXIMUM LENGTH 6'–0".

11. 21. PROVIDE TURNING VANES AT ALL 90° DUCTWORK ELBOWS WHERE INDICATED ON DESIGN DRAWINGS.

12. PROVIDE '2" D' THROAT RADIUS AT ALL ELBOWS UNLESS SHOWN OTHERWISE.

SCOPE OF WORK - BOILER ROOM - 0001B

1. REFER TO PROJECT SPECIFIC DESIGNATED SUBSTANCE SURVEY (DSS) FOR AN OVERVIEW OF KNOWN HAZARDOUS MATERIALS. ENSURE HAZARDOUS MATERIALS ARE REMOVED AND DISPOSED OF IN ACCORDANCE WITH APPLICABLE CODES AND STANDARDS. IN THE EVENT OF UNEXPECTED DISCOVERY OF FRIABLE MATERIAL NOT IDENTIFIED IN THE SITE DESIGNATED SUBSTANCE SURVEY AND REMEDIATION SCOPE OF WORK, DO NO WORK THAT WILL DISTURB SUSPECT MATERIAL UNTIL IT IS DETERMINED IF MATERIAL IS A DESIGNATED SUBSTANCE ASBESTOS. IMMEDIATELY REPORT DISCOVERY, ORALLY AND IN WRITING TO THE OWNER'S DESIGNEE. OWNER'S DESIGNEE WILL AUTHORIZE REMEDIAL WORK, IF ANY, IN WRITING. DO SUCH REMEDIAL WORK AS AN ADDITION TO THE CONTRACT.

2. REMOVE ALL EXPOSED PNEUMATIC CONTROL TUBING IN ITS ENTIRETY. TUBING CONCEALED WITHIN BUILDING CONSTRUCTION/CRAWLSPACE TO BE ABANDONED IN PLACE. UPON COMPLETION OF REMOVAL, PATCH ALL TUBING ANCHOR HOLES AND WALL/FLOOR/CEILING OPENINGS MADE REDUNDANT BY REMOVAL. PATCH CONSTRUCTION TO MATCH EXISTING WHERE POSSIBLE TO MATCH SURROUND CONSTRUCTION.

3. TEMPORARILY SHUT OFF GAS SERVICE TO BUILDING, CO–ORDINATE GAS SHUT–OFF WITH BUILDING OWNER. INSTALL NEW REDUCER AND ISOLATION VALVE IN GAS LINE BRANCH SERVING EXISTING BOILERS AS INDICATED ON DESIGN DRAWINGS. NEW ISOLATION VALVE FOR HYDRONIC BOILERS TO REMAIN IN THE CLOSED POSITION TO FACILITATE CONSTRUCTION.

4. REMOVE EXISTING BOILER REGULATOR GAS VENT LINES IN THEIR ENTIRETY. PATCH WALL OPENING WITH NON–SHRINK GROUT AND PAINT TO MATCH.

5. ISOLATE AND DRAIN HOT WATER FROM EXISTING HYDRONIC HEATING LOOP TO FACILITATE DEMOLITION AND RENOVATION. DISCONNECT PIPING FROM BOILERS, HEAT EXCHANGERS, AND CIRCULATING PUMPS AND REMOVE PIPING TO EXTENTS INDICATED ON DESIGN DRAWINGS COMPLETE WITH ALL HANGERS/SUPPORTS, AIR PURGER, EXPANSION TANK, FILTER, CHEMICAL POT FEEDER AND DDC LOOP TEMPERATURE SENSORS. DISCONNECT BREACHING FROM EXISTING STEAM HEATING BOILERS AND REMOVE TO EXTENTS INDICATED ON DESIGN DRAWINGS COMPLETE WITH ALL SUPPORTS AND HANGERS. REFER TO ELECTRICAL DRAWINGS FOR PUMP POWER FEED REMOVAL REQUIREMENTS. REFER TO ELECTRICAL DRAWINGS FOR HOT WATER BOILER POWER FEED REMOVAL REQUIREMENTS.

6. DRAIN EXISTING STEAM AND CONDENSATE HEATING LOOP IN ITS ENTIRETY TO FACILITATE DEMOLITION AND RENOVATION. DISCONNECT STEAM AND CONDENSATE PIPING FROM BOILERS, PUMPS AND HOT WATER STORAGE TANK COMPLETE WITH HANGERS, SUPPORTS AND ALL ASSOCIATED VALVING TO EXTENTS INDICATED ON DESIGN DRAWINGS.

7. REMOVE EXISTING STEAM HEATING BOILERS COMPLETE WITH STEEL SUPPORT FRAME, HYDRONIC PIPING, STEAM PIPING, DRAIN PIPING, GAS PIPING, GAS TRAIN REGULATOR VENTING AND ALL ASSOCIATED BOILER CONTROL AND DDC CONTROL WIRING TO EXTENTS INDICATED ON DESIGN DRAWINGS. REMOVE BOILER MAKE–UP WATER LINE COMPLETE WITH BACKFLOW PREVENTER TO EXTENTS INDICATED ON DESIGN DRAWINGS. REFER TO ELECTRICAL DRAWINGS FOR PUMP POWER FEED REMOVAL REQUIREMENTS. REFER TO ELECTRICAL DRAWINGS FOR BOILER POWER FEED REMOVAL REQUIREMENTS. REMOVE EXISTING CONDENSATE RECEIVER COMPLETE WITH ASSOCIATED PIPING, CHEMICAL POT FEEDER AND CONDENSATE PUMPS IN ITS ENTIRETY.

8. REMOVE EXISTING HYDRONIC CIRCULATING PUMPS COMPLETE WITH SUPPORTS IN THEIR ENTIRETY. REMOVE CIRCULATING PUMP HYDRONIC PIPING COMPLETE WITH ASSOCIATED VALVING TO EXTENTS INDICATED ON DESIGN DRAWINGS. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.

9. REMOVE EXISTING STEAM HEAT EXCHANGERS COMPLETE WITH STAND IN THEIR ENTIRETY. REMOVE HEAT EXCHANGER STEAM AND CONDENSATE PIPING COMPLETE WITH ASSOCIATED VALVING IN THEIR ENTIRETY.

10. REMOVE EXISTING FORCE FLOW CIRCULATING PUMP IN ITS ENTIRETY. REMOVE EXISTING FORCE FLOW HYDRONIC PIPING TO EXTENTS INDICATED ON DESIGN DRAWINGS. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.

11. REMOVE EXISTING UNIT HEATER COMPLETE WITH HANGERS TO HYDRONIC PIPING TO EXTENTS INDICATED ON DESIGN DRAWINGS. REMOVE EXISTING UNIT HEATER STANDALONE THERMOSTAT COMPLETE WITH CONTROL WIRING.

12. ISOLATE AND DRAIN DOMESTIC WATER SYSTEM AS REQUIRED TO FACILITATE CONSTRUCTION. REMOVE EXISTING COLD WATER SUPPLY PIPING TO EXTENTS INDICATED ON DESIGN DRAWINGS.

13. DISCONNECT DOMESTIC HOT WATER TO/FROM STORAGE TANK PIPING FROM EXISTING DOMESTIC HOT WATER HEATING BOILERS. REMOVE PIPING TO EXTENTS INDICATED ON DESIGN DRAWINGS COMPLETE WITH ALL SUPPORTS AND HANGERS.

14. REMOVE EXISTING DOMESTIC HOT WATER HEATING CIRCULATING AND DOMESTIC HOT WATER RECIRCULATION PUMPS COMPLETE WITH UNISTRUT SUPPORTS, HANGERS AND MOTOR RATED SWITCHES IN THEIR ENTIRETY. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.

SCOPE OF WORK - BOILER ROOM - 0001B

15. DISCONNECT HOT WATER TO/FROM DOMESTIC HOT WATER HEATING BOILERS AND HOT WATER RECIRCULATION PIPING FROM EXISTING HOT WATER STORAGE TANK. REMOVE DOMESTIC WATER PIPING COMPLETE WITH ALL HANGER AND SUPPORTS TO EXTENTS INDICATED ON DESIGN DRAWINGS. REMOVE EXISTING UNIT HOT WATER HORIZONTAL EXPANSION TANKS COMPLETE WITH HANGERS AND SUPPORTS IN ITS ENTIRETY. REMOVE DOMESTIC WATER PIPING COMPLETE WITH ASSOCIATED VALVING TO EXTENTS INDICATED ON DESIGN DRAWINGS. CUT HANGER RODS FLUSH WITH BOILER ROOM CEILING.

16. REMOVE ABANDONED HOT WATER STORAGE TANK IN ITS ENTIRETY. REMOVE EXISTING STEAM PIPING COMPLETE WITH HANGERS TO EXTENTS INDICATED ON DESIGN DRAWINGS.

17. REMOVE EXISTING DOMESTIC HOT WATER STORAGE TANKS IN THEIR ENTIRETY. REMOVE EXISTING HOT WATER PIPING TO EXTENTS INDICATED ON DESIGN DRAWINGS.

18. REMOVE EXISTING FLOOR MOUNTED HOT WATER EXPANSION TANK COMPLETE WITH RECIRCULATION PUMPS AND ASSOCIATED PIPING IN THEIR ENTIRETY. FOR PUMP POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.

19. REMOVE EXISTING INCINERATOR COMPLETE WITH VENTING IN ITS ENTIRETY. PACK WALL VOID WITH INSULATION AND PROVIDE METAL PATCH AND SEAL AIRTIGHT.

20. REMOVE EXISTING FLOOR DRAIN COMPLETE WITH HUB IN ITS ENTIRETY. REMOVE SANITARY PIPING TO FLOOR AND CAP. PATCH AREA AND REPAIR FLOOR AS INDICATED ON DESIGN DRAWINGS. PREP FLOOR AS PER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.

21. REMOVE ALL REMAINING CONCRETE HOUSEKEEPING PADS IN THEIR ENTIRETY. UPON COMPLETION OF REMOVAL SAWCUT PERIMETER OF PATCH AREA AND REPAIR FLOOR AS INDICATED ON DESIGN DRAWINGS. PREP FLOOR AS PER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.

22. REMOVE EXISTING CEILING SUSPENDED HEAT RECOVERY VENTILATOR COMPLETE WITH HANGERS, SUPPORTS AND CONTROL WIRING IN ITS ENTIRETY. REMOVE EXISTING DUCTWORK TO EXTENTS INDICATED ON DESIGN DRAWINGS. PATCH AND SEAL DUCTWORK WALL OPENINGS AIRTIGHT. CUT HANGER RODS FLUSH WITH BOILER ROOM CEILING. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.

23. REMOVE EXISTING AIR COMPRESSOR COMPLETE WITH FILTER STATION IN ITS ENTIRETY. REMOVE EXISTING EXPOSED PNEUMATIC TUBING IN ITS ENTIRETY. TURN OVER AIR COMPRESSOR TO OWNER. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.

24. REMOVE EXISTING WALL MOUNTED DDC CABINETS IN THEIR ENTIRETY. TOUCH UP WALL PAINT TO MATCH EXISTING.

25. REMOVE PREVIOUSLY ABANDONED FUEL OIL SUPPLY AND RETURN PIPING LOCATED IN BOILER ROOM TRENCH DRAIN TO EXTENTS INDICATED AND CAP. CONTRACTOR TO VERIFY SIZE OF ABANDONED FUEL PIPING.

26. ALL DEMOLISHED ITEMS SHALL BECOME PROPERTY OF THE CONTRACTOR AND BE REMOVED FROM SITE UNLESS NOTED OTHERWISE.

27. UPON COMPLETION OF DEMOLITION, PATCH ALL SURFACE AREAS WHERE SURFACE MOUNTED ITEMS HAVE BEEN REMOVED AND ALL REDUNDANT WALL/CEILING OPENINGS. PATCH CONSTRUCTION TO MATCH EXISTING TO MAINTAIN INTEGRITY OF FIRE SEPARATIONS. PRIME/PAINT PATCHWORK AS REQUIRED TO MATCH SURROUNDING AREAS.

28. UPON COMPLETION OF BOILER ROOM DEMOLITION AND FLOOR PATCHING, PAINT AND REPAIR MECHANICAL ROOM FLOOR AREAS AND NEW CONCRETE HOUSEKEEPING PADS WITH MINIMUM 2 COATS SIKAFLOOR 261 GLOSS FINISH FLOOR EPOXY. COLOUR TO MATCH EXISTING. PREPARE FLOOR AND WALL SURFACES AND APPLY COATING AS PER MANUFACTURER'S RECOMMENDATIONS.

29. PROVIDE NEW GLYCOL HEATING SUPPLY AND RETURN PIPING COMPLETE WITH ASSOCIATED COMPONENTS AND CONNECT TO EXISTING PIPING AS INDICATED ON DESIGN DRAWINGS. PROVIDE NEW PIPING ENCLOSURES AS INDICATED.

30. PROVIDE NEW GAS FIRED HEATING BOILERS COMPLETE WITH BOILER CIRCULATING PUMPS AND INSTALL ON NEW CONCRETE HOUSEKEEPING PAD. PROVIDE GLYCOL HEATING PIPING COMPLETE WITH ASSOCIATED COMPONENTS TO CONNECT NEW EQUIPMENT TO EXISTING HOT WATER HEATING LOOP AS INDICATED ON DESIGN DRAWINGS. PROVIDE NEW BOILER CONDENSATE DRAIN LINES TO EXISTING FLOOR DRAIN AS INDICATED ON DESIGN DRAWINGS. PROVIDE NEW GAS PIPING COMPLETE WITH ISOLATION VALVES AND DRIP LEGS FOR BOILERS AND CONNECT TO EXISTING GAS LINE. PROVIDE NEW BOILER EXHAUST AIR DUCTWORK COMPLETE WITH CONDENSATE DRAIN PIPING AND HANGERS AND ROUTE UP THROUGH EXISTING CHIMNEY AS INDICATED ON DESIGN DRAWINGS. PROVIDE NEW MOTORIZED COMBUSTION AIR DAMPER SUPPLIED WITH BOILER AND CONNECT TO NEW BOILER EXHAUST DUCTWORK. PROVIDE NEW BIRDSCREEN AND INSTALL ON BOILER SIDE INLET. ASSIGN WORK TO APPROPRIATE ELECTRICAL OR CONTROLS CONTRACTOR AS REQUIRED BY COMPONENT VOLTAGES. FOR BOILER AND PUMP POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.

31. PROVIDE NEW MAIN CIRCULATING PUMPS COMPLETE WITH INTEGRAL VARIABLE FREQUENCY DRIVES, PUMP SUPPORTS, BUTTERFLY VALVES AND CHECK VALVES. INSTALL NEW CIRCULATING PUMPS ON NEW HOUSEKEEPING PAD AS INDICATED ON DESIGN DRAWINGS. PROVIDE CONTROL WIRING AND CONNECT NEW CIRCULATING PUMPS TO NEW DDC SYSTEM. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.

32. PROVIDE NEW FILTER AND CHEMICAL POT FEEDER COMPLETE WITH UNISTRUT STAND AND CONNECT TO NEW HYDRONIC HEATING LOOP SUPPLY PIPING AS INDICATED ON DESIGN DRAWINGS.

33. PROVIDE NEW MAGNETIC DIRT SEPARATOR AND INSTALL ON NEW CONCRETE HOUSEKEEPING PAD AS INDICATED ON DESIGN DRAWINGS. PROVIDE NEW HYDRONIC SUPPLY PIPING AND CONNECT TO NEW DIRT/MAGNETIC DIRT SEPARATOR.

34. PROVIDE NEW GLYCOL FEEDER COMPLETE WITH ADHESIVE SIGN AND ALARM PANEL AS INDICATED ON DESIGN DRAWINGS. PROVIDE NEW BOILER RELIEF PIPING AND AIR VENT PIPING AS INDICATED ON DESIGN DRAWINGS. FASTEN NEW ALARM PANEL TO EXISTING CONCRETE BEAM AS INDICATED ON DESIGN DRAWINGS. MOUNT NEW ADHESIVE SIGN TO NEW GLYCOL FEEDER. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.

35. PROVIDE NEW CONTROL BALANCING VALVE AND INSTALL IN EXISTING GLYCOL SUPPLY PIPING AS INDICATED ON DESIGN DRAWINGS. PROVIDE NEW CONTROL WIRING AND CONNECT TO NEW DDC SYSTEM.

36. PROVIDE NEW GLYCOL SUPPLY AND RETURN PIPING COMPLETE WITH MANUAL BALANCING VALVE AND CONNECT TO NEW UNIT HEATER AS INDICATED ON DESIGN DRAWINGS. PROVIDE NEW WALL MOUNTED DDC THERMOSTAT AND CONNECT TO NEW UNIT HEATER.

37. PROVIDE NEW HOT WATER HEATERS COMPLETE WITH WALL SUPPORTS AND MOUNT ON EXISTING CONCRETE BLOCK WALL. PROVIDE NEW DOMESTIC WATER PIPING COMPLETE WITH PIPING HEADER AND IN–LINE EXPANSION TANK AS INDICATED ON DESIGN DRAWINGS AND CONNECT TO NEW MIXING VALVE. PROVIDE NEW HOT WATER RECIRCULATION PIPING COMPLETE WITH RECIRCULATION PUMP AND CONNECT TO EXISTING PIPING AS INDICATED ON DESIGN DRAWINGS. PROVIDE NEW GAS PIPING COMPLETE WITH UNIONS AND DRIP LEG AND CONNECT TO EXISTING GAS PIPING AS INDICATED ON DESIGN DRAWINGS. PROVIDE NEW COLD WATER PIPING AND CONNECT TO NEW TRAP SEAL PRIMER MANIFOLD AS INDICATED ON DESIGN DRAWINGS. PROVIDE NEW NON–DIRECT INTAKE VENT LOCATED IN BOILER ROOM COMPLETE WITH VENT TERMINATION SCREEN/CAP. PROVIDE NEW WATER HEAT VENTING AND ROUTE UP THROUGH ABANDONED BOILER BREECHING OPENING AND TERMINATE ABOVE EXISTING CHIMNEY. PROVIDE FLAT FLASHING AND STORM COLLAR AND SEAL CHIMNEY OPENING WEATHERTIGHT. CONTRACTOR TO MAINTAIN ALL HOT WATER HEATER AND COMBINED VENTING CLEARANCES AS PER MANUFACTURER'S RECOMMENDATIONS. FOR WATER HEATER POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.

38. PROVIDE NEW MIXING VALVE COMPLETE WITH WALL BRACKETS AND MOUNT ON EXISTING CONCRETE BLOCK WALL. PROVIDE NEW DOMESTIC WATER PIPING AND CONNECT TO EXISTING PIPING AS INDICATED ON DESIGN DRAWINGS. PROVIDE NEW CONTROL WIRING AND CONNECT TO NEW DDC SYSTEM. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.

39. PROVIDE NEW FLOOR DRAIN COMPLETE WITH CLEANOUT AND CONNECT TO EXISTING SANITARY PIPING AS INDICATED ON DESIGN DRAWINGS. SAW CUT AND PATCH EXISTING FLOOR AS REQUIRED TO FACILITATE INSTALLATION OF NEW FLOOR DRAIN. PROVIDE NEW VENT PIPING AND ROUTE IN ABANDONED INCINERATOR VENT CHIMNEY OPENING AS INDICATED ON DESIGN DRAWINGS. TERMINATE NEW VENT PIPING AT TOP OF EXISTING CHIMNEY.

40. PROVIDE NEW TRAP SEAL PRIMER MANIFOLD COMPLETE WITH WALL BRACKET AND MOUNT ON EXISTING CONCRETE BLOCK WALL. CONNECT NEW TRAP SEAL PRIMER MANIFOLD TO NEW COLD WATER PIPING AND FLOOR DRAIN AS INDICATED ON DESIGN DRAWINGS. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.

41. UPON COMPLETION OF DEMOLITION, PATCH ALL SURFACE AREAS WHERE SURFACE MOUNTED ITEMS HAVE BEEN REMOVED AND ALL REDUNDANT WALL/CEILING OPENINGS. PATCH CONSTRUCTION TO MATCH EXISTING TO MAINTAIN INTEGRITY OF FIRE SEPARATIONS. PRIME/PAINT PATCHWORK AS REQUIRED TO MATCH SURROUNDING AREAS.

SCOPE OF WORK - BOILER ROOM - 0001B

42. PROVIDE NEW JOHNSON CONTROLS FACILITY EXPLORER (FX) DIRECT DIGITAL CONTROL (DDC) SYSTEM COMPLETE WITH JOHNSON CONTROLS FX80 SUPERVISOR CONTROLLER, SUB CONTROLLERS, FIELD DEVICES, COLOUR GRAPHICAL OPERATING SOFTWARE AND UPS. FX80 CONTROL POINTS TO BE IMPORTED TO LAKEHEAD UNIVERSITY'S METASYS SERVER VIA THE EXISTING METASYS NETWORK AUTOMATION ENGINE (NAE) LOCATED IN MECHANICAL ROOM – 2024. PROGRAM THE DDC SYSTEM GRAPHICAL OPERATING SOFTWARE TO INCORPORATE ALL NEW/EXISTING HVAC AND BUILDING SYSTEMS EQUIPMENT. DDC GRAPHICS SHALL INCLUDE FLOOR PLANS OF THE BUILDING INDICATING ZONE TEMPERATURES AND HVAC SYSTEM EQUIPMENT. GRAPHICAL SYMBOLS SHALL LINK THE OPERATOR TO THE GRAPHICAL DATA DISPLAY FOR THE SPECIFIC COMPONENT. PROGRAM SOFTWARE TO PERMIT MONITORING AND EDITING OF ALL SYSTEM VARIABLES, SCHEDULING AND ALARMS IN REAL TIME VALUES. ALL EQUIPMENT ON/OFF FUNCTIONS AND SETPOINTS SHALL BE ADJUSTABLE VIA THE GRAPHICAL OPERATING SOFTWARE DISPLAY FOR THE SPECIFIC COMPONENT. LABEL ALL NEW CONTROL SYSTEM COMPONENTS.

43. DURING CONSTRUCTION KEEP AN ACCURATE RECORD OF ALL DEVIATIONS BETWEEN THE WORK SHOWN ON THE DESIGN DRAWINGS AND THAT WHICH IS INSTALLED. PROVIDE AS–BUILT DRAWINGS TO REFLECT THE ACTUAL INSTALLED CONFIGURATION AND SUBMIT TO THE DESIGN ENGINEER FOR REVIEW.

44. PROVIDE OPERATION AND MAINTENANCE MANUALS FOR ALL EQUIPMENT. O&M MANUALS SHALL BE SUBMITTED IN TWO FORMATS; BOUND HARD COPY AND ELECTRONIC FORMAT PDF ON CD. SUBMIT OPERATION AND MAINTENANCE MANUALS TO THE DESIGN ENGINEER.

45. PROVIDE SYSTEM DEMONSTRATION AND END USER TRAINING SESSION FOR ALL EQUIPMENT.

SCOPE OF WORK - MECHANICAL ROOM - 2028

1. REFER TO PROJECT SPECIFIC DESIGNATED SUBSTANCE SURVEY (DSS) FOR AN OVERVIEW OF KNOWN HAZARDOUS MATERIALS. ENSURE HAZARDOUS MATERIALS ARE REMOVED AND DISPOSED OF IN ACCORDANCE WITH APPLICABLE CODES AND STANDARDS. IN THE EVENT OF UNEXPECTED DISCOVERY OF FRIABLE MATERIAL NOT IDENTIFIED IN THE SITE DESIGNATED SUBSTANCE SURVEY AND REMEDIATION SCOPE OF WORK, DO NO WORK THAT WILL DISTURB SUSPECT MATERIAL UNTIL IT IS DETERMINED IF MATERIAL IS A DESIGNATED SUBSTANCE ASBESTOS. IMMEDIATELY REPORT DISCOVERY, ORALLY AND IN WRITING TO THE OWNER'S DESIGNEE. OWNER'S DESIGNEE WILL AUTHORIZE REMEDIAL WORK, IF ANY, IN WRITING. DO SUCH REMEDIAL WORK AS AN ADDITION TO THE CONTRACT.

2. REMOVE ALL EXPOSED PNEUMATIC CONTROL TUBING IN ITS ENTIRETY. TUBING CONCEALED WITHIN BUILDING CONSTRUCTION/CRAWLSPACE TO BE ABANDONED IN PLACE. UPON COMPLETION OF REMOVAL, PATCH ALL TUBING ANCHOR HOLES AND WALL/FLOOR/CEILING OPENINGS MADE REDUNDANT BY REMOVAL. PATCH CONSTRUCTION TO MATCH EXISTING WHERE POSSIBLE TO MATCH SURROUND CONSTRUCTION.

7. DRAIN EXISTING STEAM AND CONDENSATE HEATING LOOP IN ITS ENTIRETY TO FACILITATE DEMOLITION AND RENOVATION. DISCONNECT STEAM AND CONDENSATE PIPING FROM AIR HANDLING UNIT COMPLETE WITH HANGERS, SUPPORTS AND ALL ASSOCIATED VALVING TO EXTENTS INDICATED ON DESIGN DRAWINGS.

8. REMOVE EXISTING RAIN WATER LEADER COMPLETE WITH HANGERS TO EXTENTS INDICATED ON DESIGN DRAWINGS. CUT HANGER RODS FLUSH WITH DECKING. PROVIDE SPOOL PIECE TO SUIT.

9. REMOVE EXISTING AIR HANDLING UNIT COMPLETE WITH CONTROL WIRING, PNEUMATIC ACTUATOR, PNEUMATIC CONTROLS AND HEATING COILS IN ITS ENTIRETY. REMOVE EXISTING FRESH AIR AND SUPPLY AIR DUCTWORK TO EXTENTS INDICATED. REMOVE EXISTING FRESH AIR INTAKE DUCTWORK COMPLETE WITH EXTERNAL INSULATION, PNEUMATIC ACTUATOR AND PNEUMATIC TUBING TO EXTENTS INDICATED ON DESIGN DRAWINGS. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.

10. REMOVE EXISTING SUPPLY AND RETURN AIR DUCTWORK TO EXTENTS INDICATED ON DESIGN DRAWINGS. WHERE RETAINED DUCTWORK CONTAINS FIRE DAMPERS, CONTRACTOR IS RESPONSIBLE FOR NOTIFYING THE DESIGN ENGINEER AND REPLACING OF ANY DAMAGED FIRE DAMPER FUSIBLE LINK COMPONENTS AS REQUIRED.

11. REMOVE ALL REMAINING CONCRETE HOUSEKEEPING PADS IN THEIR ENTIRETY. UPON COMPLETION OF REMOVAL SAWCUT PERIMETER OF PATCH AREA AND REPAIR FLOOR AS INDICATED ON DESIGN DRAWINGS. PREP FLOOR AS PER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.

12. REMOVE EXISTING SUPPLY FANS COMPLETE WITH FRESH AIR DUCTWORK, PNEUMATIC ACTUATOR, PNEUMATIC TUBING AND POWER FEED IN THEIR ENTIRETY. REMOVE EXISTING HANGERS AND SUPPORTS WHERE INDICATED ON DESIGN DRAWINGS. REMOVE EXISTING SUPPLY DUCTWORK TO EXTENTS INDICATED ON DESIGN DRAWINGS. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.

13. REMOVE EXISTING RETURN FANS COMPLETE WITH EXHAUST AIR DUCTWORK, PNEUMATIC ACTUATOR, PNEUMATIC TUBING AND POWER FEED IN THEIR ENTIRETY. REMOVE EXISTING RETURN DUCTWORK TO EXTENTS INDICATED ON DESIGN DRAWINGS. REMOVE EXISTING EXHAUST AIR HOOD LOCATED ON ROOF IN ITS ENTIRETY. COORDINATE REMOVAL OF ROOF CURB WITH CORRESPONDING ROOFING UPGRADE OUTSIDE OF CONTRACT. REFER TO STRUCTURAL DRAWINGS FOR ROOF DECKING PATCHING REQUIREMENTS. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.

14. REMOVE EXISTING REDUNDANT CONTROLS CABINET COMPLETE WITH ABANDONED CONTROLS IN ITS ENTIRETY.

15. ALL DEMOLISHED ITEMS SHALL BECOME PROPERTY OF THE CONTRACTOR AND BE REMOVED FROM SITE UNLESS NOTED OTHERWISE.

22. UPON COMPLETION OF DEMOLITION, PATCH ALL SURFACE AREAS WHERE SURFACE MOUNTED ITEMS HAVE BEEN REMOVED AND ALL REDUNDANT WALL/CEILING OPENINGS. PATCH CONSTRUCTION TO MATCH EXISTING TO MAINTAIN INTEGRITY OF FIRE SEPARATIONS. PRIME/PAINT PATCHWORK AS REQUIRED TO MATCH SURROUNDING AREAS.

19. UPON COMPLETION OF MECHANICAL ROOM DEMOLITION AND FLOOR PATCHING, PAINT AND REPAIR MECHANICAL ROOM FLOOR AREAS AND NEW CONCRETE HOUSEKEEPING PADS WITH MINIMUM 2 COATS SIKAFLOOR 261 GLOSS FINISH FLOOR EPOXY. COLOUR TO MATCH EXISTING. PREPARE FLOOR AND WALL SURFACES AND APPLY COATING AS PER MANUFACTURER'S RECOMMENDATIONS.

20. PROVIDE NEW RAIN WATER LEADER PIPING AND CONNECT TO EXISTING AS INDICATED ON DESIGN DRAWINGS. COORDINATE NEW RAIN WATER LEADER PIPING WITH NEW DUCTWORK.

21. PROVIDE NEW AIR HANDLING UNITS COMPLETE WITH SUPPLY AIR DUCTWORK, RETURN AIR DUCTWORK, FRESH AIR DUCTWORK, EXHAUST AIR DUCTWORK, EXHAUST AIR GOOSENECKS, HYDRONIC HEATING COILS AND CONTROL WIRING AS INDICATED ON DESIGN DRAWINGS. PROVIDE NEW HYDRONIC PIPING COMPLETE WITH HANGERS, CONTROL BALANCING VALVES AND ASSOCIATED VALVING AND CONNECT TO NEW AIR HANDLING UNIT HYDRONIC HEATING COILS. CONNECT NEW SUPPLY, RETURN AND EXHAUST AIR DUCTWORK TO EXISTING DUCTWORK AS INDICATED ON DESIGN DRAWINGS. PROVIDE NEW SMOKE DETECTORS, CARBON DIOXIDE DETECTORS, TEMPERATURE SENSORS, FIRE DAMPERS AND FIRE DAMPER ACCESS DOORS AND INSTALL IN NEW DUCTWORK AS INDICATED ON DESIGN DRAWINGS. CONNECT NEW DUCT MOUNTED SENSORS TO DDC SYSTEM AND FIRE ALARM PANEL AS INDICATED ON DESIGN DRAWINGS. INSTALL NEW AIR HANDLING UNITS ON NEW HOUSEKEEPING PADS AS INDICATED ON DESIGN DRAWINGS. DISASSEMBLE AIR HANDLING UNIT BASE RAID AS REQUIRED TO SUIT INSTALLATION. REMOVE EXISTING EXTERIOR DOOR MULLIONS TO FACILITATE INSTALLATION OF NEW AIR HANDLING UNITS. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.

22. PROVIDE NEW ROOF MOUNTED ENERGY RECOVERY UNIT COMPLETE WITH PREFABRICATED ROOF CURB. PROVIDE NEW SUPPLY AND RETURN AIR DUCTWORK AND TRANSITION IN NEW ROOF CURB AS INDICATED ON DESIGN DRAWINGS. CONNECT NEW SUPPLY AND RETURN AIR DUCTWORK TO EXISTING DUCTWORK AS INDICATED ON DESIGN DRAWINGS. PROVIDE NEW HYDRONIC PIPING COMPLETE WITH HANGERS, CONTROL BALANCING VALVES AND ASSOCIATED VALVING AND CONNECT TO ENERGY RECOVERY UNIT HEATING COIL AS INDICATED ON DESIGN DRAWINGS. CONNECT NEW ENERGY RECOVERY UNIT AND CONTROL BALANCING VALVE TO NEW DDC SYSTEM. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.

45. PROVIDE NEW JOHNSON CONTROLS FACILITY EXPLORER (FX) DIRECT DIGITAL CONTROL (DDC) SYSTEM COMPLETE WITH JOHNSON CONTROLS FX80 SUPERVISOR CONTROLLER, SUB CONTROLLERS, FIELD DEVICES, COLOUR GRAPHICAL OPERATING SOFTWARE AND UPS. FX80 CONTROL POINTS TO BE IMPORTED TO LAKEHEAD UNIVERSITY'S METASYS SERVER VIA THE EXISTING METASYS NETWORK AUTOMATION ENGINE (NAE) LOCATED IN MECHANICAL ROOM – 2024. PROGRAM THE DDC SYSTEM GRAPHICAL OPERATING SOFTWARE TO INCORPORATE ALL NEW/EXISTING HVAC AND BUILDING SYSTEMS EQUIPMENT. DDC GRAPHICS SHALL INCLUDE FLOOR PLANS OF THE BUILDING INDICATING ZONE TEMPERATURES AND HVAC SYSTEM EQUIPMENT. GRAPHICAL SYMBOLS SHALL LINK THE OPERATOR TO THE GRAPHICAL DATA DISPLAY FOR THE SPECIFIC COMPONENT. PROGRAM SOFTWARE TO PERMIT MONITORING AND EDITING OF ALL SYSTEM VARIABLES, SCHEDULING AND ALARMS IN REAL TIME VALUES. ALL EQUIPMENT ON/OFF FUNCTIONS AND SETPOINTS SHALL BE ADJUSTABLE VIA THE GRAPHICAL OPERATING SOFTWARE DISPLAY FOR THE SPECIFIC COMPONENT. LABEL ALL NEW CONTROL SYSTEM COMPONENTS.

46. DURING CONSTRUCTION KEEP AN ACCURATE RECORD OF ALL DEVIATIONS BETWEEN THE WORK SHOWN ON THE DESIGN DRAWINGS AND THAT WHICH IS INSTALLED. PROVIDE AS–BUILT DRAWINGS TO REFLECT THE ACTUAL INSTALLED CONFIGURATION AND SUBMIT TO THE DESIGN ENGINEER.

47. PROVIDE OPERATION AND MAINTENANCE MANUALS FOR ALL EQUIPMENT. O&M MANUALS SHALL BE SUBMITTED IN TWO FORMATS; BOUND HARD COPY AND ELECTRONIC FORMAT ON CD. SUBMIT OPERATION AND MAINTENANCE MANUALS TO THE DESIGN ENGINEER.

48. PROVIDE SYSTEM DEMONSTRATION AND END USER TRAINING SESSION FOR ALL EQUIPMENT.

No.	Revision	Date	Initial
0	ISSUED FOR CONSTRUCTION	04/27/18	RG
D	ISSUED FOR FINAL CLIENT REVIEW	04/25/18	RG
C	ISSUED FOR 99% CLIENT REVIEW	04/13/18	RG
B	ISSUED FOR 75% CLIENT REVIEW	03/29/18	RG
A	ISSUED FOR 66% CLIENT REVIEW	03/16/18	RG

Notes:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING DIMENSIONS AND EXISTING CONDITIONS AT THE OUTSET OF CONSTRUCTION. REPORT ANY DISCREPANCIES TO THE ENGINEER. DO NOT PROCEED WITHOUT FURTHER WRITTEN DIRECTION FROM THE ENGINEER.
2. DRAWING SHOWS GENERAL ARRANGEMENT ONLY. DO NOT SCALE.

Approved

Approved

LICENSED PROFESSIONAL ENGINEER
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BORA LASKIN BUILDING
MECHANICAL SPECIFICATIONS
AND SCOPE OF WORK

Scale: NA
Drawn By: BT
Ckd. By: RG
Date: APRIL 2018
Dwg. No.: 18–038–M28
Rev. 0

SCOPE OF WORK - GENERAL

1. REFER TO PROJECT SPECIFIC DESIGNATED SUBSTANCE SURVEY (DSS) FOR AN OVERVIEW OF KNOWN HAZARDOUS MATERIALS. ENSURE HAZARDOUS MATERIALS ARE REMOVED AND DISPOSED OF IN ACCORDANCE WITH APPLICABLE CODES AND STANDARDS. IN THE EVENT OF UNEXPECTED DISCOVERY OF FRIABLE MATERIAL NOT IDENTIFIED IN THE SITE DESIGNATED SUBSTANCE SURVEY AND REMEDIATION SCOPE OF WORK, DO NO WORK THAT WILL DISTURB SUSPECT MATERIAL UNTIL IT IS DETERMINED IF MATERIAL IS A DESIGNATED SUBSTANCE ASBESTOS. IMMEDIATELY REPORT DISCOVERY, ORALLY AND IN WRITING TO THE OWNER'S DESIGNEE. OWNER'S DESIGNEE WILL AUTHORIZE REMEDIAL WORK, IF ANY, IN WRITING. DO SUCH REMEDIAL WORK AS AN ADDITION TO THE CONTRACT.
2. REMOVE ALL EXPOSED PNEUMATIC CONTROL TUBING IN ITS ENTIRETY. TUBING CONCEALED WITHIN BUILDING CONSTRUCTION TO BE ABANDONED IN PLACE. UPON COMPLETION OF REMOVAL, PATCH ALL TUBING ANCHOR HOLES AND WALL/FLOOR/CEILING OPENINGS MADE REDUNDANT BY REMOVAL. PATCH CONSTRUCTION TO MATCH EXISTING WHERE POSSIBLE TO MATCH SURROUND CONSTRUCTION.
3. ISOLATE AND DRAIN HOT WATER FROM EXISTING HYDRONIC HEATING LOOP TO FACILITATE DEMOLITION AND RENOVATION. DISCONNECT PIPING FROM BASEBOARD CONVENTORS, CABINET UNIT HEATERS, HEATING COILS, AND REMOVE PIPING TO EXTENTS INDICATED ON DESIGN DRAWINGS COMPLETE WITH ALL HANGERS/SUPPORTS, PNEUMATIC BALANCING VALVES, MANUAL BALANCING VALVES AND ISOLATION VALVES TO EXTENTS INDICATED ON DESIGN DRAWINGS. REMOVE EXISTING HYDRONIC CONVECTOR FINNED TUBING TO EXTENTS INDICATED ON DESIGN DRAWINGS AND RETAIN CONVECTOR FOR RE-USE. PROVIDE SPOOL PIECE WHERE INDICATED ON DRAWINGS. CAP EXISTING HYDRONIC PIPING AS INDICATED ON DESIGN DRAWINGS. RETAIN FLOOR OPENINGS WHERE INDICATED ON DESIGN DRAWINGS.
4. DRAIN EXISTING STEAM AND CONDENSATE HEATING LOOP IN ITS ENTIRETY TO FACILITATE DEMOLITION AND RENOVATION. SEAL FLOOR OPENING TO MAINTAIN FIRE SEPARATION.
5. REMOVE EXISTING HYDRONIC CONTROL VALVES COMPLETE WITH CONTROL WIRING AS INDICATED ON DESIGN DRAWINGS AND PROVIDE SPOOL PIECE TO SUIT AS INDICATED ON DESIGN DRAWING.
6. REMOVE EXISTING HYDRONIC THERMOSTATIC VALVES COMPLETE WITH CV SETTER IN THEIR ENTIRETY AND PROVIDE SPOOL PIECES TO SUIT AS INDICATED ON DESIGN DRAWINGS.
7. REMOVE EXISTING ON/OFF CONTROL VALVES COMPLETE WITH CONTROL WIRING IN THEIR ENTIRETY.
8. REMOVE PORTION OF SECOND FLOOR WORKROOM – 2030 MILLWORK TO FACILITATE HYDRONIC REZONING AND RENOVATIONS. PATCH ANY WALL OPENINGS AND REPAIR MILLWORK TO MATCHING EXISTING CONSTRUCTION.
9. REMOVE EXISTING PORTION OF BENCH AS REQUIRED TO FACILITATE NEW HYDRONIC PIPING CHASE. FOR CHASE CONSTRUCTION, REFER TO ARCHITECTURAL DRAWINGS.
10. REMOVE EXISTING HYDRONIC PNEUMATIC CONTROL VALVES COMPLETE WITH PNEUMATIC TUBING AS INDICATED ON DESIGN DRAWINGS. REMOVE EXISTING MANUAL BALANCING VALVES AS INDICATED ON DESIGN DRAWINGS. PROVIDE SPOOL PIECE AND PIPING COMPONENTS AS REQUIRED.
11. REMOVE EXISTING HYDRONIC LIFT PUMPS COMPLETE WITH VALVING, HANGERS AND SUPPORTS IN THEIR ENTIRETY. REMOVE EXISTING HYDRONIC PIPING TO EXTENTS INDICATED ON DESIGN DRAWINGS. REMOVE EXISTING LIFT PUMPS CONTROL WIRING IN THEIR ENTIRETY. CUT HANGER RODS FLUSH WITH CRAWLSPACE DECKING. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.
12. REMOVE EXISTING HYDRONIC HEATING COILS COMPLETE WITH HANGERS, CIRCUIT BALANCING VALVES AND THREE-WAY CONTROL VALVES IN THEIR ENTIRETY. REMOVE EXISTING CONTROL WIRING IN THEIR ENTIRETY. REMOVE EXISTING HYDRONIC PIPING TO EXTENTS INDICATED ON DESIGN DRAWINGS. CUT HANGER RODS FLUSH WITH DECKING.
13. REMOVE EXISTING HYDRONIC HEATING CONVECTORS COMPLETE WITH PNEUMATIC ACTUATORS FINNED TUBING AND CABINET CASING AS INDICATED ON DESIGN DRAWINGS. REMOVE EXISTING HYDRONIC PIPING COMPLETE WITH ASSOCIATED VALVING TO EXTENTS INDICATED ON DESIGN DRAWINGS. PROVIDE SPOOL PIECE WHERE INDICATED ON DESIGN DRAWINGS. RETAIN HYDRONIC HEATING COILS AND CONVECTOR CABINETS WHERE INDICATED ON DESIGN DRAWINGS. TOUCH UP WALL PAINT TO MATCH EXISTING CONDITIONS WHERE APPLICABLE. CUT HANGER RODS FLUSH WITH DECKING.
14. DISCONNECT AND REMOVE EXISTING VESTIBULE SURFACE MOUNTED CABINET FORCE FLOW HEATER IN ITS ENTIRETY. REMOVE EXISTING HYDRONIC PIPING COMPLETE WITH CONTROL VALVE, CONTROL WIRING AND ASSOCIATED VALVING TO EXTENTS INDICATED ON DESIGN DRAWINGS.
15. DISCONNECT AND REMOVE EXISTING VESTIBULE SURFACE MOUNTED CABINET FORCE FLOW HEATER IN ITS ENTIRETY. REMOVE EXISTING HYDRONIC PIPING COMPLETE WITH PNEUMATIC CONTROL VALVE, PNEUMATIC TUBING AND ASSOCIATED VALVING TO EXTENTS INDICATED ON DESIGN DRAWINGS. RETAIN CABINET FORCE FLOW HOUSEKEEPING PAD FOR RE-USE.
16. DISCONNECT AND REMOVE EXISTING VESTIBULE RECESSED CABINET FORCE FLOW HEATER IN ITS ENTIRETY. REMOVE EXISTING HYDRONIC PIPING COMPLETE WITH PNEUMATIC CONTROL VALVE, PNEUMATIC TUBING AND ASSOCIATED VALVING TO EXTENTS INDICATED ON DESIGN DRAWINGS. RETAIN WALL OPENING FOR RE-USE.
17. REMOVE EXISTING BY-PASS BOXES COMPLETE WITH HANGERS, CONTROL WIRING AND DUCTWORK IN ITS ENTIRETY. CUT HANGER RODS FLUSH WITH DECKING.
18. REMOVE EXISTING TERMINAL UNIT CONTROLLERS COMPLETE WITH CONTROL WIRING IN ITS ENTIRETY AND RETAIN TERMINAL UNITS AS INDICATED ON DESIGN DRAWINGS.
19. REMOVE EXISTING ROOFTOP MOUNTED AIR HANDLING UNITS COMPLETE WITH ROOF CURBS, DUCTWORK, DUCT MOUNTED SENSORS, CONTROL WIRING AND POWER FEEDS IN THEIR ENTIRETY. COORDINATE REMOVAL OF ROOF CURBS WITH CORRESPONDING ROOFING UPGRADE OCCURRING OUTSIDE OF CONTRACTOR. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.
20. REMOVE EXISTING WALL MOUNTED THERMOSTATS COMPLETE WITH PNEUMATIC TUBING IN ITS ENTIRETY. FOR WALL PATCHING REQUIREMENTS, REFER TO ARCHITECTURAL DRAWINGS.
21. REMOVE EXISTING WALL MOUNTED DDC THERMOSTATS AND RETAIN CONTROL WIRING AS INDICATED ON DESIGN DRAWINGS. REMOVE ABANDONED WALL MOUNTED THERMOSTAT COMPLETE WITH PNEUMATIC TUBING IN ITS ENTIRETY.
22. REMOVE EXISTING CRAWLSPACE AIR HANDLING UNIT COMPLETE WITH DUCTWORK, DUCT MOUNTED SENSORS, SUPPORTS, CONTROL WIRING AND POWER FEED IN ITS ENTIRETY. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.
23. REMOVE EXISTING CRAWLSPACE RETURN FAN COMPLETE WITH DUCTWORK, PNEUMATIC ACTUATORS, PNEUMATIC TUBING, CONTROLS, SUPPORTS, HANGERS AND POWER FEEDS IN ITS ENTIRETY. CUT HANGER RODS FLUSH WITH DECKING. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.
24. REMOVE EXISTING CRAWLSPACE EXHAUST FAN COMPLETE WITH CONTROL WIRING AND TIMECLOCK IN ITS ENTIRETY. RETAIN EXISTING EXHAUST DUCTWORK AND WALL OPENING FOR RE-USE. FOR POWER REQUIREMENTS, REFER TO ARCHITECTURAL DRAWINGS.
25. REMOVE EXISTING SUSPENDED RETURN FANS COMPLETE WITH CONTROLS, HANGERS AND SUPPORTS AND ROOFTOP EXHAUST HOODS IN THEIR ENTIRETY. REMOVE EXHAUST AIR DUCTWORK TO EXTENTS INDICATED ON DESIGN DRAWINGS. COORDINATE REMOVAL OF ROOF CURB WITH CORRESPONDING ROOFING UPGRADE OCCURRING OUTSIDE OF CONTRACT. FOR WALL AND FLOOR PATCHING REQUIREMENTS, REFER TO ARCHITECTURAL DRAWINGS. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.
26. REMOVE ROOF MOUNTED CONDENSING UNIT COMPLETE WITH PATIO STONE BASES, REFRIGERANT PIPING, PIPING ENCLOSURE, CONTROL WIRING AND POWER FEED IN ITS ENTIRETY. EVACUATE REFRIGERANT PRIOR TO DEMOLITION AND DISPOSAL AS PER APPLICABLE CODES AND STANDARDS. FOR EXTERIOR WALL PATCHING REQUIREMENTS, REFER TO ARCHITECTURAL DRAWINGS. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.
27. REMOVE EXISTING CEILING AND WALL MOUNTED AIR CONDITIONING UNITS COMPLETE CEILING MOUNTS, REFRIGERANT PIPING, REFRIGERANT ENCLOSURES, CONTROL WIRING AND TEMPERATURE CONTROLLERS IN THEIR ENTIRETY. FOR WALL AND CEILING PATCHING REQUIREMENTS, REFER TO ARCHITECTURAL DRAWINGS. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.
28. REMOVE EXISTING 'PLAN A' DUCTWORK COMPLETE WITH FIRE DAMPERS, BALANCING DAMPERS, HANGERS, SUPPORTS, TEMPERATURE SENSORS, PNEUMATIC ACTUATORS, PNEUMATIC TUBING DIFFUSERS AND GRILLES TO EXTENTS INDICATED ON DESIGN DRAWINGS. ABANDON SUPPLY AND RETURN FLOOR GRILLES IN PLACE AND CAP AIRTIGHT AS INDICATED ON DESIGN DRAWINGS. RETAIN EXISTING FRESH AIR LOUVER AND WALL OPENING FOR RE-USE. CUT HANGER RODS FLUSH WITH DECKING.
29. REMOVE EXISTING SUPPLY AND RETURN AIR DUCTWORK COMPLETE WITH HUMIDISTATS, FIRE DAMPERS, BALANCING DAMPERS, HANGERS, SUPPORTS, DIFFUSERS AND GRILLES TO EXTENTS INDICATED ON DESIGN DRAWINGS. CUT HANGER RODS FLUSH WITH DECKING. CORE WALL OPENING TO FACILITATE DUCTWORK RENOVATION REQUIREMENTS TO CONNECT TO EXISTING ABANDONED DUCTWORK. PAINT AND PATCH WALL OPENINGS AS INDICATED ON DESIGN DRAWINGS TO MATCH EXISTING CONSTRUCTION.
30. REMOVE EXISTING DUCTWORK LOCATED IN EXISTING 'PLAN A' DUCT CHASES IN THEIR ENTIRETY. REMOVE EXISTING DUCT CHASE ACCESS DOOR AS INDICATED ON DESIGN DRAWINGS. PATCH AND PAINT WALL OPENING TO MATCH EXISTING CONSTRUCTION. PROVIDE SHEET METAL DUCT CAPS AND SEAL AIRTIGHT.

SCOPE OF WORK - GENERAL

31. REMOVE EXISTING ACOUSTICALLY LINED RETURN AIR TRANSFER DUCTS AS INDICATED ON DESIGN DRAWINGS. RETAIN ACOUSTICALLY LINED RETURN AIR TRANSFER DUCTS COMPLETE WITH ASSOCIATED COMPONENTS AS INDICATED ON DESIGN DRAWINGS. FOR WALL PATCHING REQUIREMENTS, REFER TO ARCHITECTURAL DRAWINGS.
32. REMOVE EXISTING ACOUSTICALLY LINED GYM RETURN TRANSFER DUCT COMPLETE WITH GRILLES AND HANGERS IN THEIR ENTIRETY. PATCH GYM WALL OPENING TO MATCH EXISTING CONSTRUCTION.
33. REMOVE EXISTING CEILING RETURN GRILLES AS INDICATED ON DESIGN DRAWINGS.
34. REMOVE EXISTING ACCESS DOORS AND ACCESS PANELS IN THEIR ENTIRETY AND RETAIN CEILING OPENINGS AS INDICATED ON DESIGN DRAWINGS.
35. REMOVE EXISTING KILN EXHAUST AIR DUCTWORK COMPLETE WITH EXHAUST FAN, CONTROL WIRING AND POWER FEED IN ITS ENTIRETY. PATCH EXISTING WALL OPENING TO MAINTAIN FIRE SEPARATIONS. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.
36. REMOVE EXISTING DDC CONTROL PANELS COMPLETE WITH ASSOCIATED COMPONENTS AND CONTROL WIRING IN ITS ENTIRETY. TOUCH UP AND PAINT WALLS TO MATCH EXISTING CONSTRUCTION.
37. ALL DEMOLISHED ITEMS SHALL BECOME PROPERTY OF THE CONTRACTOR AND BE REMOVED FROM SITE UNLESS NOTED OTHERWISE.
38. PROVIDE NEW GLYCOL HEATING SUPPLY AND RETURN PIPING COMPLETE WITH CONTROL BALANCING VALVES AND ASSOCIATED VALVING AND COMPONENTS AS INDICATED ON DESIGN DRAWINGS. CONNECT GLYCOL HYDRONIC PIPING TO NEW CONVECTORS, CABINET UNIT HEATERS AND COILS AS INDICATED ON DESIGN DRAWINGS. PROVIDE NEW OPENING IN EXISTING FLOORS AND CEILINGS AS REQUIRED TO FACILITATE NEW PIPING INSTALLATION. PATCHWORK CONSTRUCTION TO MATCH EXISTING CONDITIONS. PATCH NEW FLOOR OPENING TO MAINTAIN EXISTING FIRE SEPARATION. PAINT PATCHWORK TO MATCH SURROUNDING AREA WHERE APPLICABLE.
39. PROVIDE NEW HYDRONIC CONTROL BALANCING VALVES COMPLETE WITH CONTROL WIRING AND CONNECT TO EXISTING HYDRONIC BASEBOARD CONVECTORS PIPING AS INDICATED ON DESIGN DRAWINGS. CONNECT NEW CONTROL WIRING TO NEW DDC THERMOSTATS AND DDC SYSTEM.
40. PROVIDE NEW HYDRONIC BASEBOARD CONVECTORS COMPLETE WITH FINNED TUBING, ENCLOSURES CONTROL BALANCING VALVES AND ASSOCIATED VALVING. PROVIDE NEW CONTROL BALANCING VALVE CONTROL WIRING AND CONNECT TO NEW TERMINAL UNITS AND THERMOSTATS AS INDICATED ON DESIGN DRAWINGS.
41. PROVIDE NEW HUB DRAIN AND CONNECT TO EXISTING SINK P-TRAP AS INDICATED ON DESIGN DRAWINGS.
42. PROVIDE NEW FLOOR MOUNTED, RECESSED AND SURFACE MOUNTED CABINET UNIT HEATER COMPLETE WITH CONTROL BALANCING VALVES AND ASSOCIATED PIPING AND CONNECT TO NEW HYDRONIC PIPING AS INDICATED ON DESIGN DRAWINGS. ROUTE NEW HYDRONIC PIPING THROUGH EXISTING FLOOR OPENINGS WHERE APPLICABLE. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.
43. PROVIDE NEW SUPPLY, RETURN AND EXHAUST AIR DUCTWORK COMPLETE WITH FIRE DAMPERS, BALANCING DAMPERS, DIFFUSERS AND GRILLES. TRANSITION NEW ROOFTOP AIR HANDLING UNITS SUPPLY AND RETURN AIR DUCTWORK WITHIN NEW ROOFTOP AIR HANDLING UNIT ROOF CURBS AS INDICATED ON DESIGN DRAWINGS. CONNECT NEW DUCTWORK TO EXISTING DUCTWORK AS INDICATED ON DESIGN DRAWINGS.
44. PROVIDE NEW ROOFTOP UNIT AIR HANDLING UNITS COMPLETE WITH PRE-FABRICATED ROOF CURB, HYDRONIC HEATING COILS, PACKAGED DX COOLING COILS, CONTROL WIRING AND POWER FEEDS. INSTALL NEW ROOF CURBS LEVEL AS PER MANUFACTURER'S RECOMMENDATIONS. PROVIDE FORMED ANGLE ROOF CURB SUPPORTS AS REQUIRED AND FASTEN TO ROOF CURB TO ALLOW FOR LEVEL CURB INSTALLATION ON SLOPED ROOF DECKING. ANGLE SUPPORT SHALL BE FABRICATED FROM GALVANIZED STEEL SAME GAUGE AS ROOF CURB. PROVIDE NEW HYDRONIC HEATING COILS COMPLETE WITH CONTROL BALANCING VALVE AND CONNECT TO ROOFTOP AIR HANDLING UNITS HEAT COILS. CORE OPENING IN BOTTOM OF NEW AIR HANDLING UNITS TO FACILITATE INSTALLATION OF NEW HYDRONIC PIPING. CONNECT NEW CONTROL BALANCING VALVE TO NEW DDC SYSTEM. PROVIDE NEW SUPPLY AND RETURN DUCTWORK AND CONNECT TO NEW TERMINAL UNITS AND FAN POWERED TERMINAL UNITS AS INDICATED ON DESIGN DRAWINGS. TRANSITION NEW SUPPLY AND RETURN AIR DUCTWORK NEW PREFABRICATED ROOF CURB. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.
45. PROVIDE NEW FAN POWERED TERMINAL UNITS COMPLETE WITH HANGERS, HYDRONIC HEATING COILS, SOUND ATTENUATORS AND INLET FILTERS. PROVIDE NEW HYDRONIC PIPING COMPLETE WITH CONTROL BALANCING VALVES, CONTROL WIRING AND ASSOCIATED VALVING AND CONNECT TO NEW FAN POWERED TERMINAL UNITS, THERMOSTATS AND DDC SYSTEM. PROVIDE NEW SUPPLY AIR DUCTWORK COMPLETE WITH BALANCING DAMPERS AND DIFFUSERS AND CONNECT TO NEW FAN POWERED TERMINAL UNIT AS INDICATED ON DESIGN DRAWINGS. FOR POWER REQUIREMENTS, REFER TO ARCHITECTURAL DRAWINGS.
46. PROVIDE NEW TERMINAL UNITS COMPLETE WITH SUPPLY AIR DUCTWORK, HANGERS, SUPPORTS AND CONTROL WIRING. CONNECT NEW TERMINAL UNITS TO DDC THERMOSTATS, CONTROL BALANCING VALVES AND DDC SYSTEM. PROVIDE NEW SUPPLY AIR DUCTWORK COMPLETE WITH BALANCING DAMPERS AND DIFFUSERS AND CONNECT TO NEW TERMINAL UNITS AS INDICATED ON DESIGN DRAWINGS. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.
47. PROVIDE NEW CEILING CASSETTE EVAPORATORS COMPLETE WITH CEILING SUSPENDING HARDWARE, BACNET MODULE, LIQUID/GAS PIPING, DRAIN PIPING, CONTROL WIRING AND POWER FEEDS. ROUTE NEW LIQUID/GAS PIPING WITHIN NEW PIPING ENCLOSURE AND CONNECT TO NEW CONDENSING UNIT LOCATED ON ROOF. ROUTE NEW DRAIN PIPING TO NEW HUB DRAIN CONNECTED TO EXISTING SINK P-TRAP AS INDICATED ON DESIGN DRAWINGS. CORE OPENINGS IN EXISTING MILLWORK TO FACILITATE INSTALLATION OF DRAIN PIPING. PROVIDE NEW FRESH AIR DUCTWORK COMPLETE WITH BALANCING DAMPERS AND CONNECT TO CEILING CASSETTE EVAPORATORS FRESH AIR INLETS. CONNECT NEW CONTROL WIRING TO DDC THERMOSTAT. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.
48. PROVIDE NEW CONDENSING UNIT COMPLETE WITH LIQUID/GAS PIPING, PITCH POCKET, PIPE SLEEVE, SNOW SCREEN, CONTROL WIRING AND POWER FEED. PROVIDE NEW LIQUID/GAS PIPING COMPLETE WITH PIPE ENCLOSURE AND ROUTE TO NEW CEILING CASSETTES AS INDICATED ON DESIGN DRAWINGS. COORDINATE INSTALLATION OF NEW CONDENSING UNIT SLEEPER PAD WITH CORRESPONDING ROOFING UPGRADE OUTSIDE OF CONTRACT.
49. PROVIDE NEW DDC THERMOSTATS COMPLETE WITH CONTROL WIRING AS INDICATED ON DESIGN DRAWINGS. CONNECT CONTROL WIRING TO NEW HVAC, HYDRONIC AND DDC SYSTEMS AS INDICATED ON DESIGN DRAWINGS.
50. PROVIDE NEW DDC TEMPERATURE SENSORS COMPLETE WITH CONTROL WIRING AND CONNECT TO NEW TERMINAL UNITS AS INDICATED ON DESIGN DRAWINGS.
51. PROVIDE NEW FIRE RATED ACCESS DOORS TO FACILITATE THE INSTALLATION OF NEW DUCTWORK AND TO FACILITATE ACCESS TO NEW BALANCING DAMPERS. PROVIDE ULC LISTED INTUMESCENT FIRE STOP TO MAINTAIN FIRE SEPARATION. FOR CEILING PATCHING REQUIREMENTS, REFER TO ARCHITECTURAL DRAWINGS.
52. PROVIDE NEW JOHNSON CONTROLS FACILITY EXPLORER (FX) DIRECT DIGITAL CONTROL (DDC) SYSTEM COMPLETE WITH JOHNSON CONTROLS FX80 SUPERVISOR CONTROLLER, SUB CONTROLLERS, FIELD DEVICES, COLOUR GRAPHICAL OPERATING SOFTWARE AND UPS. FX80 CONTROL POINTS TO BE IMPORTED TO LAKEHEAD UNIVERSITY'S METASYS SERVER VIA THE EXISTING METASYS NETWORK AUTOMATION ENGINE (NAE) LOCATED IN MECHANICAL ROOM – 2024. PROGRAM THE DDC SYSTEM GRAPHICAL OPERATING SOFTWARE TO INCORPORATE ALL NEW/EXISTING HVAC AND BUILDING SYSTEMS EQUIPMENT. DDC GRAPHICS SHALL INCLUDE FLOOR PLANS OF THE BUILDING INDICATING ZONE TEMPERATURES AND HVAC SYSTEM EQUIPMENT. GRAPHICAL SYMBOLS SHALL LINK THE OPERATOR TO THE GRAPHICAL DATA DISPLAY FOR THE SPECIFIC COMPONENT. PROGRAM SOFTWARE TO PERMIT MONITORING AND EDITING OF ALL SYSTEM VARIABLES, SCHEDULING AND ALARMS IN REAL TIME VALUES. ALL EQUIPMENT ON/OFF FUNCTIONS AND SETPOINTS SHALL BE ADJUSTABLE VIA THE GRAPHICAL OPERATING SOFTWARE DISPLAY FOR THE SPECIFIC COMPONENT. LABEL ALL NEW CONTROL SYSTEM COMPONENTS.
53. BALANCE NEW AIR FLOWS TO THE QUANTITIES INDICATED ON THE DRAWINGS. BALANCING TO BE COMPLETED BY TAB CONTRACTOR INDEPENDENT OF CONTRACTORS PERFORMING CONSTRUCTION WORK. TAB CONTRACTOR SHALL SUBMIT AIR BALANCE REPORT TO THE DESIGN ENGINEER FOR REVIEW IN TWO FORMATS: BOUND HARD COPY AND ELECTRONIC FORMAT (PDF) ON CD. SUBMIT AIR BALANCE REPORT FOR REVIEW BY THE DESIGN ENGINEER.
54. DURING CONSTRUCTION KEEP AN ACCURATE RECORD OF ALL DEVIATIONS BETWEEN THE WORK SHOWN ON THE DESIGN DRAWINGS AND THAT WHICH IS INSTALLED. PROVIDE AS-BUILT DRAWINGS TO REFLECT THE ACTUAL INSTALLED CONFIGURATION AND SUBMIT TO THE DESIGN ENGINEER.
55. PROVIDE OPERATION AND MAINTENANCE MANUALS FOR ALL EQUIPMENT. O&M MANUALS SHALL BE SUBMITTED IN TWO FORMATS; BOUND HARD COPY AND ELECTRONIC FORMAT ON PDF. SUBMIT OPERATION AND MAINTENANCE MANUALS TO THE DESIGN ENGINEER.
56. PROVIDE SYSTEM DEMONSTRATION AND END USER TRAINING SESSION FOR ALL EQUIPMENT.

SCOPE OF WORK - PLAN 'D' ROOFTOP AIR HANDLING UNITS

1. ISOLATE AND DRAIN HOT WATER FROM EXISTING HYDRONIC HEATING LOOP TO FACILITATE DEMOLITION AND RENOVATION.
2. REMOVE EXISTING SINK VENT PIPING TO EXTENTS INDICATED ON DESIGN DRAWINGS.
3. REMOVE EXISTING WALL MOUNTED HUMIDIFIERS COMPLETE WITH CONTROL WIRING, WALL BRACKETS, AND POWER FEED IN ITS ENTIRETY. DISCONNECT HUMIDIFIERS WATER FEEDS AND CAP. REMOVE EXISTING DRAIN PIPING TO WALL AND CAP. REMOVE EXISTING STEAM WAND PIPING COMPLETE WITH STEAM WANDS IN THEIR ENTIRETY. PATCH WALL OPENING TO MATCH EXISTING CONSTRUCTION AND TO MAINTAIN FIRE SEPARATION.
4. REMOVE EXISTING ROOFTOP AIR HANDLING UNITS COMPLETE WITH ROOF CURBS IN ITS ENTIRETY. REMOVE EXISTING DUCTWORK COMPLETE WITH BYPASS DAMPERS TO EXTENTS INDICATED ON DESIGN DRAWINGS. RETAIN EXISTING SUPPLY AIR DUCT STATIC PRESSURE SENSORS COMPLETE WITH CONTROL WIRING FOR RE-USE. COORDINATE REMOVAL OF ROOF CURBS WITH CORRESPONDING ROOFING UPGRADE OCCURRING OUTSIDE OF CONTRACT. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.
5. REMOVE EXISTING SUPPLY AND RETURN AIR DUCTWORK COMPLETE WITH HIGH LIMIT HUMIDISTATS, HUMIDISTATS, HANGERS, SUPPORTS, STEAM WANDS AND DIFFUSERS TO EXTENTS INDICATED ON DESIGN DRAWINGS. PATCH DUCTWORK AS INDICATED ON DESIGN DRAWINGS. CUT HANGER RODS FLUSH WITH DECKING.
6. REMOVE EXISTING SUPPLY DUCTWORK COMPLETE WITH BALANCING DAMPERS AND DIFFUSERS AS INDICATED ON DESIGN DRAWINGS AND RETAIN FOR RE-USE.
7. REMOVE EXISTING RETURN AIR GRILLE AND RETAIN FOR RE-USE.
8. ALL DEMOLISHED ITEMS SHALL BECOME PROPERTY OF THE CONTRACTOR AND BE REMOVED FROM SITE UNLESS NOTED OTHERWISE.
9. PROVIDE NEW HYDRONIC SUPPLY AND RETURN PIPING COMPLETE WITH HANGERS, SUPPORTS, CONTROL BALANCING VALVES AND ASSOCIATED VALVING AND CONNECT TO NEW ROOFTOP UNITS AS INDICATED ON DESIGN DRAWINGS. CORE OPENINGS IN BASE OF AIR HANDLING UNITS TO FACILITATE THE INSTALLATION OF NEW PIPING. ROUTE WITHIN EXISTING JOIST SPACE. CONNECT NEW HYDRONIC PIPING TO EXISTING PIPING LOCATED IN MAIN FLOOR CEILING SPACE. CORE OPENINGS IN EXISTING FLOOR TO FACILITATE INSTALLATION OF PIPING. SEAL FLOOR OPENINGS TO MAINTAIN FIRE SEPARATION. COORDINATE INSTALLATION OF NEW PIPING WITH EXISTING CUSTODIAL MOP SINK.
10. PROVIDE NEW VENT PIPING AND ROUTE THROUGH ROOF COMPLETE WITH VENT TERMINATION. COORDINATE NEW PLUMBING VENT INSTALLATION WITH CORRESPONDING ROOFING UPGRADE OCCURRING OUTSIDE OF CONTRACT.
11. PROVIDE NEW ROOFTOP UNITS COMPLETE WITH PREFABRICATED INSULATED ROOF CURB. INSTALL NEW ROOF CURBS LEVEL AS PER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS. FRAME NEW SUPPLY AND RETURN OPENINGS AS INDICATED ON DESIGN DRAWINGS. PROVIDE FORMED ANGLE ROOF CURB SUPPORTS AS REQUIRED AND FASTEN TO ROOF CURBS TO ALLOW FOR LEVEL CURB INSTALLATION ON SLOPED ROOF DECKING. ANGLE SUPPORT SHALL BE FABRICATED FROM GALVANIZED STEEL SAME GAUGE AS ROOF CURBS. COORDINATE INSTALLATION OF NEW ROOF CURBS WITH CORRESPONDING ROOFING UPGRADE OCCURRING OUTSIDE OF CONTRACT. PROVIDE TEMPORARY ROOF TIE-IN AND SEAL WEATHERTIGHT DURING COORDINATION. PROVIDE NEW SUPPLY AND RETURN DUCTWORK COMPLETE WITH FIRE DAMPERS, TEMPERATURE SENSORS, CARBON DIOXIDE DETECTORS, SMOKE DETECTORS, TURNING VEINS AND CONNECT TO EXISTING DUCTWORK AS INDICATED ON DESIGN DRAWINGS. TRANSITION NEW DUCTWORK WITHIN ROOFTOP AIR HANDING UNITS ROOF CURBS. PROVIDE 2" DUCT RADIUS' AS INDICATED ON DESIGN DRAWINGS. FOR POWER REQUIREMENTS, REFER TO ELECTRICAL DRAWINGS.
12. INSTALL RETAINED SUPPLY AIR DUCTWORK COMPLETE WITH BALANCING DAMPERS AND DIFFUSERS AS INDICATED ON DESIGN DRAWINGS. CAP EXISTING SUPPLY AIR TAKEOFF AIRTIGHT AS INDICATED ON DESIGN DRAWINGS. PROVIDE NEW SUPPLY AIR DUCT TAKEOFF COMPLETE WITH BALANCING DAMPER AND CONNECT TO RETAINED DIFFUSER. PROVIDE ADDITIONAL SUPPLY AIR DUCTWORK AS REQUIRED TO FACILITATE INSTALLATION.
13. PROVIDE NEW SUPPLY AIR DUCTWORK AND CONNECT TO EXISTING DUCTWORK AS INDICATED ON DESIGN DRAWINGS.
14. BALANCE NEW ROOFTOP AIR HANDLING UNITS AND NEW/EXISTING TERMINAL UNITS TO THE AIRFLOW QUANTITIES INDICATED ON DRAWING M27. BALANCING TO BE COMPLETED BY TAB CONTRACTOR INDEPENDENT OF CONTRACTORS PERFORMING CONSTRUCTION WORK.
15. DURING CONSTRUCTION KEEP AN ACCURATE RECORD OF ALL DEVIATIONS BETWEEN THE WORK SHOWN ON THE DESIGN DRAWINGS AND THAT WHICH IS INSTALLED. PROVIDE AS-BUILT DRAWINGS TO REFLECT THE ACTUAL INSTALLED CONFIGURATION AND SUBMIT TO THE DESIGN ENGINEER.
16. PROVIDE OPERATION AND MAINTENANCE MANUALS FOR ALL EQUIPMENT. O&M MANUALS SHALL BE SUBMITTED IN TWO FORMATS; BOUND HARD COPY AND ELECTRONIC FORMAT ON PDF. SUBMIT OPERATION AND MAINTENANCE MANUALS TO THE DESIGN ENGINEER.
17. PROVIDE SYSTEM DEMONSTRATION AND END USER TRAINING SESSION FOR ALL EQUIPMENT.

EQUIPMENT LIST

B-1 & B-2 BOILERS	HARSCO INDUSTRIAL PATTERSON-KELLEY MODEL SC1000 NG P-K SONIC NATURAL GAS FIRED FULLY MODULATING CONDENSING BOILER SUPPLIED COMPLETE WITH 16 GAUGE CARBON STEEL SINGLE WALL OUTER CASING WITH BLUE POWDER COAT FINISH, BURNER FLAME OBSERVATION PORT, 304L STAINLESS STEEL HEAT EXCHANGER, 3"ø GHS/GHR GROOVED CONNECTIONS, INTEGRAL POWER TYPE FUEL BURNER WITH 7:1 TURNDOWN, INTEGRAL MAIN GAS VALVE, GAS MANUAL SHUT-OFF VALVE, ON/OFF ROCKER SWITCH, NURO TOUCH SCREEN CONTROL SYSTEM, PROBE TYPE LOW WATER CUTOUT WITH MANUAL RESET, HIGH/LOW GAS PRESSURE SWITCHES, HIGH BACK PRESSURE SENSOR, HIGH TEMPERATURE LIMIT WITH MANUAL RESET, AIR PROVING SWITCH, 50 PSIG PRESSURE RELIEF VALVE, MODEL 10-0490-6946 NORMALLY CLOSED MOTORIZED COMBUSTION AIR DAMPER, BOILER VENT MANUAL LOCKING DAMPER KIT, 120/1/60 POWER. CAPACITY: 1,000,000 BTUH INPUT 923,000 BTUH OUTPUT
P1A & P1B HEATING LOOP CIRC. PUMPS	ARMSTRONG MODEL 4380 0205-005.0 DESIGN ENVELOPE CLOSE COUPLED VERTICAL IN-LINE PUMP SUPPLIED COMPLETE WITH LPDESF CONSTRUCTION MATERIAL, DUCTILE IRON CASING, 316 STAINLESS STEEL IMPELLER, STAINLESS STEEL ASTM TYPE 416 PUMP SHAFT, EPDM CASING O-RING, BRAIDED STAINLESS STEEL FLUSH LINE, STAINLESS STEEL ASTM TYPE 416 STUB SHAFT, INSIDE SINGLE SPRING SEAL, STAINLESS STEEL SPRINGS, STAINLESS STEEL ROTATING HARDWARE, RESIN BONDED CARBON ROTATING FACE, SINTERED SILICON CARBIDE STATIONARY SEAT, EPDM SECONDARY SEAL, 5HP MOTOR, 2"ø INLET/OUTLET, YES-QUADRATIC PRESS CONTROL, BACNET MS/TP CARD, UL TYPE 12 ENCLOSURE, L5 CONTROL ORIENTATION, RS 485 COMMUNICATION PORT AND 208/3/60 POWER, CAPACITY: 200 USGPM AT 45 FT.
MAIN CIRC. P1a/P1b PUMP STANDS	VIBRO ACOUSTIC MODEL SIPS-2 SEISMIC INLINE PUMP STAND FABRICATED FROM HIGH STRENGTH LOW ALLOY STEEL, SUPPLIED COMPLETE WITH POWDER COATED ENAMEL FINISH, VIBRATION ISOLATION PADS AND BOLT HOLES TO MATCH ANSI 125 CAST IRON 2"ø FLANGES. PROVIDE TWO (2) STANDS PER CIRCULATION PUMP.
BCP-1, 2, & 3 BOILER CIRC. PUMPS	GRUNDFOS MODEL MAGNA3 65-150 F BOILER CIRCULATION PUMP SUPPLIED COMPLETE WITH CAST IRON PUMP HOUSING, PES IMPELLER, CARBON-FIBRE-REINFORCED COMPOSITE ROTOR CAN, STAINLESS STEEL BEARING PLATE, ROTOR CLADDING, ALUMINUM ALLOY STATOR HOUSING, DIN FLANGE STANDARD, DN 65 PIPE CONNECTIONS, DIFFERENTIAL-PRESSUER SENSOR, PROPORTIONAL-PRESSURE CONTROL, CONSTANT-PRESSURE CONTROL, CONSTANT-TEMPERATURE CONTROL, CONSTANT-CURVE DUTY, AUTOMATIC NIGHT SETBACK, INSULATING SHELLS, TEMPERATURE SENSOR, TFT CONTROL BOX DISPLAY, CONTROLLER INTEGRATED CONTROL BOX, WIRELESS GRUNDFOS GO REMOTE, DIELFBUS COMMUNICATION VIA CIM MODULES, BUILT-IN VARIABLE FREQUENCY DRIVE, DIGITAL INPUTS, RELAY OUTPUTS, INTEGRATED FREQUENCY CONVERTER, ANALOG INPUTS, 4-POLE SYNCHRONOUS, PERMANENT-MAGNET MOTOR, 208/1/60 POWER. CAPACITY: 98 USGPM AT 40 FT.
STRAINER BOILERS B-1, 2, & 3	APOLLO VALVES MODEL YB3LF PART NUMBER 59LF-010-01-(E1) LEAD FREE BRONZE Y-STRAINER SUPPLIED COMPLETE WITH LEAD FREE BRONZE BODY AND CAP, 304 STAINLESS STEEL OPTIONAL (E1) #20 MESH, PTFE O-RING AND GASKET, 3"ø FNPT CONNECTIONS.
ET-1 & ET-2 HEATING LOOP EXPANSION TANK	AMTROL EXTROL MODEL SX-90V DIAPHRAGM TYPE EXPANSION TANK SUPPLIED COMPLETE WITH STEEL SHELL WITH URETHANE TOPCOAT, HEAVY DUTY BUTYL/EPDM DIAPHRAGM, AIR VALVE, 12 PSI FACTORY PRECHARGE, 1 1/4"ø FNPT SYSTEM CONNECTION, 43.5 GALLON TANK VOLUME, 34 GALLON ACCEPTANCE VOLUME

EQUIPMENT LIST - CONT'D

GF-1 GLYCOL FEEDER	AXIOM MODEL SF-100 PACKAGE HYDRONIC SYSTEM FEEDER SUPPLIED COMPLETE WITH 55 LITER STORAGE/MIXING TANK WITH LID, PUMP SUCTION HOSE WITH INLET STRAINER, PRESSURE PUMP WITH THERMAL CUTOUT, INTEGRAL PRESSURE SWITCH, INTEGRAL CHECK VALVE, CORD AND PLUG, PRE-CHARGED ACCUMULATOR TANK WITH EPDM DIAPHRAGM, MANUAL DIVERTER VALVE FOR AIR PURGING AND AGITATING, 5-55.1 PSI ADJUSTABLE PRESSURE REGULATOR WITH GAUGE, BUILT-IN CHECK VALVE, UNION CONNECTION, 1/2"ø X 36" LONG FLEXIBLE CONNECTION HOSE WITH CHECK VALVE, LOW LEVEL PUMP CUT-OUT, MODEL RIA10-1-SAA ALARM PANEL WITH PUMP/ALARM RELAY, POWER ON AND ALARM INDICATING LIGHTS, ALARM BUZZER, TEST SWITCH, SILENCE/OFF SWITCH, FLOAT SWITCH, RECEPTACLE FOR SF-100, DRY CONTACTS FOR REMOTE MONITORING, 120/1/60 POWER. ESTIMATED SYSTEM VOLUME: 705 GAL (2670 LITRES)
PRESSURE GAUGE	FNW MECHANICAL CONTRACTOR'S PRESSURE GAUGE SUPPLIED COMPLETE WITH 4 1/2"ø WHITE ALUMINUM DIAL, BLACK AND RED DUAL PRESSURE SCALES, 304 STAINLESS STEEL CASE AND RING, ACRYLIC LENS, 1/4" BRASS MNPT CONNECTION, MINI-BALL TYPE ISOLATION VALVE, PHOSPHOR BRONZE BOURDON TUBE AND BRASS MOVEMENT. RANGE TO SUIT SERVICE.
THERMOMETER	WINTERS TIM SERIES INDUSTRIAL 9IT THERMOMETER SUPPLIED COMPLETE WITH 9" VALOX IMPACT RESISTANT CASE, ORGANIC LIQUID FILLED TUBE, GLASS LENS, 3 1/2" STEM AND 3/4" BRASS SEPARABLE THERMOWELL. DUAL SCALE, RANGE TO SUIT SERVICE.
STRAINER	VICTAULIC SERIES 730 TEE TYPE STRAINER SUPPLIED COMPLETE WITH DUCTILE IRON BODY AND CAP, 304 STAINLESS STEEL FRAME AND 1/2"x1/2" MESH, EPDM COUPLING GASKET AND ACCESS CAP WITH VICTAULIC COUPLING.
CHECK VALVE	VICTAULIC SERIES 716 SUPPLIED COMPLETE WITH DUCTILE IRON BODY, STAINLESS STEEL DISC, EPDM DISC SEAL AND COATING, 316 STAINLESS STEEL SHAFT, 416 STAINLESS STEEL SHAFT PLUG, 302/304 STAINLESS STEEL SPRING, GROOVED END CONNECTIONS.
BUTTERFLY VALVE	VICTAULIC SERIES 300 OR 700 SUPPLIED COMPLETE WITH CAST IRON BODY, DUCTILE IRON DISC WITH ELECTROLESS NICKEL COATING, EPDM SEAT, 416 STAINLESS STEEL STEM, EPDM STEM SEAL, 316 STAINLESS STEEL BEARINGS WITH TFE LINING, LOCKING LEVER HANDLE, ROLLED GROOVED END CONNECTIONS.
AIR PURGER	AMTROL MODEL 461 AIR SEPARATOR SUPPLIED COMPLETE WITH CAST IRON BODY, 1 1/2"ø NPT VENT TAPPING, 1 1/2"ø NPT DRAIN TAPPING AND 5"ø FLANGED INLET/OUTLET CONNECTIONS.
AIR VENT	SPIROTHERM SPIROTOP MODEL VTP050FT AUTOMATIC AIR RELEASE VALVE SUPPLIED COMPLETE WITH BRASS BODY AND VENT HEAD, NON-FERROUS FLOAT, VITON SEALS, 1/2" FPT INLET CONNECTION, 1/2" NPT OUTLET CONNECTION
DS-1 DIRT SEPARATOR	CALEFFI MODEL NA546512A;M DIRTMAG MAGNETIC DIRT SEPARATOR SUPPLIED COMPLETE WITH EPOXY RESIN PAINTED STEEL BODY, NON-ASBESTOS FIBER HYDRAULIC SEAL, BRASS DRAIN VALVE, STAINLESS STEEL AND HDPE INTERNAL ELEMENT, NEODYMIUM RARE-EARTH MAGNET, BRASS MAGNET PROBE DRYWELL, 3/4"ø TOP CONNECTION WITH BRASS CAP, 1"ø DRAIN VALVE AND 5"ø FLANGED INLET/OUTLET CONNECTIONS.
FILTER	GENERAL FILTRATION BY-PASS FILTRATION MODEL PF-2X4 SUPPLIED COMPLETE WITH CARBON STEEL CONSTRUCTION WITH BLUE EPOXY FINISH, CAST STEEL CAP WITH BLUE EPOXY FINISH, BUNA O-RING CAP SEAL, FOUR (4) 3/4" FNPT PORTS, 2 US GALLON CAPACITY.
CHEMICAL POT FEEDER	GENERAL FILTRATION MODEL GF010 FILTER CARTRIDGE HOUSING SUPPLIED COMPLETE WITH 304 STAINLESS STEEL BODY, CAST IRON HEAD, CARBON STEEL CENTER POST AND NUT, BUNA-N HEAD GASKET, PTFE CAP NUT GASKET, 3/4" FNPT INLET/OUTLET CONNECTIONS, 1/4" FNPT DRAIN CONNECTION. SUPPLY TWELVE (12) 20 MICRON FILTER CARTRIDGES TO SUIT HOUSING.
WH-1,2,3&4 GAS FIRED WATER HEATER	NAVIEN MODEL NPE-240A GAS FIRED TANKLESS CONDENSING WALL MOUNTED WATER HEATER SUPPLIED COMPLETE WITH STEEL CASE, DUAL STAINLESS STEEL HEAT EXCHANGERS, ECO PREMIXED BURNER, NEGATIVE PRESSURE GAS VALVE, CONDENSATE COLLECTOR, TEMPERATURE LOCKOUT, INTERNAL CIRCULATION PUMP AND BUFFER TANK, LEAD FREE PLUMB EASY VALVE SET, PRESSURE RELIEF VALVE, READY LINK COMMUNICATION CABLE, INTERNAL CIRCUIT BOARD, FLAME SENSOR SYSTEM, AIR PROVING SWITCH, IGNITION OPERATION DETECTOR, WATER TEMPERATURE HIGH LIMIT SWITCH, EXHAUST TEMPERATURE HIGH LIMIT SENSOR, POWER SURGE FUSE, OVERHEAT PREVENTION DEVICE, FREEZE PROTECTION MODE, FAN MOTOR ROTATION DETECTOR, 3/4" NPT COLD/HOT/RECIRCULATION AND GAS CONNECTION, 1/2" CONDENSATE DRAIN CONNECTION, 2"ø PVC INTAKE AND EXHAUST CONNECTIONS, 1.2 GALLON WATER HOLDING CAPACITY, FLOW RATE CAPACITY OF 5.1 GPM AT 77°F TEMPERATURE RISE WITH A RATED INPUT OF 199,900 BTUH, 120/1/60 POWER
EXP-3 DOMESTIC HOT WATER EXPANSION TANK	AMTROL THERM-X-TROL MODEL ST-5 DIAPHRAGM TYPE EXPANSION TANK SUPPLIED COMPLETE WITH DEEP DRAWN STEEL CONSTRUCTION, HEAVY BUTYL RUBBER DIAPHRAGM, POLYPROPYLENE LINER MATERIAL, 40 PSIG FACTORY PRECHARGE, POLYPROPYLENE LINER, 3/4"ø NPTM STAINLESS STEEL CONNECTION, 2 GALLON TANK VOLUME, 0.9 GALLON ACCEPTANCE VOLUME.
P2 DOMESTIC HOT WATER RECIRC. PUMP	ARMSTRONG ASTRO 2 SERIES 3-SPEED WET ROTOR CIRCULATOR MODEL ASTRO 230SS HIGH SPEED SETTING SUPPLIED COMPLETE WITH STAINLESS STEEL PUMP HOUSING, 1 1/4" FLANGED CONNECTIONS, NORYL IMPELLER, CERAMIC BEARINGS, CERAMIC SHAFT, EPDM GASKET, COMPANION FLANGE KIT, 115/1/60 POWER. CAPACITY: 8 GPM AT 11 FT.
MV-1 DOMESTIC HOT WATER MIXING VALVE	HEAT-TIMER CORPORATION MODEL 915672-BAC ETV PLATINUM PLUS ELECTRONIC TEMPERING VALVE SUPPLIED COMPLETE WITH STAINLESS STEEL 3-WAY MIXING VALVE WITH STAINLESS STEEL TRIM AND 1"ø CONNECTIONS, 24 VAC ACTUATOR, MICROPROCESSOR ELECTRONIC TEMPERING VALVE CONTROL MODULE WITH PID LOGIC, BUILT-IN 120/24V TRANSFORMER, DIGITAL DISPLAY, LED INDICATOR, 120/1/60 POWER, BACNET PROTOCOL, TEMPERED WATER THERMISTOR TYPE TEMPERATURE SENSOR/PROBE, OPTIONAL HOT AND COLD WATER TEMPERATURE SENSORS/PROBES.
L-1 COMBUSTION AIR LOUVER	E.H. PRICE MODEL DE439 30x26 EXTRUDED ALUMINUM FIXED LOUVER SUPPLIED COMPLETE WITH 4" DEEP EXTRUDED ALUMINUM FRAME, CONTINUOUS EXTRUDED ALUMINUM 39° DRAINABLE BLADES, CONCEALED MULLIONS, GALVANIZED STEEL BIRDSCREEN, ALUMINUM MILL FINISH, 'B' FLAT FLANGE MOUNTING STYLE.

No.	Revision	Date	Initial
0	ISSUED FOR CONSTRUCTION	04/27/18	RG
D	ISSUED FOR FINAL CLIENT REVIEW	04/25/18	RG
C	ISSUED FOR 99% CLIENT REVIEW	04/13/18	RG
B	ISSUED FOR 75% CLIENT REVIEW	03/29/18	RG
A	ISSUED FOR 66% CLIENT REVIEW	03/16/18	RG

Notes:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING DIMENSIONS AND EXISTING CONDITIONS AT THE OUTSET OF CONSTRUCTION. REPORT ANY DISCREPANCIES TO THE ENGINEER. DO NOT PROCEED WITHOUT FURTHER WRITTEN DIRECTION FROM THE ENGINEER.
2. DRAWING SHOWS GENERAL ARRANGEMENT ONLY. DO NOT SCALE.

Approved

Approved

R. A. GRAU
100181428
APR 27/18

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LAKEHEAD UNIVERSITY
THUNDER BAY ONTARIO

BORA LASKIN BUILDING
SCOPE OF WORK AND
EQUIPMENT LIST

Scale: NA
Drawn By: BT
Ckd. By: RG
Date: APRIL 2018
Dwg. No.: 18-038-M29
Rev. 0

EQUIPMENT LIST - CONT'D

RTU-1,2 ROOF TOP AIR HANDLING UNIT	GREENHECK MODEL RV-45-15 ROOFTOP AIR HANDLING UNIT SUPPLIED COMPLETE WITH EXTERIOR GALVANIZED STEEL HOUSING, INTERNALLY LINED DOUBLE WALLED GALVANIZED STEEL, 2" 2.4# R13 DENSITY FOAM INTERIOR INSULATION, PAINTED PERMATECTOR CONCRETE GRAY (RAL 7023), STAINLESS STEEL DRAIN PAN, MICROPROCESSOR CONTROLS, ECONOMIZER MODE, DIRECT-DRIVE BACKWARD INCLINED PLENUM BLOWERS WITH FACTORY MOUNTED VFD'S, BALL BEARING MOTORS, CORROSION RESISTANT FASTENERS, BACNET MSTP NETWORK PROTOCOL, DIRTY FILTER SENSOR, PHASE AND BROWN OUT PROTECTION, 120V NEMA 3R OUTLET, RAI EXPANSION BOARD, INTERNALLY MOUNTED CONTROL ENTER WITH MOTOR STARTERS, 24VAC CONTROL TRANSFORMERS, CONTROL CIRCUIT FUSING, UNIT DISCONNECT, PREMIUM EFFICIENCY SUPPLY, PREMIUM EFFICIENCY EXHAUST, ODP 208/3/60 POWER AND MODEL GKD-63.7/158.9-G24 PREFABRICATED ROOF CURB. CONSISTING OF THE FOLLOWING COMPONENTS: RETURN AIR INTAKE: BOTTOM INTAKE, MOTORIZED INSULATED LOW LEAKAGE RETURN AIR DAMPERS AND RETURN AIR DAMPER CONTROLS. OUTDOOR AIR INTAKE: END INTAKE, OUTDOOR DOWNTURNED WEATHERHOOD, MOTORIZED INSULATED OUTSIDE AIR DAMPERS, OUTSIDE AIR DAMPER CONTROLS. SUPPLY BOX: BOTTOM DISCHARGE, SUPPLY FAN VFD CONTROL, 22" PLENUM, MOTORIZED LOW LEAKAGE RECIRC. DAMPERS AND 4.64HP MOTOR. CAPACITY: 7,000 CFM @ 0.75 IN. E.S.P. EXHAUST BOX: SIDE DISCHARGE, EXHAUST FAN VFD CONTROL, DOWNTURN WEATHERHOOD, EXHAUST DISCHARGE GRAVITY BACKDRAFT DAMPER, 22" PLENUM AND 4.12HP MOTOR. CAPACITY: 7,000 CFM @ 0.75 IN. E.S.P. FILTERS: EIGHT (8) 2" PLEATED MERV 8, 16x25x2 SUPPLY FILTERS. DIRECT EXPANSION COOLING COIL: GREENHECK PACKAGED 15.0 TON DX COIL SUPPLIED COMPLETE WITH NEOPRENE VIBRATION ISOLATORS, CRANKCASE HEATER, THERMAL EXPANSION VALVE, VARIABLE CAPACITY DIGITAL SCROLL COMPRESSOR, CONDENSING FANS, LIQUID-LINE FILTER DRIER, HIGH-PRESSURE MANUAL RESET CUTOUT, LOW-PRESSURE AUTO-RESET CUTOUT, TIME DELAY RELAYS, SERVICE/CHARGING VALVES, MOISTURE-INDICATING SIGHT GLASS, DIRECT DRIVE CONDENSING FANS WITH EXTERNAL ROTORS AND MOLDED FAN BLADES, R-410A CHARGED, CONDENSING COILS WITH 5/16" COPPER TUBES, 5-ROW AND 12 FINS/IN. TOTAL COOLING CAPACITY: 198,500 BTUH SENSIBLE COOLING CAPACITY: 164,300 BTUH COOLING: 7,000 CFM FROM 76.5°F/63.9°F DB/WB TO 55.0°F/54.4°F DB/WB HOT WATER HEATING COIL: GREENHECK MODEL HW12C02H10-55x24-RH HOT WATER HEATING COIL SUPPLIED COMPLETE WITH GALVANIZED STEEL CASING, HAND BRAZED CONSTRUCTION, COPPER TUBES, ALUMINUM FINS, 10 FINS/IN., 2-ROW AND 2"ø COIL CONNECTIONS. TOTAL HEATING CAPACITY: 107,300 BTUH HEATING: 7,000 CFM FROM 56.0.0°F DB TO 79.5°F DB USING 12.7 GPM OF 35/65 PROPYLENE GLYCOL/WATER SOLUTION ENTERING AT 150.0°F, LEAVING AT 120.0°F
RTU-3 ROOF TOP AIR HANDLING UNIT	GREENHECK MODEL RV-25-7.5 ROOFTOP AIR HANDLING UNIT SUPPLIED COMPLETE WITH EXTERIOR GALVANIZED STEEL HOUSING, INTERNALLY LINED DOUBLE WALLED GALVANIZED STEEL, 2" 2.4# R13 DENSITY FOAM INTERIOR INSULATION, PAINTED PERMATECTOR CONCRETE GRAY (RAL 7023), STAINLESS STEEL DRAIN PAN, MICROPROCESSOR CONTROLS, ECONOMIZER MODE, DIRECT-DRIVE BACKWARD INCLINED PLENUM BLOWERS WITH FACTORY MOUNTED VFD'S, BALL BEARING MOTORS, CORROSION RESISTANT FASTENERS, BACNET MSTP NETWORK PROTOCOL, DIRTY FILTER SENSOR, PHASE AND BROWN OUT PROTECTION, 120V NEMA 3R OUTLET, RAI EXPANSION BOARD, PREMIUM EFFICIENCY SUPPLY, PREMIUM EFFICIENCY EXHAUST, ODP 208/3/60 POWER AND MODEL GKD-48/145-G24 PREFABRICATED ROOF CURB. CONSISTING OF THE FOLLOWING COMPONENTS: RETURN AIR INTAKE: BOTTOM INTAKE, MOTORIZED INSULATED LOW LEAKAGE RETURN AIR DAMPERS AND RETURN AIR DAMPER CONTROLS. OUTDOOR AIR INTAKE: END INTAKE, OUTDOOR DOWNTURNED WEATHERHOOD, MOTORIZED INSULATED OUTSIDE AIR DAMPERS, OUTSIDE AIR DAMPER CONTROLS. SUPPLY BOX: BOTTOM DISCHARGE, SUPPLY FAN VFD CONTROL, 14" PLENUM, MOTORIZED LOW LEAKAGE RECIRC. DAMPERS AND 5HP MOTOR. CAPACITY: 3,000 CFM @ 0.75 IN. E.S.P. EXHAUST BOX: SIDE DISCHARGE, EXHAUST FAN VFD CONTROL, DOWNTURN WEATHERHOOD, EXHAUST DISCHARGE GRAVITY BACKDRAFT DAMPER, 14" PLENUM AND 5HP MOTOR. CAPACITY: 3,000 CFM @ 0.75 IN. E.S.P. FILTERS: FOUR (4) 2" PLEATED MERV 8, 20x20x2 SUPPLY FILTERS. DIRECT EXPANSION COOLING COIL: GREENHECK PACKAGED 7.5 TON DX COIL SUPPLIED COMPLETE WITH CRANKCASE HEATER, THERMAL EXPANSION VALVE, VARIABLE CAPACITY DIGITAL SCROLL COMPRESSOR, CONDENSING FANS, LIQUID-LINE FILTER DRIER, HIGH-PRESSURE MANUAL RESET CUTOUT, LOW-PRESSURE AUTO-RESET CUTOUT, TIME DELAY RELAYS, SERVICE/CHARGING VALVES, MOISTURE-INDICATING SIGHT GLASS, DIRECT DRIVE CONDENSING FANS WITH EXTERNAL ROTORS AND MOLDED FAN BLADES, R-410A CHARGED, CONDENSING COILS WITH 5/16" COPPER TUBES, 5-ROW AND 12 FINS/IN. TOTAL COOLING CAPACITY: 101,800 BTUH SENSIBLE COOLING CAPACITY: 78,000 BTUH COOLING: 3,000 CFM FROM 76.6°F/64.0°F DB/WB TO 52.8°F/52.4°F DB/WB HOT WATER HEATING COIL: GREENHECK MODEL HW12C01H10-40x21.7-RH HOT WATER HEATING COIL SUPPLIED COMPLETE WITH GALVANIZED STEEL CASING, HAND BRAZED CONSTRUCTION, COPPER TUBES, ALUMINUM FINS, 10 FINS/IN., 2-ROW AND 1 1/2"ø COIL CONNECTIONS. TOTAL HEATING CAPACITY: 107,300 BTUH HEATING: 3,000 CFM FROM 55.0°F DB TO 88.00°F DB USING 7.6 GPM OF 35/65 PROPYLENE GLYCOL/WATER SOLUTION ENTERING AT 150.0°F, LEAVING AT 120.0°F

EQUIPMENT LIST - CONT'D

RTU-4 ROOF TOP AIR HANDLING UNIT	GREENHECK MODEL RV-25-5 ROOFTOP AIR HANDLING UNIT SUPPLIED COMPLETE WITH EXTERIOR GALVANIZED STEEL HOUSING, INTERNALLY LINED DOUBLE WALLED GALVANIZED STEEL, 2" 2.4# R13 DENSITY FOAM INTERIOR INSULATION, PAINTED PERMATECTOR CONCRETE GRAY (RAL 7023), STAINLESS STEEL DRAIN PAN, MICROPROCESSOR CONTROLS, ECONOMIZER MODE, DIRECT-DRIVE BACKWARD INCLINED PLENUM BLOWERS WITH FACTORY MOUNTED VFD'S, BALL BEARING MOTORS, CORROSION RESISTANT FASTENERS, BACNET MSTP NETWORK PROTOCOL, DIRTY FILTER SENSOR, PHASE AND BROWN OUT PROTECTION, 120V NEMA 3R OUTLET, RAI EXPANSION BOARD, PREMIUM EFFICIENCY SUPPLY, PREMIUM EFFICIENCY EXHAUST, ODP 208/3/60 POWER AND MODEL GKD-48/145-G24 PREFABRICATED ROOF CURB. CONSISTING OF THE FOLLOWING COMPONENTS: RETURN AIR INTAKE: BOTTOM INTAKE, MOTORIZED INSULATED LOW LEAKAGE RETURN AIR DAMPERS AND RETURN AIR DAMPER CONTROLS. OUTDOOR AIR INTAKE: END INTAKE, OUTDOOR DOWNTURNED WEATHERHOOD, MOTORIZED INSULATED OUTSIDE AIR DAMPERS, OUTSIDE AIR DAMPER CONTROLS. SUPPLY BOX: BOTTOM DISCHARGE, SUPPLY FAN VFD CONTROL, 14" PLENUM, MOTORIZED LOW LEAKAGE RECIRC. DAMPERS AND 1HP MOTOR. CAPACITY: 1,500 CFM @ 0.75 IN. E.S.P. EXHAUST BOX: SIDE DISCHARGE, EXHAUST FAN VFD CONTROL, DOWNTURN WEATHERHOOD, EXHAUST DISCHARGE GRAVITY BACKDRAFT DAMPER, 14" PLENUM AND 1HP MOTOR. CAPACITY: 1,500 CFM @ 0.75 IN. E.S.P. FILTERS: FOUR (4) 2" PLEATED MERV 8, 20x20x2 SUPPLY FILTERS. DIRECT EXPANSION COOLING COIL: GREENHECK PACKAGED 5.0 TON DX COIL SUPPLIED COMPLETE WITH CRANKCASE HEATER, THERMAL EXPANSION VALVE, VARIABLE CAPACITY DIGITAL SCROLL COMPRESSOR, CONDENSING FANS, LIQUID-LINE FILTER DRIER, HIGH-PRESSURE MANUAL RESET CUTOUT, LOW-PRESSURE AUTO-RESET CUTOUT, TIME DELAY RELAYS, SERVICE/CHARGING VALVES, MOISTURE-INDICATING SIGHT GLASS, DIRECT DRIVE CONDENSING FANS WITH EXTERNAL ROTORS AND MOLDED FAN BLADES, R-410A CHARGED, CONDENSING COILS WITH 5/16" COPPER TUBES, 4-ROW AND 12 FINS/IN. TOTAL COOLING CAPACITY: 64,800 BTUH SENSIBLE COOLING CAPACITY: 44,400 BTUH COOLING: 1,500 CFM FROM 78.1°F/65.5°F DB/WB TO 51.2°F/50.9°F DB/WB HOT WATER HEATING COIL: GREENHECK MODEL HW12C02H10-40x21.7-RH HOT WATER HEATING COIL SUPPLIED COMPLETE WITH GALVANIZED STEEL CASING, HAND BRAZED CONSTRUCTION, COPPER TUBES, ALUMINUM FINS, 10 FINS/IN., 2-ROW AND 1 1/2"ø COIL CONNECTIONS. TOTAL HEATING CAPACITY: 88,400 BTUH HEATING: 1,500 CFM FROM 38.0°F DB TO 92.4°F DB USING 6.3 GPM OF 35/65 PROPYLENE GLYCOL/WATER SOLUTION ENTERING AT 150.0°F, LEAVING AT 120.0°F
AHU-1 INDOOR AIR HANDLING UNIT	DAIKIN INDOOR VISION AIR HANDLER MODEL CAH009GHAM, INLINE HORIZONTAL UNIT CONFIGURATION, RIGHT HAND DRIVE LOCATION, 4" FORMED CHANNEL BASE, CONSISTING OF THE FOLLOWING COMPONENTS: RETURN/EXHAUST FAN MODULE SUPPLIED COMPLETE WITH 2" THICK R13 GALVANIZED INSULATED FOAM INJECTED PANEL, CENTRIFUGAL DWDI FORWARD CURVED CLASS 1 FAN, TOP HORIZONTAL DISCHARGE, FAN SPRING ISOLATION, 3.0HP, 1750 RPM, 200/3/60 PREMIUM ODP POWER, V-BELT DRIVE PACKAGE, MARINE LIGHT KIT AND SWITCH, 30" DRIVE SIDE OUTWARD OPENING ACCESS DOOR WITH ROUND WINDOW. CAPACITY: 4200 CFM @ 1.00 IN. E.S.P. ECONOMIZER MODULE SUPPLIED COMPLETE WITH 2" THICK R13 GALVANIZED INJECTED FOAM PANEL, TAMCO 9000 18x60 TOP EXHAUST AIR DAMPER OPENING, TAMCO 1000 18x60 INTERNAL RETURN AIR DAMPER OPENING, TAMCO 9000 18x60 TOP OUTSIDE AIR DAMPER OPENING, MARINE LIGHT KIT AND SWITCH, 18" MIXING CHAMBER DRIVE SIDE OUTWARD OPENING ACCESS DOOR WITH ROUND WINDOW, 18" RETURN CHAMBER DRIVE SIDE OUTWARD OPENING ACCESS DOOR WITH ROUND WINDOW. PANEL FILTER MODULE SUPPLIED COMPLETE WITH 2" THICK R13 GALVANIZED INJECTED FOAM PANEL, SIDE FILTER LOADING, 3-24x20x2 MERV 8 PLEATED FILTERS, 8" WIDE DRIVE SIDE OUTWARD OPENING ACCESS DOOR, MINIHELIC II 0-500 Pa FILTER GAUGE. HEATING COIL MODULE MODEL 5WH0902B SUPPLIED COMPLETE WITH GALVANIZED STEEL CASING, COPPER HEADER, TWO (2) ROWS, 9-0.0075" ALUMINUM FINS/INCH, 0.020" COPPER TUBES, 0.625" TUBE DIAMETER, CARBON STEEL THREADED 2 1/2"ø DRIVE SIDE COIL CONNECTIONS. CAPACITY: 154,296 BTUH @ 10.60 GPM ENTERING AT 37.5°F DB AND LEAVING AT 71.1°F USING 35/65 GLYCOL MIXTURE SOLUTION. AIR HANDLER CABINET TO CONTAIN ROOM FOR FUTURE COOLING COIL (NOT SUPPLIED) SUPPLY AIR FAN MODULE SUPPLIED COMPLETE WITH 2" THICK R13 GALVANIZED INSULATED FOAM INJECTED PANEL, CENTRIFUGAL DWDI FORWARD CURVED CLASS 1 FAN, CLOCKWISE UP BLAST DISCHARGE, FAN SPRING ISOLATION, 3.0HP, 1750 RPM, 200/3/60 PREMIUM ODP POWER, V-BELT DRIVE PACKAGE, MARINE LIGHT KIT AND SWITCH, 30" WIDE DRIVE SIDE OUTWARD OPENING ACCESS DOOR WITH ROUND WINDOW. CAPACITY: 4200 CFM @ 1.00 IN. E.S.P. AIR HANDLING UNIT AHU-1 SHALL BE SHIPPED IN SECTIONS AND FIELD ASSEMBLED IN MECHANICAL ROOM. DISASSEMBLE AIR HANDLER MODULES AS REQUIRED TO FACILITATE ENTRY INTO THE MECHANICAL ROOM VIA ACCESS DOORS. REASSEMBLE MODULES ONCE IN PLACE.
AHU-2 INDOOR AIR HANDLING UNIT	DAIKIN INDOOR VISION AIR HANDLER MODEL CAH09GHAM, INLINE HORIZONTAL UNIT CONFIGURATION, RIGHT HAND DRIVE LOCATION, 4" FORMED CHANNEL BASE, CONSISTING OF THE FOLLOWING COMPONENTS: RETURN/EXHAUST FAN MODULE SUPPLIED COMPLETE WITH 2" THICK R13 GALVANIZED INSULATED FOAM INJECTED PANEL, CENTRIFUGAL DWDI FORWARD CURVED CLASS 1 FAN, TOP HORIZONTAL DISCHARGE, FAN SPRING ISOLATION, 3.0HP, 1750 RPM, 200/3/60 PREMIUM ODP POWER, V-BELT DRIVE PACKAGE, MARINE LIGHT KIT AND SWITCH, 30" DRIVE SIDE OUTWARD OPENING ACCESS DOOR WITH ROUND WINDOW. CAPACITY: 4000 CFM @ 1.00 IN. E.S.P. ECONOMIZER MODULE SUPPLIED COMPLETE WITH 2" THICK R13 GALVANIZED INJECTED FOAM PANEL, TAMCO 9000 16x58 TOP EXHAUST AIR DAMPER OPENING, TAMCO 1000 16x58 INTERNAL RETURN AIR DAMPER OPENING, TAMCO 9000 16x58 TOP OUTSIDE AIR DAMPER OPENING, MARINE LIGHT KIT AND SWITCH, 16" MIXING CHAMBER DRIVE SIDE OUTWARD OPENING ACCESS DOOR WITH ROUND WINDOW, 16" RETURN CHAMBER DRIVE SIDE OUTWARD OPENING ACCESS DOOR WITH ROUND WINDOW. PANEL FILTER MODULE SUPPLIED COMPLETE WITH 2" THICK R13 GALVANIZED INJECTED FOAM PANEL, SIDE FILTER LOADING, 2-24x24x2 MERV 8 PLEATED FILTERS, 1-24x12x2 MERV 8 PLEATED FILTER, 8" WIDE DRIVE SIDE OUTWARD OPENING ACCESS DOOR, MINIHELIC II 0-500 Pa FILTER GAUGE. HEATING COIL MODULE MODEL 5WH1202C SUPPLIED COMPLETE WITH GALVANIZED STEEL CASING, COPPER HEADER, TWO (2) ROWS, 12-0.0075" ALUMINUM FINS/INCH, 0.020" COPPER TUBES, 0.625" TUBE DIAMETER, CARBON STEEL THREADED 2 1/2"ø DRIVE SIDE COIL CONNECTIONS. CAPACITY: 326,423 BTUH @ 23.10 GPM ENTERING AT -5.5°F DB AND LEAVING AT 69.1°F USING 35/65 GLYCOL MIXTURE SOLUTION. AIR HANDLER CABINET TO CONTAIN ROOM FOR FUTURE COOLING COIL (NOT SUPPLIED) SUPPLY AIR FAN MODULE SUPPLIED COMPLETE WITH 2" THICK R13 GALVANIZED INSULATED FOAM INJECTED PANEL, CENTRIFUGAL DWDI FORWARD CURVED CLASS 1 FAN, CLOCKWISE UP BLAST DISCHARGE, FAN SPRING ISOLATION, 3.0HP, 1750 RPM, 200/3/60 PREMIUM ODP POWER, V-BELT DRIVE PACKAGE, MARINE LIGHT KIT AND SWITCH, 30" WIDE DRIVE SIDE OUTWARD OPENING ACCESS DOOR WITH ROUND WINDOW. CAPACITY: 4000 CFM @ 1.00 W.C. AIR HANDLING UNIT AHU-2 SHALL BE SHIPPED IN SECTIONS AND FIELD ASSEMBLED IN MECHANICAL ROOM. DISASSEMBLE AIR HANDLER MODULES AS REQUIRED TO FACILITATE ENTRY INTO THE MECHANICAL ROOM VIA ACCESS DOORS. REASSEMBLE MODULES ONCE IN PLACE.

EQUIPMENT LIST - CONT'D

ERV-1 ENERGY RECOVERY VENTILATOR	ALDES MODEL CW8000e ENERGY RECOVERY VENTILATOR SUPPLIED COMPLETE WITH DOUBLE WALL CABINET, 22 GA. PREPAINTED STEEL EXTERIOR STEEL GAUGE, 18 GA. GALVANIZED STEEL INTERIOR STEEL GAUGE, 2" INSULATION, ACCESS DOORS WITH QUARTER-TURN HANDLES, 24" 18 GA. STEEL PREFABRICATED ROOF CURB, FRESH AIR FORWARD-CURVED BLOWER, PILLOW-BLOCK BEARINGS, FRESH AIR POWER TRANSMISSION BY ADJUSTABLE PULLEYS AND BELTS, EXHAUST AIR FORWARD-CURVED BLOWER, PILLOW-BLOCK BEARINGS, EXHAUST AIR POWER TRANSMISSION BY ADJUSTABLE PULLEYS AND BELTS, 7.5HP FRESH AIR PREMIUM INVERTER READY ODP MOTOR, MAGNETIC FRESH AIR MOTOR STARTER, FRESH AIR MOTOR SPRING ISOLATORS, SIX (6)-20x24x4 MERV 8 FRESH AIR FILTERS, 7.5HP EXHAUST AIR PREMIUM INVERTER READY ODP MOTOR, MAGNETIC EXHAUST AIR MOTOR STARTER, EXHAUST AIR MOTOR SPRING ISOLATORS, SIX (6)-20x24x4 MERV 8 EXHAUST AIR FILTERS, 0.25HP ENTHALPY RECOVERY CORE WHEEL MOTOR, FRESH AIR MOTORIZED AND INSULATED DAMPERS, EXHAUST AIR MOTORIZED AND INSULATED DAMPERS, OUTSIDE AIR INTAKE HOOD, OUTSIDE EXHAUST AIR HOOD, DIRTY FILTER CONTACTS, FRESH AIR DAMPER TERMINAL BOARDS, EXHAUST AIR DAMPER TERMINAL BOARDS, BACNET COMPATIBLE CONTROLLER, BACNET COMMUNICATION MODULE, START/STOP DRY CONTACT, GENERAL ALARM DRY CONTACT, FREE COOLING DRY CONTACT, FAN INTERLOCK, BACK OF UNIT PRE-HEAT PIPE CHASE, BACK OF UNIT POST-HEAT PIPE CHASE, 0-10V VARIABLE FREQUENCY DRIVE WHEEL SPEED CONTROL, NON-FUSED DISCONNECTION, 208/3/60 POWER. AIRFLOW CAPACITY: FRESH AIR -7400 CFM @ 1.00 IN. E.S.P. EXHAUST AIR -7400 CFM @ 1.00 IN. E.S.P. PREHEAT COIL: MODEL 5W-01-33.0-08-63.0-11, 63x33 NOMINAL TUBE WIDTH/HEIGHT, 11 CIRCUITS, 1 ROW, 8 FINS/IN., 1 1/4"ø CONNECTIONS. CAPACITY: 305,830 BTUH FROM -30.0°F Db TO 8.27°F Db USING 21.63 GPM OF 35/65 PROPYLENE GLYCOL/WATER SOLUTION ENTERING AT 150°F, LEAVING AT 120°F. POST HEAT COIL: MODEL 5W-01-33.0-12-63.0-11 63x33 NOMINAL TUBE WIDTH/HEIGHT, 11 CIRCUITS, 1 ROW, 12 FINS/IN., 1"ø CONNECTIONS, CAPACITY: 165,590 BTUH FROM 54.4°F Db TO 75.12°F Db USING 11.8 GPM OF 35/65 PROPYLENE GLYCOL/WATER SOLUTION ENTERING AT 150°F, LEAVING AT 120°F.
UH-1 UNIT HEATER	MODINE MODEL HC121SB01SA HOT WATER UNIT HEATER SUPPLIED COMPETE WITH CORROSION RESISTANT TREATED STEEL CASING, BAKED ON GREY POLYESTER POWDER COATED PAINT, STEEL ROD FAN GUARD, ALUMINUM FIN COILS, ADJUSTABLE 2-WAY AIR-DEFLECTOR BLADES, BUILT-IN THERMAL OVERLOAD PROTECTION, 3/4"ø NPT SIDE CONNECTIONS, 1/5HP AND 120/1/60 POWER. CAPACITY: 70,050 BTUH @ 4.67 GPM
CUH-1 CABINET UNIT HEATER	RITTLING MODEL RS-200 'SIZE 3' FLOOR MOUNTED SLOPED TOP CABINET HEATER SUPPLIED COMPLETE WITH 16 GA. FRONT PANEL, IVORY EPOXY POWDER COATING, TAMPER PROOF QUARTER TURN FRONT PANEL FASTENERS, INTERNAL INSULATION, INTERNAL SUPPORT BRACKET, LEFT SIDE VALVE ACCESS CHASE, 1 ROW STANDARD HEATING CAPACITY COPPER/ALUMINUM COIL, 1/2"ø SUPPLY/RETURN COIL CONNECTIONS, 1/2"ø NOMINAL FIN TUBES, 1" CLEANABLE ALUMINUM FILTER, COIN-OPERATED VENTS, CAM-LOCK ACCESS DOORS, TAMPER PROOF RESISTANT FASTENERS, WALL SEAL KIT, SPLIT-CAPACITOR MOTOR, 1/2"ø MOTOR SHAFT, THREE-SPEED FAN SWITCH, DISCONNECT SWITCH AND 120/1/60 POWER. CAPACITY: 13,194 BTU/H USING 2.0 GPM OF 35/65 GLYCOL WATER SOLUTION ENTERING AT 150°F, LEAVING AT 120°F. STANDARD FAN SPEED.
CUH-2 CABINET UNIT HEATER	VULCAN MODEL FS-1005 'SIZE 2' FLOOR MOUNTED SLOPED TOP CABINET HEATER SUPPLIED COMPLETE WITH 16 GA. FRONT PANEL, NEUTRAL EGGSHELL BAKED POWDER COATING, TAMPER PROOF QUARTER TURN FRONT PANEL FASTENERS, INTERNAL INSULATION, INTERNAL SUPPORT BRACKET, LEFT SIDE VALVE ACCESS CHASE, 2 ROW HIGH CAPACITY COPPER/ALUMINUM COIL, 1/2"ø SUPPLY/RETURN COIL CONNECTIONS, 1/2"ø NOMINAL FIN TUBES, 1" CLEANABLE ALUMINUM FILTER, COIN-OPERATED VENTS, CAM-LOCK ACCESS DOORS, TAMPER PROOF RESISTANT FASTENERS, WALL SEAL KIT, SPLIT-CAPACITOR MOTOR, 1/2"ø MOTOR SHAFT, THREE-SPEED FAN SWITCH, DISCONNECT SWITCH AND 120/1/60 POWER. CAPACITY: 14,025 BTUH USING 2.32 GPM OF 35/65 GLYCOL WATER SOLUTION ENTERING AT 150°F, LEAVING AT 120°F. STANDARD FAN SPEED.
CUH-3,4 CABINET UNIT HEATER	VULCAN MODEL RW-1120 'SIZE 2' RECESSED WALL CABINET HEATER SUPPLIED COMPLETE WITH 16 GA. FRONT PANEL, NEUTRAL EGGSHELL BAKED POWDER COATING, TAMPER PROOF QUARTER TURN FRONT PANEL FASTENERS, INTERNAL INSULATION, INTERNAL SUPPORT BRACKET, LEFT SIDE VALVE ACCESS CHASE, 2 ROW HIGH CAPACITY COPPER/ALUMINUM COIL, 1/2"ø SUPPLY/RETURN COIL CONNECTIONS, 1/2"ø NOMINAL FIN TUBES, 1" CLEANABLE ALUMINUM FILTER, COIN-OPERATED VENTS, CAM-LOCK ACCESS DOORS, TAMPER PROOF RESISTANT FASTENERS, WALL SEAL KIT, SPLIT-CAPACITOR MOTOR, 1/2"ø MOTOR SHAFT, THREE-SPEED FAN SWITCH, DISCONNECT SWITCH AND 120/1/60 POWER. CAPACITY: 14,025 BTUH USING 2.32 GPM OF 35/65 GLYCOL WATER SOLUTION ENTERING AT 150°F, LEAVING AT 120°F. STANDARD FAN SPEED.
CUH-5 CABINET UNIT HEATER	RITTLING MODEL RS-200 'SIZE 4' FLOOR MOUNTED SLOPED TOP CABINET HEATER SUPPLIED COMPLETE WITH 16 GA. FRONT PANEL, IVORY EPOXY POWDER COATING, TAMPER PROOF QUARTER TURN FRONT PANEL FASTENERS, INTERNAL INSULATION, INTERNAL SUPPORT BRACKET, LEFT SIDE VALVE ACCESS CHASE, 2 ROW HIGH HEATING CAPACITY COPPER/ALUMINUM COIL, 1/2"ø SUPPLY/RETURN COIL CONNECTIONS, 1/2"ø NOMINAL FIN TUBES, 1" CLEANABLE ALUMINUM FILTER, COIN-OPERATED VENTS, CAM-LOCK ACCESS DOORS, TAMPER PROOF RESISTANT FASTENERS, WALL SEAL KIT, SPLIT-CAPACITOR MOTOR, 1/2"ø MOTOR SHAFT, THREE-SPEED FAN SWITCH, DISCONNECT SWITCH AND 120/1/60 POWER. CAPACITY: 23,899 BTUH USING 1.28 GPM OF 35/65 GLYCOL WATER SOLUTION ENTERING AT 150°F, LEAVING AT 120°F. STANDARD FAN SPEED.
BASEBOARD HEATER TYPE 'A'	RITTLING MODEL IBG5, 3/4C-4 1/4"x4 1/4"-32, 2 ROW, 20" ENCLOSURE HEIGHT SUPPLIED COMPLETE WITH 3/4"ø COPPER TUBE WITH 32-4 1/4"x4 1/4" ALUMINUM FINS/FOOT, 16ga. POWDER COATED ENCLOSURE, ENCLOSURE ACCESS DOOR, ALL REQUIRED ACCESSORIES FOR MOUNTING, 15° EXTRUDED ALUMINUM PENCIL PROOF GRILLE WITH CLEAR ANODIZED FINISH. FIELD VERIFY ENCLOSURE LENGTHS, REQUIRED ACCESSORIES AND COLOUR PRIOR TO ORDERING.
BASEBOARD HEATER TYPE 'B'	RITTLING MODEL IBG3, 3/4C-2 3/4"x4-32, 1 ROW, 14" ENCLOSURE HEIGHT SUPPLIED COMPLETE WITH 3/4"ø COPPER TUBE WITH 32-2 3/4"x4" ALUMINUM FINS/FOOT, 16ga. POWDER COATED ENCLOSURE, ENCLOSURE ACCESS DOOR, ALL REQUIRED ACCESSORIES FOR MOUNTING, 15° EXTRUDED ALUMINUM PENCIL PROOF GRILLE WITH CLEAR ANODIZED FINISH. FIELD VERIFY ENCLOSURE LENGTHS, REQUIRED ACCESSORIES AND COLOUR PRIOR TO ORDERING.
BASEBOARD HEATER TYPE 'C'	RITTLING MODEL IBG3, 3/4C-2 3/4"x4-40, 1 ROW, 14" ENCLOSURE HEIGHT SUPPLIED COMPLETE WITH 3/4"ø COPPER TUBE WITH 40-2 3/4"x4" ALUMINUM FINS/FOOT, 16ga. POWDER COATED ENCLOSURE, ENCLOSURE ACCESS DOOR, ALL REQUIRED ACCESSORIES FOR MOUNTING, 15° EXTRUDED ALUMINUM PENCIL PROOF GRILLE WITH CLEAR ANODIZED FINISH. FIELD VERIFY ENCLOSURE LENGTHS, REQUIRED ACCESSORIES AND COLOUR PRIOR TO ORDERING.
BASEBOARD HEATER TYPE 'D'	RITTLING MODEL IBG3, 3/4C-2 3/4"x4-48, 2 ROW, 14" ENCLOSURE HEIGHT SUPPLIED COMPLETE WITH 3/4"ø COPPER TUBE WITH 48-2 3/4"x4" ALUMINUM FINS/FOOT, 16ga. POWDER COATED ENCLOSURE, ENCLOSURE ACCESS DOOR, ALL REQUIRED ACCESSORIES FOR MOUNTING, 15° EXTRUDED ALUMINUM PENCIL PROOF GRILLE WITH CLEAR ANODIZED FINISH. FIELD VERIFY ENCLOSURE LENGTHS, REQUIRED ACCESSORIES AND COLOUR PRIOR TO ORDERING.
CU-1 CONDENSING UNIT	MITSUBISHI ELECTRIC MODEL PUHY-P72TLMU-A(-BS) 6-TON CONDENSING UNIT SUPPLIED COMPLETE WITH PRE-COATED GALVANIZED STEEL SHEET, MUNSELL FINISH, INVERTER SCROLL HERMETIC COMPRESSOR, PROPELLER FAN, SALT RESISTANT CROSS FIN, ALUMINUM TUBES, SNOW HOOD ATTACHMENT, 3/8"ø LIQUID HIGH PRESSURE CONNECTION, 7/8"ø GAS LOW PRESSURE CONNECTION, OVER-CURRENT PROTECTION, 208/3/60 POWER CAPACITY: 80,000 BTUH HEATING 72,000 BTUH COOLING

EQUIPMENT LIST - CONT'D

AC-1,3-6 CEILING CASSETTE EVAPORATOR	MITSUBISHI ELECTRIC MODEL PLFY-P08NCMU-E CEILING CASSETTE EVAPORATOR SUPPLIED COMPLETE WITH BACNET MS/TP CONTROL MODULE, WHITE MUNSELL GRILLE EXTERNAL FINISH, CROSS FIN COIL, ALUMINUM PLATE FIN, COPPER TUBE, POLYPROPYLENE HONEYCOMB FILTER, 1/4"ø FLARED LIQUID CONNECTION, 1/2"ø FLARED GAS CONNECTION, 1 1/4"ø DRAIN CONNECTION, 3"ø FRESH AIR CUT OUT, BUILT-IN LIFT MECHANISM, TURBO FAN, SINGLE-PHASE INDUCTION MOTOR, IT TERMINAL PLUG, 208/1/60 POWER. CAPACITY: 9,000 BTUH HEATING 8,000 BTUH COOLING
AC-2 CEILING CASSETTE EVAPORATOR	MITSUBISHI ELECTRIC MODEL PLFY-P12NCMU-E CEILING CASSETTE EVAPORATOR SUPPLIED COMPLETE WITH BACNET MS/TP CONTROL MODULE WHITE MUNSELL GRILLE EXTERNAL FINISH, CROSS FIN COIL, ALUMINUM PLATE FIN, COPPER TUBE, POLYPROPYLENE HONEYCOMB FILTER, 1/4"ø FLARED LIQUID CONNECTION, 1/2"ø FLARED GAS CONNECTION, 1 1/4"ø DRAIN CONNECTION, 3"ø FRESH AIR CUT OUT, BUILT-IN LIFT MECHANISM, TURBO FAN, SINGLE-PHASE INDUCTION MOTOR, IT TERMINAL PLUG, 208/1/60 POWER. CAPACITY: 13,500 BTUH HEATING 12,000 BTUH COOLING
PIPING ENCLOSURE	4" WIDE SPEEDICHANNEL LINE SET COVER SYSTEM SUPPLIED COMPLETE WITH PRIMER COATING AND ALL REQUIRED FITTINGS AND ACCESSORIES FOR A COMPLETE INSTALLATION.
FPTU-X FAN POWERED TERMINAL UNIT	E.H. PRICE MODEL FDV-5000 VARIABLE VOLUME PARALLEL FLOW FAN POWERED TERMINAL UNIT SUPPLIED COMPLETE WITH FRACTIONAL HP ECM MOTOR, MOTOR VIBRATION ISOLATION, SOLID STATE SPEED CONTROLLER, 3/4" THICK 1.5lb DENSITY INTERNAL INSULATION, BOTTOM ACCESS PANEL, CONTROL SHROUD, 120/24V TRANSFORMER FACTORY MOUNTED IN CONTROL SHROUD WITH 120V TERMINAL STRIP, HOT WATER HEATING COIL WITH TOP AND BOTTOM ACCESS DOORS, INLET ATTENUATOR SECTION, MERV 3 CLIP ON DISPOSABLE FILTER, 120/1/60 POWER. REFER TO TERMINAL UNIT SCHEDULE FOR SIZE AND HOT WATER HEATING COIL REQUIREMENTS.
TU-X TERMINAL UNIT	E.H. PRICE MODEL SDV-5000 SINGLE DUCT PRESSURE INDEPENDENT TERMINAL UNIT SUPPLIED COMPLETE WITH 1/2" THICK 1.5lb DENSITY INTERNAL INSULATION, CONTROL SHROUD AND MULTI-POINT FLOW SENSOR WITH GAUGE TAPS. REFER TO TERMINAL UNIT SCHEDULE FOR SIZE REQUIREMENTS.
CBV-X 2-WAY CONTROL BALANCE VALVE 1/2"ø SIZE	BELIMO MODEL Z2050QPT-F+CQKB24-SR-RL ZONETIGHT PRESSURE INDEPENDENT 2-WAY CONTROL VALVE, NORMALLY CLOSED, FAIL OPEN, 24VAC ELECTRONIC FAIL-SAFE ACTUATOR, 0-10VDC CONTROL INPUT, BRASS BODY, CHROME PLATED BRASS BALL AND STEM, 1/2"ø NPT CONNECTIONS. FOR VALVE SIZE AND FLOW REQUIREMENTS, REFER TO CONTROL/BALANCING VALVE SCHEDULE.
CBV-X 2-WAY CONTROL BALANCE VALVE 3/4"ø SIZE	BELIMO MODEL Z2075QPT-G+CQKB24-SR-RL ZONETIGHT PRESSURE INDEPENDENT 2-WAY CONTROL VALVE, NORMALLY CLOSED, FAIL OPEN, 24VAC ELECTRONIC FAIL-SAFE ACTUATOR, 0-10VDC CONTROL INPUT, BRASS BODY, CHROME PLATED BRASS BALL AND STEM, 3/4"ø NPT CONNECTIONS. FOR VALVE SIZE AND FLOW REQUIREMENTS, REFER TO CONTROL/BALANCING VALVE SCHEDULE.
CBV-X 2-WAY CONTROL BALANCE VALVE 1"ø AND UP	BELIMO MODEL P2___S-___AKRX24-__ ELECTRONIC PRESSURE INDEPENDENT 2-WAY CHARACTERIZED CONTROL VALVE, NORMALLY CLOSED, FAIL OPEN, 24VAC ELECTRONIC FAIL-SAFE ACTUATOR, 0-10VDC CONTROL INPUT, BRASS BODY, CHROME PLATED BRASS BALL AND STEM, NPT CONNECTIONS AND FOR GLYCOL MEASUREMENT. FOR VALVE SIZE AND FLOW REQUIREMENTS, REFER TO CONTROL/CIRCUIT BALANCE VALVE SCHEDULE.
ABV-0.1 AUTOMATIC CIRC. BALANCE VALVE	GRISWOLD ISOLATOR 'R' MODEL IR11S0G AUTOMATIC FLOW CONTROL VALVE SUPPLIED COMPLETE WITH FORGED BRASS BODY, STAINLESS STEEL CARTRIDGE, STAINLESS STEEL BALL AND STEM PACKAGE, TEFLON BALL VALVE SEATS DUAL TEFLON AND EPDM STEM SEAL, 1"ø FEMALE NPT CONNECTIONS. VALVE PSID RANGE = 1-14 FLOW RATE = 4.67 GPM
BD BALANCING DAMPER	BLADE DAMPER COMPLETE WITH LOCKING QUADRANT (ECCO KS-145 OR EQUAL)
FD FIRE DAMPER	NCA MODEL FDD TYPE 'A' DYNAMIC CLOSURE FIRE DAMPER SUPPLIED COMPLETE WITH ROLL FORMED GALVANIZED STEEL FRAME WITH SAFETY EDGE, ROLL FORMED GALVANIZED STEEL CURTAIN TYPE BLADES, 165°F FUSIBLE LINK, STAINLESS STEEL SPRING AND ACCESS DOOR. REFER TO DESIGN DRAWINGS FOR TYPE.
(T)	DDC WALL MOUNTED THERMOSTAT SUPPLIED COMPLETE WITH LCD DISPLAY AND SETPOINT ADJUSTER. PROVIDE CLEAR LOCKING COVERS IN PUBLIC SPACES.
(TS)	DDC WALL MOUNTED TEMPERATURE SENSOR. PROVIDE VANDAL RESISTANT LOCKABLE PLASTIC COVER IN PUBLIC SPACES.
(AT)	DDC WALL MOUNTED AVERAGING INDOOR SENSOR. PROVIDE VANDAL RESISTANT LOCKABLE PLASTIC COVER IN PUBLIC SPACES..
AD1 ACCESS DOOR	ACUDOR MODEL FWC-5050 16x16 FIRE RATED ACCESS DOOR SUPPLIED COMPLETE WITH 20 GA. CRS. STEEL MATERIAL, 2" FIRE RATED INSULATION, SPRING CLOSER, SELF LATCHING BOLT, CONCEALED HINGE, .25"ø COUNTER SUNK SCREWHOLES AND FLUSH KEY.

No.	Revision	Date	Initial
0	ISSUED FOR CONSTRUCTION	04/27/18	RG
D	ISSUED FOR FINAL CLIENT REVIEW	04/25/18	RG
C	ISSUED FOR 99% CLIENT REVIEW	04/13/18	RG
B	ISSUED FOR 75% CLIENT REVIEW	03/29/18	RG
A	ISSUED FOR 66% CLIENT REVIEW	03/16/18	RG

Notes:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING DIMENSIONS AND EXISTING CONDITIONS AT THE OUTSET OF CONSTRUCTION. REPORT ANY DISCREPANCIES TO THE ENGINEER. DO NOT PROCEED WITHOUT FURTHER WRITTEN DIRECTION FROM THE ENGINEER.
2. DRAWING SHOWS GENERAL ARRANGEMENT ONLY. DO NOT SCALE.

Approved

Approved

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LAKEHEAD UNIVERSITY
THUNDER BAY ONTARIO

BORA LASKIN BUILDING

EQUIPMENT LIST

Scale: NA	Drawn By: BT Ckd. By: RG	Date: APRIL 2018
	Dwg. No.: 18-038-M30	Rev. 0

SEQUENCE OF OPERATION

BOILERS B1 / B2 /B3 & GLYCOL HEATING LOOP CIRC. PUMPS P1A / P1B

WHEN THE OUTDOOR AIR TEMPERATURE DROPS BELOW THE WARM WEATHER SHUTDOWN SETPOINT (60°F) OR ON A CALL FOR HEAT FROM ANY ZONE HEATING UNIT, THE DDC SYSTEM SHALL ENABLE THE GLYCOL HEATING LOOP CIRCULATING PUMPS P1A OR P1B AND THE HEATING BOILERS.

ON A CALL FOR HEAT AS SENSED IN THE SYSTEM SUPPLY LINE, THE LEAD BOILER SHALL ENERGIZE THE NORMALLY CLOSED COMBUSTION AIR DAMPER. UPON THE DAMPER REACHING THE FULLY OPEN POSITION AS SIGNALED BY THE DAMPER END SWITCH, THE LEAD HEATING BOILERS AND SECONDARY CIRCULATING PUMP SHALL BE ENERGIZED BY THE INTERNAL BOILER CONTROLLER. THE LEAD PRIMARY PUMP SHALL BE MODULATED TO MAINTAIN A DIFFERENTIAL PRESSURE SETPOINT OF 45 FT. DDC SYSTEM SHALL OPERATE PUMPS P1A AND P1B IN A STANDBY CONFIGURATION PROVIDING AUTOMATIC CHANGEOVER BETWEEN LEAD AND LAG PUMP WHEN A FAILURE IS DETECTED. FAILURE OF A CIRCULATING PUMP SHALL GENERATE AN ALARM AT THE SUPERVISORY CONTROLLER. DDC SYSTEM SHALL PROVIDE EQUAL RUN TIME ROTATION AND EXERCISING OF PRIMARY PUMPS DURING A PERIOD OF EXTENDED SHUTDOWN.

THE DDC SYSTEM SHALL OPERATE THE HEATING BOILERS IN A LEAD/LAG CONFIGURATION AND MODULATE THE BOILER OUTPUTS TO MAINTAIN THE GLYCOL HEATING LOOP SUPPLY TEMPERATURE AT SETPOINT. IF THE LEAD HEATING BOILER IS UNABLE TO MAINTAIN THE HEATING SYSTEM SUPPLY TEMPERATURE AT SETPOINT, THE LEAD BOILER SHALL BE MODULATED DOWN TO A 50% OUTPUT LEVEL AND THE LAG CONDENSING BOILER STARTED AND MODULATED TO 50% OUTPUT. BOTH BOILERS SHALL THEN BE MODULATED IN UNISON AS REQUIRED TO SATISFY THE SUPPLY WATER SETPOINT TEMPERATURE. IF THE SETPOINT IS STILL UNABLE TO BE MET, THE OPERATING BOILERS SHALL BE MODULATED BACK TO 67% OUTPUT AND THE THIRD BOILER ENERGIZED. ALL THREE BOILERS SHALL THEN BE MODULATED IN UNISON. WHEN THE HEATING PLANT OUTPUT REQUIRED TO SATISFY THE SUPPLY WATER SETPOINT WITH ALL THREE BOILERS OPERATING DROPS TO 30%, THE LEAD BOILER SHALL BE DEENERGIZED. WHEN THE HEATING PLANT OUTPUT REQUIRED TO SATISFY THE SUPPLY WATER SETPOINT WITH TWO BOILERS OPERATING DROPS TO 20%, THE LEAD BOILER SHALL BE DEENERGIZED.

BOILER CIRCULATING PUMPS SHALL BE ENERGIZED BY THE INTERNAL BOILER CONTROL SYSTEM ON A CALL FOR HEAT. DDC SYSTEM SHALL RESET THE HEATING SUPPLY SETPOINT TEMPERATURE BASED ON AN OUTDOOR AIR RESET SCHEDULE: (150°F AT 5°F TO 120°F AT 60°F). DDC SYSTEM SHALL MONITOR BOILER ALARM CONTACTS AND GENERATE AN ALARM AT THE SUPERVISORY CONTROLLER IF A LOCKOUT CONDITION IS DETECTED. DDC SYSTEM SHALL PROVIDE EQUAL RUN TIME ROTATION FOR THE HEATING BOILERS

WHEN THE OUTDOOR TEMPERATURE RISES ABOVE THE WARM WEATHER SHUTDOWN SETPOINT WITH NO HEAT CALL, THE HEATING BOILERS AND CIRCULATING PUMPS SHALL BE DE-ENERGIZED.

GLYCOL FEEDER GF-1

DDC SYSTEM SHALL MONITOR THE GLYCOL FEEDER LOW LEVEL ALARM AND GENERATE AN ALARM AT THE SUPERVISORY CONTROLLER IF A LOW LEVEL CONDITION IS DETECTED.

DOMESTIC HOT WATER RECIRCULATION PUMP P2

THE DDC SYSTEM SHALL PROVIDE A WEEKLY SCHEDULE FOR THE OPERATION OF THE DOMESTIC HOT WATER CIRCULATING PUMP. THE CIRCULATOR SHALL RUN CONTINUALLY DURING BUILDING OCCUPIED HOURS.

DOMESTIC HOT WATER MIXING VALVE MV-1

THE ELECTRONIC TEMPERING VALVE CONTROL MODULE SHALL MONITOR THE TEMPERED WATER TEMPERATURE VIA THE TEMPERED WATER SENSOR/PROBE. CONTROL MODULE SHALL MAINTAIN THE TEMPERED WATER AT SETPOINT (110°F) BY MODULATING THE POSITION OF THE MIXING VALVE ACTUATOR.

UPON A RISE IS TEMPERED WATER TEMPERATURE ABOVE THE SETPOINT THE ELECTRONIC TEMPERING VALVE SHALL ENERGIZE IT'S INTERNAL ALARM INDICATOR AND ALSO ENERGIZE THE ALARM RELAY SIGNALLY THE DDC SYSTEM OF AN ALARM CONDITION.

ROOFTOP AIR HANDLING UNITS RTU-1 TO RTU-4

DDC SYSTEM SHALL PROVIDE AN ADJUSTABLE WEEKLY SCHEDULE INCORPORATING OPTIMIZED START/STOP SCHEDULING FOR THE OPERATION OF ROOFTOP AIR HANDLING UNITS RTU-1,2,3 AND 4.

OCCUPIED MODE

DDC SYSTEM SHALL ENERGIZE THE AIR HANDLING UNIT RETURN FAN AT MINIMUM SPEED. UPON PROOF OF RETURN FAN OPERATION, THE SUPPLY FAN SHALL BE ENERGIZED AT MINIMUM SPEED. UPON PROOF OF SUPPLY FAN OPERATION, THE TEMPERATURE, PRESSURE AND CO2 CONTROL LOOPS ARE ENABLED. FAILURE OF THE SUPPLY OR RETURN FAN TO RESPOND TO COMMANDS FROM THE DDC SYSTEM SHALL SHUT THE AIR HANDLING UNIT DOWN AND GENERATE AN ALARM AT THE SUPERVISORY CONTROLLER.

A STATIC PRESSURE SENSOR LOCATED 2/3 OF THE DISTANCE DOWNSTREAM IN THE LONGEST SUPPLY DUCT SHALL MONITOR THE SYSTEM PRESSURE AND MODULATE THE SUPPLY FAN SPEED TO MAINTAIN THE SUPPLY AIR STATIC PRESSURE AT SETPOINT. THE DDC SYSTEM SHALL MONITOR THE POSITIONS OF THE TERMINAL UNITS AND RESET THE STATIC PRESSURE SETPOINT BETWEEN PROGRAMMED LIMITS (0 TO 0.75" WC) TO DRIVE THE MOST OPEN TERMINAL UNIT DAMPER TO THE FULLY OPEN POSITION TO MAINTAIN THE TERMINAL UNIT FLOW SETPOINT. THE SPEED OF THE RETURN FAN SHALL TRACK THE SUPPLY FAN.

A RETURN AIR DUCT MOUNTED CARBON DIOXIDE (CO2) DETECTOR SHALL MONITOR THE SYSTEM CO2 LEVEL AND INITIATE A MIXED AIR SEQUENCE IF THE CO2 LEVEL RISES ABOVE THE SETPOINT LEVEL (900 PPM). DDC SYSTEM SHALL MODULATE THE EXHAUST AIR, OUTSIDE AIR AND RETURN AIR DAMPERS TO MAINTAIN THE CO2 LEVEL SETPOINT. MIXED AIR DAMPERS TO BE NORMALLY AT THE MINIMUM OUTDOOR AIR POSITION (CLOSED) AND ARE INITIATED ONLY BY A CALL FOR COOLING OR CO2 DETECTION.

MANUAL RESET HIGH AND AUTOMATIC RESET LOW LIMIT CUT-OUTS UPON SENSING A HIGH RETURN AIR TEMPERATURE OR LOW DISCHARGE TEMPERATURE RESPECTIVELY SHALL SHUT THE UNIT DOWN AND GENERATE AN ALARM AT THE SUPERVISORY CONTROLLER.

A SMOKE IONIZATION DETECTOR LOCATED IN THE SUPPLY AND RETURN DUCTS SHALL SHUT DOWN THE AIR HANDLER AND INDICATE ALARM SIGNAL AT THE SUPERVISORY CONTROLLER AND FIRE ALARM SYSTEM PANEL UPON SENSING THE PRESENCE OF SMOKE.

VENTILATION MODE

OUTDOOR AIR, RETURN AIR AND EXHAUST AIR DAMPERS SHALL BE MODULATED TO MAINTAIN THE AIR HANDLING UNIT CALCULATED SUPPLY AIR DISCHARGE TEMPERATURE SETPOINT. DISCHARGE AIR TEMPERATURE SHALL BE RESET BETWEEN PROGRAMMED LIMITS (55°F TO 72°F) BASED ON A CRITICAL ZONE TEMPERATURE OFFSET. IF THE DISCHARGE AIR TEMPERATURE DROPS BELOW THE SETPOINT TEMPERATURE DUE TO CO2 SYSTEM OUTDOOR AIR REQUIREMENTS, THE DDC SYSTEM SHALL MODULATE THE GLYCOL HEATING COIL CONTROL VALVE TO MAINTAIN THE DISCHARGE AIR TEMPERATURE AT SETPOINT.

COOLING MODE

ON A CALL FOR COOLING, OUTDOOR AIR, RETURN AIR AND EXHAUST AIR DAMPERS ARE TO BE MODULATED TO MAINTAIN THE CALCULATED DISCHARGE AIR TEMPERATURE SETPOINT. IF THE ECONOMIZER IS UNABLE TO MAINTAIN DISCHARGE AIR TEMPERATURE AT SETPOINT, THE DDC SYSTEM SHALL ENERGIZE MECHANICAL COOLING AND MODULATE THE COOLING STAGES TO MAINTAIN THE DISCHARGE AIR TEMPERATURE AT SETPOINT. WHEN THE ENTHALPY OF THE OUTDOOR AIR EXCEEDS THE ENTHALPY OF THE RETURN AIR, THE MIXED AIR DAMPERS SHALL MOVE TO THE MINIMUM OUTDOOR AIR POSITION.

UNOCCUPIED MODE

DURING UNOCCUPIED HOURS, THE AIR HANDLING UNIT SHALL BE DE-ENERGIZED. THE OUTDOOR AIR AND EXHAUST AIR DAMPERS SHALL MOVE TO THE FULLY CLOSED POSITION. THE RETURN AIR DAMPER SHALL MOVE TO THE FULLY OPEN POSITION. TEMPERATURE, PRESSURE AND CO2 CONTROL LOOPS ARE TO BE DISABLED.

WARM UP MODE

PRIOR TO A RETURN TO THE OCCUPIED MODE, THE DDC SYSTEM SHALL UTILIZE THE GLYCOL HEATING SECTION OF THE AIR HANDLER TO SUPPLY WARM AIR TO HELP RECOVER THE SPACE TEMPERATURE TO THE OCCUPIED TEMPERATURE SETPOINT. THE OUTDOOR AIR DAMPER SHALL REMAIN AT THE FULLY CLOSED POSITION. DDC SYSTEM SHALL PROVIDE START TIME OPTIMIZATION TO ENABLE SPACE TEMPERATURE TO REACH THE DESIRED SETPOINT BY OCCUPANCY TIME.

SEQUENCE OF OPERATION - CONT'D

AIR HANDLING UNITS AHU-1 AND AHU-2

DDC SYSTEM SHALL PROVIDE AN ADJUSTABLE WEEKLY SCHEDULE INCORPORATING OPTIMIZED START/STOP SCHEDULING FOR THE OPERATION OF INDOOR AIR HANDLING UNITS AHU-1 AND AHU-2.

OCCUPIED MODE

AIR HANDLING UNIT SHALL RUN CONTINUALLY DURING OCCUPIED HOURS.

DDC CONTROLLER SHALL ENERGIZE AIR HANDLING UNIT SUPPLY FAN AND RETURN FAN. FAILURE OF THE SUPPLY OR RETURN FAN TO RESPOND TO COMMANDS FROM THE DDC SYSTEM SHALL SHUT THE AIR HANDLER DOWN AND GENERATE AN ALARM AT THE SUPERVISORY CONTROLLER.

RETURN AIR DUCT MOUNTED CARBON DIOXIDE (CO2) DETECTOR SHALL MONITOR THE SYSTEM CO2 LEVEL AND INITIATE A MIXED AIR SEQUENCE IF THE SPACE CO2 LEVEL RISES ABOVE THE SETPOINT LEVEL (900 PPM). DDC SYSTEM SHALL MODULATE THE EXHAUST AIR, OUTSIDE AIR AND RETURN AIR DAMPERS TO MAINTAIN THE SYSTEM CO2 LEVEL SETPOINT. MIXED AIR DAMPERS TO BE NORMALLY AT THE MINIMUM OUTDOOR AIR POSITION (CLOSED) AND ARE INITIATED ONLY BY A CALL FOR COOLING OR CO2 DETECTION.

MANUAL RESET HIGH AND LOW LIMIT CUT-OUTS UPON SENSING A HIGH RETURN AIR TEMPERATURE OR LOW DISCHARGE TEMPERATURE RESPECTIVELY SHALL SHUT THE UNIT DOWN AND GENERATE AN ALARM AT THE SUPERVISORY CONTROLLER.

A SMOKE IONIZATION DETECTOR LOCATED IN THE SUPPLY AND RETURN DUCTS SHALL SHUT DOWN THE AIR HANDLER AND INDICATE ALARM SIGNAL AT THE SUPERVISORY CONTROLLER UPON SENSING THE PRESENCE OF SMOKE.

VENTILATION MODE

OUTDOOR AIR, RETURN AIR AND EXHAUST AIR DAMPERS SHALL BE MODULATED TO MAINTAIN THE AIR HANDLING UNIT CALCULATED SUPPLY AIR DISCHARGE TEMPERATURE SETPOINT. DISCHARGE AIR TEMPERATURE SHALL BE RESET BETWEEN PROGRAMMED LIMITS (55°F TO 72°F) BASED ON ZONE TEMPERATURE OFFSET. IF THE DISCHARGE AIR TEMPERATURE DROPS BELOW THE SETPOINT TEMPERATURE DUE TO CO2 SYSTEM OUTDOOR AIR REQUIREMENTS, THE DDC SYSTEM SHALL MODULATE THE GLYCOL HEATING COIL CONTROL VALVE TO MAINTAIN THE DISCHARGE AIR TEMPERATURE AT SETPOINT.

UNOCCUPIED MODE

DURING UNOCCUPIED HOURS, THE AIR HANDLING UNIT SHALL BE DE-ENERGIZED. AIR HANDLING UNIT EXHAUST, OUTDOOR AIR DAMPERS SHALL MOVE TO THE FULLY CLOSED POSITION. AIR HANDLING UNIT RETURN AIR DAMPER SHALL MOVE TO THE FULLY OPEN POSITION, GLYCOL HEATING CONTROL VALVES SHALL PROPORTIONATELY MODULATE TOWARD THE FULLY CLOSED POSITION. CO2 CONTROL LOOP SHALL BE DISABLED.

ENERGY RECOVERY VENTILATOR ERV-1

THE DDC SYSTEM SHALL PROVIDE AN ADJUSTABLE WEEKLY SCHEDULE FOR THE OPERATION OF THE ENERGY RECOVERY VENTILATOR.

OCCUPIED MODE

ENERGY RECOVERY VENTILATOR SHALL RUN CONTINUALLY DURING BUILDING OCCUPIED HOURS.

THE DDC SYSTEM SHALL ENERGIZE THE ENERGY RECOVERY VENTILATOR VIA BACNET INTERFACE AND ENABLE ENERGY RECOVERY WHEEL ROTATION. UPON PROOF OF OUTDOOR AND EXHAUST AIR MOTORIZED DAMPERS OPENING, THE SUPPLY AND EXHAUST FANS SHALL BE ENERGIZED BY THE INTERNAL UNIT CONTROLLER. FAILURE OF THE MOTORIZED DAMPERS TO OPEN SHALL LOCK OUT THE ENERGY RECOVERY VENTILATOR OPERATION AND GENERATE AN ALARM AT THE SUPERVISORY CONTROLLER.

UNIT DISCHARGE AIR TEMPERATURE SHALL BE MAINTAINED AT THE AVERAGE SPACE TEMPERATURE SETPOINT. IF THE DISCHARGE AIR TEMPERATURE DROPS BELOW THE SETPOINT TEMPERATURE, THE DDC SYSTEM SHALL MODULATE THE ENERGY RECOVERY WHEEL SPEED PROPORTIONATELY TOWARD FULL SPEED AS REQUIRED TO SATISFY THE DISCHARGE AIR TEMPERATURE SETPOINT. IF THE DISCHARGE AIR TEMPERATURE IS UNABLE TO BE MET WITH THE WHEEL AT FULL SPEED, THE DDC SYSTEM SHALL MODULATE THE POST HEAT COIL CONTROL VALVE TO MAINTAIN THE DISCHARGE AIR TEMPERATURE AT SETPOINT. UNIT INTERNAL CONTROLLER SHALL MONITOR THE LEAVING EXHAUST AIR TEMPERATURE AND MODULATE THE PREHEAT COIL CONTROL VALVE TO MAINTAIN THE EXHAUST AIR TEMPERATURE AT SETPOINT (36°F). IF THE DISCHARGE AIR TEMPERATURE RISES ABOVE SETPOINT, THE DDC SYSTEM SHALL PROPORTIONATELY MODULATE THE ENERGY RECOVERY WHEEL TOWARD THE MINIMUM SPEED. IF THE ENTHALPY OF THE RETURN AIR FROM THE BUILDING EXCEEDS THE ENTHALPY OF THE OUTDOOR AIR, ENERGY RECOVERY WHEEL OPERATION SHALL BE DE-ENERGIZED.

IF THE AVERAGE SPACE TEMPERATURE RISES ABOVE THE AVERAGE SPACE TEMPERATURE SETPOINT, THE DDC SYSTEM SHALL PROPORTIONATELY DECREASE THE DISCHARGE AIR TEMPERATURE SETPOINT. DISCHARGE AIR TEMPERATURE SETPOINT SHALL BE LIMITED TO A MINIMUM OF 55°F (ADJUSTABLE).

A SMOKE IONIZATION DETECTOR LOCATED IN THE SUPPLY AND RETURN AIR DUCTS SHALL SHUT DOWN THE ENERGY RECOVERY VENTILATOR UPON SENSING AN ALARM CONDITION. DDC SYSTEM SHALL GENERATE AN ALARM AT THE SUPERVISORY CONTROLLER IF AN ALARM CONDITION IS DETECTED.

MANUAL RESET HIGH AND AUTOMATIC RESET LOW LIMIT CUT-OUTS UPON SENSING A HIGH RETURN AIR TEMPERATURE OR LOW DISCHARGE AIR TEMPERATURE RESPECTIVELY SHALL SHUT THE UNIT DOWN AND GENERATE AN ALARM AT THE SUPERVISORY CONTROLLER.

IF A FAILURE OF THE ENERGY RECOVERY VENTILATOR ENTHALPY WHEEL, SUPPLY OR EXHAUST FAN IS DETECTED, DDC SYSTEM SHALL SHUT THE UNIT DOWN AND GENERATE AN ALARM AT THE SUPERVISORY CONTROLLER.

IF A HIGH FILTER DIFFERENTIAL PRESSURE IS DETECTED, THE DDC SYSTEM SHALL INDICATE FILTER SERVICE IS REQUIRED AT THE SUPERVISORY CONTROLLER.

UNOCCUPIED MODE

DURING UNOCCUPIED HOURS, THE DDC SYSTEM SHALL DE-ENERGIZE THE ENERGY RECOVERY VENTILATOR. MOTORIZED OUTDOOR AND EXHAUST AIR DAMPERS SHALL MOVE TO THE CLOSED POSITION.

TERMINAL UNIT (TU)

ON A RISE IN SPACE TEMPERATURE ABOVE THE ROOM THERMOSTAT SETPOINT, THE TERMINAL UNIT SHALL PROPORTIONATELY MODULATE TOWARD THE MAXIMUM AIR FLOW POSITION. ON A DROP IN SPACE TEMPERATURE TOWARD THE SETPOINT, THE TERMINAL UNIT SHALL MODULATE TOWARD THE MINIMUM AIR FLOW POSITION. IF THE SPACE TEMPERATURE CONTINUES TO FALL, THE TERMINAL UNIT WILL REMAIN AT THE MINIMUM POSITION.

UNOCCUPIED MODE

THE TERMINAL UNIT SHALL BE DE-ENERGIZED AT THE MINIMUM POSITION. THE ZONE HEATING TEMPERATURE SHALL BE SET BACK TO 65°F.

TERMINAL UNIT (TU) C/W HYDRONIC PERIMETER HEAT

OCCUPIED MODE

ON A RISE IN SPACE TEMPERATURE ABOVE THE ROOM THERMOSTAT SETPOINT, THE TERMINAL UNIT SHALL PROPORTIONATELY MODULATE TOWARD THE MAXIMUM AIR FLOW POSITION. ON A DROP IN SPACE TEMPERATURE TOWARD THE SETPOINT, THE TERMINAL UNIT SHALL MODULATE TOWARD THE MINIMUM AIR FLOW POSITION. IF THE SPACE TEMPERATURE CONTINUES TO FALL, THE TERMINAL UNIT WILL REMAIN AT THE MINIMUM POSITION AND THE HYDRONIC CONTROL VALVE SHALL BE PROPORTIONATELY MODULATED OPEN. AS THE ROOM TEMPERATURE RISES TOWARD SETPOINT, THE CONTROL VALVE SHALL MODULATE TOWARD THE CLOSED POSITION.

UNOCCUPIED MODE

THE TERMINAL UNIT SHALL BE DE-ENERGIZED AT THE MINIMUM POSITION. THE ZONE HEATING TEMPERATURE SHALL BE SET BACK TO 65°F. IF THE SPACE TEMPERATURE DROPS BELOW THE SETPOINT, THE ASSOCIATED HYDRONIC CONTROL VALVE SHALL BE PROPORTIONATELY MODULATED OPEN. AS THE SPACE TEMPERATURE RISES TOWARD SETPOINT, THE CONTROL VALVE SHALL MODULATE TOWARD THE CLOSED POSITION

SEQUENCE OF OPERATION - CONT'D

FAN POWERED TERMINAL UNIT (FPTU-X) C/W CONTROL BALANCING VALVE CBV-X

OCCUPIED MODE:

ON A RISE IN SPACE TEMPERATURE ABOVE THE ROOM THERMOSTAT SETPOINT, THE PRIMARY AIR CONTROL VALVE SHALL PROPORTIONATELY MODULATE TOWARD THE MAXIMUM AIRFLOW POSITION. ON A DROP IN SPACE TEMPERATURE TOWARD THE SETPOINT, THE PRIMARY AIR VALVE SHALL PROPORTIONATELY MODULATE TOWARD THE MINIMUM AIRFLOW POSITION. IF THE SPACE TEMPERATURE CONTINUES TO FALL BELOW SETPOINT, THE PRIMARY AIR VALVE SHALL MODULATE TO THE MINIMUM HEATING AIRFLOW POSITION AND THE RECIRCULATION FAN SHALL BE ENERGIZED AND PROPORTIONATELY MODULATED TO THE HEATING DESIGN AIRFLOW. IF THE SPACE TEMPERATURE CONTINUES TO FALL, THE TERMINAL UNIT HOT WATER REHEAT COIL CONTROL VALVE SHALL BE PROPORTIONATELY MODULATED OPEN. WHEN THE SPACE TEMPERATURE SETPOINT IS SATISFIED, THE RECIRCULATION FAN SHALL BE DE-ENERGIZED AND THE HOT WATER REHEAT COIL CONTROL VALVE SHALL RETURN TO THE FULLY CLOSED POSITION. DDC SYSTEM SHALL MONITOR HOT WATER CONTROL VALVE POSITION VIA CONTROL VALVE 0-10 VDC POSITION FEEDBACK OUTPUT TERMINALS.

UNOCCUPIED MODE:

DURING UNOCCUPIED HOURS, THE PRIMARY AIR CONTROL VALVE SHALL MOVE TO THE CLOSED POSITION. THE RECIRCULATION FAN SHALL BE DE-ENERGIZED. THE ZONE HEATING TEMPERATURE SHALL BE SET BACK TO 65°F. IF THE SPACE TEMPERATURE DROPS BELOW SETPOINT, THE PRIMARY AIR CONTROL VALVE SHALL REMAIN AT THE CLOSED POSITION AND THE RECIRCULATION FAN SHALL BE ENERGIZED AND PROPORTIONATELY MODULATED TO THE HEATING DESIGN AIRFLOW. IF THE SPACE TEMPERATURE CONTINUES TO FALL, THE TERMINAL UNIT HOT WATER REHEAT COIL CONTROL VALVE SHALL BE MODULATED OPEN. WHEN THE UNOCCUPIED ZONE TEMPERATURE SETPOINT IS SATISFIED, THE RECIRCULATION FAN SHALL BE DE-ENERGIZED AND THE HOT WATER REHEAT COIL CONTROL VALVE SHALL RETURN TO THE FULLY CLOSED POSITION.

UNIT HEATER UH-1

IF THE SPACE TEMPERATURE DROPS BELOW THE HEATING SETPOINT TEMPERATURE (68°C) AS DETECTED BY THE WALL MOUNTED TEMPERATURE SENSOR, THE DDC SYSTEM SHALL ENERGIZE THE UNIT HEATER CIRCULATING FAN VIA THE LOW VOLTAGE RELAY.

WHEN THE SPACE TEMPERATURE SETPOINT IS SATISFIED, THE UNIT HEATER CIRCULATING FAN SHALL BE DEENERGIZED.

CABINET UNIT HEATER (CUH-X)

OCCUPIED MODE

ON A DROP IN SPACE TEMPERATURE BELOW THE THERMOSTAT SETPOINT, THE DDC SYSTEM SHALL ENERGIZE THE CABINET UNIT HEATER CIRCULATING FAN AND MODULATE THE GLYCOL HEATING CONTROL VALVE TO THE FULLY OPEN POSITION. WHEN THE SPACE TEMPERATURE SETPOINT IS SATISFIED, THE CABINET UNIT HEATER CIRCULATING FAN SHALL BE DE-ENERGIZED AND THE GLYCOL HEATING CONTROL VALVE SHALL RETURN TO THE NORMALLY CLOSED POSITION. FORCE FLOW FAN SPEED SHALL BE ADJUSTABLE (OFF/LOW/MED./HIGH) VIA THE HEATER MOUNTED SPEED CONTROL SWITCH.

UNOCCUPIED MODE

DURING UNOCCUPIED HOURS, THE SPACE HEATING TEMPERATURE IS TO BE SET BACK TO 65°F. IF THE SPACE TEMPERATURE DROPS BELOW THE SETPOINT, THE DDC SYSTEM SHALL ENERGIZE THE CABINET UNIT HEATER CIRCULATING FAN AND MODULATE THE GLYCOL HEATING CONTROL VALVE TO THE FULLY OPEN POSITION. WHEN THE SPACE TEMPERATURE SETPOINT IS SATISFIED, CABINET UNIT HEATER CIRCULATING FAN SHALL BE DE-ENERGIZED AND THE GLYCOL HEATING CONTROL VALVE SHALL RETURN TO THE NORMALLY CLOSED POSITION.

BASEBOARD HEATERS TYPE 'X'

OCCUPIED MODE

IF THE SPACE TEMPERATURE DROPS BELOW THE ROOM THERMOSTAT SETPOINT, THE DDC SYSTEM SHALL PROPORTIONATELY MODULATE THE HEATING CONTROL VALVE OPEN. AS THE SPACE TEMPERATURE RISES TOWARD SETPOINT, THE HEATING CONTROL VALVE SHALL PROPORTIONATELY MODULATE CLOSED.

UNOCCUPIED MODE

DURING UNOCCUPIED HOURS, THE SPACE HEATING TEMPERATURE IS TO BE SET BACK TO 65°F. IF THE SPACE TEMPERATURE DROPS BELOW SETPOINT, THE DDC SYSTEM SHALL PROPORTIONATELY MODULATE THE HEATING CONTROL VALVE OPEN. AS THE SPACE TEMPERATURE RISES TOWARD SETPOINT, THE HEATING CONTROL VALVE SHALL PROPORTIONATELY MODULATE CLOSED.

CONDENSING UNIT CU-1 & AIR CONDITIONING UNITS AC-X

THE DDC SYSTEM SHALL PROVIDE AN ADJUSTABLE WEEKLY SCHEDULE FOR THE OPERATION OF THE SPLIT AIR CONDITIONING SYSTEM.

OCCUPIED MODE

INDOOR UNIT CIRCULATING FANS SHALL RUN CONTINUOUSLY ON LOW SPEED DURING OCCUPIED HOURS. ON A RISE IN SPACE TEMPERATURE ABOVE THE SPACE TEMPERATURE SETPOINT, THE DDC SYSTEM SHALL ENERGIZE MECHANICAL COOLING AND INCREASE FAN SPEED SETTING TO MEDIUM. IF THE SPACE TEMPERATURE CONTINUES TO RISE, THE DDC SYSTEM SHALL INCREASE THE FAN SPEED SETTING TO HIGH. WHEN THE SPACE TEMPERATURE IS SATISFIED, MECHANICAL COOLING SHALL BE DE-ENERGIZED.

IF THE SPACE TEMPERATURE DROPS BELOW THE SPACE TEMPERATURE SETPOINT, THE DDC SYSTEM SHALL MODULATE THE ASSOCIATED BASEBOARD HEATER(S) CONTROL VALVE TOWARD THE FULLY OPEN POSITION. AS THE SPACE TEMPERATURE RISES TOWARD SETPOINT, THE DDC SYSTEM SHALL MODULATE THE BASEBOARD HEATER(S) CONTROL VALVE TOWARD THE CLOSED POSITION.

DDC SYSTEM SHALL MONITOR INDOOR UNIT ALARM STATE AND FILTER CONDITION AND GENERATE AN ALARM AT THE SUPERVISORY CONTROLLER WHEN SERVICE IS REQUIRED. DDC SYSTEM SHALL LOCK OUT MECHANICAL COOLING SYSTEM OPERATION AT AN AMBIENT TEMPERATURE OF 32°F (ADJUSTABLE).

UNOCCUPIED MODE

DURING UNOCCUPIED HOURS THE INDOOR UNIT CIRCULATING FANS SHALL BE DE-ENERGIZED. THE ZONE HEATING TEMPERATURE IS TO BE SETBACK TO 65°F. MECHANICAL COOLING SETPOINT SHALL BE SET-UP TO 80°F. IF THE SPACE TEMPERATURE DROPS BELOW SETPOINT, THE DDC SYSTEM SHALL MODULATE THE BASEBOARD HEATER(S) CONTROL VALVE TOWARD THE FULL OPEN POSITION. AS THE SPACE TEMPERATURE RISES TOWARD SETPOINT, THE BASEBOARD HEATER(S) CONTROL VALVE SHALL MODULATE TOWARD THE CLOSED POSITION.

SEQUENCE OF OPERATION - CONT'D

GENERAL

THE NEW DIRECT DIGITAL CONTROL (DDC) SYSTEM SHALL BE JOHNSON CONTROLS FACILITY EXPLORER (FX). NEW FIELD EQUIPMENT CONTROLLERS SHALL BE BACNET MS/TP AND INCORPORATE DIGITAL DISPLAY. THE NEW SUPERVISORY CONTROLLER SHALL BE JOHNSON CONTROLS FACILITY EXPLORER FX80. THE FX80 SUPERVISORY CONTROLLER SHALL CONNECT TO THE EXISTING JOHNSON CONTROLS METASYS SERVER VIA BACNET IP. THE EXISTING METASYS NAE SHALL BE RETAINED AND RE-USED TO IMPORT THE FX80 POINTS TO THE METASYS SERVER.

AN OVERRIDE BUTTON ON THE THERMOSTATS SHALL OVERRIDE THE ASSOCIATED HVAC SYSTEM "ON" FOR 1 HOUR DURING UNOCCUPIED HOURS. PRESSING THE BUTTON AGAIN BEFORE THE OVERRIDE PERIOD EXPIRES SHALL DE-ENERGIZE THE HVAC SYSTEM. THERMOSTATS SHALL INCORPORATE PUSHBUTTON SETPOINT ADJUSTMENT AND LCD TEMPERATURE DISPLAY. ALL SYSTEM SETPOINTS ARE TO BE DISPLAYED REMOTELY BY THE SUPERVISORY CONTROLLER IN REAL TIME VALUES. ALL EQUIPMENT ON/OFF FUNCTIONS AND SETPOINTS SHALL BE ADJUSTABLE VIA THE GRAPHICAL OPERATING SOFTWARE. VAV TERMINAL AIRFLOWS SHALL BE DISPLAYED AND MIN/MAX FLOW VALUES ADJUSTABLE. SETPOINT RANGE LIMITS ARE TO BE IMPLEMENTED.

THE DDC CONTROL SYSTEM SHALL MONITOR AND DISPLAY ON THE GRAPHICAL USER INTERFACE (GUI) THE FOLLOWING POINTS AS A MINIMUM AND PROVIDE THE FOLLOWING ALARMS. ALL WRITABLE POINTS SHALL BE ADJUSTABLE VIA THE GUI:

- OUTDOOR DRY BULB TEMPERATURE
- OUTDOOR WET BULB TEMPERATURE
- BOILER STATUS/OPERATING OUTPUT
- BOILER FAILURE ALARM
- HEATING LOOP SUPPLY/RETURN TEMPERATURES
- HEATING CIRCULATING PUMP STATUS
- HEATING CIRCULATING PUMP FAILURE
- BOILER PUMP STATUS
- BOILER PUMP FAILURE
- GLYCOL FEEDER LOW LEVEL ALARM
- AIR HANDLER STATUS
- AIR HANDLER SUPPLY FAN FAILURE
- AIR HANDLER RETURN FAN FAILURE
- AIR HANDLER MOTORIZED DAMPER POSITIONS
- LOW AIR HANDLER DISCHARGE AIR TEMPERATURE
- HIGH AIR HANDLER RETURN AIR TEMPERATURE
- AIR HANDLER SUPPLY AIR TEMPERATURE
- AIR HANDLER RETURN AIR TEMPERATURE
- AIR HANDLER MIXED AIR TEMPERATURE
- AIR HANDLER SMOKE DETECTOR STATUS
- AIR HANDLER RETURN AIR CO2 LEVEL
- HIGH/LOW SUPPLY AIR STATIC PRESSURE
- VARIABLE FREQUENCY DRIVE OPERATING PARAMETERS
- TERMINAL UNIT AIR VALVE POSITION
- TERMINAL UNIT AIR FLOW RATE
- SPACE TEMPERATURES
- ENERGY RECOVERY VENTILATOR (ERV) SUPPLY FAN STATUS
- ERV EXHAUST FAN STATUS
- ERV SUPPLY FAN FAILURE
- ERV EXHAUST FAN FAILURE
- ERV WHEEL STATUS/SPEED
- ERV WHEEL FAILURE
- ERV RETURN AIR TEMPERATURE
- ERV EXHAUST AIR TEMPERATURE
- ERV BETWEEN PREHEAT AND WHEEL TEMPERATURE
- ERV BETWEEN WHEEL AND POSTHEAT TEMPERATURE
- ERV SUPPLY AIR TEMPERATURE
- ERV HEATING COIL SUPPLY AIR TEMPERATURE
- ERV LOW TEMPERATURE ALARM
- ERV FILTER ALARM STATUS
- SPLIT AIR CONDITIONING SYSTEM STATUS
- SPLIT AIR CONDITIONING SYSTEM ALARM
- DOMESTIC HOT WATER RECIRCULATION PUMP STATUS
- DOMESTIC HOT WATER RECIRCULATION PUMP ALARM
- DOMESTIC HOT WATER MIXING VALVE TEMPERATURE
- DOMESTIC HOT WATER MIXING VALVE ALARM

ALL ALARMS SHALL BE DISPLAYED AT THE SUPERVISORY CONTROLLER.

PROVIDE COMPLETE COMMISSIONING SERVICES BY DDC SYSTEM AUTHORIZED REPRESENTATIVE TO VERIFY THE PROPER OPERATION OF THE CONTROL SYSTEM. COMMISSIONING WORK TO BE PERFORMED IN CONJUNCTION WITH THE DESIGN CONSULTANT TO VERIFY THE PROPER FUNCTIONING OF THE MECHANICAL SYSTEMS IN ACCORDANCE WITH THE SEQUENCES OF OPERATION.

AN ELECTRONIC COPY OF THE SEQUENCE OF OPERATION FOR EACH PIECE OF EQUIPMENT SHALL BE INCORPORATED IN THE DDC PROGRAMMING AND BE EASILY AVAILABLE FOR VIEWING BY THE OPERATOR BY USING A BUTTON ON EACH EQUIPMENT GRAPHIC. LOCATE BUTTON IN SAME RELATIVE LOCATION ON EACH GRAPHIC.

No.	Revision	Date	Initial
0	ISSUED FOR CONSTRUCTION	04/27/18	RG
D	ISSUED FOR FINAL CLIENT REVIEW	04/25/18	RG
C	ISSUED FOR 99% CLIENT REVIEW	04/13/18	RG
B	ISSUED FOR 75% CLIENT REVIEW	03/29/18	RG
A	ISSUED FOR 66% CLIENT REVIEW	03/16/18	RG

Notes:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING DIMENSIONS AND EXISTING CONDITIONS AT THE OUTSET OF CONSTRUCTION. REPORT ANY DISCREPANCIES TO THE ENGINEER. DO NOT PROCEED WITHOUT FURTHER WRITTEN DIRECTION FROM THE ENGINEER.
2. DRAWING SHOWS GENERAL ARRANGEMENT ONLY. DO NOT SCALE.

Approved

Approved

R. A. GRAU
100181428
APR 27/18

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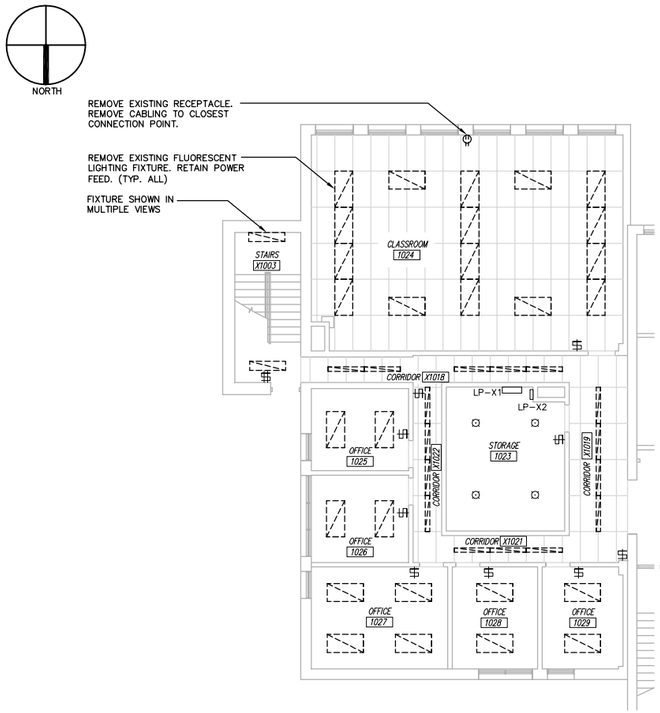
THUNDER BAY ONTARIO

BORA LASKIN BUILDING

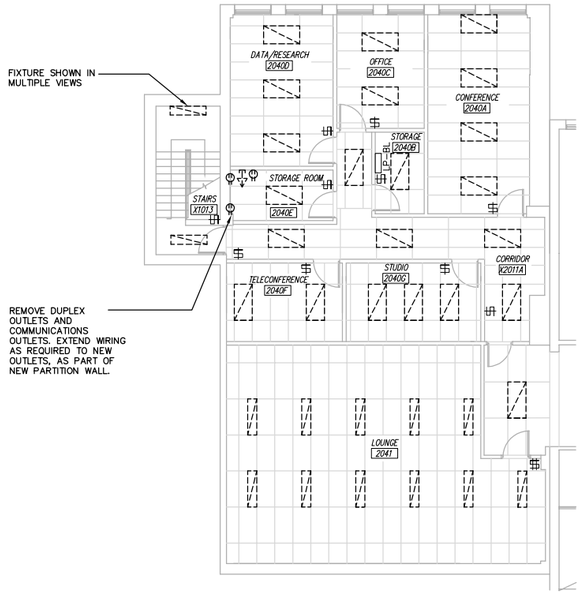
SEQUENCES OF OPERATION

Scale: NA
Drawn By: BT
Ckd. By: RG
Date: APRIL 2018
Dwg. No.: 18-038-M31
Rev. 0



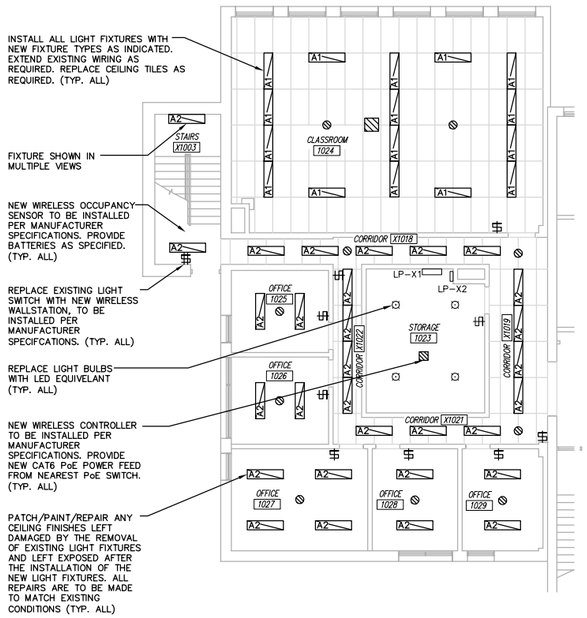
PARTIAL MAIN FLOOR PLAN 'A' - LIGHTING DEMOLITION

SCALE: 1/8" = 1'-0"



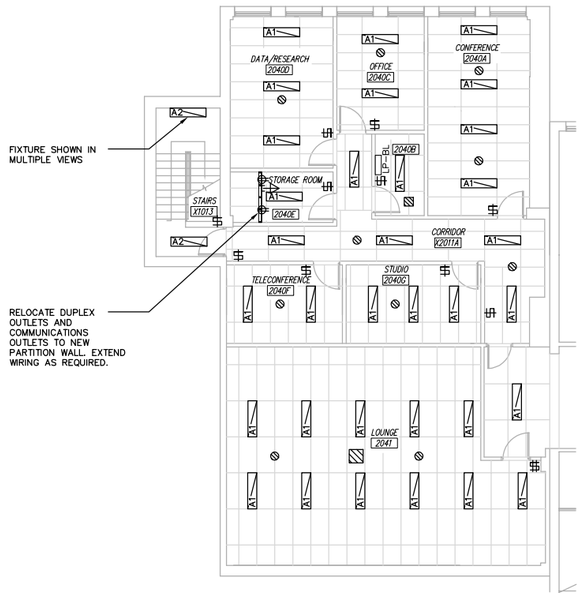
PARTIAL SECOND FLOOR PLAN 'A' - LIGHTING DEMOLITION

SCALE: 1/8" = 1'-0"



PARTIAL MAIN FLOOR PLAN 'A' - LIGHTING RENOVATION

SCALE: 1/8" = 1'-0"



PARTIAL SECOND FLOOR PLAN 'A' - LIGHTING RENOVATION

SCALE: 1/8" = 1'-0"

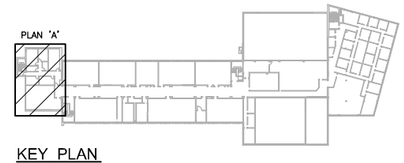
ELECTRICAL LEGEND

- A1 — RECESS MOUNTED – 1' X 4' METALUX 14FP FLAT PANEL LED TROFFER, OR APPROVED EQUIVALENT. METALUX CAT NO. 14FP4235C-SWPD1 C/W 38W, 4400 LUMEN, 350OK, 120V INPUT, 0-10V DIMMABLE DRIVER AND WIRELESS CONTROLLER.
- A2 — SURFACE MOUNTED – 1' X 4' METALUX 14FP FLAT PANEL LED TROFFER, OR APPROVED EQUIVALENT. METALUX CAT NO. 14FP4235C-SWPD1 C/W 38W, 4400 LUMEN, 350OK, 120V INPUT, 0-10V DIMMABLE DRIVER AND WIRELESS CONTROLLER. INCLUDES SURFACE MOUNT KIT CAT NO. FPSURF14.
- WIRELESS WALLSTATION – EATON WAVELINX 4 BUTTON RAISE/LOWER LIGHTING CONTROL, OR APPROVED EQUIVALENT. CAT NO. W4S-RL-W
- WIRELESS CONTROLLER – EATON WAVELINX WIRELESS CONNECTED LIGHTING SYSTEM AREA CONTROLLER OR APPROVED EQUIVALENT C/W POE POWER, OR APPROVED EQUIVALENT. CAT NO. WAC-POE
- WIRELESS OCCUPANCY SENSOR – EATON WAVELINX CEILING SENSOR C/W BATTER POWERED WITH UP TO 10 YEARS BATTERY LIFE, OR APPROVED EQUIVALENT. CAT NO. CWPD-1500

NOTES

1. ALL LIGHTING SWITCHES TO BE REPLACED WITH NEW EATON WAVELINX 4 BUTTON WIRELESS WALLSTATION CAT NO. W4S-RL-W. MULTIPOLE SWITCHES TO BE REMOVED AND REPLACED WITH EQUIVALENT WIRELESS WALLSTATION. FIELD VERIFY SWITCH LOCATIONS FOR ALL LIGHTING.
2. LIGHT FIXTURES THAT ARE NOT INCLUDED IN SCOPE OF WORK HAVE BEEN REMOVED FOR CLARITY.
3. CONTRACTOR TO INSTALL ALL WIRELESS CONTROLLERS, WIRELESS WALLSTATIONS, WIRELESS OCCUPANCY SENSORS, AND WIRELESS LED LIGHTING AS PER MANUFACTURER SPECIFICATIONS.
4. CONTRACTOR TO PROVIDE WIRELESS LIGHTING COMMISSIONING AND SUPPORTING TRAINING AND END USER DOCUMENTATION.
5. CONTRACTOR TO CONTACT ENGINEER IF NEW OR ADDITIONAL LIGHT FIXTURES CONFLICT WITH EXISTING SITE CONDITIONS AND OR DEVICES. CONTRACTOR TO AWAIT ENGINEERS DECISION BEFORE WORK CONTINUES.
6. CONTRACTOR TO RELOCATE ANY MECHANICAL DIFFUSERS (COMPLETE WITH FLEX DUCT) AND/OR GRILLES THAT CONFLICT WHERE NEW OR ADDITIONAL LIGHT FIXTURES ARE TO BE LOCATED.

PLAN 'A'



KEY PLAN

No.	Revision	Date	Initial
0	ISSUED FOR CONSTRUCTION	04/27/18	CF

Notes:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING DIMENSIONS AND EXISTING CONDITIONS AT THE OUTSET OF CONSTRUCTION. REPORT ANY DISCREPANCIES TO THE ENGINEER. DO NOT PROCEED WITHOUT FURTHER WRITTEN DIRECTION FROM THE ENGINEER.
2. DRAWING SHOWS GENERAL ARRANGEMENT ONLY. DO NOT SCALE.

Approved

Approved

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LAKEHEAD UNIVERSITY

THUNDER BAY ONTARIO

BORA LASKIN BUILDING
PLAN 'A'
MAIN FLOOR AND SECOND FLOOR PLANS
LIGHTING DEMOLITION AND RENOVATION

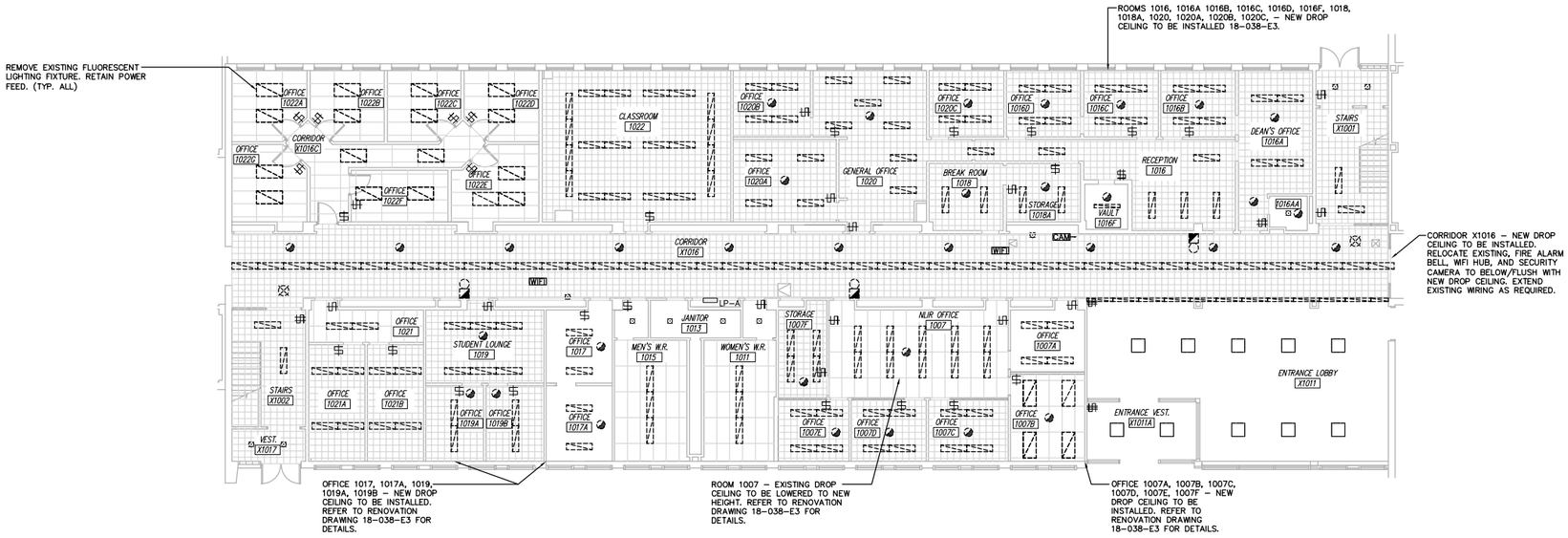
ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH MECHANICAL DRAWINGS

Scale:	Drawn By: CF	Date:
1/8" = 1'-0"	Ckd. By: JK	APRIL 2018
	Dwg. No.: 18-038-E1	Rev. 0

NORTH

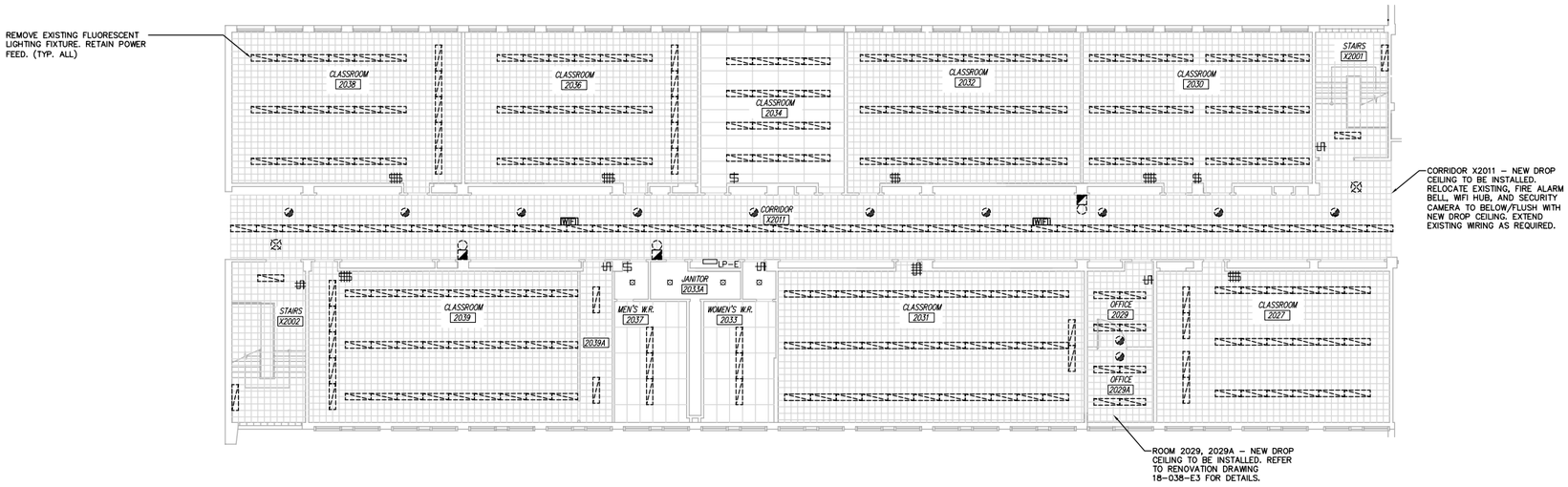
NOTES

1. ASSUME REGULAR SWITCHING CONTROLS FOR LIGHT FIXTURES UNLESS OTHERWISE INDICATED BY DIMMER. FIELD VERIFY SWITCH LOCATIONS FOR ALL LIGHTING.
2. LIGHT FIXTURES THAT ARE NOT INCLUDED IN SCOPE OF WORK HAVE BEEN REMOVED FOR CLARITY.
3. CONTRACTOR TO CONTACT ENGINEER IF NEW OR ADDITIONAL LIGHT FIXTURES CONFLICT WITH EXISTING SITE CONDITIONS AND OR DEVICES. CONTRACTOR TO AWAIT ENGINEERS DECISION BEFORE WORK CONTINUES.
4. CONTRACTOR TO RELOCATE ANY MECHANICAL DIFFUSERS (COMPLETE WITH FLEX DUCT) AND/OR GRILLES THAT CONFLICT WHERE NEW OR ADDITIONAL LIGHT FIXTURES ARE TO BE LOCATED.



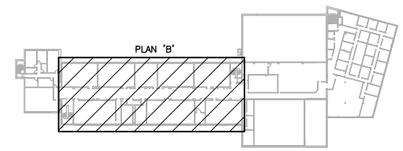
PARTIAL MAIN FLOOR PLAN 'B' - LIGHTING DEMOLITION

SCALE: 3/32" = 1'-0"



PARTIAL SECOND FLOOR PLAN 'B'- LIGHTING DEMOLITION

SCALE: 3/32" = 1'-0"



KEY PLAN

No.	Revision	Date	Initial
0	ISSUED FOR CONSTRUCTION	04/27/18	CF

Notes:

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2. DRAWING SHOWS GENERAL ARRANGEMENT ONLY. DO NOT SCALE.

Approved

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LAKEHEAD UNIVERSITY

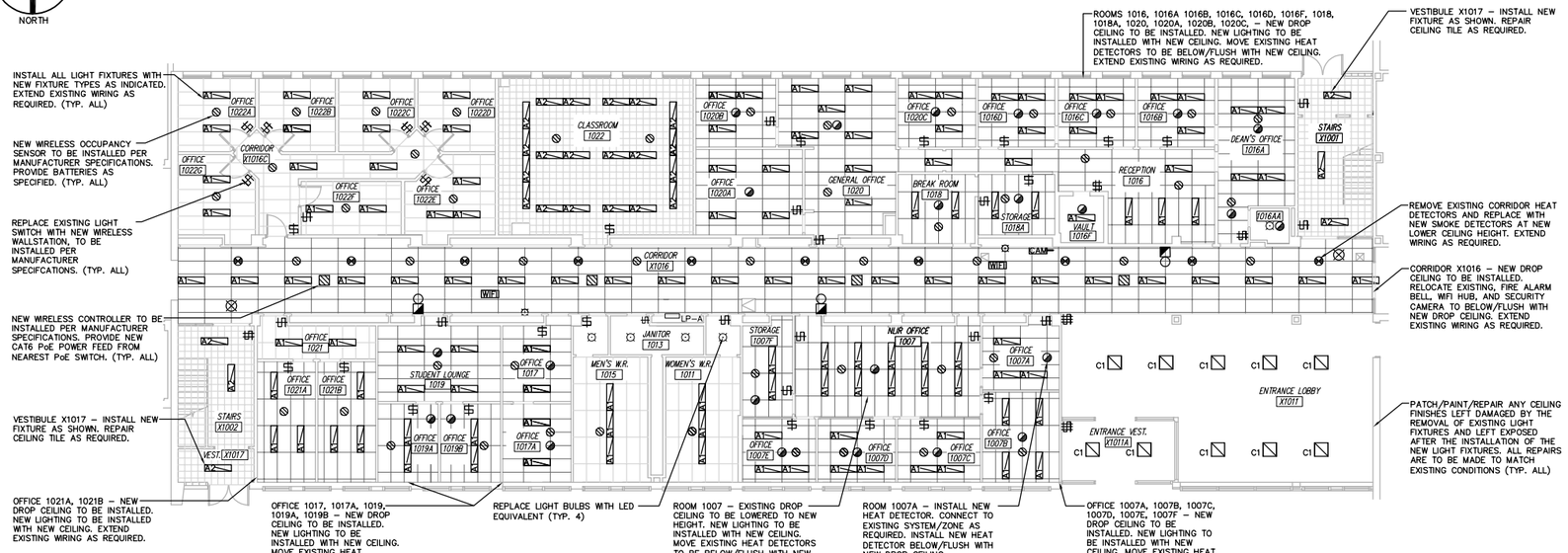
THUNDER BAY ONTARIO

BORA LASKIN BUILDING
PLAN 'B'
MAIN FLOOR AND SECOND FLOOR
LIGHTING DEMOLITION

ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH MECHANICAL DRAWINGS

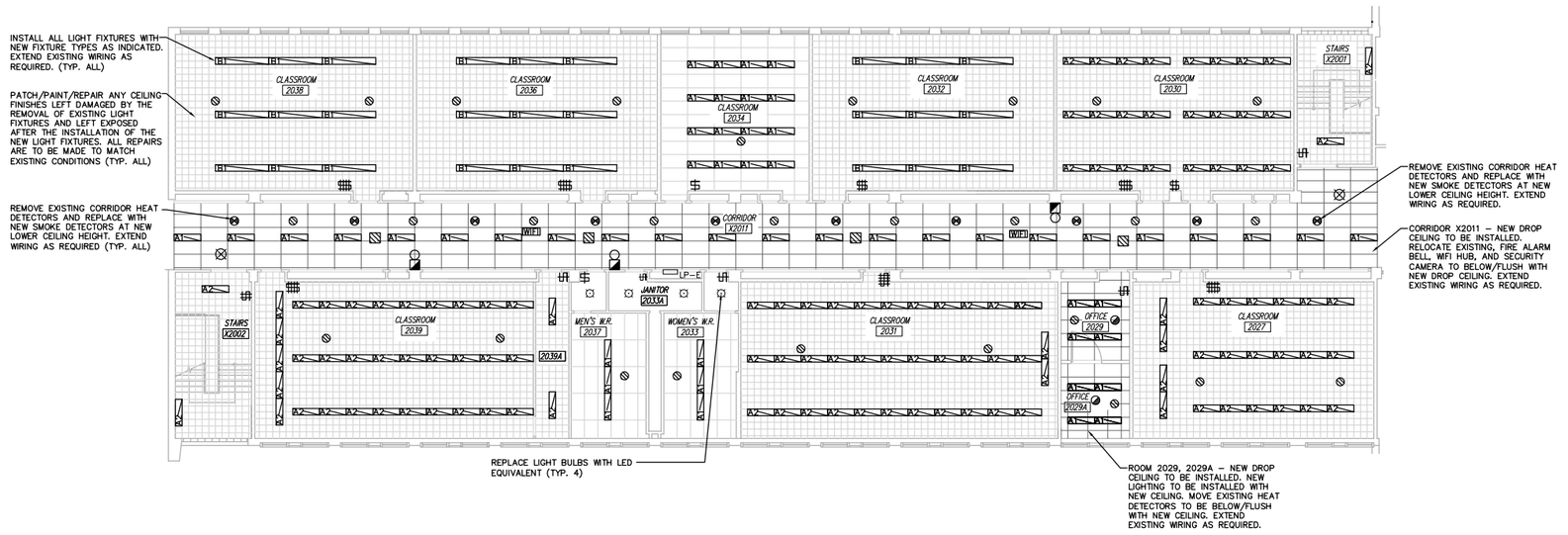
Scale:	Drawn By: CF	Date:
3/32" = 1'-0"	Ckd. By: JK	APRIL 2018
	Dwg. No.: 18-038-E2	Rev. 0

NORTH



PARTIAL MAIN FLOOR PLAN 'B' - LIGHTING RENOVATION

SCALE: 3/32" = 1'-0"



PARTIAL SECOND FLOOR PLAN 'B' - LIGHTING RENOVATION

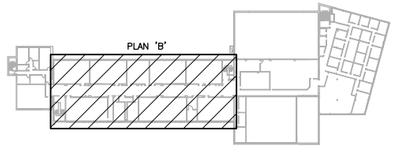
SCALE: 3/32" = 1'-0"

ELECTRICAL LEGEND

- A1 — RECESS MOUNTED – 1' X 4' 14FP METALUX FLAT PANEL LED TROFFER OR APPROVED EQUIVALENT. METALUX CAT NO. 14FP4235C–SWPD1 C/W 38W, 4400 LUMEN, 3500K, 120V INPUT, 0–10V DIMMABLE DRIVER AND WIRELESS CONTROLLER.
- A2 — SURFACE MOUNTED – 1' X 4' METALUX 14FP FLAT PANEL LED TROFFER OR APPROVED EQUIVALENT. METALUX CAT NO. 14FP4235C C/W 38W, 4400 LUMEN, 3500K, 120V INPUT, 0–10V DIMMABLE DRIVER AND WIRELESS CONTROLLER. INCLUDES SURFACE MOUNT KIT CAT NO. FPSURF14
- B1 — SUSPENDED FIXTURE – 1' X 8' METALUX LINEAR WAVESTREAM LED WSL FIXTURE C/W INTEGRATED WIRELESS CONTROLLER AND ADJUSTING HANGING SUPPORT, OR APPROVED EQUIVALENT. METALUX CAT NO. 8WSL–LD2–80–SPS–UPL15–UNV–L835–CD1–SWPD1
- C1 — CEILING FIXTURE – 2' X 2' FP22 LED CEILING FIXTURE OR APPROVED EQUIVALENT METALUX CAT NO. 22FP4235C–SWPD1 C/W 29W, 3400LUMEN, 3500K, 120V INPUT, SATIN NICKEL. INCLUDE WIRELESS CONTROLLER.
- WALLSTATION — WIRELESS WALLSTATION – EATON WAVELINX 4 BUTTON RAISE/LOWER LIGHTING CONTROL OR APPROVED EQUIVALENT. CAT NO. W4S–RL–W
- WIRELESS CONTROLLER — WIRELESS CONTROLLER – EATON WAVELINX WIRELESS CONNECTED LIGHTING SYSTEM AREA CONTROLLER OR APPROVED EQUIVALENT C/W POE POWER OR APPROVED EQUIVALENT. CAT NO. WAC–POE
- WIRELESS OCCUPANCY SENSOR – EATON WAVELINX CEILING SENSOR C/W BATTERY POWERED WITH UP TO 10 YEARS BATTERY LIFE, OR APPROVED EQUIVALENT. CAT NO. CWPD–1500

NOTES

1. ALL LIGHTING SWITCHES TO BE REPLACED WITH NEW EATON WAVELINX 4 BUTTON WIRELESS WALLSTATION CAT NO. W4S–RL–W. MULTIPOLE SWITCHES TO BE REMOVED AND REPLACED WITH EQUIVALENT WIRELESS WALLSTATION. FIELD VERIFY SWITCH LOCATIONS FOR ALL LIGHTING.
2. LIGHT FIXTURES THAT ARE NOT INCLUDED IN SCOPE OF WORK HAVE BEEN REMOVED FOR CLARITY.
3. CONTRACTOR TO INSTALL ALL WIRELESS CONTROLLERS, WIRELESS WALLSTATIONS, WIRELESS OCCUPANCY SENSORS, AND WIRELESS LED LIGHTING AS PER MANUFACTURER SPECIFICATIONS.
4. CONTRACTOR TO PROVIDE WIRELESS LIGHTING COMMISSIONING AND SUPPORTING TRAINING AND END USER DOCUMENTATION.
5. CONTRACTOR TO CONTACT ENGINEER IF NEW OR ADDITIONAL LIGHT FIXTURES CONFLICT WITH EXISTING SITE CONDITIONS AND OR DEVICES. CONTRACTOR TO AWAIT ENGINEERS DECISION BEFORE WORK CONTINUES.
6. CONTRACTOR TO RELOCATE ANY MECHANICAL DIFFUSERS (COMPLETE WITH FLEX DUCT) AND/OR GRILLES THAT CONFLICT WHERE NEW OR ADDITIONAL LIGHT FIXTURES ARE TO BE LOCATED.



KEY PLAN

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Approved

Approved

LICENSED PROFESSIONAL ENGINEER J. R. KIERSTEAD 100181072 PROVINCE OF ONTARIO Apr. 27/18

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LAKEHEAD UNIVERSITY

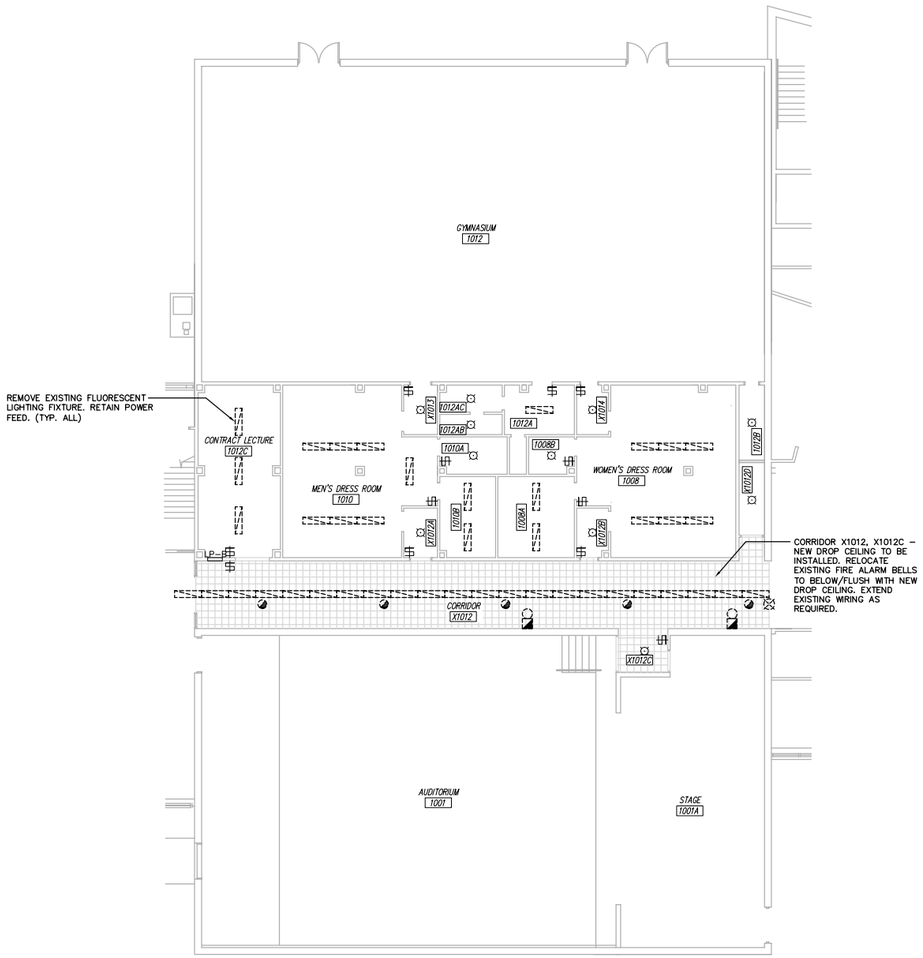
THUNDER BAY ONTARIO

BORA LASKIN BUILDING
PLAN 'B'
MAIN FLOOR AND SECOND FLOOR
LIGHTING RENOVATION

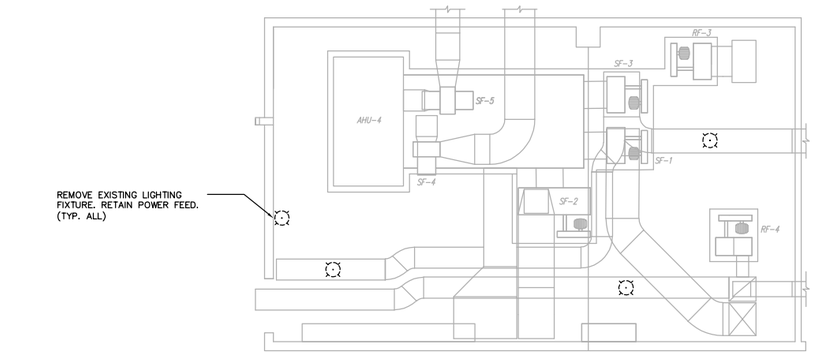
ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH MECHANICAL DRAWINGS

Scale:	Drawn By: CF	Date:
3/32" = 1'–0"	Ckd. By: JK	APRIL 2018
	Dwg. No.: 18–038–E3	Rev. 0

NORTH

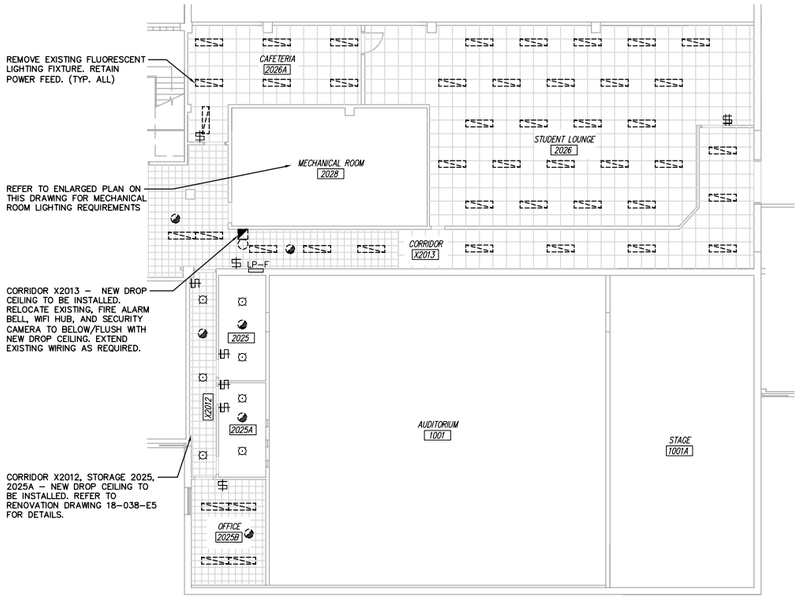


PARTIAL MAIN FLOOR PLAN 'C' - LIGHTING DEMOLITION
SCALE: 3/32" = 1'-0"



SECOND FLOOR MECHANICAL ROOM - LIGHTING DEMOLITION
SCALE: 1/4" = 1'-0"

UPPER GYMNASIUM LIGHTING NOT SHOWN FOR CLARITY. NOT PART OF THE SCOPE OF THIS PROJECT.

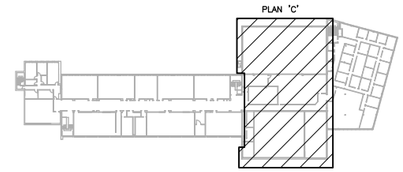


PARTIAL SECOND FLOOR PLAN 'C' - LIGHTING DEMOLITION
SCALE: 3/32" = 1'-0"

ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH MECHANICAL DRAWINGS

NOTES

1. ASSUME REGULAR SWITCHING CONTROLS FOR LIGHT FIXTURES UNLESS OTHERWISE INDICATED BY DIMMER. FIELD VERIFY SWITCH LOCATIONS FOR ALL LIGHTING.
2. LIGHT FIXTURES THAT ARE NOT INCLUDED IN SCOPE OF WORK HAVE BEEN REMOVED FOR CLARITY.
3. CONTRACTOR TO CONTACT ENGINEER IF NEW OR ADDITIONAL LIGHT FIXTURES CONFLICT WITH EXISTING SITE CONDITIONS AND OR DEVICES. CONTRACTOR TO AWAIT ENGINEERS DECISION BEFORE WORK CONTINUES.
4. CONTRACTOR TO RELOCATE ANY MECHANICAL DIFFUSERS (COMPLETE WITH FLEX DUCT) AND/OR GRILLES THAT CONFLICT WHERE NEW OR ADDITIONAL LIGHT FIXTURES ARE TO BE LOCATED.



KEY PLAN

No.	Revision	Date	Initial
0	ISSUED FOR CONSTRUCTION	04/27/18	CF

Notes:
1. CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING DIMENSIONS AND EXISTING CONDITIONS AT THE OUTSET OF CONSTRUCTION. REPORT ANY DISCREPANCIES TO THE ENGINEER. DO NOT PROCEED WITHOUT FURTHER WRITTEN DIRECTION FROM THE ENGINEER.
2. DRAWING SHOWS GENERAL ARRANGEMENT ONLY. DO NOT SCALE.

Approved	Approved
	LICENSED PROFESSIONAL ENGINEER J.R. KIERSTEAD 100181072 PROVINCE OF ONTARIO

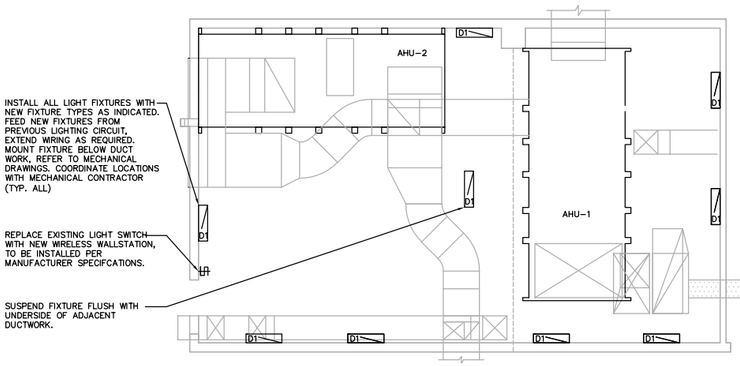
TBT ENGINEERING
CONSULTING GROUP
Thunder Bay Phone: (807) 624-5160
E-mail: info@tbte.ca

LAKEHEAD UNIVERSITY
THUNDER BAY ONTARIO

BORA LASKIN BUILDING
PLAN 'C'
MAIN FLOOR AND SECOND FLOOR
LIGHTING DEMOLITION

Scale:	Drawn By: CF Ckd. By: JK	Date:
3/32" = 1'-0"	Dwg. No.: 18-038-E4	APRIL 2018 Rev. 0

NORTH



SECOND FLOOR MECHANICAL ROOM - LIGHTING RENOVATION

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

ELECTRICAL LEGEND

- A1 — RECESS MOUNTED – 1' X 4' METALUX 14FP FLAT PANEL LED TROFFER OR APPROVED EQUIVALENT. METALUX CAT NO. 14FP4235C-SWPD1 C/W 38W, 4400 LUMEN, 3500K, 120V INPUT, 0-10V DIMMABLE DRIVER AND WIRELESS CONTROLLER.
- A2 — SURFACE MOUNTED – 1' X 4' METALUX 14FP FLAT PANEL LED TROFFER OR APPROVED EQUIVALENT. METALUX CAT NO. 14FP4235C C/W 38W, 4400 LUMEN, 3500K, 120V INPUT, 0-10V DIMMABLE DRIVER AND WIRELESS CONTROLLER. INCLUDES SURFACE MOUNT KIT CAT NO. FPSURF14.
- A3 — SURFACE MOUNTED – 1' X 4' EATON WET LOCATION RATED LED FIXTURE OR APPROVED EQUIVALENT. CAT NO. HVSL12-4-LD4-2-LO-35-UV-C-EDD-1-IP63 C/W 47W, 5379 LUMEN, 3500K, 120V INPUT, 0-10V DIMMABLE DRIVER AND WIRELESS CONTROLLER.
- D1 — WALL MOUNTED – METALUX SNLED LENSED STRIPLIGHT OR APPROVED EQUIVALENT. METALUX CAT NO. 4SNLED-LD5-34SL-LC-UNV-L835-CD1-U C/W 24.9W, 3567 LUMEN, 3500K, 120V INPUT, 0-10V DIMMABLE DRIVER AND WIRELESS CONTROLLER.
- WIRELESS WALLSTATION – EATON WAVELINX 4 BUTTON RAISE/LOWER LIGHTING CONTROL OR APPROVED EQUIVALENT. CAT NO. W4S-RL-W
- WIRELESS CONTROLLER – EATON WAVELINX WIRELESS CONNECTED LIGHTING SYSTEM AREA CONTROLLER OR APPROVED EQUIVALENT C/W POE POWER OR APPROVED EQUIVALENT. CAT NO. WAC-POE
- WIRELESS OCCUPANCY SENSOR – EATON WAVELINX CEILING SENSOR C/W BATTERY POWERED WITH UP TO 10 YEARS BATTERY LIFE, OR APPROVED EQUIVALENT. CAT NO. CWPD-1500

NOTES

1. ALL LIGHTING SWITCHES TO BE REPLACED WITH NEW EATON WAVELINX 4 BUTTON WIRELESS WALLSTATION CAT NO. W4S-RL-W. MULTIPOLE SWITCHES TO BE REMOVED AND REPLACED WITH EQUIVALENT WIRELESS WALLSTATION. FIELD VERIFY SWITCH LOCATIONS FOR ALL LIGHTING.
2. LIGHT FIXTURES THAT ARE NOT INCLUDED IN SCOPE OF WORK HAVE BEEN REMOVED FOR CLARITY.
3. CONTRACTOR TO INSTALL ALL WIRELESS CONTROLLERS, WIRELESS WALLSTATIONS, WIRELESS OCCUPANCY SENSORS, AND WIRELESS LED LIGHTING AS PER MANUFACTURER SPECIFICATIONS.
4. CONTRACTOR TO PROVIDE WIRELESS LIGHTING COMMISSIONING AND SUPPORTING TRAINING AND END USER DOCUMENTATION.
5. CONTRACTOR TO CONTACT ENGINEER IF NEW OR ADDITIONAL LIGHT FIXTURES CONFLICT WITH EXISTING SITE CONDITIONS AND OR DEVICES. CONTRACTOR TO AWAIT ENGINEERS DECISION BEFORE WORK CONTINUES.
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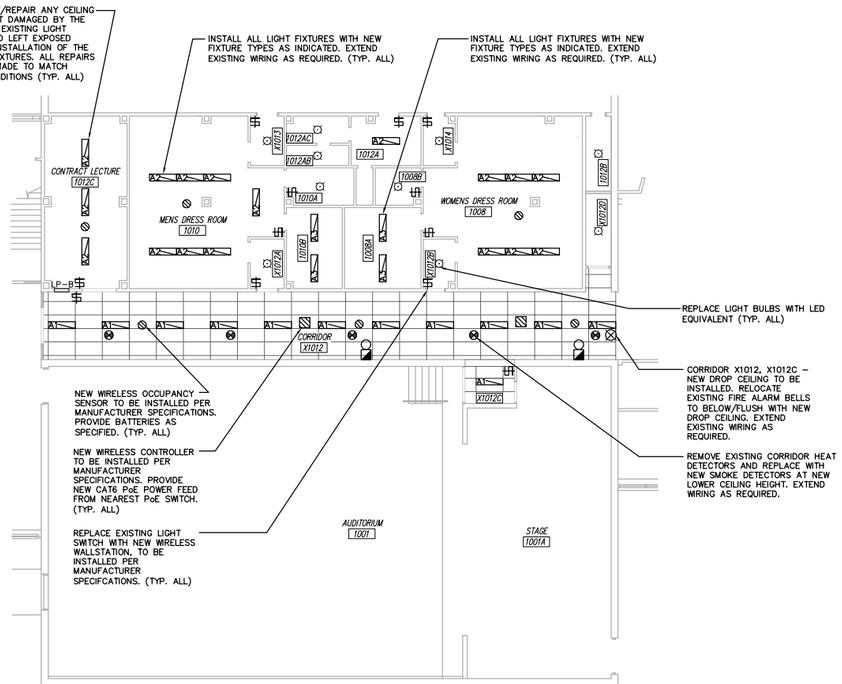
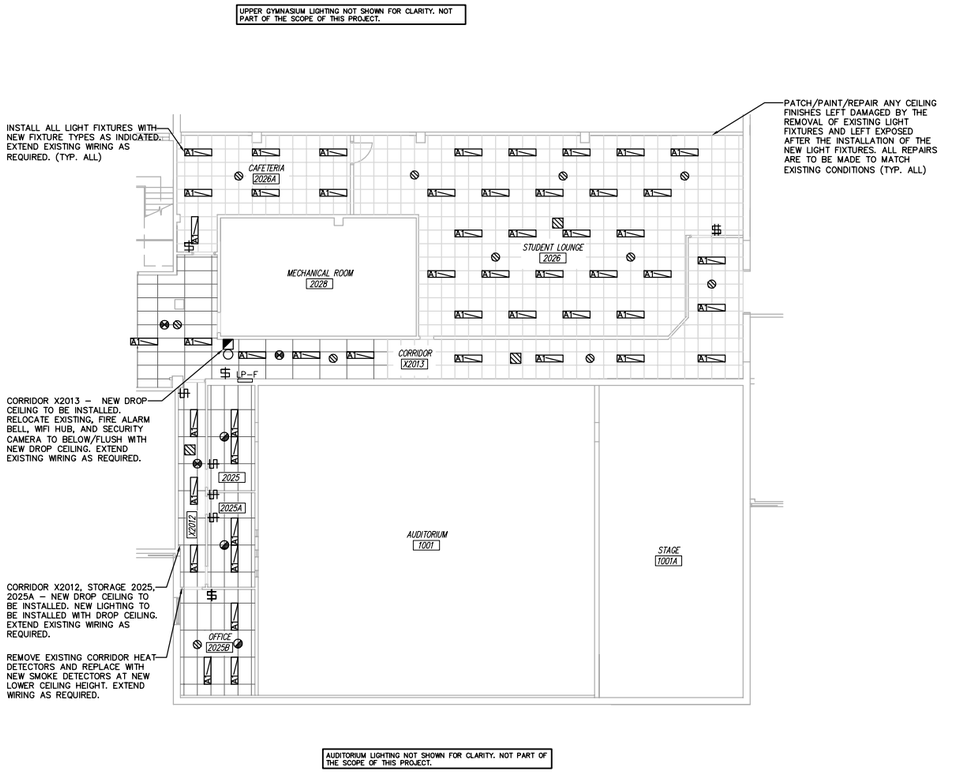


PARTIAL MAIN FLOOR PLAN 'C' - LIGHTING RENOVATION

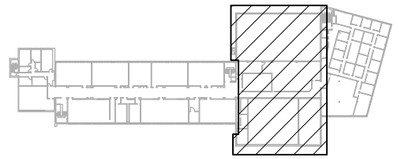
SCALE: 3/32" = 1'-0"



PARTIAL SECOND FLOOR PLAN 'C' - LIGHTING RENOVATION

SCALE: 3/32" = 1'-0"

ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH MECHANICAL DRAWINGS



KEY PLAN

No.	Revision	Date	Initial
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Approved

Approved

LICENSED PROFESSIONAL ENGINEER J.R. KIERSTEAD 100181072 Oct. 27/18 PROVINCE OF ONTARIO

TBT ENGINEERING CONSULTING GROUP
Thunder Bay Phone: (807) 624-5160
E-mail: info@tbte.ca

LAKEHEAD UNIVERSITY
THUNDER BAY ONTARIO

BORA LASKIN BUILDING
PLAN 'C'
MAIN FLOOR AND SECOND FLOOR
LIGHTING RENOVATION

Scale:	Drawn By: CF / Ckd. By: JK	Date: APRIL 2018	
3/32" = 1'-0"	Dwg. No.: 18-038-E5		Rev. 0

NORTH

REMOVE EXISTING FLUORESCENT LIGHTING FIXTURE. RETAIN POWER FEED. (TYP. ALL)

PARTIAL MAIN FLOOR PLAN 'D' - LIGHTING DEMOLITION

SCALE: 1/8" = 1'-0"

REMOVE EXISTING FLUORESCENT LIGHTING FIXTURE. RETAIN POWER FEED. (TYP. ALL)

PARTIAL SECOND FLOOR PLAN 'D' - LIGHTING DEMOLITION

SCALE: 1/8" = 1'-0"

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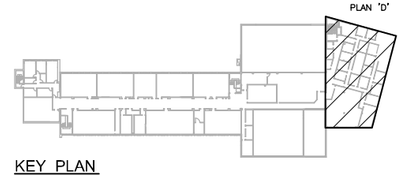

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LAKEHEAD UNIVERSITY

THUNDER BAY ONTARIO

BORA LASKIN BUILDING
PLAN 'D'
MAIN FLOOR AND SECOND FLOOR
LIGHTING DEMOLITION

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1/8" = 1'-0"	Dwg. No.: 18-038-E6		Rev. 0

NORTH

PARTIAL MAIN FLOOR PLAN 'D' - LIGHTING RENOVATION
SCALE: 1/8" = 1'-0"

PARTIAL SECOND FLOOR PLAN 'D' - LIGHTING RENOVATION
SCALE: 1/8" = 1'-0"

ELECTRICAL LEGEND

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- D1 — WALL/CEILING MOUNTED – METALUX SNLED LENSED TROFFER OR APPROVED EQUIVALENT. METALUX CAT NO. 4SNLED-LD5-34SL-LC-UNV-L835-CD1-U C/W 24.9W, 3567 LUMEN, 3500K, 120V INPUT, 0-10V DIMMABLE DRIVER AND WIRELESS CONTROLLER.
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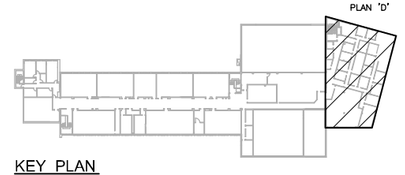

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PROVINCE OF ONTARIO

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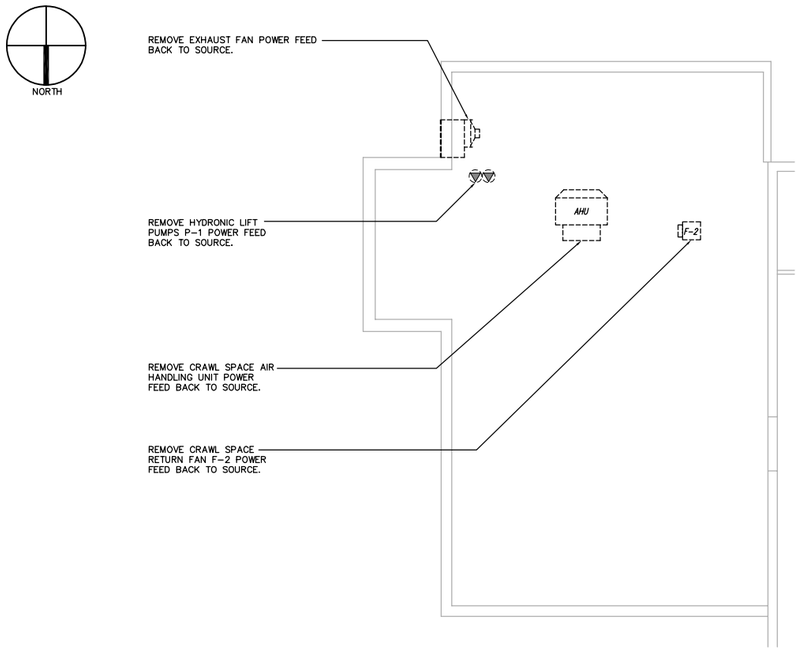
THUNDER BAY ONTARIO

BORA LASKIN BUILDING
PLAN 'D'
MAIN FLOOR AND SECOND FLOOR
LIGHTING RENOVATION

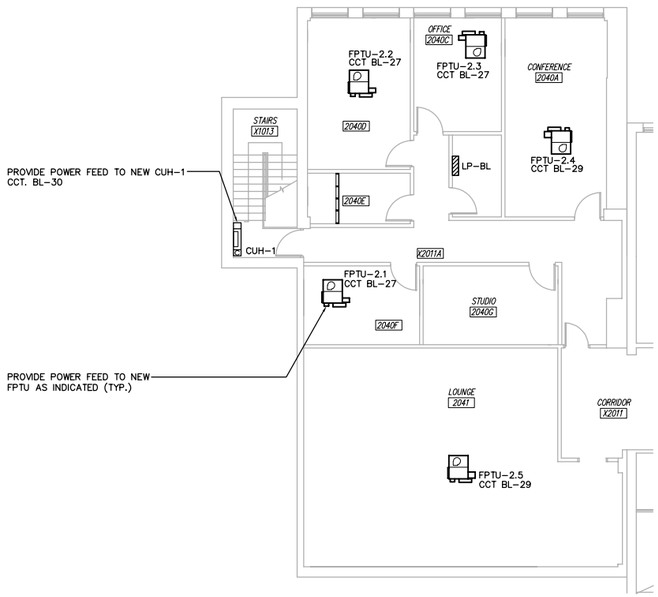
ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH MECHANICAL DRAWINGS

Scale:	Drawn By: CF	Date:
1/8" = 1'-0"	Ckd. By: JK	APRIL 2018
	Dwg. No.: 18-038-E7	Rev. 0



PARTIAL CRAWLSPACE PLAN 'A' - ELECTRICAL DEMOLITION

SCALE: 1/8" = 1'-0"

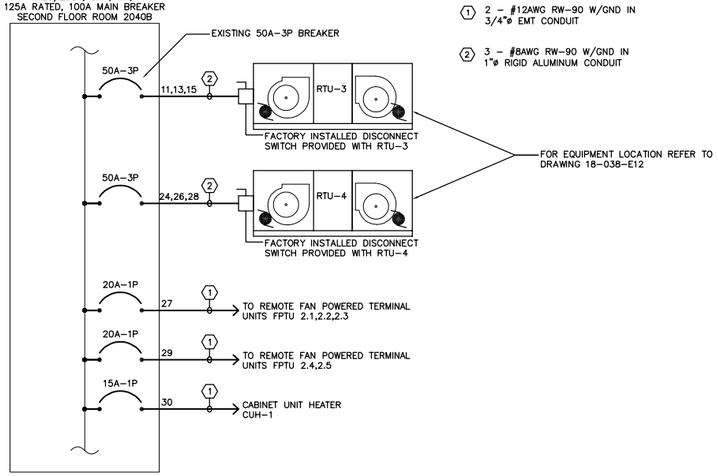


PARTIAL SECOND FLOOR PLAN 'A' - ELECTRICAL RENOVATION

SCALE: 1/8" = 1'-0"

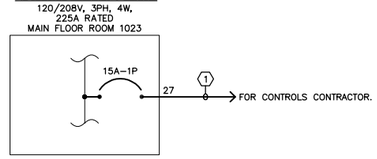
EXISTING LIGHTING PANEL 'BL'

120/208V, 3PH, 4W,
125A RATED, 100A MAIN BREAKER
SECOND FLOOR ROOM 2040B



EXISTING LIGHTING PANEL 'X1'

120/208V, 3PH, 4W,
225A RATED
MAIN FLOOR ROOM 1023



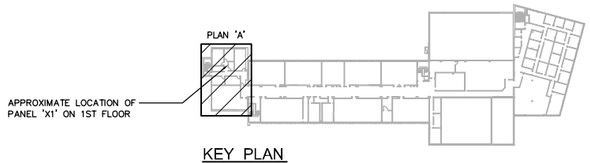
SINGLE LINE DIAGRAM

SCALE = N.T.S.

CABLE LEGEND

(1) 2 – #12AWG RW-90 W/GND IN 3/4"ø EMT CONDUIT

(2) 3 – #8AWG RW-90 W/GND IN 1"ø RIGID ALUMINUM CONDUIT



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Approved

Approved

LICENSED PROFESSIONAL ENGINEER J.R. KIERSTEAD 100181072 PROVINCE OF ONTARIO Apr. 27/18

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LAKEHEAD UNIVERSITY

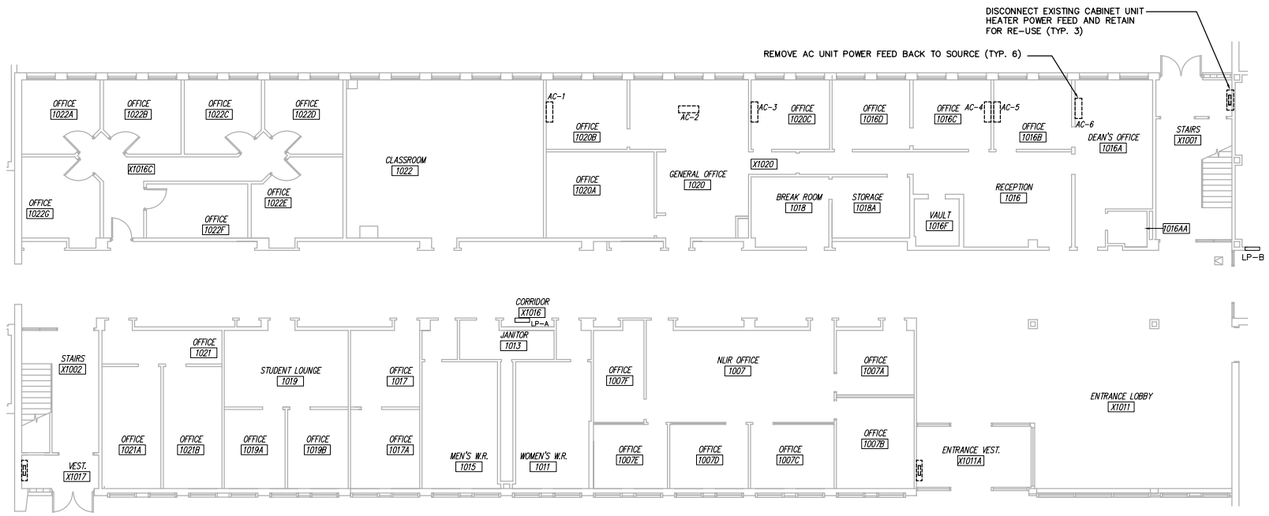
THUNDER BAY ONTARIO

BORA LASKIN BUILDING
PLAN 'A'
SECOND FLOOR, ROOF, CRAWLSPACE PLAN
ELECTRICAL DEMOLITION & RENOVATION

ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH MECHANICAL DRAWINGS

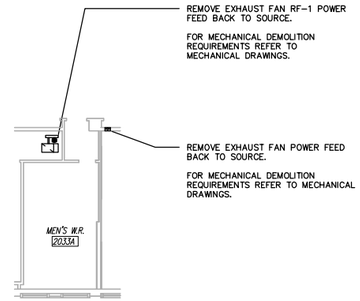
Scale:	Drawn By: CF	Date:
1/8" = 1'-0"	Ckd. By: JK	APRIL 2018
	Dwg. No.: 18-038-E8	Rev. 0

NORTH



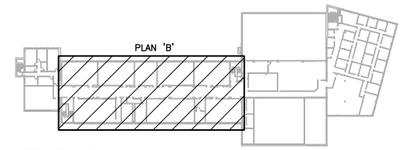
PARTIAL MAIN FLOOR PLAN 'B' - ELECTRICAL DEMOLITION

SCALE: 3/32" = 1'-0"

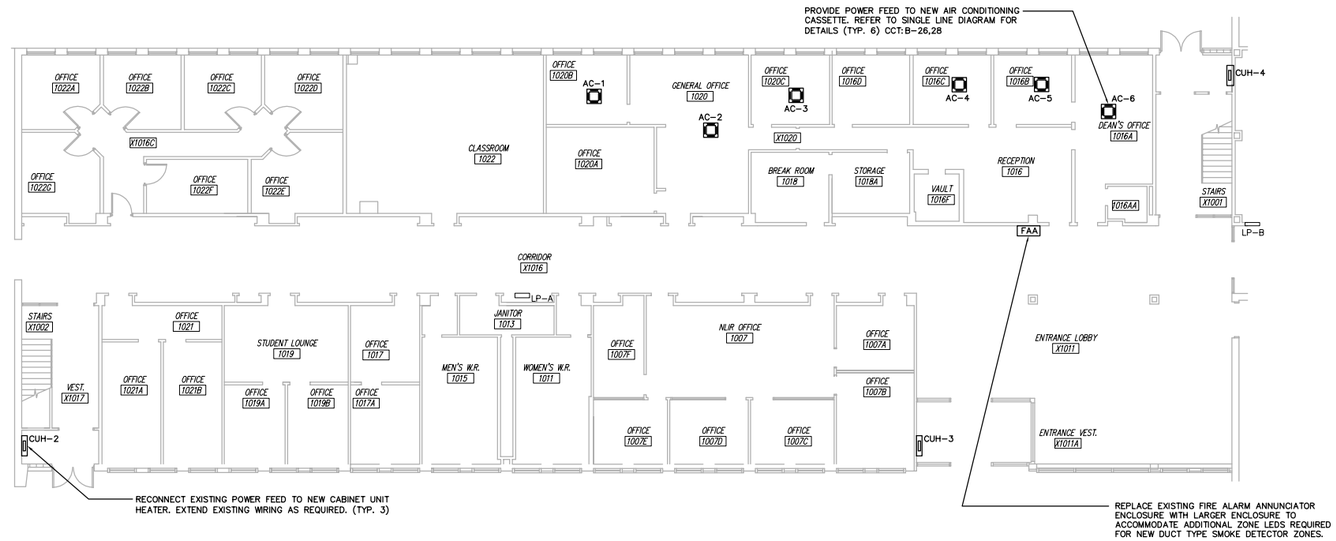


PARTIAL SECOND FLOOR PLAN 'B' - ELECTRICAL DEMOLITION

SCALE: 3/32" = 1'-0"



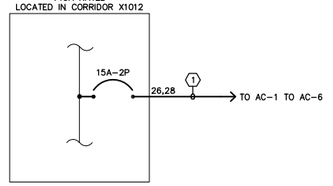
KEY PLAN



PARTIAL MAIN FLOOR PLAN 'B' - ELECTRICAL RENOVATION

SCALE: 3/32" = 1'-0"

EXISTING
LIGHTING PANEL 'B'
120/208V, 3PH, 4W,
140A RATED
LOCATED IN CORRIDOR X1012



CABLE LEGEND

1. 2 – #12AWG RW-90 W/GND IN 3/4"ø EMT CONDUIT

SINGLE LINE DIAGRAM

SCALE = N.T.S.

No.	Revision	Date	Initial
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MAIN FLOOR AND SECOND FLOOR
ELECTRICAL DEMOLITION AND RENOVATION

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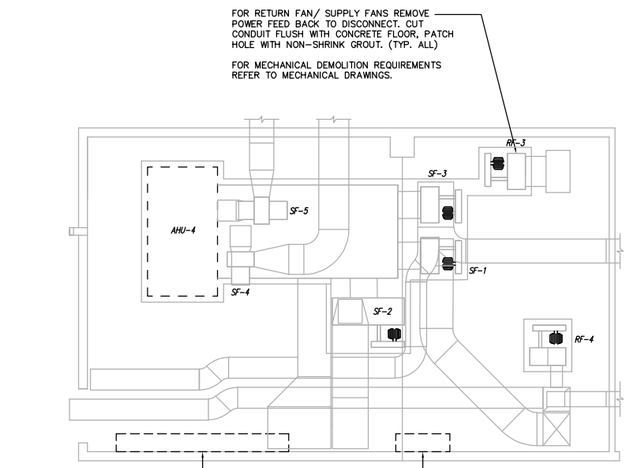
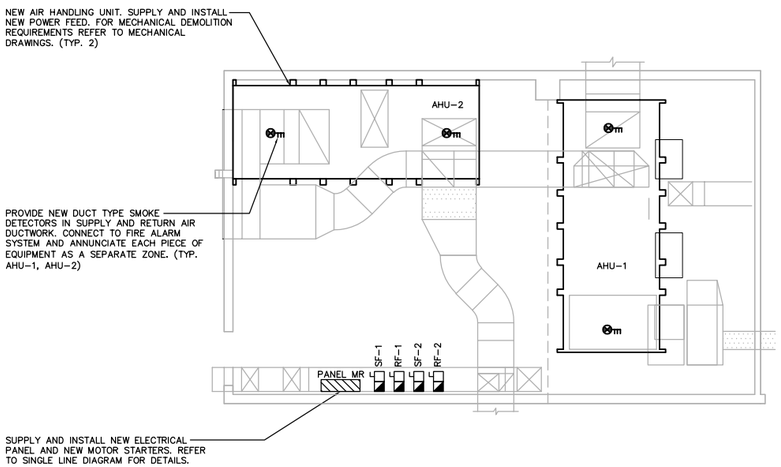
3/32" = 1'-0"	Dwg. No.: 18-038-E9	Rev. 0

NORTH



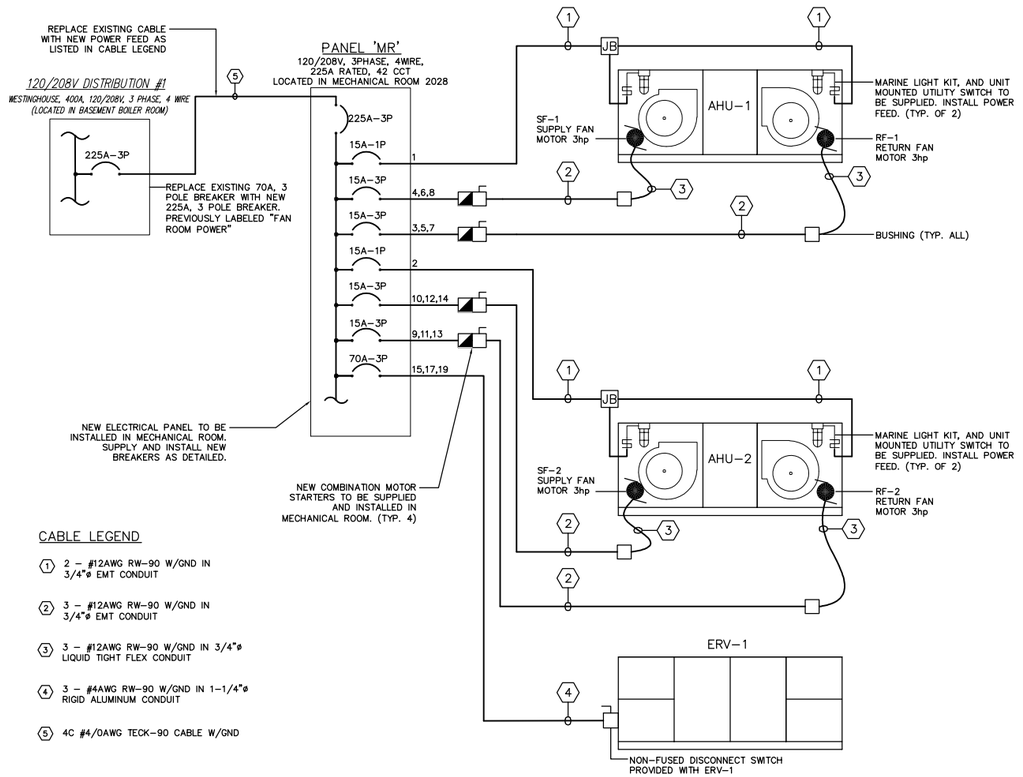
SECOND FLOOR MECHANICAL ROOM - ELECTRICAL DEMOLITION

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



SECOND FLOOR MECHANICAL ROOM - ELECTRICAL RENOVATION

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

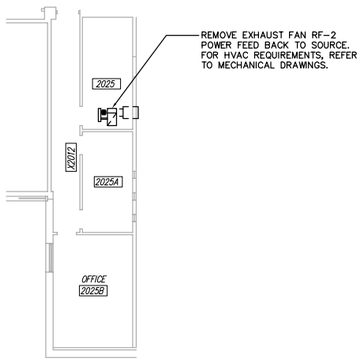


CABLE LEGEND

1. 2 – #12AWG RW-90 W/GND IN 3/4"ø EMT CONDUIT
2. 3 – #12AWG RW-90 W/GND IN 3/4"ø EMT CONDUIT
3. 3 – #12AWG RW-90 W/GND IN 3/4"ø LIQUID TIGHT FLEX CONDUIT
4. 3 – #4AWG RW-90 W/GND IN 1-1/4"ø RIGID ALUMINUM CONDUIT
5. 4C #4/0AWG TECK-90 CABLE W/GND

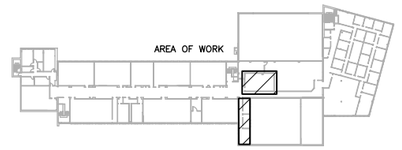
SINGLE LINE DIAGRAM - MECHANICAL ROOM

SCALE = N.T.S.



PARTIAL SECOND FLOOR PLAN 'C' - ELECTRICAL DEMOLITION

SCALE: 3/32" = 1'-0"



KEY PLAN - SECOND FLOOR

ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH MECHANICAL DRAWINGS

No.	Revision	Date	Initial
0	ISSUED FOR CONSTRUCTION	04/27/18	CF

Notes:
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2. DRAWING SHOWS GENERAL ARRANGEMENT ONLY. DO NOT SCALE.

Approved

Approved

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THUNDER BAY ONTARIO

BORA LASKIN BUILDING

SECOND FLOOR MECHANICAL ROOM
ELECTRICAL DEMOLITION AND RENOVATION

Scale:	Drawn By: CF	Date:
AS NOTED	Ckd. By: JK	APRIL 2018
	Dwg. No.: 18-038-E10	Rev. 0

NORTH

REMOVE HUMIDIFIERS H-1 & H-2 POWER FEED BACK TO SOURCE

PARTIAL SECOND FLOOR PLAN 'D' - DEMOLITION

SCALE: 1/8" = 1'-0"

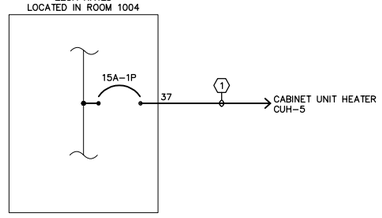
PROVIDE POWER FEED FOR NEW CABINET UNIT HEATER. REFER TO SINGLE LINE DIAGRAM DETAILS. CCT: C-37.

PARTIAL MAIN FLOOR PLAN 'D' - RENOVATION

SCALE: 1/8" = 1'-0"

LIGHTING PANEL 'C'

120/208V, 3PH, 4W,
225A RATED
LOCATED IN ROOM 1004



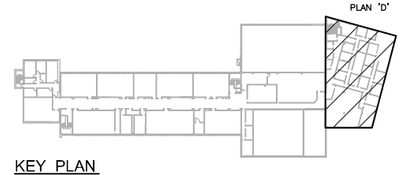
CABLE LEGEND

(1) 2 - #12AWG RW-90 W/GND IN 3/4"ø EMT CONDUIT

SINGLE LINE DIAGRAM

SCALE = N.T.S.

ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH MECHANICAL DRAWINGS



KEY PLAN

No.	Revision	Date	Initial
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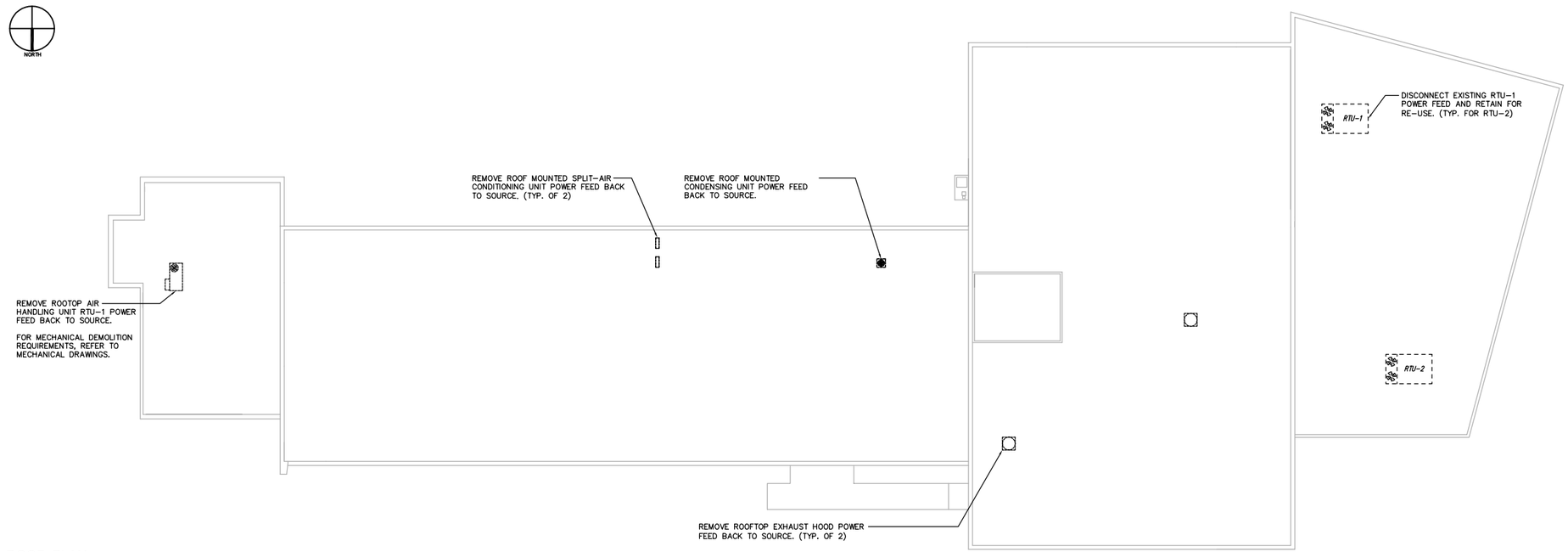
THUNDER BAY ONTARIO

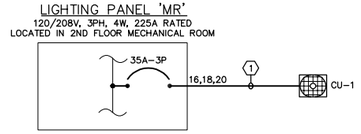
BORA LASKIN BUILDING
PLAN 'D'
MAIN FLOOR AND SECOND FLOOR
ELECTRICAL DEMOLITION & RENOVATION

Scale:	Drawn By: CF Ckd. By: JK	Date: APRIL 2018
1/8" = 1'-0"	Dwg. No.: 18-038-E11	Rev. 0



ROOF PLAN - ELECTRICAL DEMOLITION

SCALE: 1/16" = 1'-0"

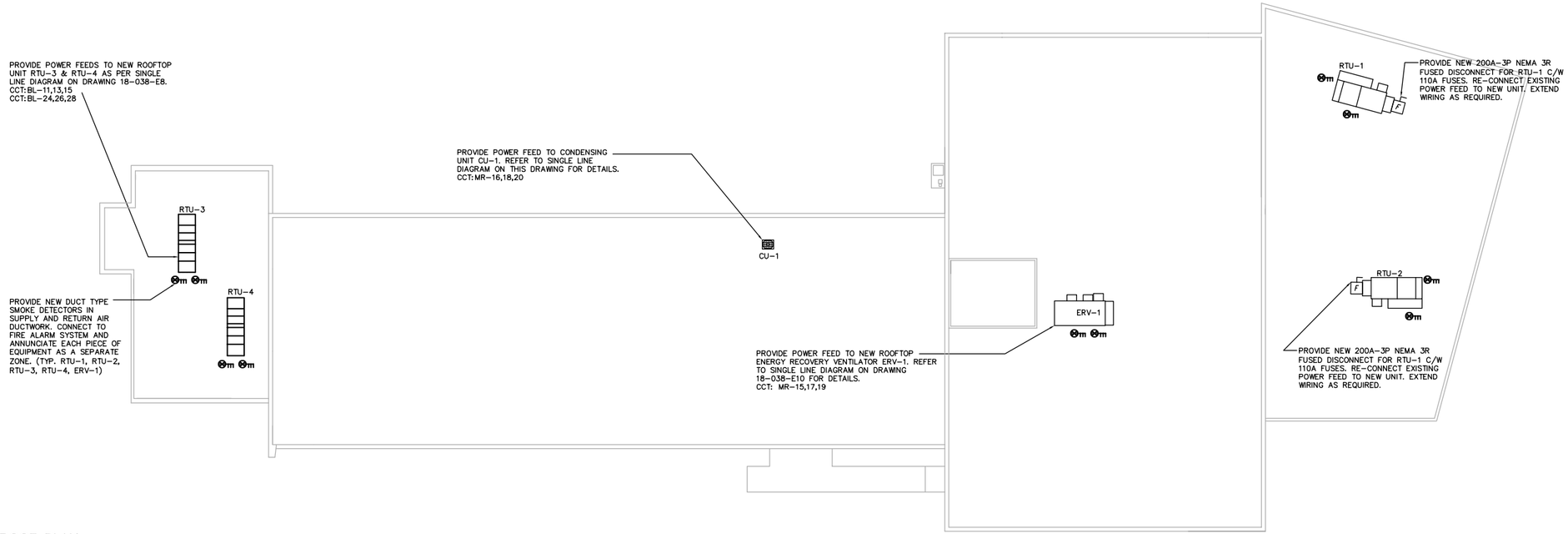


CABLE LEGEND

1 — 3 - #8AWG RW-90 W/GND IN 3/4"ø RIGID ALUMINUM CONDUIT

SINGLE LINE DIAGRAM

SCALE = N.T.S.



ROOF PLAN - ELECTRICAL RENOVATION

SCALE: 1/16" = 1'-0"

No.	Revision	Date	Initial
0	ISSUED FOR CONSTRUCTION	04/27/18	CF

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	LICENSED PROFESSIONAL ENGINEER J.R. KIERSTEAD 100181072 Apr. 27/18 PROVINCE OF ONTARIO

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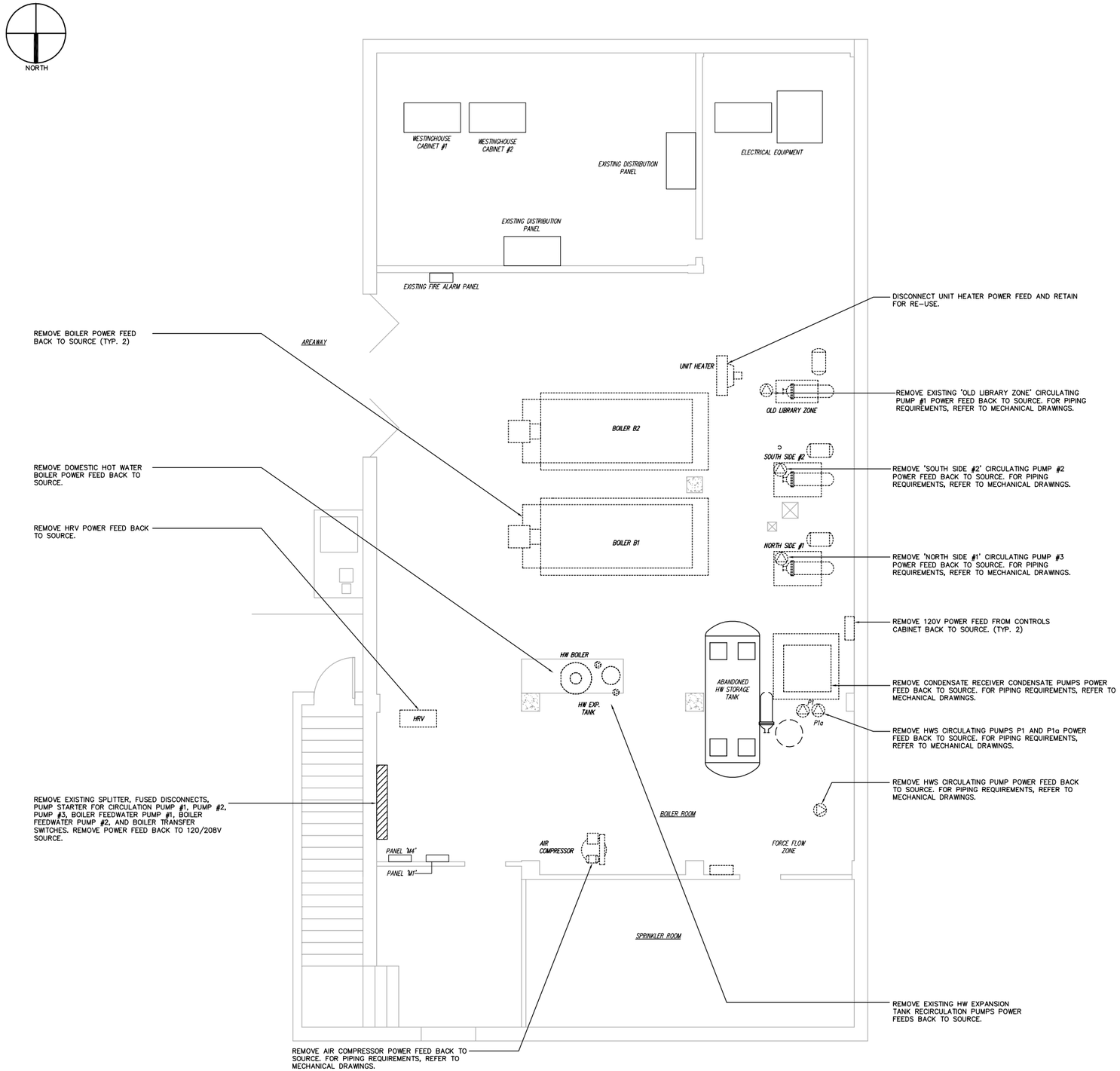
THUNDER BAY — ONTARIO

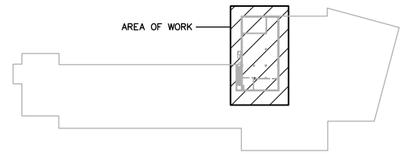
BORA LASKIN BUILDING
ROOFTOP PLAN
ELECTRICAL
DEMOLITION AND RENOVATION

Scale:	Drawn By: CF Ckd. By: JK	Date: APRIL 2018
1/16" = 1'-0"	Dwg. No.: 18-038-E12	Rev. 0



BASEMENT FLOOR PLAN - ELECTRICAL DEMOLITION

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



KEY PLAN - BASEMENT

No.	Revision	Date	Initial
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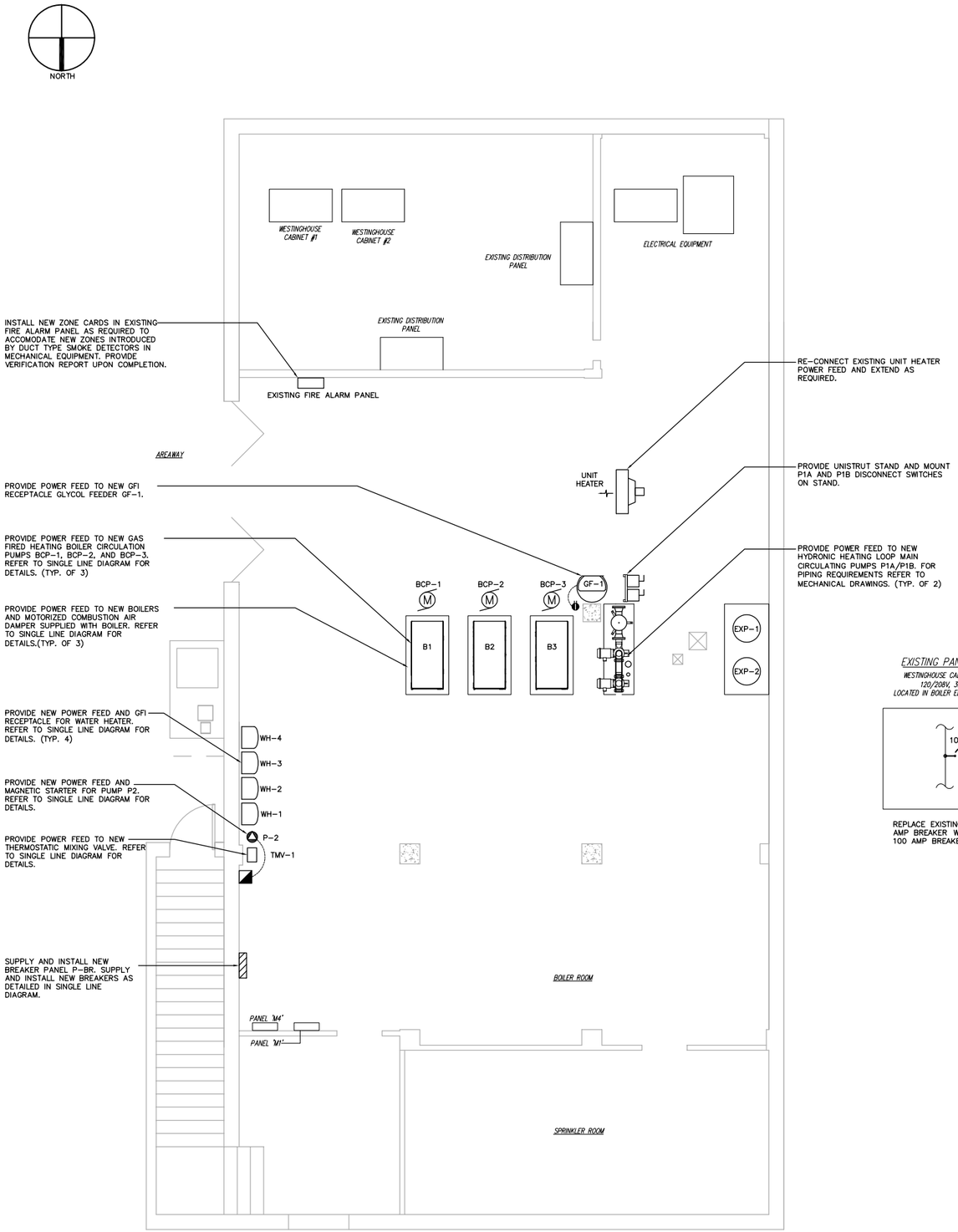
THUNDER BAY ONTARIO

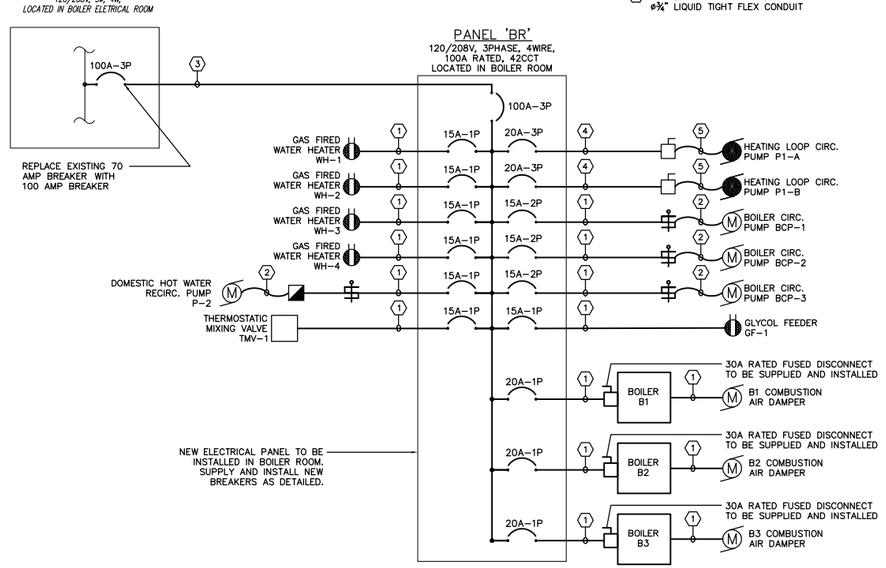
BORA LASKIN BUILDING
BOILER ROOM ELECTRICAL DEMOLITION PLAN

Scale:	Drawn By: CF Ckd. By: JK	Date: APRIL 2018
1/4"=1'-0"	Dwg. No.: 18-038-E13	Rev. 0



BASEMENT FLOOR PLAN - ELECTRICAL RENOVATION

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

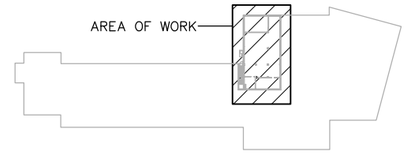


SINGLE LINE DIAGRAM - BOILER ROOM

SCALE = N.T.S.

CABLE LEGEND

1. 2 – #12 AWG RW-90 W/GND IN ø¾" EMT
2. 2 – #12 AWG RW-90 W/GND IN ø¾" LIQUID TIGHT FLEX CONDUIT
3. 4 – #2 AWG RW-90 W/GND IN ø1-1/2" EMT
4. 3 – #12 AWG RW-90 W/GND IN ø¾" EMT
5. 3 – #12 AWG RW-90 W/GND IN ø¾" LIQUID TIGHT FLEX CONDUIT



KEY PLAN - BASEMENT

No.	Revision	Date	Initial
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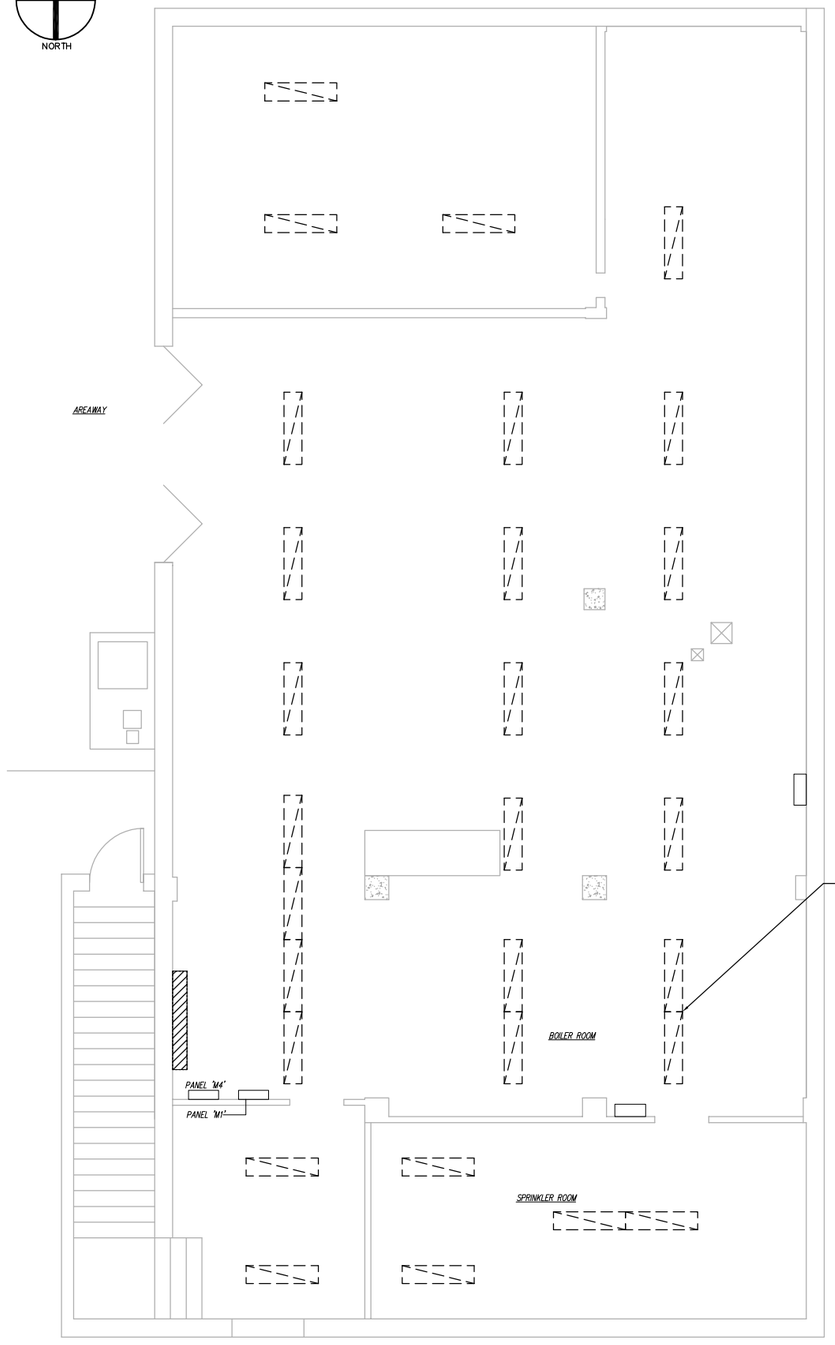
LAKEHEAD UNIVERSITY

THUNDER BAY ONTARIO

BORA LASKIN BUILDING
BOILER ROOM ELECTRICAL RENOVATION PLAN

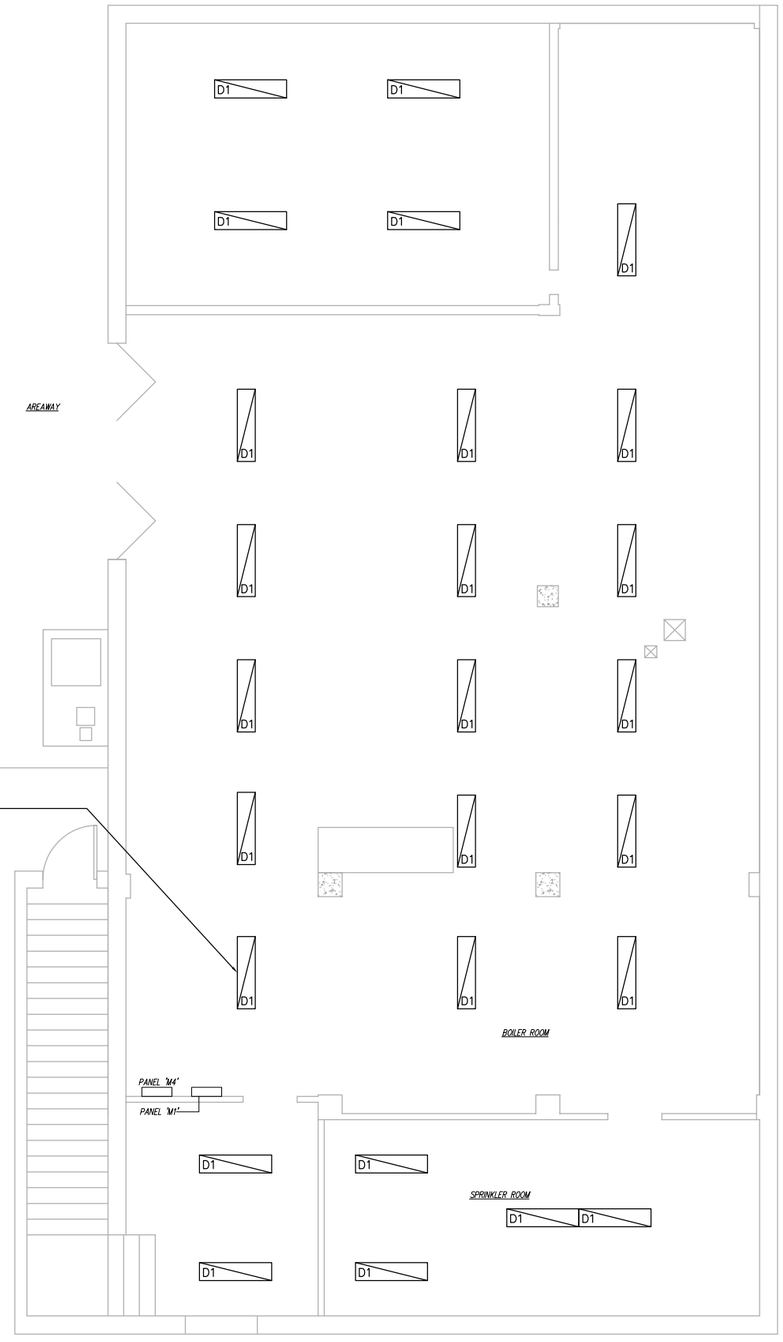
Scale:	Drawn By: CF	Date:
AS NOTED	Ckd. By: JK	APRIL 2018
	Dwg. No.: 18-038-E14	Rev. 0

NORTH



BASEMENT FLOOR PLAN - LIGHTING DEMOLITION

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

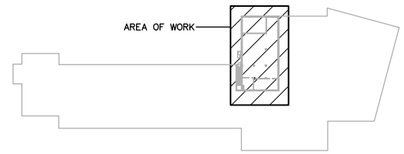


BASEMENT FLOOR PLAN - LIGHTING RENOVATION

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

ELECTRICAL LEGEND

D1 — SUSPENDED FIXTURE – INTEGRAL SNLED LENSED STRIPLIGHT OR APPROVED EQUIVALENT.
CAT NO. 4SNLED-LD5-34SL-LC-UNV-L835-CD1-U
C/W 24.9W, 3567 LUMEN, 3500K, 120V INPUT, 0-10V DIMMABLE DRIVER AND WIRELESS CONTROLLER.



KEY PLAN - BASEMENT

No.	Revision	Date	Initial
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BORA LASKIN BUILDING
BOILER ROOM
LIGHTING
DEMOLITION & RENOVATION PLAN

Scale:	Drawn By: CF Ckd. By: JK	Date: APRIL 2018
1/4"=1'-0"	Dwg. No.: 18-038-E15	Rev. 0