TBU50 HVAC REPLACEMENT

REGINA, SASKATCHEWAN

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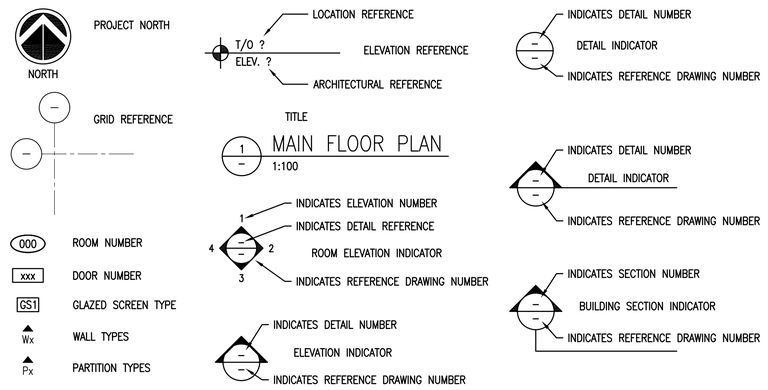
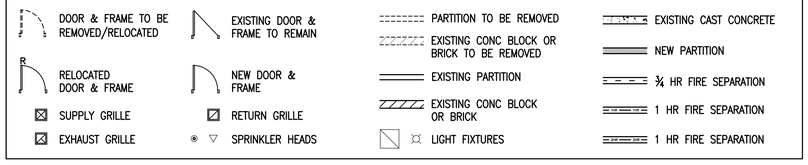
GENERAL NOTES

1. REFER TO STRUCTURAL, MECHANICAL AND ELECTRICAL DRAWINGS FOR COMPLETE SCOPE OF WORK.
2. CONTRACTOR TO CONFIRM ALL DIMENSIONS AND SITE CONDITIONS ON SITE PRIOR TO COMMENCEMENT OF WORK.
3. ALL WORK PERFORMED OUTSIDE OF GENERAL SCOPE OF WORK AREA (ie. ELECTRICAL SYSTEM COMPONENTS OR MECHANICAL SYSTEMS) SHOULD BE PERFORMED WITH THE LEAST AMOUNT OF DISTURBANCE TO SURROUNDING AREAS. PATCH, REPAIR AND REFINISH ALL AFFECTED SURROUNDING AREAS WHERE REQUIRED. PROVIDE FIRESTOPPING AS REQUIRED.
4. PATCH, REPAIR AND REFINISH ALL FINISHES, TO MATCH EXISTING, WHERE AFFECTED BY REMOVALS OR NEW WORK (PARTITIONS, ELECTRICAL FIXTURES AND DEVICES, MECHANICAL FIXTURES, DUCTWORK, GRILLES, ETC.) ENSURE ALL FIRE SEPARATIONS ARE REINSTATED.
5. OWNER WILL HAVE FIRST RIGHT OF REFUSAL FOR ALL ITEMS THAT ARE NOTED FOR REMOVAL OR DEMOLITION. REFUSED ITEMS ARE TO BE REMOVED AND DISPOSED. SALVAGED REMOVED ITEMS ARE TO BE DELIVERED TO STORAGE, ELSEWHERE ON PROJECT SITE, AS DIRECTED BY DEPARTMENTAL REPRESENTATIVE.
6. INSTALL FIRESTOPPING MATERIALS AS REQUIRED AT ALL NEW AND EXISTING PENETRATIONS THROUGH FIRE RATED ASSEMBLIES IN ACCORDANCE WITH SECTION 07 84 00 – FIRESTOPPING.
7. ALL UNDERGROUND SERVICES SHOWN ARE BASED ON EXISTING RECORD DRAWINGS PROVIDED BY THE OWNER AND HAVE NOT BEEN SITE VERIFIED. LOCATE, VERIFY AND PROTECT ALL UNDERGROUND SERVICES PRIOR TO COMMENCEMENT OF WORK.
8. LOCATE AND VERIFY ALL TREE LOCATIONS.
9. REINSTATE AFFECTED CONCRETE SLABS. MATCH ORIGINAL DETAILS. PROTECT EXISTING CONCRETE AREAS FROM DAMAGE BY EQUIPMENT. REPAIR DAMAGE CAUSED AS A RESULT OF THIS WORK. REINSTATE WORK TO EXISTING ELEVATIONS.
10. REINSTATE ASPHALT AREAS USING 100mm ASPHALT OVER COMPACTED BASE. PROTECT EXISTING ASPHALT FROM DAMAGE BY EQUIPMENT. REPAIR DAMAGE CAUSED AS A RESULT OF WORK. MATCH EXISTING ELEVATIONS.
11. REINSTATE AFFECTED LAWN AREAS USING SOD AND TOPSOIL BASE. MATCH EXISTING ELEVATIONS.
12. PROTECT ALL EXISTING TREES AND SHRUBS. HOARD AROUND TREES AS REQUIRED.
13. WHERE REQUIRED, PROVIDE TEMPORARY SHORING OF THE BLOCK MASONRY WALL OPENING. THE DESIGN SHALL BE PROVIDED BY, AND SEALED BY, A STRUCTURAL ENGINEER REGISTERED TO PRACTICE IN THE PROVINCE OF SASKATCHEWAN.
14. ENSURE ALL AREAS ADJACENT TO WORK AREA (FLOORS, WALLS, FIXTURES, LANDSCAPING, ETC.) ARE PROTECTED FROM DAMAGE FOR COMPLETE DURATION OF WORK.

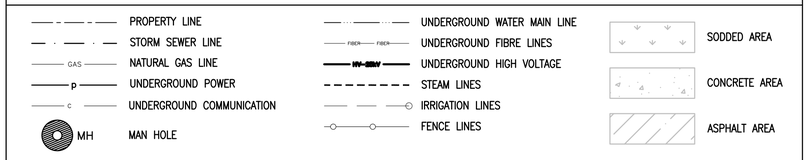
SYMBOL LEGEND



LEGEND



SITE LEGEND



ABBREVIATIONS

A.F.F.	ABOVE FINISHED FLOOR	DTL.	DETAIL	MIN.	MINIMUM	S.A.P.	SOUND ABSORPTIVE PANEL
ALUM.	ALUMINUM	ELEC.	ELECTRICAL	M.O.	MASONRY OPENING	SIM.	SIMILAR
BD.	BOARD	E.W.	EACH WAY	N.I.C.	NOT IN CONTRACT	TB	TACKBOARD
COL.	COLUMN	EQ.	EQUAL	N.T.S.	NOT TO SCALE	TYP.	TYPICAL
CONC.	CONCRETE	GYP.BD.	GYPSUM BOARD	O.C.	ON CENTER	VERT.	VERTICAL
CORR.	CORRIDOR	H.S.S.	HOLLOW STRUCTURAL STEEL	O.S.B.	ORIENTED STRAND BOARD	VEST.	VESTIBULE
C/W	COMPLETE WITH	HORIZ.	HORIZONTAL	PT	PAINT	WASH.	WASHROOM
DEMO.	DEMOLITION	INSUL.	INSULATION	R.T.	ROOF DRAIN	WB	WHITE BOARD
DEPT.	DEPARTMENT	MAX	MAXIMUM	REV.	REVERSE	W.F.	WATER CLOSET
D.F.	DRINKING FOUNTAIN	MECH.	MECHANICAL	R.F.	RESILIENT FLOORING		

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DO NOT SCALE DRAWINGS

Revision/ Revision	Description/Description	Date/Date
0	ISSED FOR TENDER	2018-03-31

Client/client

Project title/Titre du projet

TBU50 HVAC REPLACEMENT REGINA, SK

Approved by/Approuve par

Designed by/Concept par
RP

Drawn by/Dessine par
RP / RHM

Project Manager/Administrateur de Projets
MK

Architectural and Engineering Resources Manager/ Ressources Architectural et de Directeur d'ingénierie

Client/client

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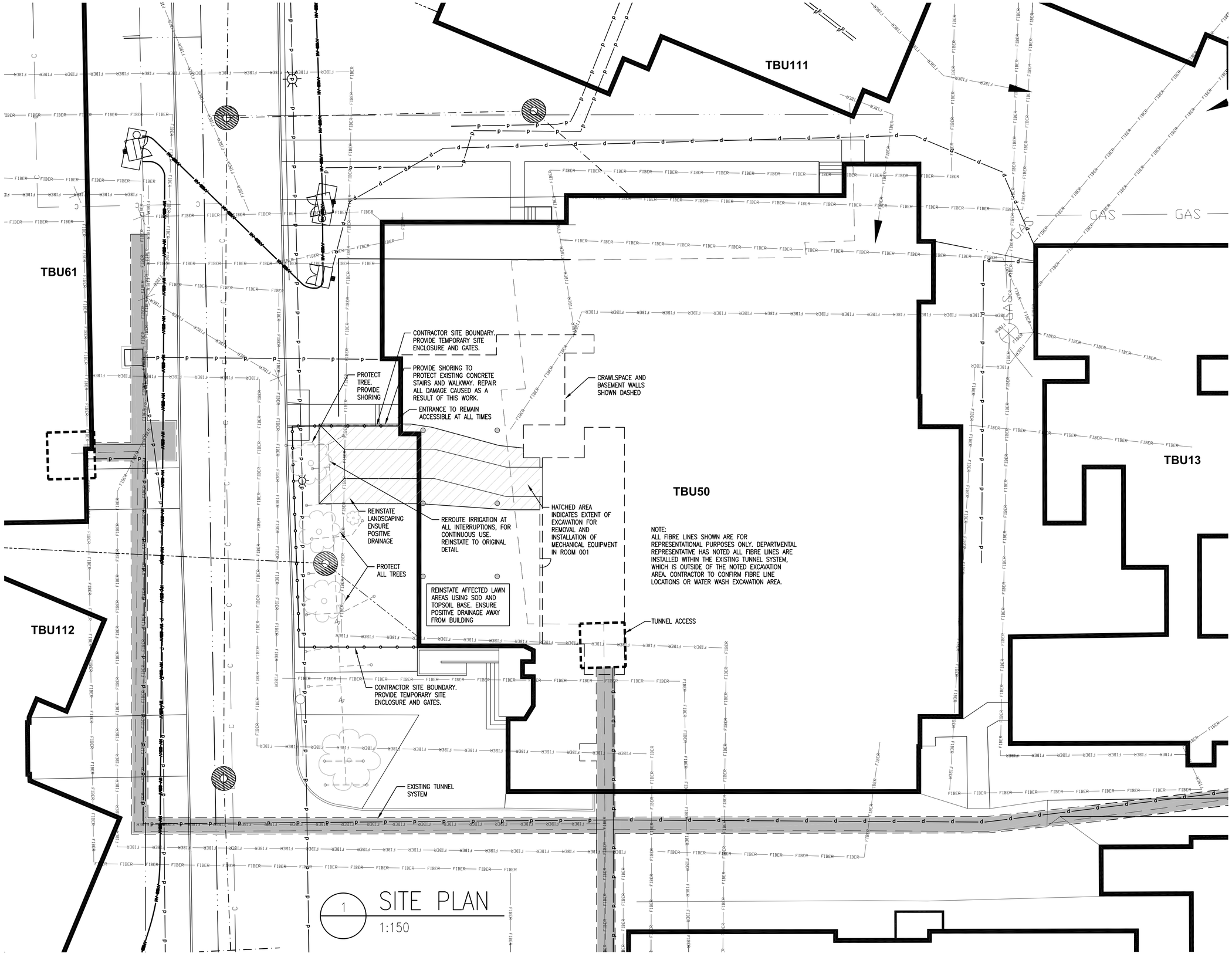
GENERAL INFORMATION SCHEDULES

Project No./No. du projet	Sheet/Feuille	Revision no./ La Révision no.
57/2017	A0.1 OF 8	0

A1 Sheet

0 10 20 30 40 50 60 70 80 90 100mm

x-57-2017 Schedules



NOTE:
ALL FIBRE LINES SHOWN ARE FOR REPRESENTATIONAL PURPOSES ONLY. DEPARTMENTAL REPRESENTATIVE HAS NOTED ALL FIBRE LINES ARE INSTALLED WITHIN THE EXISTING TUNNEL SYSTEM, WHICH IS OUTSIDE OF THE NOTED EXCAVATION AREA. CONTRACTOR TO CONFIRM FIBRE LINE LOCATIONS OR WATER WASH EXCAVATION AREA.

1 SITE PLAN
1:150

A1 Sheet

0 10 20 30 40 50 60 70 80 90 100mm

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SITE PLAN

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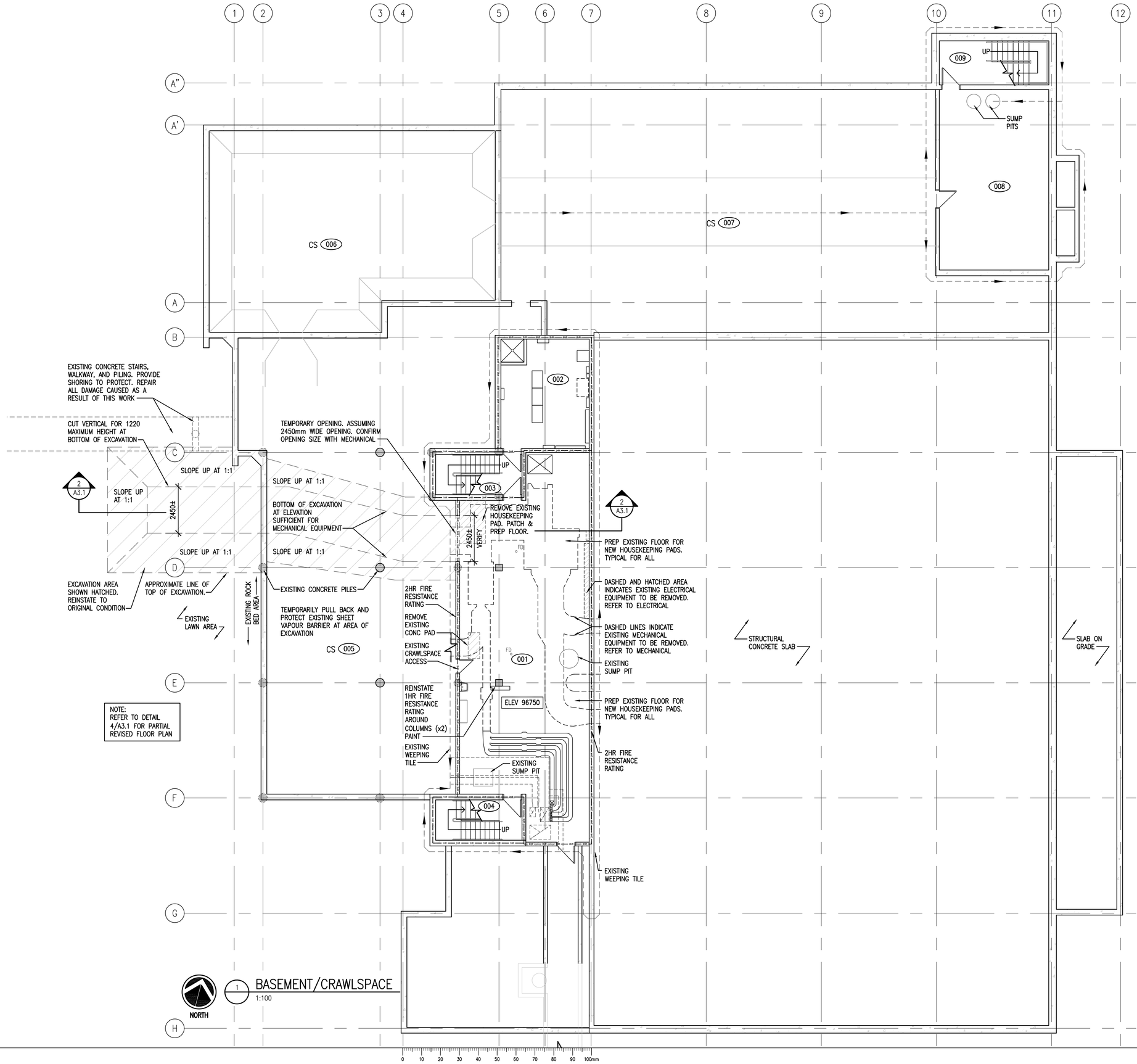
57/2017	A1.0 OF 8	0

x-57-2017 Site Plan



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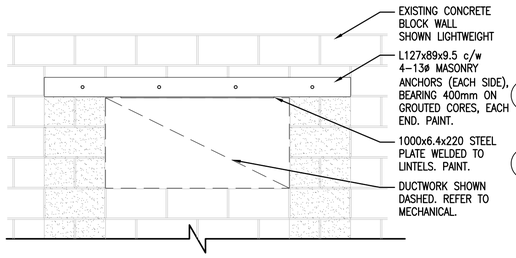
CRAWLSPACE/BASEMENT FLOOR PLAN

Project No./No. du projet	Sheet/ Feuille	Revision no./ La Révision no.
57/2017	A2.1 OF 8	0



3 A2.2 PARTIAL INTERIOR ELEVATION
1:20

2 SECOND FLOOR PLAN
1:100

1 MAIN FLOOR PLAN
1:100

A1 Sheet

0 10 20 30 40 50 60 70 80 90 100mm

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MAIN FLOOR PLAN
SECOND FLOOR PLAN
PARTIAL INTERIOR ELEVATION

Project No./No. du projet	Sheet/ Feuille	Revision no./ La Révision no.
57/2017	A2.2 OF 8	0

x-57-2017 Floor Plans

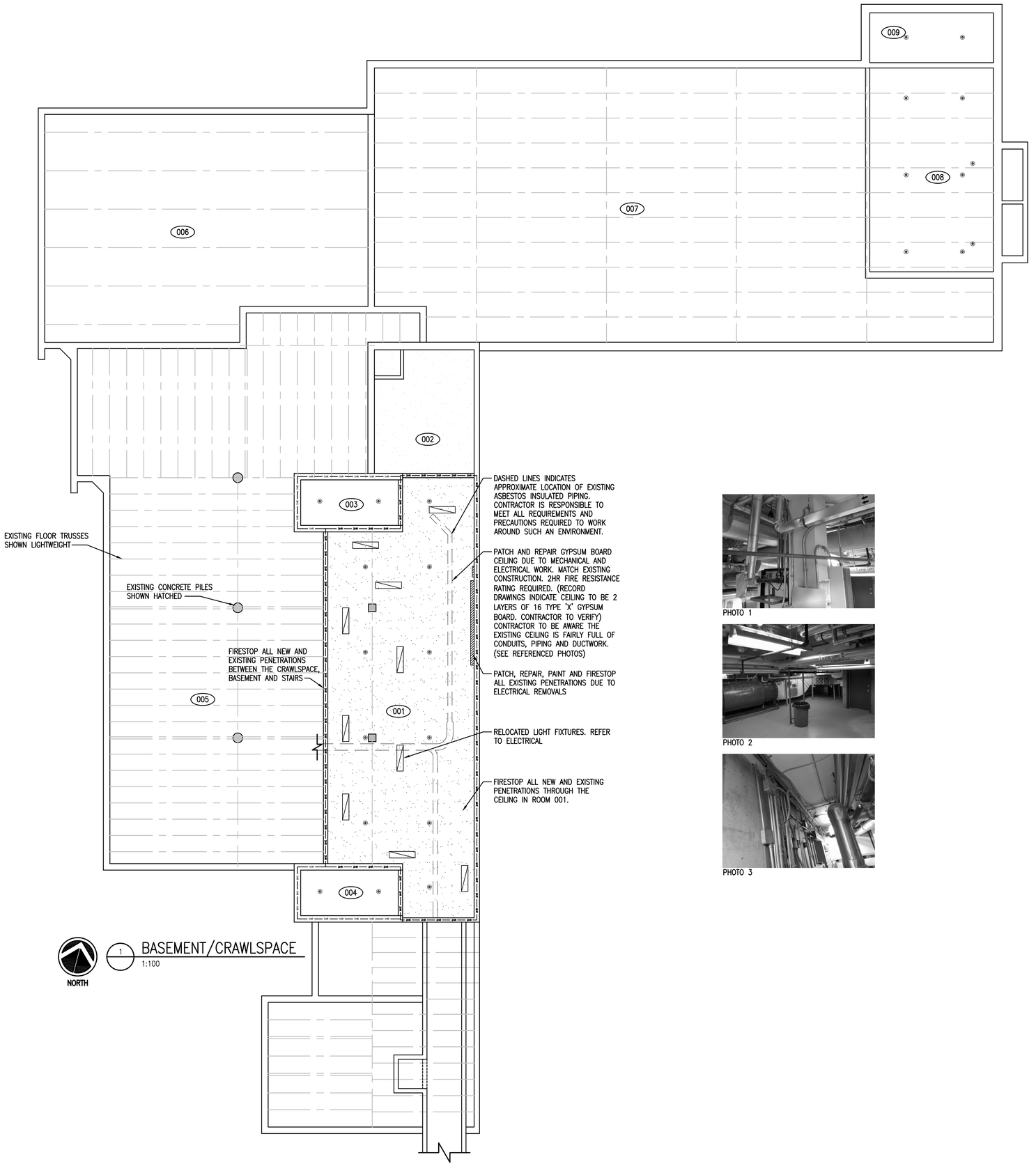

PHOTO 1

PHOTO 2

PHOTO 3

0 10 20 30 40 50 60 70 80 90 100mm

A1 Sheet

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BASEMENT/CRAWLSPACE CEILING PLAN

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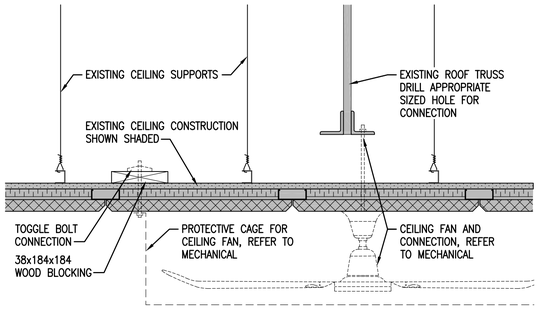
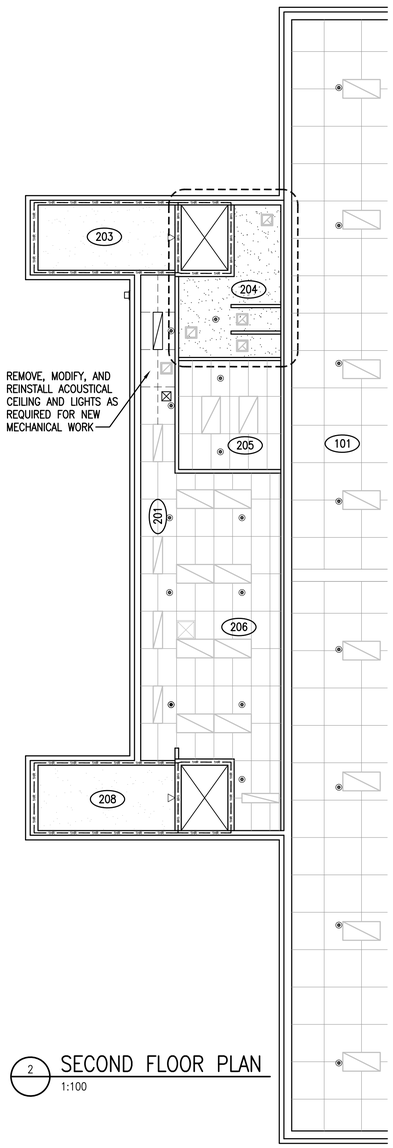
57/2017	A2.3 OF 8	0

x-57-2017 Ceiling Plans

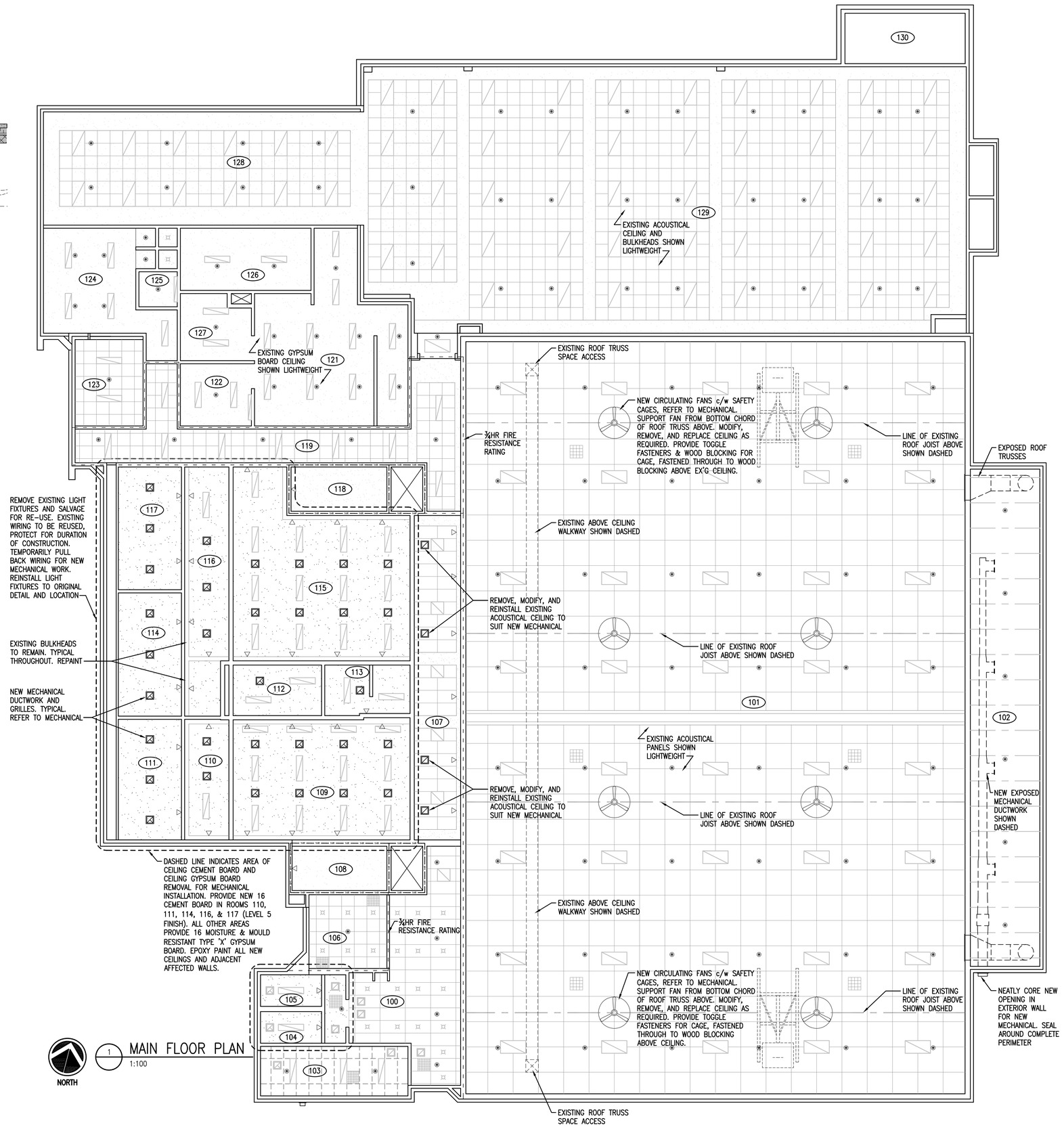


3 / A2.4 FAN/CAGE DETAIL
1:10



2 SECOND FLOOR PLAN
1:100

NORTH



1 MAIN FLOOR PLAN
1:100

NORTH

0 10 20 30 40 50 60 70 80 90 100mm

A1 Sheet

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MAIN FLOOR CEILING PLAN
SECOND FLOOR CEILING PLAN

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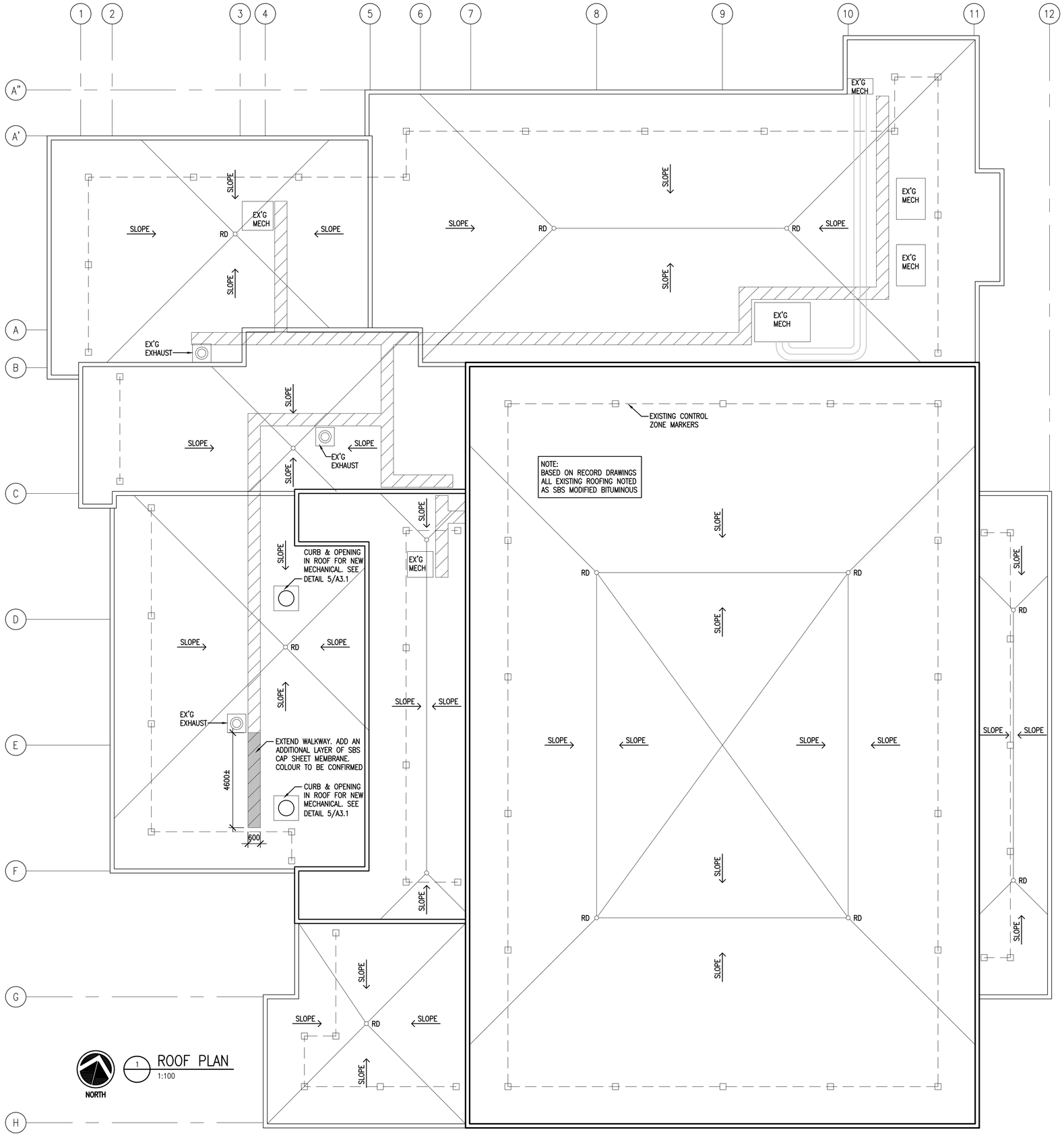
57/2017	A2.4 OF 8	0

x-57-2017 Ceiling Plans



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ROOF PLAN

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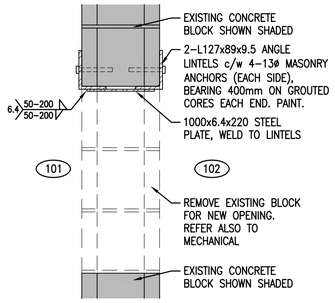
57/2017	**A2.5** OF 8	**0**

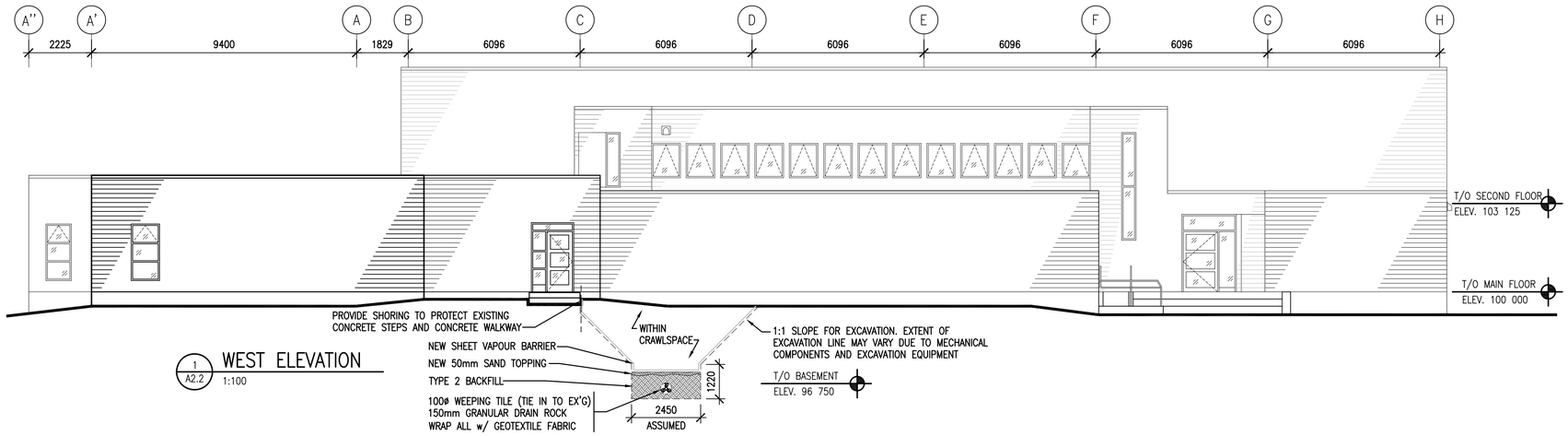
A1 Sheet

0 10 20 30 40 50 60 70 80 90 100mm

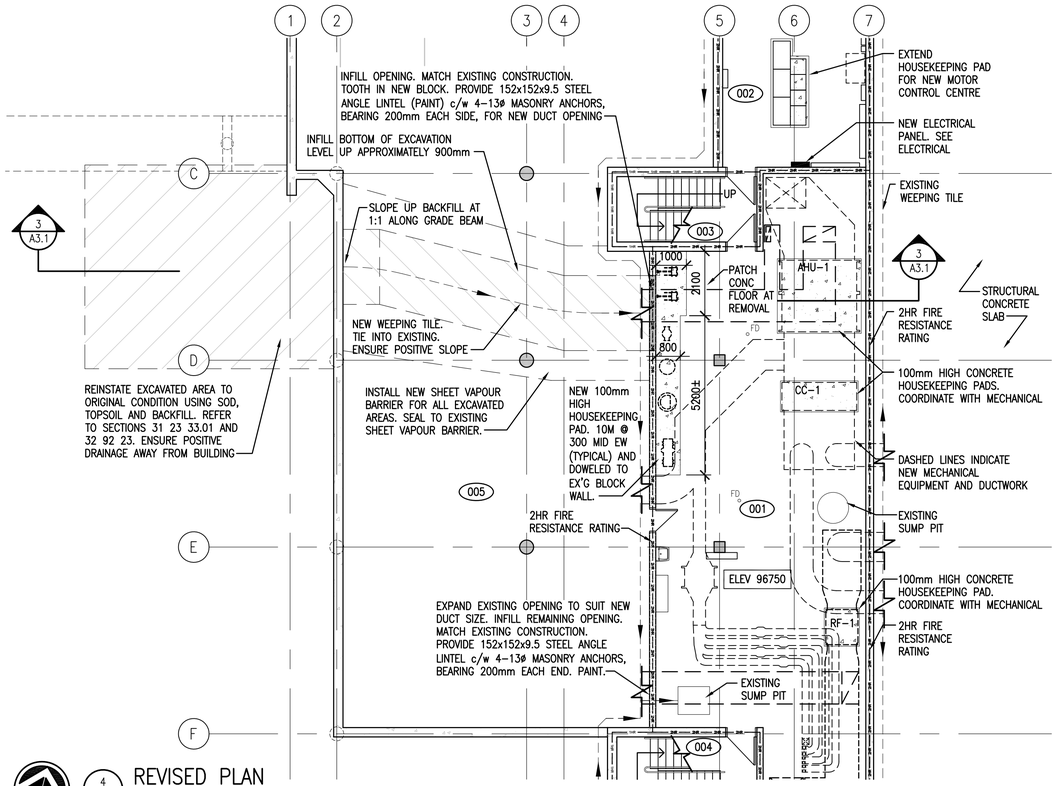
x-57-2017 Roof Plan



7 A3.1 LINTEL DETAIL 1:10

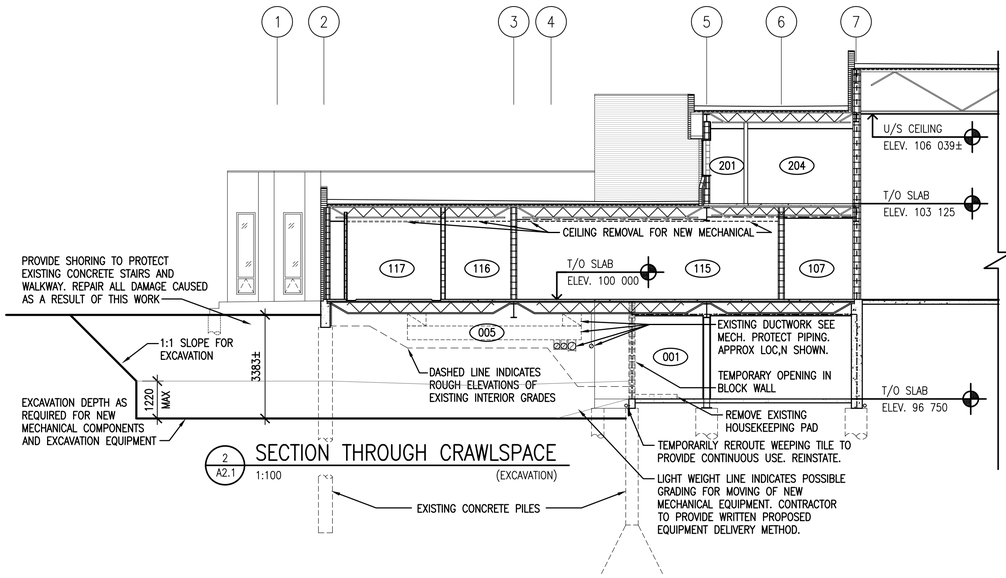


1 A2.2 WEST ELEVATION 1:100

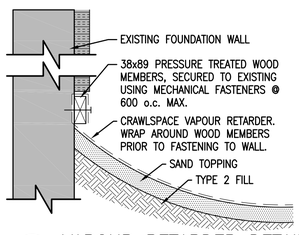


4 A2.1 REVISED PLAN 1:100

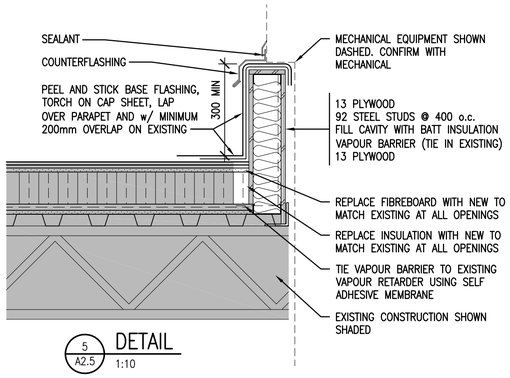
NORTH



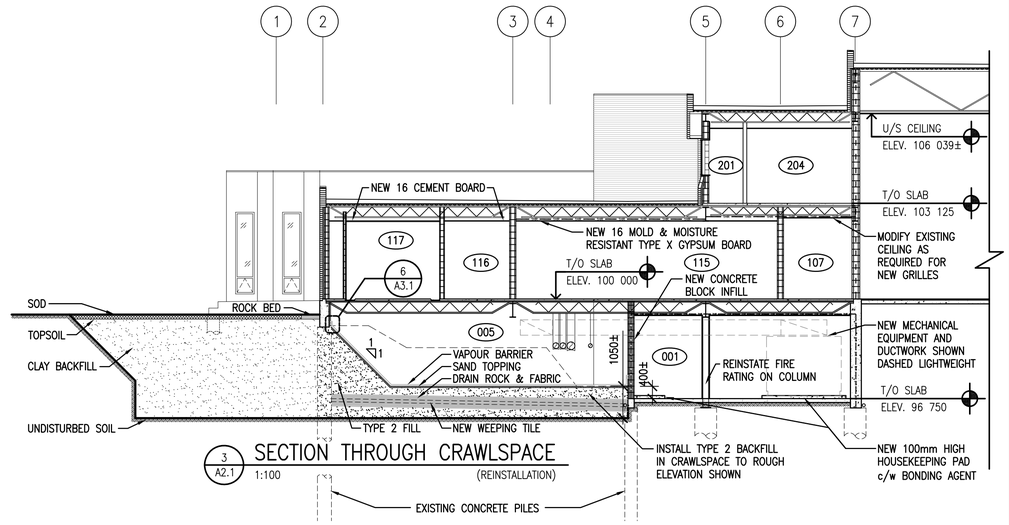
2 A2.1 SECTION THROUGH CRAWLSPACE 1:100 (EXCAVATION)



6 A3.1 VAPOUR RETARDER DETAIL 1:10



5 A2.5 DETAIL 1:10



3 A2.1 SECTION THROUGH CRAWLSPACE 1:100 (REINSTALLATION)

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EXTERIOR ELEVATION
BUILDING SECTION
DETAILS

Project No./No. du projet	Sheet/Feuille	Revision no./ La Révision no.
57/2017	A3.1 OF 8	0

A1 Sheet

0 10 20 30 40 50 60 70 80 90 100mm

x-57-2017 Exterior Elevations

SYMBOL SCHEDULE

	JUNCTION BOX/OUTLET BOX.
	CEILING/WALL SURFACE MOUNTED INCANDESCENT OR HIGH INTENSITY DISCHARGE FIXTURE.
	RECESSED CEILING MOUNTED FIXTURE
	FLUORESCENT FIXTURE, SURFACE MOUNTED OR SUSPENDED.
NON–SW	FIXTURE SHOWN SHADED AND WITH THE SUFFIX 'N/L' INDICATE UNIT IS A NON–SWITCHED NIGHT LIGHT.
	ELECTRICAL DISTRIBUTION PANEL, SURFACE/RECESSED.
M	MOTOR CONNECTION. COORDINATE FINAL LOCATION ON SITE.
	MOLDED CASE TYPE CIRCUIT BREAKER, 15 AMP UNLESS OTHERWISE NOTED.
GFI	MOLDED CASE TYPE CIRCUIT BREAKER, GROUND FAULT INTERRUPTER, 15 AMP UNLESS OTHERWISE NOTED.
WP	MOTOR DISCONNECT SWITCH, SUFFIX 'WP' INDICATES WEATHERPROOF.
S^a	S.P.S.T. SWITCH MOUNTED UP 1200mm. SUFFIX INDICATES FIXTURE SWITCHING AND QUANTITY OF SWITCHES, Sa INDICATES ONE S.P.S.T. SWITCH CONTROLLING FIXTURES WITH CORRESPONDING SUFFIX 'a'.
^3S	THREE–WAY SWITCH MOUNTED UP 1200mm.
^4S	FOUR–WAY SWITCH MOUNTED UP 1200mm.
^{OC}S	WALL OR CEILING MOUNTED OCCUPANCY/VACANCY SENSOR UP 1200mm AS DESCRIBED ON DRAWINGS AND SPECIFICATIONS.
	EMERGENCY LIGHT BATTERY PACK UNIT.
E	EMERGENCY LIGHTING UNIT. SEE EMERGENCY LIGHTING SPECIFICATIONS FOR DETAILS.
a	DUPLEX GROUNDED RECEPTACLE OUTLETS WITH NO SUFFIX SHALL BE MOUNTED UP 450mm. WHERE SUFFIXED, MOUNT AS FOLLOWS: 'a'– 250mm. ABOVE COUNTER; 'b'– UP 900mm.; 'f' FRIDGE RECEPTACLE UP 450mm; 'HK' 20A RECEPTACLE UP 450mm FOR HOUSE KEEPING; 'm' MICROWAVE RECEPTACLE UP 250mm ABOVE MICROWAVE SHELF. COORDINATE WITH ARCHITECTURE MILLWORK FOR EXACT LOCATION.
4	FOURPLEX GROUNDED RECEPTACLE OUTLETS.
WP	DUPLEX GROUNDED RECEPTACLE C/W 'WHILE IN USE' COVER MOUNTED UP 900mm. UNLESS NOTED OTHERWISE.
	DUPLEX GROUNDED RECEPTACLE, 20 AMP 5–20R RECEPTACLE MOUNTED UP 450mm.
GFI	DUPLEX GROUND FAULT CURRENT INTERRUPTER RECEPTACLE MOUNTED UP 450mm OR AS NOTED.
1D/1V▼	DATA/VOICE OUTLET MOUNTED UP 450 mm. 100 mm. SQUARE BOX C/W SINGLE GANG EXTENSION AND 27 mm CONDUIT. SUFFIX '1D' INDICATES ONE DATA JACK, '1V' INDICATES ONE VOICE JACK. DATA CABLE TYPE SHALL BE TERMINATED AT THE DATA PATCH PANEL AND OUTLET BOX. VOICE CABLE TYPE SHALL BE TERMINATED AT THE OUTLET BOX AND BIX BLOCK.
	DENOTES DEVICE TO BE REMOVED AND BLANKED OFF.

NOTE: SUBSCRIPT 'E' DENOTES DEVICE IS EXISTING;
SUBSCRIPT 'CLG' DENOTES DEVICE IS CEILING MOUNTED.

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ELECTRICAL	9273	

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Revision/ Revision	Description/Description	Date/Date
0	ISSUED FOR TENDER	2018-05-03

Client/client

Project title/Titre du projet

TBU50 HVAC REPLACEMENT REGINA, SK

Approved by/Approuve par

Designed by/Concept par
BDK

Drawn by/Dessine par
KMS

Project Manager/Administrateur de Projets
MK

Architectural and Engineering Resources Manager/ Ressources Architectural et de Directeur d'ingénierie

Client/client

Drawing title/Titre du dessin

ELECTRICAL SYMBOL SCHEDULE

Project No./No. du projet	Sheet/ Feuille	Revision no./ La Révision no.
57/2017	E0 OF E7	0

A1 Sheet

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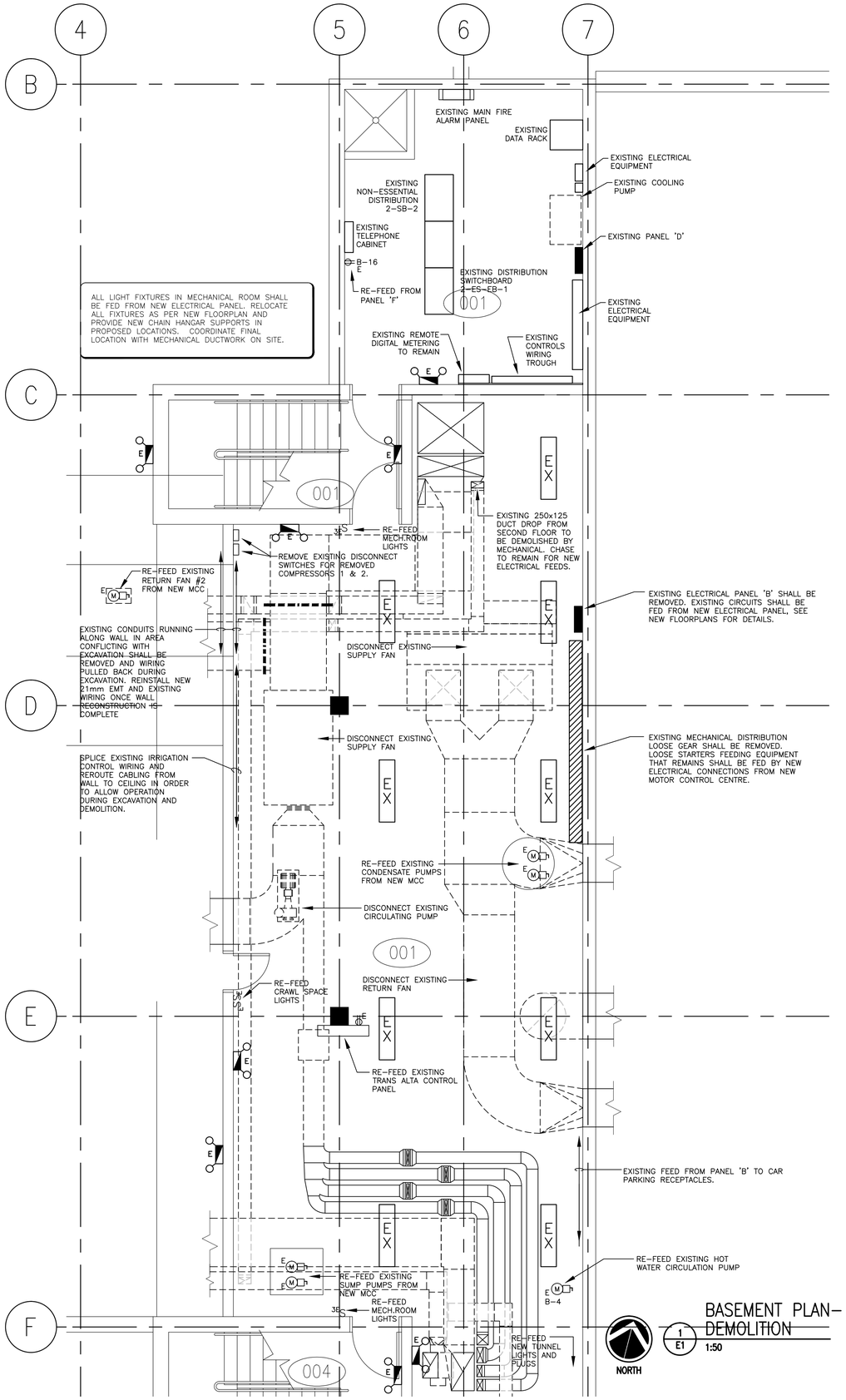

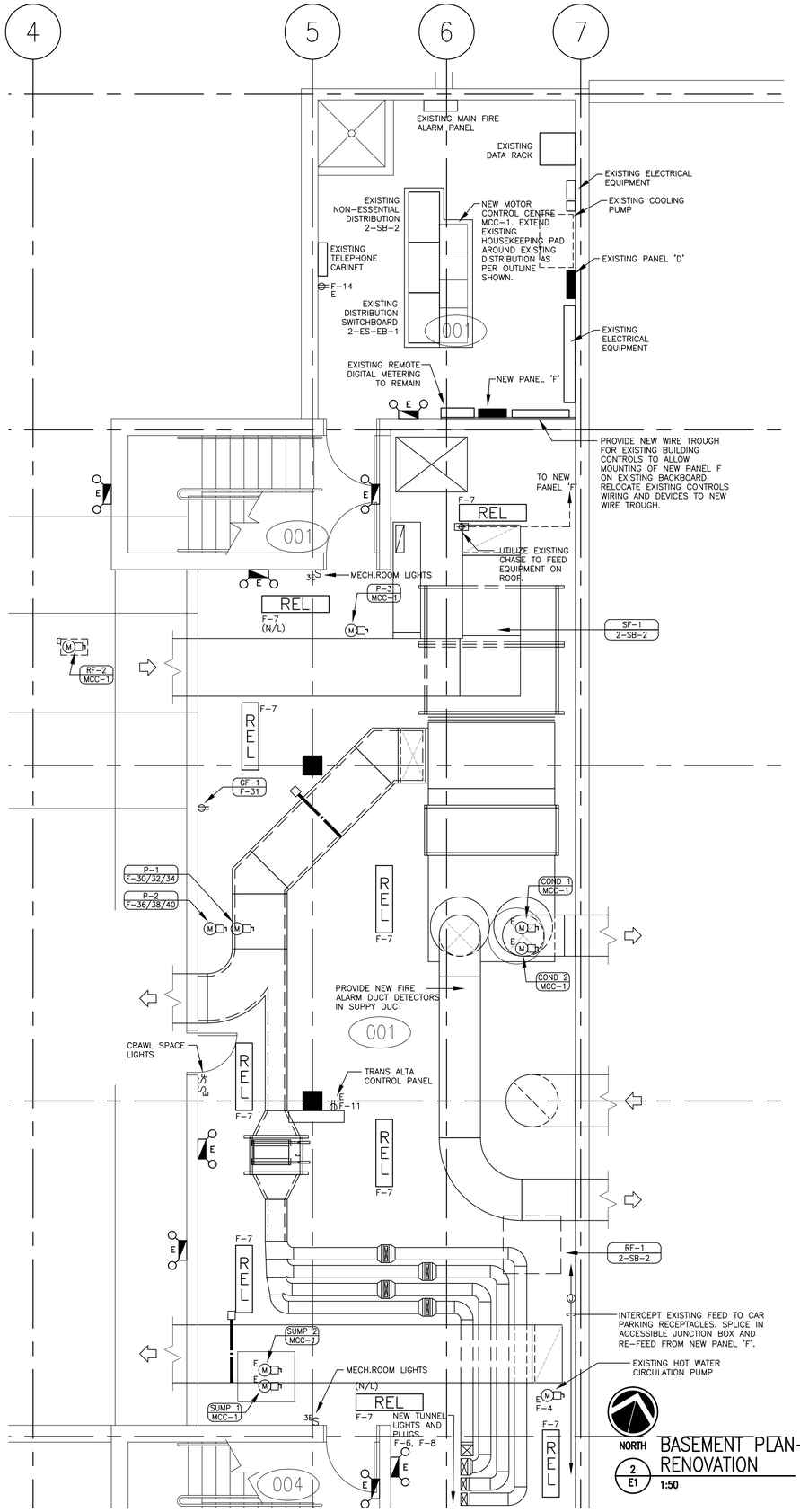

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ASSOCIATION OF PROFESSIONAL ENGINEERS OF SASKATCHEWAN
CERTIFICATE OF AUTHORIZATION
RITENBURG & ASSOCIATES LTD.
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MECHANICAL ROOM ELECTRICAL PLAN

Project No./No. du projet	Sheet/ Feuille	Revision no./ La Révision no.
57/2017	E1 OF E7	0

A1 Sheet

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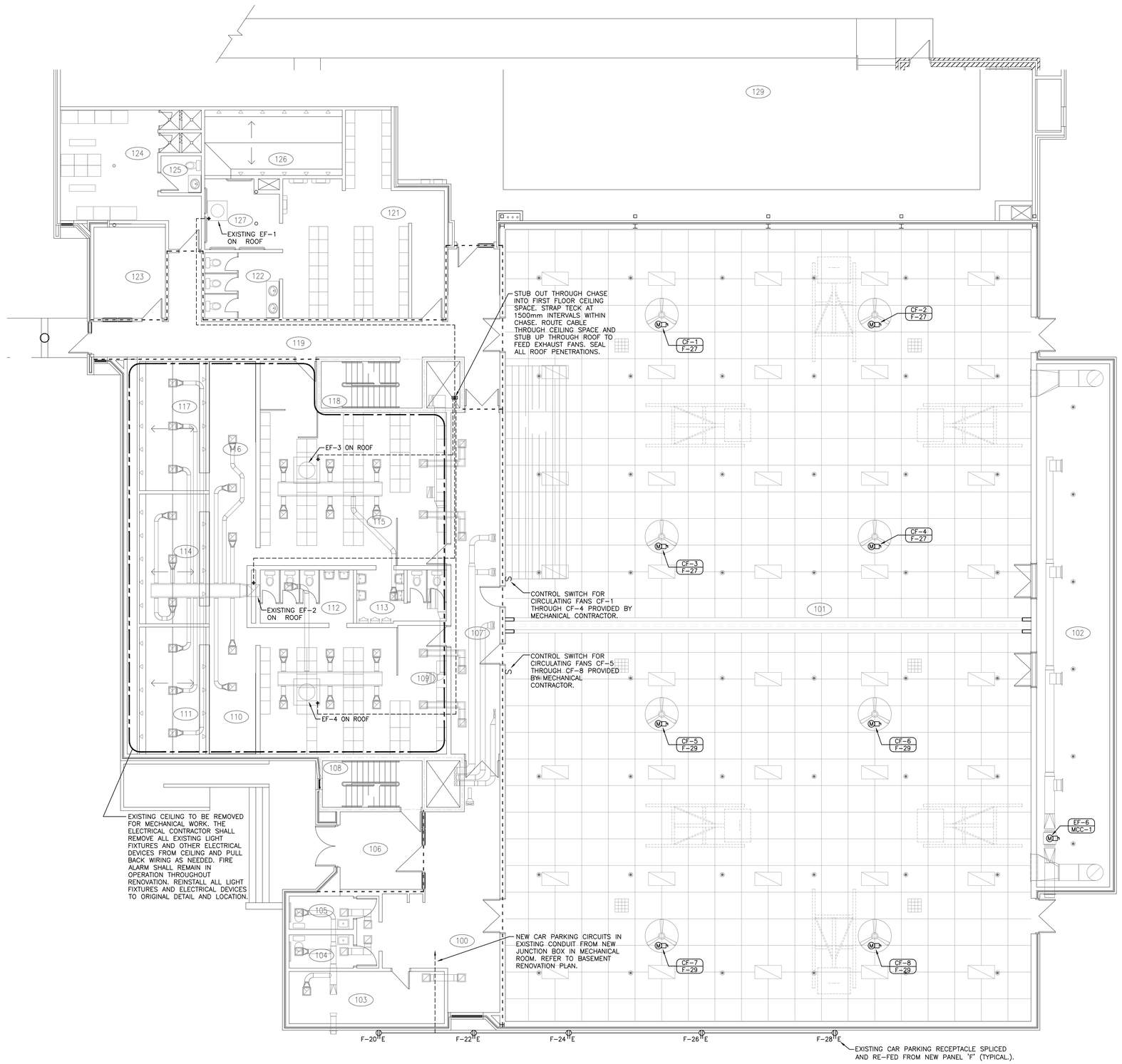

NORTH

1 / E2.1 MAIN FLOOR POWER & SYSTEMS PLAN

1:100

A1 Sheet

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MAIN FLOOR
ELECTRICAL PLAN

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57/2017	E2 OF E7	0

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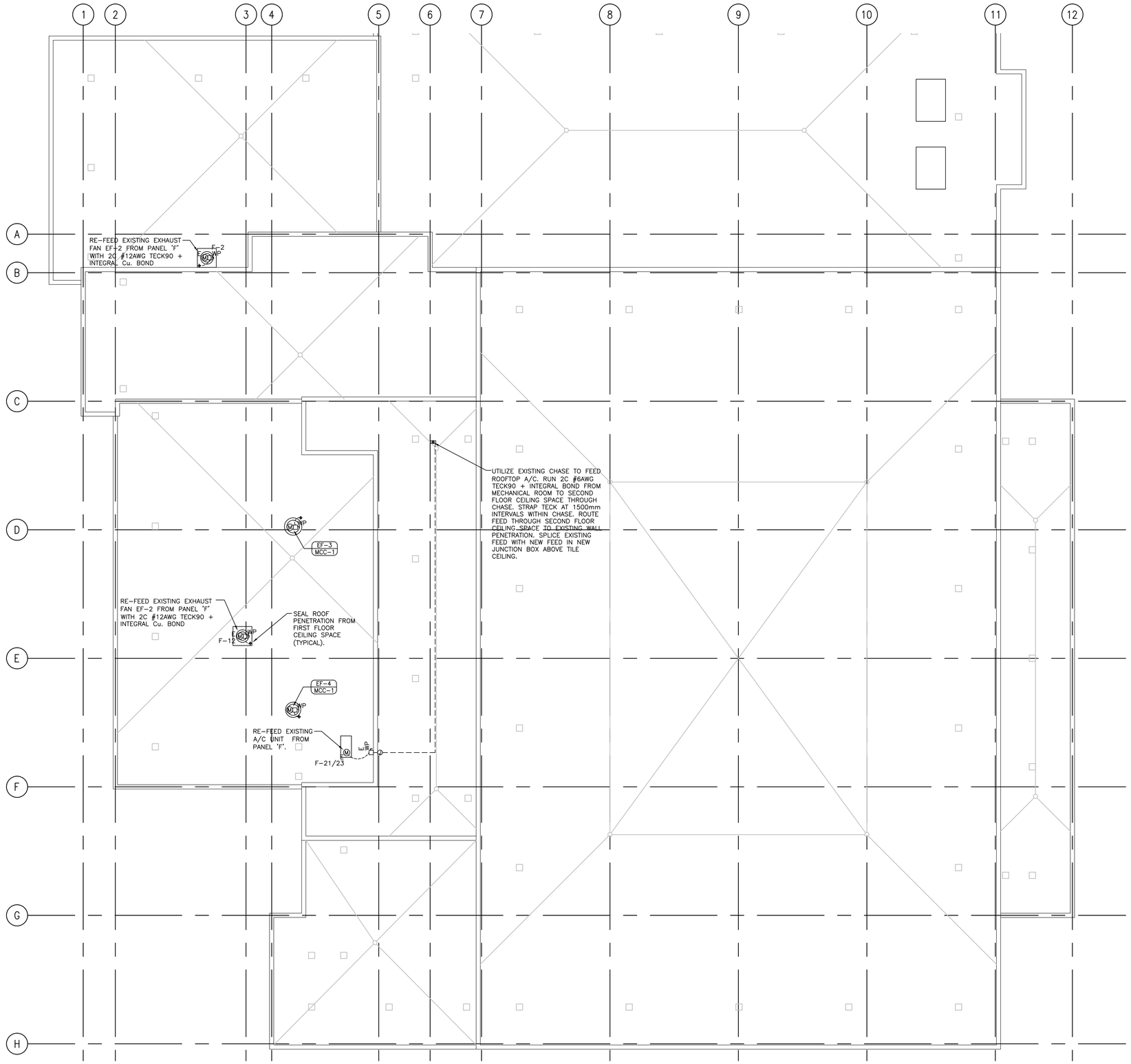

NORTH

1 / E3.0 ROOF POWER & SYSTEMS PLAN

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A1 Sheet

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ROOF ELECTRICAL PLAN

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57/2017	E3 OF E7	0

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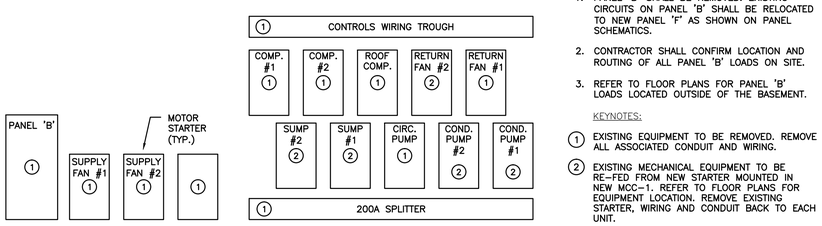


1 E3 EXISTING MECH. ROOM DISTRIBUTION – DEMO
N.T.S.

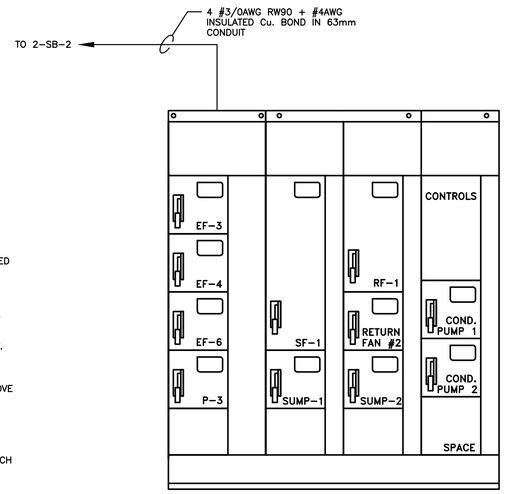
GENERAL NOTES

1. PANEL 'B' SHALL BE REMOVED. EXISTING CIRCUITS ON PANEL 'B' SHALL BE RELOCATED TO NEW PANEL 'F' AS SHOWN ON PANEL SCHEMATICS.
2. CONTRACTOR SHALL CONFIRM LOCATION AND ROUTING OF ALL PANEL 'B' LOADS ON SITE.
3. REFER TO FLOOR PLANS FOR PANEL 'B' LOADS LOCATED OUTSIDE OF THE BASEMENT.

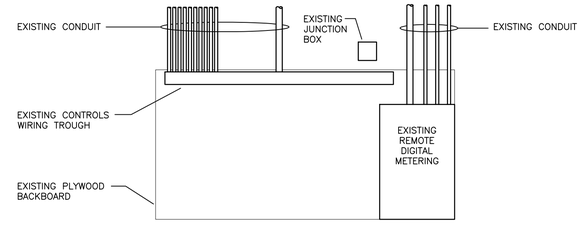
KEYNOTES:

(1) EXISTING EQUIPMENT TO BE REMOVED. REMOVE ALL ASSOCIATED CONDUIT AND WIRING.

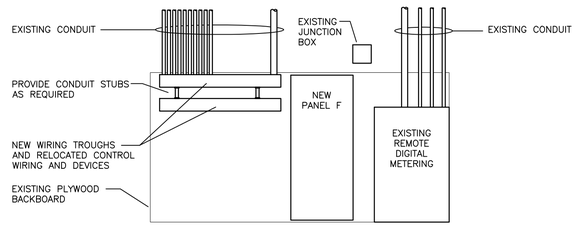
(2) EXISTING MECHANICAL EQUIPMENT TO BE RE-FED FROM NEW STARTER MOUNTED IN NEW MCC-1. REFER TO FLOOR PLANS FOR EQUIPMENT LOCATION. REMOVE EXISTING STARTER, WIRING AND CONDUIT BACK TO EACH UNIT.



2 E3 NEW MOTOR CONTROL CENTRE MCC-1
N.T.S.



3 E3 EXISTING ELECTRICAL ROOM – SOUTH BACKBOARD
N.T.S.



4 E3 NEW ELECTRICAL ROOM – SOUTH BACKBOARD
N.T.S.

NOTE: THE EXISTING PANEL SCHEMATICS ARE SHOWN FOR REFERENCE ONLY. THE CIRCUIT NUMBERS AND DESCRIPTIONS DO NOT NECESSARILY REFLECT ACTUAL CIRCUITS. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY ALL EXISTING BRANCH CIRCUITRY MODIFIED IN THIS RENOVATION AND SHALL REUSE EXISTING BREAKERS MADE SPARE BY DEMOLITION TO ACHIEVE THE CIRCUITRY SHOWN ON THESE PLANS.

* INDICATES NEW BRANCH CIRCUIT FED FROM AN EXISTING BREAKER

** INDICATES EXISTING BRANCH CIRCUIT FED FROM A NEW BREAKER

*** INDICATES EXISTING BREAKER MADE SPARE BY RENOVATION.

**** INDICATES NEW FEED FROM NEW BREAKER

ALL PANEL DIRECTORIES AFFECTED BY THIS RENOVATION SHALL BE UPDATED TO SUIT NEW AND REVISED CIRCUITRY.

ELECTRICAL ROOM
EXISTING

2-SB-2

(120/208V, 800A, 3ø, 4W)

SPARE	100A 3P	70A 3P	MOTOR P1
PANEL C	150A 3P	100A 3P	PANEL B ***
*PANEL F	150A 3P	150A 3P	PANEL A
SPARE	150A 3P	200A 3P	PANEL Y
PANEL D	150A 3P	100A 3P	PANEL X
**** MCC-1	200A 3P	15A 1P	F/A/ PANEL
200A SPACE		15A 1P	SECURITY PANEL
200A SPACE	800A	40A 3P	MOTOR P2

MECHANICAL ROOM
EXISTING TO BE REMOVED

PANEL B

(120/208V, 3ø, 4W)

CRAWL SPACE LIGHT	1	2	EXHAUST FAN (EF-1)
CRAWL SPACE LIGHT	3	4	CIRCULATING PUMP
ELECTRICAL RM. LIGHTS	5	6	NEW TUNNEL PLUGS
MECH. RM. LIGHTS	7	8	NEW TUNNEL LIGHTS
CRAWLSPACE PLUGS	9	10	SPARE
F.A. FAN SHUTDOWN	11	12	ELECTRICAL RM. PLUGS
TRANS ALTA ENERGY AFTER COOLER	13	14	EXHAUST FAN MEN'S CHANGE ROOM (EF-2)
BASEMENT BATTERY PACKS	15	16	TELEPHONE PLUGS
CIRCULATING PUMPS	17	18	SUMP PUMP
CIRCULATING PUMPS	19	20	SUMP PUMP
CIRCULATING PUMPS WEST	21	22	CAR PLUGS
SPARE GFI	23	24	CAR PLUGS
	25	26	CAR PLUGS
GROUND FLOOR A/C (ROOF) 20	27	28	CAR PLUGS
MECH. RM. EXHAUST FAN & LOUVER	29	30	CAR PLUGS

100A BUS S/N

REMOVE EXISTING FEEDER AND CONDUIT BACK TO 2-SB-2

ELECTRICAL ROOM
NEW

PANEL F

(120/208V, 3ø, 4W)

4 #1/0 AWG RW90 + #6 INSUL. Cu. BOND IN 53mm CONDUIT

150A BUS S/N

** CRAWL SPACE LIGHT	1	2	EXHAUST FAN (EF-1) **
** CRAWL SPACE LIGHT	3	4	HOT WATER CIRC. PUMP **
**ELECTRICAL RM. LIGHTS	5	6	NEW TUNNEL PLUGS **
** MECH. RM. LIGHTS	7	8	NEW TUNNEL LIGHTS **
(1) ** CRAWLSPACE PLUGS	9	10	ELECTRICAL RM. PLUGS **
** TRANS ALTA ENERGY AFTER COOLER	11	12	EXHAUST FAN MEN'S CHANGE ROOM (EF-2) **
** BASEMENT BATTERY PACKS	13	14	TELEPHONE PLUGS **
** CIRCULATING PUMPS	15	16	SUMP PUMP ** (1)
(1) ** CIRCULATING PUMPS	17	18	SUMP PUMP **
**CIRCULATING PUMPS WEST	19	20	CAR PLUGS **
	21	22	CAR PLUGS **
**GROUND FLOOR A/C (ROOF) 20	23	24	CAR PLUGS **
(1) ** MECH. RM. EXHAUST FAN & LOUVER	25	26	CAR PLUGS **
GYM FANS (CF-1 TO CF-4)	27	28	CAR PLUGS **
GYM FANS (CF-5 TO CF-8)	29	30	
GLYCOL SYSTEM FILL (GF-1)	31	32	HEATING PUMP P-1
SPARE	33	34 25	
SPARE	35	36	
SPARE	37	38	HEATING PUMP P-2
SPARE	39	40 25	
SPARE	41	42	SPARE
SPACE	43	44	SPACE
	45	46	
	47	48	
	49	50	
	51	52	
	53	54	
	55	56	
	57	58	
	59	60	

PANEL F KEYNOTES:

(1) EXISTING DEVICE NOT SHOWN ON PLANS. ALLOW FOR 30M OF CONDUIT AND WIRE TO RE-FEED DEVICE. CONTRACTOR SHALL CONFIRM EQUIPMENT LOCATION ON SITE.

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PANEL SCHEMATICS AND ELECTRICAL DETAILS

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MECHANICAL EQUIPMENT SCHEDULE

NAME	KW	HP	VOLTS	PH	FLA	DESCRIPTION	FEEDER	SW/FUSE	BREAKER	STARTER	
SF-1	--	20	208	3	--	AHU-1 SUPPLY FAN	3 #3 AWG RW90 + #6 INSUL. Cu. BOND IN 35mm CONDUIT	100A	--	VFD	PROVIDE VFD MOUNTED IN MCC-1 AND CONNECTION FROM VFD TO UNIT. PROVIDE ADDITIONAL 120V CIRCUIT CONNECTION TO UNIT MOUNTED SWITCH FOR LIGHTING.
RF-1	--	5	208	3	--	RETURN FAN 1	3 #12 AWG RW90 + #12 INSUL. Cu. BOND IN 21mm CONDUIT	25A	--	VFD	PROVIDE VFD MOUNTED IN MCC-1 AND CONNECTION FROM VFD TO UNIT.
EF-3	-	1/3	208	1	--	EXHAUST FAN 3	2C #12 AWG TECK90 + INTEGRAL Cu. BOND	15A	--	SIZE 00	PROVIDE LOCAL DISCONNECT ADJACENT TO UNIT
EF-4	-	1/3	208	1	--	EXHAUST FAN 4	2C #12 AWG TECK90 + INTEGRAL Cu. BOND	15A	--	SIZE 00	PROVIDE LOCAL DISCONNECT ADJACENT TO UNIT
EF-6	-	1/2	208	1	--	EXHAUST FAN 6	2 #12 AWG RW90 + #12 INSUL. Cu. BOND IN 21mm CONDUIT	15A	--	SIZE 00	PROVIDE LOCAL DISCONNECT ADJACENT TO UNIT
CF-1 thru CF-8	-	-	120	1	0.70	CIRCULATING FANS	2 #12 AWG RW90 + #12 INSUL. Cu. BOND IN 21mm CONDUIT	--	15A-1P	N/A	PROVIDE LOCAL DISCONNECT ADJACENT TO UNIT. COORDINATE WITH MECHANICAL CONTRACTOR FOR SPEED CONTROL/REVERSING SWITCH INSTALLATION.
P-1	-	3	208	3	--	MAIN HEATING PUMP	3 #12 AWG RW90 + #12 INSUL. Cu. BOND IN 21mm CONDUIT	--	25A-3P	VFD	PROVIDE LOCAL DISCONNECT ADJACENT TO UNIT. PROVIDE CONNECTION TO AND MOUNTING OF FACTORY SUPPLIED VFD ADJACENT TO UNIT.
P-2	-	3	208	3	--	MAIN HEATING PUMP	3 #12 AWG RW90 + #12 INSUL. Cu. BOND IN 21mm CONDUIT	--	25A-3P	VFD	PROVIDE LOCAL DISCONNECT ADJACENT TO UNIT. PROVIDE CONNECTION TO AND MOUNTING OF FACTORY SUPPLIED VFD ADJACENT TO UNIT.
P-3	-	1.5	208	3	--	HEATING COIL PUMP	3 #12 AWG RW90 + #12 INSUL. Cu. BOND IN 21mm CONDUIT	15A	--	SIZE 00	PROVIDE LOCAL DISCONNECT ADJACENT TO UNIT AND MOTOR STARTER TO ALLOW CONTROL FROM THE ENERGY MANAGEMENT CONTROL SYSTEM.
GF-1	-	-	120	1	--	GLYCOL SYSTEM FILL	2 #12 AWG RW90 + #12 INSUL. Cu. BOND IN 21mm CONDUIT	--	15A-1P	N/A	UNIT C/W 5-15P PLUG AND CORD. PROVIDE 5-15R RECEPTACLE ADJACENT TO UNIT.
RF-2	-	1	208	3	--	EXISTING RETURN FAN	3 #12 AWG RW90 + #12 INSUL. Cu. BOND IN 21mm CONDUIT	15A	--	SIZE 00	RE-FEED EXISTING EQUIPMENT FROM NEW MCC.
SUMP #1	-	1/2	208	3	--	EXISTING SUMP PUMP	3 #12 AWG RW90 + #12 INSUL. Cu. BOND IN 21mm CONDUIT	15A	--	SIZE 00	RE-FEED EXISTING EQUIPMENT FROM NEW MCC.
SUMP #2	-	1/2	208	3	--	EXISTING SUMP PUMP	3 #12 AWG RW90 + #12 INSUL. Cu. BOND IN 21mm CONDUIT	15A	--	SIZE 00	RE-FEED EXISTING EQUIPMENT FROM NEW MCC.
COND. PUMP #1	-	1/2	208	3	--	EXISTING CONDENSATE PUMP	3 #12 AWG RW90 + #12 INSUL. Cu. BOND IN 21mm CONDUIT	15A	--	SIZE 00	RE-FEED EXISTING EQUIPMENT FROM NEW MCC.
COND. PUMP #2	-	1/2	208	3	--	EXISTING CONDENSATE PUMP	3 #12 AWG RW90 + #12 INSUL. Cu. BOND IN 21mm CONDUIT	15A	--	SIZE 00	RE-FEED EXISTING EQUIPMENT FROM NEW MCC.

MECHANICAL EQUIPMENT GENERAL NOTES

1. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH MECHANICAL CONTRACTOR TO PROVIDE LINE VOLTAGE CONTROL WIRING FOR MECHANICAL CONTROLS.
2. PROVIDE FIRE ALARM RELAY MODULE FOR AIR HANDLING UNIT TO SHUT DOWN THE UNIT ON A FIRE ALARM SIGNAL.
3. PROVIDE THERMAL SWITCHES OR DISCONNECT SWITCHES AS INDICATED ON THE PLANS.
4. LOCATE MOTOR STARTERS IN NEW MCC-1.

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SPECIFICATIONS

GENERAL CONDITIONS AND INTENT

1. PROVIDE LABOUR AND MATERIALS REQUIRED TO INSTALL, TEST AND PLACE INTO OPERATION A COMPLETE ELECTRICAL SYSTEM WITH FACILITIES AND SERVICES TO MEET THE REQUIREMENTS DESCRIBED HEREIN, AS SHOWN ON THE DRAWINGS, AND IN COMPLETE ACCORD WITH APPLICABLE CODES AND ORDINANCES.

2. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE 2015 CANADIAN ELECTRICAL CODE, SASKATCHEWAN HUMAN RIGHTS ACCESSIBILITY STANDARD, LOCAL BY-LAWS, AND UTILITY REQUIREMENTS. WORK INVOLVING FIRE PROTECTION SHALL ALSO BE IN ACCORDANCE WITH UNDERWRITERS' LABORATORY OF CANADA, NATIONAL BUILDING CODE, NATIONAL FIRE CODE, NATIONAL STANDARD OF CANADA/UNDERWRITERS' LABORATORIES OF CANADA STANDARDS CAN/ULC-S524-14, CAN/ULC-S536-13, AND CAN/ULC-S537-13.

3. ALL WORK SHALL COMPLY WITH SASKPOWER'S REQUIREMENTS AND REGULATIONS. SUBMIT TO SASKPOWER THE NECESSARY NUMBER OF DRAWINGS AND SPECIFICATIONS FOR EXAMINATION AND APPROVAL PRIOR TO COMMENCEMENT OF WORK. PAY ASSOCIATED FEES. IN THE EVENT OF ANY INSPECTION AUTHORITY REQUESTING DEVIATION FROM THE DESIGN, NOTIFY THE CONSULTANT, AND OBTAIN APPROVAL BEFORE PROCEEDING WITH ANY CHANGE.

4. ALL WORK SHALL BE EXECUTED IN A WORKMANLIKE AND SUBSTANTIAL MANNER, NEAT IN ITS MECHANICAL APPEARANCE AND ARRANGEMENT. A COMPETENT REPRESENTATIVE SHALL CONSTANTLY SUPERVISE THE WORK OF THIS DIVISION FROM BEGINNING TO COMPLETION AND FINAL ACCEPTANCE. SO FAR AS POSSIBLE, THE SAME SUPERVISOR AND WORKMEN SHALL BE EMPLOYED THROUGHOUT THE PROJECT'S DURATION. MATERIAL AND WORKMANSHIP NOT MEETING THE STANDARD INTENDED AND REQUIRED BY THIS SPECIFICATION SHALL, UPON INSTRUCTION FROM THE CONSULTANT, BE PROPERLY REPLACED WITHOUT FURTHER CHARGE OR CONSIDERATION.

5. ALL REFERENCES TO KNOWN STANDARD SPECIFICATIONS SHALL MEAN AND INTEND THE LATEST EDITION OF SUCH SPECIFICATION.

6. EXAMINE ALL DRAWINGS TO ENSURE THAT WORK UNDER THIS DIVISION CAN BE PROPERLY INSTALLED WITHOUT INTERFERENCE. WHERE DISCREPANCIES, AMBIGUITIES, OBVIOUS OMISSIONS OR ERRORS HAVE BEEN MADE IN DRAWINGS AND SPECIFICATIONS, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CLARIFY SAME PRIOR TO TENDER CLOSING. NO ALLOWANCE WILL BE MADE AFTER CONTRACT AWARD FOR ANY EXPENSE INCURRED BY THE CONTRACTOR FOR HAVING TO ADJUST THE WORK TO PROPERLY CONFORM.

7. ELECTRICAL DRAWINGS FOR THE WORK UNDER THIS DIVISION ARE DIAGRAMMATIC AND APPROXIMATELY TO SCALE, UNLESS DETAILED OTHERWISE. THEY ESTABLISH SCOPE, MATERIAL AND INSTALLATION QUALITY, AND ARE NOT DETAILED INSTALLATION INSTRUCTIONS. FOLLOW MANUFACTURER'S RECOMMENDED INSTALLATION DETAILS AND PROCEDURES FOR EQUIPMENT SUPPLEMENTED BY DETAILS GIVEN HEREIN AND ON PLANS SUBJECT TO APPROVAL OF THE CONSULTANT.

8. ASSUME FULL RESPONSIBILITY FOR LAYOUT OF THIS WORK, AND FOR ANY DAMAGE CAUSED TO THE OWNER OR OTHER DIVISIONS BY IMPROPER LOCATION OR CARRYING OUT OF THIS WORK. WHERE OUTLETS OR EQUIPMENT MAY EFFECT ARCHITECTURAL OR SITE TREATMENT DESIRED, CONTACT THE CONSULTANT AND FOR INSTRUCTIONS OR DETAILED DRAWINGS.

9. THE ELECTRICAL CONTRACTOR SHALL CONNECT TO EQUIPMENT FURNISHED IN OTHER DIVISIONS AND BY OWNER. COOPERATE FULLY WITH THE CONSULTANT AND OTHER TRADES OF ELECTRICALLY OPERATED EQUIPMENT TO ENSURE PROPER ARRANGEMENT OF, AND PROVISIONS FOR ALL ELECTRICAL EQUIPMENT.

10. BEFORE COMMENCING THE WORK, THE ELECTRICAL CONTRACTOR SHALL EXAMINE THE WORK OF OTHER SUB-TRADES, AND REPORT AT ONCE ANY DEFECTS OR INTERFERENCE AFFECTING THE WORK UNDER THIS CONTRACT, OR THE GUARANTEE OF SAME.

11. INSTALL EQUIPMENT GENERALLY IN LOCATIONS AND ROUTES SHOWN, CLOSE TO BUILDING STRUCTURE WITH MINIMUM INTERFERENCE WITH OTHER SERVICES OR FREE SPACE. REMOVE AND REPLACE IMPROPERLY INSTALLED EQUIPMENT TO THE SATISFACTION OF THE CONSULTANT AT NO EXTRA COST.

12. CEILING AND FLOOR OUTLET SYMBOLS ARE SCALED TO CENTRE LINE OF SYMBOL; SYMBOL DOES NOT INDICATE THE SIZE OR SHAPE. MOUNTING HEIGHT SHALL BE MEASURED TO THE LOWEST POINT OF CEILING MOUNTED EQUIPMENT.

13. WALL OUTLETS ARE SCALED TO THE PERPENDICULAR CENTRE LINE OF THE SYMBOL. MOUNTING HEIGHTS FOR ALL WALL MOUNTED OUTLETS SHALL BE MEASURED TO THE HORIZONTAL CENTRE LINE.

14. LOCATION OF LIGHTING OUTLETS AND RECEPTACLES IN MECHANICAL OR EQUIPMENT ROOMS AND SIMILAR AREAS SHALL BE FINALIZED DURING CONSTRUCTION TO GIVE OPTIMUM ARRANGEMENT. THE CONSULTANT SHALL APPROVE FINAL LOCATION BEFORE INSTALLATION.

15. CHANGE LOCATION OF OUTLETS AT NO EXTRA COST OR CREDIT, PROVIDING DISTANCE DOES NOT EXCEED 3000 MM, AND INFORMATION IS GIVEN BEFORE INSTALLATION.

16. AS THIS PROJECT INVOLVES A RENOVATION TO AN OCCUPIED EXISTING BUILDING, THE CONTRACTOR SHALL VISIT THE SITE DURING THE TENDERING PERIOD, AND THOROUGHLY SATISFY HIMSELF THAT THE WORK CONTAINED IN THESE DRAWINGS AND SPECIFICATIONS CAN BE CARRIED OUT. NO ALLOWANCE WILL BE MADE AFTER CONTRACT AWARD FOR ANY EXPENSE INCURRED BY THE CONTRACTOR FOR HAVING TO ADJUST THIS WORK TO PROVIDE A COMPLETE, FULLY OPERATIONAL INSTALLATION.

17. SHOULD ANY CUTTING OR REPAIRING OF EITHER UNFINISHED OR FINISHED WORK BE REQUIRED, THE CONTRACTOR SHALL EMPLOY THE PARTICULAR TRADE WHOSE WORK IS INVOLVED, TO SO SUCH CUTTING AND PATCHING, AND SHALL PAY FOR ANY RESULTING COSTS.

18. HOLES REQUIRED IN EXISTING CONSTRUCTION TO ACCOMMODATE CONDUITS OR WIREWAYS SHALL BE CUT NEATLY OR DRILLED BY THIS DIVISION.

MATERIALS

1. PROVIDE MATERIALS AND EQUIPMENT IN ACCORDANCE WITH SPECIFICATION REQUIREMENTS. ALL GOODS AND MATERIALS SHALL BE NEW UNLESS OTHERWISE NOTED. ALL MATERIALS SHALL CARRY CSA APPROVED SEAL. EQUIPMENT AND MATERIAL TO BE CSA CERTIFIED. WHERE THERE IS NO ALTERNATIVE TO SUPPLYING EQUIPMENT WHICH IS NOT CSA CERTIFIED, OBTAIN SPECIAL APPROVAL FROM THE CONSULTANT AND THE ELECTRICAL INSPECTION DEPARTMENT.

2. ALL FIRE ALARM EQUIPMENT SHALL CARRY ULC APPROVAL SEAL.

3. IN NO INSTANCE SHALL THE STANDARD ESTABLISHED BY THE DRAWINGS AND SPECIFICATIONS BE REDUCED BY ANY CODE OR ORDINANCE. ALL REFERENCES TO CODES SHALL BE TO THE LATEST EDITION.

4. ALL TENDERS SHALL BE BASED ON MATERIALS SPECIFIED, EXCEPT WHERE APPROVAL OF EQUIVALENT PRODUCTS HAS BEEN OBTAINED IN WRITING FROM THE CONSULTANT.

5. NO DEVIATION FROM SPECIFIED MATERIALS SHALL BE ALLOWED, EXCEPT WHERE ALTERNATIVE MATERIALS HAVE BEEN SPECIFICALLY ACCEPTED IN WRITING.

6. WHERE MATERIALS ARE NOT DIRECTLY SPECIFIED BY CATALOGUE NUMBER AND MANUFACTURER'S NAME, A HIGH INDUSTRY SPECIFICATION GRADE PRODUCT SHALL BE PROVIDED. THE CONSULTANT SHALL BE THE SOLE JUDGE OF WHETHER THIS STANDARD IS BEING MET.

SHOP DRAWINGS

1. SUBMIT SHOP DRAWINGS FOR NEW EQUIPMENT REQUIRED. THESE SHOP DRAWINGS SHALL BE SUFFICIENTLY DETAILED TO PERMIT THE OWNER'S TECHNICIANS TO TROUBLESHOOT AND REPAIR THE EQUIPMENT. EQUIPMENT SHALL NOT BE ORDERED AND/OR FABRICATED UNTIL THE CONSULTANT HAS REVIEWED SHOP DRAWINGS.

2. ALL SHOP DRAWINGS MUST BEAR AN APPROVAL STAMP AND BE SIGNED BY THE CONTRACTOR. THIS REVIEW DOES NOT RELIEVE THIS DIVISION FROM THE RESPONSIBILITY FOR THE FINAL INSTALLATION BEING CORRECT IN ALL DETAIL, AND FULLY ACCEPTABLE TO THE CONSULTANT.

3. SHOP DRAWINGS SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING SYSTEMS: 347/600 AND 120/208 VOLT PANELBOARDS, TRANSFORMERS, SWITCHES, FUSED AND NON-FUSED DISCONNECTS, MOTOR STARTERS, FUSES, WIRING DEVICES, LIGHT FIXTURES, BALLASTS, UNIT EQUIPMENT FOR EMERGENCY LIGHTING, EXIT SIGNS, DOOR ACCESS CONTROL SYSTEMS, FIRE ALARM SYSTEMS, COMMUNICATIONS RACKS, COMMUNICATION CABLES AND PATCH PANELS.

AS BUILT DRAWINGS

1. MAINTAIN, ON A DAILY BASIS, A COMPLETE SET OF MARKED-UP PRINTS AS AS-BUILT DRAWINGS THAT SHOW IN COMPLETE DETAIL THE FINAL ARRANGEMENT AND LOCATION OF ALL ELECTRICAL COMPONENTS AND THE INTERCONNECTING WIRING. ALL RISER CONDUITS, PANEL FEEDS, CONDUIT RUNS OVER 200 AMP AND MAIN COMMUNICATIONS SHALL BE MARKED ON PLANS. THESE ARE TO BE MAINTAINED IN A NEAT AND SUBSTANTIAL MANNER, SO AS TO PROPERLY AND FULLY ILLUSTRATE THE WAY IN WHICH THE INSTALLATION HAS BEEN COMPLETED.

WARRANTY

1. ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FROM DATE OF SUBSTANTIAL COMPLETION. PROPERLY REPAIR AND REPLACE ALL DEFECTIVE WORK AND OTHER WORK WHICH BECOMES DEFECTIVE DURING THE TERM OF WARRANTY. SERVICE ON EQUIPMENT OR SYSTEMS CRITICAL TO THE OWNER'S OPERATION SHALL BE PROVIDED ON EMERGENCY BASIS WHICH MAY NECESSITATE OVERTIME AND SERVICE OUTSIDE THE NORMAL WORKING HOURS. THE CONTRACTOR SHALL ENSURE THAT ALL SUPPLIERS COMPLY WITH THIS REQUIREMENT.

MAINTENANCE MANUALS

1. UPON COMPLETION OF THE INSTALLATION, PROVIDE THREE (3) COMPLETE AND COMPREHENSIVE IDENTICAL SETS OF OPERATING AND MAINTENANCE MANUALS TO BE REVIEWED BY THE CONSULTANT PRIOR TO THE MANUALS BEING SENT TO THE OWNER.

2. THE OPERATING AND MAINTENANCE MANUALS SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING INFORMATION:

   a. CERTIFICATION REPORTS.
   b. DOCUMENTATION INDICATING OWNER'S RECEIPT OF OPERATING INSTRUCTIONS.
   c. COMPLETE LIST OF ALL MATERIALS TURNED OVER TO THE OWNER C/W RECEIPTS FOR SAME.
   d. SHOP DRAWINGS PROPERLY INDEXED AND CONTAINED IN SUITABLY SIZED ENVELOPES.
   e. MANUFACTURER'S INSTALLATION MANUALS AS SUPPLIED WITH THE EQUIPMENT OR DEVICE.
   f. SCHEMATIC DRAWINGS FOR ALL SYSTEMS INDEXED AND CONTAINED IN SUITABLY SIZED ENVELOPES.
   g. CATALOGUE BROCHURES FOR LIGHT FIXTURES, PANELBOARDS, SWITCHES, RECEPTACLES, FUSES, ETC.
   h. OVERCURRENT COORDINATION AND ARC FAULT STUDY AND DOCUMENTATION OF ASSOCIATED TESTS.
   i. PHASE ROTATION CONFIRMATION BY THE CONTRACTOR.
   j. CERTIFICATE OF OWNER'S ELECTRICAL EQUIPMENT TRAINING.
   k. ACCEPTANCE TESTING REPORTS.

3. THE ABOVE INFORMATION SHALL BE BOUND IN BLACK, HARD-BACKED, THREE-RING, LETTERHEAD SIZE BINDERS. INCOMPLETE OR POORLY REPRODUCED MANUALS WILL BE REJECTED.

4. OPERATING AND MAINTENANCE MANUALS, AS WELL AS ALL OWNER INSTRUCTIONS, SHALL BE COMPLETE BEFORE SUBSTANTIAL COMPLETION (AS OUTLINED BY THE BUILDERS' LIEN ACT) WILL BE CONSIDERED. ALSO, PRELIMINARY MAINTENANCE MANUALS MUST BE SUBMITTED PRIOR TO 70% COMPLETION. NO FURTHER PROGRESS PAYMENTS WILL BE PERMITTED UNTIL THESE PRELIMINARY MAINTENANCE MANUALS HAVE BEEN SUBMITTED AND APPROVED.

IDENTIFICATION

1. THIS CONTRACTOR SHALL INCLUDE IDENTIFICATION OF ALL NEW EQUIPMENT, JUNCTION BOXES, CIRCUITRY, ETC. TO ASSIST THE OWNERS IN FOLLOW UP MAINTENANCE OF THE SYSTEM.

2. LAMECOID NAMEPLATES SHALL BE PROVIDED FOR ALL NEW ELECTRICAL EQUIPMENT INCLUDING POWER PANELS, DISTRIBUTION PANELS, LIGHTING PANELS, TRANSFORMERS, DISCONNECT SWITCHES, CONTACTORS, TELEPHONE PANELS, MISCELLANEOUS SYSTEMS AND PANELS. LAMECOID LABELS TO IDENTIFY SUCH EQUIPMENT SHALL AS FOLLOWS:

   a. NORMAL POWER EQUIPMENT: BLACK SHEET WITH WHITE ENGRAVED LETTERS

3. LAMECOID NAMEPLATES, APPROXIMATELY 75 MM X 25 MM, SHALL BE PROVIDED ON FRONT DOORS OF EACH SWITCH FOR IDENTIFICATION, SHOWING THE NAME AND RATING. ALSO, A 150 MM X 50 MM NAMEPLATE SHALL BE PROVIDED ON TOP PORTION OF PANELBOARD FOR IDENTIFICATION.

4. NAMEPLATES FOR EACH ELECTRICAL PANEL SHALL INDICATE PANEL DESIGNATION, MAINS VOLTAGE AND PANEL CIRCUIT NUMBER FROM WHICH THE PANEL IS FED.

5. NAMEPLATES FOR DISCONNECTS SHALL INDICATE EQUIPMENT BEING CONTROLLED AND VOLTAGE.

6. LAMECOID NAMEPLATES SHALL BE FASTENED TO EQUIPMENT IN A CONSPICUOUS LOCATION WITH SELF TAPPING METAL SCREWS.

7. FEEDER PULL BOXES AND JUNCTION BOXES SHALL BE IDENTIFIED WITH WATERPROOF INK, SHOWING FEEDER OR SYSTEM CONCERNED. CONDUIT ENTERING JUNCTION BOXES FOR COMMUNICATIONS SYSTEMS SHALL BE IDENTIFIED WITH THE ROOM NUMBER THAT EACH CONDUIT SERVES.

8. BRANCH CIRCUIT IDENTIFICATION SHALL BE PROVIDED ON ALL PLUG-IN TYPE RECEPTACLES AND LOCAL SWITCHES, AND SHALL BE IDENTIFIED BY A CLEAR 12MM LAMINATED MARKER TAPE WITH CONTRASTING BLACK LETTERING.

DEMOLITION

1. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE DEMOLITION OF ALL EXISTING LIGHTING, ELECTRICAL SYSTEMS, COMMUNICATION SYSTEMS, MEDICAL EMERGENCY AND FIRE ALARM SYSTEMS WITHIN THE RENOVATION AREA AS OUTLINED IN THE ELECTRICAL, MECHANICAL, AND ARCHITECTURAL DRAWINGS.

2. ALL SALVAGED MATERIALS SHALL REMAIN THE PROPERTY OF THE OWNER, UNLESS OTHERWISE NOTED, AND SHALL BE STOCKPILED AS PER THE OWNER'S INSTRUCTIONS. THE SALVAGEABLE MATERIALS SHALL BE REMOVED FOR THE PURPOSES OF REUSE, AND UNUSED MATERIALS SHALL BE RETURNED AS PER THE OWNER'S INSTRUCTIONS. THE FOLLOWING MATERIALS SHALL BE SALVAGED AND RETURNED TO OWNER: LIGHTING FIXTURES, WIRING DEVICES, NURSE CALL STATIONS AND COMPONENTS, MEDICAL EMERGENCY ALARM PUSHBUTTON STATIONS AND ASSOCIATED MONITOR MODULES AND COVERPLATES, FIRE ALARM FIELD DEVICES.

3. EXISTING LIGHTING FIXTURES AND WIRING DEVICES BEING REMOVED SHALL BE RE-USED/RELOCATED AS SHOWN ON THE FLOOR PLANS. UNUSED FIXTURES AND WIRING DEVICES (SWITCHES, DUPLEX RECEPTACLES) SHALL BE TURNED OVER TO OWNER.

4. ALL ABANDONED CONDUIT, DUCTS, BOXES, WIRE AND CABLE (EXISTING CONDITIONS AND AS A RESULT OF THE RENOVATIONS) SHALL BE COMPLETELY REMOVED BACK TO THE SOURCE OR ORIGIN.

5. ALL EXISTING CEILING POWER DISTRIBUTION (CONDUIT, CABLE, OUTLET BOXES) THAT IS ABANDONED BY THE RENOVATION SHALL BE COMPLETELY REMOVED BACK TO THE EXISTING ELECTRICAL PANELS.

6. ALL EXISTING DATA AND VOICE CABLING, CONDUITS AND TRAY THAT IS ABANDONED SHALL BE COMPLETELY REMOVED BACK TO THE BIX BLOCKS OR DATA RACK, WHICH SHALL REMAIN.

7. EXISTING ELECTRICAL DEVICES ON WALLS NOT AFFECTED BY THE RENOVATION THAT ARE NOT SHOWN ON THE DRAWINGS SHALL REMAIN.

8. WHERE WALLS ARE TO BE REMOVED, THE CONTRACTOR SHALL REMOVE ALL EXISTING ELECTRICAL DEVICES SUCH AS RECEPTACLES, SWITCHES, COMMUNICATIONS AND DATA OUTLETS AND FIRE ALARM DEVICES.

9. ALL FIRE ALARM SYSTEM DEVICES REMOVED DURING THIS RENOVATION SHALL BE COMPLETELY REMOVED BACK TO THE NEAREST JUNCTION BOX. DEVICES SHALL BE SALVAGED FOR REUSE IN THE FINAL LAYOUT.

10. ALL EXISTING EXIT SIGNS SHALL REMAIN UNLESS NOTED OTHERWISE.

FIRE BARRIERS

1. ALL CONDUIT AND CABLE PENETRATIONS IN HORIZONTAL AND VERTICAL FIRE BARRIERS SHALL BE SEALED WITH AN APPROVED FIRE SEAL SYSTEM CONSISTING OF A FIREPROOF CEMENT AND/OR SEALANT. ALL FIRE SEALS SHALL COMPLY WITH THE REQUIREMENTS OF THE PROVINCIAL FIRE COMMISSIONER AND THE LOCAL AUTHORITY HAVING JURISDICTION. COORDINATE WITH GENERAL CONTRACTOR AND CONFIRM FIRE BARRIER LOCATIONS.

2. WHERE POWER OR COMMUNICATION CABLES PASS THROUGH A FIRE BARRIER WITHOUT THE PROTECTION OF CONDUIT, A MULTI-CABLE TRANSIT SHALL BE USED WITHIN THE SLEEVED OPENING, AS MANUFACTURED BY HILTI, STI – SPECIFIED TECHNOLOGIES INC, OR LEGRANDE WIRELMOLD.

3. ALL ELECTRICAL OUTLET BOXES INSTALLED IN PARTITIONS IDENTIFIED ON THE ARCHITECTURAL DRAWINGS AS A FIRE BARRIER OR SEPARATION SHALL BE PROTECTED WITH A NON-HARDENING, INTUMESCENT MOLDABLE FIRESTOP PUTTY COMPOUND. FIRESTOP PUTTY PADS SHALL BE MANUFACTURED BY HILTI, STI – SPECIFIED TECHNOLOGIES INC., OR APPROVED EQUAL

4. FIRE PROOFING AND FIRE STOPPING OF ELECTRICAL RACEWAYS, CABLING, AND OUTLET BOXES FOR THIS DIVISION SHALL BE COMPLETED BY A UL CERTIFIED FIRE STOP CONTRACTOR FOR THIS DIVISION AND SHALL BE INSTALLED AS RECOMMENDED BY THE MANUFACTURER'S RECOMMENDED INSTALLATION DETAILS AND PROCEDURES.

CONDUIT/RACEWAYS/CONNECTIONS

1. CONDUIT FOR ALL POWER, COMMUNICATIONS AND SIGNAL SYSTEMS SHALL BE SUPPLIED AND INSTALLED AS HEREIN SPECIFIED.

2. CONDUIT AND CABLES IN FINISHED AREAS SHALL BE RUN CONCEALED, ABOVE FINISHED CEILINGS, AND IN WALLS AND PARTITIONS. CONDUIT AND CABLES IN UNFINISHED AREAS SUCH AS ELECTRICAL/ COMMUNICATION ROOMS, SHALL BE RUN EXPOSED. ALL CONDUIT/CABLING SHALL BE RUN AT RIGHT ANGLES OR PARALLEL TO BUILDING LINES AND MECHANICAL DUCTWORK, ACCURATE IN LINE AND LEVEL.

3. RUNS OF CONDUIT AND CABLES, WHERE SHOWN, ARE INDICATED ONLY BY GENERAL LOCATION AND ROUTING. CONDUITS AND CABLES SHALL BE INSTALLED TO PROVIDE MAXIMUM HEADROOM AND SPACE WITHIN ACCESSIBLE CEILINGS, AND TO INTERFERE AS LITTLE AS POSSIBLE WITH FREE USE OF SPACES THROUGH WHICH THEY PASS. WHERE SPACE IS INDICATED FOR FUTURE EQUIPMENT, LEAVE SPACE CLEAR.

4. CONDUIT SHALL NOT BE BENT OVER SHARP OBJECTS. IMPROPERLY FORMED BENDS AND RUNNING THREADS WILL NOT BE ACCEPTED. BENDS AND FITTINGS SHALL NOT BE USED TOGETHER.

5. PROPER SUPPORTS OF MANUFACTURED CHANNELS SHALL BE INSTALLED, AND SHALL BE SPACED IN COMPLIANCE WITH THE CANADIAN ELECTRICAL CODE.

6. CONDUIT AND CABLES SHALL BE INSTALLED TO AVOID PROXIMITY TO WATER AND HEATING PIPES. THEY SHALL NOT RUN WITHIN 150MM OF SUCH PIPES, EXCEPT WHERE CROSSINGS ARE UNAVOIDABLE, IN WHICH CASE THEY SHALL BE KEPT AT LEAST 25MM FROM COVERING OF PIPE CROSSED.

7. CONDUIT SHALL BE OF SUFFICIENT SIZE TO PERMIT EASY REMOVAL OF CONDUCTORS AT ANY TIME. CONDUIT SIZES, WHERE SHOWN ON DRAWINGS, ARE MINIMUM AND SHALL NOT BE REDUCED. THE MINIMUM SIZE OF CONDUIT SHALL BE 21MM.

8. ALL EMPTY CONDUIT PROVIDED SHALL BE COMPLETE WITH PULL TWINE.

9. NOT MORE THAN FOUR (4) 90 DEGREE BENDS OR EQUIVALENT OFFSETS WILL BE PERMITTED BETWEEN PULL BOXES. WHEN MAXIMUM NUMBER OF BENDS IS USED, THE TOTAL RUN BETWEEN PULL BOXES SHALL NOT EXCEED 18000 MM.

10. JUNCTION BOXES OR CABLE ANCHOR BOXES SHALL BE INSTALLED WHEREVER NECESSARY FOR PROPER PULLING OR ANCHORING OF CABLES. THEY SHALL BE INSTALLED TO BE ACCESSIBLE AFTER BUILDING IS COMPLETED, AND SHALL BE SET TO COME WITHIN FINISHED LINES OF THE BUILDING.

11. CONDUIT TO OUTLETS BOXES SHALL NOT BE RUN HORIZONTALLY WITHIN WALLS. ALL CONNECTIONS SHALL BE MADE VERTICALLY THROUGH THE WALL STRUCTURE.

12. EMT COUPLINGS AND CONNECTORS SHALL BE SET-SCREW TYPE EXCEPT IN ELECTRICAL, MECHANICAL, COMMUNICATION, AND SPRINKLER ROOMS, WHICH SHALL BE WATER-TIGHT.

13. FLEXIBLE CONDUIT AND EMT CONNECTORS SHALL BE OF THE INSULATED THROAT TYPE.

14. ALL CONDUITS SHALL BE TERMINATED WITH A SUITABLE BUSHING TO PROTECT CONDUCTORS OR CABLE FROM ABRASION.

15. EMT ENTERING BOXES OR ENCLOSURES SHALL BE TERMINATED WITH NYLON INSULATED CONCRETE TIGHT CONNECTORS.

16. PVC CONDUIT AND NON-METALLIC TUBING SHALL NOT PASS THROUGH A FIRE PARTITION OR FLOOR SEPARATION. WHERE IT IS NECESSARY FOR PVC CONDUITS OR NON-METALLIC TUBING TO PASS THROUGH A FIRE BARRIER, A HILTI FIRE STOP COLLAR SHALL BE PROVIDED FOR EITHER SIDE OF THE FIRE BARRIER. ALSO, PVC CONDUIT AND NON-METALLIC TUBING SHALL NOT BE USED IN RETURN AIR PLENUMS.

CONDUCTORS

1. ALL CONDUCTORS SHALL BE COPPER AND MINIMUM #12 AWG (COPPER). ALL CONDUCTORS #12 AWG TO #8 AWG SHALL BE RATED FOR MINIMUM 600V RW-90 XLPE. CONDUCTORS #6 AWG AND LARGER SHALL BE RATED FOR MINIMUM 1000V RW-90 XLPE. WIRING IN CHANNEL BACK OF FLUORESCENT FIXTURES SHALL BE 600V TYPE GTF OR TEW. SIZE, GRADE OF INSULATION, VOLTAGE AND MANUFACTURER'S NAME SHALL BE MARKED AT REGULAR INTERVALS.

2. CONDUCTORS SHALL BE COLOR CODED. CONDUCTORS #2 AWG AND SMALLER SHALL HAVE COLOR IMPREGNATED INTO INSULATION AT TIME OF MANUFACTURE. CONDUCTORS SIZE NO. 1 AWG AND LARGER MAY BE COLOR CODED WITH ADHESIVE COLOR CODING TAPE, BUT ONLY BLACK INSULATED CONDUCTORS SHALL BE EMPLOYED IN THIS CASE, EXCEPT FOR NEUTRALS, WHICH SHALL BE WHITE WHEREVER POSSIBLE. COLOR CODING SHALL ALSO APPLY TO BUSING IN PANELS. COLOR CODING SHALL BE AS FOLLOWS:

   PHASE 'A' – RED GROUND – GREEN OR BARE
   PHASE 'B' – BLACK NEUTRAL – WHITE
   PHASE 'C' – BLUE CONTROL – ORANGE

3. HOME RUNS TO 120/208 VOLT LIGHTING AND RECEPTACLE PANELS WHICH EXCEED 30000MM IN LENGTH SHALL BE MINIMUM NO. 10 GAUGE.

4. BRANCH CIRCUIT CONDUCTORS SHALL BE SIZED TO PERFORM AT A MAXIMUM VOLTAGE DROP OF 3% BASED ON THE CIRCUIT LOAD OF 80% OF THE CIRCUIT PROTECTIVE DEVICE.

5. ALL CONDUCTOR SIZES SHOWN ARE BASED ON THE 750C AMPACITY RATING OF THE CANADIAN ELECTRICAL CODE DUE TO THE VARYING ELECTRICAL EQUIPMENT TERMINATION RATINGS. ELECTRICAL CONTRACTOR MAY REVISE CONDUCTOR SIZES BASED ON 900C RATINGS BUT IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE TERMINATIONS RATINGS FOR ALL EQUIPMENT IS COORDINATED WITH THE APPROPRIATE CONDUCTOR AND BONDING AMPACITY RATING AS REQUIRED BY THE C.E.C. CONTRACTOR SHALL CONFIRM WITH THE CONSULTANT THAT THEY ARE USING 90 DEGREE LUGS AND CABLE PRIOR TO INSTALLATION.

6. WHERE CONDUCTOR SIZES ARE SHOWN ON DRAWINGS THEY HAVE BEEN BASED ON A MAXIMUM OF 3 HOT CONDUCTORS INSTALLED IN A CONDUIT. THESE CONDUCTOR SIZES ARE BASED ON TABLES IN C.E.C. WHERE ADDITIONAL CONDUCTORS ARE INSTALLED WITHIN A CONDUIT CONDUCTORS SIZES MAY NEED TO BE INCREASED TO REFLECT THE NEW CORRECTION FACTOR. FOR ALL CIRCUITS EXCEEDING 15A CONTRACTOR SHALL CONFIRM WITH THE CONSULTANT ALL NECESSARY INCREASES IN CONDUCTOR SIZES REQUIRED PRIOR TO INSTALLING MORE THAN 3 CONDUCTORS IN A CONDUIT. IN NO CASE UNLESS APPROVED BY THE CONSULTANT SHALL MORE THAN 6 HOT CONDUCTORS BE INSTALLED IN ONE CONDUIT.

7. ALL CONDUCTORS SHALL BE INSTALLED WITHIN EMT UNLESS NOTED OTHERWISE. TECK CABLE AND FLEXIBLE ARMOURED CABLE MAY BE INSTALLED ONLY WHERE SPECIFICALLY INDICATED ON DRAWINGS OR SPECIFICATIONS OR WHERE THE BUILDING CONSTRUCTION DOES NOT ALLOW FOR THE PROPER INSTALLATION OF CONDUIT OR RACEWAY. THE USE OF TECK AND FLEXIBLE ARMOURED CABLES SHALL BE APPROVED BY THE CONSULTANT PRIOR TO INSTALLATION.

8. TECK CABLE SHALL BE IN ACCORDANCE WITH CAN/CSA_C22.2 NO. 131. ALL CABLES SHALL INCLUDE A GROUND CONDUCTOR SIZED IN ACCORDANCE WITH THE 2015 CEC. ALL CONDUCTORS SHALL BE COPPER WITH RW90 XLPE INSULATION. CONDUCTORS SIZED #12 TO #10 GAUGE SHALL BE RATED FOR MINIMUM 600V. CONDUCTORS SIZED #8 AND LARGER SHALL BE RATED FOR MINIMUM 1000V.

9. TECK CABLES SHALL BE FASTENED WITH ONE HOLE STEEL STRAPS TO SECURE SURFACE CABLES 50 MM AND SMALLER, AND WITH TWO HOLE STEEL STRAPS FOR CABLES LARGER THAN 50 MM. PROVIDE CHANNEL TYPE SUPPORTS FOR TWO OR MORE CABLES. THREADED RODS SHALL BE 6 MM DIA. TO SUPPORT SUSPENDED CHANNELS.

10. TECK CABLE CONNECTORS SHALL BE WATERTIGHT APPROVED FOR TECK CABLE.

11. FLEXIBLE ARMOURED CABLE SHALL BE TYPE AC90 WITH INTERLOCKING ARMOUR FABRICATED FROM ALUMINUM STRIP. CONDUCTORS SHALL BE COPPER WITH RW90 INSULATION. ARMOURED CABLE SHALL BE USED ONLY WHERE INDICATED.

12. FLEXIBLE ARMOURED CABLE MAY BE INSTALLED FOR MOTOR CONNECTIONS AND FROM CEILING JUNCTION BOXES TO LIGHT FIXTURES.

13. FLEXIBLE ARMOURED CABLE MAY BE INSTALLED IN FINISHED WALLS OR CEILINGS WHERE WIRING IS TO BE FISHED AND IS IMPRACTICABLE TO INSTALL CONDUIT AND WITHIN MILLWORK CONSTRUCTION.

14. FLEXIBLE ARMOURED CABLE SHALL NOT BE EXPOSED OR INSTALLED HORIZONTALLY WITHIN WALLS.

15. ALL CONNECTIONS TO SWITCHES, OUTLETS, ETC SHALL BE MADE VERTICALLY THROUGH THE WALL STRUCTURE.

16. TERMINATION FOR #8 AWG AND LARGER SHALL BE BY MEANS OF APPROVED SOLDERLESS CONNECTOR LUG. FOR PARALLEL CONDUCTORS, A COMMON LUG WITH SEPARATE TERMINATION FOR EACH CONDUCTOR SHALL BE EMPLOYED.

17. WIRE SHALL BE AS MANUFACTURED BY NEXANS OR BICC GENERAL WIRE.

OUTLET BOXES

1. PROVIDE OUTLET BOXES SUITABLE FOR THE APPLICATION AND LOCATION OF THE DEVICES. ALL BOXES SHALL BE SIZED IN ACCORDANCE WITH CSA C22.1.

2. ALL OUTLET BOXES FOR COMMUNICATIONS SYSTEMS SHALL BE 102MM SQUARE OUTLET BOXES WITH EXTENSION AND PLASTER RINGS FOR FLUSH MOUNTING DEVICES IN FINISHED WALLS

3. EACH OUTLET BOX INSTALLED IN STEEL STUD AND GYPROC WALLS SHALL BE MOUNTED ON CADDY #BHA, SERIES SGB OR TSGB SCREW GUN BRACKETS. WOOD STRAPPING WITH STEEL STUDS SHALL NOT BE UTILIZED FOR SUPPORTING OUTLET BOXES.

4. EACH OUTLET BOX INSTALLED IN ACOUSTIC TILE CEILINGS SHALL BE MOUNTED ON DOUBLE CADDY "TEE BAR HANGER" #512 IN SUCH A MANNER THAT THE OUTLET BOX WILL NOT TWIST IN ANY DIRECTION.

5. WHERE BOXES ARE SURFACE MOUNTED IN UNFINISHED AREAS, SUCH AS FURNACE OR BOILER ROOMS, STAMPED GALVANIZED STEEL 100 MM SQUARE BOX TO ACCEPT #8300 SERIES RAISED COVERS SHALL BE USED.

6. PROVIDE BLANK COVER PLATES FOR BOXES WITHOUT WIRING DEVICES.

7. WHERE SURFACE WIRING METHODS ARE ALLOWED AND APPROVED IN FINISHED AREAS, USE HUBBELL OR WIREMOLD BOXES AS PER DRAWINGS C/W SUITABLE ADAPTER FOR WIREWAY ENTRANCE.

COVERPLATES

1. METAL WALL PLATES SHALL BE PROVIDED FOR ALL SWITCHES, RECEPTACLES, BLANKS, TELEPHONE AND SPECIAL PURPOSE OUTLETS. THE WALL PLATES SHALL BE OF SUITABLE CONFIGURATION FOR THE DEVICE FOR WHICH IT IS TO COVER WITH COLOR MATCHED MOUNTING SCREWS. USE GANGED PLATE WHERE MORE THAN ONE DEVICE OCCURS AT ONE LOCATION. METAL WALL PLATES SHALL BE STAINLESS STEEL.

2. BLANK COVER PLATES IN FINISHED CEILING AREAS SHALL BE COLUMBIA ELECTRIC #9002 BAKED WHITE ENAMEL FOR WHITE CEILINGS, OR PAINTED TO MATCH COLORED FINISHES.

3. WHERE SURFACE WIRING METHODS NEED TO BE EMPLOYED IN A HIGH FINISH AREA, STAINLESS STEEL WALL PLATES SHALL BE USED IN CONJUNCTION WITH WIREMOLD SURFACE BOX TO SUIT THE DEVICE.

CONVENIENCE OUTLETS & SWITCHES

1. CONVENIENCE OUTLETS SHALL BE WHITE, SPECIFICATION GRADE, STRAIGHT BLADE, 15A, 125 VOLT, 3 WIRE, SELF-GROUNDING, BACK AND SIDE WIRED C/W HIGH IMPACT CHEMICAL RESISTANT MOLDED NYLON OR POLYCARBONATE FACE. DEVICE TO ACCEPT UP TO #10 COPPER CONDUCTORS ON BACK WIRING. ALL RECEPTACLES TO BE OF ONE OF THE FOLLOWING MANUFACTURERS: ARROW HART, BRYANT, EAGLE, HUBBELL, LEVITON OR PASS & SEYMOUR.

FUSIBLE SWITCHES

1. FUSIBLE SWITCHES SHALL BE QUICK-MAKE, QUICK-BREAK, VISIBLE BLADES, INTEGRAL HANDLE MECHANISM, DE-IONIZING ARC QUENCHERS, DOOR INTERLOCK TO PREVENT ACCESS TO FUSES WHEN SWITCH IS 'ON', FRONT OPERATION, HIGH PRESSURE FUSE CLIPS AND RECESSED LIVE PARTS. OPERATING HANDLES TO HAVE PROVISION FOR PADLOCKING IN EITHER 'ON' OR 'OFF' POSITIONS. HANDLE TO BE MARKED TO CLEARLY INDICATE SWITCH CONTACT POSITIONS. FUSIBLE SWITCHES SHALL BE MANUFACTURED BY SCHNEIDER ELECTRIC, CUTLER-HAMMER, OR SIEMENS.

FUSES

1. NEW FUSES SHALL BE CSA CERTIFIED HRC1-J TIME DELAY AND SHALL BE IN ACCORDANCE WITH CSA SPECIFICATION C22-2 NO. 106-M92. HRC-1 FUSE DIMENSIONS AND CURRENT LIMITING PERFORMANCE SHALL BE IN ACCORDANCE WITH THE UL STANDARD 198C. FUSE INTERRUPTING RATING SHALL BE 200,000 AMPERES RMS SYMMETRICAL, UNLESS NOTED OTHERWISE. ALL FUSES SHALL BE MANUFACTURED BY LITTLEFUSE, BUSS, FERRAZ SHAWMUT, OR EDISON.

GROUNDING

1. THE ENTIRE INSTALLATION SHALL BE GROUNDED IN ACCORDANCE WITH THE 2015 CANADIAN ELECTRICAL CODE AND DETAILS AS SHOWN ON THE DRAWINGS.

2. ALL GROUND CONDUCTORS SHALL BE BARE OR INSULATED, STRANDED, MEDIUM HARD DRAWN COPPER WIRE. ALL INSULATED GROUND WIRES SHALL BE GREEN.

3. ALL NON-CURRENT CARRYING METALLIC PARTS OF EQUIPMENT IN ELECTRICAL ROOMS AND MECHANICAL EQUIPMENT ROOMS SHALL HAVE A DIRECT COPPER CONNECTION RUN TO THE GROUND BUS IN EACH.

4. ALL METALLIC RACEWAYS AND CONDUITS FOR COMMUNICATIONS, CABLE AND CONDUCTORS SHALL BE GROUNDED.

5. ALL BRANCH CIRCUITS SHALL INCLUDE A GROUND WIRE. CONDUIT SHALL NOT BE USED AS A GROUND.

6. ALL CIRCUITS SERVING COMPUTER RECEPTACLES OR SYSTEMS FURNITURE SHALL BE PROVIDED WITH A SEPARATE NEUTRAL.

7. PROVIDE A #6 AWG GROUND WIRE TO ALL COMMUNICATION TERMINATION POINTS.

PANELBOARDS

1. ALL BREAKER PANELS SHALL BE LOAD BALANCED SUCH THAT THE MAXIMUM VARIATION BETWEEN THE TWO WORST PHASES DOES NOT EXCEED 5%.

2. ALL PANELS SHALL HAVE A COPPER MAIN BUS BAR EQUIPPED WITH SOLDERLESS LUG AND BE CAPABLE OF ACCEPTING ANY ARRANGEMENT OF SINGLE, TWO OR THREE POLE BREAKERS.

3. PANELS FOR 347/600 VOLT AND 120/208 VOLT, 3 PHASE, 4 WIRE SYSTEMS, SHALL BE COMPLETE WITH BOLT-IN TYPE BREAKERS, WITH A MINIMUM NOMINAL WIDTH OF 20MM PER POLE, AND A BUS OF SUFFICIENT CAPACITY TO FEED THE NUMBER OF BRANCH CIRCUIT BREAKERS INDICATED.

4. BRANCH CIRCUIT BREAKER SHALL HAVE QUICK-MAKE, QUICK-BREAK TOGGLE MECHANISM WITH SINGLE, TWO OR THREE POLE COMMON TRIP THERMAL MAGNETIC UNITS IN AMPERE RATINGS AS DESIGNATED ON THE DRAWINGS. BREAKER HANDLES SHALL HAVE THREE POSITIONS: 'ON', 'OFF' AND 'TRIPPED'. ALL CIRCUIT BREAKERS AND PANEL BUS SHALL HAVE AN INTERRUPTING CAPACITY OF 10,000 AMPS SYMMETRICAL.

5. EACH PANEL SHALL BE EQUIPPED WITH A GROUND BUS SUITABLE FOR TERMINATING ONE GROUND CONDUCTOR PER LOAD CIRCUIT.

6. PROVIDE SPRINKLER GUARDS ON TOP OF ALL SURFACE MOUNTED PANELS. ALL CONDUITS ENTERING THE TOPS OF THE PANELS SHALL BE C/W WATER TIGHT CONNECTORS. SEAL ALL CONDUIT CONNECTORS WITH SILICONE BASED CAULKING TO PROVIDE A DEGREE OF WATER TIGHTNESS IN THE EVENT OF A WATER LEAK.

7. EACH PANEL SHALL BE COMPLETE WITH A TYPED DIRECTORY, WHICH SHALL BE MOUNTED INSIDE THE DOOR IN A METAL FRAME WITH CLEAR PLASTIC COVER.

8. ALL PANEL DIRECTORIES AFFECTED BY THIS PROJECT SHALL BE UPDATED. PROVIDE A NEW UPDATED TYPED PANEL DIRECTORY WITHIN A CLEAR PLASTIC COVER AS REQUIRED. STICKERS OR WRITING ON THE PANEL DOOR IS NOT ACCEPTABLE.

9. ALL PANELS SHALL BE SPECIFICATION GRADE AND OF THE SAME MANUFACTURER. LOAD CENTRES ARE NOT ACCEPTABLE.

10. PANELS SHALL BE SIEMENS, CUTLER HAMMER OR FEDERAL PIONEER OR SQUARE 'D' AS MANUFACTURED BY SCHNEIDER ELECTRIC.

MOTOR CONTROL

1. PROVIDE ALL MOTOR CONNECTIONS, INCLUDING STARTERS, OVERLOAD PROTECTION AND DISCONNECTING DEVICES AT MOTORS. ALL MOTOR DRIVEN EQUIPMENT SHALL BE PROVIDED WITH A LOCKABLE DISCONNECTING DEVICE.

2. SUPPLY AND INSTALL COMPLETE WIRING REQUIREMENTS FOR FULL VOLTAGE IN-LINE DEVICES ON SINGLE PHASE EQUIPMENT SUCH AS THERMOSTATS, MULTI-SPEED SWITCHES FOR FORCE FLOWS, CABINET HEATERS, ETC. SINGLE PHASE TYPE MOTOR THERMAL SWITCHES THAT ARE LOCATED IN ENTRANCE VESTIBULES SHALL BE THE FLUSH MOUNTED, KEY OPERATED TYPE TO PREVENT TAMPERING BY UNAUTHORIZED PERSONNEL.

3. ALL THREE PHASE STARTERS SHALL BE COMBINATION QUICK-MAKE, QUICK-BREAK, SWITCH, FUSE AND MAGNETIC STARTER C/W RED AND GREEN INDICATOR LIGHTS, H.O.A. OR START-STOP SWITCH AND TWO SPARE AUXILIARY CONTACTS, IN ADDITION TO THOSE REQUIRED FOR THE PILOT LIGHTS. EACH STARTER SHALL BE EQUIPPED WITH A SEPARATE 120 VOLT CONTROL TRANSFORMER, SIZED SUFFICIENTLY LARGE ENOUGH TO ALLOW FOR 50 VA SUPPLY TO EXTERNAL CONTROL DEVICES IN ADDITION TO THE STARTER INTERNAL REQUIREMENT. PROVIDE PRIMARY FUSE FOR THIS CONTROL TRANSFORMER. STARTERS SHALL NOT BE EQUIPPED WITH AN AUTOMATIC THERMAL OVERLOAD RESET. THE OVERLOAD RELAYS SHALL BE THE AMBIENT TEMPERATURE COMPENSATED TYPE, AND THE TRIP RATING OF A SPECIFIC HEATER ELEMENT SHALL BE FIELD ADJUSTABLE OVER A RANGE OF APPROXIMATELY 85% + 115% OF ITS RESPECTIVE RATING.

4. CHECK OTHER DIVISIONS TO ENSURE THAT SUITABLE PROVISIONS HAVE BEEN PROVIDED FOR ALL MOTORS. IT IS POSSIBLE THAT SOME MOTORS MAY VARY IN SIZE, NUMBERS AND CHARACTERISTICS, DEPENDING ON THE EQUIPMENT MANUFACTURER'S SPECIFIC REQUIREMENTS. ANY VARIATIONS IN THIS REGARD WILL NOT CONSTITUTE CAUSE FOR FURTHER CONSIDERATION.

LIGHTING FIXTURES

1. THE ELECTRICAL CONTRACTOR SHALL CONFIRM EXISTING FIXTURE COUNT PRIOR TO TENDER CLOSING TO ENSURE THAT LAYOUT SHOWN CAN BE CARRIED OUT. NEW FIXTURES SHALL BE ORDERED AS REQUIRED TO SUIT LAYOUT SHOWN.

2. ALL LIGHT FIXTURES WITHIN THE RENOVATION AREA SHALL BE CLEANED AND RE-LAMPED BY THE CONTRACTOR. ANY DAMAGED LENSES AND SOCKETS, DAMAGED AS AN EXISTING CONDITION OR DURING RELAMPING SHALL BE REPLACED.

3. ALL FIXTURES SHALL BE SUPPORTED FROM STRUCTURAL MEMBERS OF THE BUILDING OR CEILING.

4. EACH FIXTURE SHALL HAVE A SEPARATE FEED FROM THE NEAREST JUNCTION BOX ABOVE THE REMOVABLE CEILINGS. BRANCH WIRING TO LIGHTING FIXTURES FROM CEILING JUNCTION BOXES MAY BE FLEXIBLE ARMORED CABLE OR FLEXIBLE CONDUIT, 12MM SIZE MINIMUM, AND SHALL BE A MAXIMUM LENGTH OF 3000MM. LOOPING BETWEEN FIXTURES OR WIRING ROWS THROUGH BALLAST CHANNEL WILL NOT BE ACCEPTED. ALL OTHER BRANCH CIRCUITRY SHALL BE WITHIN EMT CONDUIT.

5. THE LIGHTING FIXTURES SHALL BE AS SPECIFIED IN THE FOLLOWING SCHEDULE, AND THE MANUFACTURER'S NUMBERS SHOWN SHALL NOT REDUCE OR AMEND THE REQUIREMENTS AS OUTLINED UNDER THE DESCRIPTION OF EACH FIXTURE TYPE.

FIRE ALARM SYSTEM

1. THE EXISTING FIRE ALARM PANEL SHALL REMAIN OPERATIONAL AT ALL TIMES. ALL DEVICES WITHIN THE SPACE SHALL BE TESTED TO CONFIRM PROPER OPERATION ONCE PROJECT IS NEARING COMPLETION.

2. ENSURE THAT ALL SMOKE AND HEAT DETECTORS ARE AT LEAST 900MM FROM ANY AIR SUPPLY DUCTS OR FURTHER IF REQUIRED BY THE DEVICE INSTALLATION INSTRUCTIONS. ENSURE THAT ALL DETECTORS ARE AT LEAST 600MM FROM ANY ADJACENT WALL OR LIGHT FIXTURE.

3. THE CONTRACTOR ALONG WITH THE FIRE ALARM CONTRACTOR SHALL BE RESPONSIBLE TO RE-VERIFY THE FIRE ALARM SYSTEM TO ENSURE THAT THE FIRE ALARM DEVICES WITHIN THE RENOVATION AREA ARE IN PROPER WORKING ORDER.

4. A CERTIFICATE FROM THE MANUFACTURER REPRESENTATIVE IS REQUIRED VERIFYING DEVICES HAVE BEEN TESTED AND THAT THE OWNER'S PERSONNEL HAVE BEEN TRAINED.

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CERTIFICATE OF AUTHORIZATION
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PERMISSION TO CONSULT HELD BY:

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ELECTRICAL	9273	

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Project title/Titre du projet

TBU50 HVAC REPLACEMENT
REGINA, SK

Approved by/Approuve par

Designed by/Concept par
BDK

Drawn by/Dessine par
KMS

Project Manager/Administrateur de Projets
MK

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Ressources Architectural et de Directeur d'ingénierie

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ELECTRICAL SPECIFICATIONS

Project No./No. du projet	Sheet/Feuille	Revision no./La Révision no.
57/2017	E6 OF E7	0

0 10 20 30 40 50 60 70 80 90 100mm

A1 Sheet

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SPECIFICATIONS (continued)

VARIABLE FREQUENCY DRIVES

1. ALL VFDS SHALL BE MOUNTED INSIDE MOTOR CONTROL CENTRES.

2. PROVIDE VARIABLE FREQUENCY DRIVES (VFD) WHERE DESIGNATED BY THE MOTOR CONTROL SCHEDULE AND DRAWINGS. THESE DRIVES SHALL HAVE THE FOLLOWING FEATURES:
   - 2.1. THE DRIVES SHALL BE CAPABLE OF CONTINUOUSLY OPERATING ANY STANDARD SQUIRREL CAGE INDUCTION MOTOR, NEMA DESIGN A, B, OR C SELF-VENTILATED OR FORCE VENTILATED AND INVERTER DUTY MOTORS. COORDINATE FINAL TYPE WITH MECHANICAL CONTRACTOR.
   - 2.2. IT IS REQUIRED THAT THE VARIABLE SPEED DRIVE MODELS FOR THE FANS BE THE HVAC APPLICABLE TYPE DRIVES THAT HAVE ACCESSORIES AND FUNCTIONS TYPICAL FOR REQUIREMENTS OF MOTORS USED IN HVAC APPLICATIONS.
   - 2.3. IT IS REQUIRED THAT THE VARIABLE SPEED DRIVE MODELS FOR THE PUMPS BE THE PUMP APPLICABLE TYPE DRIVES THAT HAVE ACCESSORIES AND FUNCTIONS TYPICAL FOR REQUIREMENTS OF MOTORS USED IN PUMPING APPLICATIONS.
   - 2.4. THE VARIABLE SPEED DRIVE SHALL BE THE PULSE WIDTH MODULATED (PWM SINUSOIDAL) OUTPUT TYPE WITH PROGRAMMABLE ADJUSTABLE CARRIER FREQUENCIES.
   - 2.5. UNLESS OTHERWISE NOTED, ALL HORSEPOWER/KILOWATT DRIVE RATINGS ARE TO BE BASED ON A VARIABLE TORQUE LOAD AND FLA OF MOTOR BEING CONTROLLED.
   - 2.6. THE DRIVE SHALL MAINTAIN A MINIMUM LINE SIDE POWER FACTOR OF 0.95 THROUGHOUT THE ENTIRE SPEED RANGE AND THE DRIVE SHALL BE CAPABLE OF AN OVERLOAD OF 115% FOR 1 MINUTE.
   - 2.7. PROVIDE SURGE ARRESTORS WITH A MINIMUM 250 JOULE (LINE-GROUND) RATING SHALL BE USED TO PROTECT THE DRIVE FROM AC LINE TRANSIENTS. SURGE ARRESTORS SHALL NOT TO BE PART OF THE BRIDGE CIRCUIT.
   - 2.8. PROVIDE SEPARATE INPUT LINE REACTORS RATED A MINIMUM IMPEDANCE OF 3%. ENSURE ADEQUATE VENTILATION IS PROVIDED FOR PROPER HEAT DISSIPATION.
   - 2.9. PROVIDE EMI AND RFI FILTERS FOR ALL VFD'S. EQUIPMENT SHALL BE DESIGNED THAT USE OF COMMUNICATION EQUIPMENT ADJACENT TO VFD UNITS IS PERMISSIBLE. THE VFD SHALL NOT BE SUSCEPTIBLE TO INTERFERENCE FROM COMMUNICATIONS EQUIPMENT OPERATED ADJACENT TO IT.
   - 2.10. THE OUTPUT INVERTER SECTION SHALL UTILIZE INSULATED GATE BIPOLAR TRANSISTORS AND DIODES TO PROVIDE A SINE CODED PULSE WIDTH MODULATED OUTPUT TO THE MOTOR.
   - 2.11. THE VFD SHALL NOT BE SENSITIVE TO INCOMING POWER FEEDER PHASE SEQUENCE.
   - 2.12. CHASSIS MOUNTED TERMINAL STRIPS SHALL BE REMOVABLE WITHOUT DISTURBING THE CONTROL WIRING AND MUST HAVE A LOCKING SYSTEM RESISTANT TO VIBRATION. EACH INPUT AND OUTPUT SHALL BE IDENTIFIED. ALL PLUG-IN CONNECTORS INSIDE THE UNIT SHALL BE IDENTIFIED WITH PERMANENT LABELS ON EACH TERMINATION.
   - 2.13. OPERATOR CONTROLS SHALL CONSIST OF:
     - 2.13.1. "HAND / OFF / AUTO" SELECTOR SWITCH
       - 2.13.1.1. "HAND" FOR LOCAL CONTROL OF VFD OR BYPASS STARTER. VFD IS OPERATED BY PANEL MOUNTED KEYPAD PUSHBUTTONS, SPEED CONTROLLED BY THE KEYPAD. LCD KEYPAD DISPLAY. LCD DISPLAY TO BE FULL ENGLISH WORD.
       - 2.13.1.2. MOTOR CANNOT BE STARTED OR REMAIN RUNNING IN OFF POSITION THROUGH POWER REMOVAL FUNCTION.
       - 2.13.1.3. IN "AUTO" POSITION, THE VFD OPERATES BY REMOTE START/STOP COMMAND, THE SPEED IS CONTROLLED BY A PROGRAMMABLE ANALOGUE INPUT SELECTABLE ISOLATED INPUT SIGNAL 0 TO 10 VDC OR 4 TO 20 MA FROM THE BMS AND FIRE ALARM PANEL.
   - 2.14. VFD/OFF/BYPASS SELECTOR SWITCH
   - 2.15. THE DRIVE SHALL HAVE THE FOLLOWING PILOT LIGHTS.
     - 2.15.1. VFD DISPLAY OPERATION SHALL BE USED TO CONFIRM POWER IS PRESENT.
     - 2.15.2. VFD STATUS: "STOPPED" AND "RUN"
   - 2.16. INPUT DISCONNECT SWITCHES, FUSES, AND ALL ACCESSORIES SHALL BE MOUNTED IN THE MOTOR CONTROL CENTRE. IN THE EVENT THAT THE MOTOR PROTECTION SUCH AS THE OVERLOADS OR THERMISTOR TRIPPING UNIT SENSES A MOTOR FAULT, THE STARTER SHALL LOCK OUT AND THE MOTOR SHALL BE DE-ENERGIZED.
   - 2.17. ALL CONTROL WIRING SHALL BE RUN IN SEPARATE RACEWAY AWAY FROM ANY LINE VOLTAGE OR MOTOR FEEDER POWER WIRING. MOTOR CABLES SHALL BE SEPARATED FROM THE SUPPLY CABLES AT A MINIMUM DISTANCE OF 600MM AND FROM SIGNAL / CONTROL CABLES AT A MINIMUM DISTANCE OF 400MM. THE SIGNAL / CONTROL CABLES SHALL BE SEPARATED FROM THE MOTOR CABLES AT A MINIMUM DISTANCE OF 900MM. WHERE SIGNAL / CONTROL CABLES MUST CROSS POWER OR MOTOR CABLES, THE CROSSOVER ANGLE SHALL BE 90 DEGREES.
   - 2.18. THE DRIVE SHALL BE DESIGNED AND CONSTRUCTED TO OPERATE AT A MAXIMUM ALTITUDE OF 1000 M WITHOUT DERATING AND AN AMBIENT TEMPERATURE BETWEEN 00 C AND 400 C. THE DRIVE SHALL OPERATE IN AN ENVIRONMENT WITH A RELATIVE HUMIDITY UP TO 90% WITH NO CONDENSATION.
   - 2.19. THE DRIVES SHALL OPERATE AT 600 VOLTS AS APPLICABLE PLUS 10% 60HZ, 3PH. DRIVES WHICH REQUIRE ISOLATION TRANSFORMERS OR ARE RATED AT 575 VOLTS ARE NOT ACCEPTABLE.
   - 2.20. THE DRIVE SHALL HAVE PROGRAMMABLE ANALOG SIGNAL OF 0-10VDC, 4-20MA, +/- 10VDC.
   - 2.21. ALL VFD SET-UP OPERATIONS AND ADJUSTMENTS SHALL BE DIGITAL AND STORED IN NONVOLATILE MEMORY (EEPROM).
   - 2.22. THE VFD SHALL HAVE A POWER LOSS RIDE THROUGH CAPABILITY.
   - 2.23. THE VFD SHALL BE CAPABLE OF OPERATING WITH THE VFD OUTPUT OPEN CIRCUITED (NO MOTOR CONNECTED) WITH NO FAULT OR DAMAGE TO ANY PART OF THE DRIVE.
   - 2.24. THE DRIVE SHALL HAVE THE CAPABILITY TO ENERGIZE AND CONTROL A CURRENTLY "SPINNING" LOAD REGARDLESS OF THE DIRECTION OF ROTATION OF THE LOAD.
   - 2.25. PROVIDE A BUMP-LESS SPEED TRANSFER FROM REMOTE CONTROL TO LOCAL CONTROL OR LOCAL CONTROL TO REMOTE CONTROL WITHOUT SETTING THE MOTOR TO ZERO.
   - 2.26. THE SETTING CONTROLS SHALL BE ACCESSIBLE FROM THE FRONT OF THE CONTROL BOARD, FROM A COMMISSIONING TERMINAL. PROVIDE PROGRAMMING SOFTWARE AND ACCESSORIES FOR COMMUNICATIONS BETWEEN VFD AND PC.
   - 2.27. THE FOLLOWING FUNCTIONS SHALL BE INDEPENDENTLY FIELD ADJUSTABLE:
     - 2.27.1. ACCELERATION RATE
     - 2.27.2. DE-ACCELERATION RATE
     - 2.27.3. ACCELERATION AND DECELERATION RAMPS
     - 2.27.4. ADJUSTABLE MINIMUM SPEED OF 0 TO MAXIMUM SPEED.
     - 2.27.5. ADJUSTABLE MAXIMUM SPEED OF MINIMUM SPEED TO MAX. FREQUENCY.
     - 2.27.6. AUTOMATIC RESTART.
   - 2.28. THE FOLLOWING CONDITIONS SHALL RESULT IN A DRIVE FAULT AND ORDERLY SHUTDOWN. THE MODE OF THE FAULT SHALL BE DISPLAYED ON THE ELECTRONIC DISPLAY ON THE FRONT OF THE DRIVE.
     - 2.28.1. PHASE FAILURE ON THE INPUT LINE
     - 2.28.2. UNDER INPUT LINE VOLTAGE
     - 2.28.3. OVER INPUT LINE VOLTAGE
     - 2.28.4. DRIVE OVER TEMPERATURE
     - 2.28.5. MOTOR PHASE FAILURE
   - 2.29. THE DRIVE CONTROLS SHALL FACILITATE THE LOCKING OF SETTINGS IN THE SPEED CONTROLLER. THIS SHALL RESULT IN THE SPEED CONTROLLER'S TERMINAL AND DIALOGUE UNIT NO LONGER ALLOWING CHANGE IN THE SETTINGS. UNLOCKING OF THE SETTINGS SHALL BE POSSIBLE BY DEACTIVATING THIS FEATURE.
   - 2.30. THE DRIVE SHALL INCLUDE A SELF-DIAGNOSTIC SYSTEM TO TEST ALL MAIN FUNCTIONS AND IDENTIFY ANY FAILED ELEMENTS.
   - 2.31. PROVIDE AN OPERATIONS AND MAINTENANCE MANUAL WITH THE FOLLOWING:
     - 2.31.1. DESIGN AND OPERATION
     - 2.31.2. TECHNICAL CHARACTERISTICS
     - 2.31.3. INSTALLATION
     - 2.31.4. CONNECTIONS
     - 2.31.5. TROUBLESHOOTING CHARTS FOR ALL DEVICE FAULTS.
     - 2.31.6. AN INSTRUCTION MANUAL FOR PROGRAMMING AND HARDWARE PROVIDED WITH THE EQUIPMENT AT TIME OF SHIPMENT.
     - 2.31.7. A LISTING OF AUTHORIZED SERVICE DEPOTS, SPARE PARTS LISTS AND RECOMMENDED SPARE PARTS
     - 2.31.8. FINAL SETTINGS OF ALL PARAMETERS
     - 2.31.9. INPUT AND OUTPUT FILTER TYPE AND SIZE
     - 2.31.10. SPECIFIED ENVIRONMENTAL CONDITIONS
     - 2.31.11. VOLTAGE AND CURRENT WAVE FORM PRINTOUT TAKEN FROM THE MOTOR TERMINALS
     - 2.31.12. BOLT AND LUG TORQUE SCHEDULE FOR ALL CURRENT CARRYING BUSS AND CABLE CONNECTIONS.
   - 2.32. PROVIDE A TROUBLE SHOOTING GUIDE WITH THE FOLLOWING FEATURES:
     - 2.32.1. OBSERVATION, FAULT CODE
     - 2.32.2. POSSIBLE CAUSES
     - 2.32.3. CHECKS TO BE MADE
     - 2.32.4. RESULT
     - 2.32.5. REMEDIAL ACTION
     - 2.32.6. COMMENTS
   - 2.33. THE STARTER SHALL BE EQUIPPED WITH AN AUTOMATIC START MODE THAT SHALL RESTART THE MOTOR AFTER A POWER FAILURE WITHOUT OPERATOR INTERVENTION. THIS OPTION SHALL BE CONTROLLED BY THE INTERNAL PARAMETER SETTINGS. DRIVES THAT LOCK OUT IN A FAULT CONDITION DUE TO POWER OUTAGE OR TRANSFER FROM AND TO EMERGENCY POWER SHALL NOT BE ACCEPTED. THE DRIVE SHALL RESUME TO THE LAST KNOWN FREQUENCY.
   - 2.34. THE STARTER SHALL BE EQUIPPED WITH A PROGRAMMABLE AUTOMATIC RESET/RESTART AFTER ANY INDIVIDUAL TRIP CONDITION RESULTING FROM EITHER OVERCURRENT, OVER VOLTAGE, UNDER VOLTAGE, OR AN OVER TEMPERATURE. THIS PARAMETER SHALL INITIALLY BE SET TO DISABLED.
   - 2.35. THE DRIVES ARE TO BE SET FOR TWO (2) ONLY RESTARTS, SET FOR A 30 SECOND DELAY FOLLOWING THE RETURN OF ESSENTIAL POWER TO THE DRIVE. FAILURE OF THE DRIVE TO RESTART THE MOTOR FOLLOWING THESE TWO (2) RESTARTS WILL NECESSITATE A MANUAL ACKNOWLEDGEMENT OF THE FAULT AT THE ACTUAL DRIVE CONTROL PANEL.
   - 2.36. PRIOR TO ANY MOTOR CONTROL EQUIPMENT ORDERING, THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH SUCCESSFUL CONTROLS CONTRACTOR AND DETERMINE THE REQUIRED CONTROL, I.E. '2 WIRE' OR '3 WIRE' CONTROL. EQUIPMENT SHALL BE ORDERED AS SUCH UPON WRITTEN CONFIRMATION FROM THE CONTROLS CONTRACTOR.
   - 2.37. COORDINATE ALL CONTROL REQUIREMENTS PRIOR TO ORDERING EQUIPMENT.
   - 2.38. EACH VFD SHALL BE PROVIDED WITH A MINIMUM OF 2 DRY CONTACTS ASSIGNABLE TO ALARM CONDITIONS SUCH AS A VFD FAULT. BOTH CONTACTS SHALL BE WIRED TO THE NEAREST BMS CONTROL PANEL.

3. THE CONTRACTOR SHALL CO-ORDINATE WITH THE VFD MANUFACTURER REGARDING ALL MOTOR SIZES, MOTOR TYPES AND MOTOR FEEDER LENGTHS. PROVIDE LOAD DV/DT FILTERS FOR ALL MOTORS EQUIPPED WITH VFD'S WHERE THE FEEDER DISTANCE EXCEEDS THE LIMITS FOR THE PULSE RISE TIMES SHOWN IN THE FOLLOWING TABLE:

PULSE RISE TIME (MICROSECONDS)	CRITICAL LEAD LENGTH (METERS)
1 OR GREATER	45
0.5	20
0.1 AND LESS	ALWAYS

ALL VFD'S NOT REQUIRING AN LC OR LCR FILTER SHALL BE EQUIPPED WITH A 5% OUTPUT LOAD REACTOR. LOAD DV/DT FILTERS AND LOAD REACTORS SHALL BE MANUFACTURED BY MTE CORPORATION, OR T.C.I. ALEN BRADLEY'S 1204 TERMINATOR, AND CUTLER-HAMMER WAVETRAP OUTPUT FILTER IS ALSO APPROVED. COORDINATE WITH MANUFACTURER TO ENSURE PROPER MOUNTING OF ALL OUTPUT FILTERS (WHEN REQUIRED).

4. THE MANUFACTURER IN CO-ORDINATION WITH THE CONTRACTOR SHALL HAVE VOLTAGE AND CURRENT WAVEFORMS TAKEN AT THE TIME OF FINAL COMMISSIONING FROM THE MOTOR TERMINALS OF EACH MOTOR CONTROLLED TO ENSURE THAT THE WAVEFORMS ARE WITHIN THE TOLERANCE LIMIT OF THE MOTOR AND DRIVES. THE SETTINGS OF THE WAVEFORM CAPTURE SHALL BE SUCH THAT THE PULSE RISE TIME OF THE WAVEFORM SHALL BE VISIBLE AND EASILY EVALUATED FOR VOLTAGE REFLECTION AMPLIFICATION. ANY DOCUMENTATION NOT MEETING THIS REQUIREMENT SHALL BE REJECTED AND RESUBMITTED UNTIL IT IS SATISFACTORY TO THE CONSULTANT.

5. CO-ORDINATE WITH THE MECHANICAL CONTRACTOR TO ENSURE THE PROPER FILTER PROTECTION IS PROVIDED FOR ALL MOTORS SERVED BY THE VFD'S. THE ELECTRICAL CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR ENSURING A COMPLETE AND FULLY OPERATIONAL SYSTEM IN REGARDS TO OUTPUT AND INPUT FILTERING FOR THE MOTORS AND VFD'S SUPPLIED.

6. THE MANUFACTURER SHALL PROVIDE ALL NECESSARY ASSISTANCE, INCLUDING ON-SITE SUPPORT, TO BOTH MECHANICAL AND ELECTRICAL CONTRACTORS TO DETERMINE FINAL DRIVE PARAMETER SETTINGS. THE VFD MANUFACTURER SHALL ADJUST THE DRIVE PARAMETER SETTINGS TO SUIT ON-SITE CONDITIONS PRIOR TO COMMISSIONING. DURING THE WARRANTY PERIOD, THIS ELECTRICAL CONTRACTOR SHALL ALLOW/PROVIDE FOR THE MANUFACTURER TO ADJUST PARAMETERS ON SITE UTILIZING THREE (3) TRIPS AT ONE (1) WORKING DAY EACH.

7. SETTING OF ALL DRIVE PARAMETERS, COMMISSIONING, TESTING AND CERTIFICATION OF ALL VFD'S SHALL BE COMPLETED BY THE VFD MANUFACTURER CERTIFIED VFD SERVICE TECHNICIANS WITH 5 YEARS OF VFD EXPERIENCE. THIRD PARTY COMMISSIONING AGENTS WILL NOT BE ACCEPTED.

8. UPON COMPLETION OF COMMISSIONING AND START-UP BY VFD MANUFACTURERS CERTIFIED TECHNICIANS, VFD UNITS TO HAVE A TWO (2) YEAR WARRANTY.

9. COORDINATE ALL CONTROL REQUIREMENTS PRIOR TO ORDERING EQUIPMENT.

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TBU50 HVAC REPLACEMENT
REGINA, SK

Approved by/Approuve par

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BDK

Drawn by/Dessine par
KMS

Project Manager/Administrateur de Projets
MK

Architectural and Engineering Resources Manager/ Ressources Architectural et de Directeur d'Ingénierie

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ELECTRICAL SPECIFICATIONS CONTINUED

Project No./No. du projet	Sheet/Feuille	Revision no./ La Révision no.
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0 10 20 30 40 50 60 70 80 90 100mm

12773_E6-E7_spec

AIR HANDLING UNIT SCHEDULE

Design is based on DAIKIN Vision Air Handling Unit. Configuration: Supply Air (in order of airflow), MERV 8A pleated prefilter, Varicel II MH cartridge MERV 14 filter c/w mag gauge, hot water heating coil, centrifugal plenum supply fan complete with zero pressure drop piezoelectric factory ring airflow measuring system. Refer to Drawings for unit configurations.

AHU to have double wall construction with minimum R value of R-13. 150 mm (6") formed channel base. Fans and drives to be internally spring isolated, complete with flexible duct connections, 50 mm deflection spring isolators and factory installed spring isolated metal fan base. Access to be hinged doors complete with 1/4 turn fasteners, all access and fan sections to be complete with lights. Fan Performance based on the following filter APDs: 50mm (2") Winter or Summer Prefilter Based on a Mean APD of 152 Pa (.61") Final Filters Based on a Mean APD of 279 Pa (1.12"). Belt fans to include auto belt tensioner pully. Fan inlet element air flow measuring may be utilized provided pressure drop does not exceed 0.25" at 19,000 cfm and resulting increase in pressure does not alter motor size. Frequency drives to be supplied, mounted, and wired by Electrical. Electrical to provide separate 115V/1 phase circuit for lighting, circuit to be wired to switch on exterior of unit complete with termination to interior wiring, refer to unit specifications. Unit to be installed on 100mm high concrete housekeeping pad.

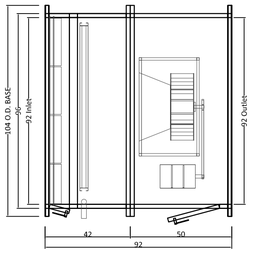
Contractor to dissasemble supply fan, motor, and/or base rail as required to allow transportion of supply fan section from exterior to mechaical room through crawlspace. Supply fan, motor, and/or base rail to be reinstalled in air handling unit once unit has been placed. Contractor to ensure all required fan perfomance tolerance are met after re-assembly.

AHU-1

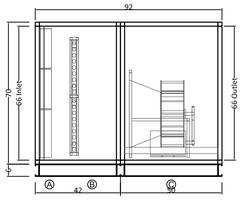
Fan Data																		General Information	
Tag	Size		Fan		Design Airflow		Balanced Airflow		TSP		ESP		Control	H.P.		B.H.P.		V / Hz / P	Unit Weight
	mm	in	Type	Class	L/S	(CFM)	L/S	(CFM)	Pa	in. w.c.	Pa	in. w.c.		kW	hp	kW	hp		lbs. (kg)
SF-1	838	(33.0)	CP	II	8,962	(19,000)	8,019	(17,000)	834	(3.35)	311	(1.25)	VFD - EMCS	14.92	(20)	11.8614	(15.90)	208/60/3	3,209 (1,456)

Hydronic Heating Coil																				
Tag	Number of Coils	Number of Rows	Design Airflow		EAT		LAT		APD		Coil Capacity		Medium	Derate	EWT		LWT		Flow		Water PD	
			L/S	(CFM)	Deg. C.	Deg. F.	Deg. C.	Deg. F.	Pa	in. w.c.	kW	(MBH)			Deg. C.	Deg. F.	Deg. C.	Deg. F.	L/S	(GPM)	kPa	ft
HC-1	2	2	8,962	(19,000)	-7.8	(18.00)	27.8	(82.1)	37	(0.15)	364.2	(1,242.5)	30% PG		87.8	(190.0)	70.6	(159.0)	5.32	(84.4)	26.59	(8.9)

Abbreviations:
ACP - Airfoil Centrifugal Plenum, PG - Propylene Glycol, VFD - Variable Frequence Drive, EMCS - Energy Management Control System



PLAN VIEW



ELEVATION VIEW

Component Key		
Ⓐ	Panel and Cartridge Filter	
	Pre Filter Type:	Pleated (MERV 8)
	Cartridge Filter Type:	Varicel II MH
	Right Door (WxH):	10 ins x 66 ins
Ⓑ	Hot Water Coil	
	Coil Model:	5WS1302A
	Total Capacity:	1221598.0 Btu/hr
Ⓒ	Supply Fan	
	Fan Type:	Centrifugal - Plenum
	Fan Size (Class):	33 (2)
	Air Flowrate:	19000.0 cfm
	T.S.P:	2.4 insWg
	Motor Power:	15.0 HP
	Right Door (WxH):	26 ins x 66 ins

LEGEND

HP–STEAM HIGH PRESSURE STEAM
LP–STEAM LOW PRESSURE STEAM
COND CONDENSATE
HWS HOT WATER SUPPLY
HWR HOT WATER RETURN
D DRAIN LINE
P PUMPED DRAIN LINE
CHWS CHILLED WATER SUPPLY
CHWR CHILLED WATER RETURN
GATE VALVE (UNLESS OTHERWISE NOTED)
BALL VALVE
BUTTERFLY VALVE
GLOBE VALVE
CHECK VALVE
TWO WAY CONTROL VALVE
THREE WAY CONTROL VALVE
HOSE BIBB
STRAINER
CIRCUIT BALANCE VALVE
FLOW RESTRICTOR
UNION
FLOOR DRAIN
ELBOW DOWN
ELBOW UP
PRESSURE GAUGE
THERMOMETER
T OR TEMPERATURE SENSOR/THERMOSTAT
F & T TRAP

M MOTORIZED DAMPER
FD FIRE DAMPER
TURNING VANES
MANUAL BALANCE DAMPER
INTERNALLY INSULATED DUCT
EXTERNALLY INSULATED DUCT
EXISTING DUCT TO REMAIN
EXISTING DUCT TO BE MOVED, REMOVED, OR RELOCATED

SUPPLY DUCT SECTION
RETURN DUCT SECTION
EXHAUST DUCT SECTION

COOLING COIL SCHEDULE

Design is based on DAIKIN Vision Air Handling Unit. Cooling coil to have double wall construction with minimum R value of R-13. 150 mm (6") formed channel base. Access to be hinged doors complete with 1/4 turn fasteners,. Provide Stainless Steel drain pan under cooling coil. CC-1 to be mounted on 100mm high concrete housekeeping pad.

Cooling Coil

Tag	Number of Coils	Number of Rows	Design Airflow		EAT		LAT		APD		Total Capacity		Sensible Capacity		Medium	EWT		LWT		Flow		Water PD	
			L/S	(CFM)	Deg. C.	Deg. F.	Deg. C.	Deg. F.	Pa	in. w.c.	kW	(MBH)	kW	(MBH)		Deg. C.	Deg. F.	Deg. C.	Deg. F.	L/S	(GPM)	kPa	ft
CC-1	1	12	5,843	(12,387)	26.7	(80.0)	12.8	(55.1)	234	(0.94)	133.6	(455.785)	92.3	(314.854)	40% PG	7.2	(45.0)	13.5	(56.3)	5.52	(87.5)	30.78	(10.3)
CC-2	1	12	425	(900)	26.7	(80.0)	12.2	(54.0)	67	(0.27)	10.3	(35.246)	6.9	(23.693)	40% PG	7.2	(45.0)	13.9	(57.0)	0.40	(6.4)	9.56	(3.2)

Abbreviations: PG - Propylene Glycol
Note: Cooling Coil (CC-1) is existing and to be supplied by Owner

Return Fan Schedule

Inline Fan: Design based on Cook Model QMX. Mixed flow inline, horizontal mount, belt drive, arrangement 9. High efficiency mixed flow wheel, continuously welded steel housing with powder coating, welded aerodynamic straightening vanes, integral inlet and outlet collars for slip fit duct connections, adjustable motor plate utilizing threaded studs for positive belt tensioning, heavy duty ball or roller bearings with extended lube lines, belt guard, lifting lugs, adjustable mounting feet., statically and dynamically balanced, AMCA rated for air and sound performance, complete with disconnect switch, premium efficient motor (inverter duty), aluminum wheel, isolation rail, and vibration isolators. Frequency drives to be supplied, mounted, and wired by Electrical. Unot to be installed on 100mm high concrete housekeeping pad.

General Information						Airflow						Motor					
Tag	Serving	Wheel	Model	Fan RPM	Sound Sones	Design Flow L/S	(CFM)	Balanced Flow L/S	(CFM)	S.P. Pa	in. w.c.	Control	Drive Loss %	H.P. kW	hp	V / Hz / P
RF-1	101	Mixed Flow	270QMX	VFD	71.0	5,189	(11,000)	4,406	(9,341)	374	(1.50)	EMCS	Direct	3.730	(5)	208/60/3

Abbreviations:
24 / 7 - Fan to operate 24 hours a day, 7 days a week, VFD - Variable Frequence Drive, EMCS - Energy Management Control System

Exhaust Fan Schedule

Roof Exhaust: Design based on Cook Model ACE-D VF. Downblast centrifugal, roof mounted, direct drive, electronically commutated vari-flow motor, backward inclined fan, aluminum construction, statically and dynamically balanced, AMCA rated for air and sound performance, complete with disconnect switch, fan mounted speed control, backdraft damper, birdscreen, roof curb and vibration isolators. Motor: ECM with potentiometer dial pre-mounted and wired on motor for speed control with 80% usable turndown, balancer to use speed control for balancing.

General Information						Airflow						Motor				
Tag	Serving	Wheel	Model	Fan RPM	Sound Sones	Design Flow L/S	(CFM)	Balanced Flow L/S	(CFM)	S.P. Pa	in. w.c.	Control	Drive Loss %	H.P. kW	hp	V / Hz / P
EF-3	113 / 115	Centrifugal	150C17D (VF)	1,102	10.2	855	(1,812)	770	(1,632)	125	(0.50)	24 / 7	Direct	0.249	(1/3)	208/60/1
EF-4	109 / 112	Centrifugal	135C17D (VF)	1,268	11.1	682	(1,446)	620	(1,314)	125	(0.50)	24 / 7	Direct	0.249	(1/3)	208/60/1
Inline Cabinet: Design based on Cook Model SQN-D VF. Centrifugal square inline, direct drive, electronically commutated Vari-Flow motor. Housings to be lined with 12 mm thick acoustic insulation. Motor to be mounted on resilient elastic grommets. Fan shall have forward curved centrifugal wheel AMCA rated for air and sound performance. Units shall be complete with canvas duct connections, fan mounted speed control, backdraft dampers, and sidewall discharge caps with birdscreen. Suspend fan from structure with spring isolation hangers. Unit to be complete with factory mounted and wired solid state speed control for air flow balance.															
EF-6	102	Centrifugal	150SQN17D (VF)	1,233	12.2	880	(1,866)	800	(1,696)	125	(0.500)	24 / 7	Direct	0.373	(1/2)	208/60/1

Abbreviations
24 / 7 - Fan to operate 24 hours a day, 7 days a week

PUMP SCHEDULE

Pump Data							Fluid Flow				Motor			
Tag	Service	Type	Model	Connection Size	RPM	Medium	Flow L/S	(GPM)	S.P. kPa	ft. w.c.	Control	H.P. kW	hp	V/Hz/P
P-1	Main Heating	SelfSensing Vertical	SKV3007	3 x 3 (76 x 76)	VFD	30% PG	7.89	(125.0)	89.6	(30.0)	VFD	2.24	3.000	208/60/3
P-2	Main Heating	SelfSensing Vertical	SKV3007	3 x 3 (76 x 76)	VFD	30% PG	7.89	(125.0)	89.6	(30.0)	VFD	2.24	3.000	208/60/3
P-3	Heating Coil	Vertical Inline	KV3006	2 x 2 (51 x 51)	1,760	30% PG	5.36	(85.0)	74.7	(25.0)	EMCS	1.12	1.500	208/60/3

Abbreviations
PG - Propylene Glycol, VFD - Variable Frequence Drive, EMCS - Energy Management Control System

MECHANICAL EQUIPMENT SCHEDULE
The design is based on the equipment listed here and noted in the Equipment Schedule Tables. Refer to Section 21 05 01 Article 1.24 ALTERNATE MATERIALS & EQUIPMENT for responsibilities when utilizing equipment that differs from the basis of design but still meets the design intent and the process to apply to use equipment that alters the design intent.

HEAT EXCHANGERS (HX–1 and HX–2): Design based on Taco model PF 10–39–1–EH low pressure steam to water plate heat exchanger comprised of the following material: Plates – AISI 316L Stainless Steel, Frame – Epoxy Painted Carbon Steel, Nozzles – 316L Stainless Steel, Pack Shroud – Aluminum. Product to be rated for a design pressure of 1,030 kPa (150 psig) and a maximum temperature of 149 Deg.C. (300 Deg.F), exchange a total of 587 kW (2,000 MBH), Pressure Loss: 2.88 PSI, Number of Plates Total: 39. Connection Sizes: 50mm (2") typed 316L Stainless Steel for all four connections. Heat exchangers to be mounted on housekeeping pad.

STEAM SIDE: Mass Flow: 892 kg/hr (1,965.93 lb/h), Volume Flow Rate: 3,378.364 GPM, Inlet Temperature: 121.0 Deg.C. (249.76 Deg.F)., Outlet Temperature: 72.0 Deg.C. (161.56 Deg.F)., Operating Pressure 36.94 ft(water)g.

WATER SIDE: Mass Flow: 32,220 kg/hr (71,034.17 lb/hr), Volume Flow Rate: 143.0 GPM, Inlet Temperature: 71.1 Deg.C. (160.0 Deg.F.), Outlet Temperature: 87.8 Deg.C. (190.0 Deg.F.), Operating Pressure: 11 ft(water)g.

PUMPS: Design based on Taco centrifugal type with mechanical seals compatible with glycol. Cast iron construction for space heating, all bronze construction for domestic water use. In–line pumps shall be supported from the floor with pipe stands or supported from structure with hangers. Frequency drives to be supplied (shipped loose) by Mechanical. Frequency drive to be mounted and wired by Electrical. 30% Glycol 70% water solution. See pump schedule.

HEATING SYSTEM EXPANSION TANK (ET–1): Design based on Taco Model CA450–125P, 450 litre (119 gallon) total volume, Pre–Charge: 12 psi, Working Pressure: 125 psi, Unit Dimensions: 508 mm (20") diameter x 1,965mm (77–3/8") high. Unit to be vertical installation. Installation to be complete with heavy duty Butyl removable bladder, isolation valve and drain valve piped to glycol tank. Provide and install pressure relief valve piped to floor, in accordance with requirements of TSASK.

GLYCOL SYSTEM FILL (GF–1): Design based on Hydronic System Sentry Model HSS–180 solution glycol feeder, completely preassembled and factory tested consisting of 180 litre (48 US gallon) polyethylene fluid container with cover, CSA labelled pressure pump with integral high pressure cut–out, integral check valve, cord and plug. CSA labelled low fluid cut–off with piggyback plug. Bronze and stainless steel automatic pressure reducing valve with integral check valve and visual pressure indication. Pre–charged pressure tank. Suction strainer, bronze and stailess bypass and fill ball valves, flexible connection hose, labelled valves. Unit to be mounted on 100mm (4") high housekeeping pad at location shown. Power: 120V/60/1 phase.

HEATING SYSTEM ANTIFREEZE: Supply and install 30% inhibited propylene glycol and 70% water solution.

AIR SEPARATOR (AS–1): Design based on Taco Series 4900 air and dirt separator. Units to be line size, flanged connections, complete with factory installed blowdown valve, and automatic air eliminator.

SIDE STREAM FILTER: Shelco filters Model 7FOS1–C–316–2MNPT–ML–B. Unit to have seven 316 stainless steel housings that accept 250mm high 222 fin/flat style cartridges. Housing to have 50mm male pipe threaded connections with mounting legs, Buna N gasket on head and clamp. Unit shall be complete with sight glass and one case of thirty 20 micron cartridges and one case of thirty 5 micron cartridges.

TRIPLE DUTY VALVE: Design based on Bell & Gossett, sized for flow required, installed in accordance with manufacturer's recommendations.

CIRCUIT BALANCE VALVE: Design based on Armstrong, sized for flow required, installed in accordance with manufacturer's recommendations.

AUTOMATIC FLOW LIMITING VALVE C/W ISOLATION VALVE: Design based on Nexus Model UltraMatic combination automatic flow control/ball valve. Valve to be of brass construction with a stainless steel filter screen, Teflon ball seals, PT test plug and union end. Units to be sized based on flow requirements and installed as per manufacturer's recommendations.

COMBINATION BALL VALVE AND WYE STRAINER: Design based on Nexus Model Ultra Y combination ball valve/strainer. Valve to be of brass construction with a stainless steel filter screen, Teflon ball seals, PT test plug and blow down drain valve. Units to be sized based on flow requirements and installed as per manufacturer's recommendations.

PRESSURE GAUGES: Liquid filled, 4.5" diameter face, 1/4" NPT connection, +/– 1% accuracy, black figures on white background. Working range of gauge to be 1.5 times pressure relief valves. Provide pressure gauges at locations shown on drawings and across every circulating pump complete with isolation valve.

TEMPERATURE GAUGES: Variable angle 7" scale with 3.5" or 6" stem, 2 °F (1 °C) divisions, standard ranges to suit purpose, +/–1% accuracy, with cast aluminum case. Provide thermometers at locations shown on drawings and as follows: inlet and outlet of heat exchangers, AHU heating coils, and common heating and chilled water supply and return mains.

SENSOR WELLS: 3/4" x 2–1/2" x 6" nominal length at insulated piping. Provide sensor wells as required to suit control points. Coordinate with controls.

STRAINERS: Grooved or flanged, to match service, brass, cast steel or ductile iron, Y–type strainer with 3/64" or 1/16" stainless steel perforated screen and drain tapping complete with isolation valve and hose connection with cap and chain

CIRCULATING FANS (CF–1 thru CF–8): Design based on Banvil 2000 Bronze Line Model FP56R, 1,422mm (56") diameter up or down blowing, 3 curved metal blades, 254mm (10") downrod. Unit to deliver 10,377 l/s (22,000 cfm) at high speed. Motor: 0.70 Amps, 55 Watts, 120V/60/1 phase. Unit to be complete with Model 105FR variable speed control with reversing switch, one controller for 4 fans (see Ventilation plan for control grouping). Unit to be complete with factory supplied ceiling mounted cage.

GRILLES & DIFFUSERS:

R–1: Design based on E.H. Price Model 80/F/A/B12, eggcrate face ceiling return grille, 13mm x 13mm x 13mm (1/2"x1/2"x1/2") aluminum grid core, 32mm (1–1/4") flat border (surface mount), countersunk screwholes. Finish: White Powder Coat

R–2: Design based on E.H. Price Model 95FH/SM/L/66, heavy duty filter return gym grille, 19mm (3/4") blade spacing, 0 degree deflection grille, front blades parallel to long dimension, 32mm border, quarter turn fasteners, continuous hinge applied to long dimension. Finish: Brushed Aluminum.
Return Grille to be supplied with two 600x600 MERV–8 filters.

E–1: Design based on E.H. Price Model 80D/F/A/B12, eggcrate face ceiling return grille with steel opposed blade damper, 13mm x 13mm x 13mm (1/2"x1/2"x1/2") aluminum grid core, 32mm (1–1/4") flat border (surface mount), countersunk screwholes. Finish: White Powder Coat

WEATHERHOOD (WTHD–3): Design based on Greenheck Model WTHD, 45 degree weatherhood to tie into ductwork. Unit to be complete with backdraft damper, birdscreen, and baked enamel finish (color as selected by Architect). Unit sized for 800 l/s (1,696 CFM) airflow.

MOTORIZED DAMPERS: Design based on Tamco Series 9000 BF, thermally broken extruded aluminum dampers. Damper frame shall be no less than 100mm deep and insulated with polystyrene on all four sides. Entire frame shall be thermally broken. Blades shall be extruded aluminum less than 200mm width, internally insulated with expanded polyurethane foam, thermally broken, and mounted in opposed blade action. Blade and frames seals to be extruded extremely flexible silicone secured in an integral slot. Dampers to be rated to operate in temperatures between –40 deg.C. (–40 deg.F) and 100 deg.C. (212 deg.F.). Pressure drop of dampers, when fully open, to not exceed 7 Pa (0.03") at 5.08 m/s (1000 fpm). Dampers to be flanged to duct and installed in strict accordance with manufacturer's installation guidelines. Intermediate or tubular steel structural support is required for all dampers that consist of two or more sections in either height or width or both.

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DO NOT SCALE DRAWINGS

Revision/ Revision	Description/Description	Date/Date
0	ISSUED FOR TENDER	2018–03–31

Client/client

Project title/Titre du projet
TBU50 HVAC REPLACEMENT REGINA, SK

Approved by/Approuve par

Designed by/Concept par
EKC

Drawn by/Dessine par
CHK

Project Manager/Administrateur de Projets
MK

Architectural and Engineering Resources Manager/ Ressources Architectural et de Directeur d'Ingénierie

Client/client

Drawing title/Titre du dessin
MECHANICAL EQUIPMENT SCHEDULE

Project No./No. du projet	Sheet/Feuille	Revision no./ La Révision no.
57/2017	M01 OF M08	0

A1 Sheet

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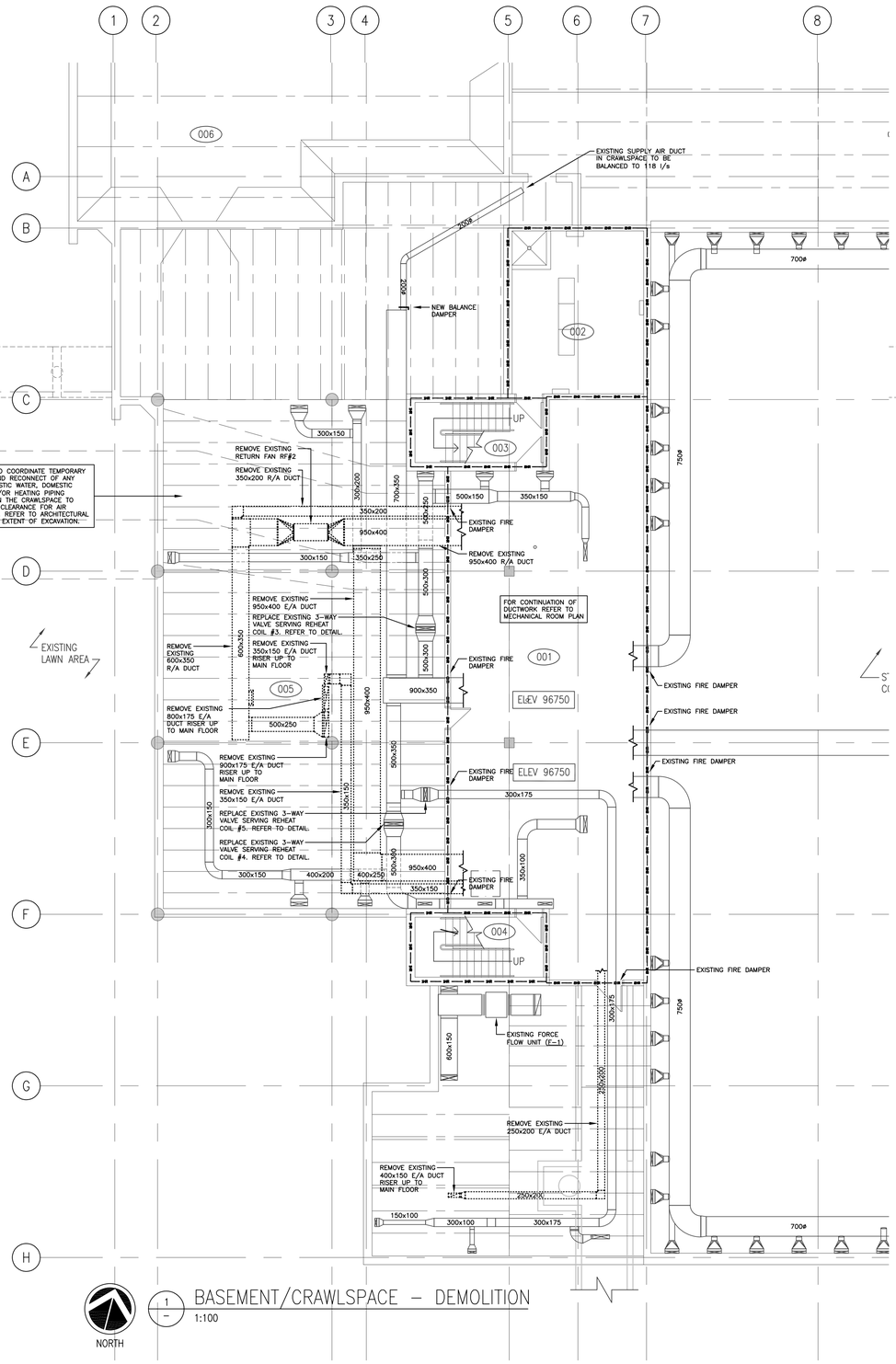

1 – BASEMENT/CRAWLSPACE – DEMOLITION
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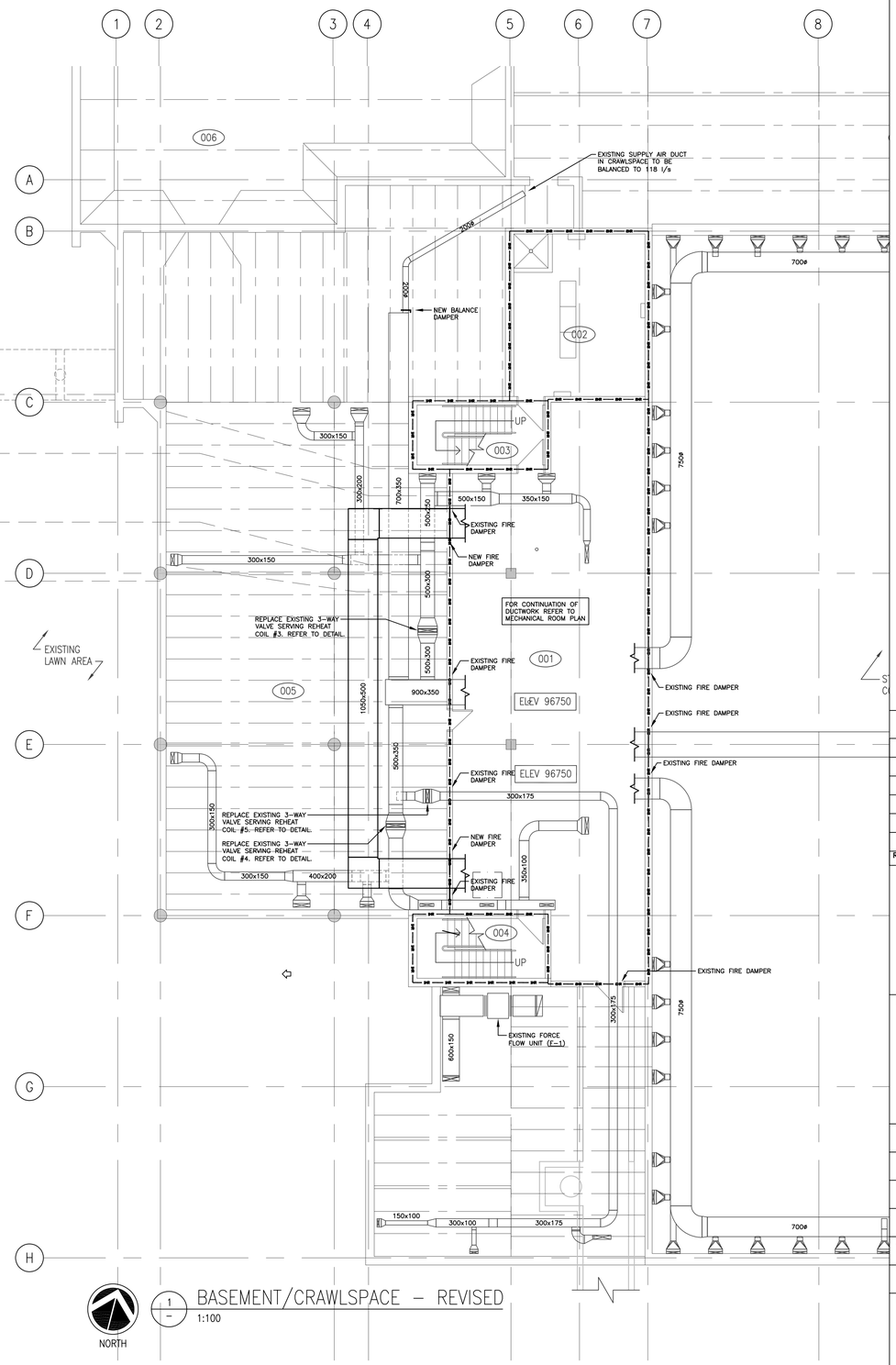
NORTH



1 – BASEMENT/CRAWLSPACE – REVISED
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NORTH

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BASEMENT AND CRAWL SPACE FLOOR PLAN - VENTILATION DEMOLITION

Project No./No. du projet	Sheet/Feuille	Revision no./ La Révision no.
57/2017	M02 OF M08	0

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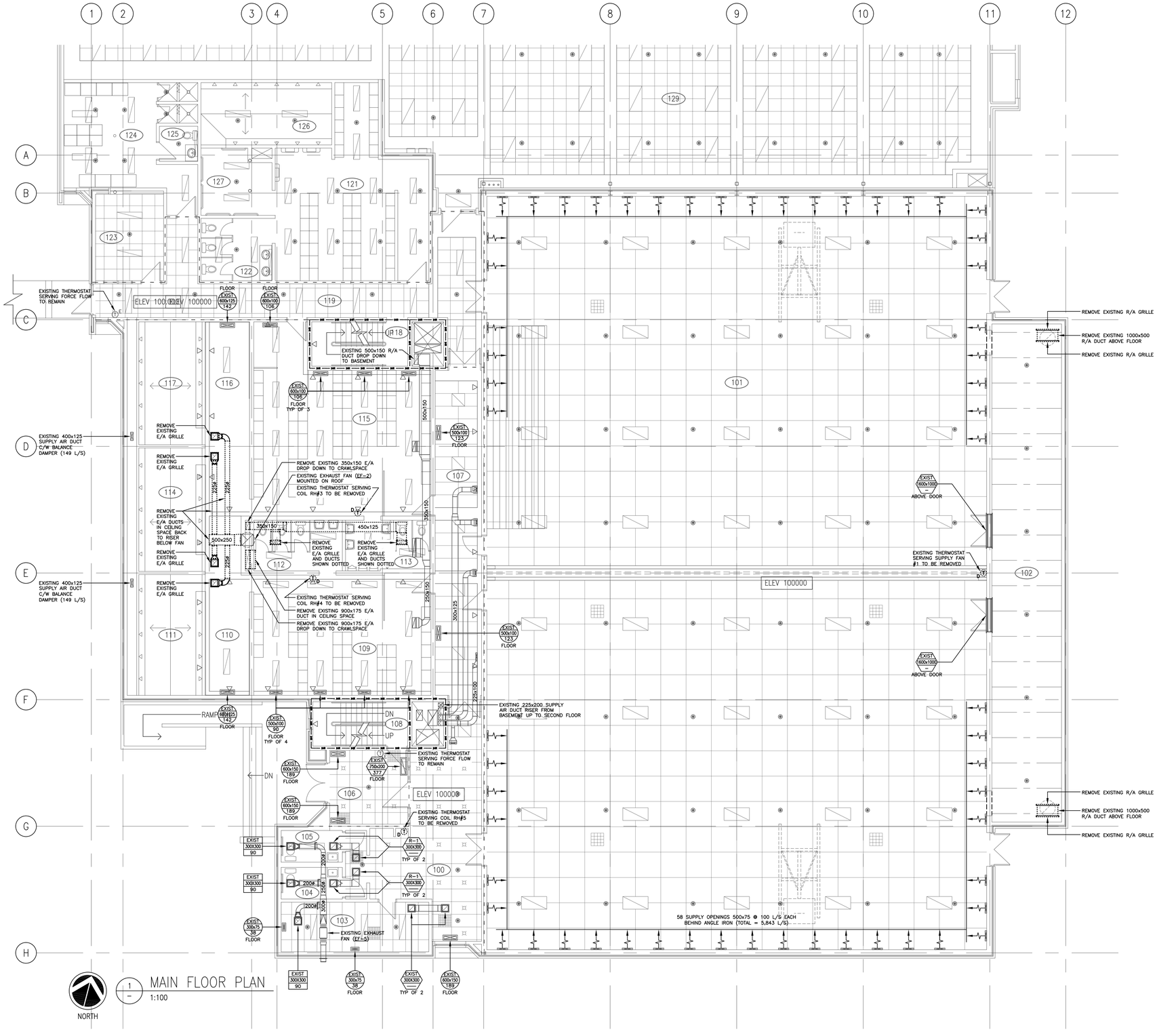

1 MAIN FLOOR PLAN
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DO NOT SCALE DRAWINGS

Revision/ Revision	Description/Description	Date/Date
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REGINA, SK

Approved by/Approuve par

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Drawing title/Titre du dessin

MAIN FLOOR PLAN
DEMOLITION

Project No./No. du projet	Sheet/Feuille	Revision no./ La Révision no.
57/2017	M03 OF M08	0

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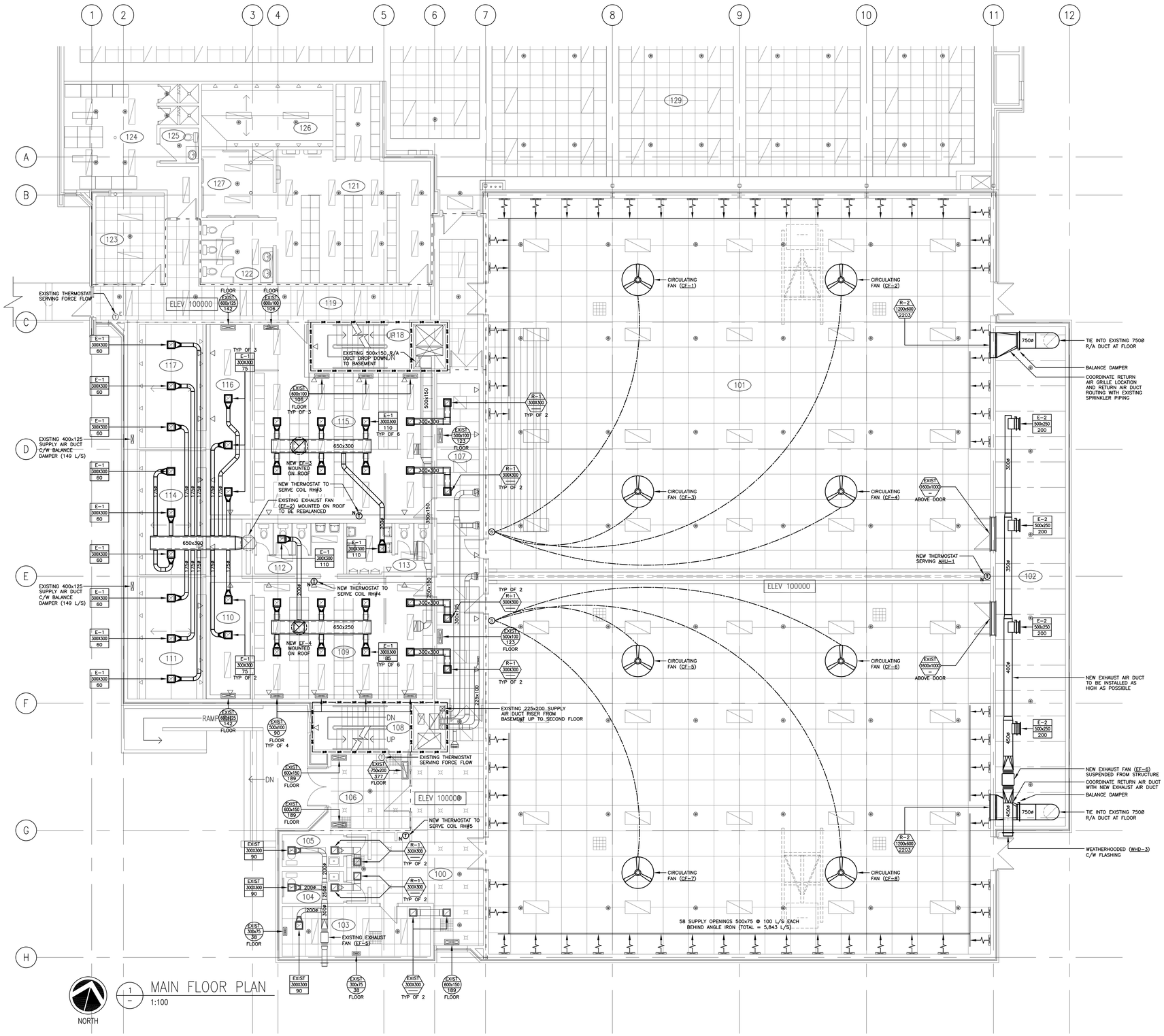

VENTILATION GENERAL NOTES

- ALL DUCTWORK SHOWN DOUBLE LINE INSIDE PERIMETER OF DUCT IS TO BE COMPLETE WITH 25mm (1") INTERNAL INSULATION. ALL OTHER DUCTWORK IS TO BE C/W 25mm (1") EXTERNAL INSULATION. SIZES INCLUDE INTERNAL INSULATION WHERE APPLICABLE.
- ALL FITTINGS ON INTERNALLY INSULATED DUCTWORK ARE TO BE C/W INTERNAL INSULATION. ALL OTHERS ARE TO BE EXTERNALLY INSULATED.
- ALL SUPPLY AIR AND EXHAUST AIR BRANCH DUCTS TO GRILLES AND DIFFUSERS ARE TO BE C/W BALANCE DAMPERS IN BRANCH DUCT NEAR MAIN, UNLESS BALANCE DAMPERS ARE PROVIDED IN GRILLE OR DIFFUSER.
- ALL EXHAUST FANS ARE TO BE SUSPENDED FROM STRUCTURE ON THREADED ROD C/W SPRING ISOLATORS.
- ALL RADIUSED ELBOWS TO BE WITH CENTERLINE RADIUS OF 1.5 TIMES DUCT DIAMETER (ROUND DUCTS) OR DUCT WIDTH (RECTANGULAR). ALL MITERED ELBOWS TO BE COMPLETE WITH AIRFOIL TURNING VANES. ALL RECTANGULAR BRANCHES TO BE WITH RADIUS ON BRANCH 1.5 TIMES WIDTH OF DUCT. ALL ROUND BRANCHES TO ENTER MAIN DUCT AT 45 DEGREES WITH CONICAL CONNECTION.
- PROVIDE ACCESS DOORS FOR ACCESS TO ALL MOTORIZED DAMPERS, FIRE DAMPERS, HUMIDIFIERS AND CONTROL DEVICES, AND TO FACILITATE DUCT CLEANING.
- COORDINATE ALL WORK WITH OTHER TRADES.
- RUN DUCTS AS HIGH AS POSSIBLE TO PROVIDE MAXIMUM CLEARANCE.

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Mech.	11372	

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Revision/ Revision	Description/Description	Date/Date
0	ISSUED FOR TENDER	2018-03-31

Client/client

Project title/Titre du projet

TBU50 HVAC REPLACEMENT REGINA, SK

Approved by/Approuve par

Designed by/Concept par
EKC

Drawn by/Dessine par
CHK

Project Manager/Administrateur de Projets
MK

Architectural and Engineering Resources Manager/ Ressources Architectural et de Directeur d'ingénierie

Client/client

Drawing title/Titre du dessin

MAIN FLOOR PLAN VENTILATION

Project No./No. du projet	Sheet/Feuille	Revision no./ La Révision no.
57/2017	M04 OF M08	0

A1 Sheet

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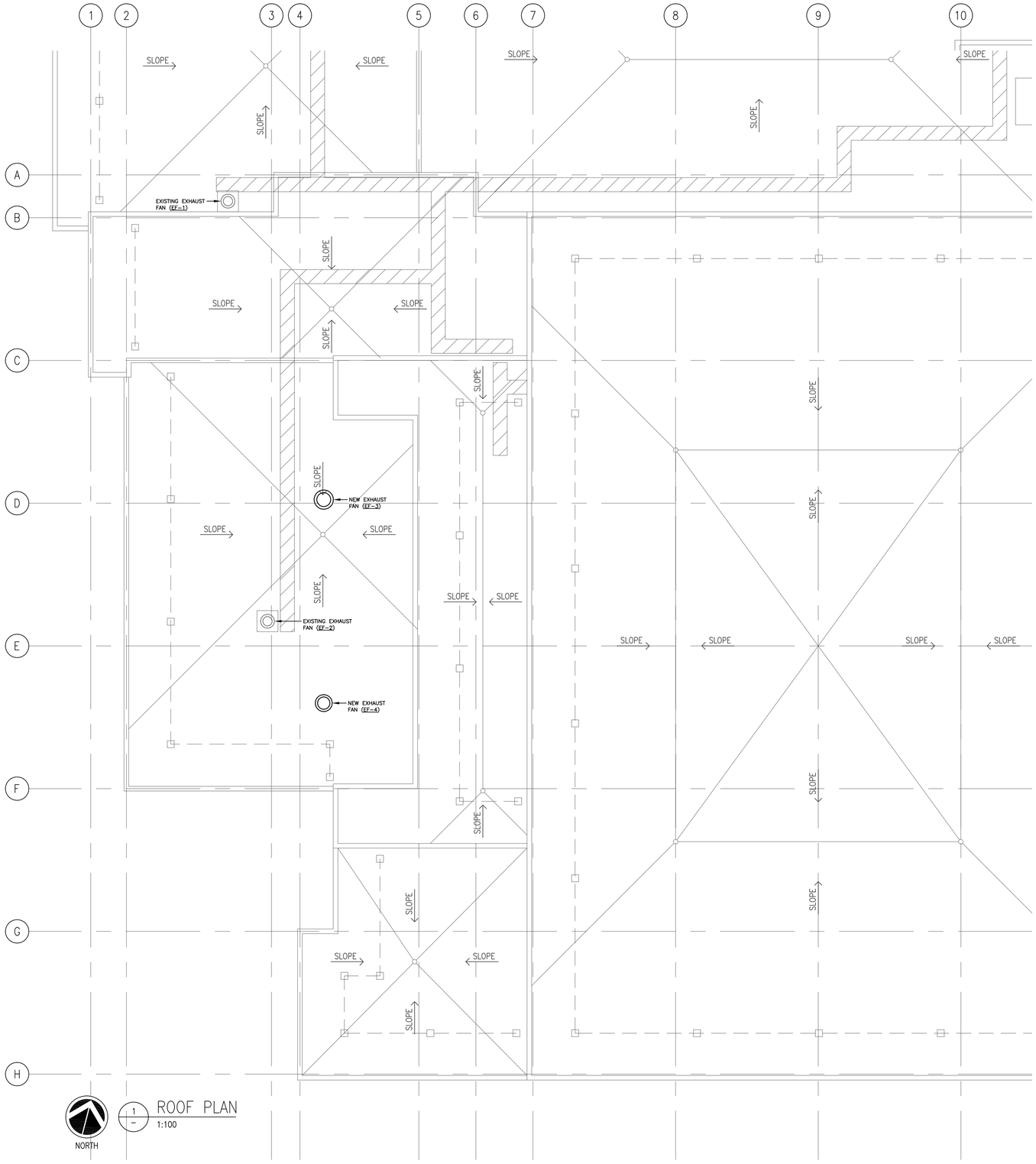
17045vnt1



1 ROOF PLAN
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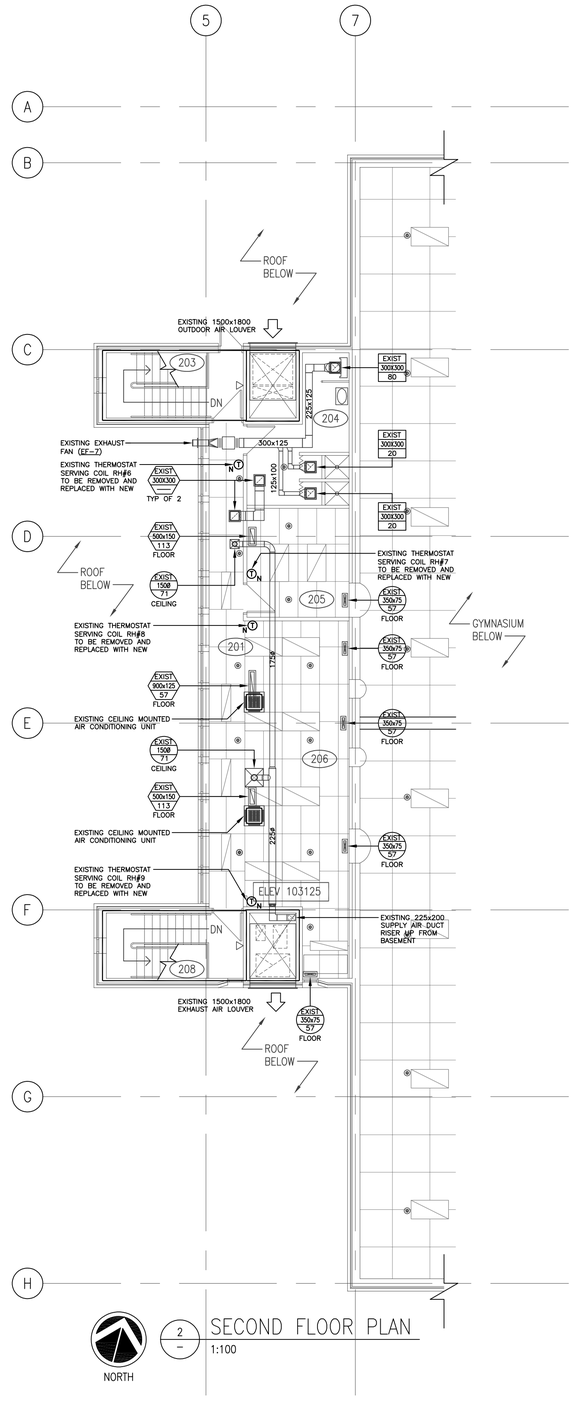

2 SECOND FLOOR PLAN
1:100

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A1 Sheet

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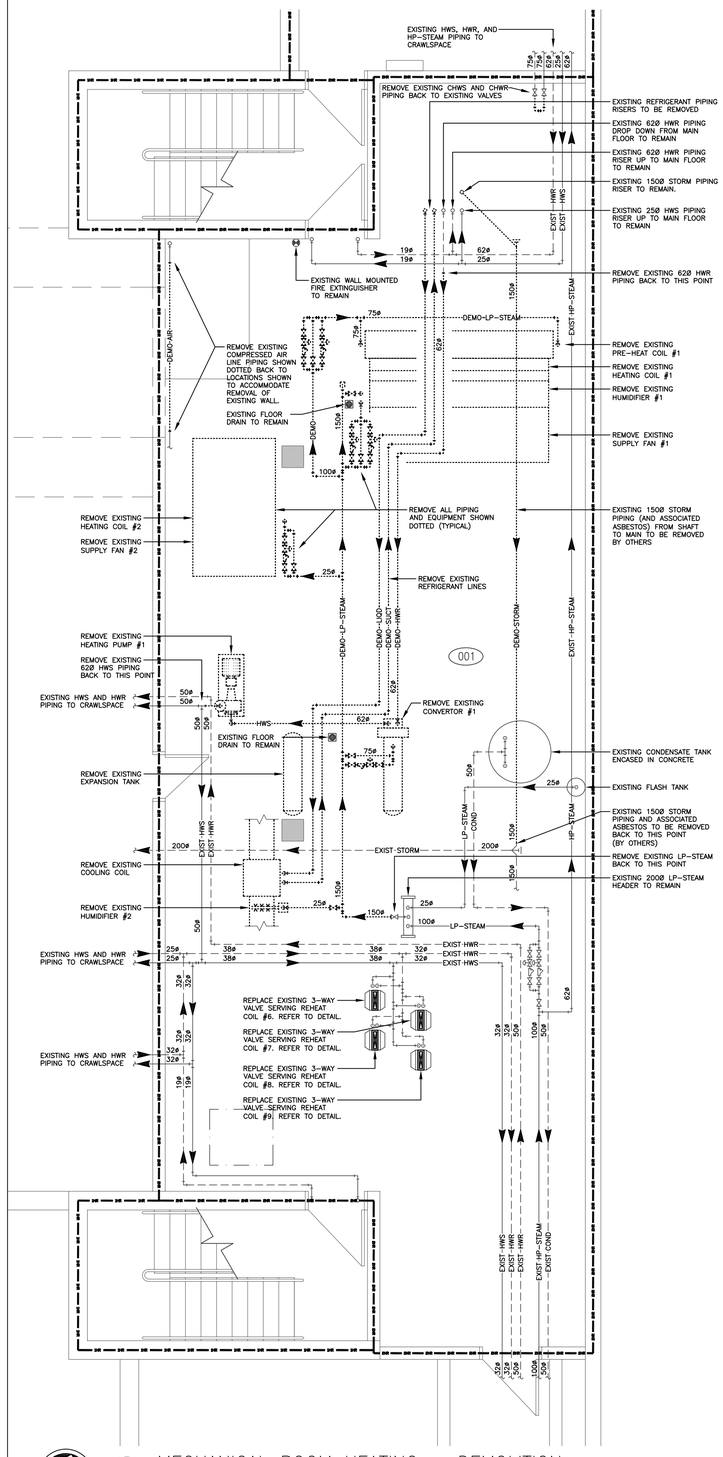
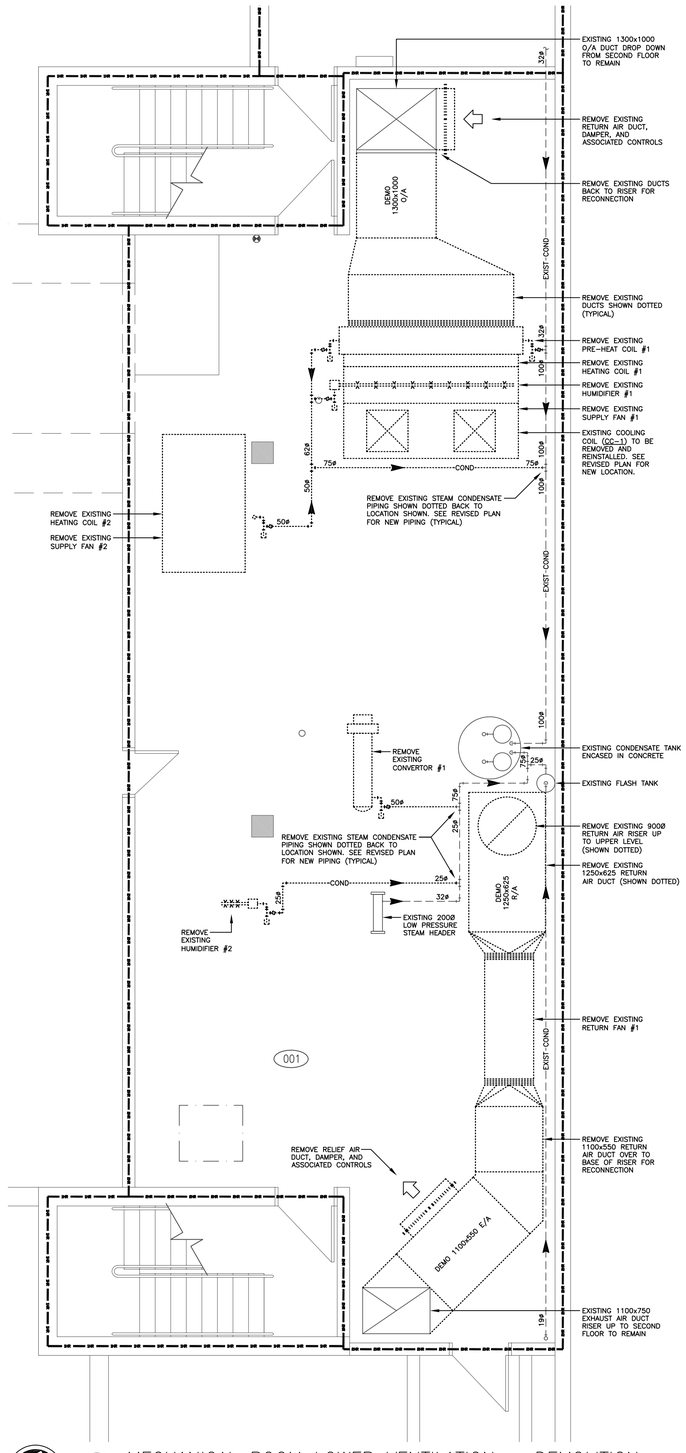
ROOF PLAN
SECOND FLOOR PLAN
VENTILATION

Project No./No. du projet	Sheet/Feuille	Revision no./ La Révision no.
57/2017	M05 OF M08	0

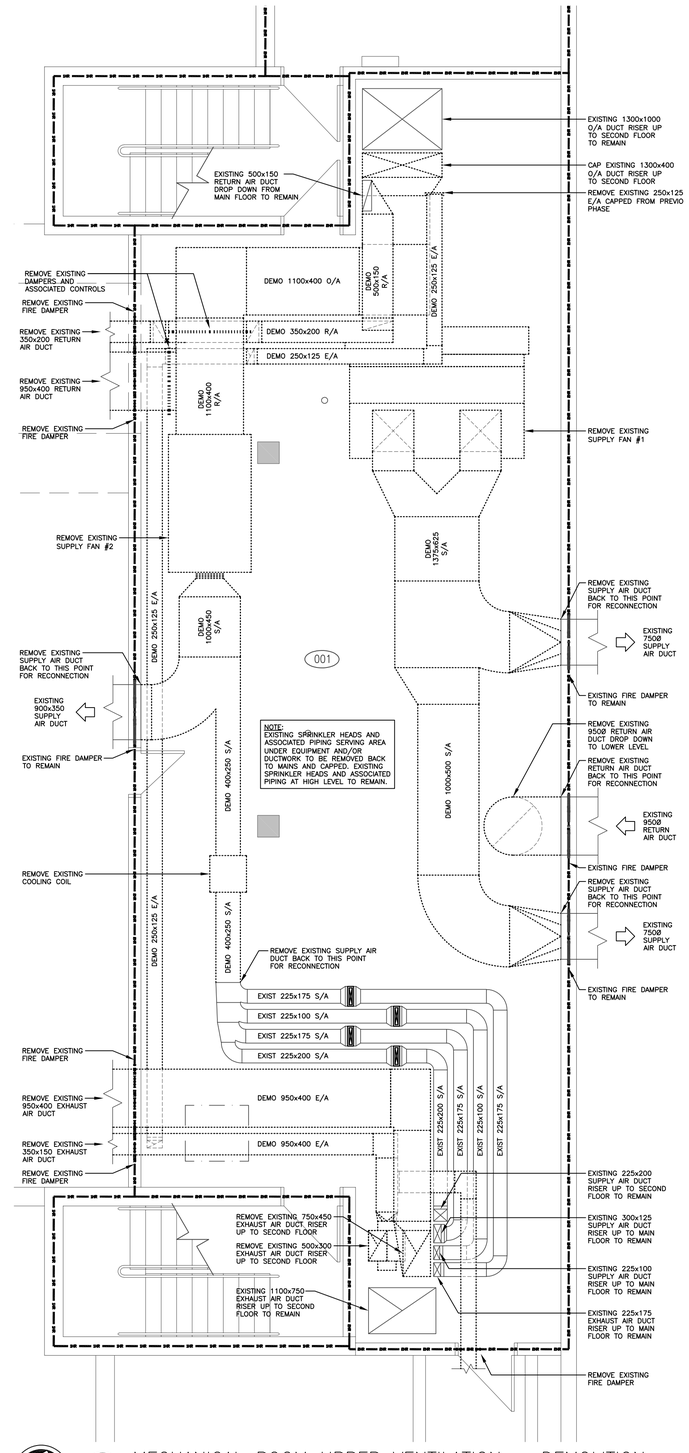
17045vnt1



1 — 1:50 MECHANICAL ROOM HEATING – DEMOLITION



2 — 1:50 MECHANICAL ROOM LOWER VENTILATION – DEMOLITION



3 — 1:50 MECHANICAL ROOM UPPER VENTILATION – DEMOLITION

A1 Sheet

0 10 20 30 40 50 60 70 80 90 100mm

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Project Manager/Administrateur de Projets
MK

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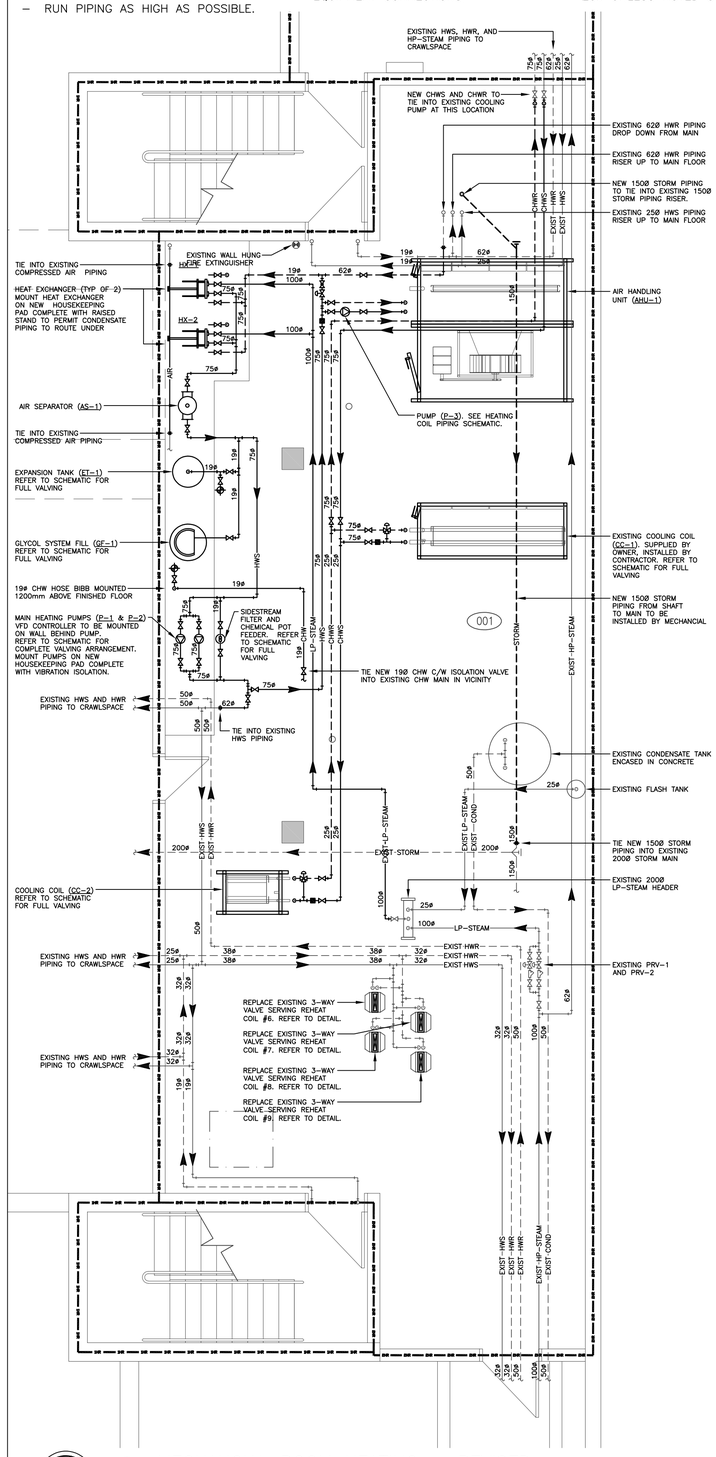
MECHANICAL ROOM DEMOLITION

Project No./No. du projet	Sheet/Feuille	Revision no./ La Révision no.
57/2017	M06 OF M08	0

17045mech

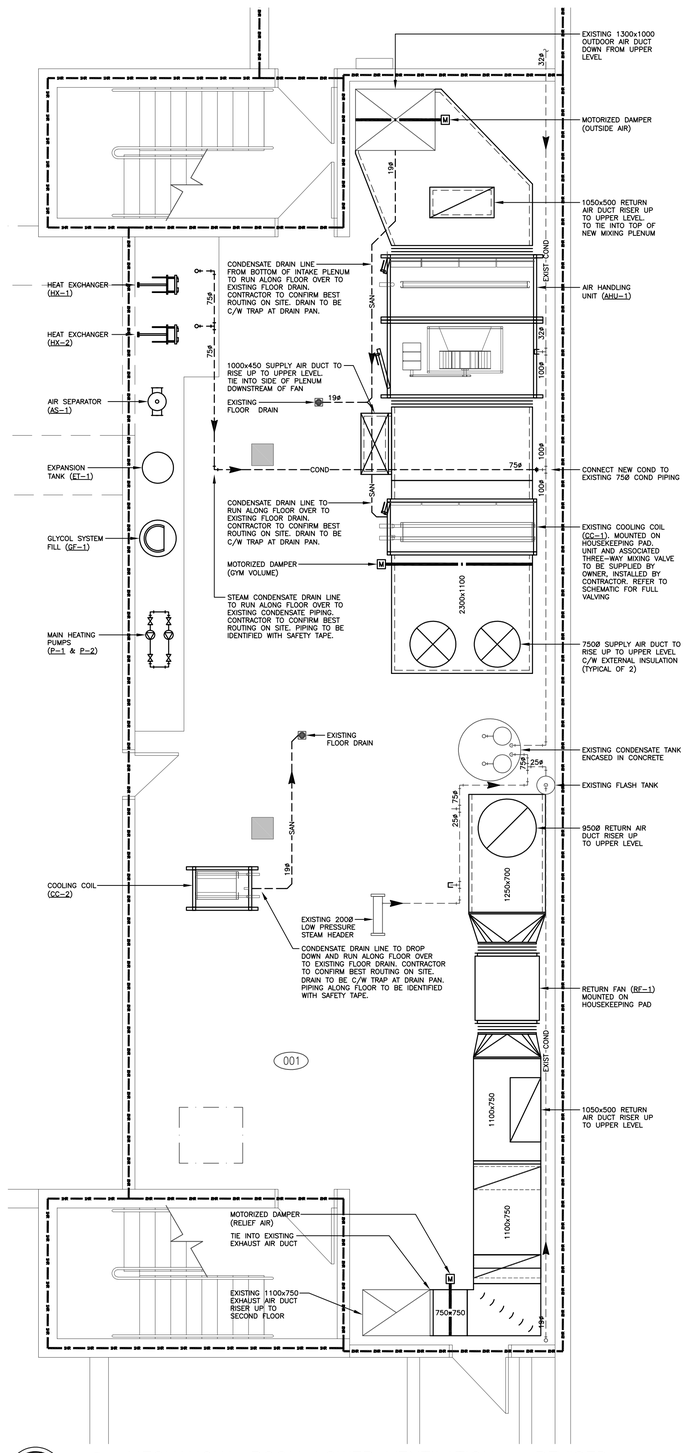
GENERAL HEATING NOTES:

- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.
- COORDINATE ALL WORK WITH OTHER TRADES AND SITE CONDITIONS.
- RUN PIPING AS HIGH AS POSSIBLE.
- INSTALL AUTO AIR VENTS WITH PET COCKS AT ALL HIGH POINTS IN THE SYSTEM PIPING.
- REFER TO DETAIL SHEETS FOR EQUIPMENT CONNECTIONS.
- ALL RUNOUTS TO REHEAT COILS, RADIANT PANELS, OR WALL-FIN RADIATION TO BE 19ø UNLESS NOTED OTHERWISE. ALL RUNOUTS TO UNIT HEATERS AND FORCE FLOWS TO BE 25ø UNLESS NOTED OTHERWISE.



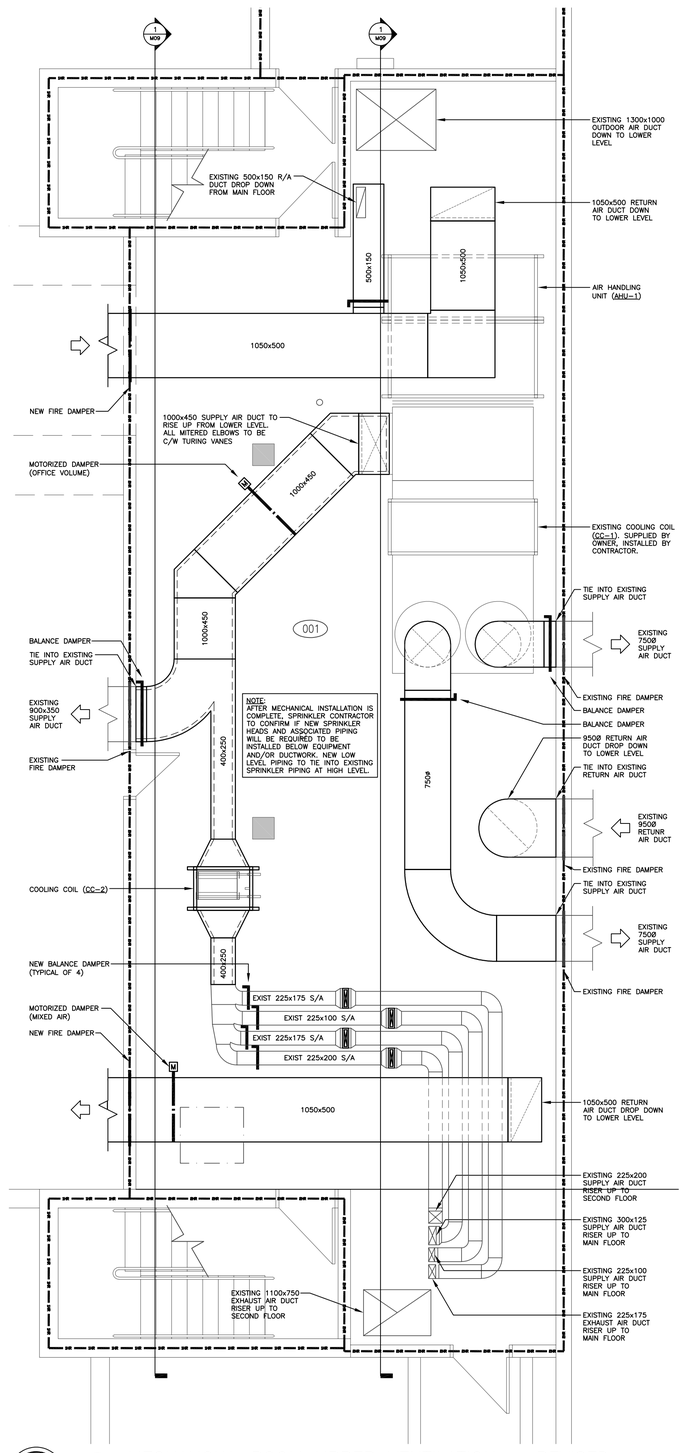
1 — MECHANICAL ROOM HEATING – REVISED
1:100

NORTH



2 — MECHANICAL ROOM LOWER VENTILATION – REVISED
1:100

NORTH



3 — MECHANICAL ROOM UPPER VENTILATION – REVISED
1:100

NORTH

A1 Sheet

0 10 20 30 40 50 60 70 80 90 100mm

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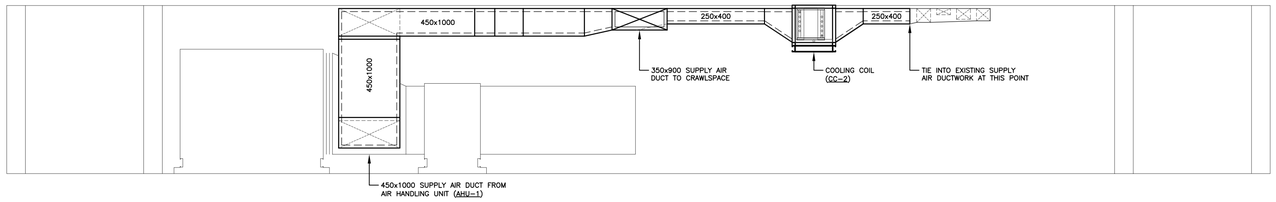
MECHANICAL ROOM
REVISED HEATING
REVISED VENTILATION

Project No./No. du projet	Sheet/Feuille	Revision no./ La Révision no.
57/2017	M07 OF M08	0

17045mech



1 – MECHANICAL ROOM VENTILATION – SECTION
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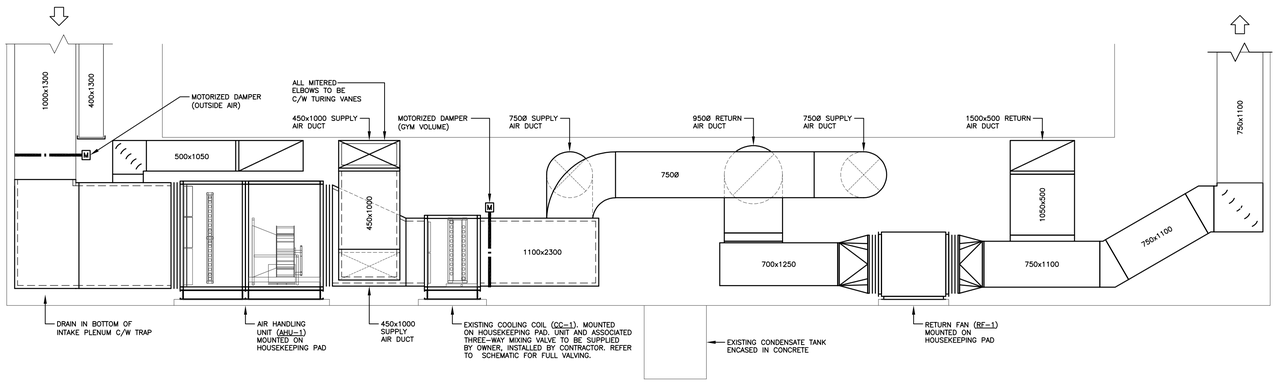
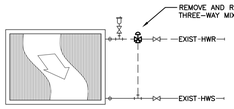
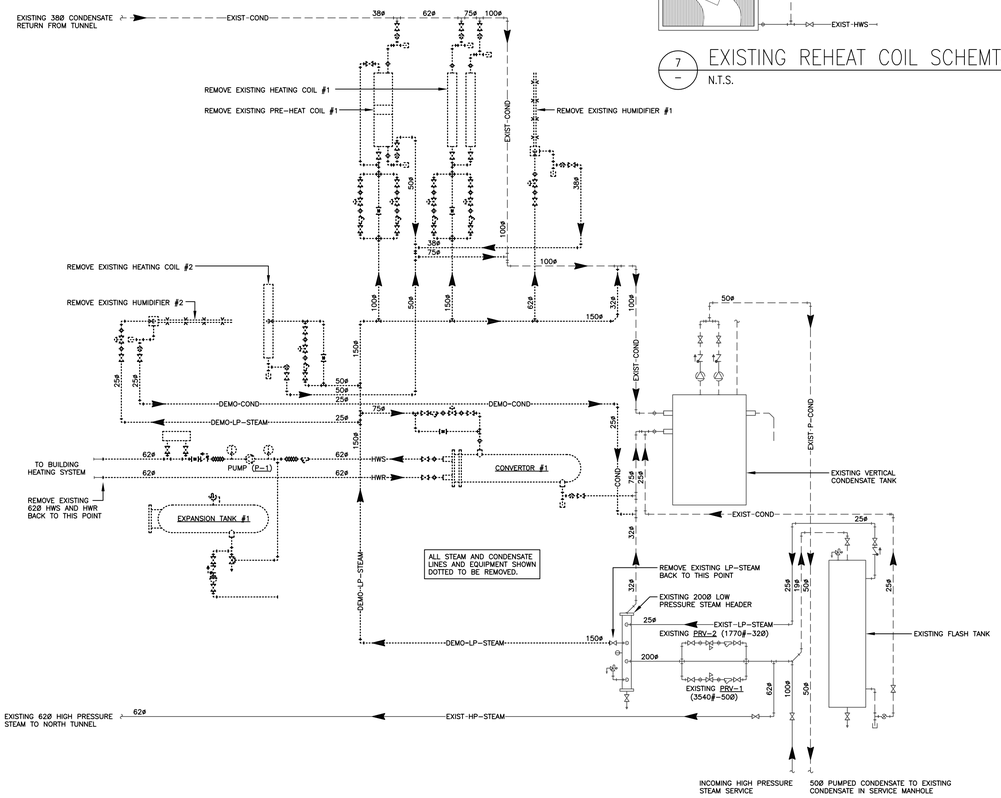


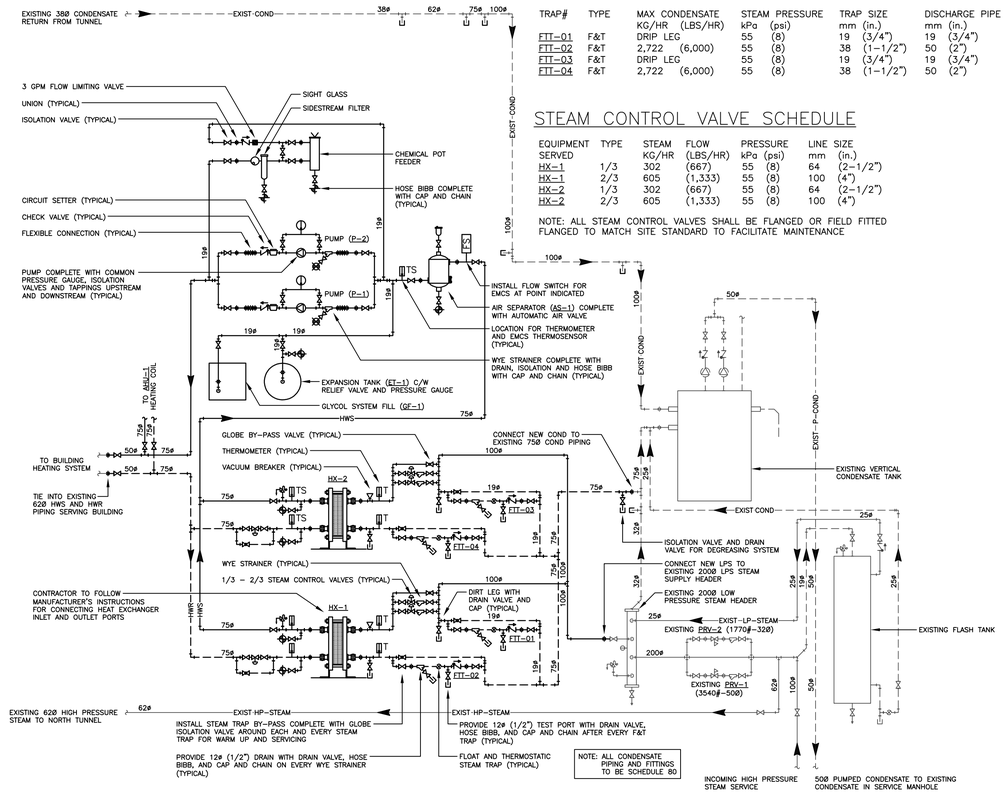
2 – MECHANICAL ROOM VENTILATION – SECTION
1:50



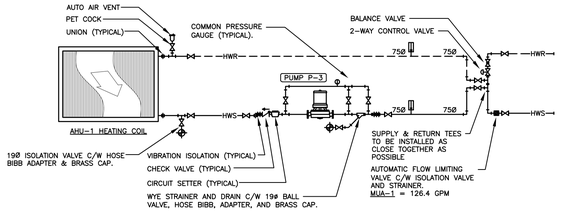
7 – EXISTING REHEAT COIL SCHEMTAIC
N.T.S.



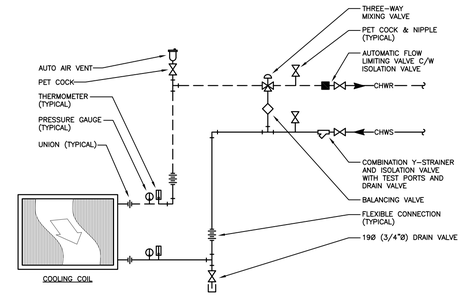
3 – MECHANICAL FLOW SCHEMATIC – DEMOLITION
1:50



4 – MECHANICAL FLOW SCHEMATIC – REVISED
1:50



5 – HEATING COIL PIPING SCHEMATIC
N.T.S.



6 – COOLING COIL PIPING SCHEMATIC
N.T.S.

DESIGN CONDITIONS:

HP-STEAM: 690 kPa (100 PSI)
LPS: LP-STEAM: MAXIMUM 103 kPa (15 PSI) DESIGNED FOR 55 kPa (8 PSI)

HWS: 87.8 DEG.C (190 DEG.F.), 30% PROP GLYCOL / 70% H20
HWR 71.1 DEG.C. (160 DEG.F.) 30% PROP GLYCOL / 70% H20

STEAM TRAP SCHEDULE

TRAP#	TYPE	MAX CONDENSATE KG/HR (LBS/HR)	STEAM PRESSURE kPa (psi)	TRAP SIZE mm (in.)	DISCHARGE PIPE mm (in.)
FTT-01	F&T	DRIP LEG	55 (8)	19 (3/4")	19 (3/4")
FTT-02	F&T	2,722 (6,000)	55 (8)	38 (1-1/2")	50 (2")
FTT-03	F&T	DRIP LEG	55 (8)	19 (3/4")	19 (3/4")
FTT-04	F&T	2,722 (6,000)	55 (8)	38 (1-1/2")	50 (2")

STEAM CONTROL VALVE SCHEDULE

EQUIPMENT SERVED	TYPE	STEAM KG/HR	FLOW (LBS/HR)	PRESSURE kPa (psi)	LINE SIZE mm (in.)
HX-1	1/3	302	(667)	55 (8)	64 (2-1/2")
HX-1	2/3	605	(1,333)	55 (8)	100 (4")
HX-2	1/3	302	(667)	55 (8)	64 (2-1/2")
HX-2	2/3	605	(1,333)	55 (8)	100 (4")

NOTE: ALL STEAM CONTROL VALVES SHALL BE FLANGED OR FIELD FITTED FLANGED TO MATCH SITE STANDARD TO FACILITATE MAINTENANCE

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TBU50 HVAC REPLACEMENT
REGINA, SK

Approved by/Approuve par

Designed by/Concept par
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Drawn by/Dessine par
CHK

Project Manager/Administrateur de Projets
MK

Architectural and Engineering Resources Manager/ Ressources Architectural et de Directeur d'ingénierie

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MECHANICAL ROOM SECTION

Project No./No. du projet	Sheet/Feuille	Revision no./ La Révision no.
57/2017	M08 OF M08	0

A1 Sheet

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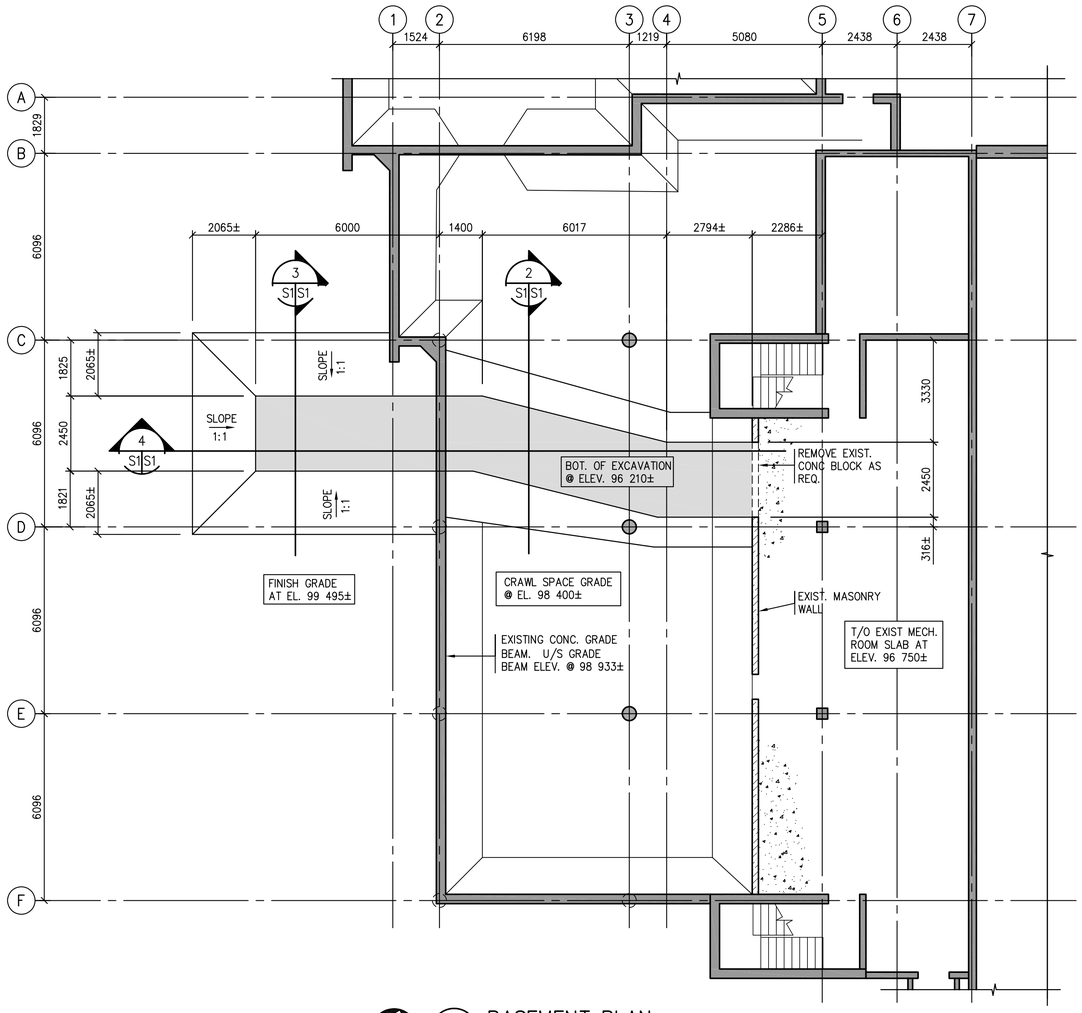
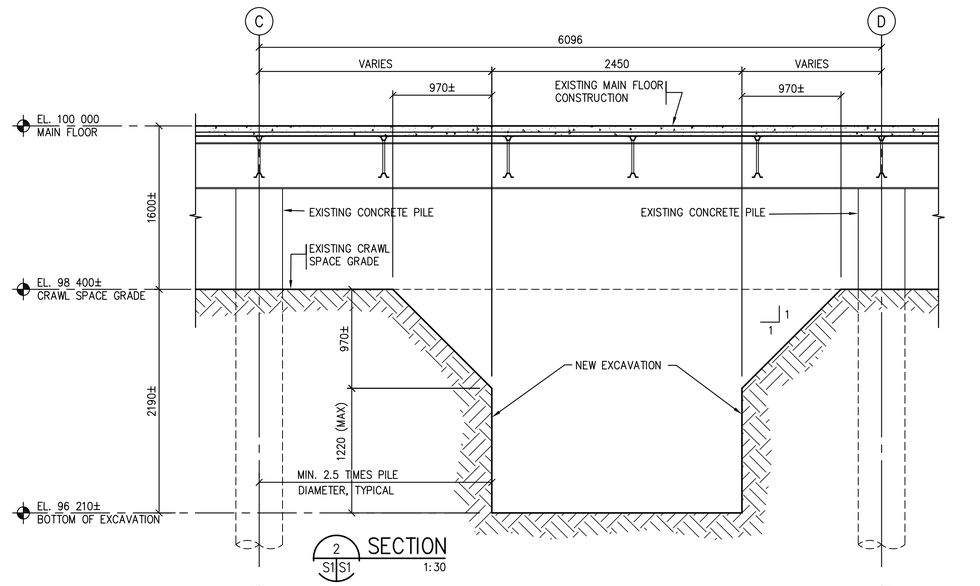
17045mech



1 S1 S1 BASEMENT PLAN
1 : 100

NOTE:
1. CONFIRM DEPTH OF EXCAVATION WITH EQUIPMENT REQUIREMENTS.
2. EXCAVATION TO STAY MINIMUM 2.5 TIMES PILE DIAMETER AWAY FROM PILES, TYPICAL.



2 S1 S1 SECTION
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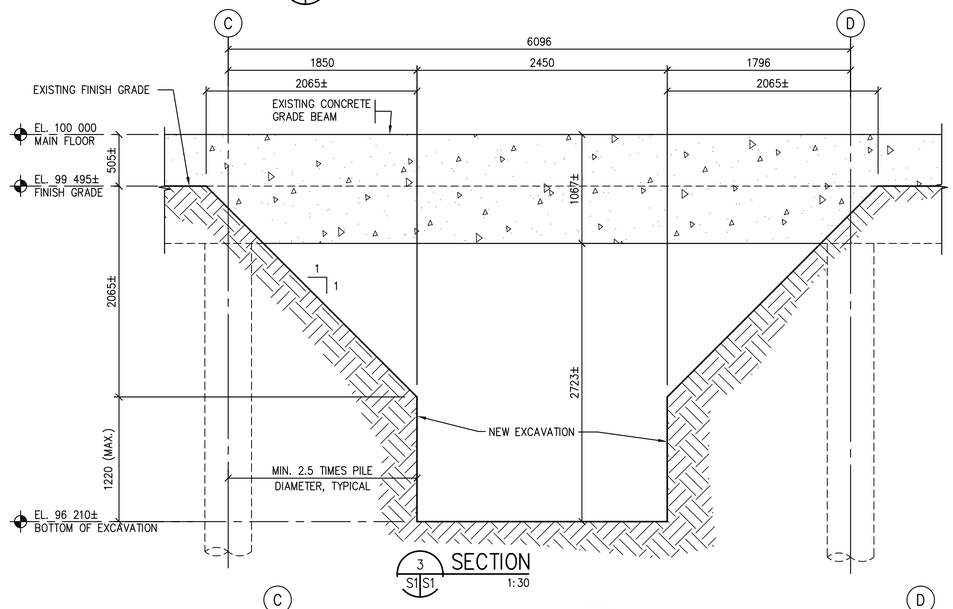
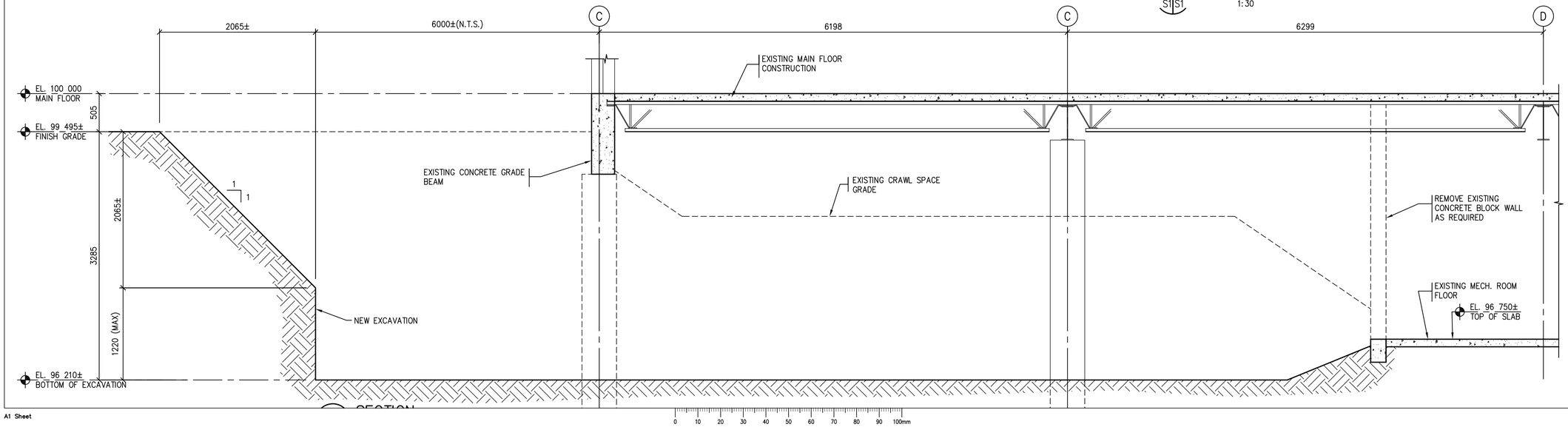


3 S1 S1 SECTION
1:30



SECTION

A1 Sheet

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BBK STRUCTURAL ENGINEERS
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BROWNLEE BEATON KREKE (REGINA) LTD.
NUMBER 525
PERMISSION TO CONSULT HELD BY:

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BASEMENT PLAN
SECTIONS

Project No./No. du projet	Sheet/Feuille	Revision no./ La Révision no.
57/2017	S1 OF	0

106780-S1