PLUMBING PIPING LEGEND					
DCW	DOMESTIC COLD WATER	<u></u> ıw	INDUSTRIAL WASTE ABOVE FLOOR OR		
— СА —	COMPRESSED AIR		GROUND		
— CAI —	COMPRESSED AIR INTAKE	<u></u> ıw	INDUSTRIAL WASTE BELOW FLOOR		
——cww	CLEAR WATER WASTE ABOVE FLOOR		OR GROUND		
	OR GROUND	—кw—	KITCHEN WASTE ABOVE FLOOR/GROUND		
——cww—	CLEAR WATER WASTE BELOW FLOOR	<u>—кw—</u>	KITCHEN WASTE BELOW FLOOR/GROUND		
	OR GROUND	——LPG——	LIQUID PETROLEUM GAS		
—_cwv—_	CLEAR WATER WASTE VENT	<u>— G—</u>	NATURAL GAS		
<u></u> — DI —	DEIONIZED WATER SUPPLY	— нс —	NATURAL GAS - HIGH PRESSURE		
— DIR —	DEIONIZED WATER RETURN	— мс—	NATURAL GAS - MEDIUM PRESSURE		
——GW——	GRAY WATER ABOVE FLOOR OR GROUND	— PD —	PUMP DISHARGE		
——GW——	GRAY WATER BELOW FLOOR OR GROUND	— RW —	RECLAIMED WATER		
—_DHW—	DOMESTIC HOT WATER	— R0 —	REVERSE OSMOSIS WATER		
—HW140—	HOT WATER (140°F)	—ROR—	REVERSE OSMOSIS WATER RETURN		
—HWR140—	HOT WATER RETURN (140°F)	—SAN—	SANITARY SEWER ABOVE FLOOR/GROUND		
— н w 160 —	HOT WATER (160°F)	—SAN—	SANITARY SEWER BELOW FLOOR/GROUP		
—HWR160—	HOT WATER RETURN (160°F)	v	SANITARY SEWER VENT		
—DHWR—	DOMESTIC HOT WATER RETURN	— SD —	STORM DRAIN ABOVE FLOOR/GROUND		
——SCW——	SOFT COLD WATER	— SD —	STORM DRAIN BELOW FLOOR/GROUND		
SHW	SOFT HOT WATER	—SSD—	SECONDARY STORM DRAIN ABOVE		
SHWR	SOFT HOT WATER RETURN		FLOOR OR GROUND		
—_FOR—	FUEL OIL RETURN	—SSD—	SECONDARY STORM DRAIN BELOW		
— F0 —	FUEL OIL SUPPLY		FLOOR OR GROUND		
<u> — ICW — </u>	INDUSTRIAL NONPOTABLE COLD WATER	SUB	SUBSURFACE STORM DRAIN		
— ІНЖ —	INDUSTRIAL NONPOTABLE HOT WATER	— ТР —	TRAP PRIMER		
IHWR	INDUSTRIAL NONPOTABLE HOT	— тw —	TEMPERED WATER		
	WATER RETURN	—_TWR—	TEMPERED WATER RETURN		
ISCW	INDUSTRIAL NONPOTABLE SOFT	VAC	VACUUM		
	COLD WATER	——VEX——	VACUUM EXHAUST		
ISHW	INDUSTRIAL NONPOTABLE SOFT	—wo—	WASTE OIL		
	HOT WATER	wov	WASTE OIL VENT		
—ISHWR—	INDUSTRIAL NONPOTABLE SOFT	+////	DEMOLITION PIPING		
	HOT WATER RETURN	1111,	DEMOLITION EQUIPMENT		
IV	INDUSTRIAL VENT	•			
	•				

	1	1	1	
<u>*F</u>	DEGREES FAHRENHEIT	MFR	MANUFACTURER	
<u>.c</u>	DEGREES CELSIUS	MIN	MINIMUM	
ø	DIAMETER	MTD	MOUNTED	
AD	ACCESS DOOR	N/A	NOT APPLICABLE	
ADJ	ADJUSTABLE	NC	NORMALLY CLOSED OR NOISE CRITERIA	
AFF	ABOVE FINISHED FLOOR	NIC	NOT IN CONTRACT	
AFG	ABOVE FINISHED GRADE	NO	NORMALLY OPEN OR NUMBER	
BFF	BELOW FINISHED FLOOR	NOM	NOMINAL	
BHP	BRAKE HORSEPOWER	NTS	NOT TO SCALE	
BOD	BOTTOM OF DUCT	OB	OCTAVE BAND	
BMS	BUILDING MANAGEMENT CONTROL SYSTEM	oc	ON CENTER	
B0P	BOTTOM OF PIPE	OD	OUTSIDE DIAMETER	
BTU	BRITISH THERMAL UNIT	OV	OUTLET VELOCITY	
BTUH	BRITISH THERMAL UNIT PER HOUR	PD	PRESSURE DROP	
CLG	CEILING	PH	PHASE	
COL	COLUMN	POC	POINT OF CONNECTION	
CUF	CUBIC FEET	POD	POINT OF DEMARCATION	
DB	DRY BULB TEMPERATURE	POS	POSITION OR POSITIVE	
DN	DOWN	PSIG	POUNDS PER SQUARE INCH GAUGE	
DP	DIFFERENTIAL PRESSURE	QTY	QUANTITY	
DWG	DRAWING	RC	ROOM CRITERIA (NOISE)	
EA	EACH	RET	RETURN (NOISE)	
EFF	EFFICIENCY	REQD	REQUIRED	
ELEV	ELEVATION	RH	<u> </u>	
		<u> </u>	RELATIVE HUMIDITY ROOM	
ENT	ENTERING	RM	1.00	
EQUIP	EQUIPMENT	RPM	REVOLUTIONS PER MINUTE	
EXH	EXHAUST	SCH	SCHEDULE	
EXP	EXPANSION	SHT	SHEET	
(E)	EXISTING	SPEC	SPECIFICATION	
EXTRM	EXISTING TO BE REMOVED	SQ	SQUARE	
ETR	EXISTING TO REMAIN	SQFT	SQUARE FEET	
FA	FIRE ALARM	STD	STANDARD	
FD	FLOOR DRAIN	SUP	SUPPLY	
FLR	FLOOR	TEMP	TEMPERATURE	
FPM	FEET PER MINUTE	TO	TRANSFER OPENING	
FT	FEET	TOD	TOP OF DUCT	
FT/SEC	FEET PER SECOND	TON	TONS OF REFRIGERATION	
GA	GAUGE	TOP	TOP OF PIPE	
GAL	GALLONS	TYP	TYPICAL	
GPH	GALLONS PER HOUR	UNO	UNLESS NOTED OTHERWISE	
GPM	GALLONS PER MINUTE	UTR	UP THROUGH ROOF	
HP	HORSEPOWER	V	VENT	
HR	HOUR	VAV	VARIABLE AIR VOLUME	
HZ	HERTZ	VEL	VELOCITY	
ID	INSIDE DIAMETER	VFD	VARIABLE FREQUENCY DRIVE	
IN	INCHES	VOL	VOLUME	
KW	KILOWATT	VTR	VENT THROUGH ROOF	
LB	POUND	w	WIDTH	
LF	LINEAR FEET	" W/	WITH	
		<u> </u>		
LVG	LEAVING	W/O	WITHOUT	
MAX	MAXIMUM	WB	WET BULB TEMPERATURE	
MBH	THOUSAND BRITISH THERMAL UNITS PER HOUR	WF	WATER ANDS	
		WG	WATER GAUGE	
MEZZ	MEZZANINE	WT	WEIGHT	

AIR SYSTEM LEGEND					
1	RECTANGULAR SUPPLY/ OUTSIDE AIR DUCT UP	SPACE PRESSURIZATION ARROW			
100	RECTANGULAR SUPPLY/ OUTSIDE AIR DUCT DOWN	DL/ UC—V—	DOOR LOUVER / UNDERCUT DOOR		
2	RECTANGULAR RETURN/ RELIEF AIR DUCT UP	-	SUPPLY AIRFLOW ARROW		
1	RECTANGULAR RETURN/ RELIEF AIR DUCT DOWN	→	RETURN OR EXHAUST AIRFLOW ARROW		
1	RECTANGULAR EXHAUST AIR DUCT UP	———	AIR VOLUME TRAVERSE STATION		
	RECTANGULAR EXHAUST AIR DUCT DOWN	\boxtimes	CEILING DIFFUSER (SUPPLY)		
₹ □ ⊗	ROUND SUPPLY/ OUTSIDE AIR DUCT UP		RETURN AIR GRILLE OR REGISTER		
 	ROUND SUPPLY/ OUTSIDE AIR DUCT DOWN		EXHAUST AIR GRILLE OR REGISTER		
20	ROUND RETURN/ RELIEF AIR DUCT UP		LIGHT TROFFER DIFFUSER		
7	ROUND RETURN/ RELIEF AIR DUCT DOWN		BOTT INOTER BILLOSEK		
7 0	ROUND EXHAUST AIR DUCT UP	^ _	DIFFUSER WITH FLOW DIRECTION. NO FLOW ARROWS		
2	ROUND EXHAUST AIR DUCT DOWN		INDICATES STANDARD 4-WAY PATTERN.		
2==3	DUCT WITH LINING OR SOUND INSULATION	₩	CIRCULAR CEILING DIFFUSER (SUPPLY)		
	STAINLESS STEEL DUCT		SIDE WALL GRILLE		
	PVC COATED DUCT	⊕ <u>x</u>	HUMIDITY SENSOR / HUMIDISTAT & NUMBER		
	DOUBLE WALL DUCT	<u>S</u> X	SENSOR AND NUMBER		
ACD	AUTOMATIC CONTROL DAMPER FOR ROUND AND RECTANGULAR DUCT	§W ⊻	SWITCH AND NUMBER		
BDD	BACKDRAFT DAMPER FOR ROUND AND RECTANGULAR DUCT	<u>⊕</u> <u>x</u>	TEMPERATURE SENSOR / THERMOSTAT & ZONE NUMBER		
FD TI	FIRE DAMPER FOR ROUND AND RECTANGULAR DUCT	ŒX	TEMPERATURE SENSOR / THERMOSTAT W/ VANDAL GUARD & ZONE NUMBER		
SD 1	SMOKE DAMPER FOR ROUND AND RECTANGULAR DUCT	(\)	REMOTE DAMPER OPERATOR		
SFD	COMBINATION SMOKE/FIRE DAMPER FOR ROUND AND RECTANGULAR DUCT	B	DIFFERENTIAL PRESSURE SENSOR		
SGD	SLIDE GATE DAMPER FOR ROUND AND RECTANGULAR DUCT	SD	DUCT SMOKE DETECTOR		
1	MANUAL VOLUME DAMPER FOR ROUND AND RECTANGULAR DUCT	(SP)	STATIC PRESSURE SENSOR		
7 11 7	FLEXIBLE CONNECTION	(3)	CARBON MONOXIDE SENSOR		
OR OR	ROOF EXHAUST FAN	<u>©</u>	CARBON DIOXIDE SENSOR		
	(SHOWN ON ROOF)	A <u>A-#</u> #	DIFFUSER TYPE - DIFFUSER SIZE		
	ROOF EXHAUST FAN	##	DIFFUSER CFM		
OR	(SHOWN ON FLOOR PLAN)	CTE	CONNECT TO EXISTING		

PIPING TURN DOWN OR DROP PIPING TURN UP OR RISE PIPING TEE DOWN OR DROP PIPING TEE DOWN OR DROP PIPING TEE UP OR RISE PIPING TEE DOWN OR DROP PIPING TEE UP OR RISE PIPING TEE DOWN OR DROP PIPING TEE UP OR RISE PIPING TURN UP OR RISE UNION TRAP PRIMER THERMOMETER WATER HAMMER ARRESTOR DIRECTION OF FLOW WATER HAMMER ARRESTOR DIRECTION OF FALL PIPING TIE UP OR RISE PIPING TEE UP OR RISE WATER HAMMER ARRESTOR PRESSURE REDUCING VALVE PIPING TEE UP OR RISE PIPING TEE UP OR RISE WATER HAMMER ARRESTOR PRESSURE REDUCING VALVE PIPING TIE UP OR RISE PIPING TEE UP OR RISE WATER HAMMER ARRESTOR PRESSURE REDUCING VALVE PIPING TEE UP OR RISE PRESSURE REDUCING VALVE PIPING TEE UP OR RESSURE SWITCH PRESSURE SAUTE TOOL OF TOOL OR REDUCING TOOL OR REDUCING TOOL OR REDUCING TOOL OR REDUCI	PLUMBING SYMBOL LEGEND				
PIPING TURN UP OR RISE PIPING TEE DOWN OR DROP PIPING TEE DOWN OR DROP PIPING TEE UP OR RISE PIPING TEE UP OR RISE PIPING TEE UP OR RISE PRESSURE SWITCH PRESSURE SWITCH CHECK VALVE PRESSURE GAUGE WITH GAUGE COCK POH BALL VALVE PRESSURE GAUGE WITH GAUGE COCK WALVE PRESSURE GAUGE WITH GAUGE COCK WALVE PRESSURE REDOWN OR DROP MIXING VALVE PRESSURE REDUCING VALVE POINT OF CONNECTION PRESSURE RELIEF VALVE POINT OF DEMARCATION PRESSURE RELIEF VALVE POINT OF DEMARCATION PRESSURE RELIEF VALVE PRESSURE SWICH PRE			TIVIDOL L		
PIPING TEE DOWN OR DROP PIPING TEE UP OR RISE PRESSURE SWITCH PATRAP CATE VALVE PRESSURE SWITCH AUTOMATIC AIR VENT PRESSURE GAUGE WITH GAUGE COCK VALVE ON PIPING RISE OR DROP TRAP PRIMER WATER HAMMER ARRESTOR PRESSURE REDUCING VALVE PRESSURE REDUCING VALVE DIRECTION OF FLOW BALANCING VALVE BALANCING VALVE PRESSURE REDUCING VALVE PREDUCER OR INCREASER AUTOMATIC FLOW CONTROL VALVE POINT OF CONNECTION PRESSURE RELIEF VALVE MOTORIZED SHUT-OFF VALVE SOLENOID VALVE DRAIN RECEPTOR FLOOR CLEAN OUT FLOOR CLEAN OUT CAPPED PIPE / CLEAN OUT FLOOR DRAIN FLOOR SINK CHECK TOWN PRESSURE RELIEF VALVE PRESSURE RELIEF VALVE PRESSURE RELIEF VALVE PRESSURE FEET SOLENOID VALVE PRESSURE FEET SOLENOID VALVE PRESSURE FEET SOLENOID TRAP PRESSURE POINT OF DEMARCATION PRESSURE FEET SOLENOID VALVE PRESSURE SAVICE VALVE PRESSURE FEET SOLENOID VALVE PRESSUR	<u> </u>	——— PIPING TURN DOWN OR DROP		WALL HYDRANT	
PIPING TEE UP OR RISE P-TRAP P-TRAP CHECK VALVE PRESSURE SWITCH PRESSURE SWITCH CHECK VALVE PRESSURE GAUGE WITH GAUGE COCK CHOLOR BALL VALVE PRESSURE GAUGE WITH GAUGE COCK CHOLOR BALL VALVE PRESSURE GAUGE WITH GAUGE COCK CHOLOR BALL VALVE PRESSURE OR DROP TRAP PRIMER THERMOMETER CHOLOR CALLE PRESSURE REDUCING VALVE POINT OF CONNECTION TEMP. & PRESSURE RELIEF VALVE POINT OF DEMARCATION THE PRESSURE FEET SOLENOID VALVE PRESSURE FEET SOLENOI	\	PIPING TURN UP OR RISE	──	UNION	
P-TRAP GATE VALVE CHECK VALVE		PIPING TEE DOWN OR DROP	P	FLOW SWITCH	
GATE VALVE CHECK VALVE PRESSURE GAUGE WITH GAUGE COCK VALVE ON PIPING RISE OR DROP MIXING VALVE MIXING VALVE BUTTERFLY VALVE CLOBE VALVE PRESSURE REDUCING VALVE PRESSURE REDUCING VALVE BALANCING VALVE	\longrightarrow	PIPING TEE UP OR RISE		PRESSURE SWITCH	
CHECK VALVE CHECK ON PIPING RISE OR DROP TRAP PRIMER TRAP PRIMER THERMOMETER CHECK CONTROL VALVE CHECK CONTROL	5	P-TRAP	— <u>[]</u>	EXPANSION JOINT	
HOH BALL VALVE TRAP PRIMER TRAP PRIMER	\longrightarrow	GATE VALVE		AUTOMATIC AIR VENT	
MIXING VALVE BUTTERFLY VALVE GLOBE VALVE PRESSURE REDUCING VALVE BACKFLOW PREVENTER BALANCING VALVE BOINT OF CONNECTION FX TEMP. & PRESSURE RELIEF VALVE POINT OF DEMARCATION FX PRESSURE RELIEF VALVE BOLAMETER MOTORIZED SHUT—OFF VALVE BOLANDID VALVE BOLANDIC VALVE	7	CHECK VALVE	<u> </u>	PRESSURE GAUGE WITH GAUGE COCK	
BUTTERFLY VALVE GLOBE VALVE PRESSURE REDUCING VALVE DIRECTION OF FLOW BACKFLOW PREVENTER BALANCING VALVE BALANCING VALVE BALANCING VALVE AUTOMATIC FLOW CONTROL VALVE POINT OF CONNECTION FX TEMP. & PRESSURE RELIEF VALVE POINT OF DEMARCATION PRESSURE RELIEF VALVE BOLENOID VALVE DIAMETER WOTORIZED SHUT-OFF VALVE DRAIN RECEPTOR FLOOR CLEAN OUT FLOOR SINK CHECTION OF FLOW AREA DRAIN FLOOR SINK CHECTION OF FLOW AREA DRAIN FLOOR SINK CHECTION OF FLOW REDUCER OR INCREASER POINT OF CONNECTION POINT OF DEMARCATION DIAMETER DIAMETER SQUARE FEET SQUARE FEET FLOOR DRAIN FLOOR CLEAN OUT FLOOR SINK CHECTION OF DRAIN FLOOR SINK CHECTION OF DRAIN FLOOR SINK CHECTION OF DRAIN FLOOR DRAIN FLOOR SINK CHECTION OF DRAIN FLOOR DRAIN FLOOR DRAIN FLOOR SINK CHECTION OF DRAIN FLOOR DRAIN FL	—ю—	BALL VALVE	₺ — ₺ —	VALVE ON PIPING RISE OR DROP	
GLOBE VALVE PRESSURE REDUCING VALVE BACKFLOW PREVENTER BALANCING VALVE POINT OF CONNECTION PE PRESSURE RELIEF VALVE BOLIAMETER MOTORIZED SHUT—OFF VALVE BOLIAMETER WOOTORIZED SHUT—OFF VALVE BOLIAMETER BOL	─ \ <u>\</u>	MIXING VALVE		TRAP PRIMER	
PRESSURE REDUCING VALVE BACKFLOW PREVENTER BALANCING VALVE POINT OF CONNECTION PRESSURE RELIEF VALVE BOILAMETER BOILAMETER BOILAMETER BOUCER OR INCREASER POINT OF CONNECTION BOILAMETER BOLANCIE SHUT-OFF VALVE BOLANCIE FEET BOLANCIE STRAINER CHARACTERIOR CLEAN OUT BOLANCIE STRAINER CHARACTERIOR CLEAN OUT BOLANCIE STRAINER CHARACTERIOR CLEAN OUT BOLANCIE STRAINER BOLANCIE STRAINER CHARACTERIOR CLEAN OUT BOLANCIE STRAINER C	 ≠	BUTTERFLY VALVE	<u>_</u>	THERMOMETER	
BACKFLOW PREVENTER BALANCING VALVE BALANCING VALVE AUTOMATIC FLOW CONTROL VALVE POINT OF CONNECTION TEMP. & PRESSURE RELIEF VALVE POINT OF DEMARCATION PRESSURE RELIEF VALVE DIAMETER WOTORIZED SHUT-OFF VALVE SOLENOID VALVE DRAIN RECEPTOR FLOOR CLEAN OUT FLOOR CLEAN OUT EXTERIOR CLEAN OUT CAPPED PIPE / CLEAN OUT FLOOR DRAIN SECONDARY ROOF DRAIN EXECUTED NOT OF FALL REDUCER OR INCREASER POINT OF CONNECTION POINT OF DEMARCATION POINT OF DEMARCATION POINT OF DEMARCATION AREA DRAIN FLOOR SINK CHEVERIOR CLEAN OUT ROOF DRAIN EXECUTED NOT OF DRAIN	─	GLOBE VALVE		WATER HAMMER ARRESTOR	
BALANCING VALVE AUTOMATIC FLOW CONTROL VALVE POINT OF CONNECTION TEMP. & PRESSURE RELIEF VALVE POINT OF DEMARCATION PRESSURE RELIEF VALVE DIAMETER WOTORIZED SHUT-OFF VALVE SOLENOID VALVE DRAIN RECEPTOR FLOOR CLEAN OUT FLOOR SINK CHECK TEMP. & PRESSURE RELIEF VALVE POINT OF DEMARCATION POINT OF DEMARCATION POINT OF DEMARCATION AUTOMATIC FLOOR DEMARCATION AREA DRAIN FLOOR SINK CHECK TERIOR CLEAN OUT ROOF DRAIN EXTERIOR CLEAN OUT EXTERIOR CLEAN OUT CAPPED PIPE / CLEAN OUT SECONDARY ROOF DRAIN FLEXIBLE CONNECTION (PIPE) (E) EXISTING	─ ₩—	PRESSURE REDUCING VALVE		DIRECTION OF FLOW	
AUTOMATIC FLOW CONTROL VALVE POINT OF CONNECTION TEMP. & PRESSURE RELIEF VALVE POINT OF DEMARCATION PRESSURE RELIEF VALVE DIAMETER SQUARE FEET SOLENOID VALVE DRAIN RECEPTOR FLOOR DRAIN FLOOR CLEAN OUT FLOOR SINK CHEXTERIOR CLEAN OUT CAPPED PIPE / CLEAN OUT FLOOR DRAIN ROOF DRAIN ROOF DRAIN EXTERIOR CLEAN OUT SECONDARY ROOF DRAIN FLEXIBLE CONNECTION (PIPE) (E) EXISTING		BACKFLOW PREVENTER		SLOPE & DIRECTION OF FALL	
TEMP. & PRESSURE RELIEF VALVE POINT OF DEMARCATION PRESSURE RELIEF VALVE MOTORIZED SHUT-OFF VALVE SQUARE FEET DRAIN RECEPTOR FLOOR DRAIN FLOOR CLEAN OUT FLOOR SINK CHEXTERIOR CLEAN OUT EXTERIOR CLEAN OUT CAPPED PIPE / CLEAN OUT FLOOR DRAIN ROOF DRAIN ROOF DRAIN EXTERIOR CLEAN OUT SECONDARY ROOF DRAIN EXECUPTOR FLOOR SINK CHEXIBLE CONNECTION (PIPE) (E) EXISTING				REDUCER OR INCREASER	
PRESSURE RELIEF VALVE MOTORIZED SHUT-OFF VALVE SQUARE FEET SOLENOID VALVE DRAIN RECEPTOR FLOOR DRAIN FLOOR DRAIN FLOOR SINK CHEXTERIOR CLEAN OUT ROOF DRAIN SECONDARY ROOF DRAIN EXTERIOR CLEAN OUT CAPPED PIPE / CLEAN OUT FLEXIBLE CONNECTION (PIPE) DIAMETER ROULANE FEET SQUARE FEET AREA DRAIN FLOOR SINK ROOF DRAIN SECONDARY ROOF DRAIN EXISTING	—≌ —	AUTOMATIC FLOW CONTROL VALVE		POINT OF CONNECTION	
MOTORIZED SHUT-OFF VALVE SQUARE FEET SOLENOID VALVE DRAIN RECEPTOR FLOOR DRAIN FLOOR DRAIN AREA DRAIN FLOOR SINK CHEXTERIOR CLEAN OUT CAPPED PIPE / CLEAN OUT FLEXIBLE CONNECTION (PIPE) SQUARE FEET RAIN FLOOR DRAIN FLOOR DRAIN FLOOR SINK ROOF DRAIN SECONDARY ROOF DRAIN EXISTING		r坛 TEMP. & PRESSURE RELIEF VALVE		POINT OF DEMARCATION	
SOLENOID VALVE STRAINER FLOOR CLEAN OUT WALL CLEAN OUT EXTERIOR CLEAN OUT CAPPED PIPE / CLEAN OUT FLOOR SINK CHEVIELD OUT CAPPED PIPE / CLEAN OUT EXECUPTOR DRAIN RECEPTOR FLOOR DRAIN FLOOR SINK ROOF DRAIN SECONDARY ROOF DRAIN EXECUPTOR EXISTING		PRESSURE RELIEF VALVE	ø	DIAMETER	
SOLENOID VALVE STRAINER FLOOR CLEAN OUT WALL CLEAN OUT EXTERIOR CLEAN OUT CAPPED PIPE / CLEAN OUT FLOOR SINK CHEVIELD OUT CAPPED PIPE / CLEAN OUT EXECUPTOR DRAIN RECEPTOR FLOOR DRAIN FLOOR SINK ROOF DRAIN SECONDARY ROOF DRAIN EXECUPTOR EXISTING		MOTORIZED SHUT-OFF VALVE	Ø	SQUARE FEET	
STRAINER FLOOR CLEAN OUT WALL CLEAN OUT EXTERIOR CLEAN OUT CAPPED PIPE / CLEAN OUT FLEXIBLE CONNECTION (PIPE) FLOOR DRAIN AREA DRAIN FLOOR SINK ROOF DRAIN SECONDARY ROOF DRAIN EXISTING		SOLENOID VALVE	Ø	DRAIN RECEPTOR	
WALL CLEAN OUT FLOOR SINK		STRAINER	Ŏ	FLOOR DRAIN	
C EXTERIOR CLEAN OUT ROOF DRAIN CAPPED PIPE / CLEAN OUT SECONDARY ROOF DRAIN FLEXIBLE CONNECTION (PIPE) (E) EXISTING	d	FLOOR CLEAN OUT	_	AREA DRAIN	
CAPPED PIPE / CLEAN OUT SECONDARY ROOF DRAIN FLEXIBLE CONNECTION (PIPE) (E) EXISTING	⊩—			FLOOR SINK	
FLEXIBLE CONNECTION (PIPE) (E) EXISTING	а——	EXTERIOR CLEAN OUT		ROOF DRAIN	
— TEXABLE CONTROLLENGY (TITE)	[CAPPED PIPE / CLEAN OUT		SECONDARY ROOF DRAIN	
+ HOSE BIBB ☐→ BY-PASS TERMINAL UNIT		FLEXIBLE CONNECTION (PIPE)	(E)	EXISTING	
	+	HOSE BIBB	<u>_</u> +	BY-PASS TERMINAL UNIT	

	TAGS & CALLOUTS					
ÆQUIP\	EQUIPMENT REQUIRING ELECTRICAL SERVICE, REFER TO SCHEDULES FOR		REVISION CALLOUT			
#	# SERVICE. REFER TO SCHEDULES FOR PERFORMANCE REQUIREMENTS.		KEYNOTE CALLOUT			
EQUIP	EQUIPMENT <u>NOT</u> REQUIRING ELECTRICAL SERVICE. REFER TO SCHEDULES FOR PERFORMANCE REQUIREMENTS.	•	POINT OF CONNECTION			
#		•	POINT OF DEMARCATION			
	SECTION CALLOUT SECTION DESIGNATION	E	FURNISHED & INSTALLED BY ELECTRICAL			
P3.1	SHEET NUMBER	M	FURNISHED & INSTALLED BY MECHANICAL			
A	DETAIL CALLOUT DETAIL DESIGNATION	P	FURNISHED AND INSTALLED BY PLUMBING			
P3.1	SHEET NUMBER	S E 1 1	HEAT TRACE CIRCUIT START AND END HEAT TRACE CIRCUIT NUMBER			

FIRE PROTECTION LEGEND
PORTABLE FIRE EXTINGUISHER

	NOTEC
(2FINFRAL	NOTE2

- . ALL DRAWINGS ARE DIAGRAMMATIC ONLY. THE ARRANGEMENTS OF EQUIPMENT SHOWN ARE APPROXIMATIONS ONLY AND MAY BE ALTERED BY THE ENGINEERS TO MEET THE REQUIREMENTS OF THE PROJECT. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE ARCHITECT'S, INTERIOR DESIGNER, AND MECHANICAL DRAWINGS FOR LOCATION OF ALL LUMINARIES, SWITCHES, DEVICES, OUTLETS, FURNITURE FEEDING POINTS, DIMENSIONS, MOUNTING HEIGHTS, AND CONSTRUCTION DETAILS.
- 2. IN EVERY INSTANCE WHERE IT IS REQUIRED IN THE SPECIFICATION OR ON DRAWING THAT EQUIPMENT AND MATERIALS BE REMOVED FROM EXISTING LOCATIONS AND RE-INSTALLED, EITHER IN WHOLE OR IN PART IN NEW LOCATIONS, ALL SUCH EQUIPMENT AND MATERIALS SHALL BE THOROUGHLY CLEANED AND WHERE NECESSARY PUT INTO GOOD OPERATING CONDITION BEFORE BEING RE-INSTALLED IN THE NEW LOCATION. TEST ALL PARTS OF THE RE-USED OR RELOCATED ELECTRICAL EQUIPMENT AND CORRECT ALL FAULTS AND GROUNDS.
- 3. ALL SLAB OPENINGS SHALL BE X-RAYED AND REVIEWED WITH LANDLORD AND BASE BUILDING STRUCTURAL CONSULTANT. CONTRACTOR SHALL X-RAY THE FLOOR AND SUBMIT TO BASE BUILDING STRUCTURAL ENGINEER FOR WRITTEN APPROVAL AT LEAST 72 HOURS PRIOR TO ANY CORE DRILLING ON THE BUILDING. THE CONTRACTOR SHALL INCLUDE THE COST OF STRUCTURAL ENGINEER. COORDINATE ALL CORE DRILLING WITH LANDLORD'S SITE REPRESENTATIVE AND TENANT. ALL NOISY WORK SHALL BE PERFORMED AFTER HOURS.
- ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LANDLORD'S GUIDELINES AND SHALL ADHERE TO THE REQUIREMENTS STATED IN THE BASE BUILDING CONSTRUCTION MANUAL.
- 5. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF ALL WORK WITH ALL OTHER TRADES, CONSULTANTS, TENANT & LANDLORD. ALL WORK SHALL BE SCHEDULED AND CARRIED OUT IN SUCH A MANNER TO ENSURE CONTINUED AND NON-INTERRUPTED OPERATION OF EXISTING FACILITY.
- ALL OPENINGS IN BUILDING RISER, IF APPLICABLE, SHALL BE SEALED WITH APPROVED FIRE STOP MATERIAL. ANY FIRE STOPPING MATERIAL REMOVED WILL BE REPLACED WITH A SUITABLE AND APPROVED FIRE STOPPING MATERIAL AND SHALL BE INSTALLED AS PER BUILDING AND FIRE CODE.
- . ALL PIPE PENETRATIONS THROUGH FIRE RATED WALLS & FLOORS SHALL BE SEALED WITH FIRE STOP MATERIAL. FIRE STOP MATERIAL SHALL BE THAT WHICH IS APPROVED BY THE LANDLORD FOR USE IN THE BUILDING. REFER TO BASE BUILDING CONSTRUCTION MANUAL FOR FIRE STOPPING REQUIREMENTS.
- 8. SEAL AIR-TIGHT AROUND ALL DUCT, PIPE, CONDUIT & WIRE PENETRATIONS THROUGH PARTITIONS,
 BAFFLES ABOVE CEILINGS & THROUGH FLOORS THAT ARE NOT FIRE RATED.
- 9. COORDINATE WITH TENANT & LANDLORD TO CONFIRM EQUIPMENT, SYSTEMS & DEVICES TO REMAIN.
- 10. PROVIDE TEMPORARY FILTERS ON ALL BASE BUILDING RETURN AIR OPENINGS, AND TRANSFER DUCTS CONNECTING TO THE ADJACENT TENANT SPACE THAT REMAIN OPERATIONAL DURING CONSTRUCTION. FILTERS SHALL HAVE A MERV RATING OF 13. FILTERS SHALL BE REPLACED WEEKLY & SHALL BE REMOVED UPON COMPLETION OF CONSTRUCTION.
- 1. ALL FILTERS IN BASE BUILDING AIR HANDLING EQUIPMENT SERVING THE CONSTRUCTION AREA SHALL BE REPLACED UPON COMPLETION OF CONSTRUCTION.
- 2. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL REFINISHING OF DAMAGED BUILDING AREAS AND FINISHES AFFECTED BY THE WORK AS OUTLINED UNDER SCOPE OF WORK OF THIS PROJECT.
- 13. ALL INSTALLATIONS WITHIN EXISTING AREAS SHALL BE COORDINATED WITH LANDLORD AND BASE BUILDING MANAGEMENT. INSTALLATION MUST BE PERFORMED IN A MANNER TO ELIMINATE ANY INTERFERENCES TO STAFF AND NORMAL OPERATION OF THE FACILITY.
- 14. THE CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION AND DISTRIBUTION OF TEMPORARY POWER WITHIN THE PREMISES DURING THE CONSTRUCTION PERIOD. EXPOSED ELECTRICAL CORDS OUTSIDE THE LEASED PREMISES SHALL NOT BE PERMITTED.
- 15. DIMENSIONS ON DRAWINGS ARE EXPRESSED IN METRIC UNITS AND FLOWS ON DRAWINGS ARE EXPRESSED IN IMPERIAL UNITS.
- 16. ALL HVAC CONTROLS WORK SHALL BE PREFORMED BY THE BASE BUILDING HVAC CONTROLS CONTRACTOR, CONVERGINT TECHNOLOGIES. CONTRACTOR SHALL CARRY BASE BUILDING HVAC CONTROLS CONTRACTOR FOR ALL HVAC CONTROLS WORK. CONTACT OMAR YAKOBI: OMAR.YAKOBI@CONVERGINT.COM OR (905) 602-8622.
- 7. ALL SPRINKLER AND FIRE PROTECTION WORK SHALL BE PERFORMED BY THE A SPRINKLER CONTRACTOR APPROVED TO DO WORK IN THE BUILDING. REFER TO TENANT DESIGN AND CONSTRUCTION MANUAL.
- 18. ALL TESTING, ADJUSTING, AND BALANCING (TAB) WORK SHALL BE PERFORMED BY AN INDEPENDENT AIR AND WATER BALANCING CONTRACTOR APPROVED TO DO WORK IN THE BUILDING. REFER TO TENANT DESIGN AND CONSTRUCTION MANUAL.
- 19. ANY SHUTDOWN, DRAINAGE, AND/OR FILLING OF BASE BUILDING SYSTEMS AND/OR SERVICES SHALL BE DONE BY THE LANDLORD'S BUILDING MANAGEMENT STAFF. SCHEDULE & COORDINATE ANY SHUTDOWNS WITH THE LANDLORD AT LEAST 72 HOURS IN ADVANCE. CONTRACTOR SHALL FOLLOW ALL LANDLORD'S INSTRUCTIONS, & SHALL CARRY ALL COSTS ASSOCIATED WITH THIS WORK IN THE TENDER PRICE.
- 20. ALL NOISY WORK (CORE DRILLING, ETC.) SHALL BE PERFORMED AFTER HOURS AND SHALL BE COORDINATED WITH THE LANDLORD & THE FACILITY AT LEAST 72 HOURS IN ADVANCE OF THE WORK
- 21. ALL CORE DRILLING SHALL BE COORDINATED WITH THE CLIENT AND THE LANDLORD AT LEAST 72 HOURS IN ADVANCE OF ANY WORK TAKING PLACE. LOCATIONS OF ALL CORE SHALL BE COORDINATED WITH, AND APPROVED BY THE LANDLORD'S STRUCTURAL ENGINEER.
- 22. LOCATIONS OF CORES SHALL BE X-RAYED PRIOR TO START OF CORING WORK. COORDINATE X-RAY WORK WITH CLIENT AND LANDLORD AT LEAST 72 HOURS IN ADVANCE.
- 23. SUBMIT TO TENANT & LANDLORD OPERATIONS & MAINTENANCE MANUALS FOR EACH PIECE OF EQUIPMENT PROVIDED UNDER THIS CONTRACT. OPERATION & MAINTENANCE MANUALS SHALL INCLUDE DATA SHEETS, BROCHURES, MAINTENANCE INFORMATION, RECOMMENDED SPARE PARTS LISTS, LUBRICATION INSTRUCTIONS, & START-UP CERTIFICATES.
- 24. SUBMIT TO TENANT & LANDLORD A REVIEWED SET OF ALL SHOP DRAWINGS CLEARLY MARKED WITH "REVIEWED" BY THE INSTALLING CONTRACTOR & THE TENANT ENGINEER.
- 25. SUBMIT TO TENANT & LANDLORD A COMPLETE SET OF AS-BUILT RECORD DRAWINGS. AS-BUILT DRAWINGS SHALL BE PREPARED USING CAD SOFTWARE (I.E. AUTOCAD) & SUBMITTED IN DIGITAL PDF & DWG FORMATS, AND AS A HARD COPY TO EACH THE TENANT & THE LANDLORD. SCANNED REDLINE MARKED-UP DRAWINGS ARE NOT ACCEPTABLE.

	DRAWING LIST
M-1	MECHANICAL NOTES AND LEGENDS
M-2	MECHANICAL SPECIFICATIONS
M-3	MECHANICAL SPECIFICATIONS
M-4	MECHANICAL SPECIFICATIONS
M-5	MECHANICAL SCHEDULES AND DETAILS
M-6	MECHANICAL - SECOND FLOOR - PLUMBING & FIRE PROTECTION PLAN
M-7	MECHANICAL - SECOND FLOOR - HVAC PLAN
M-8	MECHANICAL - ROOF PLAN

CLIENT

PROJECT NORTH

MUNICIPALITY OF CASSELMAN

2	ISSUED FOR 99% COORDINATION	2025-02-24
1	ISSUED FOR 66% COORDINATION	2023-05-12
ISSUE	DESCRIPTION	DATE

IT IS THE RESPONSIBILITY OF THE APPROPRIATE CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON SITE AND PROMPTLY REPORT ALL ERRORS AND/OR OMISSIONS TO THE CONSULTANT BEFORE WORK COMMENCES.

ALL WORK IS TO FOLLOW THE OBC 2012 AND ANY OTHER APPLICABLE CODES AND REGULATIONS.

DO NOT SCALE DRAWINGS.

PROFESSIONAL STAMP	

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PROJECT

1 INDUSTRIEL STREET OFFICE FIT-UP

DRAWING

MECHANICAL NOTES AND LEGENDS

PROJECT No:	MRK-23002008-A0	REVISION:	
DRAWN:	M. OMAR	DATE:	JUNE 2023
APPROVED:	B. BROWN	SCALE:	AS SHOWN

R A

M-1

<u>GENERAL</u>

GENERAL REQUIREMENTS

- THE WORK SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF THE BUILDING CODE, THE MINISTRY OF LABOUR, THE CITY AND ALL CODES HAVING JURISDICTION, WHICH ARE TO BE CONSIDERED AN INTEGRAL PART OF THESE SPECIFICATIONS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTION & PROVIDE REPAIR OF ADJACENT EXISTING SURFACES, EQUIPMENT, AREAS & PROPERTY THAT MAY BE DAMAGED AS A RESULT OF ANY DEMOLITION AND / OR NEW WORK.
- PAY FOR AND OBTAIN ALL REQUIRED PERMITS, FEES. LICENSES, CERTIFICATES OF INSPECTION, ETC. PROVIDE AND SUBMIT REQUIRED DRAWINGS TO THE AUTHORITIES HAVING JURISDICTION
- THE CONTRACTOR SHALL FURNISH ALL MATERIALS, LABOR, EQUIPMENT, TRANSPORTATION & SERVICES NECESSARY FOR COMPLETION OF THE WORK. ALL MATERIALS & WORK SHALL BE IN COMPLIANCE WITH ALL APPLICABLE CODES & GOVERNING REGULATIONS & SHALL MEET WITH THE APPROVAL OF THE
- ALL DRAWINGS ARE CONSIDERED TO BE PART OF THE CONTRACT DOCUMENTS . THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REVIEW & COORDINATION OF ALL DRAWINGS PRIOR TO ANY CONSTRUCTION, INCLUDING ARCHITECTURAL, STRUCTURAL, AIR CONDITIONING, PLUMBING & ELECTRICAL. ANY DISCREPANCIES THAT OCCUR SHALL BE BROUGHT TO THE ATTENTION OF ENGINEER PRIOR TO THE START OF CONSTRUCTION SO THAT A CLARIFICATION MAY BE ISSUED. ANY WORK PERFORMED IN CONFLICT WITH THE CONTRACT DOCUMENTS OR ANY CODE REQUIREMENT SHALL BE CORRECTED BY THE CONTRACTOR AT HIS OWN EXPENSE, & AT NO EXPENSE TO THE OWNER.
- DO NOT SCALE DRAWINGS ALL DIMENSIONS & JOB SITE CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR AT THE JOB SITE PRIOR TO BID SUBMITTAL, START OF CONSTRUCTION AND / OR FABRICATION OF MATERIALS. IF DISCREPANCIES ARE ENCOUNTERED, THE ENGINEER SHALL BE NOTIFIED
- CONTRACTOR TO PROVIDE ANY TEMPORARY HEATING AND OR COOLING MEASURES FOR SPACES THAT REQUIRE THE SHUTDOWN OF AN EQUIPMENT
- CONTRACTOR TO KEEP A RECORD SET OF DRAWINGS ON SITE AT ALL TIMES. ANY CHANGES SHALL BE RECORDED ON THIS SET FOR AS-BUILT
- PROVIDE SEISMIC BRACING FOR MECHANICAL EQUIPMENT BASED ON APPROPRIATE SEISMIC ZONE REQUIREMENTS PER LOCAL AND NATIONAL CODES. CONTRACTOR'S RESPONSIBILITY INCLUDES STRUCTURAL ENGINEER'S CERTIFICATION ON DETAILS SUBMITTED FOR PERMITTING.

2. INTERRUPTION OF SERVICES

- 2.2. ALL INTERRUPTIONS OF EXISTING MECHANICAL SYSTEMS MUST BE APPROVED BY AND CO-ORDINATED WITH THE OWNER.
- DISRUPTION OF NORMAL OPERATIONS WILL NOT BE ALLOWED. ALL INTERRUPTIONS SHALL OCCUR AFTER THE CLOSE OF NORMAL HOURS. PREMIUM TIME
- CONTRACTOR TO ARRANGE WITH THE OWNER FOR NECESSARY SHUTDOWNS FOR ALL SYSTEMS THAT REQUIRE TIE-INS AND WORK WITHIN OTHER TENANT SPACES. SCHEDULING OF THIS WORK TO BE COORDINATED WITH THE OWNER AND OTHER TENANTS.

SHOP DRAWINGS

- 3.1. SUBMIT SHOP DRAWINGS FOR THE FOLLOWING MAJOR EQUIPMENT:
- DOMESTIC HOT WATER HEATER SUPPLY AIR DIFFUSERS, GRILLES & REGISTERS
- EXHAUST FANS 3.1.5. FLOOR DRAINS
- HUB DRAINS PLUMBING FIXTURES
- ALTERNATE EQUIPMENT MAY BE SPECIFIED, PROVIDED THAT THE SPACE REQUIREMENTS, QUALITY AND PERFORMANCE CHARACTERISTICS, AIR AND FLUID FLOW REQUIREMENTS, WEIGHTS AND POWER REQUIREMENTS ARE EQUAL TO THE SPECIFIED EQUIPMENT. ACCEPTANCE OF ANY ALTERNATE EQUIPMENT SHALL BE BY THE CONSULTANT.

COORDINATION

- COORDINATE AND VERIFY EXACT LOCATIONS, SIZES, POINTS OF CONNECTION AND INVERT ELEVATIONS OF NEW AND EXISTING BUILDING PLUMBING SERVICE LATERALS ON SITE PRIOR TO PERFORMING WORK. NOTIFY ARCHITECT IMMEDIATELY OF ANY DISCREPANCIES. MAKE FINAL CONNECTIONS TO LATERALS.
- 4.2. COORDINATE ELECTRICAL REQUIREMENTS WITH THE ELECTRICAL CONTRACTOR INCLUDING POWER LOADS OF NEW EQUIPMENT, FIXTURES AND APPLIANCES.
- 4.3. COORDINATE ACCESS PANEL REQUIREMENTS WITH THE ARCHITECT. PROVIDE PANEL SIZES, FINISH, ELEVATIONS AND LOCATIONS.
- COORDINATE LOCATIONS, SIZES AND ELEVATIONS OF SLEEVES AND PENETRATIONS THRU WALLS, FLOORS, BEAMS (INCLUDING GRADE BEAMS/FOOTINGS)
- AND SLABS WITH THE ARCHITECT AND STRUCTURAL ENGINEER. COORDINATE AND PROVIDE PIPING ROUGH-INS AND CONNECTIONS TO EQUIPMENT, FIXTURES AND APPLIANCES THRU PRE MANUFACTURED CABINET
- THE LOCATION, QUANTITIES AND SIZES OF EXISTING PIPING, FIXTURES, EQUIPMENT, SHUT-OFF VALVES, ETC. INDICATED ON THE PLANS HAS BEEN DERIVED FROM AVAILABLE RECORD DRAWINGS AND FIELD INVESTIGATIONS AND ARE SHOWN DIAGRAMMATICALLY. THE CONTRACTOR SHALL VERIFY ALL
- SUCH ITEMS PRIOR TO INSTALLATION OF NEW WORK. WHERE EXISTING/UNDOCUMENTED PIPING SYSTEMS ARE INSTALLED IN WALLS THAT ARE TO BE REMOVED OR REMODELED, THE CONTRACTOR SHALL IMMEDIATELY IDENTIFY SUCH SYSTEMS TO THE ARCHITECT FOR REVIEW PRIOR TO DEMOLITION OR REROUTE. IF REROUTE IS DEEMED NECESSARY TO
- 4.8. CONTRACTOR SHALL COORDINATE ALL DUCT, PIPE AND EQUIPMENT LOCATIONS WITH ELECTRICAL, STRUCTURAL, PLUMBING AND ALL OTHER TRADES.

MAINTAIN OTHER BUILDING SYSTEM OPERATIONS, THE CONTRACTOR SHALL PROVIDE A SOLUTION TO THE REPOUTE FOR REVIEW BY THE ARCHITECT

4.9. ALL OUTLETS FOR FUTURE CONNECTIONS SHALL BE INSTALLED SO AS TO PERMIT EASY CONNECTION. COORDINATE DUCTWORK, STRUCTURAL CONDITIONS AND ARCHITECTURAL LAYOUT.

5. SLEEVES, CUTTING AND PATCHING

- INSTALL SLEEVES AND FRAMES FOR PIPING AND SIMILAR EQUIPMENT TO BE BUILT INTO THE BUILDING AS THE CONSTRUCTION PROGRESSES. IF THESE ARE NOT INSTALLED AT THE TIME OF CONSTRUCTION, THE COST OF CUTTING AND PATCHING AT A LATER DATE, WILL BE AT THE EXPENSE OF THIS
- 5.2. THE PRIME MECHANICAL CONTRACTOR IS RESPONSIBLE FOR THE CUTTING AND PATCHING OF ALL HOLES AND OPENINGS UP TO AND INCLUDING 200 mm (8") DIAMETER.
- THE PRIME MECHANICAL CONTRACTOR IS TO LOCATE THE EXACT POSITIONS AND DIMENSIONS OF LARGER OPENINGS FOR CUTTING BY THE GENERAL DIVISION.
- SEAL AROUND SERVICES PASSING THROUGH CUT OPENINGS WITH MATERIALS EQUIVALENT TO THE FIRE RATING OF THE WALL FLOOR OR ROOF. ENSURE SEALING IS WEATHERPROOF FOR OPENINGS THROUGH EXTERIOR WALLS AND ROOFS. PROVIDE ANY PAINTING ON REPAIRED SURFACES IF REQUIRED
- 5.5. PROVIDE SLEEVES FOR ALL NEW PIPING PASSING THROUGH FLOOR AND ROOF SLABS, BEAMS, CONCRETE WALLS AND SLAB TO SLAB PARTITIONS, ETC.
- SEAL TO BE AIR-TIGHT AROUND ALL DUCTWORK AND PIPING PENETRATIONS THROUGH PARTITIONS, BAFFLES ABOVE CEILINGS, AND THROUGH FLOORS THAT ARE NOT FIRE RATED.
- PROVIDE ALL SLEEVES REQUIRED FOR DUCTWORK, PIPING AND ACCESS OPENINGS.
- FOR INTERIOR WALLS, EXTERIOR WALLS ABOVE GRADE, NON WATERPROOF FLOORS, PROVIDE SCHEDULE 40 STEEL PIPE, MEDIUM CAST IRON OR 18 GAUGE GALVANIZED STEEL.

COMMISSIONING AND CLOSEOUT

- 6.1. CONTRACTOR SHALL PROVIDE COMMISSIONING AND REPORT FOR ALL THE NEW EQUIPMENT AND ANY ON—SITE TRAINING REQUIRED FOR OPERATION.
- 6.2. CLEAN ALL EQUIPMENT AND THE OVERALL INSTALLATION. FOLLOW INITIAL MAINTENANCE INSTRUCTIONS FROM THE MANUFACTURER.
- GUARANTEE IN WRITING FOR THE MATERIAL AND WORKMANSHIP INCLUDING THE MANUFACTURER'S GUARANTEE FOR THE PERIOD OF ONE (1) YEAR FROM THE DATE OF ACCEPTANCE.
- PROVIDE ALL DOCUMENTATION REQUIRED CLOSEOUT DOCUMENTATION (AIR/WATER BALANCE REPORT, NFPA 13 COMPLIANCE LETTER, TEST CERTIFICATES, ETC.) PRIOR TO PROJECT CLOSEOUT & CLOSE OF BUILDING PERMIT.
- 6.5. CERTIFY IN WRITING FOR ALL WORK HAS BEEN COMPLETED IN ACCORDANCE WITH THE SPECIFICATIONS AND DRAWINGS.
- SUBMIT TO TENANT & LANDLORD OPERATIONS & MAINTENANCE MANUALS FOR EACH PIECE OF EQUIPMENT PROVIDED UNDER THIS CONTRACT. OPERATION & MAINTENANCE MANUALS SHALL INCLUDE DATA SHEETS, BROCHURES, MAINTENANCE INFORMATION, RECOMMENDED SPARE PARTS LISTS, LUBRICATION
- INSTRUCTIONS, & START-UP CERTIFICATES. SUBMIT TO TENANT & LANDLORD A REVIEWED SET OF ALL SHOP DRAWINGS CLEARLY MARKED WITH "REVIEWED" BY THE INSTALLING CONTRACTOR & THE
- TENANT ENGINEER.
- SUBMIT TO TENANT & LANDLORD A COMPLETE SET OF AS-BUILT RECORD DRAWINGS. AS-BUILT DRAWINGS SHALL BE PREPARED USING CAD SOFTWARE (I.E. AUTOCAD) & SUBMITTED IN DIGITAL PDF & DWG FORMATS, AND AS A HARD COPY TO EACH THE TENANT & THE LANDLORD. SCANNED REDLINE MARKED-UP DRAWINGS ARE NOT ACCEPTABLE

FIRE EXTINGUISHERS

- 7. CODES AND STANDARDS: FIRE EXTINGUISHERS ARE TO BE IN ACCORDANCE WITH THE FOLLOWING CODES AND STANDARDS:
- NATIONAL FIRE CODE OF CANADA: NFPA 10, STANDARD FOR PORTABLE FIRE EXTINGUISHERS;
- CAN/ULC-S508-02 (INCLUDING AMENDMENTS 1 AND 2), STANDARD FOR THE RATING AND FIRE TESTING OF FIRE EXTINGUISHERS.

GENERAL

- 8.1. ALL FIRE EXTINGUISHERS ARE TO BE PRESSURIZED (STORED PRESSURE) RECHARGEABLE TYPE, IN ACCORDANCE WITH NFPA 10, AND UL AND/OR ULC LISTED AND LABELLED FOR THE CLASS OF FIRES AND HAZARD LOCATIONS FOR WHICH THEY ARE SPECIFIED. EACH EXTINGUISHER IS TO BE COMPLETE WITH:
- 8.2.1. A MANUFACTURER'S IDENTIFICATION LABEL INDICATING THE EXTINGUISHER MODEL NUMBER, RATING, AND OPERATING INSTRUCTIONS; AN ANODIZED ALUMINUM OR CHROME PLATED FORGED BRASS VALVE WITH POSITIVE SQUEEZE GRIP ON-OFF OPERATION AND A PULL-PIN
- SAFETY LOCK: 8.2.3. DISCHARGE HOSE WITH NOZZLE OR HORN AND HOSE SECURING CLIP:

8.2.4. FOR WALL MOUNTED EXTINGUISHERS, A WALL MOUNTING BRACKET.

- 9. INSTALLATION OF FIRE EXTINGUISHERS
- 9.1. PROVIDE FIRE EXTINGUISHERS OF TYPE(S) IN ACCORDANCE WITH REQUIREMENTS OF NFPA 10.
- UNLESS OTHERWISE SHOWN OR SPECIFIED, WALL MOUNT EXTINGUISHERS USING WALL BRACKETS SUPPLIED WITH EXTINGUISHERS.
- DO NOT INSTALL EXTINGUISHERS UNTIL AFTER WALL FINISHING WORK IS COMPLETE.
- BE RESPONSIBLE FOR MAINTAINING FIRE EXTINGUISHERS UNTIL SUBSTANTIAL COMPLETION OF THE WORK. 9.5. IF EXTINGUISHERS ARE INDICATED ADJACENT TO A DOOR, LOCATE EXTINGUISHERS AT THE STRIKE SIDE OF THE DOOR.

DOMESTIC WATER PIPING AND VALVES

10. DOMESTIC WATER PIPING AND VALVES ARE TO COMPLY WITH FOLLOWING CODES, REGULATIONS AND STANDARDS (AS APPLICABLE):

COMPLETE WITH BRASS INSERTS AND CRIMP—RING OR COLD—EXPANSION JOINT FITTINGS AND COUPLINGS.

HANDLE. VALVES IN INSULATED PIPING ARE TO BE COMPLETE WITH STEM EXTENSIONS. ACCEPTABLE PRODUCTS ARE:

- 10.1. APPLICABLE LOCAL CODES AND REGULATIONS;
- 10.2. CAN/CSA B125.1, PLUMBING SUPPLY FITTINGS;
- 10.3. CAN/CSA B125.3, PLUMBING FITTINGS; 10.4. CAN/CSA B137 SERIES, THERMOPLASTIC PRESSURE PIPING COMPENDIUM;
- 10.5. NSF/ANSI 14, PLASTICS PIPING SYSTEM COMPONENTS AND RELATED MATERIALS;
- 10.6. NSF/ANSI 61, DRINKING WATER SYSTEM COMPONENTS HEALTH EFFECTS; 10.7. NSF/ANSI 372, DRINKING WATER SYSTEM COMPONENTS - LEAD CONTENT.
- 11. PIPE, FITTINGS AND JOINTS
- 11.1. SOFT COPPER: TYPE "K" SOFT COPPER TO ASTM B88, SUPPLIED IN A CONTINUOUS COIL WITH NO JOINTS IF POSSIBLE, AND COMPLETE WITH, IF JOINTS
- ARE REQUIRED. COMPRESSION TYPE FLARED JOINT COUPLINGS. COPPER PRESSURE COUPLED JOINT: TYPE "L" HARD DRAWN SEAMLESS COPPER TO ASTM B88 WITH "PROPRESS WITH SMART CONNECT FEATURE" COPPER FITTINGS WITH EDPM SEALS, AND PRESSURE TYPE CRIMPED JOINTS MADE BY USE OF A RIGID TOOL CO. MODEL RP 330 OR MODEL RP 210
- ELECTRO-HYDRAULIC CRIMPING TOOL. 11.3. SEMI-RIGID POLYETHYLENE TUBING: VERSA FITTINGS AND MFG. INC. 1/2" DIA., HIGH DENSITY, SEMI-RIGID POLYETHYLENE TUBING, 200 PSI RATED. 11.4. CROSS-LINKED POLYETHYLENE (PEX) TUBING: NON-BARRIER TYPE PEX PIPING IN ACCORDANCE WITH CAN/CSA B137.5, ASTM F876 AND TESTED FOR COMPLIANCE BY AN INDEPENDENT THIRD-PARTY AGENCY, 25/50 FLAME SPREAD/SMOKE DEVELOPED RATED WHEN TESTED TO CAN/ULC S102.2 AND
- 12. SHUT-OFF VALVES:
- BALL VALVES: CLASS 600, 600 PSI WOG RATED FULL PORT BALL TYPE VALVES, EACH COMPLETE WITH A FORGED BRASS BODY WITH SOLDER ENDS, FORGED BRASS CAP, AND BLOWOUT-PROOF STEM, SOLID FORGED BRASS CHROME PLATED BALL, "TEFLON" OR "PTFE" SEAT, AND A REMOVABLE LEVER
 - 12.1.1. TOYO VALVE CO. FIG. 5049A: 12.1.2. MILWAUKEE VALVE CO. #BA-155;
 - 12.1.3. KITZ CORPORATION CODE 59;
 - 12.1.4. APOLLO VALVES # 77-200; 12.1.5. WATTS INDUSTRIES (CANADA) INC. #FBVS-3.
- 13. CHECK VALVES 13.1. HORIZONTAL: CLASS 125, BRONZE 200 PSI WOG RATED HORIZONTAL SWING TYPE CHECK VALVES WITH SOLDER ENDS. ACCEPTABLE PRODUCTS ARE:
 - 13.1.1. TOYO VALVE CO. FIG. 237; 13.1.2. MILWAUKEE VALVE CO. #1510;
- 13.1.3. KITZ CORPORATION CODE 23;
- 13.1.4. APOLLO VALVES # 61-600. 13.2. VERTICAL: EQUAL TO KITZ CORP. CODE 26, BRONZE, 250 PSI WOG RATED VERTICAL LIFT CHECK VALVE WITH SOLDERING ENDS.

- MINIMUM 300 PSI WATER RATED, 3/4" DIA., STRAIGHT PATTERN FULL PORT BRONZE BALL VALVES, EACH COMPLETE WITH A THREADED OUTLET
- SUITABLE FOR COUPLING CONNECTION OF 3/4" DIA. GARDEN HOSE, AND A CAP AND CHAIN. ACCEPTABLE PRODUCTS ARE: 14.1.1. TOYO VALVE CO. FIG. 5046;
- 14.1.2. DAHL BROTHERS CANADA LTD. FIG. NO. 50. 430;
- 14.1.3. KITZ CORPORATION CODE 58CC;
- 14.1.4. APOLLO VALVES # 78-104-01; 14.1.5. WATTS INDUSTRIES (CANADA) INC. #B6000-CC.

15. PIPING INSTALLATION REQUIREMENTS

- PROVIDE ALL REQUIRED DOMESTIC WATER PIPING.
- 15.2. PIPING, UNLESS OTHERWISE SPECIFIED, IS TO BE AS FOLLOWS: 15.2.1. FOR UNDERGROUND PIPING LESS THAN 100 MM (4") DIA. INSIDE BUILDING - TYPE "K" SOFT COPPER;
- 15.2.2. FOR 12 MM (½") DIA. TRAP SEAL PRIMER TUBING LOCATED UNDERGROUND OR IN CONCRETE OR MASONRY CONSTRUCTION -SEMI-RIGID POLYETHYLENE:
- FOR PIPE INSIDE BUILDING AND ABOVEGROUND IN SIZES TO 100 MM (4") DIA., EXCEPT IN VERTICAL SHAFTS AND THROUGH FIRE BARRIERS RIGID CPVC: FOR BRANCH HOT AND COLD PIPING ABOVEGROUND FROM MAINS AND RISERS TO FIXTURES, FITTINGS, AND EQUIPMENT WHERE FIRE RATED
- CONSTRUCTION IS NOT PENETRATED -AT YOUR OPTION, PEX TUBING INSTALLED AND JOINED IN STRICT ACCORDANCE WITH MANUFACTURERS 15.2.5. FOR UNDERGROUND PIPING OUTSIDE BUILDING TO FIXTURES/OUTLETS AT GRADE LEVEL -FLEXIBLE POLYETHYLENE, SNAKED IN THE TRENCH AND
- IN A CONTINUOUS LENGTH WHEREVER POSSIBLE; 15.2.6. FOR PIPE INSIDE BUILDING AND ABOVEGROUND IN SIZES TO 100 MM (4") DIA. -TYPE "L" HARD COPPER WITH SOLDER JOINTS OR TYPE "L"
- 16. INSTALLATION OF DOMESTIC HOT WATER THERMOSTATIC MIXING VALVES

HARD COPPER WITH PRESSURE COUPLED MECHANICAL JOINTS

- 16.1. PROVIDE A DOMESTIC HOT WATER THERMOSTATIC MIXING VALVE ASSEMBLY AND WALL MOUNT. 16.2. ADJUST EACH VALVE TO DESIGN REQUIREMENTS AND CHECK AND TEST OPERATION. SET MAXIMUM TEMPERATURE LIMIT STOPS.
- 16.3. IDENTIFY EACH VALVE AND ITS WATER TEMPERATURE DELIVERY SETTING WITH AN ENGRAVED NAMEPLATE.
- 17. FLUSHING AND DISINFECTING PIPING 17.1. FLUSH AND DISINFECT ALL NEW AND/OR REWORKED DOMESTIC WATER PIPING AFTER LEAKAGE TESTING IS COMPLETE.

DRAINAGE, WASTE & VENT PIPING & VALVES

- 18. DRAIN AND VENT PIPING INSTALLATION REQUIREMENTS
- 18.1. PROVIDE ALL REQUIRED DRAINAGE AND VENT PIPING. PIPE, UNLESS OTHERWISE SPECIFIED, IS TO BE AS FOLLOWS:
- FOR UNDERGROUND PIPE INSIDE BUILDING AND TO POINTS 1.5 M (5') OUTSIDE BUILDING LINES -RIGID PVC SEWER PIPE, MINIMUM 75 MM (3")
- 18.1.2. FOR PIPE INSIDE BUILDING AND ABOVEGROUND IN SIZES LESS THAN OR EQUAL TO 65 MM (2-1/2") DIA. -TYPE DWV COPPER;
- 18.1.3. FOR PIPE INSIDE BUILDING AND ABOVEGROUND IN SIZES GREATER THAN OR EQUAL TO 75 MM (3") DIA. -CLASS 4000 CAST IRON;
- FOR PIPE INSIDE BUILDING AND ABOVEGROUND IN LIEU OF TYPE DWV COPPER AND CAST IRON, AT YOUR OPTION AND WHERE PERMITTED BY GOVERNING CODES AND REGULATIONS -RIGID PVC DWV; FOR DRAINAGE PUMP DISCHARGE PIPE CONNECTIONS FROM PUMP TO AND INCLUDING SHUT-OFF AND CHECK VALVE CONNECTIONS -TYPE "DWV"
- 18.2. UNLESS OTHERWISE SPECIFIED, SLOPE HORIZONTAL DRAINAGE PIPING ABOVEGROUND IN SIZES TO AND INCLUDING 75 MM (3") DIA. 25 MM (1") IN 1.2 M

COPPER WITH VICTAULIC "COPPER CONNECTION" FITTINGS AND COUPLINGS, OR SCHEDULE 40 GALVANIZED STEEL WITH VICTAULIC FITTINGS AND

- (4'), AND PIPE 100 MM (4") DIA. AND LARGER 25 MM (1") IN 2.4 M (8'). 18.3. INSTALL AND SLOPE UNDERGROUND DRAINAGE PIPING TO INVERTS OR SLOPES INDICATED ON DRAWINGS TO FACILITATE STRAIGHT AND TRUE GRADIENTS BETWEEN POINTS SHOWN. VERIFY AVAILABLE SLOPES BEFORE INSTALLING PIPES.
- 18.4. UNLESS OTHERWISE SPECIFIED, SLOPE HORIZONTAL BRANCHES OF VENT PIPING DOWN TO FIXTURE OR PIPE TO WHICH THEY CONNECT WITH A MINIMUM PITCH OF 25 MM (1") IN 1.2 M (4').
- 18.5. EXTEND VENT STACKS UP THROUGH ROOF GENERALLY WHERE SHOWN BUT WITH EXACT LOCATIONS TO SUIT SITE CONDITIONS AND IN ANY CASE A MINIMUM OF 3 M (10') FROM FRESH AIR INTAKES. TERMINATE VENT STACKS A MINIMUM OF 330 MM (13") ABOVE ROOF (INCLUDING ROOF PARAPETS) IN VENT STACK COVERS. WHERE NOT SHOWN ON DRAWINGS, ROUTE VENT PIPING FROM SOURCE TO BUILDING EXTERIOR AS REQUIRED IN ORDER TO SATISFY LOCAL GOVERNING CODES AND AUTHORITY. COORDINATE VENT ROUTING WITH OTHER BUILDING SERVICES AND ENSURE THERE IS NO ARCHITECTURAL
- 18.6. PROVIDE CAST BRASS DIELECTRIC UNIONS AT CONNECTIONS BETWEEN COPPER PIPE AND FERROUS PIPE OR EQUIPMENT.

ELECTRIC DOMESTIC WATER HEATERS

- 19. POINT-OF-USE ELECTRIC HOT WATER STORAGE TANK AND HEATER
- 19.1. ULC LISTED AND CSA CERTIFIED ELECTRIC HOT WATER HEATER WITH MODEL NUMBER AND PERFORMANCE AS SPECIFIED ON DRAWINGS, AND COMPLETE
- 19.1.1. 1035 KPA (150 PSI) RATED (WORKING PRESSURE) STEEL TANK, GLASS LINED, POLYURETHANE FOAM INSULATED, COVERED WITH AN ENAMELLED STEEL JACKET WITH ACCESS PANEL, AND EQUIPPED WITH A BOTTOM HOSE END DRAIN COCK;
- IMMERSION HEATING ELEMENT IMBEDDED IN MAGNESIUM OXIDE AND SEALED IN A SEAMLESS COPPER TUBE;
- 19.1.3. SACRIFICIAL ANODE ROD; SURFACE MOUNTED ADJUSTABLE THERMOSTAT AND A HIGH TEMPERATURE SAFETY CUT-OUT; ASME RATED TEMPERATURE AND PRESSURE RELIEF VALVE;
- 19.1.6. ROUND GALVANIZED STEEL AUXILIARY CATCH PAN WITH DRAIN HOLE AND CONNECTION SPIGOT.
- 19.2.1. RHEEM CANADA LTD.; 19.2.2. JOHN WOOD (GSW WATER HEATING CO.);
- 19.2.3. SMITH WATER PRODUCTS CO.;
- 19.2.4. BRADFORD WHITE CANADA INC.; 19.2.5. PVI;

19.2. ACCEPTABLE MANUFACTURERS ARE:

- 19.2.6. RBI WATER HEATERS.
- 19.3. INSTALLATION OF POINT-OF-USE ELECTRIC HOT WATER STORAGE TANK AND HEATER
- 19.3.1. PROVIDE A POINT-OF-USE DOMESTIC HOT WATER HEATER. 19.3.2. PROVIDE A WALL BRACKET (SUPPLIED BY THE HEATER MANUFACTURER) FOR HEATER MOUNTING AND RIGIDLY SECURE IN PLACE.
- 19.3.3. MOUNT HEATER IN A CATCH PAN AND:
- 19.3.4. PIPE TEMPERATURE/PRESSURE RELIEF VALVE OUTLET TO DRAIN; PIPE AUXILIARY CATCH PAN TO DRAIN; 19.3.5.
- COORDINATE INSTALLATION WITH ELECTRICAL TRADE WHO WILL CONNECT HEATER WITH POWER WIRING;
- 19.3.7. CHECK AND TEST HEATER OPERATION AND, UNLESS OTHERWISE SPECIFIED OR INSTRUCTED, SET THERMOSTAT TO PRODUCE 48.8°C (120°F) HOT

DRAINAGE WASTE PIPING SPECIALTIES

- 20. SUBMITTALS
- 20.1. SHOP DRAWINGS/PRODUCT DATA: SUBMIT SHOP DRAWINGS/PRODUCT DATA SHEETS FOR ALL PRODUCTS SPECIFIED IN THIS SECTION.
- 21.1. HORIZONTAL PIPING: TY PIPE FITTING WITH AN EXTRA HEAVY BRASS PLUG SCREWED INTO THE FITTING.
- 21.2. VERTICAL PIPING: BRONZE OR COPPER CLEANOUT TEES IN COPPER PIPING, EACH COMPLETE WITH A BRONZE FERRULE, AND, FOR CAST IRON PIPING, "BARRETT" TYPE CAST IRON CLEANOUT TEES, EACH GAS AND WATER-TIGHT AND COMPLETE WITH A BOLTED COVER.
- 22. FLOOR CLEANOUT TERMINATIONS 22.1. FACTORY FINISHED CAST IRON TERMINATIONS, EACH ADJUSTABLE AND COMPLETE WITH A CAST IRON BODY WITH NEOPRENE SLEEVE, SOLID, GASKETED,
 - POLISHED NICKEL-BRONZE SCORIATED TOP ACCESS COVER TO SUIT THE FLOOR FINISH, A SEAL PLUG, AND CAPTIVE, VANDAL-PROOF, STAINLESS STEEL SECURING HARDWARE. ACCEPTABLE PRODUCTS ARE:
 - 22.1.1. WATTS INDUSTRIES (CANADA) LTD.;
 - 22.1.2. JAY R. SMITH MANUFACTURING CO.; ZURN INDUSTRIES LTD.; 22.1.3.
 - 22.1.4. MIFAB INC. 22.2. ALL CLEANOUT TERMINATIONS IN AREAS WITH A TILE OR SHEET VINYL FLOOR FINISH ARE TO BE AS ABOVE BUT WITH A SQUARE TOP IN LIEU OF A
- 23. FLOOR DRAINS, FUNNEL FLOOR DRAINS AND HUB DRAINS 23.1. UNLESS OTHERWISE SPECIFIED OR SCHEDULED, FLOOR DRAINS AND FUNNEL FLOOR DRAINS ARE TO BE VANDAL-PROOF DRAINS IN ACCORDANCE WITH
- THE DRAWING SCHEDULE, EACH COMPLETE WITH A CAST IRON BODY AND A TRAP SEAL PRIMER CONNECTION. ALL CAST IRON COMPONENTS ARE TO BE FACTORY FINISHED WITH LATEX BASED PAINT COATING. 23.2. ALL FLOOR DRAINS IN AREAS WITH A TILE OR SHEET VINYL FLOOR FINISH ARE TO BE AS ABOVE BUT WITH A SQUARE GRATE IN LIEU OF A ROUND
- 23.3. ACCEPTABLE MANUFACTURERS ARE:
- 23.3.1. WATTS INDUSTRIES (CANADA) LTD. 23.3.2. JAY R. SMITH MANUFACTURING CO.;
- 23.3.3. ZURN INDUSTRIES LTD.;
- 23.3.4. MIFAB INC.
- 24. INSTALLATION OF CLEANOUTS
- 24.1. PROVIDE CLEANOUTS IN DRAINAGE PIPING IN LOCATIONS AS FOLLOWS: 24.1.1. IN THE BUILDING DRAIN OR DRAINS AS CLOSE AS POSSIBLE TO THE INNER FACE OF THE OUTSIDE WALL, AND, IF A BUILDING TRAP IS
 - INSTALLED, LOCATE THE CLEANOUT ON THE DOWNSTREAM SIDE OF THE BUILDING TRAP;
- 24.1.2. AT OR AS CLOSE AS PRACTICABLE TO THE FOOT OF EACH DRAINAGE STACK; 24.1.3. AT MAXIMUM 50' INTERVALS IN HORIZONTAL PIPE 4" DIA. AND SMALLER;
- 24.1.4. AT MAXIMUM 100' INTERVALS IN HORIZONTAL PIPE LARGER THAN 4" DIA.;
- 24.1.5. WHEREVER ELSE SHOWN ON DRAWINGS. 24.2. CLEANOUTS ARE TO BE SAME DIAMETER AS PIPE IN PIPING TO 100 MM (4") DIA., AND NOT LESS THAN 100 MM (4") DIA. IN PIPING LARGER THAN 100
- 24.3. WHERE CLEANOUTS IN VERTICAL PIPING ARE CONCEALED BEHIND WALLS OR PARTITIONS, INSTALL CLEANOUTS NEAR FLOOR AND SO COVER IS WITHIN 25 MM (1") OF THE FINISHED FACE OF THE WALL OR PARTITION.
- 25. INSTALLATION OF FLOOR CLEANOUT TERMINATIONS 25.1. WHERE CLEANOUTS OCCUR IN HORIZONTAL INACCESSIBLE UNDERGROUND PIPING, EXTEND THE CLEANOUT TY FITTING UP TO THE FLOOR, AND PROVIDE A
- CLEANOUT TERMINATION SET FLUSH WITH THE FINISHED FLOOR. IN WATERPROOF FLOORS, ENSURE THAT EACH CLEANOUT TERMINATION IS EQUIPPED WITH A FLASHING CLAMP DEVICE. CLEANOUT TERMINATIONS ARE TO SUIT THE FLOOR FINISH.

25.3. WHERE CLEANOUT TERMINATIONS OCCUR IN FINISHED AREAS, CONFIRM LOCATIONS PRIOR TO ROUGH-IN AND ARRANGE PIPING TO SUIT.

- 25.4. ENSURE THAT CLEANOUT TERMINATION COVERS IN TILED FLOOR ARE SQUARE IN LIEU OF ROUND. 26. INSTALLATION OF FLOOR DRAINS, FUNNEL FLOOR DRAINS AND HUB DRAINS
- 26.1. PROVIDE FLOOR DRAINS, FUNNEL FLOOR DRAINS AND HUB DRAINS. 26.2. COORDINATE LOCATION OF FLOOR DRAINS, FUNNEL FLOOR DRAINS AND HUB DRAINS WITH EQUIPMENT PROVIDED BY MECHANICAL DIVISION AND OWNER'S
- SUPPLIED EQUIPMENT. INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. 26.3. EQUIP EACH DRAIN WITH A TRAP. 26.4. IN EQUIPMENT ROOMS AND SIMILAR AREAS, EXACTLY LOCATE FLOOR DRAINS TO SUIT THE LOCATION OF MECHANICAL EQUIPMENT AND EQUIPMENT
- INDIRECT DRAINAGE PIPING. IN WASHROOMS, EXACTLY LOCATE FLOOR DRAINS TO AVOID INTERFERENCE WITH TOILET PARTITIONS. CONFIRM THE EXACT LOCATION OF DRAINS PRIOR TO ROUGHING IN. WHERE FLOOR DRAINS OCCUR IN WASHROOMS COORDINATE LOCATIONS WITH TOILET PARTITION INSTALLATIONS. 26.6. TEMPORARILY PLUG AND COVER FLOOR DRAINS DURING CONSTRUCTION PROCEDURES. REMOVE PLUGS AND COVERS DURING FINAL CLEANUP WORK AND

- PLUMBING FIXTURES AND FITTINGS
- 27. GENERAL RE: PLUMBING FIXTURES AND FITTINGS 27.1. FIXTURES AND FITTINGS, WHERE APPLICABLE, ARE TO BE IN ACCORDANCE WITH REQUIREMENTS OF CAN/CSA B45 SERIES, GENERAL REQUIREMENTS FOR

WHEN REQUESTED, DEMONSTRATE FREE AND CLEAR OPERATION OF EACH DRAIN. REPLACE ANY DAMAGED GRATES, AND REFINISH ANY AREAS OF THE

PLUMBING FIXTURES, INCLUDING SUPPLEMENTS, ASME A112.1.18.1/CSA B125.1, PLUMBING SUPPLY FITTINGS, AND CSA B125.3, PLUMBING FITTINGS. 27.2. BARRIER-FREE FIXTURES AND FITTINGS ARE TO BE IN ACCORDANCE WITH GOVERNING CODE REQUIREMENTS.

DRAIN WHERE THE CAST IRON FINISH HAS BEEN DAMAGED OR REMOVED, INCLUDING RUSTED AREAS.

27.3. UNLESS OTHERWISE SPECIFIED, VITREOUS CHINA, PORCELAIN ENAMELLED, AND ACRYLIC FINISHED FIXTURES ARE TO BE WHITE.

27.4. UNLESS OTHERWISE SPECIFIED, FITTINGS AND PIPING EXPOSED TO VIEW ARE TO BE CHROME PLATED AND POLISHED.

- 27.5. FITTINGS LOCATED IN AREAS OTHER THAN PRIVATE WASHROOMS ARE TO BE VANDAL-PROOF.
- 27.6. FIXTURE CARRIERS ARE TO BE SUITABLE IN ALL RESPECTS FOR THE FIXTURE THEY SUPPORT AND CONSTRUCTION IN WHICH THEY ARE LOCATED.

27.7. FLOOR FLANGES FOR FLOOR MOUNTED WATER CLOSETS ARE TO BE CAST IRON OR BRASS, SECURED TO FLOOR TO PREVENT MOVEMENT AND COMPLETE

- WITH A WAX SEAL AND BRASS OR STAINLESS STEEL BOLTS, NUTS, AND WASHERS. PLASTIC FLOOR FLANGES WILL NOT BE ACCEPTABLE. 27.8. PROPER SEAL TO MATE WITH FIXTURE CARRIER FLANGE AND PRODUCE A WATER-TIGHT INSTALLATION.
- 27.9. EXPOSED TRAPS FOR FIXTURES NOT EQUIPPED WITH INTEGRAL TRAPS, SUCH AS LAVATORIES, ARE TO BE ADJUSTABLE CHROME PLATED CAST BRASS "P" TRAPS WITH CLEANOUTS, MINIMUM #17 GAUGE CHROME PLATED TUBULAR EXTENSIONS, AND CHROME PLATED ESCUTCHEONS, ALL TO SUIT FIXTURE TYPE AND DRAIN CONNECTION.

27.10. CONCEALED TRAPS FOR FIXTURES NOT EQUIPPED WITH INTEGRAL TRAPS, SUCH AS COUNTER SINKS, ARE TO BE ADJUSTABLE CAST BRASS WITH

27.11. EXPOSED SUPPLIES FOR FIXTURES WHICH DO NOT HAVE SUPPLY TRIM/FITTINGS WITH INTEGRAL STOPS, I.E. LAVATORIES, ARE TO BE SOLID CHROME PLATED BRASS ANGLE VALES WITH SCREWDRIVER STOPS FOR PUBLIC AREAS, WHEEL HANDLE STOPS FOR PRIVATE AREAS, FLEXIBLE STAINLESS STEEL RISERS, AND STAINLESS STEEL OR CHROME PLATED STEEL ESCUTCHEONS, ALL ARRANGED AND SIZED TO SUIT FIXTURE.

27.12. WATER PIPING AS SPECIFIED, COMPLETE WITH BALL TYPE SHUT-OFF VALVES AS SPECIFIED WITH WATER PIPING, OR DAHL BROS. CANADA LTD. 1/4 TURN

MINI BALL VALVES.

BASEBOARD HEATERS

- 28. DIMPLEX, "BN-ELITE PRO" SERIES, CSA APPROVED, STANDARD WATT DENSITY ELECTRIC BASEBOARD HEATERS AS SIZED ON DRAWINGS, EACH COMPLETE WITH FOLLOWING FEATURES:
- 28.1. CONSTRUCTION -CONTOURED FRONT AND TOP CONSTRUCTED OF EXTRUDED ALUMINIUM WITH FRONT AIR INTAKE AND EXHAUST VENTS; LARGE REAR ENTRY JUNCTION BOXES ON BOTH SIDES; KNOCKOUTS FOR POWER CONNECTION;
- 28.2. ELEMENTS STAINLESS STEEL SHEATH ENCLOSING A NICKEL CHROMIUM FINNED TUBULAR ELEMENT; ALUMINUM FINS; 28.3. FINISH - HYBRID POLYESTER EPOXY POWDER COAT, TO CONSULTANT'S DIRECTION;
- 28.4. THERMOSTAT ADJUSTABLE, INTEGRAL, TAMPERPROOF, 7°C 30°C (45°F 85°F) RANGE; 28.5. FULL LENGTH AUTOMATIC OVERHEAT PROTECTION;

CLEANOUT PLUGS, ALL TO SUIT FIXTURE TYPE AND DRAIN CONNECTION.

NATURAL GAS PIPING SYSTEM

- 29.1. SUBMIT SHOP DRAWINGS/PRODUCT DATA FOR ALL PRODUCTS SPECIFIED IN PART 2 OF THIS SECTION EXCEPT FOR PIPE, FITTINGS, AND UNIONS. INDICATE PERFORMANCE CRITERIA, CONFORMANCE TO APPROPRIATE REFERENCE STANDARDS, AND LIMITATIONS.
- 30.1. ALL GAS SYSTEM WORK IS TO BE IN ACCORDANCE WITH REQUIREMENTS OF CAN/CSA-B149.1, NATURAL GAS AND PROPANE INSTALLATION CODE, AS
- AMENDED BY LOCAL GAS CODES. 30.2. ALL GAS SYSTEM WORK IS TO BE PERFORMED ONLY BY LICENSED GAS PIPE FITTERS (HOLDING GAS TECHNICIAN 1 CERTIFICATE) AUTHORIZED UNDER THE

MUNICIPALITY OF CASSELMAN

CLIENT

PROJECT NORTH

IT IS THE RESPONSIBILITY OF THE APPROPRIATE CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON SITE AND PROMPTLY REPORT ALL ERRORS AND/OR OMISSIONS TO THE CONSULTANT

DESCRIPTION

ISSUED FOR 99% COORDINATION

ISSUED FOR 66% COORDINATION

2023-05-12

DATE

ALL WORK IS TO FOLLOW THE OBC 2012 AND ANY OTHER APPLICABLE CODES AND REGULATIONS.

BEFORE WORK COMMENCES.

DO NOT SCALE DRAWINGS.

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PROJECT

BUILDINGS • EARTH & ENVIRONMENT • ENERGY •

INDUSTRIAL
 INFRASTRUCTURE
 SUSTAINABILITY

1 INDUSTRIEL STREET

OFFICE FIT-UP

DRAWING

DRAWING No:

MECHANICAL **SPECIFICATIONS**

MRK-23002008-A0 M. OMAR JUNE 2023 APPROVED AS SHOWN B. BROWN

30.3. APPLY FOR, ON TSSA FORMS, APPROVAL OF THE GAS SYSTEM DESIGN BY THE TSSA PRIOR TO WORK BEGINNING AT THE SITE AND PRIOR TO ORDERING ANY EQUIPMENT. SUBMIT THE COMPLETED TSSA FORM AND COPIES OF SHOP DRAWINGS/PRODUCT DATA SHEETS AS REQUIRED TO THE TSSA AND OBTAIN AN APPROVAL CERTIFICATE, PAY ALL COSTS FOR THE TSSA REVIEW AND APPROVAL PROCESS. IF THE TSSA REQUIRES REVISIONS TO THE SYSTEM AND THE REVISIONS RESULT IN AN EXTRA COST, A NOTICE OF CHANGE WILL BE ISSUED BY THE CONSULTANT FOR THE REVISION.

31. PIPE, FITTINGS AND JOINTS

31.1. FOR UNDERGROUND PIPING

31.1.1. COATED BLACK STEEL - WELDED JOINTS: "YELLOW JACKET" SCHEDULE 40 MILD BLACK CARBON STEEL, ASTM A53, GRADE B, FACTORY COATED WITH YELLOW PLASTIC, MILL OR SITE BEVELLED, AND COMPLETE WITH FORGED STEEL BUTT WELDING FITTINGS AND WELDED JOINTS. ALL BARE METAL SURFACES ARE TO BE CLEANED AND CORROSION PROTECTED WITH A SUITABLE DENSO PRIMER AND TAPE CORROSION PROTECTION

31.1.2. POLYETHYLENE: SAFETY YELLOW COLOURED POLYETHYLENE PIPE, FITTINGS, AND JOINTS TO CSA-B137.4.

COATED COPPER: TYPE "K" SOFT TEMPER COPPER WITH A FACTORY APPLIED EXTERNAL YELLOW PLASTIC COATING AND FLARE FITTINGS WITH FORGED BRASS NUTS TO CAN/CSA-B149.1. NUTS ARE TO BE STAMPED WITH THE DESIGNATION C37700 TO INDICATE THAT THEY ARE FORGED

31.2. FOR PIPING ABOVE GROUND:

31.2.1. UNCOATED BLACK STEEL - SCREWED JOINTS: SCHEDULE 40 MILD BLACK CARBON STEEL, ASTM A53, GRADE B, COMPLETE WITH MALLEABLE

CAST IRON SCREWED FITTINGS TO ANSI B2.1. AND SCREWED JOINTS. UNCOATED BLACK STEEL - WELDED JOINTS: SCHEDULE 40 MILD BLACK CARBON STEEL, ASTM A53, GRADE B, MILL OR SITE BEVELLED, COMPLETE WITH FACTORY MADE FORGED STEEL BUTT WELDING FITTINGS AND WELDED JOINTS.

COPPER-UNCOATED: TYPE "G" SEAMLESS COPPER TUBING TO ASTM B837, HARD TEMPER WITH WROUGHT COPPER CAPILLARY BRAZED JOINT TYPE FITTINGS TO ASTM B.61, AND BRAZED JOINTS MADE WITH "SIL-FOS" OR "SIL-FOS 5" BRAZING ALLOY, OR, SOFT TEMPER WITH FLARED BRASS FITTINGS OF A SINGLE 45° FLARE TYPE, FORGED OR WITH A MACHINED LONG NUT AND COPPER TO COPPER THREADED CONNECTORS,

32. PIPING UNIONS

32.1. SCREWED PIPING: MALLEABLE IRON, GROUND JOINT, BRONZE OR BRASS TO IRON OR BRONZE TO BRONZE SEAT SCREWED UNIONS AND UNION ELBOWS

WITH A MINIMUM PRESSURE RATING OF 1725 KPA (250 PSI) STEAM AT 260°C (500°F). FLANGED PIPING: FORGED CARBON STEEL SLIP-ON TYPE RAISED FACED WELDING FLANGE UNIONS TO ASTM A105, 150 LB. CLASS FOR STEEL PIPE, AND SLIP-ON TYPE 150 LB. CLASS BRONZE FLANGES FOR COPPER PIPE.

32.3. COPPER TO STEEL: EQUAL TO KAMCO PRODUCTS "COPPER STOPPER"

AND, WHERE REQUIRED, FLARED BRASS COPPER TO NPS ADAPTERS.

33. EARTHQUAKE ACTIVATED AUTOMATIC SHUT-OFF VALVE

EQUAL TO KAS INTERNATIONAL OR NIHON KOSO MODEL 315 HPF EARTHQUAKE ACTIVATED, FLANGED, HIGH PRESSURE AUTOMATIC SHUT-OFF VALVE SUITABLE FOR BOTH NATURAL GAS AND PROPANE, ULC LISTED AND IN ACCORDANCE WITH ANSI Z21.70, EARTHQUAKE ACTUATED AUTOMATIC GAS

34. SHUT-OFF VALVES

34.1. BALL TYPE: CGA CERTIFIED, MINIMUM 3100 KPA (450 PSI) WOG RATED, 1/4 TURN, FULL PORT NON-LUBRICATED BRASS BALL VALVES, EACH COMPLETE WITH A TEFLON PTFE SEAT, CHROME PLATED SOLID BALL, REMOVABLE LEVER HANDLE, AND SCREWED ENDS. ACCEPTABLE PRODUCTS ARE:

34.1.1. NEO VALVES INC. #425;

34.1.2. KITZ CORP. CODE 58;

34.1.3. TOYO VALVE CO. FIG. 5044A; 34.1.4. FLOWTEK S85.

35. NATURAL GAS CONVENIENCE OUTLET

35.1. NEO VALVES MODEL 3/375 QUICK-CONNECT TYPE CSA CERTIFIED OUTLET WITH INTERLOCKING SAFETY CAM TO PREVENT RELEASE OF THE APPLIANCE CONNECTOR UNTIL THE VALVE IS OFF, INTEGRAL THERMAL PROTECTION TO PREVENT GAS FLOW IF THE OUTLET IS EXPOSED TO TEMPERATURES

EXCEEDING 90°C (195°F), AND A WALL ENCLOSURE BOX. ACCEPTABLE MANUFACTURERS ARE: 35.1.1. NEO VALVES INC.; 35.1.2. FAIRVIEW FITTINGS & MFG. LTD.

PRESSURE REGULATORS

36.1. CSA CERTIFIED PRESSURE REGULATORS AS FOLLOWS: 36.1.1. VENTED TYPE: SPRING-LOADED SELF-OPERATED DESIGN, TIGHT CLOSING, SELECTED FOR THE FACILITY GAS PRESSURE AND PIPING PRESSURE LOSS, AND CONNECTED EQUIPMENT LOAD AT FULL FIRING RATE PLUS 20% SPARE, AND COMPLETE WITH:

1035 KPA (150 PSI) RATED CAST IRON BODY FINISHED WITH CORROSIVE RESISTANT EPOXY ENAMEL;

ALUMINUM DIAPHRAGM AND SPRING CASE WITH NITRILE DIAPHRAGM, DISC, AND BODY O-RING; THROTTLING TYPE, HIGH FLOW RATE, TIGHT SHUT-OFF RELIEF VALVE SELECTED TO PROTECT EQUIPMENT DOWNSTREAM OF THE REGULATOR IN 36.1.1.3. COORDINATION WITH REGULATOR CAPACITY.

36.1.2. ACCEPTABLE MANUFACTURERS ARE: 36.1.2.1. MAXITROL CO.:

36.1.2.2. FISHER CONTROLS;

LESLIE CONTROLS INC.; 36.1.2.3. LAKESIDE PROCESS CONTROLS. 36.1.2.4.

QUALIFICATION RECORD.

EXPANSION LOOPS

PROVIDE FLEXIBLE HOSE EXPANSION LOOP(S) AS INDICATED ON THE CONTRACT DRAWINGS OR AS REQUIRED TO ACCOMMODATE ANY THERMAL

EXPANSION, CONTRACTION, BUILDING SETTLEMENT, OR SEISMIC MOVEMENT OF THE PIPING SYSTEM. FLEXIBLE HOSE EXPANSION LOOPS SHALL BE MANUFACTURED COMPLETE WITH TWO PARALLEL SECTIONS OF CORRUGATED METAL HOUSE, COMPATIBLE BRAID, 180 DEG RETURN BEND, WITH INLET AND OUTLET CONNECTIONS. FIELD FABRICATED LOOPS SHALL NOT BE ACCEPTABLE.

FLEXIBLE LOOPS SHALL BE CAPABLE OF MOVEMENT IN THE $\pm X$, $\pm Y$, AND $\pm Z$ PLANES.

37.4. FLEXIBLE HOSE EXPANSION LOOPS SHALL IMPART NO THRUST LOADS TO SYSTEM SUPPORT, ANCHORS OR BUILDING STRUCTURE. ALL FLEXIBLE HOSE EXPANSION LOOPS SHALL BE MANUFACTURED IN ACCORDANCE WITH THE DOCUMENTED MANUFACTURERS WELD PROCEDURE SPECIFICATIONS. THE PROCEDURE QUALIFICATION RECORD SHALL BE USED TO DOCUMENT THE EXECUTION OF THIS PROCEDURE AND SHALL FOLLOW THE GENERAL "GUIDELINES" OF ASME SECTION IX. EACH INDIVIDUAL WELDER SHALL CONFORM TO THE IN-HOUSE PROCEDURE QUALIFICATION RECORD AND BE QUALIFIED PRIOR TO EACH PRODUCTION LOT. THE TESTING OF EACH INDIVIDUAL WELDER SHALL BE DOCUMENTED IN A WELDING PROCEDURE

37.6.1. FITTINGS SHALL BE STANDARD WEIGHT, CARBON STEEL CONFORMING TO ASTM A234 / ASME B16.9

37.6.2. CORRUGATED HOSE; STAINLESS STEEL, TYPE 321

37.6.3. BRAID; 304 STAINLESS STEEL.

37.6.4. END FITTINGS SHALL CARBON STEEL PLATE FLANGES WITH 150 LB. DRILLING. 37.7. FLEXIBLE HOSE EXPANSION LOOPS FOR FLAMMABLE LIQUID OR GAS SERVICE UP TO 4"SHALL BE CSA / AGA LISTED AND BE IN CONFORMANCE WITH

37.8. FLEXIBLE HOSE EXPANSION LOOPS TO BE "GAS METRALOOP" AS MANUFACTURED BY THE METRAFLEX COMPANY, OR EQUAL.

38. NATURAL GAS SERVICE 38.1. MAKE ALL REQUIRED ARRANGEMENT WITH THE NATURAL GAS SUPPLY UTILITY ON BEHALF OF THE OWNER FOR INSTALLATION OF NATURAL GAS SERVICE

PIPING WITH GAS PRESSURE REGULATOR 38.2. PROVIDE AN EARTHQUAKE ACTIVATED AUTOMATIC SHUT-OFF VALVE IN GAS SERVICE PIPING OUTSIDE THE BUILDING IN ACCORDANCE WITH THE VALVE MANUFACTURER'S INSTALLATION INSTRUCTIONS. PROVIDE AN ANGLE IRON FRAMED WIRE MESH ENCLOSURE AROUND THE VALVE AND BOLTED TO THE

38.3. PROVIDE 2 M (7') HIGH MINIMUM 200 MM (8") DIAMETER SCHEDULE 80 GALVANIZED STEEL CONCRETE FILLED BOLLARDS AT THE METER-REGULATOR LOCATION IN A PATTERN TO PROTECT THE METER-REGULATOR. INSTALL THE PIPE STRAIGHT AND PLUMB A 1.2 M (4') BELOW GRADE IN A CONTINUOUS 600 MM (2') DIAMETER REINFORCED CONCRETE FOOTING. SMOOTHLY CROWN THE TOP OF THE CONCRETE ABOVE THE TOP OF THE PIPE.

39. NATURAL GAS PIPING INSTALLATION REQUIREMENTS

39.1. PROVIDE ALL REQUIRED NATURAL GAS DISTRIBUTION PIPING AND CONNECT GAS FIRED OR OPERATED EQUIPMENT, AND PROVIDE ALL REQUIRED VENT PIPING TO ATMOSPHERE, INCLUDING VENT PIPING FROM PRESSURE REGULATORS. DO ALL PIPING WORK IN ACCORDANCE WITH REQUIREMENTS OF CAN/CSA-B149.1, NATURAL GAS AND PROPANE INSTALLATION CODE, AS AMENDED BY LOCAL GAS CODES.

39.2. PIPING IS TO BE AS FOLLOWS: 39.2.1. FOR UNDERGROUND PIPING, COATED SCHEDULE 40 BLACK STEEL, COATED SOFT COPPER, OR POLYETHYLENE;

FOR ABOVE GROUND PIPING, UNCOATED SCHEDULE 40 BLACK STEEL, HARD TEMPER OR SOFT COPPER, OR, IF PERMITTED, FLEXIBLE STAINLESS 39.2.2.

40. INSTALLATION OF SHUT-OFF VALVES

40.1. PROVIDE CSA APPROVED BALL TYPE OR LUBRICATED PLUG TYPE SHUT-OFF VALVES TO ISOLATE EQUIPMENT, AND WHEREVER ELSE SHOWN.

40.2. ENSURE THAT VALVES ARE LOCATED FOR EASY ACCESSIBILITY AND MAINTENANCE.

41. INSTALLATION OF NATURAL GAS CONVENIENCE OUTLETS 41.1. PROVIDE NATURAL GAS CONVENIENCE OUTLETS AND WALL MOUNT.

41.2. PROVIDE A SHUT-OFF VALVE IN CONNECTING PIPING, CONFIRM EXACT LOCATION PRIOR TO ROUGHING-IN, AND ENSURE THAT THE OUTLET IS RIGIDLY SECURED IN PLACE.

42. INSTALLATION OF PRESSURE REGULATORS

42.1. PROVIDE PRESSURE REGULATORS IN GAS DISTRIBUTION PIPING WHERE INDICATED AND/OR REQUIRED.

42.2. USE VENTED TYPE PRESSURE REGULATORS FOR ALL OTHER APPLICATIONS. 42.3. INSTALL REGULATING STATIONS IN ACCORDANCE WITH REQUIREMENTS OF CAN/CSA-B149.1.

42.4. PROVIDE 6 MM (1/4") DIAMETER TEST PORTS UPSTREAM AND DOWNSTREAM OF EACH REGULATOR ASSEMBLY.

42.5. LOCATE OUTDOOR REGULATING STATIONS A MINIMUM OF 300 MM (12") AWAY FROM WALKWAYS, AND 3 M (10') AWAY FROM EQUIPMENT AIR INTAKES AND BUILDING OPENINGS. PROVIDE ALL REQUIRED VENT PIPING AND TÉRMINATE VENTS IN A TURN-DOWN ELBOW FITTING WITH BRONZE BUG SCREEN SECURED IN PLACE.

42.6. LOCATE INDOOR REGULATING STATIONS IN LOCATIONS ACCESSIBLE WITHOUT THE USE OF LADDERS OR LIFTS. COMBINE VENTS WHERE PERMITTED AND INCREASE VENT PIPE SIZE ACCORDINGLY. EXTEND VENT PIPING UP THROUGH THE ROOF 3 M (10') AWAY FROM EQUIPMENT AIR INTAKES AND BUILDING OPENINGS AND TERMINATED IN A TURN-DOWN ELBOW FITTING WITH BRONZE BUG SCREEN SECURED IN PLACE.

42.7. INDICATE OPERATING SET-POINTS, RELIEF SETTINGS AND VENT ARRANGEMENTS FOR EACH REGULATING STATION ON AS-BUILT RECORD DRAWINGS.

43. INSTALLATION OF EXPANSION LOOPS

43.1. INSTALL AND GUIDE PER MANUFACTURERS' INSTALLATION INSTRUCTIONS AND MECHANICAL CONTRACTORS ASSOCIATION OF AMERICA "GUIDELINES FOR QUALITY PIPING INSTALLATIONS".

43.2. FLEXIBLE HOSE EXPANSION LOOP RETURN FITTING SHALL BE SUPPORTED TO ALLOW MOVEMENT.

HVAC AIR DISTRIBUTION

44. GALVANIZED STEEL DUCTWORK

44.1. GALVANIZED STEEL SHEET IS TO BE HOT DIPPED IN ACCORDANCE WITH REQUIREMENTS OF ASTM A653. G60 GALVANIZING FOR BARE UNCOVERED DUCT TO BE FINISH PAINTED. G90 FOR ALL OTHER GALVANIZING.

44.2.1. LOCK FORMING GRADE HOT DIP GALVANIZED STEEL, ASTM A653, SHOP FABRICATED, MINIMUM #26 GAUGE.

44.3.1. FACTORY MACHINE FABRICATED, SPIRAL, MECHANICALLY LOCKED FLAT SEAM, SINGLE WALL DUCT, FITTINGS AND COUPLINGS

44.4.1. FACTORY MACHINE FABRICATED, SINGLE WALL, 4-PLY SPIRAL LOCK SEAM DUCT, FITTINGS AND COUPLINGS

45. MANUAL BALANCING (VOLUME) DAMPERS

45.1. FLANGED AND DRILLED, SINGLE OR PARALLEL BLADE (DEPENDING ON DAMPER SIZE) MANUAL BALANCING DAMPERS, EACH CONSTRUCTED OF SAME MATERIAL AS CONNECTING DUCTWORK UNLESS OTHERWISE SPECIFIED, EACH DESIGNED TO MAINTAIN INTERNAL FREE AREA OF CONNECTING DUCT, AND

45.1.1. HEXAGONAL OR SQUARE SHAFT EXTENSION THROUGH FRAME;

45.1.2. NON-STICK, NON-CORROSIVE SYNTHETIC BEARINGS FOR RECTANGULAR DAMPERS, FLANGE STAINLESS STEEL BEARINGS FOR ROUND DAMPERS;

45.1.3. BLADE STOPS FOR SINGLE BLADE DAMPERS, DESIGNED TO PREVENT BLADE FROM MOVING MORE THAN 90°; 45.1.4. LINKAGE FOR MULTIPLE BLADE DAMPERS;

45.1.5. LOCKING HAND QUADRANT DAMPER OPERATOR WITH, FOR INSULATED DUCTS 50 MM (2") STANDOFF MOUNTING.

45.2. RECTANGULAR DAMPERS: NAILOR INDUSTRIES INC. 1800 SERIES, MAXIMUM SIZE 1.2 M X 1.2 M (4' X 4') FOR A SINGLE DAMPER.

45.3. ROUND DAMPERS: NAILOR INDUSTRIES INC. MODEL 1890, MAXIMUM 600 MM (24") DIAMETER, EQUIPPED WITH A MINIMUM 200 MM (8") DEEP FRAME, AND

45.4. MULTIPLE RECTANGULAR DAMPER SECTION ASSEMBLY: RECTANGULAR ASSEMBLY SUPPLIED WITH THE DAMPERS OR SITE CONSTRUCTED, OF SAME MATERIAL AS DAMPER AND DESIGNED FOR TIGHT AND SECURE MOUNTING OF INDIVIDUAL DAMPERS.

45.5. ACCEPTABLE MANUFACTURERS ARE: 45.5.1. NAILOR INDUSTRIES INC.;

45.5.2. MORRISON & CO. INC. "TAMCO"; 45.5.3. NCA MANUFACTURING LTD.;

45.5.4. GREENHECK FAN CORP.; 45.5.5. RUSKIN CO.

46. FABRICATION AND INSTALLATION OF GALVANIZED STEEL DUCTWORK

PROVIDE REQUIRED DUCTWORK, RECTANGULAR, ROUND AND/OR FLAT OVAL. WHERE RECTANGULAR DUCTWORK IS SHOWN, ROUND OR FLAT OVAL DUCTWORK OF EQUIVALENT CROSS-SECTIONAL AREA IS ACCEPTABLE.

46.2. IT IS TO BE UNDERSTOOD THAT ALL DUCT DIMENSIONS SHOWN ON DRAWINGS ARE CLEAR INTERNAL DIMENSIONS.

CONFIRM ROUTING OF ALL DUCTWORK AT SITE AND SITE MEASURE DUCTWORK PRIOR TO FABRICATION. DUCT DIMENSIONS MAY BE REVISED TO SUIT SITE ROUTING AND BUILDING ELEMENT REQUIREMENTS. IF DIMENSION REVISIONS ARE REVIEWED WITH AND APPROVED BY CONSULTANT. DUCT ROUTING AND/OR DIMENSION REVISIONS TO SUIT CONDITIONS AT SITE ARE NOT GROUNDS FOR A CLAIM FOR AN EXTRA COST.

REFER TO STRUCTURAL DRAWINGS. WHERE DUCTWORK IS TO BE RUN WITHIN OR THROUGH OPEN WEB STEEL JOISTS, DUCTWORK SHOWN ON MECHANICAL DRAWINGS IS SCHEMATIC ONLY AND IS TO BE ALTERED AS REQUIRED TO SUIT STEEL JOIST CONFIGURATION, SPACING, PANEL POINTS, AND

WHEREVER DUCTWORK IS REQUIRED AT LOCATIONS WHERE SPRAYED FIREPROOFING IS APPLIED TO BUILDING CONSTRUCTION, INSTALL DUCTWORK ONLY AFTER FIREPROOFING WORK IS COMPLETE AND DO NOT COMPROMISE FIRE RATING OF SPRAYED FIREPROOFING.

46.6. INSTALL (BUT DO NOT CONNECT) DUCT SYSTEM MOUNTED AUTOMATIC CONTROL COMPONENTS SUPPLIED AS PART OF THE AUTOMATIC CONTROL WORK.

SUPPORT HORIZONTAL RECTANGULAR DUCTS INSIDE BUILDING IN ACCORDANCE WITH ANSI/SMACNA HVAC DUCT CONSTRUCTION STANDARDS METAL AND FLEXIBLE, BUT USE TRAPEZE HANGERS WITH, UNLESS OTHERWISE SPECIFIED, GALVANIZED STEEL CHANNELS, AND GALVANIZED STEEL HANGER RODS FOR EXPOSED DUCTS AND CONCEALED DUCTS WIDER THAN 500 MM (20"). SUPPORT HARDWARE CONSTRUCTED OF SAME MATERIAL AS DUCT FOR METAL DUCT. AND. UNLESS OTHERWISE SPECIFIED, TYPE 316 STAINLESS STEEL FOR NON-METAL DUCT. SUPPORTS FOR "HEAVY" DUCT SUCH AS CEMENTITIOUS CORE DUCT IS TO BE SUITABLE IN ALL RESPECTS FOR THE APPLICATION AND APPROVED BY CONSULTANT.

SUPPORT ROUND AND FLAT OVAL DUCTS INSIDE BUILDING IN ACCORDANCE WITH ANSI/SMACNA HVAC DUCT CONSTRUCTION STANDARDS METAL AND FLEXIBLE, BUT, UNLESS OTHERWISE SPECIFIED, FOR BOTH UNINSULATED AND INSULATED DUCTS EXPOSED IN FINISHED AREAS, USE BANDS AND SECURE AT TOP OF DUCT TO A HANGER ROD, ALL SIMILAR TO DUCTMATE CANADA LTD. TYPE "BA". IF DUCT IS INSULATED, SIZE STRAP TO SUIT DIAMETER OF INSULATED DUCT. UNLESS OTHERWISE SPECIFIED, DUCT SUPPORT HARDWARE FOR METAL DUCT IS CONSTRUCTED OF SAME MATERIAL AS DUCT, AND FOR

WHERE FLANGED DUCT JOINTS ARE USED, DO NOT LOCATE JOINTS IN WALL OR SLAB OPENINGS, OR IMMEDIATELY AT WALL OR SLAB OPENINGS. DO NOT JSE FLANGED JOINTS FOR EXPOSED UNINSULATED DUCTS IN FINISHED AREAS.

46.10. WHERE WATERTIGHT HORIZONTAL DUCTWORK IS REQUIRED, CONSTRUCT DUCTS WITHOUT BOTTOM LONGITUDINAL SEAMS, SOLDER OR WELD JOINTS OF BOTTOM AND SIDE SHEETS. SEAL ALL OTHER JOINTS WITH DUCT SEALER. SLOPE HORIZONTAL DUCT TO HOODS, RISERS, OR DRAIN POINTS, PROVIDE

46.10.1. DUCTWORK OUTSIDE BUILDING OR OTHERWISE EXPOSED TO THE ELEMENTS;

46.11.1. DUCTWORK LEAKAGE IS NOT TO EXCEED FOLLOWING:

46.11.1.1. DUCTWORK TO 2" W.C. CLASS, 1% OF TOTAL AIR QUANTITY HANDLED BY RESPECTIVE FANS;

46.11.2. LEAKAGE TESTING IS TO BE PERFORMED BY THE TESTING, ADJUSTING AND BALANCING (TAB) AGENCY IN ACCORDANCE WITH SMACNA HVAC AIR DUCT LEAKAGE TEST MANUAL AND IS TO BE WITNESSED BY CONSULTANT.

46.11.3. BE RESPONSIBLE FOR FOLLOWING:

PREPARING DUCT SYSTEMS FOR LEAKAGE TESTING PRIOR TO INSTALLATION OF EXTERNAL INSULATION INCLUDING CAPPING DUCT RUNOUTS AND

PROVISION OF FINAL TAP-IN FOR TEST EQUIPMENT: SCHEDULE TESTING WITH TAB AGENCY IN ADVANCE, BE PRESENT FOR ALL TESTING AND ENSURE NOTICE IS GIVEN TO CONSULTANT SO THEY MAY WITNESS TESTING:

RESEALING AND/OR REPLACEMENT OF DEFECTIVE DUCTWORK; BEARING ALL COSTS ASSOCIATED WITH RETESTING DUCTWORK WHICH HAS FAILED TO PASS LEAKAGE TESTING.

46.12. SEAL ALL DUCTWORK IN ACCORDANCE WITH SMACNA SEAL CLASS "A", EXCEPT FOR ROUND DUCT WITH SELF-SEALING GASKETED FITTINGS AND COUPLINGS WHICH DOES NOT REQUIRE SITE APPLIED SEALANT. APPLY SEALANTS BY BRUSH OR GUN TO CLEANED METAL SURFACES. WHERE BARE DUCTWORK IS EXPOSED APPLY NEAT UNIFORM LINES OF SEALANT. RANDOMLY BRUSHED, SLOPPY LOOKING SEALANT APPLICATIONS WILL BE REJECTED AND MUST BE REPAIRED OR REPLACED WITH A NEAT APPLICATION OF SEALANT.

46.13. APPLY SEALANTS BY BRUSH OR GUN TO CLEANED METAL SURFACES. WHERE BARE DUCTWORK IS EXPOSED APPLY NEAT UNIFORM LINES OF SEALANT. RANDOMLY BRUSHED, SLOPPY LOOKING SEALANT APPLICATIONS WILL BE REJECTED AND MUST BE REPAIRED OR REPLACED WITH A NEAT APPLICATION OF

46.14. CLEAN EXTERIOR EXPOSED (UNINSULATED) DUCTS AND COAT WITH A HEAVY FULL COVERAGE OF BAKOR #410-02 BLACK METAL PAINT.

46.15. WHERE DISSIMILAR METAL DUCTS ARE TO BE CONNECTED, ISOLATE DUCTS BY MEANS OF FLEXIBLE DUCT CONNECTION MATERIAL.

47. INSTALLATION OF FLEXIBLE DUCTWORK

PROVIDE MAXIMUM 3 M (10') LONG LENGTHS OF FLEXIBLE DUCTWORK FOR CONNECTIONS BETWEEN GALVANIZED STEEL DUCT MAINS AND BRANCHES, AND NECKS OF CEILING GRILLÈS AND DIFFUSERS. DO NOT INSTALL FLEXIBLE DUCTWORK THROUGH WALLS, EVEN IF SHOWN ON DRAWINGS.

47.2. AT RECTANGULAR GALVANIZED STEEL DUCT, ACCURATELY CUT HOLES AND PROVIDE FLANGED OR "SPIN-IN" ROUND FLEXIBLE DUCT CONNECTION COLLARS. SEAL JOINTS WITH DUCT SEALER.

47.3. INSTALL FLEXIBLE DUCTS AS STRAIGHT AS POSSIBLE AND SUPPORT IN ACCORDANCE WITH REQUIREMENTS OF ANSI/SMACNA HVAC DUCT CONSTRUCTION STANDARDS METAL AND FLEXIBLE, AND SECURE AT EACH END WITH NYLON OR STAINLESS STEEL GEAR TYPE CLAMPS, AND SEAL JOINTS. PROVIDE LONG RADIUS DUCT BENDS WHERE THEY ARE REQUIRED.

47.4. DO NOT PENETRATE FIRE BARRIERS WITH FLEXIBLE DUCT.

48. DUCT SYSTEM PROTECTION, CLEANING AND START-UP

48.1. TEMPORARILY COVER ALL OPEN ENDS OF DUCTS DURING CONSTRUCTION.

CONSTRUCTION FILTERS, AND INSTALL NEW PERMANENT FILTERS.

REMOVE ALL DIRT AND FOREIGN MATTER FROM ENTIRE DUCT SYSTEMS AND CLEAN DUCT SYSTEM TERMINALS AND INTERIOR OF AIR HANDLING UNITS

PRIOR TO STARTING ANY SUPPLY AIR HANDLING SYSTEM PROVIDE 50 MM (2") THICK GLASS FIBRE CONSTRUCTION FILTERS AT FAN EQUIPMENT IN PLACE

PROVIDE CHEESECLOTH OVER DUCT SYSTEM INLETS AND OUTLETS AND RUN SYSTEM FOR 24 HOURS, AFTER WHICH REMOVE CHEESECLOTH AND

INCLUDE ALL LABOUR FOR A COMPLETE SITE WALK-THROUGH WITH TESTING AND BALANCING PERSONNEL FOLLOWING ROUTE OF ALL DUCT SYSTEMS TO BE TESTED, ADJUSTED AND BALANCED FOR THE PURPOSE OF CONFIRMING PROPER POSITION AND ATTITUDE OF DAMPERS, LOCATION OF PITOT TUBE OPENINGS, AND ANY OTHER WORK AFFECTING TESTING AND BALANCING PROCEDURES. PERFORM CORRECTIVE WORK REQUIRED AS A RESULT OF THIS

49. INSTALLATION OF GRILLES AND DIFFUSERS:

PROVIDE GRILLES AND DIFFUSERS WHERE SHOWN ON THE DRAWINGS. WHEREVER POSSIBLE, GRILLES AND DIFFUSERS ARE TO BE THE PRODUCT OF ONE

49.2. UNLESS OTHERWISE SPECIFIED CONNECT GRILLES AND DIFFUSERS IN ACCORDANCE WITH REQUIREMENTS OF SMACNA HVAC DUCT CONSTRUCTION

49.3. EXACTLY LOCATE GRILLES AND DIFFUSERS TO CONFORM TO THE FINAL ARCHITECTURAL REFLECTED CEILING PLANS AND DETAILED WALL ELEVATIONS, AND TO CONFORM TO THE FINAL LIGHTING ARRANGEMENT, CEILING LAYOUT, ORNAMENTAL AND OTHER WALL TREATMENT.

49.4. EQUIP SUPPLY DIFFUSERS HAVING A BASIC FOUR-WAY OR ALL ROUND AIR PATTERN FOR OPERATION IN ONE, TWO, OR THREE WAY PATTERN WHERE

49.5. GRILLES AND DIFFUSERS ARE TO BE TESTED AND PERFORMANCE CERTIFIED TO THE AIR-CONDITIONING AND REFRIGERATION INSTITUTE STANDARD ARI

650, STANDARD FOR AIR OUTLETS AND INLETS.

49.6. ACCEPTABLE MANUFACTURERS ARE:

49.6.1. PRICE INDUSTRIES INC.; 49.6.2. METALAIRE;

49.6.3. KRUEGER DIVISION OF AIR SYSTEM COMPONENTS INC.; 49.6.4. TITUS:

49.6.5. NAILOR INDUSTRIES INC.: 49.6.6. TUTTLE & BAILEY.

<u>INSULATION</u>

50. PIPE INSULATION MATERIALS

50.1. PREMOULDED MINERAL FIBRE: RIGID, SECTIONAL, SLEEVE TYPE INSULATION TO ASTM STANDARD C 547-00, WITH A FACTORY APPLIED VAPOUR BARRIER JACKET. ACCEPTABLE PRODUCTS ARE:

50.1.1. JOHNS MANVILLE INC. "MICRO-LOK AP-T PLUS";

50.1.2. KNAUF FIBER GLASS "PIPE INSULATION" WITH "ASJ-SSL" JACKET; 50.1.3. MANSON INSULATION INC. "ALLEY K APT";

50.1.4. OWENS CORNING FIBERGLAS PIPE INSULATION.

27. PIPE INSULATION REQUIREMENTS - MINERAL FIBRE 27.1. INSULATE THE FOLLOWING PIPE INSIDE THE BUILDING AND ABOVE GROUND WITH MINERAL FIBRE INSULATION OF THE THICKNESS INDICATED:

27.1.1. DOMESTIC COLD WATER PIPING TO AND INCLUDING 100 MM (4") DIA. -25 MM (1") THICK; 27.1.2. DOMESTIC HOT WATER PIPING, TO AND INCLUDING 40 MM (1½") DIA. -25 MM (1") THICK;

28. DUCTWORK SYSTEM INSULATION MATERIALS

RIGID MINERAL FIBRE BOARD: PREFORMED BOARD TYPE INSULATION TO ASTM C612-00A, 48 KG/M3 (3.0 LB./FT.3) DENSITY, WITH A FACTORY APPLIED REINFORCED ALUMINUM FOIL AND KRAFT PAPER FACING. ACCEPTABLE PRODUCTS ARE:

28.1.1. KNAUF FIBER GLASS INSULATION BOARD WITH FSK FACING; 28.1.2. MANSON INSULATION INC. "AK BOARD FSK";

28.1.3. JOHNS MANVILLE INC. TYPE 814 "SPIN-GLAS";

28.1.4. OWENS CORNING 703.

28.2. SEMI-RIGID MINERAL FIBRE BOARD: ROLL FORM INSULATION TO ASTM STANDARD C1393 00A, CONSISTING OF CUT STRIPS OF RIGID MINERAL BOARD INSULATION GLUED TO AN ALUMINIUM FOIL AND KRAFT PAPER FACING. ACCEPTABLE PRODUCTS ARE:

28.2.1. MULTI-GLASS INSULATION LTD. "MULTI-FLEX MKF"; 28.2.2. GLASS-CELL FABRICATORS LTD. "R-FLEX";

28.2.3. OWENS CORNING PIPE AND TANK INSULATION; 28.2.4. JOHNS MANVILLE INC. PIPE AND TANK INSULATION.

28.3. BLANKET MINERAL FIBRE: BLANKET TYPE ROLL FORM INSULATION TO ASTM STANDARD C553-00, 24 KG/M3 (1½ LB./FT.3) DENSITY, 40 MM (1½") THICK, WITH A FACTORY APPLIED VAPOUR BARRIER FACING. ACCEPTABLE PRODUCTS ARE:

28.3.1. JOHNS MANVILLE INC. MICROLITE FSK DUCT WRAP TYPE 150; 28.3.2. KNAUF FIBER GLASS BLANKET INSULATION FSK DUCT WRAP TYPE III;

28.3.3. MANSON INSULATION INC. ALLEY WRAP FSK DUCT WRAP TYPE III;

28.3.4. CERTAINTEED CORPORATION SOFTTOUCH FSK DUCT WRAP TYPE 150. 28.4. FLEXIBLE FOAM ELASTOMERIC SHEET: SHEET FORM, CFC FREE, CLOSED CELL, SELF-ADHERING ELASTOMERIC NITRILE RUBBER INSULATION WITH A WATER VAPOUR PERMEABILITY RATING OF 0.08 IN ACCORDANCE WITH ASTM E96 PROCEDURE A. ACCEPTABLE PRODUCTS ARE:

28.4.1. ARMACELL "AP/ARMAFLEX SA"; 28.4.2. IK INSULATION GROUP "K-FLEX DUCT WRAP", S2S.

BLANKET AS REQUIRED:

REQUIREMENTS ARE AS FOLLOWS:

29. DUCTWORK INSULATION REQUIREMENTS - MINERAL FIBRE

29.1. INSULATE THE FOLLOWING DUCTWORK SYSTEMS INSIDE THE BUILDING AND ABOVE GROUND WITH MINERAL FIBRE INSULATION OF THE THICKNESS 29.1.1. ALL OUTSIDE AIR INTAKE DUCTWORK, CASINGS AND PLENUMS FROM FRESH AIR INTAKES TO AND INCLUDING MIXING PLENUMS OR SECTIONS, OR, IF MIXING PLENUMS OR SECTIONS ARE NOT PROVIDED, TO THE FIRST HEATING COIL, OR IF BOTH MIXING PLENUMS OR SECTIONS AND HEATING COIL SECTIONS ARE NOT PROVIDED, AND THE FRESH AIR IS NOT TEMPERED, THEN THE FRESH AIR DUCTWORK SYSTEM COMPLETE - MINIMUM 40

MM (11/3") THICK AS REQUIRED: MIXED SUPPLY AIR OR PREHEATED SUPPLY AIR CASINGS, PLENUMS AND SECTIONS TO AND INCLUDING THE FAN SECTION WHERE NOT FACTORY INSULATED - MINIMUM 25 MM (1") THICK RIGID BOARD OR MINIMUM 40 MM (1½") THICK FLEXIBLE BLANKET AS REQUIRED;

SUPPLY AIR DUCTWORK OUTWARD FROM FANS, EXCEPT FOR SUPPLY DUCTWORK EXPOSED IN THE AREA IT SERVES - MINIMUM 25 MM (1") THICK RIGID BOARD OR MINIMUM 40 MM (1½") THICK FLEXIBLE BLANKET AS REQUIRED; 29.1.4. EXHAUST DISCHARGE DUCTWORK FOR A DISTANCE OF 3 M (10') DOWNSTREAM (BACK) FROM EXHAUST OPENINGS TO ATMOSPHERE, INCLUDING ANY EXHAUST PLENUMS WITHIN THE 3 M (10') DISTANCE - MINIMUM 25 MM (1") THICK RIGID BOARD OR MINIMUM 40 MM (1½") THICK FLEXIBLE

ANY OTHER DUCTWORK, CASINGS, PLENUMS OR SECTIONS SPECIFIED OR DETAILED ON THE DRAWINGS TO BE INSULATED - THICKNESS AS

CONCEALED RECTANGULAR DUCTWORK IS TO BE BLANKET TYPE. 29.3. EXPOSED RECTANGULAR DUCTS AND/OR CASINGS: LIBERALLY APPLY ADHESIVE TO ALL SURFACES OF THE DUCT AND/OR CASING. ACCURATELY AND NEATLY PRESS THE INSULATION INTO THE ADHESIVE WITH TIGHTLY FITTED BUTT JOINTS. PROVIDE PIN AND WASHER INSULATION FASTENERS AT 300 MM (12") CENTRES ON BOTTOM AND SIDE SURFACES. SECURE AND SEAL ALL JOINTS WITH 75 MM (3") WIDE TAPE SEALANT. ADDITIONAL INSTALLATION

INSULATION FOR CASINGS, PLENUMS, AND EXPOSED RECTANGULAR DUCTWORK IS TO BE RIGID BOARD TYPE. INSULATION FOR ROUND DUCTWORK AND

29.3.2. PROVIDE DRYWALL TYPE METAL CORNER BEADS ON EDGES OF DUCTWORK, CASINGS AND PLENUMS IN EQUIPMENT ROOMS, SERVICE CORRIDORS, AND ANY OTHER AREA WHERE THE INSULATION IS SUBJECT TO ACCIDENTAL DAMAGE, AND SECURE IN PLACE WITH TAPE SEALANT.

29.4. CONCEALED RECTANGULAR OR OVAL DUCTWORK: LIBERALLY APPLY ADHESIVE TO ALL SURFACES OF THE DUCT AND WRAP THE INSULATION AROUND THE DUCT WITH A TOP BUTT JOINT AND TIGHT SECTION TO SECTION BUTT JOINTS. PROVIDE PIN AND WASHER INSULATION FASTENERS AT 300 MM (12") CENTRES ON BOTTOM SURFACES. SECURE AND SEAL ALL JOINTS WITH 75 MM (3") TAPE SEALANT. ADDITIONAL INSTALLATION REQUIREMENTS ARE AS 29.4.1. AT EACH TRAPEZE TYPE DUCT HANGER PROVIDE A 100 MM (4") WIDE FULL LENGTH PIECE OF RIGID MINERAL FIBRE BOARD INSULATION BETWEEN

29.3.1. AT TRAPEZE HANGER LOCATIONS INSTALL INSULATION BETWEEN THE DUCT AND THE HANGER;

FLANGE AND COVER THE TOP OF THE FLANGES WITH TAPE SEALANT;

ENSURE THAT SHEET METAL WORK JOINTS ARE SEALED WATERTIGHT PRIOR TO APPLYING INSULATION.

31.1.2. ESTIMATED SOUND POWER LEVELS TO BE EXPECTED ACROSS INDIVIDUAL OCTAVE BANDS IN DB;

INCLUDE A COPY OF EACH REPORT WITH O & M MANUAL PROJECT CLOSE-OUT DATA.

31.1.3. CERTIFIED POWER AND CONTROL WIRING DIAGRAMS WHICH DIFFERENTIATE BETWEEN FACTORY AND SITE WIRING;

31.1.4. DIMENSIONED LAYOUTS, INCLUDING DIMENSIONED CURB LAYOUTS AND DUCT PENETRATIONS, AS APPLICABLE;

29.5. EXPOSED & CONCEALED ROUND OR OVAL DUCTWORK: ACCURATELY CUT SECTIONS OF INSULATION TO FIT TIGHTLY AND COMPLETELY AROUND THE DUCT. LIBERALLY APPLY ADHESIVE TO ALL SURFACES OF THE DUCT AND WRAP THE INSULATION AROUND THE DUCT WITH A TOP BUTT JOINT AND TIGHT SECTION TO SECTION BUTT JOINTS. SEAL ALL JOINTS WITH TAPE SEALANT. AT DUCT HANGER LOCATIONS INSTALL THE INSULATION BETWEEN THE DUCT AND HANGER. AT EACH HANGER LOCATION FOR CONCEALED DUCTWORTH WHERE FLEXIBLE BLANKET INSULATION IS USED, PROVIDE A 100 MM (4") WIDE FULL CIRCUMFERENCE STRIP OF SEMI-RIGID BOARD TYPE DUCT INSULATION BETWEEN THE DUCT AND THE HANGER.

29.6. COMMON DUCT INSULATION REQUIREMENTS: INSULATION APPLICATION REQUIREMENTS COMMON TO ALL TYPES OF RIGID DUCTWORK ARE AS FOLLOWS: 29.6.1. AT DUCT CONNECTION FLANGES INSULATE THE FLANGES WITH NEATLY CUT STRIPS OF THE RIGID INSULATION MATERIAL SECURED WITH ADHESIVE TO SIDE SURFACES OF THE FLANGE WITH A TOP STRIP TO COVER THE EXPOSED EDGES OF THE SIDE STRIPS, THEN BUTT THE FLAT SURFACE DUCT INSULATION UP TIGHT TO THE FLANGE INSULATION, OR, ALTERNATIVELY, INCREASE THE INSULATION THICKNESS TO THE DEPTH OF THE

THE INSTALLATION OF FASTENER PINS AND WASHERS IS TO BE CONCURRENT WITH THE DUCT INSULATION APPLICATION; CUT INSULATION FASTENER PINS ALMOST FLUSH TO THE WASHER AND COVER WITH NEATLY CUT PIECES OF TAPE SEALANT;

ACCURATELY AND NEATLY CUT AND FIT INSULATION AT DUCT ACCESSORIES SUCH AS DAMPER OPERATORS (WITH STANDOFF MOUNTING) AND

29.6.5. PRIOR TO CONCEALMENT OF INSULATION BY EITHER CONSTRUCTION FINISHES OR CANVAS JACKET MATERIAL, PATCH ALL VAPOUR BARRIER DAMAGE BY MEANS OF TAPE SEALANT.

PITOT TUBE ACCESS COVERS:

THE DUCT AND THE HANGER.

30. DUCTWORK INSULATION REQUIREMENTS - FLEXIBLE ELASTOMERIC 30.1. INSULATE ALL EXPOSED EXTERIOR DUCTWORK (EXCEPT FRESH AIR INTAKE DUCTWORK) AND ASSOCIATED PLENUMS AND/OR CASINGS OUTSIDE THE

BUILDING WITH MINIMUM 40 MM (1½") THICK FLEXIBLE ELASTOMERIC SHEET INSULATION AS REQUIRED, APPLIED IN TWO MINIMUM 20 MM (¾") THICK LAYERS WITH STAGGERED TIGHTLY BUTTED JOINTS. INSTALL WITH ADHESIVE IN STRICT ACCORDANCE WITH THE MANUFACTURER'S PUBLISHED INSTRUCTIONS TO PRODUCE A WEATHER-PROOF INSTALLATION.

AIR HANDLING UNIT

31. SUBMITTALS 31.1. SHOP DRAWINGS/PRODUCT DATA: SUBMIT SHOP DRAWINGS/PRODUCT DATA FOR ALL UNITS TO CONFIRM COMPLIANCE WITH REQUIREMENTS OF THE CONTRACT DOCUMENTS. INCLUDE:

CERTIFIED FAN PERFORMANCE CURVES;

31.1.5. PRODUCT DATA FOR FAN MOTORS AND DRIVES:

31.1.6. ALL ITEMS SHIPPED LOOSE FOR SITE INSTALLATION. 31.2. FACTORY INSPECTION AND TEST REPORT: SUBMIT WITH DELIVERY OF EACH UNIT A COPY OF THE FACTORY INSPECTION AND FIRE TEST REPORT, AND MUNICIPALITY OF CASSELMAN

CLIENT

PROJECT NORTH

	ISSUED FOR 99% COORDINATION	2025-02-24
	ISSUED FOR 66% COORDINATION	2023-05-12
SUE	DESCRIPTION	DATE

IT IS THE RESPONSIBILITY OF THE APPROPRIATE CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON SITE AND PROMPTLY REPORT ALL ERRORS AND/OR OMISSIONS TO THE CONSULTANT BEFORE WORK COMMENCES.

ALL WORK IS TO FOLLOW THE OBC 2012 AND ANY OTHER APPLICABLE CODES AND REGULATIONS.

DO NOT SCALE DRAWINGS.

PROFESSIONAL STAMP	

EXP Services Inc.

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100 - 2650 Queensview Drive Ottawa, ON K2B 8H6 Canada

PROJECT

1 INDUSTRIEL STREET OFFICE FIT-UP

BUILDINGS • EARTH & ENVIRONMENT • ENERGY •

• INDUSTRIAL • INFRASTRUCTURE • SUSTAINABILITY •

DRAWING

DRAWING No:

MECHANICAL SPECIFICATIONS

MRK-23002008-A0 M. OMAR JUNE 2023 AS SHOWN B. BROWN

- 31.3. SITE INSPECTION AND START-UP REPORT: SUBMIT A SITE INSPECTION AND START-UP REPORT FROM THE MANUFACTURER'S REPRESENTATIVE AS SPECIFIED IN PART 3 OF THIS SECTION.
- 31.4. SPARE AIR FILTERS: SUBMIT SPARE AIR FILTERS AS SPECIFIED IN PART 2 OF THIS SECTION.
- 31.5. WALL OPENING COORDINATION: SUPPLY REVIEWED COPIES OF CURB ASSEMBLY SHOP DRAWINGS OR PRODUCT DATA SHEETS TO THE TRADE WHO WILL CUT THE WALL OPENINGS FOR DUCTWORK. AND ENSURE THAT THE OPENINGS ARE PROPERLY SIZED AND LOCATED.
- 31.6. EXTENDED WARRANTIES: SUBMIT SIGNED COPIES OF THE MANUFACTURER'S EXTENDED WARRANTIES AS FOLLOWS:
- 31.6.1. STAINLESS STEEL GAS FIRED UNIT HEAT EXCHANGER: TEN YEARS;
- 31.6.2. REFRIGERANT COMPRESSOR(S): FIVE YEARS; 31.6.3. INTEGRATED MODULAR CONTROL: THREE YEARS.

32. QUALITY ASSURANCE

- 32.1. HEATING AND AIR CONDITIONING EQUIPMENT IS TO BE RATED (CAPACITY, PERFORMANCE, EFFICIENCY AND SOUND) AND CERTIFIED IN ACCORDANCE WITH REQUIREMENTS OF THE FOLLOWING AIR-CONDITIONING AND REFRIGERATION INSTITUTE STANDARDS:
- 32.1.1. ARI 210/240, PERFORMANCE RATING OF UNITARY AIR—CONDITIONING AND AIR—SOURCE HEAT PUMP EQUIPMENT;
- 32.1.2. ARI 270, SOUND RATING OF OUTDOOR UNITARY EQUIPMENT; 32.1.3. ARI 340/360, COMMERCIAL AND INDUSTRIAL UNITARY AIR-CONDITIONING AND HEAT PUMP EQUIPMENT.
- 32.2. HEATING AND AIR CONDITIONING EQUIPMENT IS ALSO TO BE IN ACCORDANCE WITH REQUIREMENT OF THE FOLLOWING CODES, STANDARDS, AND REGULATIONS:
- 32.2.1. CSA B52, MECHANICAL REFRIGERATION CODE;
- 32.2.2. CAN/CSA-C22.2 NO. 236/UL 1995, HEATING AND COOLING UNITS;
- 32.2.3. ANSI/ASHRAE 90.1, ENERGY STANDARD FOR BUILDINGS EXCEPT LOW RISE RESIDENTIAL BUILDINGS;
- 32.2.4. CSA OR ETL CERTIFICATION AND LABELLING FOR ALL ELECTRICAL COMPONENTS;
- 32.2.5. CAN/CSA B149, NATURAL GAS AND PROPANE CODE; 32.2.6. GOVERNING LOCAL CODES AND REGULATIONS.
- 32.3. GAS FIRED HEATING AND AIR CONDITIONING UNITS ARE TO BE INSTALLED BY LICENSED JOURNEYMAN GAS FITTERS.
- 32.4. ACCEPTABLE MANUFACTURERS ARE: 32.4.1. LENNOX INDUSTRIES INC.
- 32.4.2. CARRIER ENTERPRISE CANADA
- 32.4.3. TRANE CANADA INC.;
- 32.4.4. JOHNSON CONTROLS YORK;
- 32.4.5. DAIKIN INDUSTRIES LTD.; 32.4.6. AAON;
- 32.4.7. GREENHECK FAN CORP.; 32.4.8. PRICE INDUSTRIES LTD.
- 33. AIR HANDLING UNITS PACKAGED OUTDOOR
- 33.1. PACKAGE TYPE, FACTORY TESTED, OUTDOOR, WEATHERPROOF HEATING AND AIR CONDITIONING UNITS AS PER THE DRAWING SCHEDULE.
- CABINET: CONSTRUCTED OF MINIMUM #18 GAUGE GALVANIZED STEEL PANELS ERECTED ON FULL PERIMETER MINIMUM #14 GAUGE GALVANIZED STEEL BASE RAILS WITH LIFTING LUGS, FINISHED WITH TWO COATS OF BAKED EXTERIOR ENAMEL PAINT ON PRIMER, ARRANGED AND CONSTRUCTED FOR AIRFLOW CONFIGURATIONS AS SHOWN, AND COMPLETE WITH COLLARS FOR ELECTRICAL POWER AND DUCT CONNECTION OPENINGS, AND THE FOLLOWING:
- 33.2.1. A FULLY INSULATED BASE, AND INSULATION FOR ALL PANELS ADJACENT TO CONDITIONED AIR, WITH 50 MM (2") THICK NEOPRENE FACED, 32 KG/M³ (2 LB/FT³) DENSITY INSULATION MEETING FLAME SPREAD AND SMOKE DEVELOPED RATING REQUIREMENTS OF CAN/ULC S102 AND SECURED IN PLACE SUCH THAT INSULATION WILL NOT SAG AND FIBRES WILL NOT ERODE OR ENTER THE AIRSTREAM;
- 33.2.2. HINGED ACCESS PANELS, EACH AIR AND WATER SEALED AND EQUIPPED WITH 1/4 TURN LATCHING HANDLES, AND PROVIDED FOR COMPRESSOR/CONTROLS/HEATING AREAS, BLOWER ACCESS, AND AIR FILTER AND ECONOMIZER ACCESS.
- 33.3. COMPRESSOR/CONDENSER & REFRIGERATION: VIBRATION ISOLATED SCROLL TYPE HERMETICALLY SEALED COMPRESSOR(S) WITH DIRECT DRIVE VERTICAL DISCHARGE PROPELLER TYPE CONDENSER FAN(S) AND COPPER TUBE/ALUMINIUM FIN FACTORY LEAK AND PRESSURE TESTED CONDENSER COIL(S), AND EQUIPPED WITH THE FOLLOWING:
- 33.3.1. PVC COATED CONDENSER FAN GUARD AND CONDENSER COIL GUARD;
- PERMANENTLY LUBRICATED TOTALLY ENCLOSED, RESILIENTLY MOUNTED, OVERLOAD PROTECTED CONDENSER FAN MOTOR(S) CONFORMING TO REQUIREMENTS OF THE MECHANICAL WORK SECTION ENTITLED BASIC MECHANICAL MATERIALS AND METHODS, TOTALLY ENCLOSED FROM THE
- 33.3.3. A REFRIGERATION SYSTEM CAPABLE OF OPERATING DOWN TO -17°C(0°F) WITHOUT INSTALLATION OF ADDITIONAL CONTROLS, COMPLETE WITH SELF-SEALING DISCHARGE, SUCTION AND LIQUID LINE SERVICE GAUGE PORTS, FREEZE-STATS, EXPANSION VALVES, COPPER REFRIGERANT TUBING AND INSULATION WHERE REQUIRED, LIQUID LINE FILTER DRIER, A FULL CHARGE OF R410A REFRIGERANT, AUTOMATIC RESET HIGH AND LOW PRESSURE COMPRESSOR CIRCUIT CONTROLS, AND FAN CONTROL FOR -34°C (-30°F) LOW AMBIENT OPERATION;
- COPPER TUBE/ALUMINIUM FIN FACTORY TESTED EVAPORATOR COIL WITH THERMAL EXPANSION VALVE WITH ADJUSTABLE SUPERHEAT AND EXTERNAL EQUALIZER, AND NON-CORROSIVE CONDENSATE DRAIN PAIN REMOVABLE FOR CLEANING, DESIGNED TO PREVENT STANDING WATER AND EQUIPPED WITH A DRAIN CONNECTION WITH DEEP SEAL TRAP.
- 33.4. COOLING CONTROLS: COOLING CONTROLS ARE TO INCLUDE THE FOLLOWING:
- 33.4.1. SMOKE DETECTORS IN BOTH SUPPLY AND RETURN AIR STREAMS;
- 33.4.2. MOTORIZED NORMALLY CLOSED FRESH AIR AND EXHAUST AIR DAMPERS AND NORMALLY OPEN RETURN AIR DAMPER (EQUAL TO T. A. MORRISON TAMCO SERIES 1000 FOR RETURN AIR AND SERIES 9000 FOR FRESH AIR AND EXHAUST AIR), WITH 24 VOLT SPRING RETURN BELIMO OR EQUAL OPERATORS AND A CONTROL PACKAGE TO AUTOMATICALLY VARY THE OUTSIDE AIR QUANTITY;
- 33.4.3. ADJUSTABLE MIXED AIR CONTROLS TO MAINTAIN 13°C (55°F OR AS INDICATED) MIXED AIR TEMPERATURE;
- 33.4.4. UP TO FOUR STAGES OF COOLING CONTROL;
- 33.4.5. CONTROLS FOR BLOWER ON DELAY OF UP TO SIXTY SECONDS AFTER A COOLING DEMAND HAS BEEN RECEIVED, WITH A DEFAULT VALUE OF ZERO, AND CONTROLS TO ALLOW BLOWER OFF DELAY OF UP TO TWO HUNDRED AND FORTY SECONDS AFTER COOLING DEMAND HAS ENDED, WITH A DEFAULT VALUE OF ZERO:
- 33.4.6. MINIMUM COMPRESSOR ON AND OFF TIME OF THREE HUNDRED SECONDS. BOTH ADJUSTABLE BETWEEN SIXTY AND FIVE HUNDRED AND TEN
- 33.4.7. DEFAULT MAXIMUM HIGH PRESSURE SWITCH TRIP OCCURRENCE DURING COOLING OR DEHUMIDIFICATION CYCLE OF THREE (ADJUSTABLE BETWEEN ONE AND EIGHT OCCURRENCES), WITH COMPRESSOR LOCK-OUT IF MAXIMUM OCCURRENCE LIMIT IS REACHED, AND DIGITAL OUTPUT FOR SERVICE
- 33.4.8. LOW PRESSURE TRIP READ DELAY OF FIVE MINUTES (ADJUSTABLE BETWEEN ZERO AND THIRTY-FOUR MINUTES) IF COMPRESSOR OFF TIME HAS BEEN LESS THAN FOUR HOURS (ADJUSTABLE BETWEEN ONE AND SIX HOURS) AND THE OUTDOOR TEMPERATURE IS LESS THAN 21°C (70°F), ADJUSTABLE BETWEEN −12°C AND 38°C:
- 33.4.9. LOW PRESSURE TRIP READ DELAY OF FIFTEEN MINUTES (ADJUSTABLE BETWEEN ZERO AND THIRTY-FOUR MINUTES) IF COMPRESSOR OFF TIME HAS BEEN LESS THAN FOUR HOURS (ADJUSTABLE BETWEEN ONE AND SIX HOURS) AND THE OUTDOOR TEMPERATURE IS LESS THAN 21°C (70°F), ADJUSTABLE BETWEEN -12°C AND 38°C;
- 33.4.10. LOW PRESSURE TRIP READ DELAY OF TWO MINUTES (ADJUSTABLE BETWEEN ZERO AND THIRTY-FOUR MINUTES) IF THE COMPRESSOR OFF TIME HAS BEEN LESS THAN FOUR HOURS AND THE OUTDOOR AIR TEMPERATURE IS 21°C (70°F) OR GREATER; 33.4.11. LOW PRESSURE TRIP READ DELAY OF EIGHT MINUTES (ADJUSTABLE BETWEEN ZERO AND THIRTY-FOUR MINUTES) IF THE COMPRESSOR OFF TIME
- HAS BEEN FOUR HOURS AND THE OUTDOOR AIR TEMPERATURE IS 21°C (70°F) OR GREATER;
- 33.4.12. EACH PRESSURE SWITCH TRIP OCCURRENCE (EITHER HIGH OR LOW) TO RECORD AN ERROR IN NON-VOLATILE MEMORY AND IDENTIFY THE COMPRESSOR CIRCUIT:
- 33.4.13. LOW OUTDOOR AIR TEMPERATURE COMPRESSOR LOCKOUT SET-POINT OF -18°C (0°F) FOR EACH COMPRESSOR CIRCUIT, INDIVIDUALLY ADJUSTABLE
- 33.4.14. MAXIMUM ALLOWABLE EVAPORATOR FREEZE-STAT TRIP OCCURRENCE OF THREE (ADJUSTABLE BETWEEN ONE AND FOUR OCCURRENCES) DURING COOLING DEMAND, WITH CIRCUITRY TO SHUT-OFF THE COMPRESSOR EACH TIME A FREEZE-STAT TRIP OCCURS AND RECORD AN ERROR IN NON-VOLATILE MEMORY, AND IF THE MAXIMUM LIMIT IS REACHED, THE COMPRESSOR IS TO BE LOCKED-OUT AND A DIGITAL OUTPUT FOR
- SERVICE IS TO BE DISPLAYED: 33.4.15. CONDENSER FAN CONTROL INCLUDING:
- SIX SECOND (ADJUSTABLE BETWEEN ZERO AND SIXTEEN SECONDS) BETWEEN CONDENSER FAN SHUT-OFF AND RESTART TO PREVENT REVERSE ROTATION OF THE FANS(S);
- COOLING STAGE LOW OUTDOOR TEMPERATURE SET-POINT CONTROL (4 TO 13°C (40 TO 55°F) DEPENDING ON NUMBER OF FANS AND ADJUSTABLE BETWEEN 16°C AND -12°C (60°F AND 10°F) TO REDUCE AIRFLOW THROUGH THE CONDENSER BY TURNING OFF SOME OR ALL FANS, DEPENDING ON THE NUMBER OF CONDENSER FANS.
- 33.5. FILTERS: ROLL TYPE GLASS FIBRE MESH CONSTRUCTION FILTER MEDIA FACTORY INSTALLED WHEN THE UNIT IS SHIPPED, AND DISPOSABLE, 50 MM (2') THICK, PLEATED, UL CLASS 1 MERV 7 RATED, METAL FRAMED FILTERS WITH AN INITIAL LOADING OF FILTERS, AND A SPARE SET OF FILTERS FOR EACH UNIT, SUPPLIED LOOSE IN SEALED CONTAINERS.
- 33.6. SUPPLY AIR BLOWER: CENTRIFUGAL, STATICALLY AND DYNAMICALLY BALANCED, REMOVABLE (SLIDE-OUT) BLOWER ASSEMBLY COMPLETE WITH:
- 33.6.1. MOTOR, DRIVE ASSEMBLY AND GUARD CONFORMING TO REQUIREMENTS SPECIFIED IN THE MECHANICAL WORK SECTION ENTITLED BASIC MECHANICAL MATERIALS AND METHODS:
- 33.7. MODULAR CONTROLLER: INTEGRAL SOLID-STATE CONTROL BOARD TO OPERATE THE UNIT, COMPATIBLE IN ALL RESPECTS WITH THE BUILDING AUTOMATION SYSTEM, AND WITH BUILT-IN FUNCTIONS AS FOLLOWS:
- 33.7.1. BLOWER ON/OFF DELAY; 33.7.2. CONTROL PARAMETER DEFAULTS;

- 33.7.3. SERVICE RELAY OUTPUT;
- 33.7.4. DIRTY FILTER SWITCH INPUT; DEHUMIDISTAT INPUT;
- 33.7.6. ECONOMIZER CONTROL
- GAS VALVE DELAY BETWEEN STAGES;
- 33.7.8. UNIT DIAGNOSTICS; 33.7.9. DIAGNOSTICS CODE STORAGE
- 33.7.10. INDOOR AIR QUALITY INPUT; 33.7.11. LOW AMBIENT CONTROLS;
- 33.7.12. MINIMUM RUN TIME: 33.7.13. NIGHT SETBACK MODE;
- 33.7.14. SMOKE ALARM MODE;
- 33.7.15. LOW PRESSURE CONTROL; 33.7.16. THERMOSTAT BOUNCE RELAY;
- 33.7.17. 3-DIGIT DISPLAY AND DEGREES F OR C DISPLAY; 33.7.18. HEAT/COOL THERMOSTAT COMPATIBLE WITH WARM-UP MODE.
- 33.8. ROOM THERMOSTAT: SURFACE WALL MOUNTING (ON A RECESSED BOX) ADJUSTABLE 24 VOLT THERMOSTAT SUPPLIED LOOSE WITH THE UNIT AND EQUIPPED WITH A FAN AUTO-ON SWITCH, OFF-HEAT-COOL-AUTO SWITCH, NIGHT SET-BACK CONTROLS, AND DIGITAL THERMOMETER AND SET-POINT
- 33.9. ROOF MOUNTING CURB: MINIMUM 450 MM (18') HIGH PREFABRICATED AND INSULATED CURB CONFORMING TO REQUIREMENTS OF THE NATIONAL ROOFING CONTRACTORS ASSOCIATION.
- 33.10. SEISMIC RESTRAINT HARDWARE: FACTORY SECURED SEISMIC RESTRAINT CONNECTION HARDWARE.
- 33.11. INSTALLATION OF AIR HANDLING UNITS PACKAGED OUTDOOR
 - 33.11.1. PROVIDE OUTDOOR HEATING AND AIR CONDITIONING UNITS WHERE SHOWN.
 - 33.11.2. PROVIDE ALL REQUIRED RIGGING AND HOISTING/MOVING EQUIPMENT REQUIRED TO MOVE EACH UNIT TO THE REQUIRED LOCATIONS. DO ALL RIGGING/HOISTING/MOVING IN ACCORDANCE WITH THE UNIT MANUFACTURER'S DIRECTIONS AND DETAILS.
 - 33.11.3. SECURE BASE MOUNTING UNITS IN PLACE, LEVEL, AND PLUMB, ON A FABRICATED STEEL BASE OR CONCRETE PAD AS INDICATED.
 - 33.11.4. BRACE AND SECURE EACH UNIT IN ACCORDANCE WITH REQUIREMENTS SPECIFIED IN THE MECHANICAL WORK SECTION ENTITLED SEISMIC CONTROL AND RESTRAINT
 - 33.11.5. INSTALL ALL COMPONENTS SHIPPED LOOSE WITH THE UNITS. INSTALL IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. CALIBRATE ALL CONTROL COMPONENTS REQUIRING FIELD CALIBRATION. EXTEND CONDENSATE TRAPPED DRAINS USING SCHEDULE 40 GALVANIZED STEEL PIPING TO THE ROOF.
 - 33.11.7. PROVIDE THERMOSTATS AND WALL MOUNT ON A RECESSED BOX WHERE SHOWN. CONFIRM EXACT LOCATIONS PRIOR TO ROUGHING-IN. CONNECT COMPLETE WITH 24 VOLT CONTROL WIRING IN CONDUIT TO THE STANDARDS OF THE ELECTRICAL WORK AND THE MANUFACTURER'S CERTIFIED WIRING DIAGRAM. SET-UP AND PROGRAM THERMOSTATS IN ACCORDANCE WITH THE OWNER'S REQUIREMENTS.
- 33.11.8. CAREFULLY COORDINATE THE INSTALLATION OF EACH UNIT WITH ALL OTHER TRADES MAKING CONNECTIONS TO THE UNIT, IN PARTICULAR, POWER, INTERLOCK CONNECTIONS, AND CONTROL CONNECTIONS.
- EQUIPMENT AND SYSTEM MANUFACTURER'S CERTIFICATION: REFER TO THE ARTICLE ENTITLED EQUIPMENT AND SYSTEM MANUFACTURER'S CERTIFICATION IN THE MECHANICAL WORK SECTION ENTITLED MECHANICAL WORK GENERAL INSTRUCTIONS. 33.11.10. START-UP: REFER TO THE ARTICLE ENTITLED EQUIPMENT AND SYSTEM START-UP IN THE MECHANICAL WORK SECTION ENTITLED MECHANICAL
- WORK GENERAL INSTRUCTIONS. 33.11.11. DEMONSTRATION AND TRAINING: REFER TO THE ARTICLE ENTITLED EQUIPMENT AND SYSTEM O&M DEMONSTRATION & TRAINING IN THE MECHANICAL WORK SECTION ENTITLED MECHANICAL WORK GENERAL INSTRUCTIONS. INCLUDE FOR A ONE HALF DAY ON-SITE OPERATION DEMONSTRATION AND TRAINING SESSION. THE TRAINING IS TO BE A FULL REVIEW OF ALL COMPONENTS INCLUDING BUT NOT LIMITED TO A FULL OPERATION AND MAINTENANCE DEMONSTRATION, WITH ABNORMAL EVENTS.

TESTING, ADJUSTING, AND BALANCING

34. APPLICATION

- THIS SECTION SPECIFIES MECHANICAL SYSTEM TESTING, ADJUSTING, AND BALANCING REQUIREMENTS THAT ARE COMMON TO MECHANICAL WORK SECTIONS OF THE SPECIFICATION AND IT IS A SUPPLEMENT TO EACH SECTION AND IS TO BE READ ACCORDINGLY.
- 35. SUBMITTALS NAME AND QUALIFICATIONS OF TESTING AND BALANCING AGENCY: WITHIN THIRTY DAYS OF WORK COMMENCING AT THE SITE, SUBMIT THE NAME AND QUALIFICATIONS OF THE PROPOSED TESTING AND BALANCING AGENCY IN ACCORDANCE WITH REQUIREMENTS OF THE ARTICLE ENTITLED QUALITY
- SAMPLE TEST FORMS: SUBMIT SAMPLE TEST FORMS, IF OTHER THAN THOSE STANDARD FORMS PREPARED BY THE ASSOCIATED AIR BALANCE COUNCIL
- (AABC) OR NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB) ARE PROPOSED FOR USE. DRAWING EVALUATION REPORT: SUBMIT A REPORT BY THE AGENCY TO INDICATE THE AGENCY'S EVALUATION OF THE MECHANICAL DRAWINGS WITH RESPECT TO SERVICE ROUTING AND LOCATION OR LACK OF BALANCING DEVICES. INCLUDE THE SET OF DRAWINGS USED AND MARKED-UP BY THE AGENCY TO PREPARE THE REPORT.
- SITE VISIT REPORTS: SUBMIT A REPORT BY THE AGENCY AFTER EACH SITE VISIT MADE BY THE AGENCY DURING THE CONSTRUCTION PHASE OF THIS
- DRAFT REPORT: SUBMIT A DRAFT REPORT, AS SPECIFIED IN PART 3 OF THIS SECTION.
- 35.6. FINAL REPORT: SUBMIT A FINAL REPORT, AS SPECIFIED IN PART 3 OF THIS SECTION. WARRANTY: SUBMIT A TESTING AND BALANCING WARRANTY AS SPECIFIED IN PART 3 OF THIS SECTION.
- POST CONSTRUCTION SITE VISIT REPORTS: SUBMIT REPORTS LISTING OBSERVATIONS AND RESULTS OF POST CONSTRUCTION SITE VISITS AS SPECIFIED IN PART 3 OF THIS SECTION.
- DEFINITIONS 36.1. THE FOLLOWING ARE DEFINITIONS OF WORDS USED IN THIS SECTION: 36.1.1. "TAB" — MEANS TESTING, ADJUSTING AND BALANCING TO DETERMINE AND CONFIRM QUANTITATIVE PERFORMANCE OF EQUIPMENT AND SYSTEMS
 - AND TO REGULATE THE SPECIFIED FLUID FLOW RATE AND AIR PATTERNS AT THE TERMINAL EQUIPMENT, E.G., REDUCE FAN SPEED, THROTTLING,
 - "HYDRONIC SYSTEMS" INCLUDES HEATING WATER, CHILLED WATER, GLYCOL-WATER SOLUTION, CONDENSER WATER, AND ANY SIMILAR SYSTEM; "AIR SYSTEMS" - INCLUDES ALL OUTSIDE AIR, SUPPLY AIR, RETURN AIR, EXHAUST AIR, AND RELIEF AIR SYSTEMS;
 - "FLOW RATE TOLERANCE" MEANS THE ALLOWABLE PERCENTAGE VARIATION, MINUS TO PLUS, OF ACTUAL FLOW RATE VALUES IN THE CONTRACT DOCUMENTS "REPORT FORMS" - MEANS TEST DATA SHEETS ARRANGED FOR COLLECTING TEST DATA IN LOGICAL ORDER FOR SUBMISSION AND REVIEW. AND
 - THESE FORMS, WHEN REVIEWED AND ACCEPTED, SHOULD ALSO FORM THE PERMANENT RECORD TO BE USED AS THE BASIS FOR REQUIRED FUTURE TESTING, ADJUSTING AND BALANCING; "TERMINAL" - MEANS THE POINT WHERE THE CONTROLLED FLUID ENTERS OR LEAVES THE DISTRIBUTION SYSTEM, AND THESE ARE SUPPLY
 - INLETS ON WATER TERMINALS, SUPPLY OUTLETS ON AIR TERMINALS, RETURN OUTLETS ON WATER TERMINALS, AND EXHAUST OR RETURN INLETS ON AIR TERMINALS SUCH AS REGISTERS, GRILLES, DIFFUSERS, LOUVERS, AND HOODS; "MAIN" - MEANS THE DUCT OR PIPE CONTAINING THE SYSTEM'S MAJOR OR ENTIRE FLUID FLOW;
 - "SUBMAIN" MEANS THE DUCT OR PIPE CONTAINING PART OF THE SYSTEMS' CAPACITY AND SERVING TWO OR MORE BRANCH MAINS;
 - 36.1.9. "BRANCH MAIN" MEANS DUCT OR PIPE SERVICING TWO OR MORE TERMINALS;
 - 36.1.10. "BRANCH" MEANS DUCT OR PIPE SERVING A SINGLE TERMINAL.
- QUALITY ASSURANCE
- TESTING AND BALANCING AGENCY: EMPLOY THE SERVICES OF AN INDEPENDENT TESTING, ADJUSTING, AND BALANCING AGENCY MEETING THE QUALIFICATIONS SPECIFIED BELOW. TO BE THE SINGLE SOURCE OF RESPONSIBILITY TO TEST. ADJUST, AND BALANCE THE BUILDING MECHANICAL SYSTEMS) PRODUCE THE DESIGN OBJECTIVES. THE TESTING. ADJUSTING AND BALANCING AGENCY IS TO HAVE SUCCESSFULLY COMPLETED TESTING. ADJUSTING AND BALANCING OF MECHANICAL SYSTEMS FOR A MINIMUM OF FIVE PROJECTS SIMILAR TO THIS PROJECT WITHIN THE PAST THREE YEARS, AND IS TO BE CERTIFIED AS AN INDEPENDENT AGENCY IN ALL REQUIRED CATEGORIES BY ONE OF THE FOLLOWING:
- 37.1.1. AABC ASSOCIATED AIR BALANCE COUNCIL; 37.1.2. NEBB — NATIONAL ENVIRONMENTAL BALANCING BUREAU;
- 37.2. STANDARDS: TESTING, ADJUSTING AND BALANCING OF THE COMPLETE MECHANICAL SYSTEMS IS TO BE PERFORMED OVER THE ENTIRE OPERATING RANGE OF EACH SYSTEM IN ACCORDANCE WITH ONE OF THE FOLLOWING PUBLICATIONS: 37.2.1. NATIONAL STANDARDS FOR A TOTAL SYSTEM BALANCE PUBLISHED BY THE ASSOCIATED AIR BALANCE COUNCIL;
 - PROCEDURAL STANDARDS FOR TESTING, ADJUSTING AND BALANCING OF ENVIRONMENTAL SYSTEMS PUBLISHED BY THE NATIONAL ENVIRONMENTAL BALANCING BURFAU:
- 37.2.3. CHAPTER 37, TESTING, ADJUSTING, AND BALANCING OF ASHRAE HANDBOOK HVAC APPLICATIONS.
- 38. ACCEPTABLE LIST OF TAB FIRMS:
- 38.1. AIR & WATER PRECISION BALANCING; 38.2. DESIGNTEST & BALANCING CO LTD.;
- 38.3. FLOWSET BALANCING LTD.
- 38.4. DYMANIC FLOW BALANCING
- 39. SCOPE OF WORK PERFORM TOTAL MECHANICAL SYSTEMS TESTING. ADJUSTING, AND BALANCING. REQUIREMENTS INCLUDE MEASUREMENT AND ESTABLISHMENT OF THE FLUID QUANTITIES OF THE MECHANICAL SYSTEMS AS REQUIRED TO MEET DESIGN SPECIFICATIONS AND COMFORT CONDITIONS, AND RECORDING AND REPORTING THE RESULTS.
- 39.2. MECHANICAL SYSTEMS TO BE TESTED, ADJUSTED AND BALANCED INCLUDE: 39.2.1. DOMESTIC WATER SYSTEMS: TAB OF DOMESTIC WATER SYSTEMS (ALL PIPING EXTENDED FROM THE MUNICIPAL MAIN) IS TO INCLUDE: DOMESTIC HOT WATER RECIRCULATION PIPING;
- 39.2.1.2. TEMPERED WATER PIPING FLOWS. 39.2.2. HEATING SYSTEMS: TAB OF HEATING SYSTEMS IS TO INCLUDE ALL PIPING AND EQUIPMENT FLUID TEMPERATURES, PRESSURE, FLOWS AND CONTROL, AND IF TAB IS NOT DONE DURING THE HEATING SEASON, A FOLLOW-UP SITE VISIT DURING THE HEATING SEASON WILL BE REQUIRED
- TO CONFIRM PROPER FLOWS AND TEMPERATURES, AND ANY REQUIRED SYSTEM "FINE TUNING". COOLING SYSTEMS: TAB OF COOLING SYSTEMS IS ALSO TO INCLUDE ALL PIPING AND EQUIPMENT FLUID TEMPERATURES, FLOWS AND CONTROL, AND IF TAB IS NOT DONE DURING THE COOLING SEASON, A FOLLOW-UP SITE VISIT DURING THE COOLING SEASON WILL BE REQUIRED TO CONFIRM PROPER FLOWS AND TEMPERATURES, AND ANY REQUIRED SYSTEM "FINE TUNING".
- EXISTING SYSTEMS: ALL OF THE EXISTING SYSTEMS REVISED AS PART OF THE MECHANICAL WORK, ARE TO BE TESTED, ADJUSTED AND

AIR HANDLING SYSTEMS: TAB OF AIR HANDLING SYSTEMS IS TO INCLUDE ALL EQUIPMENT AND DUCTWORK AIR TEMPERATURES, CAPACITIES AND

BALANCED AS FOR NEW SYSTEMS.

40 TESTING ADJUSTING AND BALANCING

- 40.1. GENERAL REQUIREMENTS: CONFORM TO THE FOLLOWING REQUIREMENTS: 40.1.1. AS SOON AS POSSIBLE AFTER AWARD OF CONTRACT, THE AGENCY IS TO CAREFULLY EXAMINE A WHITE PRINT SET OF MECHANICAL DRAWINGS
- WITH RESPECT TO ROUTING OF SERVICES AND LOCATION OF BALANCING DEVICES, AND IS TO ISSUE A REPORT LISTING THE RESULTS OF THE 40.1.2. THE SET OF DRAWINGS EXAMINED BY THE AGENCY IS TO BE RETURNED WITH THE EVALUATION REPORT, WITH RED LINE MARK-UPS TO INDICATE

- LOCATIONS FOR DUCT SYSTEM TEST PLUGS, AND REQUIRED REVISION WORK SUCH AS RELOCATION OF BALANCING DEVICES AND LOCATIONS FOR ADDITIONAL DEVICES:
- 40.1.3. AFTER REVIEW OF THE MECHANICAL WORK DRAWINGS AND SPECIFICATION, THE AGENCY IS TO VISIT THE SITE AT FREQUENT, REGULAR INTERVALS DURING CONSTRUCTION OF THE MECHANICAL SYSTEMS, TO OBSERVE ROUTING OF SERVICES, LOCATIONS OF TESTING AND BALANCING DEVICES,
- WORKMANSHIP, AND ANYTHING ELSE THAT WILL AFFECT TESTING, ADJUSTING AND BALANCING; 40.1.4. AFTER EACH SITE VISIT, THE AGENCY IS TO REPORT RESULTS OF THE SITE VISIT INDICATING THE DATE AND TIME OF THE VISIT, AND DETAILED
- RECOMMENDATIONS FOR ANY CORRECTIVE WORK REQUIRED TO ENSURE PROPER ADJUSTING AND BALANCING; 40.1.5. TESTING, ADJUSTING AND BALANCING IS NOT TO BEGIN UNTIL:
- BUILDING CONSTRUCTION WORK IS SUBSTANTIALLY COMPLETE AND DOORS HAVE BEEN INSTALLED;
- MECHANICAL SYSTEMS ARE COMPLETE IN ALL RESPECTS, AND HAVE BEEN CHECKED, STARTED, ADJUSTED, AND THEN SUCCESSFULLY PERFORMANCE TESTED.
- 40.1.6. ALL MECHANICAL SYSTEMS TO BE TESTED, ADJUSTED AND BALANCED ARE TO BE MAINTAINED IN FULL, NORMAL OPERATION DURING EACH DAY OF TESTING, ADJUSTING AND BALANCING; OBTAIN COPIES OF REVIEWED SHOP DRAWINGS OF ALL APPLICABLE MECHANICAL PLANT EQUIPMENT AND TERMINALS, AND TEMPERATURE
- CONTROL DIAGRAMS AND SEQUENCES; THE AGENCY IS TO WALK EACH SYSTEM FROM THE SYSTEM "HEAD END" EQUIPMENT TO TERMINAL UNITS TO DETERMINE VARIATIONS OF INSTALLATION FROM DESIGN, AND THE SYSTEM INSTALLATION TRADES WILL ACCOMPANY THE AGENCY;
- THE AGENCY IS TO CHECK ALL VALVES AND DAMPERS FOR CORRECT AND LOCKED POSITION, AND TEMPERATURE CONTROL SYSTEMS FOR COMPLETENESS OF INSTALLATION BEFORE STARTING EQUIPMENT;
- 40.1.11. FOR BELT-DRIVEN EQUIPMENT, THE AGENCY IS TO REPORT TO THE COMMISSIONING AGENT WHO IN TURN IS TO INFORM THE CONTRACTOR AND CONSULTANT OF ANY SITUATION WHERE SHEAVES HAVE TO BE REPLACED TO SUIT TESTING AND BALANCING, AND REPLACEMENTS ARE TO BE

40.1.10. WHEREVER POSSIBLE, THE AGENCY IS TO LOCK ALL BALANCING DEVICES IN PLACE AT THE PROPER SETTING, AND PERMANENTLY MARK SETTINGS

- DONE BY THE CONTRACTOR AT NO COST: 40.1.12. THE AGENCY IS TO LEAK TEST ALL DUCTWORK AS SPECIFIED IN SECTION 23 31 05 IN ACCORDANCE WITH REQUIREMENTS OF SMACNA "HVAC AIR DUCT LEAK TEST MANUAL", COORDINATE WORK WITH THE WORK OF SECTION 23 31 05, PROVIDE DETAILED SKETCH(ES) TO SHEET METAL
- CONTRACTOR AND CONSULTANT IDENTIFYING DUCTWORK NOT IN ACCORDANCE WITH ACCEPTABLE LEAKAGE VALUES SPECIFIED IN SECTION 23 31 05 AND 23 31 06, AND RETEST CORRECTED DUCTWORK; 40.1.13. NOISE: THE AGENCY IS TO BALANCE ALL SYSTEMS WITH DUE REGARD TO OBJECTIONABLE NOISE WHICH IS TO BE A FACTOR WHEN ADJUSTING FAN SPEEDS AND PERFORMING TERMINAL WORK SUCH AS ADJUSTING AIR QUANTITIES, AND SHOULD OBJECTIONABLE NOISE OCCUR AT THE DESIGN CONDITIONS, THE AGENCY IS TO IMMEDIATELY REPORT THE PROBLEM AND SUBMIT DATA, INCLUDING SOUND READINGS, TO PERMIT AN
- ACCURATE ASSESSMENT OF THE NOISE PROBLEM TO BE MADE; 40.1.14. STRATIFICATION: THE AGENCY IS TO CHECK ALL SUPPLY AIR HANDLING SYSTEM MIXING PLENUMS FOR STRATIFICATION, AND WHERE THE VARIATION OF MIXED AIR TEMPERATURE ACROSS COILS IS FOUND TO BE IN EXCESS OF PLUS OR MINUS 5 PERCENT OF DESIGN REQUIREMENTS,
- THE AGENCY IS TO REPORT THE PROBLEM AND ISSUE A DETAIL SKETCH OF PLENUM BAFFLE(S) REQUIRED TO ELIMINATE THE STRATIFICATION; 40.1.15. TOLERANCES: THE AGENCY IS TO PERFORM TESTING, ADJUSTING AND BALANCING TO WITHIN PLUS OR MINUS 5% OF DESIGN VALUES, AND MAKE AND RECORD MEASUREMENTS USING INSTRUMENTS WITH MINIMUM ACCURACY WHICH ARE WITHIN PLUS OR MINUS 2% OF REQUIRED VALUES; 40.1.16. FILTERS FOR ALL AIR HANDLING SYSTEMS EQUIPPED WITH AIR FILTERS, TEST AND BALANCE THE SYSTEMS WITH SIMULATED 50% LOADED (DIRTY)
- FILTERS BY PROVIDING A FALSE PRESSURE DROP; 40.1.17. SEASONAL REQUIREMENTS: TEST, ADJUST AND BALANCE AIR CONDITIONING SYSTEMS DURING THE SUMMER SEASON AND HEATING SYSTEMS DURING WINTER SEASON, INCLUDING AT LEAST A PERIOD OF OPERATION AT OUTSIDE CONDITIONS WITHIN 2.8°C (5°F) WET BULB TEMPERATURE OF MAXIMUM SUMMER DESIGN CONDITION, AND WITHIN 5.5°C (10°C) DRY BULB TEMPERATURE OF MINIMUM WINTER DESIGN CONDITION, AND TAKE
- FINAL TEMPERATURE READINGS DURING SEASONAL OPERATION. 40.2. PREPARATION OF REPORTS: PREPARE REPORTS AS INDICATED BELOW.
- 40.2.1. DRAFT REPORTS: UPON COMPLETION OF TESTING, ADJUSTING, AND BALANCING PROCEDURES, PREPARE DRAFT REPORTS ON AABC OR NEBB FORMS. DRAFT REPORTS MAY BE HAND WRITTEN, BUT MUST BE COMPLETE, FACTUAL, ACCURATE, AND LEGIBLE. ORGANIZE AND FORMAT DRAFT REPORTS IN THE SAME MANNER SPECIFIED FOR THE FINAL REPORTS. SUBMIT TWO COMPLETE SETS OF DRAFT REPORTS. ONLY ONE COMPLETE SET OF DRAFT REPORTS WILL BE RETURNED.
- 40.2.2. FINAL REPORT: UPON VERIFICATION AND APPROVAL OF DRAFT REPORTS, PREPARE FINAL REPORTS, TYPE WRITTEN, AND ORGANIZED AND FORMATTED AS SPECIFIED BELOW. SUBMIT 2 COMPLETE SETS OF FINAL REPORTS. USE UNITS OF MEASUREMENT (SI OR IMPERIAL) AS USED ON THE PROJECT DOCUMENTS.
- 40.2.3. REPORT FORMAT: REPORT FORMS ARE TO BE THOSE STANDARD FORMS PREPARED BY THE REFERENCED STANDARD FOR EACH RESPECTIVE ITEM AND SYSTEM TO BE TESTED, ADJUSTED, AND BALANCED. BIND REPORT FORMS COMPLETE WITH SCHEMATIC SYSTEMS DIAGRAMS AND OTHER DATA IN REINFORCED, VINYL, THREE-RING BINDERS. PROVIDE BINDING EDGE LABELS WITH THE PROJECT IDENTIFICATION AND A TITLE DESCRIPTIVE OF THE CONTENTS. DIVIDE THE CONTENTS OF THE BINDER INTO THE DIVISIONS LISTED BELOW, SEPARATED BY DIVIDER TABS:
- 40.2.3.2. AIR SYSTEMS;

GENERAL INFORMATION AND SUMMARY:

40.2.3.1.

- TEMPERATURE CONTROL SYSTEMS; 40.2.3.3.
- 40.2.4. REPORT CONTENTS: THE AGENCY IS TO PROVIDE THE FOLLOWING MINIMUM INFORMATION, FORMS AND DATA: INSIDE COVER SHEET TO IDENTIFY THE AGENCY, THE CONTRACTOR, AND PROJECT, INCLUDING ADDRESSES, AND CONTACT NAMES AND TELEPHONE
- NUMBERS AND A LISTING OF THE INSTRUMENTATION USED FOR THE PROCEDURES ALONG WITH THE PROOF OF CALIBRATION; THE REMAINDER OF THE REPORT IS TO CONTAIN THE APPROPRIATE FORMS CONTAINING AS A MINIMUM, THE INFORMATION INDICATED ON THE
- STANDARD AABC OR NEBB REPORT FORMS PREPARED FOR EACH RESPECTIVE ITEM AND SYSTEM; THE AGENCY IS TO INCLUDE FOR EACH SYSTEM TO BE TESTED, ADJUSTED AND BALANCED, A NEATLY DRAWN, IDENTIFIED (SYSTEM DESIGNATION, PLANT EQUIPMENT LOCATION, AND AREA SERVED) SCHEMATIC "AS-BUILT" DIAGRAM INDICATING AND IDENTIFYING ALL EQUIPMENT, TERMINALS, AND
- THE AGENCY IS TO INCLUDE REPORT SHEETS INDICATING BUILDING COMFORT TEST READINGS FOR ALL ROOMS.
- 40.3. VERIFICATION OF REPORTS: AFTER THE FINAL TESTING AND BALANCING REPORT HAS BEEN SUBMITTED, THE AGENCY IS TO VISIT THE SITE WITH THE CONTRACTOR AND CONSULTANT TO SPOT CHECK RESULTS INDICATED ON THE BALANCING REPORT. THE AGENCY IS TO SUPPLY ALL LABOUR, LADDERS, AND INSTRUMENTS TO COMPLETE SPOT CHECKS. NOTE THAT IF RESULTS OF SPOT CHECKS DO NOT, ON A CONSISTENT BASIS, AGREE WITH THE FINAL REPORT. THE SPOT CHECK PROCEDURES WILL STOP AND THE AGENCY IS TO THEN REBALANCE THE SYSTEMS INVOLVED, RESUBMIT THE FINAL REPORT, AND AGAIN PERFORM SPOT CHECKS WITH THE CONTRACTOR AND CONSULTANT.
- 40.4. CERTIFICATION AND WARRANTY: WHEN THE FINAL REPORT HAS BEEN ACCEPTED, THE CONTRACTOR IS TO SUBMIT TO THE OWNER, IN THE NAME OF THE OWNER, A CERTIFICATE EQUAL TO THE AABC NATIONAL GUARANTY CERTIFICATION OR A NEBB QUALITY ASSURANCE PROGRAM BOND, AND IN ADDITION, THE CONTRACTOR IS TO SUBMIT A WRITTEN EXTENDED WARRANTY FROM THE AGENCY COVERING ONE FULL HEATING SEASON AND ONE FULL COOLING SEASON, DURING WHICH TIME ANY BALANCING PROBLEMS WHICH OCCUR, WITH THE EXCEPTION OF MINOR REVISION WORK DONE DURING SCHEDULED SITE VISITS, WILL, AT NO COST, BE INVESTIGATED BY THE AGENCY AND REPORTED ON TO THE OWNER, AND IF IT IS DETERMINED THAT THE PROBLEMS ARE A
- RESULT OF IMPROPER TESTING, ADJUSTING AND BALANCING, THEY ARE TO BE IMMEDIATELY CORRECTED WITHOUT ADDITIONAL COST TO THE OWNER. 40.5. POST BALANCING SITE VISITS: AFTER ACCEPTANCE OF THE FINAL REPORT, THE AGENCY IS TO PERFORM POST TESTING AND BALANCING SITE VISITS IN
- ACCORDANCE WITH THE FOLLOWING REQUIREMENTS:
- 40.5.1. POST TESTING AND BALANCING SITE VISITS ARE TO BE MADE: ONCE DURING THE FIRST MONTH OF BUILDING OPERATION; 40.5.1.2.
- ONCE DURING THE THIRD MONTH OF BUILDING OPERATION; ONCE BETWEEN THE FOURTH AND TENTH MONTHS IN A SEASON OPPOSITE TO THE FIRST AND THIRD MONTH VISIT.
- 40.5.2. DURING EACH RETURN VISIT AND ACCOMPANIED BY THE OWNER'S REPRESENTATIVE, THE AGENCY IS TO SPOT REBALANCE TERMINAL UNITS AS REQUIRED TO SUIT BUILDING OCCUPANTS AND ELIMINATE COMPLAINTS;
- THE AGENCY IS TO SCHEDULE EACH VISIT WITH THE CONTRACTOR AND THE OWNER. AND INFORM THE CONSULTANT: 40.5.4. AFTER EACH FOLLOW-UP SITE VISIT, THE AGENCY IS TO ISSUE TO THE CONTRACTOR AND CONSULTANT A REPORT INDICATING ANY CORRECTIVE WORK PERFORMED DURING THE VISIT, ALL ABNORMAL CONDITIONS AND COMPLAINTS ENCOUNTERED, AND RECOMMENDED CORRECTIVE ACTION.

MUNICIPALITY OF CASSELMAN

CLIENT

- PROJECT NORTH
- ISSUED FOR 99% COORDINATION 2025-02-24
- IT IS THE RESPONSIBILITY OF THE APPROPRIATE CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON SITE AND PROMPTLY REPORT ALL ERRORS AND/OR OMISSIONS TO THE CONSULTANT BEFORE WORK COMMENCES.

ISSUED FOR 66% COORDINATION

DESCRIPTION

2023-05-12

DATE

- ALL WORK IS TO FOLLOW THE OBC 2012 AND ANY OTHER APPLICABLE CODES AND REGULATIONS.

DO NOT SCALE DRAWINGS.

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PROJECT

1 INDUSTRIEL STREET OFFICE FIT-UP

DRAWING

DRAWING No:

MECHANICAL **SPECIFICATIONS**

MRK-23002008-A0 M. OMAR JUNE 2023 APPROVED AS SHOWN B. BROWN

									ROOF	TOP UNIT	SCHEDUL	E					
				COOLING			HEATING			SUPPL	Y AIR FAN		ELE	CTRICAL			
TAG	LOCATION	WEIGHT (LBS)	TOTAL CAPACITY (MBH)	SENSIBLE CAPACITY (MBH)	POWER INPUT W/O BLOWER (kW)	FUEL SOURCE	INPUT CAPACITY (MBH)	OUTPUT CAPACITY (MBH)	SUPPLY AIR (CFM)	ESP (IN WG)	POWER INPUT (kW)	MOTOR HP	POWER SUPPLY (V/PH/HZ)	MCA	MOCP	BASIS OF DESIGN	REMARKS
RTU-1	ROOFTOP AT NORTH SIDE OF BUILDING	1245	95.4	65.4	5.58	NATURAL GAS	180	146	3,300	0.75	2.01	3	575/3/60	18.8	20	YORK SINGLE PACKAGE R-454B AIR CONDITIONER MODEL # KJ090N18R5BBAAE2A1	C/W 2-STAGE NATURAL GAS HEAT, ECONOMIZER W/BAROMETRIC RELIEF AND HOODS, DUAL ENTHALPY KIT (FIELD INSTALLED)
RTU-2	ROOFTOP AT SOUTH SIDE OF BUILDING	1245	101.1	68.5	6.28	NATURAL GAS	180	146	3,300	0.75	1.83	3	575/3/60	17.3	25	YORK SINGLE PACKAGE R-454B AIR CONDITIONER MODEL # KJ102S18R5BBAAE2A1	C/W 2-STAGE NATURAL GAS HEAT, ECONOMIZER W/BAROMETRIC RELIEF AND HOODS, DUAL ENTHALPY KIT (FIELD INSTALLED)

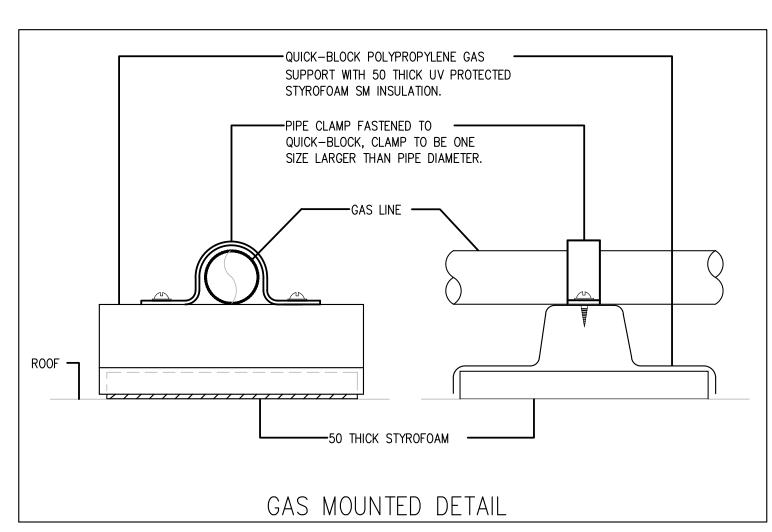
	ELECTRIC DOMESTIC HOT WATER HEATER SCHEDULE								
TAG	LOCATION	STORAGE CAPACITY (GAL.)	RECOVERY RATE @ 100°F (GAL/H)	SHIPPING WEIGHT (LBS.)	INPUT (kW)	ELECTRICAL (V/Ph/Hz)	BASIS OF DESIGN	REMARKS	
DHWT-1	JANITOR ROOM	20	21	_	5	208/3/60	A.O. SMITH DEL-20S-5		

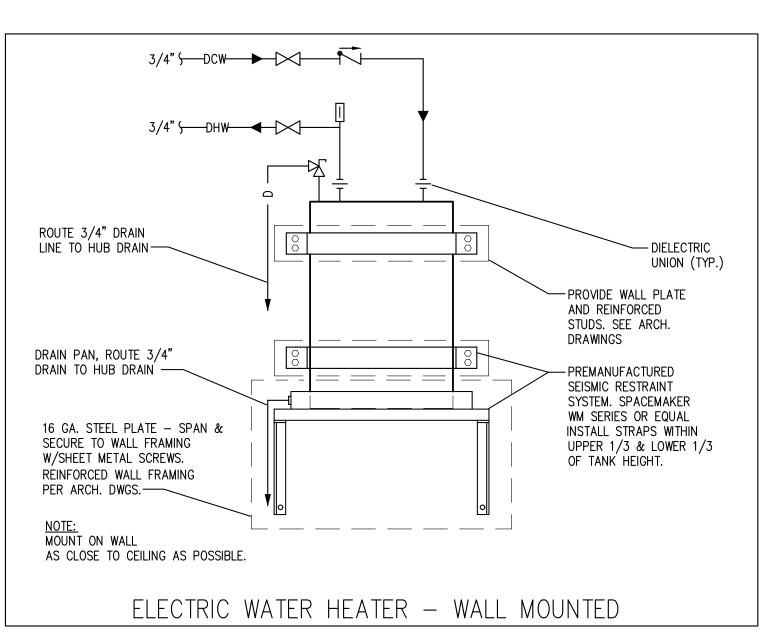
		ELEC ⁻	TRIC BASEB	OARD HEATER SCHEDULE	
TAG	kW / BTU	VOLTS/PH/HZ	LENGTH (IN)	BASIS OF DESIGN	REMARKS
B-1	0.5 / 1706	120/1/60	22	STELPRO - CODE#SPR0501W	C/W INTEGRAL THERMOSTAT
B-2	0.75 / 2560	208/1/60	36	STELPRO - CODE#SPR1002W	C/W INTEGRAL THERMOSTAT
B-3	1 / 2560	208/1/60	36	STELPRO - CODE#SPR1002W	C/W INTEGRAL THERMOSTAT
B-4	1.5 / 2560	208/1/60	50	STELPRO - CODE#SPR1508W	C/W INTEGRAL THERMOSTAT

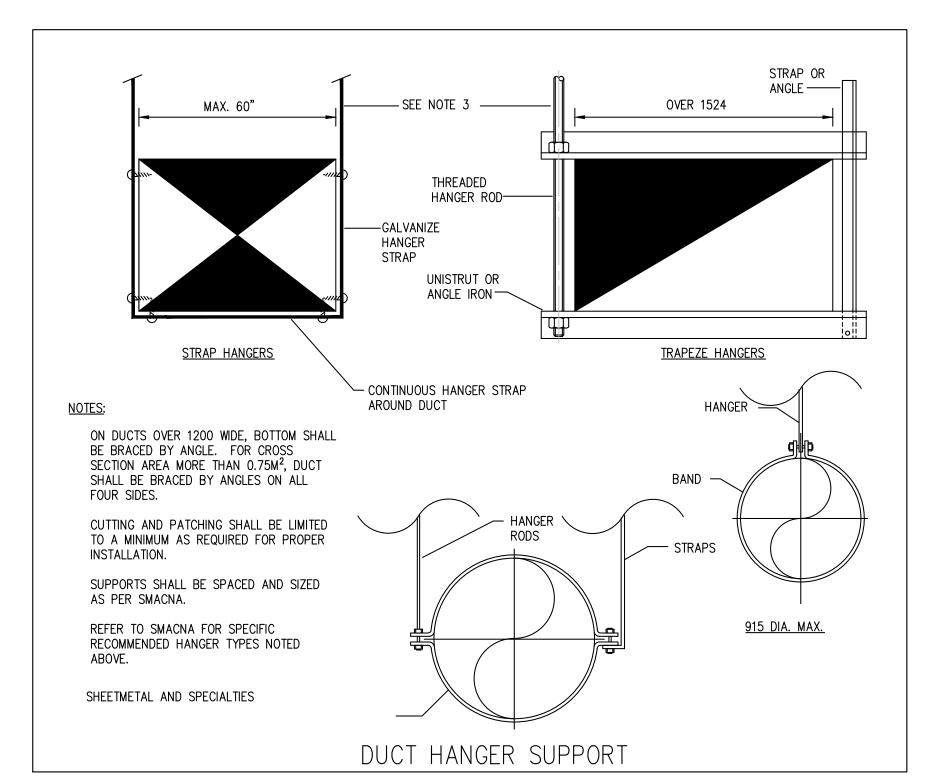
	(GRILLE AND	DIFFUSER S	CHEDULE	
TAG	TYPE	FACE SIZE (IN X IN)	NECK SIZE (IN)	BASIS OF DESIGN	REMARKS
D-1	SUPPLY DIFFUSER	24" X 24"	SHOWN IN PLANS	EH PRICE SCD	
D-2	SUPPLY DIFFUSER	12" X 12"	6"	EH PRICE SCD	
D-3	SUPPLY DIFFUSER	-	SHOWN IN PLANS	EH PRICE RCD	
G-1	EGG CRATE RETURN GRILLE	24" X 4"	-	EH PRICE 80	
G-2	EGG CRATE RETURN GRILLE	24" X 24"	-	EH PRICE 80	
ALL GRILLES AND REGI	ISTERS TO BE COLOUR B12 (WHITE)	•	,		

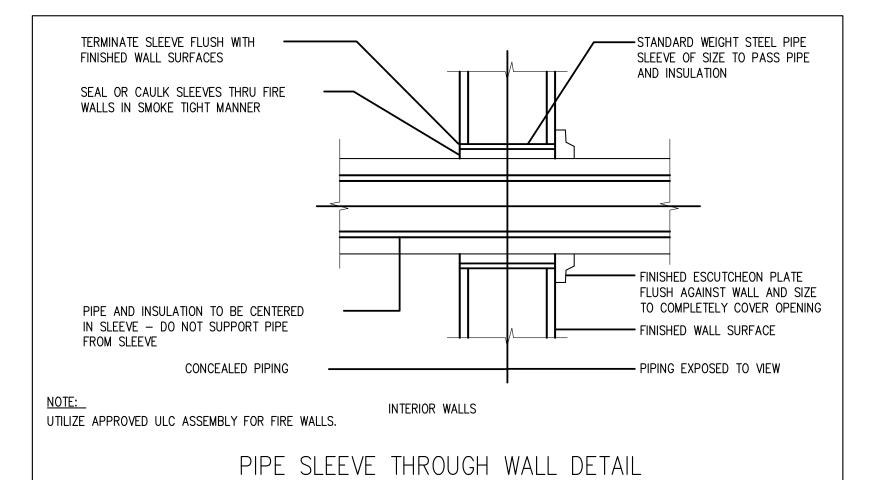
	FAN SCHEDULE									
TAG	LOCATION	TYPE	AIR FLOW (CFM)	SP (IN WG)	BASIS OF DESIGN	REMARKS				
EF-1	BF WASHROOM 216	INLINE EXHAUST FAN	70	0.25	GREENHECK SP-A70	INTERLOCK WITH WASHROOM LIGHT. COORDINATE WITH ELECTRICAL				
EF-2	JANITOR 217	INLINE EXHAUST FAN	70	0.25	GREENHECK SP-A70	INTERLOCK WITH LIGHT. COORDINATE WITH ELECTRICAL				
EF-3	WASHROOM 218	INLINE EXHAUST FAN	70	0.25	GREENHECK SP-A70	INTERLOCK WITH WASHROOM LIGHT. COORDINATE WITH ELECTRICAL				
EF-4	WASHROOM 219	INLINE EXHAUST FAN	70	0.25	GREENHECK SP-A70	INTERLOCK WITH WASHROOM LIGHT. COORDINATE WITH ELECTRICAL				
EF-5	WASHROOM 220	INLINE EXHAUST FAN	70	0.25	GREENHECK SP-A70	INTERLOCK WITH WASHROOM LIGHT. COORDINATE WITH ELECTRICAL				
EF-6	WASHROOM 221	INLINE EXHAUST FAN	70	0.25	GREENHECK SP-A70	INTERLOCK WITH WASHROOM LIGHT. COORDINATE WITH ELECTRICAL				
TF-1	IT ROOM 213	INLINE CABINET FAN	200	0.5	GREENHECK CSP-A250-QD	INTERLOCK WITH THERMOSTAT				
TF-2	ELECTRICAL ROOM 201	INLINE CABINET FAN	200	0.5	GREENHECK CSP-A250-QD	INTERLOCK WITH THERMOSTAT				

		PLUMBING FIXTURE SCHEDU	JLE 			
TAG	TYPE	DESCRIPTION		INECTION SIZE	E (IN)	REMARKS
			C.W.	H.W.	DRAIN	
WC-1	WASHROOM TOILET	AMERICAN STANDARD CADET RIGHT HEIGHT ELONGATED PRESSURE-ASSISTED TOILET 1.6 GPF	1/2	_	3	BARRIER FREE
L-1	WASHROOM SINK	MONOLITH B SERIES SINK (38"X 24") C/W AN ANGLED PIPE SKIRT AND ZURN AQUASPEC Z82200-XL SINGLE CONTROL FAUCET	1/2	1/2	1 1/2	BARRIER FREE
L-2	WASHROOM SINK	MONOLITH A SERIES SINK (30"X 24") C/W AN ANGLED PIPE SHIRT AND ZURN AQUASPEC Z82200-XL SINGLE CONTROL FAUCET	1/2	1/2	1 1/2	
S-1	KITCHEN SINK	COUNTER MOUNTED, DOUBLE COMPARTMENT SINK, CONSTRUCTED FROM 18 GAUGE TYPE 304 STAINLESS STEEL, WITH OVERALL DIMENSION 794 MM (31-1/4") LONG, 460 MM (18-1/8") WIDE, 203 MM (8") HIGH. C/W CHICAGO FAUCETS 434-ABCP FAUCET, MCGUIRE LFBV2165 SUPPLY, MCGUIRE 8912CB P-TRAP	1/2	1/2	1 1/2	
JS-1	JANITOR SINK	MOLDED HIGH DENSITY COMPOSITE BASIN, PVC DRAIN BODY, STAINLESS STEEL STRAINER AND 2" GASKETED OUTLET CONNECTION, C/W AMERICAN STANDARD SINK FAUCET MODEL #GUS29RT22	1/2	1/2	2	









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MUNICIPALITY OF CASSELMAN

PROJECT NORTH

ISSUED FOR 99% COORDINATION 2025-02-24 ISSUED FOR 66% COORDINATION 2023-05-12 DESCRIPTION DATE

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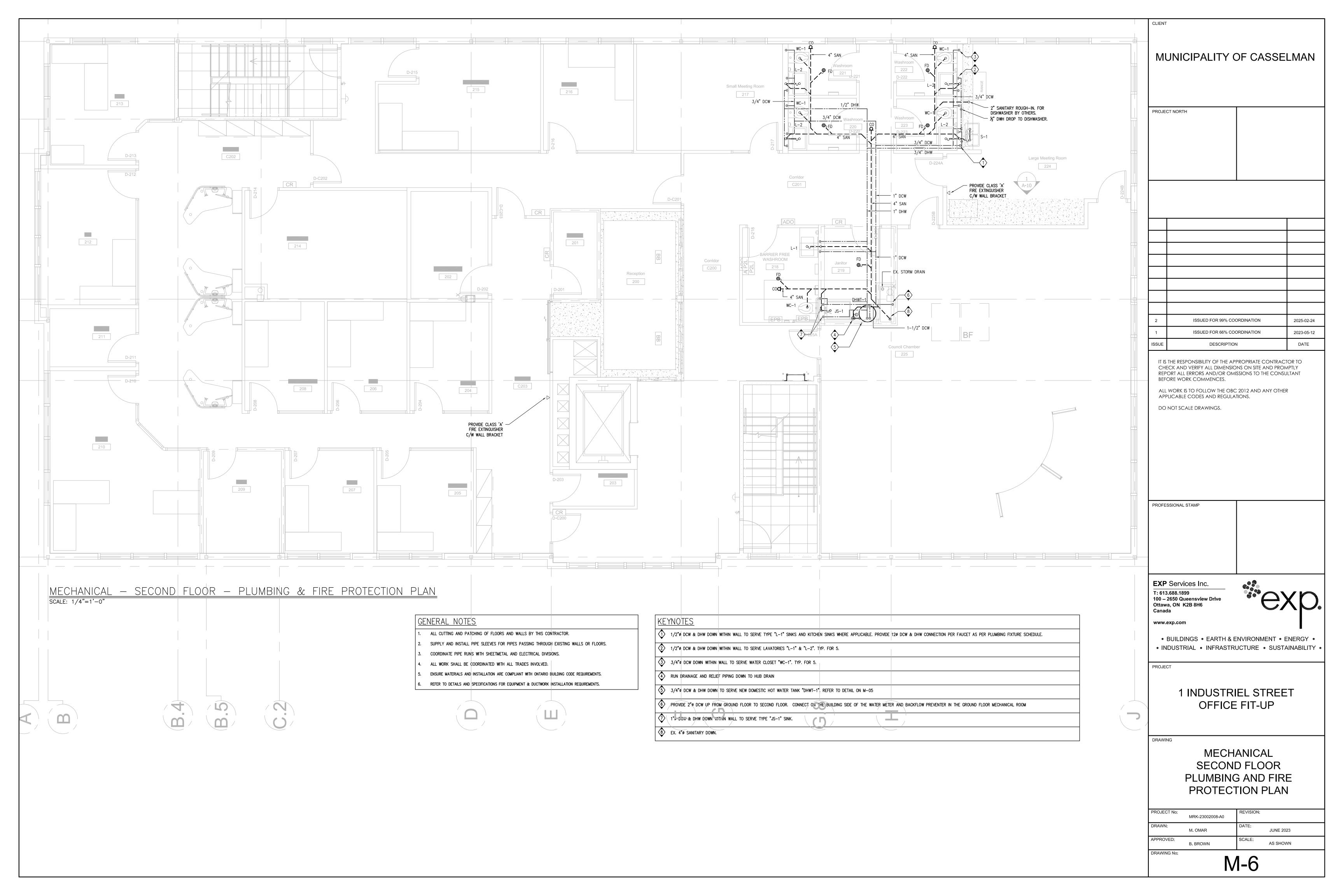
1 INDUSTRIEL STREET OFFICE FIT-UP

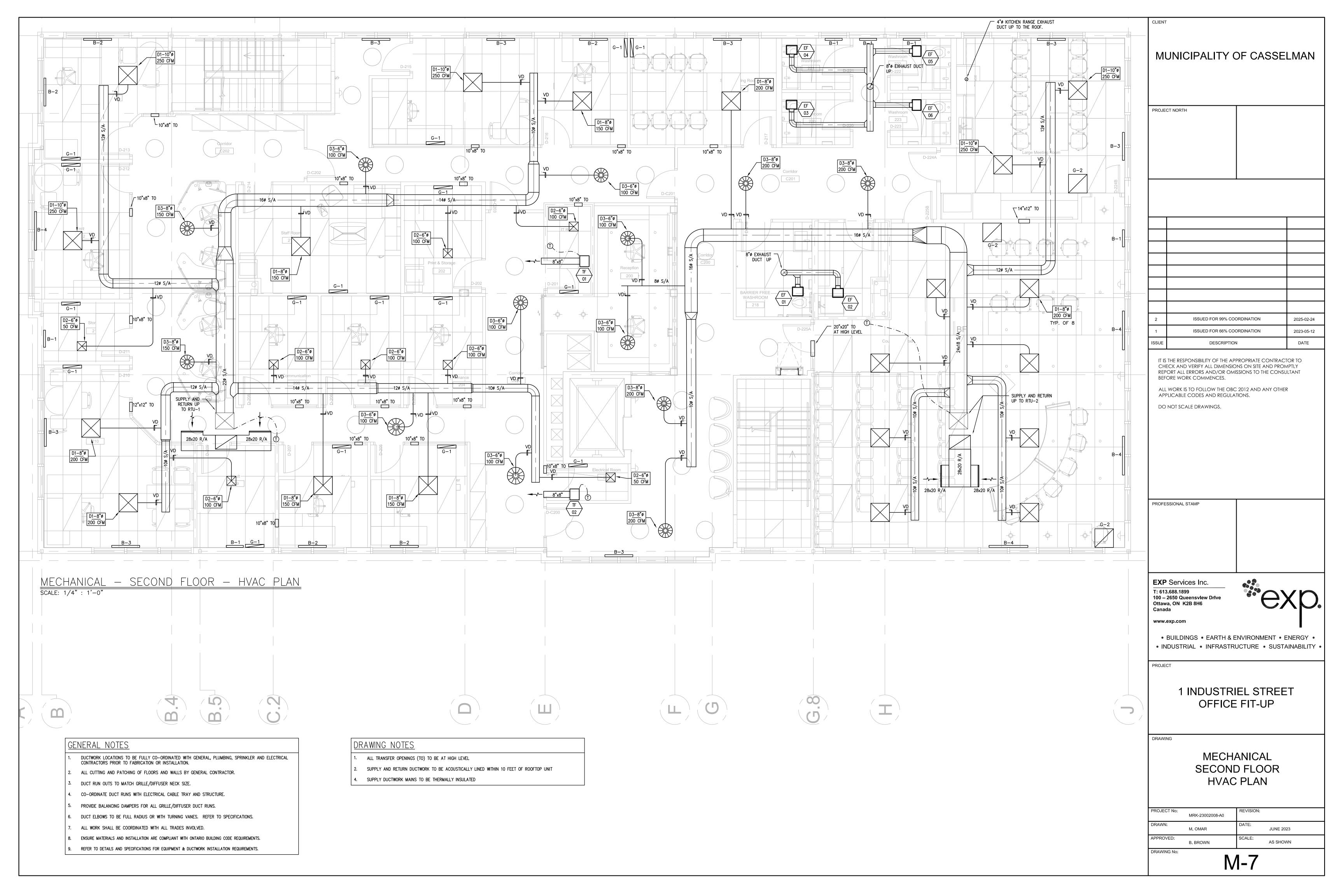
DRAWING

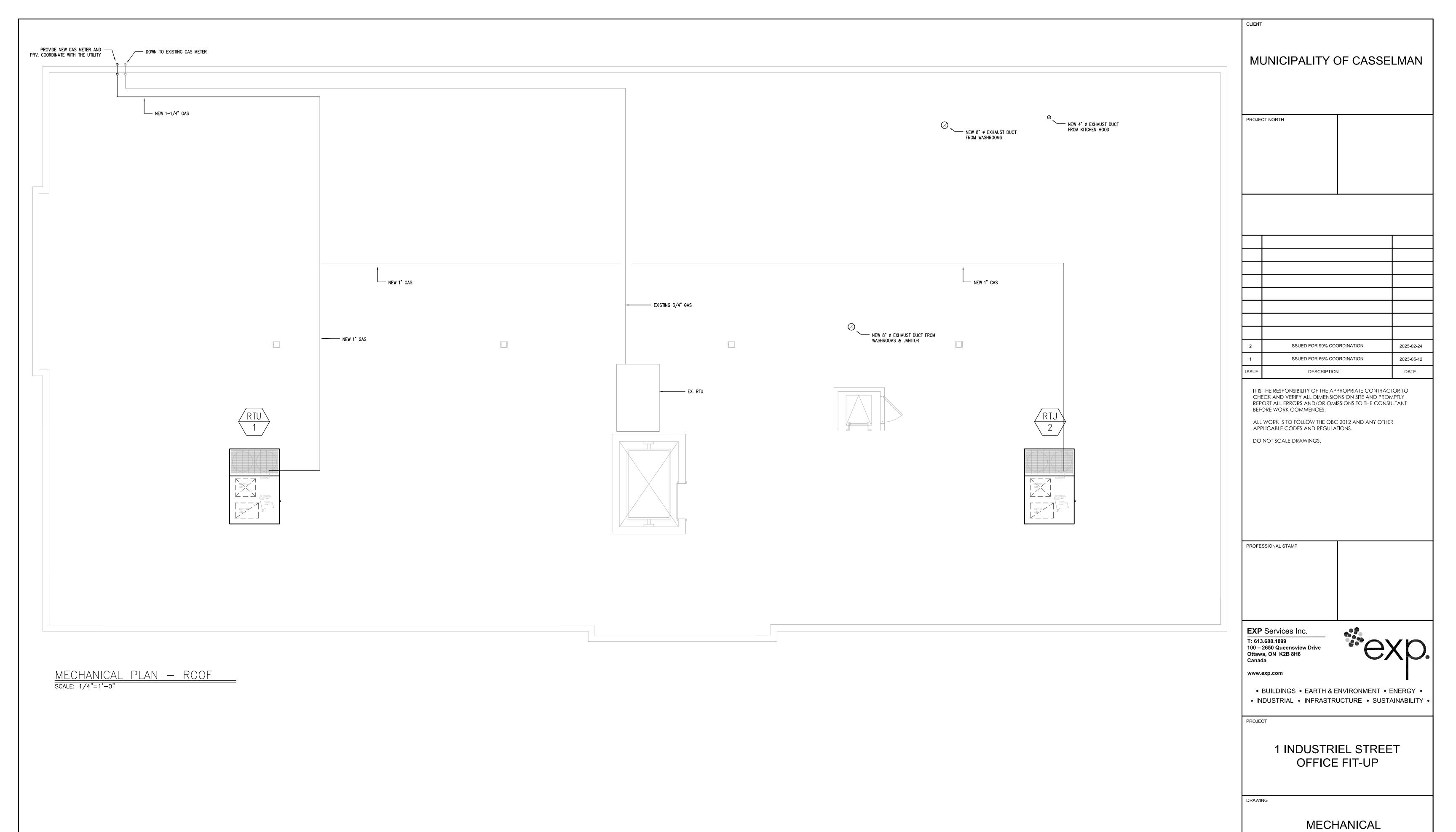
MECHANICAL SCHEDULES AND DETAILS

MRK-23002008-A0 M. OMAR JUNE 2023 AS SHOWN B. BROWN DRAWING No:

M-5







MRK-23002008-A0

ROOF PLAN

DRAWN:

M. OMAR

DATE:

JUNE 2023

APPROVED:

B. BROWN

DRAWING No:

M-8

Municipality of Casselman Office Fit-Up

Washroom Design Concept



Prepared by Pye & Richards – Temprano & Young Architects Inc.

824 Meath St, Ottawa, ON,

(613) 724-7700



Floating Sink Concept:







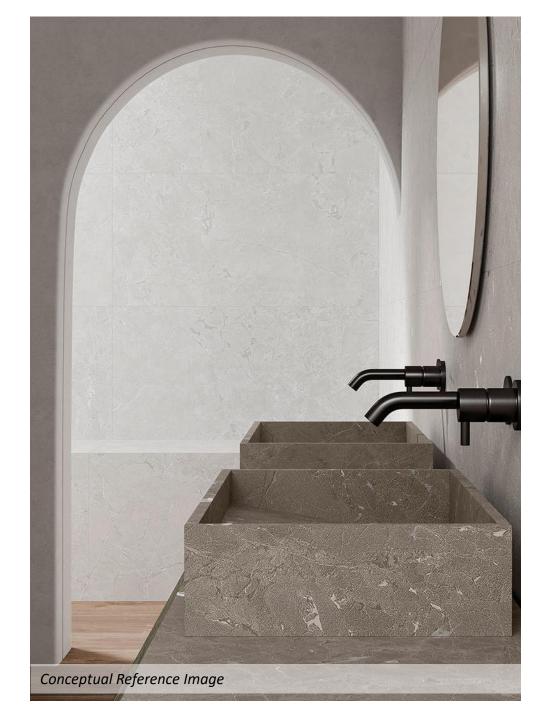
Wall Tile (textured, behind sink only) Centura: Avorio – Cortina \$7.95 sq.ft.

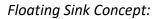




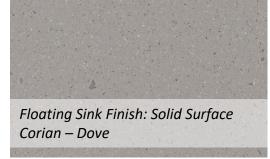


\$6.40 sq.ft.







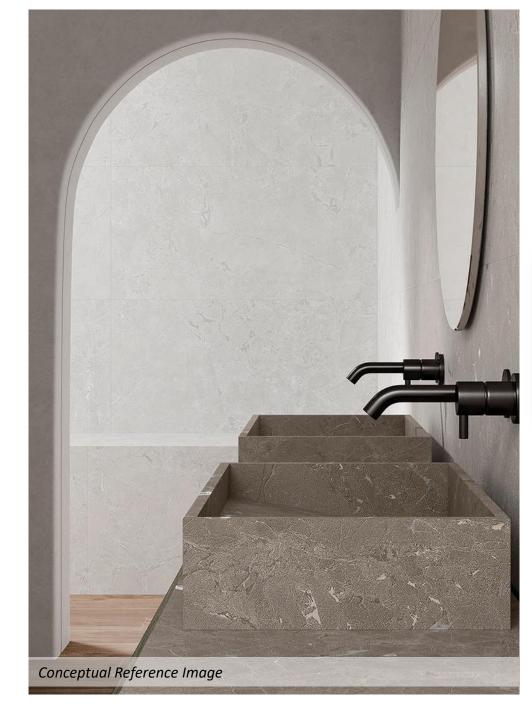


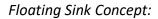


ACT Grid & Tiles











Floating Sink Finish: Solid Surface Corian – Designer White









Municipality of Casselman Office Fit-Up

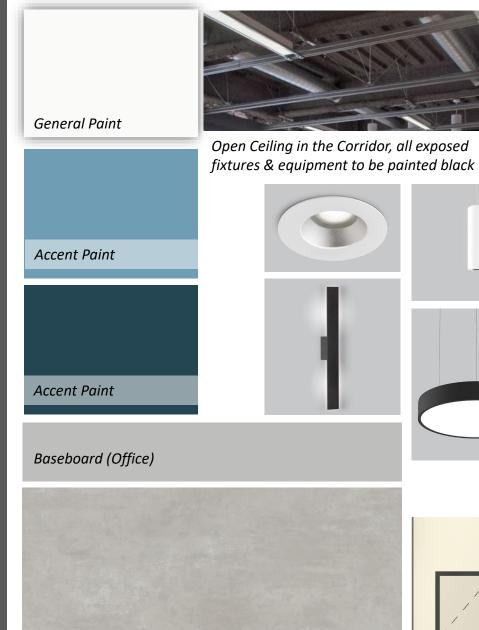
Final Design Concept



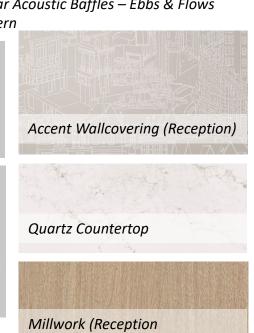
Prepared by Pye & Richards – Temprano & Young Architects Inc.

824 Meath St, Ottawa, ON,

(613) 724-7700









LVT Flooring or Polished Concrete (Reception & Washroom

General Paint

ACT Ceiling Grid and Tiles in Council Chamber with Linear Acoustic Baffles – Ebbs & Flows Pattern in smoke colour, Suspended over Millwork



Suspended Light Fixture, centered in the room (Closed Session)

ACT Grid & Tiles (Closed Session)



Quartz Countertop

Cabinet Colour



Wood Veneer -Millwork & Wall

Accent Wallcovering



Baseboard

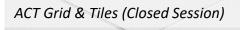






General Paint

ACT Ceiling Grid and Tiles in Council Chamber with Linear Acoustic Baffles – Ebbs & Flows Pattern in Whisper Colour, Suspended over Millwork





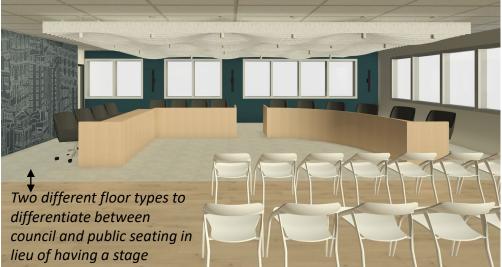
Suspended Light Fixture, centered in the room (Closed Session)



Cabinet Colour











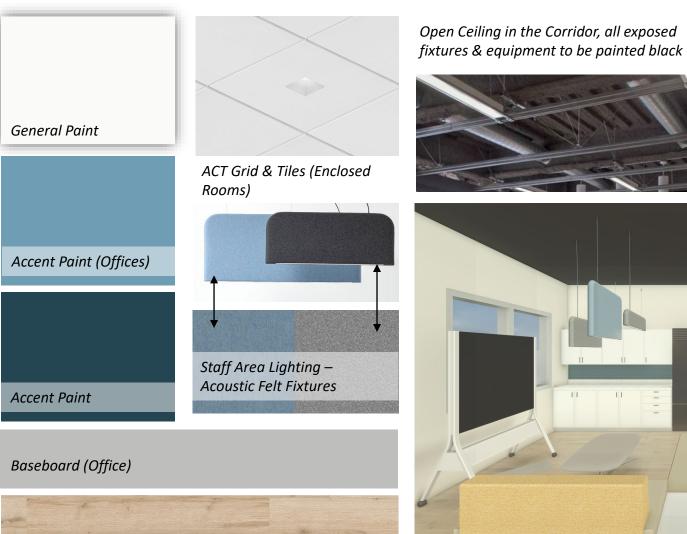




Accent Wallcovering

Baseboard

Accent Paint





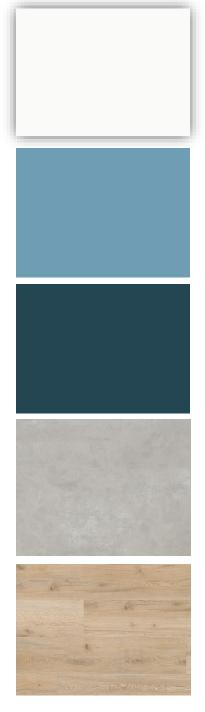


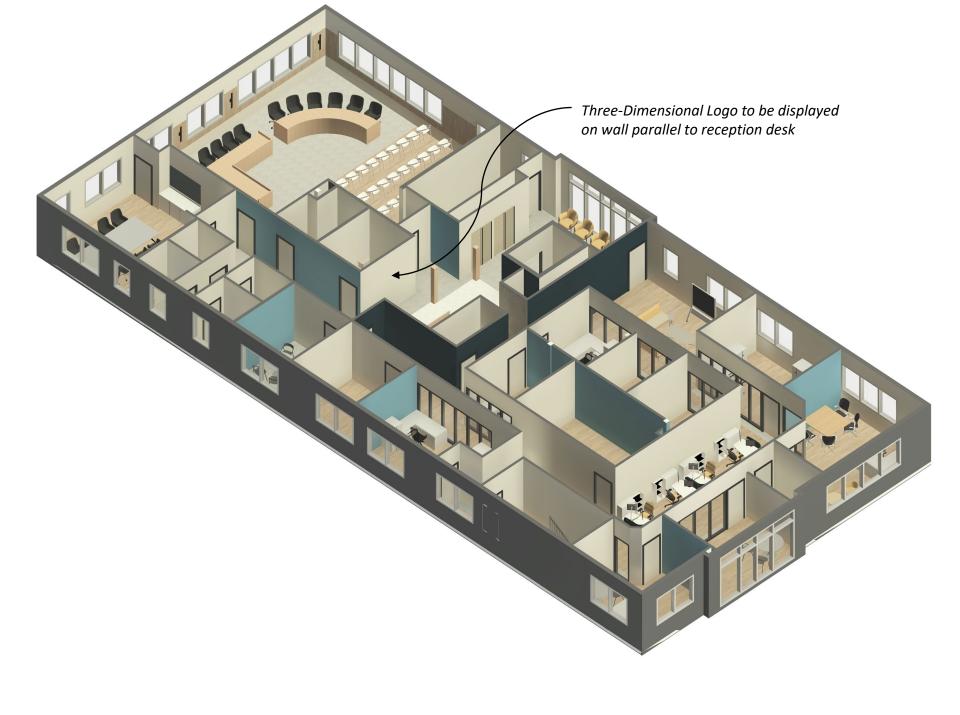
Countertop Cabinet Colour

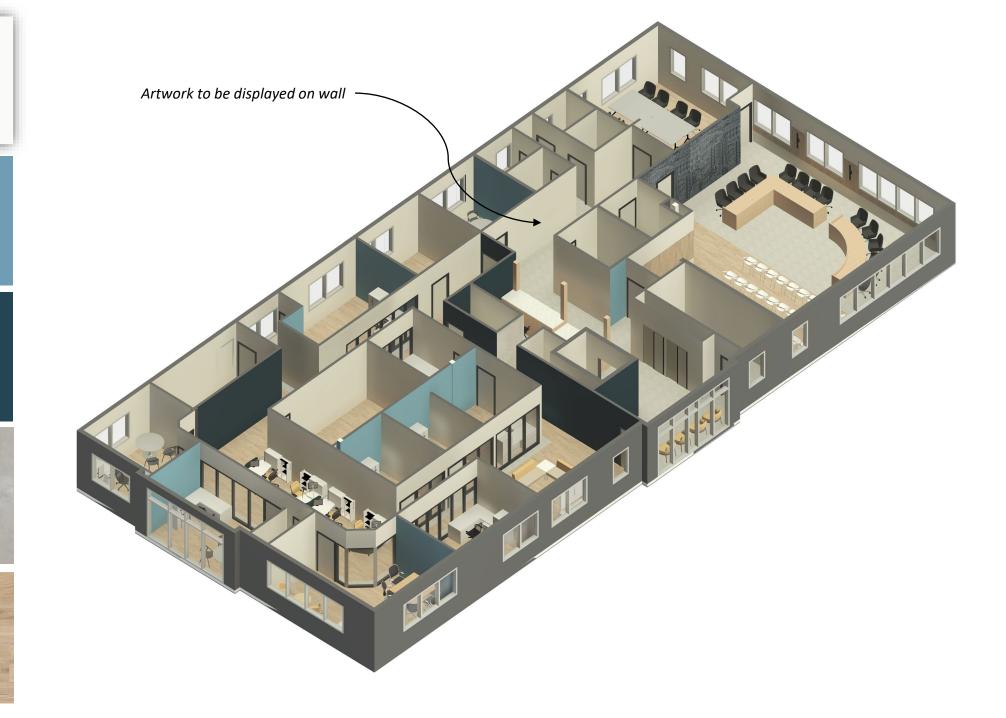


LVT Flooring Used for Wayfinding to offices, located under glazing)

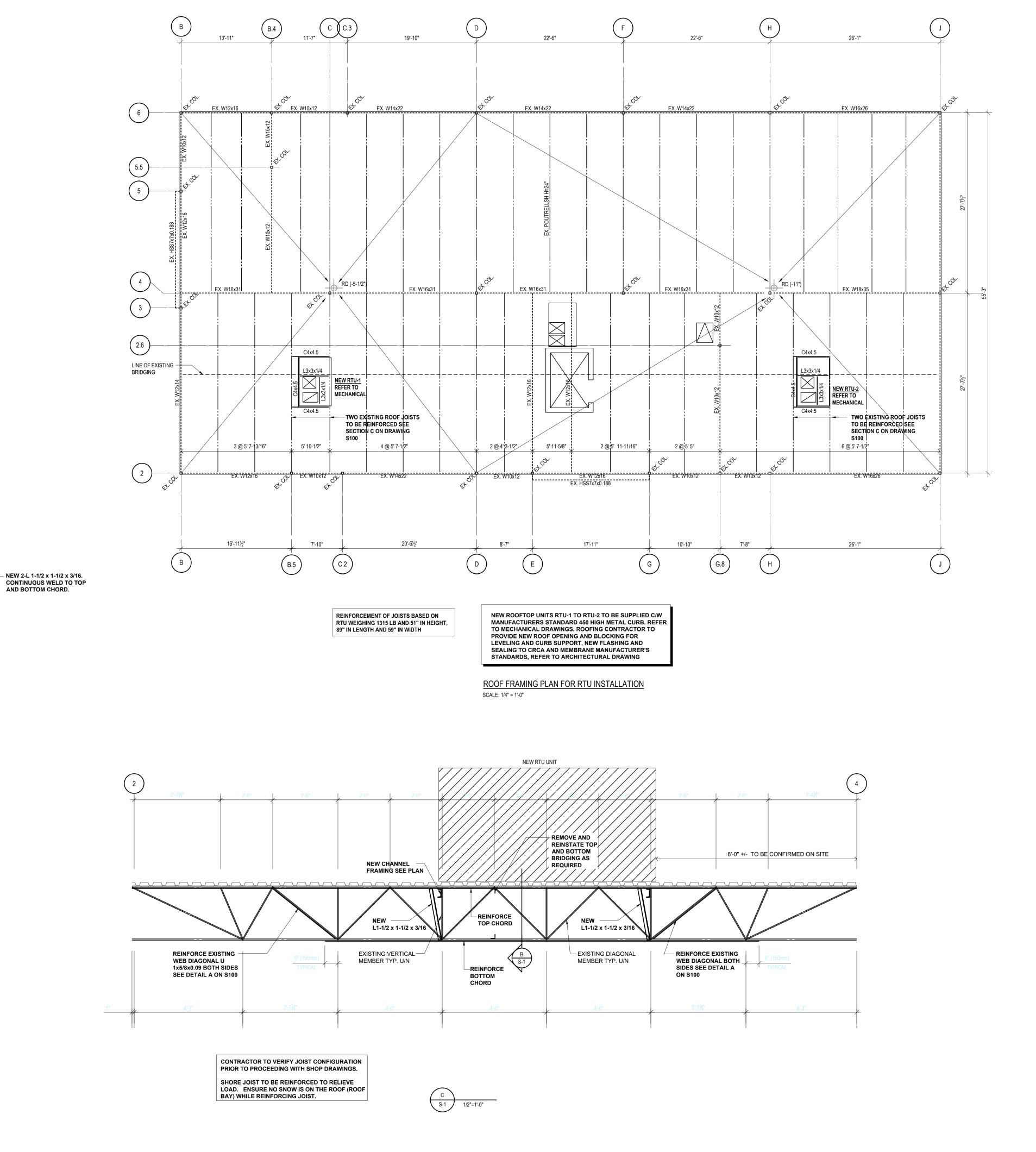
LVT Flooring (Office)











1-1/2" MIN. LONG 0.118" 0.118"

EXISTING TOP & — BOTTOM CHORDS

0.236" | 3" @ 12" 0.236" | 3" @ 12"

DO NOT STAGGER WELDS

0.118" 3" @ 12" 0.118" 3" @ 12"

EXISTING VERTICAL

EXISTING DIAGONAL - WEB FRAMING

WEB FRAMING

JOIST REINFORCEMENT DETAIL FOR WEB DIAGONAL

1-1/2" MIN. LONG 0.118" 0.118"

EXISTING 2 - L 1-3/4" x 1-3/4" x0.157"

- EXISTING U DIAGONAL AND VERTICAL

- EXISTING 2 - L 1-5/8" x 1-5/8" x 0.118"

WEB MEMBERS MEMBER TYP.

-NEW 6" (150) x 1/4" (6.4) PLATE

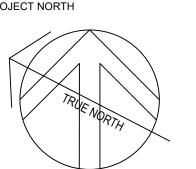
- NEW 2 - 19 (3/4") DIA ROD

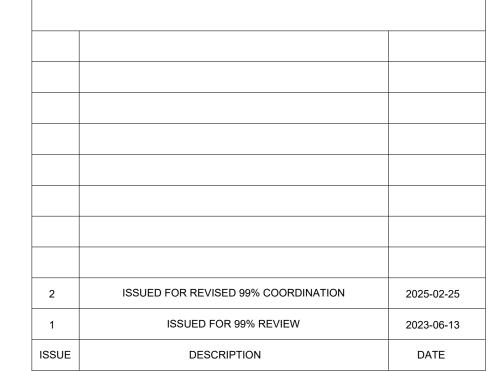
AND BOTTOM CHORD.

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1 INDUSTRIEL STREET OFFICE FIT-UP

DRAWING No:

ROOF FRAMING PLAN SECTION AND DETAILS

PROJECT No: REVISION: MRK-23002008-A0 MAY 2023 APPROVED: SCALE: AS SHOWN KAB

S-1

GENERAL NOTES

- CHECK ALL DIMENSIONS ON STRUCTURAL DRAWINGS WITH OTHER DRAWINGS AND EXISTING SITE CONDITIONS. REPORT ANY INCONSISTENCIES BEFORE PROCEEDING WITH THE WORK. DO NOT SCALE THESE DRAWINGS.
- 2. ALL WORK SHALL COMPLY WITH CURRENT PROVISIONS OF THE ONTARIO BUILDING CODE, THE WORKPLACE SAFETY AND INSURANCE BOARD AND BEST TRADE PRACTICES. WORK SHALL COMPLY WITH ALL LOCAL AND PROVINCIAL REGULATIONS AND WITH APPLICABLE C.S.A. STANDARDS. IN ALL CASES, THE LATEST EDITIONS OF CODES AND STANDARDS SHALL APPLY.
- 3. STRUCTURAL DESIGN COMPLIES WITH THE MINIMUM STANDARDS OF PART 4 OF THE ONTARIO BUILDING CODE 2025.
- 4. BEFORE SUBMITTING TENDERS CONTRACTORS SHALL CAREFULLY EXAMINE EXISTING CONDITIONS TO ESTABLISH THE EXTENT OF THE WORK.
- 5. CONFIRM OWSJ MEMBER SIZES TO ENGINEER AT LOCATIONS TO BE REINFORCED PRIOR TO PROCEEDING WITH WORK.
- 6. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY BRACING, AND SHORING NECESSARY TO UNDERTAKE THE WORK.
- 7. WHERE MECHANICAL EQUIPMENT IS SUPPORTED ON CURBS DIRECTLY ON ROOF DECK PROVIDE WEDGES IN FLUTES OF DECK UNDER SLEEPER AT STRUCTURAL SUPPORT (BEAMS, JOISTS).
- 8. THE CONTRACTOR IS RESPONSIBLE FOR REMOVING EXCESS MATERIALS AND CLEANING UP ON COMPLETION OF THE WORK.

MATERIALS SPECIFICATIONS

TOUCH UP FIELD COAT.

- ROLLED STRUCTURAL STEEL SHAPES GENERAL REQUIREMENTS TO CSA-S16:19, ROLLED SHAPES TO CSA- G40.21-13(R2023), 350W MINIMUM. ANGLES AND PLATES, 300W MINIMUM.
- 2. WELDING TO CSA-W59-13, E49XXCH OR LH BASIC ELECTRODES CONFORMING TO
- CSA-W48:23.

 3. PRIME PAINT TO STRUCTURAL STEEL TO CAN/CGSB-1.40, ONE SHOP COAT, ONE

SUBMITTALS

1. SUBMIT STRUCTURAL SHOP DRAWINGS TO CONSUULTANT.

FIELD QUALITY CONTROL

1. INSPECTION AND TESTING COMPANY SHALL PERFORM INSPECTION OF WELDED JOINTS, GENERAL INSEPCTION OF FIELD CUTTING AND ALTERATIONS AND GENERAL INSPECTION OF COATING TOUCH-UP.

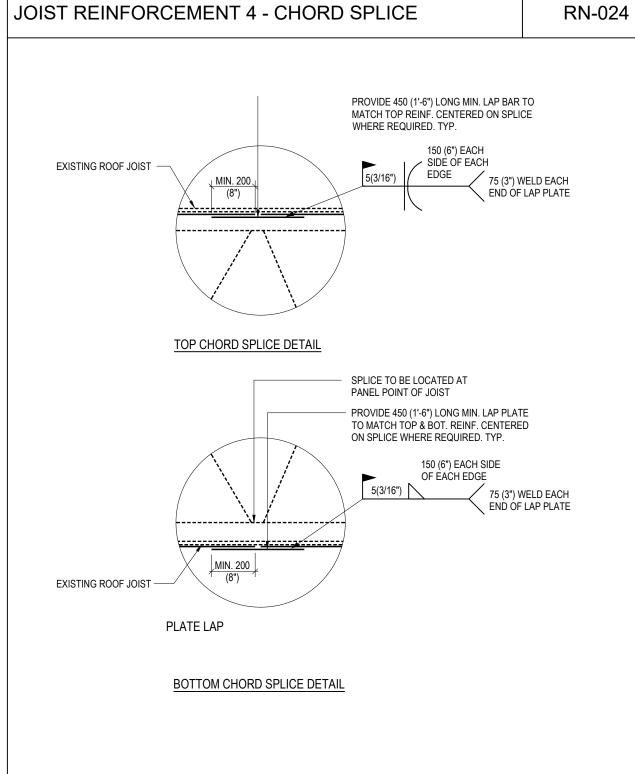
DESIGN LOADS AS INDICATED ON STRUCTURAL DRAWING S4 REV. 1 PREPARED BY SOLIDER AND DATED 2012-04-27

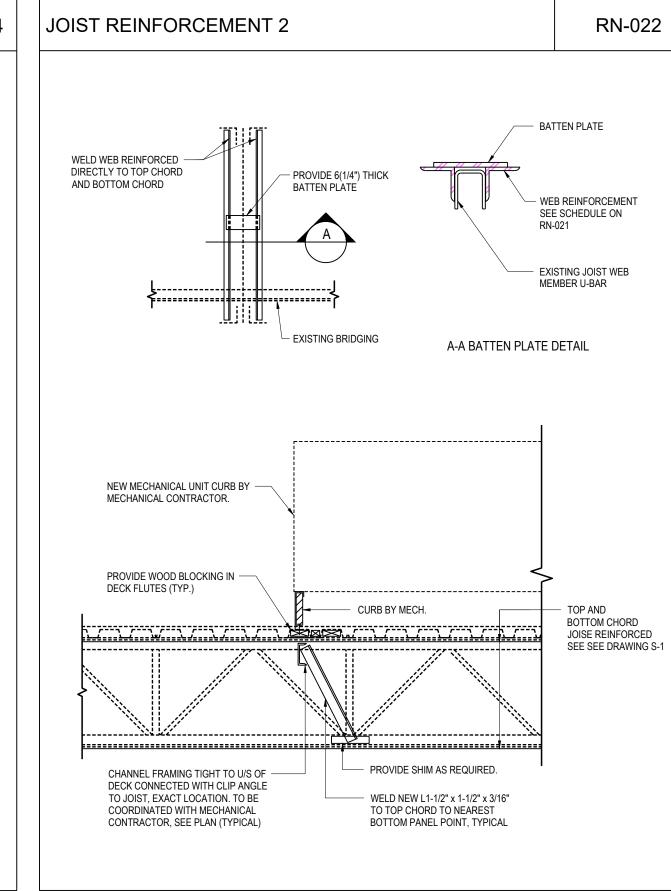
ROOF

TOTAL DEAD LOAD 23 psf (1.1 kN/m²)

LIVE (SNOW) S = Ss (Cb Cw Cs Ca) + Sr = 48.5 psf (2.32 kN/m²)

NEW MECHANICAL RTUS SEE PLAN



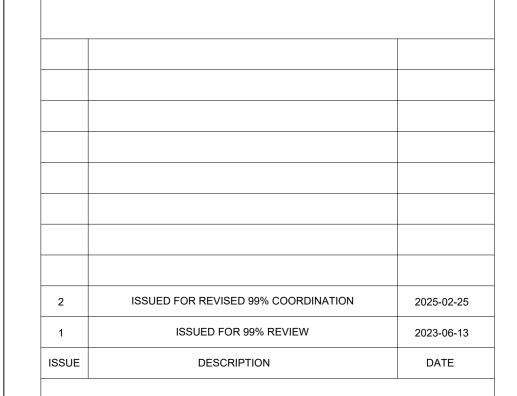


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1 INDUSTRIEL STREET OFFICE FIT-UP

DRAWING

GENERAL NOTES
TYPICAL DETAILS

PROJECT No:

MRK-23002008-A0

DRAWN:

CJ

DATE:

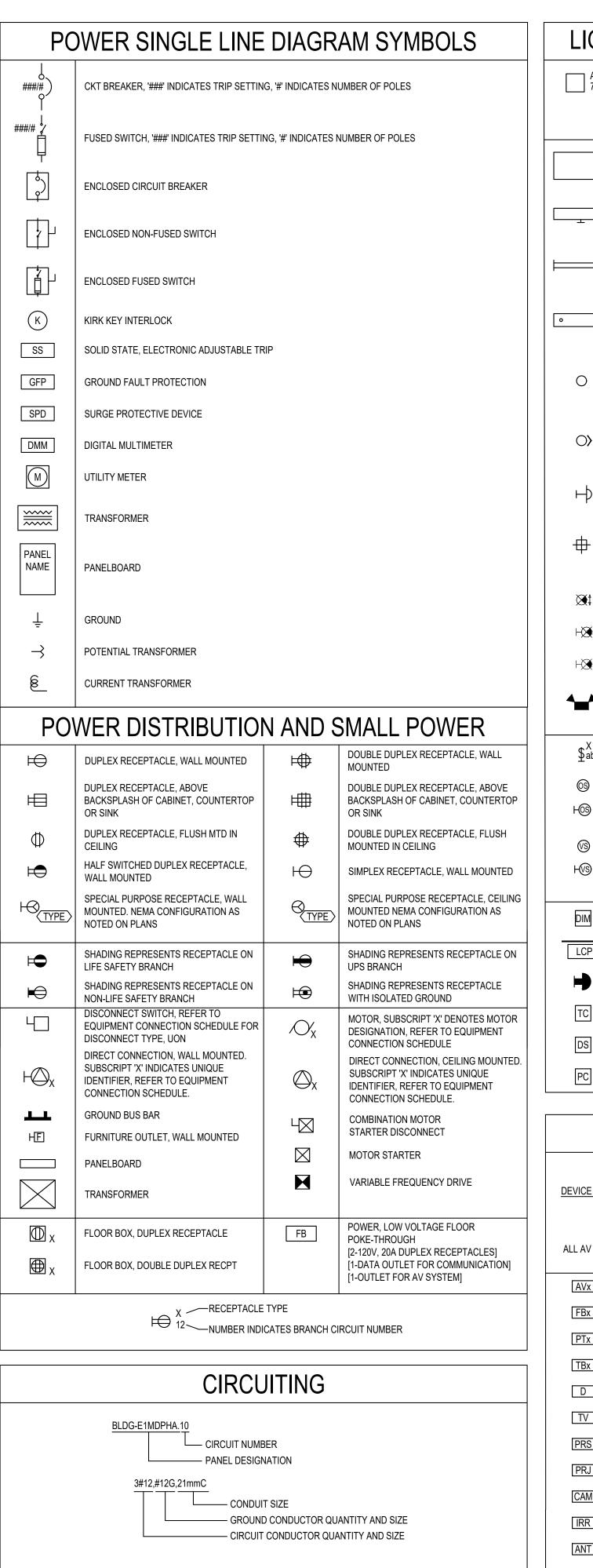
MAY 2023

APPROVED:

KAB

DRAWING No:

S-2



TAGS AND CALL OUT SYMBOLS

1

DETAIL CALLOUT

A THE DETAIL DESIGNATION

► SHEET NUMBER

REVISION CALLOUT

KEYNOTE CALLOUT

LIGH	TING, LIGHITNG SV	VITCHIN	NG & CONTROLS
AF10 7ab	UPPER CASE LETTERS INDICATE LIGH	HTING FIXTURE TY	/PE
	NUMBER INDICATES CIRCUIT NUMBER INDICATES SWITCHLEG	R, LOWER CASE L	ETTER
	LIGHTING FIXTURE ON NORMAL BRANCH POWER - CEILING MOUNTED		LIGHTING FIXTURE ON EMERGENCY BRANCH POWER OR EMERGENCY BALLAST - CEILING MOUNTED
	LIGHTING FIXTURE ON NORMAL BRANCH POWER - WALL MOUNTED		LIGHTING FIXTURE ON EMERGENCY BRANCH POWER OR EMERGENCY BALLAST - WALL MOUNTED
	STRIP LIGHTING FIXTURE ON NORMAL BRANCH POWER		STRIP LIGHTING FIXTURE ON EMERGENCY BRANCH POWER OR EMERGENCY BALLAST
o o	PENDANT LINEAR FIXTURE ON NORMAL BRANCH POWER	•	PENDANT LINEAR FIXTURE ON EMERGENCY BRANCH POWER OR EMERGENCY BALLAST
0	DOWNLIGHT LIGHTING FIXTURE ON NORMAL BRANCH POWER - RECESSED MOUNTED	•	DOWNLIGHT LIGHTING FIXTURE ON EMERGENCY BRANCH POWER OR EMERGENCY BALLAST - RECESSED MOUNTED
\bigcirc	WALL WASH LIGHTING FIXTURE ON NORMAL BRANCH POWER - ARROW INDICATES DIRECTION OF BEAM	•>	WALL WASH LIGHTING FIXTURE ON EMERGENCY BRANCH POWER OR EMERGENCY BALLAST - ARROW INDICATES DIRECTION OF BEAM
\mapsto	WALL SCONCE LIGHTING FIXTURE ON NORMAL BRANCH POWER - WALL MOUNTED	+	WALL SCONCE LIGHTING FIXTURE ON EMERGENCY BRANCH POWER OR EMERGENCY BALLAST - WALL MOUNTED
+	BOLLARD LIGHT FIXTURE ON NORMAL BRANCH POWER	+	BOLLARD ON EMERGENCY BRANCH POWER OR EMERGENCY BALLAST
≥ ‡	EXIT SIGN - SINGLE FACE - CEILING MOUNTED	† ₩‡	EXIT SIGN - DUAL FACE - CEILING MOUNTED
⊢∕	EXIT SIGN - SINGLE FACE - WALL MOUNTED	- 	EXIT SIGN - DUAL FACE - WALL MOUNTED
⊢≫ _{LL}	LOW LEVEL EXIT SIGN - SINGLE FACE - WALL OR DOOR MOUNTED	⊢	SINGLE REMOTE EMERGENCY LIGHT - WALL MOUNTED
	DUAL HEAD EMERGENCY LIGHT WITH INTEGRAL BATTERY PACK - WALL MOUNTED	♦	DUAL REMOTE EMERGENCY LIGHT - WALL MOUNTED
\$ ^X \$ab	SPST SWITCH, WALL MOUNTED.		
<u> </u>	OCCUPANCY SENSOR, CEILING MOUNTED	ASSOCIATE	ES INDIVIDUAL GANGED SWITCHES AND O SWITCH LEGS CONTROLLED, SUBSCRIPT 'X'
⊬⊚	OCCUPANCY SENSOR, WALL MOUNTED	INDICATES:	
(§) H(§)	VACANCY SENSOR, CEILING MOUNTED VACANCY SENSOR, WALL MOUNTED	2 - DOUBLE PO 3 - THREE WAY 4 - FOUR WAY D - WALL BOX	Y LV - LOW VOLTAGE P - PILOT LIGHT
DIM X	DIMMING CONTROL STATION, SUBSCRIPT 'X'	INDICATES TYPE	OR UNIQUE IDENTIFIER
LCP	LIGHTING CONTROL PANEL		
	SHUNT TRIP PUSH BUTTON		
TC X	TIME CLOCK, SUBSCRIPT 'X' INDICATES UNIC	ONE IDENTIFIED	
		AOL IDEIXIII IEN	
DS X	DAYLIGHT SENSOR, CEILING MOUNTED		
PC X	AUDIOVISUAL S	YSTEM	DEVICES
DEVICE LEGEN		M <u>→</u>	MOUNTING TAG
ALL AV SYSTE	DEVICE TAG — AA		
AVx	AV CONNECTIVITY PLATE "x" DENOTE	S TYPE. REFER TO	O AV SYSTEMS DETAILS
FBx			D AV SYSTEMS DETAILS
PTx		S TYPE. REFER TO	D AV SYSTEMS DETAILS
TBx	TABLE BOX "x" DENOTE	S TYPE. REFER TO	O AV SYSTEMS DETAILS
D	DISPLAY	RSP	ROOM SCHEDULING PANEL
TV	TELEVISION OUTLET	RSS	ROOM SCHEDULING SIGN

	RFLR	
	ARL	
DEVICES		_
	JB	-
DUNTING TAG ECONDARY ATTRIBUTE	JB	
BY MOUNTING TAG		_
AV SYSTEMS DETAILS	< R >	_
AV SYSTEMS DETAILS	< RL >	
AV SYSTEMS DETAILS		
AV SYSTEMS DETAILS	< EX >	
ROOM SCHEDULING PANEL	< NL >	
ROOM SCHEDULING SIGN		-
BUTTON PANEL		
AV SYSTEM SPEAKER	A AFCI	
SUBWOOFER SPEAKER	AFF	
LOCAL CREDENZA RACK	ATS	
AV RACK	CK	
	EMT	
SHADE/DRAPE INTERFACE TO AV SYSTEM	EP	
MICROPHONE	F	
TOUCH SCREEN	FL	
LIGHTING INTERFACE TO AV SYSTEM	GFCI	
	GFI USB	
	USD	_

BP

S

SUB

LCR

AVR

SI

MIC

TS

LI

PROJECTOR SCREEN

AV SYSTEM CAMERA

NFRARED RADIATOR

AV SYSTEM ROOM OCCUPANCY SENSOR

AV SYSTEM PARTITION SENSOR

BACnet INTERFACE TO AV SYSTEM

PHOTOMETRIC SENSOR

PROJECTOR

ANTENNA

LS

		TELECOMMUNIC	ATIONS	SYSTEM
	◁	WALL MOUNT VOICE OUTLET	abla	FLOOR MOUNT VOICE OUTLET
	•	WALL MOUNT DATA OUTLET		FLOOR MOUNT DATA OUTLET
	◀	WALL MOUNT DATA/VOICE OUTLET	V	FLOOR MOUNT DATA/VOICE OUTLET
	WAP	CEILING MOUNT DATA FOR WIRELESS ACCESS POINT		
İ	DEVICE LEGEND)		
	∢ x →	── NUMBER OF DATA JACKS ◀ X	//Y → NU	MBER OF DATA/VOICE JACKS
		NUMBER OF VOICE JACKS		
	NO SUBSCRIP	T = (1) DATA/VOICE		
	MOUNTING:	()		
		NTING HEIGHTS TO BE COORDINATED WITH IN	TERIOR DESIGNER	DURING DD PHASE
Į				
		SECURITY	/ SYSTE	EM
	DEVICE LEGEN	ND		
		DEVICE TAG — ► A	M - N	MOUNTING TAG SECONDARY ATTRIBUTE
	ALL SECURITY	SYSTEM DEVICES ARE WALL MOUNTED UNLE	SS OTHERWISE IN	DICATED BY MOUNTING TAG
	ACP	ACCESS CONTROL PANEL	ADO	AUTO DOOR OPERATOR
	ALM	ALARM DEVICE	CR	CARD READER

ALL SECURI	TY SYSTEM DEVICES ARE WALL MOUNTED UNLES	SS OTHERWISE II	NDICATED BY MOUNTING TAG
ACP	ACCESS CONTROL PANEL	ADO	AUTO DOOR OPERATOR
ALM	ALARM DEVICE	CR	CARD READER
DC	DOOR CONTACT	DCR	DOOR CONTROLLER
EL	ELECTRIFIED LOCKSET	EP	ELECTRIFIED PANIC HARDWARE
ES	ELECTRIC STRIKE	(GB)	GLASS BREAK DETECTOR
IC	INTERCOM	ID	INTRUSION DETECTION DEVICE
KP	KEYPAD	KEY	KEY SWITCH
ML	MAGNETIC LOCK	MS	MOTION SENSOR
PB	PUSH BUTTON	PNL	PANEL / CONTROLLER
PO	PUSH TO OPEN PLATE	PX	POWER TRANSFER
LFE	LOW FREQUENCY EXCITER	REX	REQUEST TO EXIT DEVICE
\bigcirc	INFRARED READER	SEN	ALARM SENSOR
RDU	REMOTE DISPLAY UNIT	SPS	SECURITY SYSTEM POWER SUPPLY
LAR	LOCAL AREA RECEIVER	SVR	SERVER
(a)	DIRECTIONAL PASSIVE TAG DETECTOR	WKS	SECURITY WORKSTATION
IRC	INFRARED CURTAIN	H	CCTV CAMERA, WALL-MOUNTED
RFR	RF READER		CCTV CAMERA, CEILING-MOUNTED
RFM	RF READER MASTER	RFER	RF ETHERNET READER
RFLR	RF LONG RANGE READER	DL	LED DOME LIGHT WITH SOUNDER
ARL	ASSISTANCE REQUEST LED ANNUNCIATOR WITH SOUNDER	PL	PUSH TO LOCK

	MISCELLANE	EOUS DE	VICES
JB	JUNCTION BOX, WALL MOUNTED	1 17 157 1	ONTACTOR, SUBSCRIPT 'X' INDICATES INIQUE IDENTIFIER
JB	JUNCTION BOX, CEILING MOUNTED		ONTROL RELAY & REQUIRED INPUT/OUTPUT IODULE
	DEN	MOLITION	
< R >	EXISTING TO BE REMOVED		- DEMOLITION CONDUIT
< RL >	EXISTING TO BE RELOCATED		DEMOLITION EQUIPMENT
< EX >	EXISTING TO REMAIN		EXISTING TO REMAIN CONDUIT
< NL >	EXISTING - NEW LOCATION		EXISTING TO REMAIN EQUIPMENT
	ABBRE	VIATIONS	3

	ABBREVIATIONS										
А		ANALOG	MCB	MAIN CIRCUIT BREAKER							
AF	-CI	ARC FAULT CIRCUIT INTERRUPTOR	MCC	MOTOR CONTROL CENTER							
AFI	F	ABOVE FINISHED FLOOR	MD	MOTORIZED DAMPER							
AT:	S	AUTOMATIC TRANSFER SWITCH	MH	MOUNTING HEIGHT							
CK	(CLOCK HANGER	NC	NORMALLY CLOSED							
CL	-	CEILING MOUNTED	NO	NORMALLY OPEN							
EM	ΛT	ELECTRICAL METALLIC TUBING	OC	OVER THE COUNTER							
EP	o	EXPLOSION PROOF	PTZ	PAN, TILT, ZOOM							
F		FURNITURE OR MILLWORK MOUNTED	ST	SHUNT TRIP							
FL		FLOOR MOUNTED	TP	TAMPER PROOF							
GF	-CI	GROUND FAULT CIRCUIT INTERRUPTER	TV	OUTLET AT TV HEIGHT. COORDINATE ON SITE.							
GF	=	GROUND FAULT INTERRUPTER	WP	WEATHER PROOF							
US	SB	USB TYPE OF RECEPTACLE									

	DRAWING LIST
E-01	ELECTRICAL LEGEND, GENERAL NOTES, AND DRAWING LIST
E-02	ELECTRICAL DEMOLITION PLAN
E-03	POWER & SYSTEM SECOND FLOOR LAYOUT- NEW WORK
E-04	ELECTRICAL ROOF LAYOUT- NEW WORK
E-05	LIGHITNG SECOND FLOOR LAYOUT- NEW WORK
E-06	ELECTRICAL SCHEDULE AND DIAGRAM
E-07	ELECTRICAL DETAILS
E-08	ELECTRICAL SPECIFICATIONS
E-09	COMMUNICATIONS SPECIFICATIONS
E-10	COMMUNICATIONS SPECIFICATIONS
E-11	SECURITY SPECIFICATIONS
E-12	SECURITY SPECIFICATIONS

- ALL DRAWINGS ARE DIAGRAMMATIC ONLY. THE ARRANGEMENTS OF EQUIPMENT SHOWN ARE APPROXIMATIONS ONLY AND MAY BE ALTERED BY THE ENGINEERS TO MEET THE REQUIREMENTS OF THE PROJECT. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE CONSULTANT'S, AND MECHANICAL DRAWINGS FOR LOCATION OF ALL DEVICES. ALL EXISTING ELECTRICAL SYSTEMS, INCLUDING BUT NOT LIMITED TO EQUIPMENT DEVICES AND CONNECTIONS, SHALL REMAIN UNLESS SPECIFICALLY NOTED TO BE REMOVED. DURING CONSTRUCTION IF REQUIRED/IMPACTED BY OTHER WORKS, CONTRACTOR TO TEMPORARILY REMOVE/RELOCATE ELECTRICAL SYSTEMS AND/OR PROVIDE TEMPORARY CONNECTIONS ON SITE TO ALLOW CONSTRUCTION OF OTHERS WORKS. EXISTING ELECTRICAL SYSTEM ARE TO REMAIN FUNCTIONAL DURING THE CONSTRUCTION.
- MAINTAIN EXISTING FIRE ALARM, EXIT SIGNS AND EMERGENCY LIGHTS IN FULL OPERATION DURING THE ENTIRE CONSTRUCTION STAGE. WHERE DISRUPTION TO LIFE SAFETY SYSTEM ARE REQUIRED, PROVIDE CONTINUOUS MONITORING DURING SHUT DOWN PERIOD AND ENSURE THAT ALL SYSTEMS ARE REACTIVATED PRIOR TO LEAVING THE SITE AT THE END OF EACH WORKING DAY.
- ALL OPENINGS, IF APPLICABLE, SHALL BE SEALED WITH APPROVED FIRE STOP MATERIAL. ANY FIREPROOFING MATERIAL REMOVED WILL BE REPLACED WITH A SUITABLE AND APPROVED FIREPROOFING MATERIAL AND SHALL BE INSTALLED AS PER MANUFACTURER'S RECOMMENDATIONS TO APPLICABLE BUILDING AND FIRE CODES.
- CONTRACTOR SHALL BE RESPONSIBLE FOR ALL REFINISHING OF DAMAGED BUILDING AREAS AND FINISHES AFFECTED BY THE WORK AS OUTLINED UNDER SCOPE OF WORK OF THIS PROJECT. SHOULD ANY EXISTING SYSTEM BE DAMAGED, MAKE FULL REPAIR/REPLACES WITHOUT EXTRA COST, AND TO THE SATISFACTION OF CONSULTANT.
- CONTRACTOR TO PROVIDE WRITTEN NOTICE TO OWNER FOR ANY SHUTDOWN REQUIRED.
- CONTRACTOR IS RESPONSIBLE FOR STORAGE AND PROTECTION OF ALL EXISTING ITEMS WHICH WILL BE RELOCATED/REUSED IN THIS PROJECT.
- EXPOSED ELECTRICAL CORDS OUTSIDE THE LEASED PREMISES SHALL NOT BE PERMITTED.
- CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF ALL THE WORK WITH ALL OTHER TRADES, CONSULTANTS, AND THE OWNER. ALL WORK SHALL BE SCHEDULED AND CARRIED OUT BY THE CONTRACTOR IN A MANNER TO ENSURE CONTINUED AND NON-INTERRUPTED OPERATION OF EXISTING FACILITY.
- CONTRACTOR SHALL IDENTIFY AND LABEL CLEARLY ALL CIRCUITS, WIRING, SERVICES, JUNCTION BOXES, PULLBOXES, DEVICES AND EQUIPMENT INSTALLED AND CONNECTED UNDER THE SCOPE OF WORK OF THIS PROJECT. IDENTIFICATION SHALL BE AS PER OWNER'S REQUIREMENTS AND ALL MARKINGS SHALL BE OF NON-ERASEABLE LAMACOID TYPE. COORDINATE ALL LABELING WITH THE OWNER AND CONSULTANT.
- CONTRACTOR TO PAY FOR AND OBTAIN ALL REQUIRED PERMITS, FEES, LICENSES, CERTIFICATES OF INSPECTION ETC IF REQUIRED.
- CONTRACTOR TO REPORT BACK TO THE ENGINEER AND OWNER ON ANY ELECTRICAL SYSTEM FAILURES THAT OCCUR DURING THE CONSTRUCTION PHASE.
- PHASING AND SCHEDULING OF THE WORK IS REQUIRED IN ORDER TO MAINTAIN EXISTING BUILDING OPERATIONS. INCLUDE COSTS FOR "OFF-HOURS" WORK.
- FOR ALL LUMINAIRES THAT EXCEED 150V SHOWN, SUPPLY AND INSTALL NEW LUMINAIRES DISCONNECT THAT
- COMPLY WITH RECOMMENDATION SPECIFIED IN CANADIAN ELECTRICAL CODE, RULE 30-308(4). ALL NEW RELOCATED FIXTURES (THAT EXCEED 150V) SHALL BE MARKED IN A CONSPICUOUS LEGIBLE AND PERMANENT MANNER ADJACENT TO THE CONNECTING MEANS, IDENTIFYING THE SPECIFIC PURPOSES.
- NEW AND EXISTING ELECTRICAL WIRING AND CABLES EXPOSED WITHIN THE CEILING SPACES SHALL CONFORM TO THE PLENUM REQUIREMENTS OF ONTARIO BUILDING CODE SENTENCE 3.6.4.3. (1).

END, GENERAL NOTES, AND DRAWING LIST		MUNICIPALITY OF CASSELMAN				
		MONI	OII ALITT	OI CAGGE		
OLITION PLAN						
M SECOND FLOOR LAYOUT- NEW WORK						
LAYOUT- NEW WORK		PROJECT NORTI	Н			
D FLOOR LAYOUT- NEW WORK						
EDULE AND DIAGRAM						
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GENERAL NOTES						

IT IS THE RESPONSIBILITY OF THE APPROPRIATE CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON SITE AND PROMPTLY REPORT ALL ERRORS AND/OR OMISSIONS TO THE CONSULTANT BEFORE WORK COMMENCES.

ISSUED FOR REVISED 99% REVIEW

ISSUED FOR 99% COORDINATION

ISSUED FOR 66% COORDINATION

DESCRIPTION

2025-02-19

2023-06-13

2023-05-12

DATE

ALL WORK IS TO FOLLOW THE OBC 2012 AND ANY OTHER APPLICABLE CODES AND REGULATIONS.

DO NOT SCALE DRAWINGS.

ISSUE

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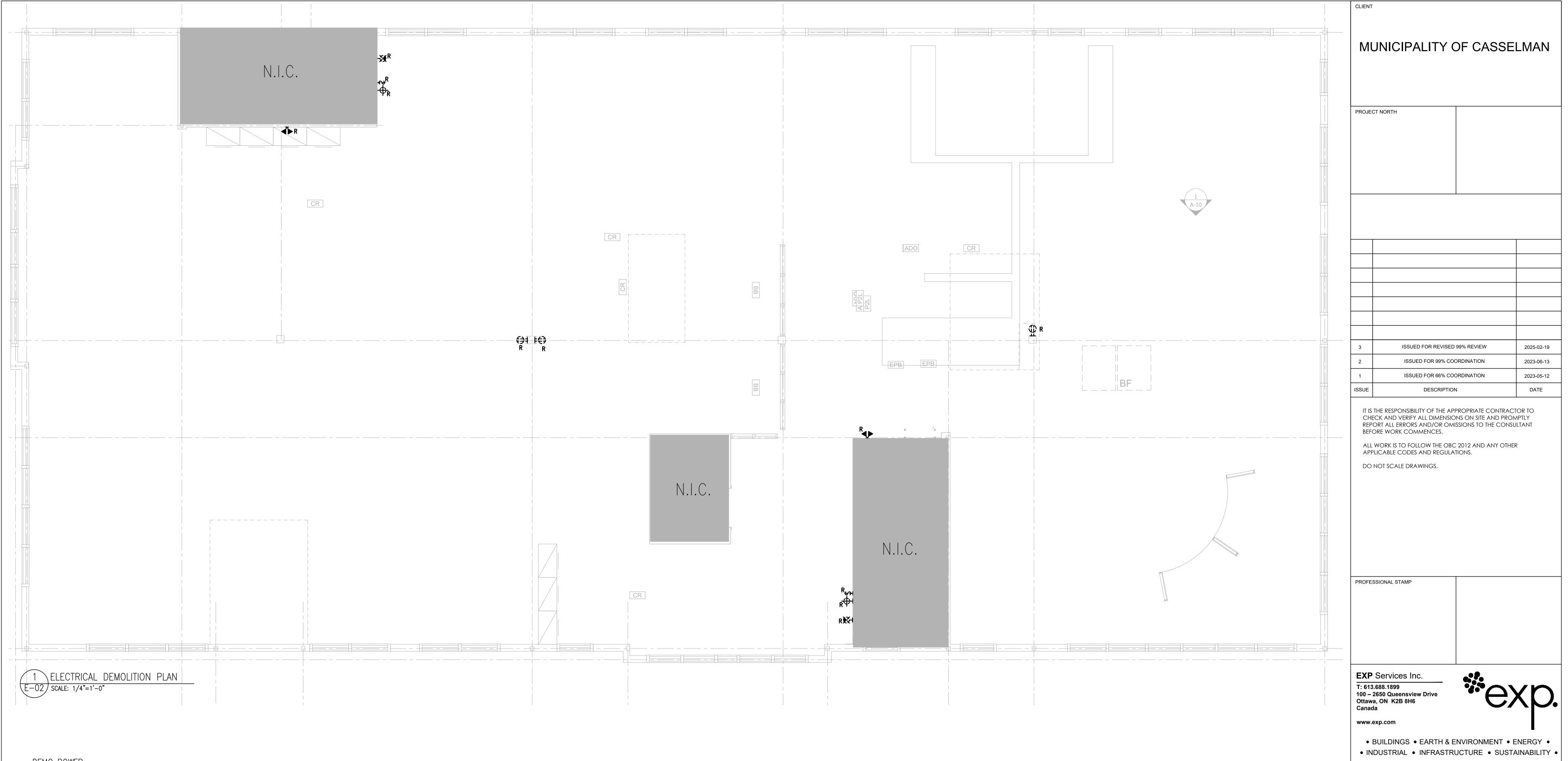
PROJECT

1 INDUSTRIEL STREET OFFICE FIT-UP

DRAWING

ELECTRICAL LEGEND, GENERAL NOTES, AND **DRAWING LIST**

PROJECT No: REVISION: MRK-23002008-A0 MAY 2023 APPROVED: SCALE: AS SHOWN DRAWING No:



DEMO POWER:

- 1. THIS DEMOLITION DRAWING IS DIAGRAMMATIC AND MAY NOT REPRESENT ALL OF THE DEVICES TO BE REMOVED. IT IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO ENSURE THE COMPLETE REMOVAL/RELOCATION OF POWER AND SYSTEMS IS COMPLETE IN THE AREAS OF SCOPE OF WORK. ALL ELECTRICAL ITEMS IN THIS AREA/ROOM NOT SHOWN WITHIN SCOPE OF WORK AREA ARE TO REMAIN.
- 2. DEMOLISH EXISTING LIGHT FIXTURES NOTED ON THE DRAWING IN THE DEMOLITION AREA C/W CONTROLS CONDUIT, WIRING, JUNCTION BOXES, ETC. BACK TO SOURCE. WHERE CIRCUIT AND/OR CONTROLS ARE BEING UTILIZED BY OTHER ELEMENTS, THE CIRCUIT IS TO BE REMOVED BACK TO NEAREST JUNCTION BOX.
- 3. DURING CONSTRUCTION ENSURE ALL LUMINAIRES IN AND/OR OUT OF SCOPE OF WORK ARE FREE OF DUST AND DEBRIS. CONTRACTOR TO CLEAN LENSES AFFECTED BY CONSTRUCTION DUST AND/OR DEBRIS.
- 4. ALL EXISTING FIXTURES TO BE REMOVED ARE TO BE DISPOSED OF AND IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.
- 5. ALL EXISTING POWER SUCH THAT SURROUNDING AREAS REMAIN OPERATIONAL AND ARE NOT AFFECTED AS A RESULT OF BUILDING DEMOLITION.
- 6. ALL EXISTING DEVICES TO REMAIN ARE TO BE PROTECTED FROM DUST DEBRIS DURING
- 7. WHERE EXISTING CIRCUITS ON PANELS ARE NOT AFFECTED, THOSE CIRCUITS WILL BE INCLUDED IN THE NEW PANEL DIRECTORIES WHERE PANELS HAVE BEEN AFFECTED BY THIS PROJECT.
- 8. EXISTING BASE BUILDING ACCESS CONTROL SYSTEM TO REMAIN OPERATIONAL DURING THE WORK. COORDINATE ALL SHUTDOWNS AS REQUIRED WITH OWNER.
- 9. ANY EXISTING CONDUITS NOT BEING REUSED DURING THE NEW CONSTRUCTION TO BE REMOVED.

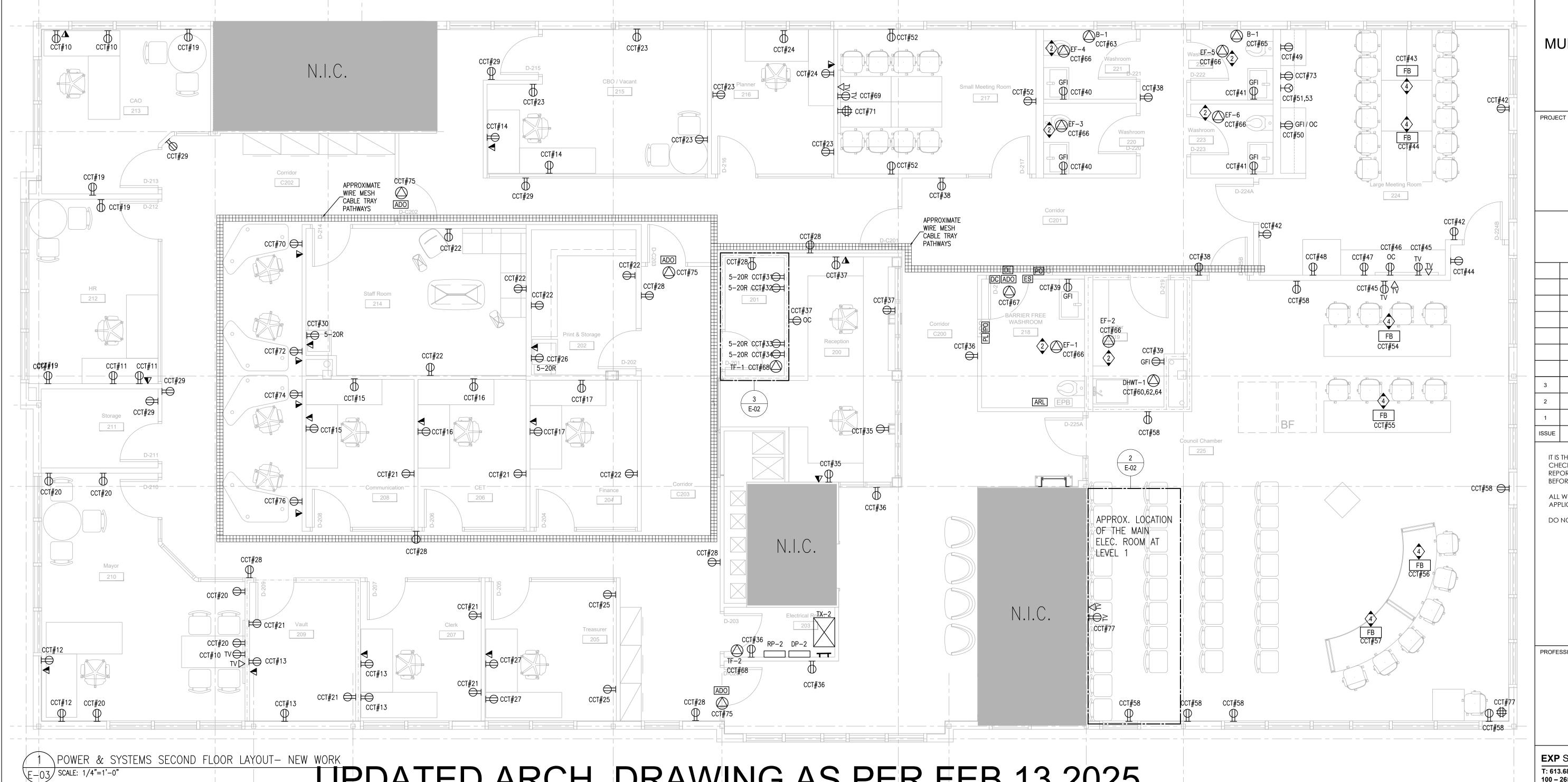
PROJECT

1 INDUSTRIEL STREET OFFICE FIT-UP

DRAWING

ELECTRICAL **DEMOLITION PLAN**

PROJECT No: MRK-23002008-A0 MAY 2023 APPROVED: AS SHOWN DRAWING No:

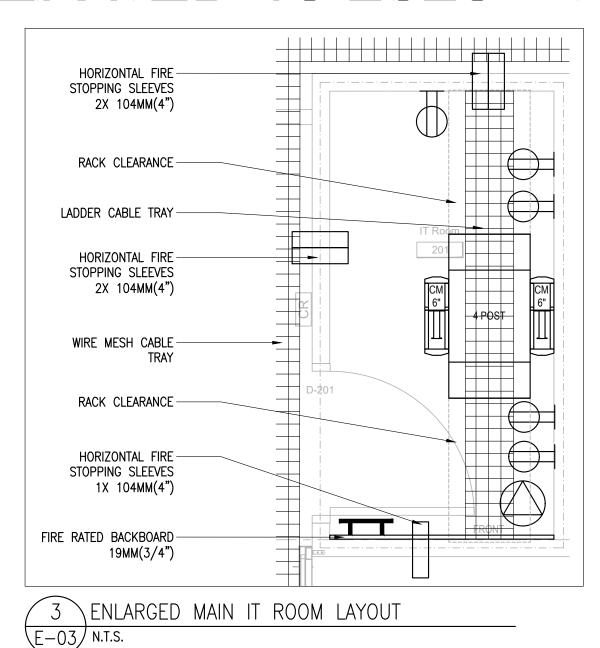


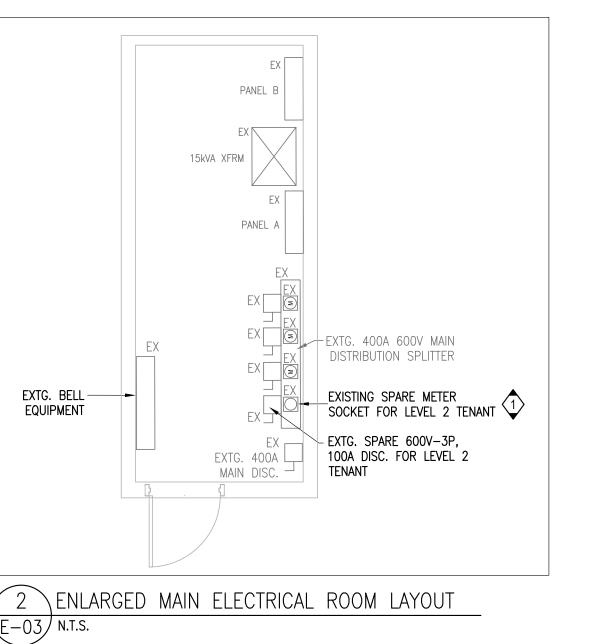
UPDATED ARCH. DRAWING AS PER FEB 13 2025

GENERAL NOTES:

- 1. ELECTRICAL WORK OF THE MAIN FEEDER INSTALLATION AND WORK IN COMMON/PUBLIC AREA WHICH REQUIRE ANY DISCONNECTION, ETC. MAY HAVE TO BE DONE AFTER HOURS ON WEEKEND AND/OR AT OTHER TIMES SUITABLE FOR BUILDING OWNER AND TENANTS WITHIN THE BUILDING. INCLUDE IN PRICE SUBMITTAL PREMIUM TIME AND ALL ASSOCIATED COSTS TO PERFORM THE WORK.
- 2. PLACEMENT OF ALL DEVICES SHALL BE ALIGNED AND STRATEGICALLY PLACED. VERIFY WITH ARCHITECT FOR EXACT MOUNTING LOCATIONS OF ALL ELECTRICAL DEVICES.
- 3. PROVIDE A SEPARATE NEUTRAL INSULATED CONDUCTOR FOR EACH NEW CIRCUIT.
- 4. 120V 20A DUPLEX RECEPTACLE (NEMA 5-20R ALTERNATE 'T-SLOT') RECEPTACLE SHALL BE FED FROM A 20A-1P BREAKER. #10 AWG. WIRE SHALL BE USED.
- ALL EXTRA LOW VOLTAGE WALL OUTLETS LOCATED WITHIN DRYWALL CEILING AREAS SHALL BE INSTALLED C/W CONDUIT ROUTED BACK TO ACCESSIBLE CEILING SPACE AREA. CEILING MOUNTED EXTRA LOW VOLTAGE OUTLETS DESIGNATED FOR SECURITY CAMERAS AND WIRELESS ACCESS POINTS LOCATED WITHIN DRYWALL CEILING AREAS, ARE TO BE INSTALLED C/W CONDUIT ROUTED BACK TO ACCESSIBLE CEILING SPACE AREA.
- 6. COORDINATE EXACT COMMUNICATION J-HOOK PATHWAY ON SITE TO AVOID INTERFERENCES WITH LIGHTING FIXTURE, MECHANICAL DUCTING, AND STRUCTURAL BEAMS.
- IN EXPOSED CEILING AREAS, ALL CONDUITS SHALL RUN PARALLEL AND PERPENDICULAR TO BUILDING LINES; ALL COMMUNICATION CABLING TO BE CONCEALED IN METAL CONDUIT READY TO ACCEPT PAINT FINISH.
- 8. INDICATED CIRCUITS ON THIS SHEET TO BE CIRCUITED BACK TO PANEL 'RP-2' UNLESS NOTED OTHERWISE.

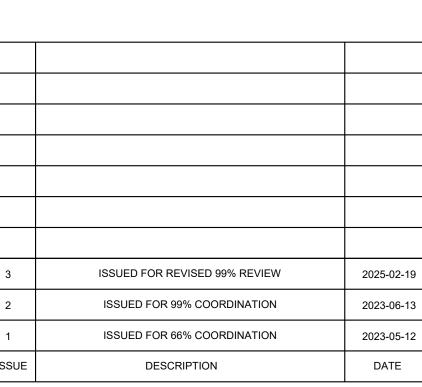
- EXISTING SPARE METER SOCKET FOR SECOND FLOOR.
- 2 WASHROOM AND JANITOR ROOM EXHAUST FAN SHALL BE TIED INTO THE LIGHTING SWITCH
- RECEPTACLE FOR KITCHEN HOOD AT HIGH LEVEL. COORDINATION HEIGHT AND CONNECTION
- 4 INCLUDE FOR CORE DRILLS AND X-RAY, ALL ASSOCIATED JUNCTION BOX(ES) AND CONDUITS FROM FLOOR MONUMENT/FEED LOCATION IN CEILING SPACE OF FLOOR BELOW BACK TO RESPECTIVE ELECTRICAL ROOM (FOR POWER) AND IT ROOM (FOR COMMUNICATIONS CABLES). COORDINATE WITH OWNER'S AV VENDER FOR ADDITIONAL CONDUIT REQUIREMENTS FOR A/V SYSTEM AS IDENTIFIED AT FLOOR MONUMENT LOCATION. SUITABLE TO THE TENANT ON FLOOR BELOW. COORDINATE AND SCHEDULE WITH BUILDING OWNER AND OBTAIN APPROVAL PRIOR TO PROCEEDING WITH THIS SCOPE OF WORK. BUILDING OWNER SHALL BE GIVEN AT LEAST 72 HOURS NOTICE PRIOR TO X-RAYING. COORDINATE EXACT FLOOR MONUMENT LOCATION/DIMENSIONS WITH FURNITURE SUPPLIER





MUNICIPALITY OF CASSELMAN

PROJECT NORTH



IT IS THE RESPONSIBILITY OF THE APPROPRIATE CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON SITE AND PROMPTLY REPORT ALL ERRORS AND/OR OMISSIONS TO THE CONSULTANT BEFORE WORK COMMENCES.

ALL WORK IS TO FOLLOW THE OBC 2012 AND ANY OTHER APPLICABLE CODES AND REGULATIONS.

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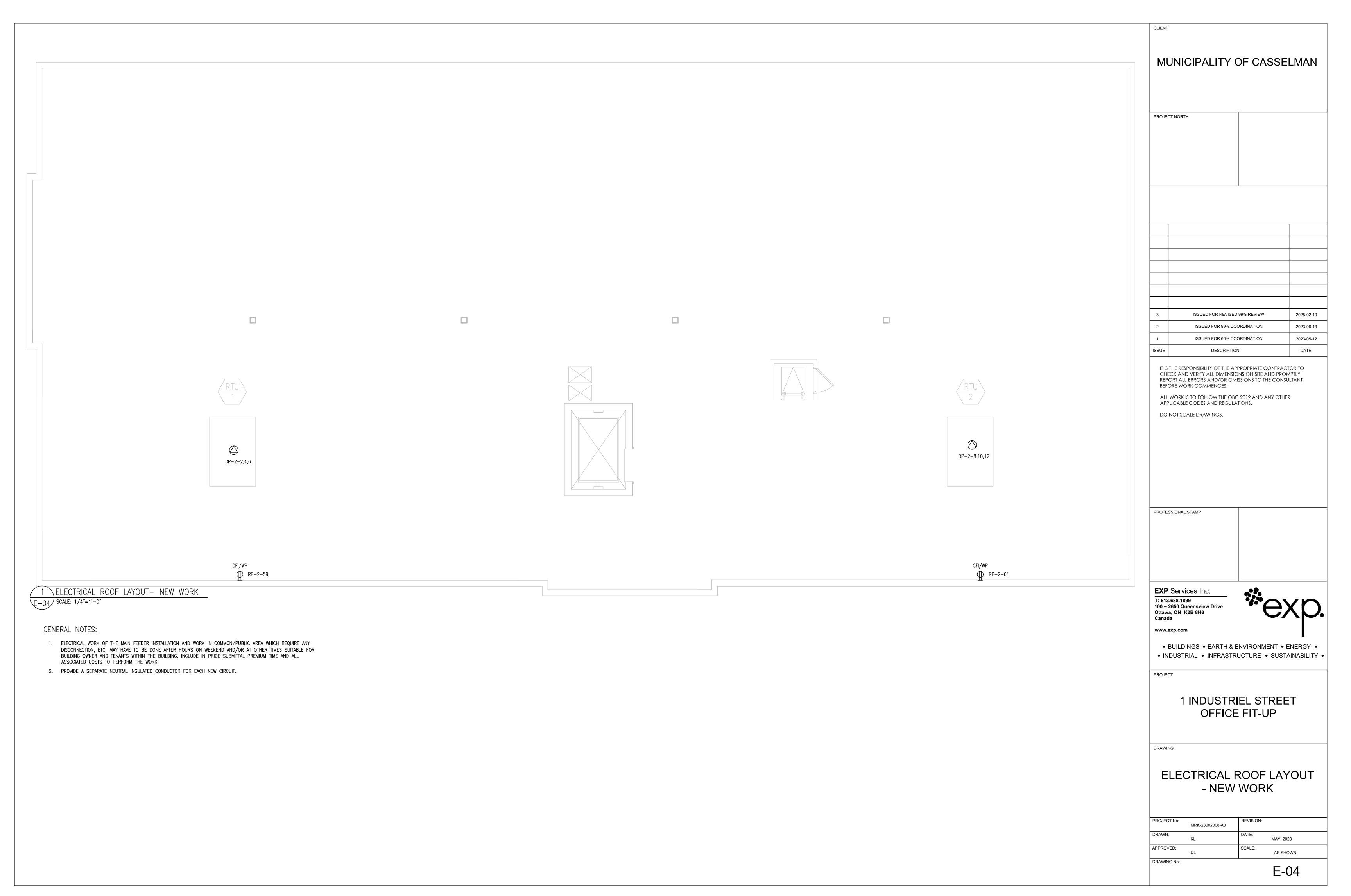
PROJECT

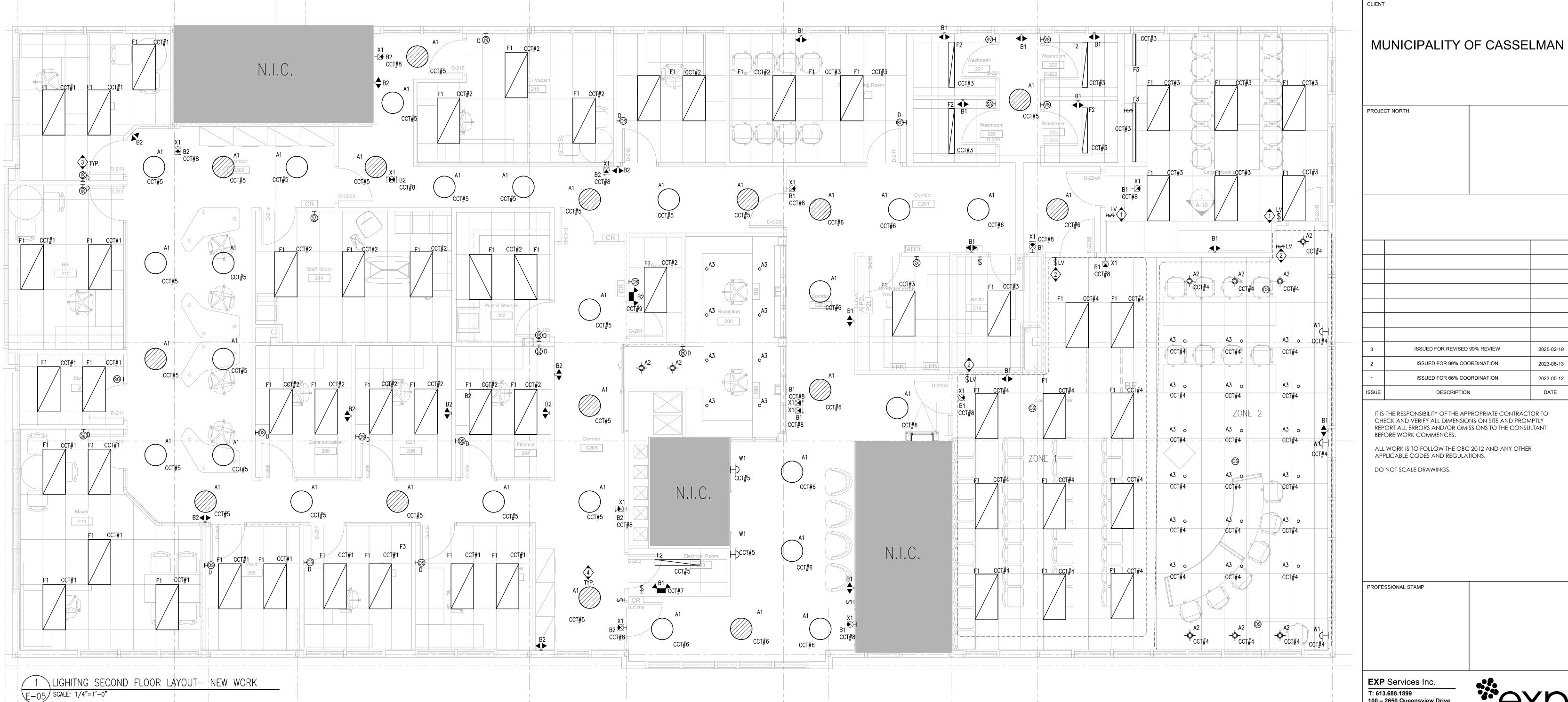
1 INDUSTRIEL STREET OFFICE FIT-UP

DRAWING

POWER & SYSTEMS SECOND FLOOR LAYOUT - NEW WORK

PROJECT No:	MRK-23002008-A0	REVISION:	
DRAWN:	KL	DATE:	MAY 2023
APPROVED:	DL	SCALE:	AS SHOWN
DRAWING No:			





<u>GENERAL NOTES:</u>

- 1. ELECTRICAL CONTRACTOR TO COORDINATE EXACT LOCATIONS OF LIGHT FIXTURE WITH ARCHITECT AND CLIENT PRIOR TO INSTALLATION.
- 2. RUN 2#10-1/2" C. FROM REMOTE EMERGENCY HEAD(S) OR DC BACK-UP FROM NEW EXIT SIGN TO EMERGENCY
- BATTERY UNIT. TOTAL LOAD SHOULD NOT EXCEED 36W ON EACH RUN. IF RUN EXCEED 94' #8 WIRE SHALL BE USED. 3. NEW EXIT SIGNS TO BE CONNECTED TO NEW EMERGENCY DC BATTERY BACK-UP UNIT AND DEDICATED 120V
- NON-RELAY/NON-SWITCHING CIRCUIT.
- 4. PLACEMENT OF ALL FIXTURES SHALL BE ALIGNED AND STRATEGICALLY PLACED. VERIFY WITH ARCHITECT FOR EXACT MOUNTING LOCATIONS.
- 5. PROVIDE A SEPARATE NEUTRAL INSULATED CONDUCTOR FOR EACH NEW CIRCUIT.
- 6. CIRCUIT NUMBERS SHOWN ARE DIAGRAMMATIC ONLY. CONNECT TO CIRCUITS MADE AVAILABLE BY THESE RENOVATIONS.
- 7. IN EXPOSED CEILING AREAS, ALL CONDUITS SHALL RUN PARALLEL AND PERPENDICULAR TO BUILDING LINES; ALL COMMUNICATION CABLING TO BE CONCEALED IN METAL CONDUIT READY TO ACCEPT PAINT FINISH.
- 8. INDICATED CIRCUITS ON THIS SHEET TO BE CIRCUITED BACK TO PANEL 'RP-2' UNLESS NOTED OTHERWISE.

GENERAL NOTES:

- 1 CURRENT LIGHTING NXSW SERIES OR EQUIVALENT WALL MOUNTED EXTRA LOW VOLTAGE DIMMER SWITCH. ELECTRICAL CONTRACTOR SHALL PROVIDE THE ASSOCIATED CONTROL MODULE, ACCESSORIES AND COORDINATE WITH THE MANUFACTURER TO ENSURE THE SWITCH IS COMPATIBLE WITH THE LIGHT FIXTURES.
- 2 CURRENT LIGHTING NXSW SERIES OR EQUIVALENT WALL MOUNTED EXTRA LOW VOLTAGE DIMMER SWITCH COMPLETE WITH ▼ SCENE SELECTION. ELECTRICAL CONTRACTOR SHALL PROVIDE THE ASSOCIATED CONTROL MODULE, ACCESSORIES AND COORDINATE WITH THE MANUFACTURER TO ENSURE THE SWITCH IS COMPATIBLE WITH THE LIGHT FIXTURES.
- (3) LINE VOLTAGE WALL MOUNTED DUAL TECHNOLOGY DIMMING SENSOR SWITCH.
- 4 NIGHT LIGHT SHALL NOT BE CONTROLLER BY CORRIDOR SWITCH AND TO BE REMAIN ON ALL THE TIME.

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1 INDUSTRIEL STREET OFFICE FIT-UP

DRAWING

LIGHTING SECOND FLOOR LAYOUT - NEW WORK

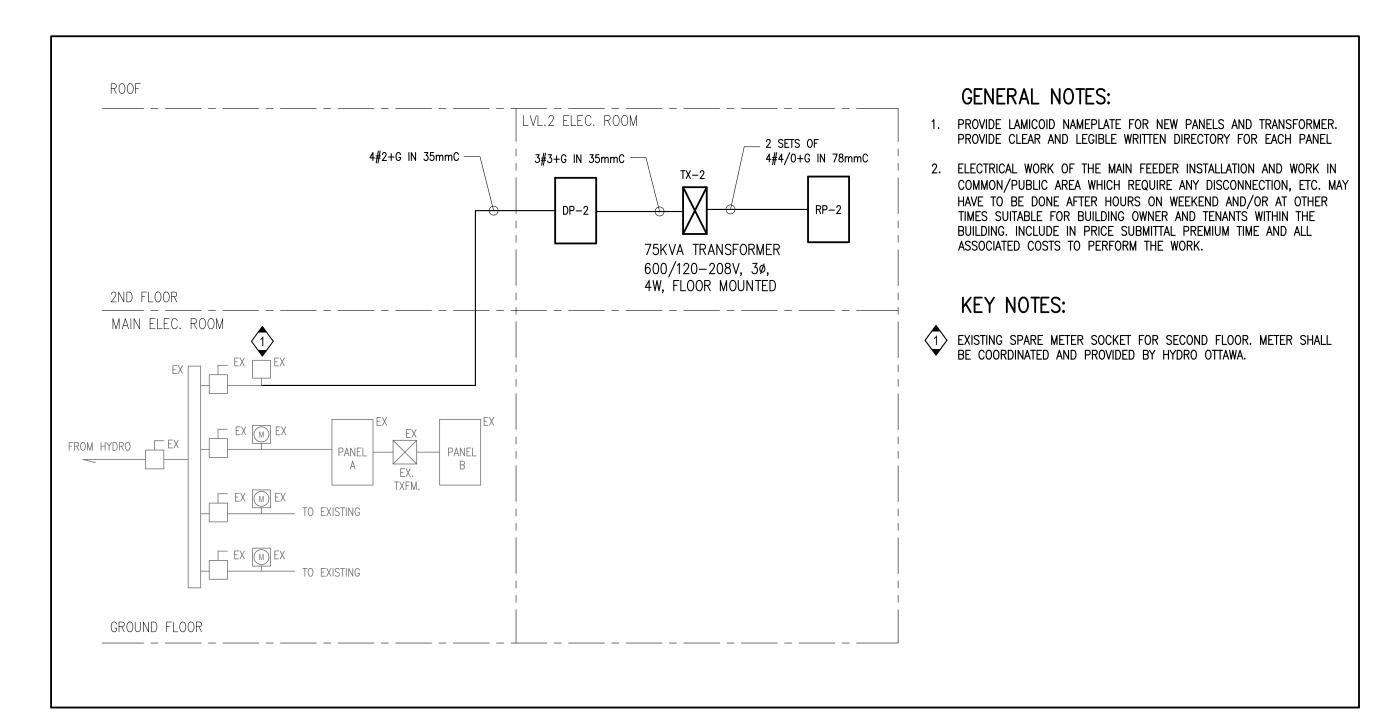
PROJECT No:	MRK-23002008-A0	REVISION:	
DRAWN:	KL	DATE:	MAY 2023
APPROVED:	DL	SCALE:	AS SHOWN
DRAWING No:	•		•

E-05

2025-02-19

2023-06-13

2023-05-12



1 ELECTRICAL DISTRIBUTION RISER DIAGRAM E-06 N.T.S.

TYPE	DESCRIPTION	PART NO.	MANUFACTURER	NOTES
F1	2X4 LED TROFFER	CPX 2X4 4000LM 35K M2 MW	LITHONIA	
F2	4"X4'LED TROFFER	LSIX 4FT 3000LM 80CRI 35K FFR SWL MIN10 ZT MVOLT MW	LITHONIA	
F3	LED TAPE	6020-FL-COB-3.1W24V-35K (LED tape) + 6100- AP-SM-1708 (aluminum extrusion + frosted lens) + 5030-PSU-60W24V-TRI-DIM-JB-CL2 (dimmable power supply)	PRISM	
A1	17" CEILING PENDANT	4275-17-LED.REG-35K-90-120V-DV-C60-RC1-BLKE-BLK-BLKE-WH	EUREKA	
A2	4" DOWNLIGHT	JPDZ4 DC ALO10 SWW5WD 90CRI JPDZRMJBX MVOLT ZT10 WWH	JUNO	
А3	3" PENDANT	4048-10-LED-35-80-120V-DV-ME-FRO-C60-RC2-WHE-WHE-WHE	EUREKA	
L1	ACOUSTIC SUSPENDED LINEAR PENDANT	LX-BL-M-H1-S-LG-35-UNV-RD-LG	MVP	
L2	ACOUSTIC SUSPENDED LINEAR PENDANT	LX-BL-M-H2-S-LB-35-UNV-RD-LB	MVP	
L3	ACOUSTIC SUSPENDED LINEAR PENDANT	LX-BL-M-H0-S-LG-35-UNV-RD-LG	MVP	
W1	WALL SCONCE	1125-BL-H6-40K	MVP	
★ X1	STEEL PICTOGRAM EXIT SIGN UNIVERSAL FACE	LS3WU STEEL PICTOGRAM EXIT SIGN UNIV	LUMACELL	
	12V STEEL EMERG. BATTERY UNIT C/W 4W MR16-LED	RG12S1442LD7	LUMACELL	
◆	PLASTIC EMERG. REMOTE HEAD DBL 12V4W-LED WS	MQM2LD7	LUMACELL	

		PANEL D)ESIGNA	TION:	DP-	-2				ECT NAME: CIPALITY OF CASSELMAN OFFICE FIT—UP
MAIN BUS: 100A	MAIN BREA	KER: 100	A VO	LTAGE:	347/	600V,	. 39	ð, 4W,	25kA	SURFACE MOUNTED. NEW PANEL
	ad Piption		BRKR SIZE	CCT. No.		PHASE B		CCT. No.	BRKR SIZE	LOAD DESCRIPTION
			90A /	1				2	20A /	
TRANSFORMER TX	-2		/ 3P	3	-	+		4	3P	RTU-1
			/ 51	5 7	\prod			6	<u>/</u>	
				9				8 10	25A /	 RTU-2
				11				12	3P	
				13			Ţ	14	<u> </u>	
				15				16		
				17			•	18		
				19	_		_	20		
				21		•	_	22		
				23			•	24		
				25	 			26		
				27		+	+	28		
				29			•	30		
				31	<u> </u>			32		
				33		•		34		
				35			•	36		
				37	+			38		
				39		•		40		
				41	\vdash	+	•	42		

1. ALL FINISHES, FLANGE AND PLASTER COLOURS TO BE CONFIRMED WITH ARCHITECT/INTERIOR DESIGNER PRIOR TO ORDERING LUMINAIRES.
2. CONTRACTOR TO PROVIDE SUITABLE MOUNTING ACCESSORIES AND HARDWARE ACCORDINGLY TO CEILING FINISHES.

3. PROVIDE SUITABLE STEP DOWN TRANSFORMER FOR ANY LOW VOLTAGE LIGHTING AS REQUIRED.

LOAD DESCRIPTION OFFICE LIGHTS OFFICE LIGHTS CORRIDOR LIGHTS BATTERY UNIT BATTERY UNIT OFFICE RECEPTACLE OFFICE RECEPTACLE	MAIN BREAKER:	250A BRKF SIZE 20A 20A 20A	No.	<u> </u>	HASE		CCT.	BRKR	SURFACE MOUNTED. NEW PANEL
DESCRIPTION OFFICE LIGHTS OFFICE LIGHTS CORRIDOR LIGHTS BATTERY UNIT BATTERY UNIT OFFICE RECEPTACLE	ION	20A 20A	No.			•			
OFFICE LIGHTS CORRIDOR LIGHTS BATTERY UNIT BATTERY UNIT OFFICE RECEPTACLE		20A				С	NO.	SIZE	DESCRIPTION
CORRIDOR LIGHTS BATTERY UNIT BATTERY UNIT OFFICE RECEPTACLE			7	ΙŢ			2	20A	OFFICE LIGHTS
BATTERY UNIT BATTERY UNIT OFFICE RECEPTACLE		20A	3		•		4	20A	OFFICE LIGHTS
BATTERY UNIT OFFICE RECEPTACLE			5	}		lack	6	20A	CORRIDOR LIGHTS
OFFICE RECEPTACLE		20A	7	│			8	20A	EXIT SIGNS
		20A	9		•		10	15A	OFFICE RECEPTACLE
OFFICE RECEPTACLE		15A	11	 	+	lack	12	15A	OFFICE RECEPTACLE
		15A	13				14	15A	OFFICE RECEPTACLE
OFFICE RECEPTACLE		15A	15		•		16	15A	OFFICE RECEPTACLE
OFFICE RECEPTACLE		15A	17				18	15A	OFFICE RECEPTACLE
OFFICE RECEPTACLE		15A	19				20	15A	OFFICE RECEPTACLE
OFFICE RECEPTACLE		15A	21		<u> </u>	Щ	22	15A	OFFICE RECEPTACLE
OFFICE RECEPTACLE		15A	23		1		24	15A	PRINTER ROOM REC.
TREASURE ROOM REC	<u> </u>	15A				\coprod	26	20A	PRINTER REC.
TREASURE ROOM REC		15A		$oxed{f igsquare}$			28	15A	CORRIDOR REC.
	J.	15A	29				30	20A	PRINTER REC.
CORRIDOR REC.		_	+ +						
IT ROOM REC.		20A		-			32	20A	IT ROOM REC.
IT ROOM REC.		20A					34	20A	IT ROOM REC.
RECEPTION REC.		15A	35				36	15A	CORRIDOR REC.
RECEPTION REC.		15A		+			38	15A	CORRIDOR REC.
WASHROOM REC.		15A			•		40	15A	WASHROOM REC.
WASHROOM REC.		15A	41			lack	42	15A	LARGE MEETING ROOM REC.
LARGE MEETING ROOF	M REC.	20A	43	 •			44	20A	LARGE MEETING ROOM REC.
LARGE MEETING ROOF	M TV REC.	15A	45		•		46	15A	LARGE MEETING ROOM COUNTER REC.
LARGE MEETING ROOF	M FRIDGE REC.	15A	47			•	48	15A	LARGE MEETING ROOM FRIDGE REC.
LARGE MEETING ROOF	M REC.	15A	49	 			50	15A	LARGE MEETING ROOM COUNTER REC.
LARGE MEETING RANG	CE REC	40A	51	\vdash	•		52	15A	SMALL MEETING ROOM REC.
LANGE MILETING NAIN	or Neo.	2F	53	_		lack	54	15A	COUNCIL CHAMBER REC.
COUNCIL CHAMBER R	EC.	20A	55	 	+		56	20A	COUNCIL CHAMBER REC.
COUNCIL CHAMBER R	EC.	20A	57	\vdash	+	+	58	15A	COUNCIL CHAMBER REC.
ROOF REC.		20A	59		+	\blacklozenge	60	20A /	
ROOF REC.		20A	61]-	+		62		DHWT-1
BASEBOARD HEATER		15A	63	 	•		64	3P	
BASEBOARD HEATER		15A	65			lack	66	15A	EXHAUST FAN
UNIV. WASHROOM DO	OR CONTROLLER	15A	67	1	+		68	15A	TRANSFER FAN
SMALL MEETING ROOF	M TV REC.	15A	69	1	—	\perp	70	15A	WORK STATION REC.
SMALL MEETING ROOF	M REC.	20A	71				72	15A	WORK STATION REC.
KITCHEN HOOD REC.		15A		 	_	\perp	74	15A	WORK STATION REC.
		15A			—		76	15A	WORK STATION REC.
TV REC.	ADO				\perp		 78	20A	SPARE
SPACE		15A	79			Ш	80	20A	SPARE
			81				82	20A	
SPACE SPACE			83	$\left\{ \left \right ^{-} \right\}$			84	20A 20A	SPARE SPARE

MUNICIPALITY OF CASSELMAN

CLIENT

PROJECT NORTH

3	ISSUED FOR REVISED 99% REVIEW	2025-02-19			
2	ISSUED FOR 99% COORDINATION 2023-0				
1	ISSUED FOR 66% COORDINATION	2023-05-12			
ISSUE	DESCRIPTION	DATE			

IT IS THE RESPONSIBILITY OF THE APPROPRIATE CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON SITE AND PROMPTLY REPORT ALL ERRORS AND/OR OMISSIONS TO THE CONSULTANT BEFORE WORK COMMENCES.

ALL WORK IS TO FOLLOW THE OBC 2012 AND ANY OTHER APPLICABLE CODES AND REGULATIONS.

DO NOT SCALE DRAWINGS.

PROFESSIONAL STAMP	

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PROJECT

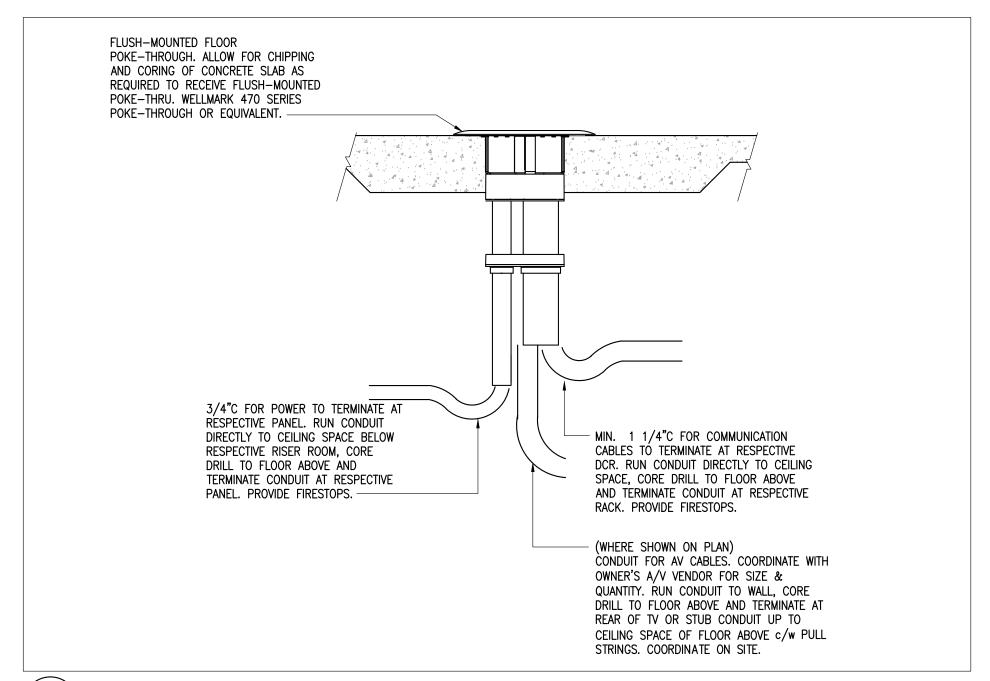
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1 INDUSTRIEL STREET OFFICE FIT-UP

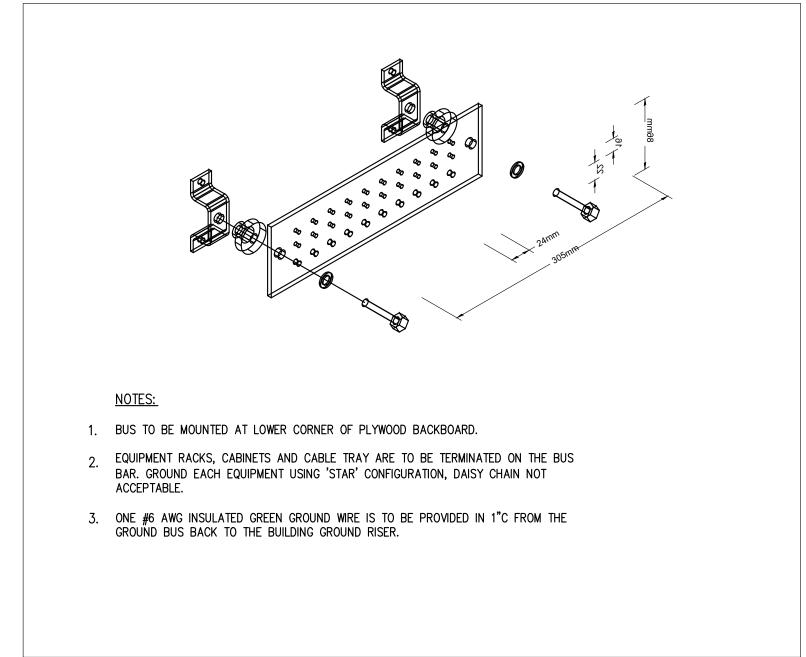
DRAWING

ELECTRICAL SCHEDULE AND DIAGRAM

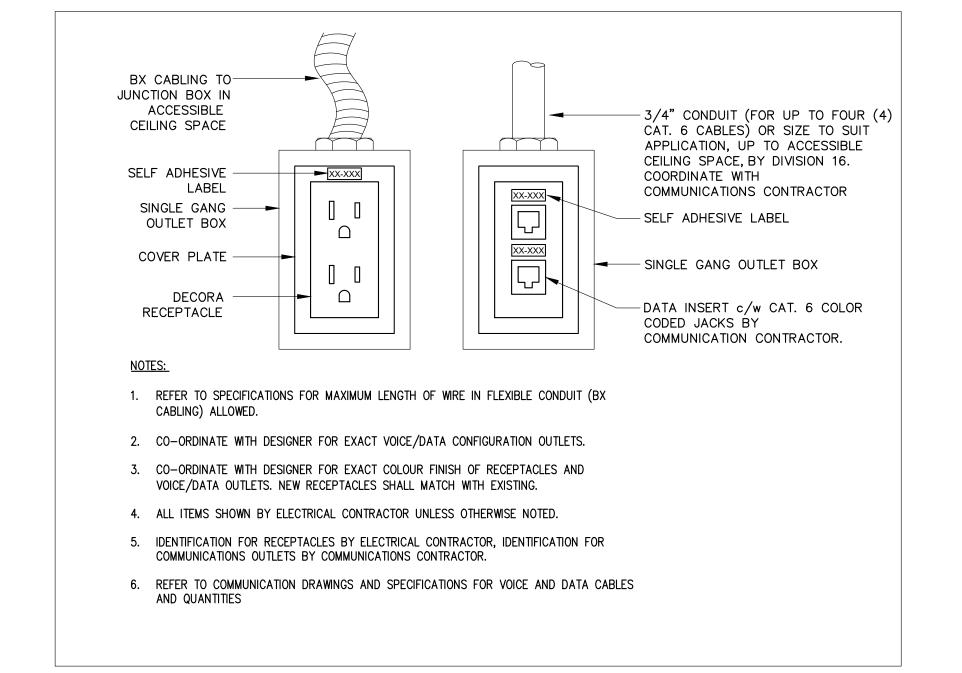
PROJECT No:	MRK-23002008-A0	REVISION:
DRAWN:	KL	DATE: MAY 2023
APPROVED:	DL	SCALE: AS SHOWN



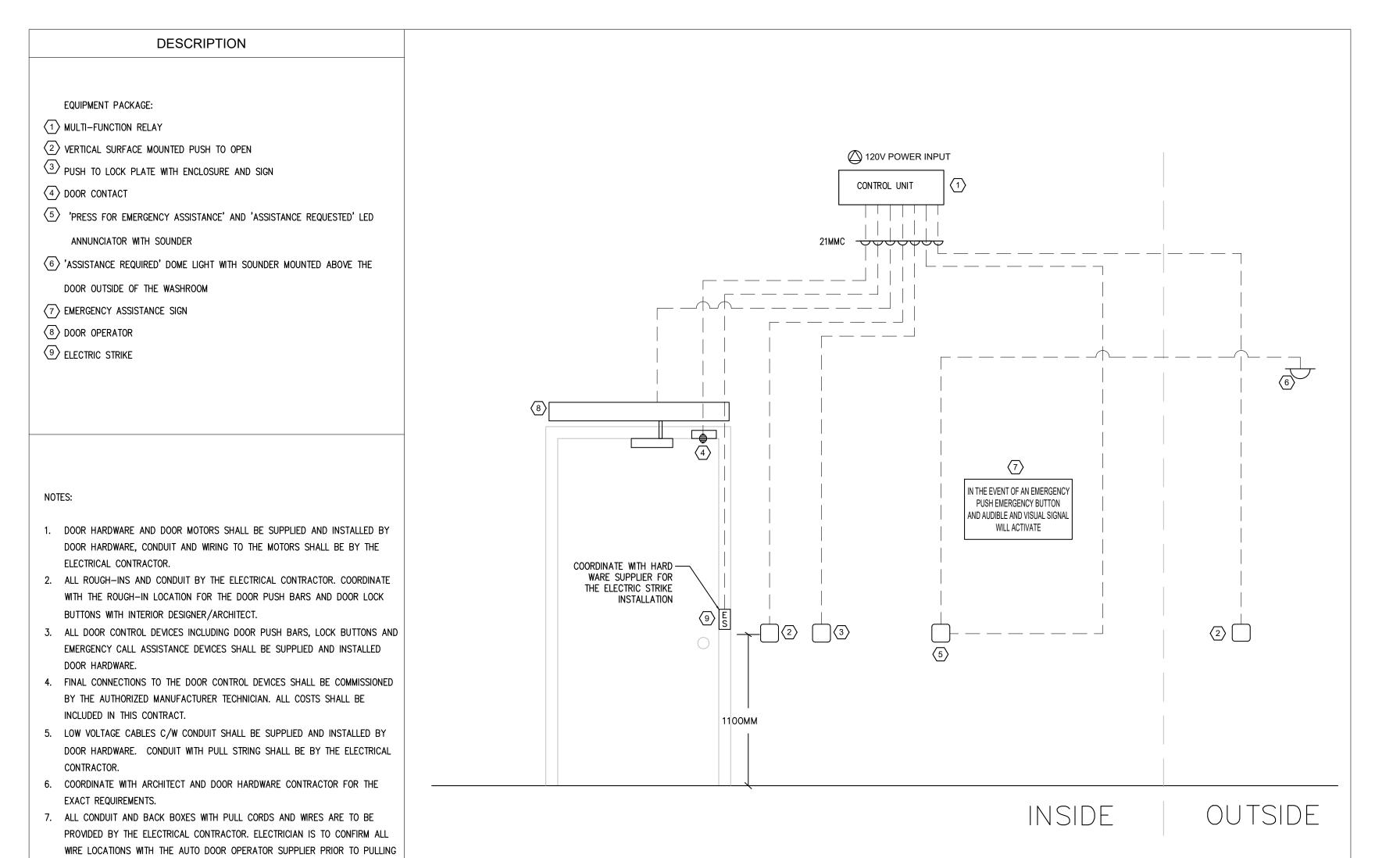
4 DETAIL OF FLOOR POKE—THROUGH E-07 SYMBOL: 位



1 DETAIL OF WALL MOUNTED GROUND BUS BAR: E-07 N.T.S.



2 TYPICAL WALL MOUNTED POWER/DATA OUTLET DETAIL
E-07 N.T.S



BARRIER FREE WASHROOM EMERGENCY CALL ASSISTANCE AND DOOR CONTROL DETAIL

E-07)
N.T.S.

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PROJECT NORTH	

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1 INDUSTRIEL STREET OFFICE FIT-UP

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DRAWING

ELECTRICAL DETAILS

PROJECT No:	MRK-23002008-A0	REVISION:
DRAWN:	KL	DATE: MAY 2023
APPROVED:	DL	SCALE: AS SHOWN

- 1. SCOPE OF WORK
- 1.1 SUPPLY LABOUR. TOOLS. SERVICES AND EQUIPMENT. AND PROVIDE MATERIALS REQUIRED TO COMPLETE WORK IN ACCORDANCE WITH THIS SPECIFICATION AND DRAWINGS. COMPLY WITH LAWS, REGULATIONS AND CODES OF AUTHORITIES HAVING JURISDICTION. CONFORM TO REQUIREMENTS OF BIDDING DOCUMENTS AND DIVISION 1. PERFORM WORK IN ACCORDANCE WITH LOCAL APPLICABLE GOVERNING CODES AND AUTHORITIES INCLUDING THE ONTARIO BUILDING CODE AND ONTARIO ELECTRICAL SAFETY CODE (OESC).
- 2. EXAMINATION OF SITE AND DOCUMENTS
- 2.1 PRIOR TO SUBMITTING BID, CAREFULLY EXAMINE CONDITIONS AT SITE WHICH WILL OR MAY AFFECT WORK, DRAWINGS, AND SPECIFICATIONS, AND BECOME FAMILIAR WITH BUILDING CONSTRUCTION. FINISHES AND OTHER WORK ASSOCIATED WITH WORK IN ORDER THAT BID INCLUDES FOR EVERYTHING NECESSARY FOR COMPLETION OF WORK.
- 3. PERMITS, CERTIFICATES AND FEES
- 3.1 PAY FOR AND OBTAIN PERMITS TO COMPLETE WORK. WHEN WORK IS COMPLETE, SUPPLY AND TURN OVER INSPECTION CERTIFICATES FROM GOVERNING AUTHORITIES TO CONSULTANT. PAY FEES AND CHARGES LEVIED BY MUNICIPALITY AND OTHER GOVERNING AUTHORITIES FOR PERMITS, INSPECTIONS AND CERTIFICATES. KEEP COPY OF SUCH PERMITS AND CERTIFICATES, ETC., ON JOB SITE.
- 4. CO-ORDINATION AND CO-OPERATION
- 4.1 COORDINATE ALL WORK WITH OTHER TRADES TO ENSURE A PROPER AND COMPLETE INSTALLATION. NOTIFY ALL TRADES CONCERNED OF REQUIREMENT FOR OPENINGS, SLEEVES, INSERTS AND OTHER HARDWARE NECESSARY IN THEIR WORK FOR INSTALLATION OF YOUR WORK. AND, WHERE YOUR WORK IS TO BE INTEGRATED WITH WORK OF OTHER TRADES OR IS TO BE INSTALLED IN CLOSE PROXIMITY WITH WORK OF OTHER TRADES, CAREFULLY COORDINATE WORK PRIOR TO AND DURING INSTALLATION.
- 4.2 EXACT LOCATIONS AND ROUTING OF SERVICES MUST BE PROPERLY PLANNED, COORDINATED AND ESTABLISHED WITH ALL AFFECTED TRADES PRIOR TO INSTALLATION SUCH THAT THEY WILL CLEAR EACH OTHER AS WELL AS ANY OBSTRUCTIONS. GENERALLY, PIPING REQUIRING UNIFORM PITCH SHALL BE GIVEN RIGHT OF WAY, WITH OTHER SERVICES LOCATED AND ARRANGED TO SUIT.
- NOISE CONTROL
- 5.1 WORK WHICH MAY CAUSE NOISE DISTURBANCES MUST BE SCHEDULED AT TIMES APPROVED BY CONSULTANT. COORDINATE WORK WITH TRADES TO MINIMIZE NOISE DISTURBANCES.
- CLEANING UP
- 6.1 DURING CONSTRUCTION, KEEP SITE REASONABLY CLEAR OF RUBBISH AND WASTE MATERIAL RESULTING FROM WORK ON DAILY BASIS. AFTER COMPLETION OF WORK. REMOVE RUBBISH AND DEBRIS, ARRANGE AND PAY FOR REPAIR OF DAMAGES CAUSED AND LEAVE PREMISES AND WORK IN GOOD ORDER.
- 7. PROTECTION OF EQUIPMENT AND MATERIAL
- 7.1 PROPERLY PROTECT AND STORE ALL EQUIPMENT AND MATERIALS ON SITE FROM DAMAGE. CONTRACTOR SHALL BE RESPONSIBLE FOR SAFE STORAGE OF ALL EQUIPMENT AND GOODS TO BE RELOCATED AND SHALL REPAIR OR REPLACE DAMAGED EQUIPMENT AND GOODS AT DISCRETION OF OWNER.
- 8.1 CONSULTANT SHALL AT ALL TIMES HAVE ACCESS TO WORK AND SHALL BE NOTIFIED AT AGREED UPON TIMES OF STAGES OF WORK.
- 8.2 WHERE STANDARDS OF WORK ARE SPECIFIED OR IMPLIED AND WORK DOES NOT COMPLY WITH PERFORMANCE SPECIFIED OR IMPLIED, SUCH DEFICIENCY SHALL BE CORRECTED AS DIRECTED BY CONSULTANT. ANY SUBSEQUENT TESTING TO VERIFY PERFORMANCE SHALL BE DONE AT CONTRACTOR'S EXPENSE. ANY CHARGES FOR OWNER'S STAFF, CONSULTANT OR OTHER PERSONNEL RELATED TO SUCH RETESTING SHALL ALSO BE AT EXPENSE OF CONTRACTOR.
- 9. PRODUCTS
- 9.1 PRODUCTS LISTED AND/OR SPECIFIED ON CONTRACT DOCUMENTS ARE SELECTED TO ESTABLISH DESIGN STANDARDS. IN MOST CASES, ACCEPTABLE MANUFACTURERS ARE LISTED. BASE YOUR BID PRICE ON BASE SPECIFIED PRODUCTS OR PRODUCTS SUPPLIED FROM ACCEPTABLE MANUFACTURERS. ENSURE PRODUCTS SUPPLIED FROM MANUFACTURERS OTHER THAN BASE SPECIFIED MANUFACTURERS ARE EQUIVALENT TO SPECIFIED PRODUCTS. CHANGES TO MANUFACTURERS OF PRODUCTS MAY BE PROPOSED TO CONSULTANT FOR ACCEPTANCE PRIOR TO CLOSING OF BIDS, LISTING IN EACH CASE CORRESPONDING CREDIT. CONSULTANT HAS SOLE DISCRETION IN ACCEPTING ANY PROPOSED SUBSTITUTION. INCLUDE IN BID PRICE ANY ADDITIONAL COSTS FOR CHANGES TO ASSOCIATED OR ADJACENT WORK RESULTING FROM PROVISION OF PRODUCTS SUPPLIED BY MANUFACTURER OTHER THAN BASE 16.2 PROPERLY IDENTIFY SHOP DRAWINGS FOR REVIEW AND SHOW IN DETAIL SPECIFIED MANUFACTURER. ANY PROPOSED CHANGES INITIATED BY CONTRACTOR AFTER AWARD OF CONTRACT MAY BE CONSIDERED BY THE CONSULTANT AT CONSULTANT'S DISCRETION, WITH COSTS FOR SUCH CHANGES IF APPROVED BY CONSULTANT, AND COSTS OF SUCH REVIEW BY THE CONSULTANT TO BE PAID FOR BY THE CONTRACTOR.
- 10 WARRANTY
- 10.1 WARRANT WORK TO BE IN STRICT ACCORDANCE WITH CONTRACT DOCUMENTS AND FREE FROM DEFECTS FOR 1 YEAR PERIOD FROM DATE OF WRITTEN ACCEPTANCE BY CONSULTANT. REPAIR AND/OR REPLACE ANY SUCH DEFECTS WHICH APPEAR IN WORK WITHIN WARRANTY 16.2.4 PART LISTS WITH NUMBERS: PERIOD, ORDINARY WEAR AND TEAR AND WILFUL DAMAGE BY, OR CARELESSNESS OF OWNER'S STAFF OR AGENTS EXCEPTED, WITHOUT ADDITIONAL EXPENSE TO OWNER. WHERE SUCH DEFECTS OCCUR, BE RESPONSIBLE FOR COSTS INCURRED IN MAKING DEFECTIVE WORK 16.2.6 COPIES OF INSPECTION CERTIFICATES ISSUED BY GOVERNING GOOD, INCLUDES REPAIR OR REPLACEMENT OF BUILDING FINISHES, OTHER MATERIALS, OR DAMAGE TO OTHER EQUIPMENT CAUSED BY SUCH DEFECTS. OR BY SUBSEQUENT REPLACEMENT OR REPAIRS.
- 11. INTERRUPTIONS TO AND SHUT-DOWNS OF EXISTING SERVICES AND SYSTEMS
- 11.1 COORDINATE AND PERFORM SHUT-DOWNS AND INTERRUPTIONS TO EXISTING SYSTEMS AND SERVICES AT TIMES ACCEPTABLE TO OWNER. OBTAIN WRITTEN APPROVAL MINIMUM FIVE (5) DAYS IN ADVANCE OF SHUT-DOWN OR INTERRUPTION. INCLUDE FOR COSTS OF PREMIUM TIME TO PERFORM WORK DURING NIGHTS, WEEKENDS OR OTHER TIME OUTSIDE OF NORMAL WORKING HOURS, AS NECESSARY TO MAINTAIN SERVICES IN OPERATION OR WITH MINIMUM INTERRUPTIONS AND TO COMPLY WITH OWNER'S REQUIREMENTS. NOTE: WORK ASSOCIATED WITH SHUT-DOWNS AND INTERRUPTIONS WILL BE CARRIED OUT AS CONTINUOUS OPERATIONS TO MINIMIZE SHUT-DOWN TIME AND TO REINSTATE SYSTEMS AS SOON AS POSSIBLE, AND, PRIOR TO SHUT-DOWN, ENSURE MATERIALS AND LABOUR REQUIRED TO COMPLETE WORK FOR WHICH SHUT-DOWN IS REQUIRED ARE AVAILABLE AT SITE.
- 12. CUTTING, PATCHING AND CORE DRILLING
- 12.1 DO CUTTING, PATCHING AND CORE DRILLING OF EXISTING BUILDING REQUIRED FOR INSTALLATION OF WORK AFTER HOURS AND MUST BE CONFIRMED BY LANDLORD. PERFORM CUTTING IN NEAT AND TRUE FASHION, WITH PROPER TOOLS AND EQUIPMENT TO OWNER'S APPROVAL. PATCHING WILL EXACTLY MATCH EXISTING FINISHES AND BE PERFORMED BY TRADESMEN SKILLED IN PARTICULAR TRADE OR APPLICATION WORKED ON TO OWNER'S APPROVAL.
- 12.2 IN FIRE RATED CONSTRUCTION, PACK AND SEAL VOID BETWEEN OPENING AND CONDUIT FOR LENGTH OF OPENING WITH ASBESTOS-FREE ELASTOMERIC AND INTUMESCENT ULC LISTED AND LABELLED MATERIALS. INSTALL FIRESTOP AND SMOKE SEAL MATERIALS IN ACCORDANCE TO ULC CERTIFICATION AND MANUFACTURER'S REQUIREMENTS TO PROVIDE FIRESTOP RATINGS OF OPENINGS IN ACCORDANCE WITH GOVERNING BUILDING CODE REQUIREMENTS. SUBMIT WITH SHOP DRAWINGS, SPECIFIC ULC DESIGNATED NUMBER FOR EACH APPLICATION.
- 12.3 DO NOT CUT OR DRILL EXISTING WORK WITHOUT PRIOR OWNER'S APPROVAL. IN CONSULTATION WITH OWNER AND BY USE OF X-RAY (WITH OWNER'S APPROVAL). OR RADAR SCANNING, DETERMINE PRESENCE OF EXISTING SERVICES AND REINFORCING RODS CONCEALED BEHIND SURFACE TO BE CUT. ENSURE THAT AREAS OF BOTH SIDES OF THE SURFACE BEING CUT ARE PROTECTED FROM DEBRIS. NOTE: YOU WILL BE HELD RESPONSIBLE FOR DAMAGE DONE TO EXISTING BUILDING AND SERVICES CAUSED BY CUTTING OR DRILLING. IF X-RAYING IS NOT PERMITTED, USE NON-DESTRUCTIVE RADAR SCANNING OR CAREFULLY HAND CHIESEL TO EXPOSE RE-BAR AND BURIED SERVICES AND CHIESEL OUT REQUIRED OPENINGS.
- 12.4 X-RAY THE FLOOR SHALL ONLY BE PERMITTED AFTER HOURS (10:00PM), AND A MINIMUM 72 HOURS' WRITTEN NOTICE SHALL BE PROVIDED TO THE LANDLORD FOR APPROVAL. 13. DISCONNECTION, REMOVAL AND RELOCATION WORK
- 13.1 WHERE INDICATED ON DRAWINGS. AND DETERMINED BY SITE VISIT. DISCONNECT AND REMOVE ITEMS OF EXISTING OBSOLETE ELECTRICAL WORK AND RELOCATE DEVICES. WHERE FIXTURES, SWITCHES, RECEPTACLES AND OTHER DEVICES AND/OR EQUIPMENT IS REMOVED, DISCONNECT AT POINT OF ELECTRICAL SUPPLY, REMOVE OBSOLETE WIRING, AND MAKE SYSTEM SAFE. WHERE EXISTING OBSOLETE CONDUIT AND SIMILAR RACEWAY MATERIAL CANNOT BE REMOVED, CUT BACK AND CAP OBSOLETE CONDUITS OR RACEWAYS. REVISE PANELBOARD DIRECTORIES ACCORDINGLY, IF AFFECTED BY WORK.

- 13.2 UNLESS OTHERWISE NOTED, OBSOLETE MATERIALS WHICH ARE DISCONNECTED AND ARE NOT TO BE RELOCATED OR REUSED WILL BECOME YOUR PROPERTY. REMOVE FROM SITE AND TURNED OVER TO OWNER. SAID ITEMS WILL REMAIN PROPERTY OF OWNER.
- 13.3 PROVIDE JUNCTION BOXES, OUTLET BOXES, WIRING, PLATES, ETC., AS NECESSARY FOR COMPLETE RELOCATION OF DEVICES. CLEAN AND RELAMP RELOCATED LUMINAIRES. REPLACE FAULTY BALLASTS. WHEN RELOCATION WORK IS COMPLETE, CONFIRM RELOCATED DEVICES ARE IN PROPER WORKING ORDER. ALL RELOCATED OR TEMPORARY REMOVED DEVICES SHALL BE CLEANED AND VERFIED TO BE IN GOOD WORKING CONDITION PRIOR TO
- 13.4 WHERE EXISTING SERVICES PASS THROUGH OR ARE IN AN AREA TO SERVE ITEMS WHICH ARE TO REMAIN, MAINTAIN SERVICES. INCLUDE FOR REPOUTING EXISTING SERVICES CONCEALED BEHIND FINISHES AND WHICH BECOME EXPOSED DURING RENOVATION WORK, SO AS TO BE CONCEALED BEHIND FINISHES.
- 13.5 IN AREAS WHICH ARE NOT BEING ARCHITECTURALLY RENOVATED AND WHICH ELECTRICAL CONTRACTOR MUST RUN SERVICES THROUGH, BE RESPONSIBLE FOR REMOVAL AND REINSTALLATION OF ARCHITECTURAL CEILING TILES, MECHANICAL EQUIPMENT, SPRINKLERS, ETC., AS REQUIRED FOR INSTALLATION OF YOUR WORK. IF THE REQUIRED ELECTRICAL WORK IS REQUIRED TO ACCOMMODATE WORK OF OTHER TRADES, AND IF REMOVAL OF EXISTING CEILING TILES IS NOT THE RESPONSIBILITY OF OTHERS, BE RESPONSIBLE FOR ALL WORK TO GAIN ACCESS TO THOSE DEVICES THAT NEED TO BE WORKED ON. SECURELY SUPPORT ANY DEVICE/LUMINAIRE LEFT "DANGLING" DUE TO REMOVAL OF SUPPORTING MEANS. RE-INSTALL DEVICES AFTER INSPECTION OF WORK IS APPROVED BY CONSULTANT. PRIOR TO REMOVAL OF CEILING TILES OR OTHER DEVICES, INSPECT FOR DAMAGES/WORKING ORDER AND REPORT ANY DEFICIENCIES TO OWNER PRIOR TO START OF WORK. PATCH AND MAKE GOOD (INCLUDING PAINTING) SURFACES TO MATCH
- 13.6 ANY FIRE ALARM OR COMMUNICATION SYSTEM DEVICE THAT HAS BEEN WORKED ON OR RELOCATED, SHALL BE TESTED AND VERIFIED BY MANUFACTURER'S AUTHORIZED TECHNICIAN AFTER COMPLETION OF WORK. INCLUDE FOR ALL COSTS.
- 14.1 IF AT ANY TIME DURING COURSE OF WORK ASBESTOS MATERIALS ARE ENCOUNTERED OR SUSPECTED, CEASE WORK IN AREA IN QUESTION AND IMMEDIATELY REPORT, IN ACCORDANCE WITH ONTARIO REGULATION 169/97 (SECTION 41) TO CONSULTANT. DO NOT RESUME WORK IN AFFECTED AREA WITHOUT APPROVAL FROM CONSULTANT.
- 15. RECORD DRAWINGS (AS-BUILTS)
- 15.1 DRAWINGS FOR THIS PROJECT HAVE BEEN PREPARED ON A CAD SYSTEM. THE SOFTWARE USED IS AUTOCAD RELEASE 2010. COPIES OF DRAWINGS ON DISKS FOR USE IN PREPARING AS-BUILTS. MAY BE PURCHASED FROM CONSULTANT AT A COST OF \$25 CDN. PLUS GST PER DRAWING
- 15.2 WHEN WORK BEGINS AT SITE, CLEARLY AND ACCURATELY MARK ON A BOUND SET OF WHITE PRINTS OF CONTRACT DRAWINGS, ON A DAILY BASIS, ALL CHANGES AND DEVIATIONS FROM ROUTING OF AND LOCATIONS OF EQUIPMENT SHOWN ON CONTRACT DRAWINGS, CHANGES AND DEVIATIONS INCLUDING THOSE MADE BY ADDENDA, CHANGE ORDERS, AND SITE INSTRUCTIONS, AND CHANGES AND DEVIATIONS INDICATED ON SUPPLEMENTAL DRAWINGS ISSUED WITH ADDENDA, CHANGE ORDERS, AND SITE INSTRUCTIONS. MAINTAIN "AS-BUILT" WHITE PRINTS AT SITE FOR PERIODIC INSPECTION BY CONSULTANT THROUGHOUT 20.2 PROVIDE PULLBOXES AND JUNCTION BOXES WHEREVER NECESSARY TO FACILITATE DURATION OF WORK. PAY PARTICULAR ATTENTION TO ACCURATELY DIMENSIONING LOCATION OF ALL CONCEALED SERVICES TERMINATED FOR FUTURE EXTENSION, ALL BURIED WORK AND SERVICES, AND WORK CONCEALED WITHIN BUILDING IN INACCESSIBLE LOCATIONS.
- 15.3 WHEN WORK ENDS AT SITE, UPDATE A COMPUTER FILE COPY OF CONTRACT DOCUMENT DRAWING SET SO THAT IT REFLECTS ALL DEVIATIONS FROM ORIGINAL CONTRACT DOCUMENT DRAWINGS, THUS FORMING A TRUE "AS-BUILT" DRAWING DISK SET. PROVIDE A SET OF REPRODUCIBLE MYLAR PRINTS OF CONTRACT DRAWINGS PRODUCED FROM PRINTS AND CAD PRODUCED "AS-BUILT" MYLAR PRINTS TO CONSULTANT. ALL SUBMITTED DRAWINGS SHALL BE OF THE SAME QUALITY AS ORIGINAL CONTRACT DOCUMENT DRAWINGS.
- 15.4 UPDATE OWNER'S DISTRIBUTION RISER DIAGRAMS POSTED IN ELECTRICAL ROOMS.
- 16. SHOP DRAWINGS AND OPERATING/MAINTENANCE INSTRUCTION MANUALS
- 16.1 SUBMIT SHOP DRAWINGS AND OPERATING/MAINTENANCE INSTRUCTION MANUALS FOR
- 16.1.1 SPECIAL RECEPTACLES AND SWITCHES;
- EQUIPMENT AND MATERIALS. ENDORSE EACH DRAWING, INCLUDE COMPANY NAME AND SUBMITTAL DATE. PROVIDE MANUALS AS INDEXED, IDENTIFIED HARD COVER 3-RING BINDERS COMPLETE WITH:
- 16.2.1 TITLE SHEET AND LIST OF CONTENTS;
- 16.2.2 A COPY OF EACH "REVIEWED" SHOP DRAWING;
- 16.2.3 EXPLANATIONS OF OPERATING PRINCIPLES AND SEQUENCES;
- 16.2.5 RECOMMEND MAINTENANCE PRACTICES AND PRECAUTIONS;
- 16.2.7 WIRING AND CONNECTION DIAGRAMS;
- 16.2.8 COPIES OF ADDITIONAL AND REVISED PANELBOARD DIRECTORIES.
- 16.3 PROVIDE 2 SETS OF MANUALS. CONFIRM EXACT QUANTITY AND METHOD OF AUTHORITIES;
- 17. GENERAL CONDUIT AND CONDUCTOR INSTALLATION REQUIREMENTS
- 17.1 INSTALL CONDUIT AND CONDUCTORS CONCEALED TO DEGREE MADE POSSIBLE BY FINISHES AND PROVIDE INSTALLATIONS IN ACCORDANCE WITH CEC AND LOCAL GOVERNING AUTHORITIES. PLAN AND COORDINATE LOCATIONS AND ROUTING OF SERVICES, WITH TRADES PRIOR TO INSTALLATION. IN AREAS WHERE A MULTIPLICITY OF SERVICES OCCURS, PREPARE DETAIL DRAWINGS AND SUBMIT TO CONSULTANT FOR REVIEW PRIOR TO START OF AFFECTED WORK.
- 17.2 WHERE CONDUIT AND/OR CONDUCTORS ARE EXPOSED, ARRANGE SAME TO AVOID INTERFERENCE WITH OTHER WORK AND PARALLEL TO BUILDING LINES. WHERE HORIZONTAL CONDUITS AND/OR CONDUCTORS ARE EXPOSED, INSTALL AS HIGH AS POSSIBLE. DO NOT INSTALL CONDUIT AND/OR CONDUCTORS WITHIN 6" (150 mm) OF "HOT" PIPES OR EQUIPMENT UNLESS CONDUIT AND/OR CONDUCTORS ARE ASSOCIATED WITH EQUIPMENT. INDEPENDENTLY RUN CONDUIT AND CONDUCTORS MUST BE SUPPORTED FROM THE CEILING/WALL STRUCTURE, NOT FROM CEILING HANGERS, DUCTWORK, PIPING, CABLE TRAYS, ETC.
- 17.3 IDENTIFY CONDUIT RUNS. (I.E.: TAG BOTH ENDS OF CONDUIT RUNS).
- 17.4 AT NO EXTRA COST, ALLOW FOR FINAL RELOCATIONS OF DEVICES UP TO 10' (3M) TO SUIT FINAL COORDINATED DEVICE LOCATIONS, PRIOR TO INSTALLATION OF WALL COVERINGS.
- 17.5 GENERALLY, CONDUCTORS AND CONDUIT ARE SIZED ON DRAWINGS, BUT IN ABSENCE OF DIRECTION IN TYPE AND SIZING. TYPE AND SIZE REQUIRED QUANTITY IN ACCORDANCE WITH THE INTENDED APPLICATION, TO APPLICABLE OESC REQUIREMENTS. SIZES WHERE SHOWN, ARE MINIMUM SIZES AND SHALL NOT BE REDUCED UNLESS APPROVED BY CONSULTANT.
- 17.6 WHERE RECEPTACLE TYPE DEVICES ARE LOCATED IN EXISTING FLOORS AND/OR WHERE FEEDS ARE REQUIRED TO FURNITURE SYSTEMS IN OPEN SPACES, AND WHERE CHASING OF FLOOR SLAB TO RUN CONDUIT IS NOT ACCEPTABLE TO CONSULTANT, PROVIDE "POKE-THRU" ASSEMBLY INSTALLED THROUGH FLOOR AND FEED FROM CONDUIT RUNS PROVIDED IN CEILING SPACE OF FLOOR BELOW.
- 17.7 CONDUCTORS IN PLENUM SPACES AND IN RAISED FLOOR AREAS SHALL COMPLY WITH OBC AND OESC REQUIREMENTS WITH REGARDS TO FLAME AND SMOKE TEST.
- 18.1 PROVIDE CONDUIT FOR CONDUCTORS. INTERIOR CONDUIT TO BE EMT (THINWALL) GALVANIZED, ELECTRICAL METALLIC TUBING TO CSA C22.2 NO. 83, COMPLETE WITH FACTORY MADE BENDS WHERE SITE BENDING IS NOT POSSIBLE, AND JOINTS AND TERMINATIONS MADE WITH SET SCREW TYPE CONNECTORS; FOR SHORT BRANCH CIRCUIT CONNECTORS TO MOTORIZED EQUIPMENT AND TRANSFORMERS (MINIMUM LENGTH 18" [450 mm], MAXIMUM LENGTH 24" [600 mm] WITH 180 DEGREE LOOP WHERE POSSIBLE) -GALVANIZED STEEL FLEXIBLE FLUID-TIGHT METALLIC CONDUIT TO CSA C22.2 NO. 56. COMPLETE WITH IDEAL "STEEL TOUGH" LIQUID TIGHT FLEXIBLE CONDUIT CONNECTORS AT TERMINATIONS. FOR EXTERIOR EXPOSED CONDUIT, AND FOR INTERIOR CONDUIT GREATER THAN 2" (50 mm) DIAMETER AND FOR SURFACE MOUNTED CONDUIT AT HEIGH LESS THAN

- 4' (1200 mm), PROVIDE RIGID GALVANIZED STEEL TO CSA C22.2 NO. 45 COMPLETE WITH FITTINGS, CONNECTORS AND RIGID COUPLINGS.
- AND DISPOSE. OBTAIN FROM OWNER, LIST OF EXISTING ITEMS TO BE CAREFULLY REMOVED 18.2 SUPPORT AND SECURE CONDUIT AT SPACING IN ACCORDANCE WITH CODE REQUIREMENTS BY MEANS OF GALVANIZED PIPE STRAPS, CONDUIT CLIPS, RING BOLT TYPE HANGERS, OR BY OTHER PROPER MANUFACTURED DEVICES. PROVIDE CONDUIT FITTINGS CONSTRUCTED OF SAME MATERIALS AS CONDUIT AND SUITABLE FOR APPLICATION. SQUARE AND PROPERLY REAM ENDS OF SITE CUT CONDUIT. GENERALLY, CONDUIT IS SIZED ON DRAWINGS. SIZE CONDUIT NOT SIZED ON DRAWINGS IN ACCORDANCE WITH CODE. BEND CONDUIT AT FULL CONDUIT DIAMETER WITH NO KINKING AND NO FLAKING OR CRACKING OF FINISHES.

 - 19.1 PROVIDE CONDUCTORS. REFER TO DRAWINGS FOR SIZING OF CONDUCTORS. GENERALLY, BRANCH CIRCUIT CONDUCTOR SIZES ARE INDICATED ON CONSULTANT'S DRAWINGS. SUCH SIZES ARE MINIMUM REQUIREMENTS AND MUST BE INCREASED, TO SUIT LENGTH OF RUN AND VOLTAGE DROP IN ACCORDANCE WITH SCHEDULE OBTAINED FROM CONSULTANT. CONDUCTORS NOT SIZED ON DRAWINGS SHALL BE SIZED IN ACCORDANCE WITH CODE. PROVIDE CABLE SUPPORT SYSTEM ACCESSORIES WHICH ARE NOT SPECIFIED HEREIN OR SHOWN ON DRAWINGS BUT ARE REQUIRED FOR PROPER INSTALLATION.
 - 19.2 INTERIOR CONDUCTORS TO BE "RW90" SINGLE CONDUCTOR TO CSA C22.2 NO. 75, COLOUR CODED, 167 DEGREES F. (75 DEGREES C.) RATED, PVC INSULATED AND NYLON COVERED.
 - 19.3 CONDUCTORS IN ACCESSIBLE SUSPENDED CEILING SPACES, IN STUD WALL CONSTRUCTION TO SUSPENDED CEILING SPACES (MAXIMUM 5' RUN PERMITTED) MAY BE "BX" TYPE, AC-90 FLEXIBLE ARMOURED CABLE WITH "RW-90" CONDUCTORS AND BARE COPPER GROUND CONDUCTOR TO CSA C22.2 NO. 51 (BULLETIN NO. 994). PROVIDE PROPER SQUEEZE 24.3 ACCEPTABLE MANUFACTURERS ARE: TYPE CONNECTORS AND PLASTIC ANTI-SHORT BUSHINGS AT TERMINATIONS. SUPPORT "BX" IN CEILING SPACES AND IN STUD WALL CONSTRUCTIONWITH STEEL 2 HOLE CABLE STRAPS TO "CODE" REQUIREMENTS.
 - 19.4 CONDUCTORS UP TO AND INCLUDING NO. 10 AWG SHALL BE SOLID. CONDUCTORS IN SIZES LARGER THAN NO. 10 AWG SHALL BE STRANDED. PROVIDE CONDUCTORS CONSTRUCTED OF 98% CONDUCTIVE COPPER AND APPROVED FOR 600V. DO NOT USE CONDUCTORS SMALLER THAN NO. 12 AWG UNLESS OTHERWISE NOTED.
 - 19.5 19.5 PROVIDE IDI ELECTRIC "IDEAL" NO. 451, NO. 452 AND NO. 453 "WING-NUT" CSA CERTIFIED 600V RATED PRESSURE TYPE CONNECTORS
 - 19.6 19.6 COLOUR CODE CONDUCTORS IN ACCORDANCE WITH CODE, THROUGHOUT TO IDENTIFY PHASES, NEUTRALS AND GROUND BY MEANS OF SELF-LAMINATING COLOURED TAPE, COLOURED CONDUCTOR INSULATION, OR PROPERLY SECURED COLOURED PLASTIC DISCS.
 - 19.7 WHEN PULLING WIRES INTO CONDUIT, USE IDI ELECTRIC "IDEAL YELLOW 77" LUBRICANT. ENSURE WIRES ARE KEPT STRAIGHT AND ARE NOT TWISTED OR ABRAISED.
 - 19.8 WIRING FOR EMERGENCY LIGHTING SHALL BE FIRE RATED.
 - 20. OUTLET BOXES, PULLBOXES AND JUNCTION BOXES

SHALL BE CAST FS/FD TYPES.

- 20.1 PROVIDE CSA APPROVED STAMPED GALVANIZED STEEL OUTLET BOX FOR EACH LUMINAIRE, FIRE ALARM DEVICE, ETC. REFER TO DRAWINGS FOR LOCATIONS OF OUTLETS. CONFIRM EXACT LOCATIONS PRIOR TO ROUGHING-IN. BOXES FOR RIGID STEEL CONDUITS
- CONDUCTOR/CONDUIT INSTALLATIONS. GENERALLY, PROVIDE CONDUIT RUNS EXCEEDING 100' (30 m) IN LENGTH, OR WITH MORE THAN 3, 90 DEGREE BENDS WITH PULLBOX INSTALLED AT CONVENIENT AND SUITABLE INTERMEDIATE ACCESSIBLE LOCATION. PROVIDE JUNCTION BOXES AND PULLBOXES SIZED IN ACCORDANCE WITH CODE TO SUIT NUMBER AND SIZE OF CONDUITS AND CONDUCTORS. BOXES TO BE GALVANIZED OR PRIME COATED PLATE STEEL COMPLETE WITH SCREW-ON OR HINGED COVERS AND KNOCKOUTS. BOXES MUST BE
- ACCESSIBLE AFTER WORK IS COMPLETE. TRUE "AS-BUILT" DRAWING SET. SUBMIT "AS-BUILT" DRAWING COMPACT DISKS WITH WHITE 20.3 SIZE, ARRANGEMENT AND TYPE OF BOXES MUST BE SUITABLE FOR APPLICATION. PROVIDE BLANK COVERPLATES ON EXISTING OBSOLETE BOXES WHICH ARE TO REMAIN. CLEARLY IDENTIFY MAIN PULL OR JUNCTION BOXES BY SPRAY PAINTING COVERS IN ACCORDANCE TO BASE BUILDING STANDARDS AND SHALL BE CONFIRMED ON SITE.
 - 20.4 WHERE REQUIRED, SUPPLY ACCESS DOORS OF MINIMUM NO. 12 GAUGE. PRIME COATED STEEL COMPLETE WITH HINGES AND FRAMES TO GIVE ACCESS TO BOXES AND CONDUCTOR JOINTS AND OTHER SIMILAR ELECTRICAL WORK WHICH MAY NEED MAINTENANCE OR REPAIR, BUT WHICH IS CONCEALED IN INACCESSIBLE CONSTRUCTION. CONFIRM FINISHES WITH
 - 21. RECEPTACLES, SWITCHES AND FACEPLATES
 - 21.1 FOR GENERAL AREAS: PROVIDE HUBBELL CANADA HBL1221 CSA APPROVED, HEAVY DUTY, SPECIFICATION GRADE, AC QUIET ACTION TOGGLE TYPE, 20A, 120-277V SWITCHES AND HBL5262, HEAVY DUTY, SPECIFICATION GRADE PREMIUM QUALITY DUPLEX NYLON CONSTRUCTION U-GROUND. 15A-125V. 3W RECEPTACLES. DEVICES SHALL BE BACK AND SIDE WIRED. PROVIDE IMPACT RESISTANT THERMOPLASTIC FACEPLATES WITH MATCHING SCREWS. CONFIRM TYPE AND FINISH OF DEVICES WITH OWNER PRIOR TO ORDERING.
 - 21.2 FOR PUBLIC SPACES OR OTHER AREAS WHERE DESIGNER DEVICES ARE REQUIED: PROVIDE HUBBELL CANADA CSA APPROVED, "STYLE LINE" SPECIFICATION GRADE, ROCKER TYPE, 20A, 120-277V DECORATIVE TYPE SWITCHES AND "STYLE LINE" SPECIFICATION GRADE DUPLEX NYLON CONSTRUCTION U-GROUND, 15A-125V, 3W DECORATIVE RECEPTACLES. DEVICES SHALL BE BACK AND SIDE WIRED. PROVIDE IMPACT RESISTANT THERMOPLASTIC FACEPLATES WITH MATCHING SCREWS. CONFIRM TYPE AND FINISH OF DEVICES WITH OWNER PRIOR TO ORDERING. POLE, 3W, ORANGE COLOURED, SPECIFICATION GRADE ISOLATED
 - 21.3 WHERE SHOWN, PROVIDE HUBBELL NO. IG.5262, 15A-125V, ULC LISTED, 2 RECEPTACLE COMPLETE WITH STAINLESS STEEL FACEPLATE AND MATCHING SCREWS.
 - 21.4 WHERE SHOWN, PROVIDE HUBBELL NO. GF.5252, 15A-125V, ULC LISTED. CLASS A. GROUP ONE, 2-POLE, 3W. IVORY COLOURED, SPECIFICATION GRADE, GROUND FAULT INTERRUPTER DUPLEX RECEPTACLE, COMPLETE WITH STAINLESS STEEL FACEPLATES AND MATCHING SCREWS.
 - 21.5 IDENTIFY CIRCUIT NUMBERS ON RECEPTACLE DESIGNATED LABELLING SPACES. PROVIDE PERMANENTLY LABELLED, SELF ADHESIVE, IDENTIFICATION TAPE ON OUTSIDE OF EACH DEVICE OUTLET, IDENTIFYING LOCATION FROM WHERE EACH DEVICE IS FED.
 - 22. FASTENING AND SECURING HARDWARE
 - 22.1 PROVIDE PROPER FASTENERS AND SIMILAR HARDWARE REQUIRED FOR CONDUIT, CONDUCTORS. AND FOR EQUIPMENT HANGER AND/OR SUPPORT MATERIAL UNLESS OTHERWISE NOTED. EXPLOSIVE POWDER ACTUATED FASTENERS WILL NOT BE PERMITTED UNLESS SPECIFIC WRITTEN APPROVAL FOR THEIR USE AND TYPE HAS BEEN OBTAINED FROM CONSULTANT. UNDER NO CIRCUMSTANCES USE CEILING SUSPENSION HANGERS OR GRIDS FOR SUSPENSION OF CONDUIT AND CONDUCTORS.
 - 23. IDENTIFICATION NAMEPLATES
 - 23.1 FOR EACH PIECE OF ELECTRICAL DISTRIBUTION EQUIPMENT FROM ELECTRICALSOURCE OF SUPPLY UP TO AND INCLUDING PANELBOARDS, PROVIDE ENGRAVED LAMACOID IDENTIFICATION NAMEPLATES SECURED TO APPARATUS WITH STAINLESS STEEL SCREWS. WORDING TO INDICATE SOURCE OF ELECTRICAL SUPPLY AND SIZED TO SUIT EQUIPMENT FOR WHICH IT IS PROVIDED. CONFIRM EXACT NAMEPLATE WORDING, DESIGNATIONS, AND SIZES 25.8 EQUIP CIRCUIT BREAKERS CONNECTED TO DEDICATED EQUIPMENT OR DEVICES WITH HANDLE WITH OWNER PRIOR TO MANUFACTURE. LEMACOID NAMEPLATES TO MATCH BASE BUILDING STANDARDS FOR SIZE.
 - 24. DISTRIBUTION TRANSFORMERS
 - 24.1 HAMMOND POWER SOLUTIONS, DRY TYPE TRANSFORMERS AS PER DRAWING SCHEDULE, CSA APPROVED AND/OR ULC LISTED AND LABELLED, CONSTRUCTED AND FACTORY TESTED IN ACCORDANCE WITH LATEST REQUIREMENTS OF FOLLOWING: 24.1.1 CSA STANDARD C9;
 - 24.1.2 CAN/CSA C22.2 NO. 47;
 - 24.1.3 CAN/CSA-C802.2 24.1.4 UL 1561;
 - 24.1.5 NEMA TP1;
 - 24..2 Dry type transformers to be complete with:
 - 24.2.1 MINIMUM NEMA 3R ENCLOSURE WITH A RIGID END FRAME, REMOVABLE PLATES, A TERMINAL COMPARTMENT; VENTILATION LOUVRES DESIGNED TO PREVENT PENETRATION OF WATER SPRAY FROM ACTIVATED SPRINKLERS ONTO LIVE PARTS, AND GASKETTED DOORS AND COMPONENT OPENINGS:
 - 24.2.2 CLASS "H", 220°C CLASS, SILICONE TYPE COIL INSULATION, SUCH THAT WINDING TEMPERATURE RISE TO NOT EXCEED 150C*(270F*) AND ENCLOSURE TEMPERATURE RISE NOT EXCEED 65C°(117F°) UNDER FULL LOAD IN A 40°C (104°F) AMBIENT TEMPERATURE;
 - 24.2.3 TOP MOUNTED FACTORY PAINTED DRIP SHIELD;

24.1.6 LOCAL GOVERNING AUTHORITY CODES AND STANDARDS.

- 24.2.4 COPPER WINDINGS;
- 24.2.5 CORE CONSTRUCTION CONSISTING OF STACKED LAMINATIONS OF HIGH PERMEABILITY SILICONE STEEL;
- 24.2.6 VACUUM IMPREGNATED POLYESTER OR EPOXY RESIN;
- 24.2.7 LUGS OR PRESSURE TYPE TERMINALS TO SUIT PRIMARY AND SECONDARY CONDUCTORS;
- 24.2.8 FOUR (4) 2-1/2% FULL CAPACITY TAPS; TWO (2) ABOVE NORMAL AND TWO (2) BELOW NORMAL; TAPS LOCATED ON PRIMARY WINDING;
- 24.2.9 AN INTEGRAL VIBRATION DAMPENING SYSTEM WITH ANTI-VIBRATION PADS USED BETWEEN 29. LUMINAIRES CORE AND ENCLOSURE;
- 24.2.10 SEISMIC RESTRAINT REQUIREMENTS TO SUIT LOCAL GOVERNING AUTHORITY REQUIREMENTS AND CODES;
- 24.2.11 UNLESS OTHERWISE NOTED, SOUND LEVEL AND BASIC IMPULSE LEVEL TO MEET CSA C9 REQUIREMENTS; UNLESS OTHERWISE NOTED, TRANSFORMERS 300 KVA AND LARGER TO HAVE NOISE LEVEL 3DB BELOW CSA C9 REQUIREMENTS;
- 24.2.12 EFFICIENCY MEETING OR EXCEEDING CSA C802.2;
- 24.2.13 FACTORY PAINTED WITH AN ANSI GREY ENAMEL FINISH;
- 24.2.14 ALUMINUM NAMEPLATE INDICATING IMPEDANCE RATING, WEIGHT, CONNECTION DIAGRAM, STYLE AND SERIAL NUMBER, RIVETED TO FRONT OF ENCLOSURE.
- 24.3.1 HAMMOND POWER SOLUTIONS;
- 24.3.2 DELTA GROUP; 24.3.3 SCHNEIDER ELECTRIC;
- 24.3.4 REX POWER MAGNETICS;
- 24.3.5 BEMAG TRANSFORMER;
- 24.3.6 SIEMENS; 24.3.7 STI POWER.
- 25. PANELBOARDS
- 25.1 PROVIDE FACTORY ASSEMBLED DEAD FRONT SURFACE MOUNTED PANELBOARDS AS PER SCHEDULES, MANUFACTURED TO CSA STANDARD C22.2 NO. 29 AND ONTARIO ELECTRICAL SAFETY CODE, AND DESIGNED FOR SEQUENCE PHASE CONNECTION OF BRANCH CIRCUIT BREAKERS.
- 25.2 AS SCHEDULED, PANELBOARDS ARE OF TYPES:
- "POW-R-LINE 1", 120/208 V, 3-PHASE AND SINGLE PHASE WITH MINIMUM "BAB" FRAME, BOLT-ON MOULDED CASE CIRCUIT BREAKERS WITH A MINIMUM INTERRUPTING CAPACITY OF 10 KA SYMMETRICAL AT 208 V, UNLESS OTHERWISE SCHEDULED. WHERE PANELBOARDS ARE SCHEDULE TO INCLUDE SERIES RATED PROVISIONS, PROVIDE BREAKERS AS RECOMMENDED BY PANEL MANUFACTURER;
- 25.3 WHERE GROUND FAULT CIRCUIT INTERRUPTING (GFCI) TYPE BREAKERS ARE REQUIRED BY CODE AND/OR SCHEDULED, PROVIDE "QUICKLAG" GROUND FAULT, CSA CLASS "A", GROUP 1, COMBINATION THERMAL MAGNETIC BOLT-ON CIRCUIT BREAKERS WITH SOLID-STATE GROUND FAULT INTERRUPTERS.
- 25.4 PANELBOARDS TO BE EQUIPPED WITH ONE (1) CONTINUOUS BUS BAR PER PHASE. EACH BUS BAR TO HAVE SEQUENTIALLY PHASED BRANCH CIRCUIT CONNECTORS LIMITED TO BOLT-ON BRANCH CIRCUIT BREAKERS. BUSSING TO BE FULLY RATED AND OF PLATED COPPER CONSTRUCTION.
- 25.5 PANELBOARDS ARE TO BE COMPLETE WITH:
- 25.5.1 NEMA 1, BOX CONSTRUCTED OF CODE GAUGE GALVANIZED STEEL WITH REMOVABLE BOX ENDS, WIRING GUTTER SPACE ON SIDES; CONDUIT ENTRIES SEALED WATER-TIGHT;
- 25.5.3 ENCLOSURE CONSTRUCTED OF CODE GAUGE, HOT ZINC DIPPED GALVANIZED STEEL

25.5.2 DEAD-FRONT CONSTRUCTION TO SHIELD USER FROM ENERGIZED PARTS;

- CONSTRUCTED IN ACCORDANCE WITH UL 50 REQUIREMENTS: TRIM FOR FLUSH OR SURFACE WALL MOUNTING AS SHOWN; FRONT PANEL TO NOT BE REMOVABLE WITH
- 25.5.4 HINGED DOOR WITH CONCEALED FASTENERS, CONCEALED HINGE, CHROME PLATED DOOR LATCH AND KEYED ALIKE LOCK WITH KEY;
- 25.5.5 A STEEL FRAME HOLDER AND CIRCUIT DIRECTORY CARD PROTECTED BY CLEAR ACETATE AND SECURED TO BACK OF DOOR, AND MYLAR CIRCUIT BREAKER IDENTIFICATION STRIPS;
- 25.5.6 DRIP SHIELD FOR SURFACE MOUNTED PANELBOARDS:
- 25.5.7 COPPER NEUTRAL BARS; 25.5.8 200% SIZED NEUTRALS FOR PANELS EQUIPPED WITH SPD UNITS AND FOR PANELS AS
 - SCHEDULED;
- 25.5.9 SOLIDLY BONDED EQUIPMENT COPPER GROUND BAR;
- 25.5.10 HIGH STRENGTH, SET SCREW TYPE, ANTI-TURNING WIRE CONNECTORS; 25.5.11 CURRENT-CARRYING PARTS BE INSULATED FROM GROUND AND PHASE-TO-PHASE
- BY HIGH DIELECTRIC STRENGTH THERMOPLASTIC: 25.5.12 ISOLATED GROUND BUS FOR PANELBOARDS FEEDING ELECTRICALLY SENSITIVE
- EQUIPMENT;
- 25.5.13 FILLER PLATES COVERING UNUSED MOUNTING SPACE; 25.5.14 NON-AUTOMATIC AND AUTOMATIC MAIN BREAKER TO FUNCTION AS AN ISOLATING
- SWITCH, WHERE SHOWN AND AS REQUIRED; 25.5.15 GROUND FAULT CIRCUIT INTERRUPTING (GFCI) TYPE BREAKERS TO FEED DEVICES AS

SCHEDULED AND FOR APPLICATIONS REQUIRED BY LOCAL GOVERNING CODES;

- 25.5.16 ARC FAULT CIRCUIT INTERRUPTER (AFCI) TYPE BREAKERS TO FEED DEVICES AS
- SCHEDULED AND FOR APPLICATIONS REQUIRED BY LOCAL GOVERNING CODES. 25.6 PANELS, DOORS AND TRIM ARE TO BE FACTORY PAINTED WITH ANSI GREY ENAMEL FINISH.
- RECESSED BACKBOXES (TUBS) NEED NOT BE FINISHED PAINTED. 25.7 EQUIP BREAKERS OF FRAME SIZE 225 AMPERES AND GREATER, WITH SOLID STATE
- ADJUSTABLE TRIP UNITS.
- 25.9 ACCEPTABLE MANUFACTURERS ARE: EATON (CUTLER-HAMMER), SCHNEIDER ELECTRIC
- (SQUARE D), SIEMENS ELECTRIC LTD OR APPROVED BY OWNER. 26. GROUNDING

CONNECTORS.

- 26.1 PROVIDE COMPLETE SYSTEM OF GROUNDING WHICH COMPLIES WITH REQUIREMENTSOF AUTHORITIES HAVING JURISDICTION FOR ELECTRICAL WORK, INCLUDE REQUIRED GROUNDING SECTIONS OF THE OESC. CONNECT GROUNDING CONDUCTORS TO EXISTING BUILDING GROUND SYSTEM. PROVIDE SEPARATE INSULATED GROUND WIRE FOR EACH ISOLATED GROUND CIRCUIT. BURIED OR IN SLAB GROUND CONNECTIONS SHALL BE MADE WITH ERICO CADWELD TYPE WELDED COPPER CONNECTIONS OR BURNDY HYGROUND COMPRESSION
- 27. GENERAL ELECTRICAL WORK TESTING
- 27.1 IN ADDITION TO TESTS REQUIRED BY GOVERNING AUTHORITIES AND REGULATIONS, TEST WORK TO ENSURE THERE ARE NO GROUNDS OR CROSSES. ENSURE DEVICES ARE COMMISSIONED AND OPERABLE. CONNECT CIRCUITS TO PANELBOARDS SO AS TO BALANCE ACTUAL LOADS (WATTAGE) WITHIN 5%. IF REQUIRED, TRANSPOSE CIRCUITS WHEN WORK IS COMPLETE TO MEET THIS REQUIREMENT.
- 28. PROVISIONS FOR MISCELLANEOUS SYSTEM ROUGH-INS
- 28.1 PROVIDE COMPLETE SYSTEM OF EMPTY CONDUITS, OUTLET BOXES, JUNCTION BOXES, FACEPLATES AND SLEEVES (IF REQUIRED) AND FIRE RETARDANT PLYWOOD BACKBOARD TO ACCOMMODATE FUTURE EXTENSION OF EXISTING SYSTEM BY SYSTEMS INSTALLERS WHO WILL PROVIDE EQUIPMENT AND WIRING. PROVIDE BLANK TYPE FACEPLATES.

- 28.2 PROVIDE CONDUIT WITH MINIMUM DIAMETER AS SHOWN. PROVIDE PULLBOXES IN CONDUIT RUNS LONGER THAN 100' (30 m) OR HAVING MORE THAN 2, 90 DEGREE BENDS. PULLBOX SIZES SHALL NOT BE LESS THAN 8 TIMES ENTERING CONDUIT IN LENGTH. LEAVE CONDUITS FREE AND CLEAR OF OBSTRUCTIONS AND TERMINATE AS SHOWN. EQUIP TERMINATIONS WITH BUSHINGS AND CLEARLY IDENTIFY EACH RUN. PROVIDE FISH WIRES IN EMPTY CONDUIT FOR NETWORK CABLING SYSTEMS, BOXES, CONDUITS AND BENDING RADII SHALL CONFORM TO EIA/TIA 568B STANDARDS FOR INSTALLATION OF CAT. 6E/6 CABLING.
- 28.3 CONFIRM EXACT REQUIREMENTS AND LOCATIONS OF EQUIPMENT WITH OWNER AND SYSTEM INSTALLERS PRIOR TO ROUGHING-IN.
- 29.1 PROVIDE LUMINAIRES AS NOTED COMPLETE WITH ELECTRONIC BALLASTS. CONFIRM FINISHES WITH CONSULTANT PRIOR TO ORDERING. PROVIDE T8 LAMPS OF LOW LEAD AND LOW MERCURY CONTENT, WITH 2950 LUMENS INITIAL, 3500 K, COLOUR TEMPERATURE, AND MINIMUM CRI 85. INCLUDE LAMP LISTING IN LUMINAIRE MANUALS. FLUORESCENT
- BALLASTS SHALL BE ELECTRONIC ENERGY SAVING RAPID START BALLASTS AS FOLLOWS: 29.1.1 CSA APPROVED AND ULC LISTED AND LABELLED;
- 29.1.2 COMPLY WITH FCC RULES AND REGULATIONS, AND ANSI SPEC
- C62.41-1980/C62.45-1987; 29.1.3 IN ACCORDANCE WITH ANSI SPEC C82.11;
- 29.1.4 CLASS A SOUND RATING;
- 29.1.5 CAPABLE OF STARTING LAMPS DOWN TO 0 DEGREES C.; 29.1.6 TOTAL HARMONIC DISTORTION NOT EXCEEDING 10%;
- 29.1.7 MINIMUM POWER FACTOR OF 0.97 AND BALLAST FACTOR OF AT LEAST 0.88;
- 29.1.8 LAMP CURRENT CREST FACTOR NOT GREATER THAN 1.7; 29.1.9 FREQUENCY OF OPERATION BETWEEN 20 KHZ MINIMUM TO 60 KHZ MAXIMUM, BUT NOT
- BETWEEN 30 KHZ AND 42 KHZ; LAMPS SHALL OPERATE WITHOUT VISIBLE FLICKER;
- 29.1.10 EMI/RFI FILTERING; 29.1.11 NAMEPLATE IDENTIFYING ELECTRICAL DATA AND STANDARDS;
- 29.1.12 5-YEAR FULL REPLACEMENT PARTS AND LABOUR INCLUDED WARRANTY. 29.2 THOROUGHLY REVIEW CEILING TYPES, FINISHES AND CONSTRUCTION DETAILS WITH OWNER BEFORE PLACING LUMINAIRE ORDERS AND ENSURE REQUIRED MOUNTING ASSEMBLIES, RINGS AND SIMILAR FEATURES ARE INCLUDED. INCLUDE FOR ASSEMBLY, MOUNTING AND ADJUSTING OF LUMINAIRES, COMPLETE WITH WIRING, CONNECTIONS, HANGERS, ALIGNERS, BOX COVERS AND ACCESSORIES FOR COMPLETE, SAFE, FULLY OPERATIONAL ASSEMBLY. CAREFULLY COORDINATE LUMINAIRE INSTALLATION WITH WORK OF OTHER TRADES TO ENSURE NECESSARY RECESSING DEPTHS AND MOUNTING SPACES ARE PROVIDED. INSTALL LUMINAIRES IN ACCORDANCE WITH APPLICABLE ARCHITECTURAL REFLECTED CEILING PLANS AND/OR WALL ELEVATIONS. CONFIRM
- CEILING SLAB STRUCTURE, NOT TO CEILING HANGERS, DUCTWORK, PIPING, CABLE 29.3 CONNECT LUMINAIRES TO CIRCUITS AND NEW AND/OR EXISTING LIGHTING
- CONTROL EQUIPMENT AS SHOWN. TRAYS, ETC. 29.4 ACCEPTABLE LAMP MANUFACTURERS ARE SYLVANIA, YORK, PEERLESS, PRESCOLITE, HALO,

LUMINAIRE LOCATIONS PRIOR TO ROUGHING-IN. SUPPORT LUMINAIRES DIRECTLY TO

- C&M, CAPRI, MIDDAY ETC. 30. CLOSEOUT DOCUMENTS
- 30.1.1 AS-BUILT DRAWINGS COMPLETE WITH CAD FILE DRAWINGS; ENSURE MAIN BRANCH CONDUITS, JUNCTION BOXES, AND ASSOCIATED ARE SHOWN ON AS BUILT DRAWINGS.

30.1 FOLLOWING DOCUMENTS ARE TO BE PROVIDED:

- 30.1.2 APPROVED AND STAMPED SHOP DRAWINGS;
- 30.1.3 ESA INSPECTION CERTIFICATE; 30.1.4 MAINTENANCE MANUALS;

30.1.5 COPY OF PANEL BOARD SCHEDULES

30.1.6 EMERGENCY LIGHTING TEST REPORT; 30.2 PROVIDE 3 SETS OF CLOSEOUT DOCUMENTS AFTER SUBSTANTAIL COMPLETION OF THE

MUNICIPALITY OF CASSELMAN

PROJECT NORTH

ISSUED FOR REVISED 99% REVIEW 2025-02-19 ISSUED FOR 99% COORDINATION ISSUED FOR 66% COORDINATION 2023-05-12 DESCRIPTION

IT IS THE RESPONSIBILITY OF THE APPROPRIATE CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON SITE AND PROMPTLY REPORT ALL ERRORS AND/OR OMISSIONS TO THE CONSULTANT BEFORE WORK COMMENCES.

ALL WORK IS TO FOLLOW THE OBC 2012 AND ANY OTHER APPLICABLE CODES AND REGULATIONS.

DO NOT SCALE DRAWINGS.

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DRAWING

ELECTRICAL SPECIFICATIONS

REVISION: MRK-23002008-A0 MAY 2023 **APPROVED** SCALE: AS SHOWN DRAWING No:

1. GENERAL REQUIREMENTS:

1.1. THIS DOCUMENT SPECIFIES THE USE OF AN END TO END STRUCTURED CABLING SOLUTION AS MANUFACTURED, WARRANTED, AND CERTIFIED BY A SINGLE MANUFACTURER. THE ACCEPTABLE

4.4. DATA CABLES: UTP, 24 AWG SOLID CONDUCTOR, CMP CABLE. CABLE COLOUR TO BE BLUE. MANUFACTURERS ARE AS FOLLOWS: BELDEN, COMMSCOPE, PANDUIT, OR HUBBELL. NO SUBSTITUTION IS ALLOWED. WORK DONE UNDER THIS SECTION SHALL INCLUDE FURNISHING OF LABOUR, MATERIALS, AND EQUIPMENT REQUIRED FOR INSTALLATION, TESTING, AND PUTTING INTO 4.5. WIRELESS ACCESS POINT (W.A.P.) DATA: UTP, 24 AWG SOLID CONDUCTOR, CMP CABLE.

1.2. WHILE EVERY ATTEMPT HAS BEEN MADE TO ENSURE ALL INFORMATION IS CORRECT AT THE TIME OF PUBLICATIONS, THE PRODUCTS SPECIFIED ARE AVAILABLE, AND THAT THE PART NUMBER 4.6. VOICE CABLES: UTP, 24 AWG SOLID CONDUCTOR, CMP CABLE. CABLE COLOUR TO BE BLUE. IDENTIFIED ARE CORRECT, IT IS THE RESPONSIBILITY OF THE COMMUNICATIONS CONTRACTOR TO VERIFY ALL PART NUMBER AND TO REPORT AND ERRORS AND/OR OMISSIONS IN THE DRAWINGS AND SPECIFICATIONS WITH THEIR BID SUBMISSIONS.

1.3. THE COMMUNICATIONS CONTRACTOR SHALL SUPPLY AND INSTALL A COMPLETE STRUCTURED CABLING SOLUTION BASED ON A PHYSICAL STAR WIRING TOPOLOGY THAT IS DESIGNED IN ACCORDANCE WITH, AND SUPPORTED BY A MANUFACTURER BACKED CERTIFICATION AND WARRANTY AS SPECIFIED HEREIN.

1.4. THE COMMUNICATIONS CONTRACTOR IS REQUIRED TO BE ON SITE DURING EACH PHASE/MOVE. THEY SHOULD PROVIDE FOR EIGHT (8) HOURS SUPPORT ON EACH OF THE PHASES/MOVES ON WEEKENDS. THE COMMUNICATIONS CONTRACTOR SHALL INCLUDE IN THEIR BID 4.10. CATV CABLE: RG-6 COAXIAL CABLE, CMP CABLE ALL NECESSARY ALLOWANCES FOR OVERTIME WORK AFTER REGULAR HOURS AND/OR WEEKENDS AS DICTATED BY THE PROJECT SCHEDULE.

1.5. THE COMMUNICATIONS CONTRACTOR SHALL BE RESPONSIBLE FOR THE ASSEMBLY OF THE COMMUNICATIONS SYSTEM AND PROTECTION OF THE MATERIAL AND EQUIPMENT AND RELATED ITEMS UNTIL PROJECT CUT OVER. ANY DAMAGE TO MATERIALS AND EQUIPMENT SHALL BE THE LIABILITY OF THE COMMUNICATIONS CONTRACTOR. ALL DAMAGE SHALL BE REPAIRED OR AT THE CLIENT'S REQUEST, THE EQUIPMENT SHALL BE REPLACED AT NO EXTRA CHARGE TO THE CLIENT.

1.6. PROVIDE EQUIPMENT, MATERIALS, AND LABOUR NOT SPECIFICALLY MENTIONED OR SHOWN WHICH MAY BE NECESSARY TO PERFECT ALL PARTS OF THIS INSTALLATION AND IN COMPLIANCE WITH REQUIREMENTS STATED OR REASONABLY INFERRED BY THE CONTRACT DOCUMENTS.

1.7. PRIOR TO SUBMITTING THEIR TENDER RESPONSE, THE COMMUNICATIONS CONTRACTOR SHALL PERFORM A SITE SURVEY TO FAMILIARIZE THEMSELVES WITH THE SITE AND ALL CONDITIONS OF THE SITE AFFECTED BY THE PROPOSED WORK. NO CLAIMS FOR EXTRA PAYMENT WILL BE CONSIDERED BECAUSE OF FAILURE TO DO SO.

2. SCOPE OF WORK

2.1. THIS PROJECT CONSISTS OF THE SUPPLY AND INSTALLATION OF AN END TO END STRUCTURED CABLING SOLUTION TO SUPPORT DATA AND VOICE APPLICATIONS, CATV CABLING SYSTEM APPLICATIONS, INTRA-BUILDING BACKBONE CABLING CONSISTING OF MULTIPAIR COPPER CABLING AND INTRA-BUILDING BACKBONE CABLING CONSISTING OF FIBER OPTIC CABLING. THIS SOLUTION SHALL BE INSTALLED, TESTED AND WARRANTED TO A UTP STANDARD CONSISTENT WITH 5.3.3.2. OM3 - 50/125UM LASER OPTIMIZED WITH MINIMUM BANDWIDTH OF 2000MHZ/KM AT THE GRADE OF CABLE BEING PROVIDED AS DETAILED IN ANSI/TIA-568-C.0, 568-C.1, 568-C.2, AND 568-C.3.

2.2. THE COMMUNICATIONS CONTRACTOR IS RESPONSIBLE TO KEEP THE WORKPLACE CLEAN, SAFE, AND FREE FROM ALL DEBRIS. ALL DEBRIS MUST BE REMOVED ON A DAILY BASIS.

2.3. THE COMMUNICATIONS CONTRACTOR IS RESPONSIBLE FOR THE STORAGE, HANDLING, DELIVERY AND INSTALLATION OF ALL MATERIALS USED IN THE PERFORMANCE OF THE WORK.

2.4. ALL CABLE PAIRS MUST BE TERMINATED AT EACH END USING EIA/TIA T568A, UNLESS OTHERWISE SPECIFIED.

2.5. THE CABLE LENGTH TO THE FARTHEST WORK AREA FROM THE I.T. CLOSET WILL BE LIMITED AND POLYOLEFIN INSULATION. THE CABLE CORE SHALL CONSIST OF 25 PAIR SUB-UNITS. THE TO 90 METERS (295 FEET). COMMUNICATIONS CONTRACTOR TO PROVIDE A 10 FOOT SERVICE LOOP CABLE SHALL HAVE SEQUENTIAL LENGTH MARKINGS PRINTED ON THE CABLE JACKET. THE CABLE ON ALL CABLES AT EACH END UNLESS OTHERWISE NOTED. IT IS THE RESPONSIBILITY OF THE COMMUNICATIONS CONTRACTOR TO NOTIFY THE COMMUNICATION ENGINEER'S REPRESENTATIVE IMMEDIATELY UPON DISCOVERY OF ANY CABLE RUN EXCEEDING 90m (295 FEET).

BREAKOUT PRICING:

3.1. COMMUNICATIONS CONTRACTOR TO PROVIDE A UNIT PRICE TO SUPPLY AND INSTALL ONE (1) CABLE C/W PERIPHERALS FOR COMPLETE CONNECTIVITY. TERMINATED. TESTED AND LABELED. COMMUNICATIONS CONTRACTOR TO ASSUME THAT CABLE LENGTHS WILL BE APPROXIMATELY 250 FEET AND THAT WORK WILL BE DONE DURING REGULAR HOURS. 3.1.1. ADD______ DELETE___

3.2. COMMUNICATIONS CONTRACTOR TO PROVIDE A UNIT PRICE TO SUPPLY AND INSTALL ONE (1) END TO END VENDOR WARRANTIES WILL BE APPLICABLE. RG-6 COAXIAL CMP CABLE C/W PERIPHERALS FOR COMPLETE CONNECTIVITY. TERMINATED. TESTED AND LABELED. COMMUNICATIONS CONTRACTOR TO ASSUME THAT CABLE LENGTHS WILL BE APPROXIMATELY 250 FEET AND THAT WORK WILL BE DONE DURING REGULAR HOURS. 3.2.1. ADD______ DELETE___

3.3. COMMUNICATIONS CONTRACTOR TO PROVIDE A UNIT PRICE TO SUPPLY AND INSTALL ONE (1) CABLE C/W PERIPHERALS FOR COMPLETE CONNECTIVITY, TERMINATED, TESTED AND LABELED. COMMUNICATIONS CONTRACTOR TO ASSUME THAT CABLE LENGTHS WILL BE APPROXIMATELY 250 COLOURS AS FOLLOWS: FEET AND THAT WORK WILL BE DONE DURING AFTER HOURS. 3.3.1. ADD______ DELETE___

3.4. COMMUNICATIONS CONTRACTOR TO PROVIDE A UNIT PRICE TO SUPPLY AND INSTALL ONE (1) RG-6 COAXIAL CMP CABLE C/W PERIPHERALS FOR COMPLETE CONNECTIVITY, TERMINATED, TESTED AND LABELED. COMMUNICATIONS CONTRACTOR TO ASSUME THAT CABLE LENGTHS WILL BE APPROXIMATELY 250 FEET AND THAT WORK WILL BE DONE DURING AFTER HOURS. 3.4.1. ADD______ DELETE_____

3.5. COMMUNICATIONS CONTRACTOR SHALL PROVIDE A SEPARATE PRICE TO SUPPLY AND INSTALL ONE HUNDRED (100) ADDITIONAL CABLES. COMMUNICATIONS CONTRACTOR TO ASSUME 6.4. BLANK INSERT TO BE PROVIDED WHERE PORTS DO NOT CONTAIN JACKS. COLOUR SHALL THAT CABLE LENGTHS WILL BE APPROXIMATELY 250 FEET. LOCATIONS TO BE DETERMINED ON SITE MATCH FACEPLATE. WITH CLIENT.

3.6. COMMUNICATIONS CONTRACTOR SHALL PROVIDE AN ALTERNATE PRICE TO SUPPLY AND INSTALL A CATEGORY 6 CABLING SOLUTION.

4. HORIZONTAL TRANSMISSION MEDIA:

THE CONTRACT DOCUMENTS. THE COMMUNICATIONS CONTRACTOR SHALL USE PATHWAYS (BY DIVISION 16) TO DISTRIBUTE THE CABLES THROUGHOUT THE FACILITY. WHERE THE CABLES LEAVE LOCATIONS. THE PATHWAYS AND EXTEND TO THE TERMINATION POINT THEY SHALL USE J-HOOKS AS SPECIFIED.

4.2. COMMUNICATIONS CONTRACTOR TO PROVIDE A 12 FOOT SERVICE LOOP AT EACH END ON ALL CABLES, UNLESS OTHERWISE NOTED.

4.3. ALL COMPONENTS OF THE HORIZONTAL CHANNEL SHALL MEET THE MINIMUM PERFORMANCE 7.3. SYSTEM FURNITURE OUTLETS TO BE: CHARACTERISTICS OF:

4.3.1. CATEGORY 6A+ - 750MHZ AND A DATA RATE OF 10GB/S

4.3.2. CATEGORY 6A+ - 625MHZ AND A DATA RATE OF 10GB/S 4.3.3. CATEGORY 6A - 500MHZ AND A DATA RATE OF 10GB/S

4.3.4. CATEGORY 6+ - 400MHZ AND A DATA RATE OF 2.4GB/S 4.3.5. CATEGORY 6 - 250MHZ AND A DATA RATE OF 2.4GB/S

PROPER OPERATION A COMPLETE COMMUNICATIONS SYSTEMS AS SHOWN, AS SPECIFIED AND AS

CABLE COLOUR TO BE BLUE. COMMUNICATIONS CONTRACTOR TO PROVIDE A MINIMUM OF 20 FEET

7.5. CATV OUTLET: F-CONNECTOR FOR COAXIAL CABLE. SLACK AT THE OUTLET LOCATION FOR CLIENT TO HAVE THE FLEXIBILITY TO RELOCATE THE

4.7. AUDIO VISUAL (AV) CABLES: UTP, 24 AWG SOLID CONDUCTOR, CMP CABLE. CABLE COLOUR MOUNTABLE UNLOADED MODULAR PATCH PANELS IN THE NEAREST TELECOM ROOM.

4.8. SECURITY CABLES: UTP, 24 AWG SOLID CONDUCTOR, CMP CABLE. CABLE COLOUR TO BE

4.9. INTER-CABINET CABLES: UTP, 24 AWG SOLID CONDUCTOR, CMP CABLE. CABLE COLOUR TO BE BLUE.

5. VERTICAL/BACKBONE AND INTERCONNECTIVITY TRANSMISSION MEDIA:

5.1. THE COMMUNICATIONS CONTRACTOR SHALL SUPPLY BACKBONE CABLING AS REQUIRED BY THE CONTRACT DOCUMENTS. THE COMMUNICATIONS CONTRACTOR SHALL USE PATHWAYS (BY DIVISION 16) TO DISTRIBUTE THE CABLES THROUGHOUT THE FACILITY. WHERE THE CABLES LEAVE CABINETS. THE PATHWAYS AND EXTEND TO THE TERMINATION POINT THEY SHALL USE J-HOOKS AS SPECIFIED.

5.2. THE COMMUNICATIONS CONTRACTOR SHALL VERIFY ALL BACKBONE CABLE RUN LENGTHS ON SITE PRIOR TO ORDERING.

5.3. OPTICAL FIBRE BACKBONE CABLE:

5.3.1. ALL FIBRE OPTIC CABLES SHALL MEET OR EXCEED THE LATEST REQUIREMENTS OF EIA/TIA-568 C-3. THE CABLES SHALL HAVE SEQUENTIAL LENGTH MARKINGS PRINTED ON THE CABLE. JACKET. THE CABLES SHALL HAVE A CRUSH RESISTANCE OF 2000 N/CM AS PER EIA-455-41. THE CABLES SHALL HAVE AN IMPACT RESISTANCE OF 1000 IMPACTS WITH 1.6 N-M REQUIREMENTS PER ANSI/TIA/EIA-568-B. PATCH CORDS TO BE FACTORY ASSEMBLED AND NOT AS PER EIA-455-25. THE CABLES SHALL HAVE A MINIMUM FLEXURE RATING OF 2000 CYCLES AS SITE PREPARED, COMPLETE WITH SNAGLESS BOOT. THE PATCH CORDS SHALL BE: PER EIA-455-104.

5.3.2. ALL COMPONENTS OF THE MULTIMODE FIBER OPTIC BACKBONE CHANNEL SHALL MEET THE MINIMUM PERFORMANCE CHARACTERISTICS OF:

5.3.3.1. OM5 - 50/125UM LASER OPTIMIZED WITH MINIMUM BANDWIDTH OF 2000MHZ/KM AT 850NM & 500MHZ/KM AT 1300NM UP TO 550 METERS.

850NM & 500MHZ/KM AT 1300NM UP TO 300 METERS.

5.3.2. ALL COMPONENTS OF THE SINGLEMODE FIBER OPTIC BACKBONE CHANNEL SHALL MEET THE MINIMUM PERFORMANCE CHARACTERISTICS OF:

5.3.2.1. OS1 - 8/125UM TO 9/125UM WITH MINIMUM BANDWIDTH STIPULATED BY THE CABLE MANUFACTURER AT 1310NM & 1550NM. CABLE/PATCH CORD COMPONENT SHALL BE ZERO WATER PEAK DESIGN ALLOWING USE OF ENTIRE SPECTRUM FROM 1260NM TO 1620NM.

5.4. MULTIPAIR COPPER BACKBONE CABLE:

5.4.1. THE MULTIPAIR CABLE SHALL MEET THE ICEA S-910-661-1997 AND BE COMPLIANT WITH BELLCORE AND REA SPECIFICATIONS. THE MULTIPAIR CABLE SHALL MEET OR EXCEED THE LATEST REQUIREMENTS OF EIA/TIA-568B. THE CABLE SHALL HAVE 24 AWG SOLID COPPER CONDUCTORS SHALL HAVE ONE JACKET EQUIPPED WITH A JACKET SPLITTING CORD.

5.4.2. ALL COMPONENTS OF THE MULTIPAIR COPPER BACKBONE CHANNEL SHALL MEET THE MINIMUM PERFORMANCE CHARACTERISTICS OF:

5.4.2.1. CATEGORY 5E - 100MHZ AND A DATA RATE OF 1.0GB/S

5.4. CATV COAXIAL BACKBONE CABLE: COAXIAL BACKBONE CABLE FROM I.T. CLOSET TO SERVICE PROVIDER DEMARCATION TO BE ARRANGED BY THE OWNER'S I.T. REPRESENTATIVE WITH THE SERVICE PROVIDER.

MODULAR JACKS:

6.1. MODULAR JACKS MUST BE MATCHED APPROPRIATELY WITH THE CABLES TO ENSURE THAT

6.2. MODULAR JACKS TO BE T568A 8P8C MDVO STYLE (OR EQUIVALENT) MODULAR JACK FOR WALL MOUNTED OUTLETS AND T568A 8P8C KEYSTONE (OR EQUIVALENT) STYLE FOR FLOOR AND MEETING ROOM TABLE OUTLETS. THE GRADE AND MANUFACTURER SHALL BE CONSISTENT WITH THE CABLING BEING WARRANTED.

6.3. ALL HORIZONTAL CABLING SHALL BE TERMINATED AT EACH END WITH THE MODULAR JACK

CABLE DESIGNATION	COLOUR
DATA	BLUE
WIRELESS ACCESS POINTS	YELLOW
VOICE	WHITE
AUDIO/VISUAL	GREEN
SECURITY	RED
INTER-CABINET CONNECTIVITY	BLACK

COMMUNICATION OUTLETS AND ACCESSORIES:

7.1. WALL OUTLETS TO BE:

7.1.1. 3-PORT AND 1-PORT DECORA + MODULES. COLOUR TO MATCH DIVISION 16 (ELECTRICAL) UNLESS OTHERWISE NOTED. COLOUR TO BE VERIFIED BY INTERIOR DESIGNER PRIOR TO PURCHASE AND INSTALLATION.

4.1. THE COMMUNICATIONS CONTRACTOR SHALL SUPPLY HORIZONTAL CABLING AS REQUIRED BY 7.1.2. SOME LOCATIONS ON THE FLOOR PLAN MAY INDICATE A WALL MOUNT TELEPHONE. PROVIDE A WALL MOUNT FACEPLATE SUITABLE FOR WALL MOUNTING A TELEPHONE SET IN THESE

7.2. FLOOR AND MEETING ROOM TABLE OUTLETS TO BE: 7.2.1. 3-PORT KEYSTONE DECORA + KEYSTONE MODULES. COLOUR TO MATCH DIVISION 16

(ELECTRICAL) UNLESS OTHERWISE NOTED. COLOUR TO BE VERIFIED BY INTERIOR DESIGNER PRIOR TO PURCHASE AND INSTALLATION.

7.3.1. 3-PORT MODULAR FURNITURE ADAPTER (IF SYSTEM FURNITURE HAS A STANDARD OPENING FOR COMMUNICATIONS CABLING) OR 1-PORT SIDE ENTRY BOX (IF SYSTEM FURNITURE HAS NO OPENING FOR COMMUNICATIONS CABLING) OR TEKNION FURNITURE ADAPTER (IF THE SYSTEM FURNITURE IS TEKNION). COMMUNICATIONS CONTRACTOR TO CONFIRM SYSTEM FURNITURE TYPE ON

SITE WITH THE OWNER BEFORE ORDERING FURNITURE ADAPTER.

7.4. CEILING MOUNTED OUTLETS TO BE: 7.4.1. 1-PORT OR 2-PORT SURFACE MOUNT BOXES, AS INDICATED ON DRAWINGS. COLOUR TO BE

TERMINATION HARDWARE:

8.1. HORIZONTAL CABLES: ALL HORIZONTAL CABLES SHALL BE TERMINATED ONTO RACK

8.2. OPTICAL FIBRE BACKBONE CABLE: FIBER BACKBONE CABLES SHALL BE TERMINATED ONTO THE OPTICAL FIBRE PATCH PANEL WHICH SHALL BE COMPATIBLE WITH STANDARD 19"RACKS, MUST BE SERVICEABLE FROM THE FRONT BY ALLOWING THE FIBRE PATCH PANEL TO SLIDE OR PIVOT AWAY FROM THE RACK AND SHALL BE MOUNTED AS INDICATED ON DETAIL DRAWINGS.

8.3. COPPER BACKBONE CABLES: COPPER BACKBONE CABLE SHALL BE TERMINATED ONTO AN IDC BLOCK ON PLYWOOD BACKBOARD IN THE LAN ROOM AND AT THE SERVICE PROVIDER DEMARCATION.

8.4. COPPER TIE CABLES: COPPER TIE CABLES SHALL BE TERMINATED ONTO AN IDC BLOCK ON PLYWOOD BACKBOARD AND RACK MOUNTABLE UNLOADED MODULAR PATCH PANEL (1 PAIR PER PORT) ON NETWORK RACK IN THE LAN ROOM.

8.5. INTER-CABINET CONNECTIVITY CABLES: ALL INTER-CABINET DATA CABLES SHALL BE TERMINATED BETWEEN RACK MOUNTABLE UNLOADED MODULAR PATCH PANELS IN NETWORK

9. CONNECTIVITY ITEMS:

9.1. UTP COPPER PATCH CORDS: ALL PATCH CORDS SHALL BE CONNECTED IN THE TELECOM ROOM TO THE CLIENT SUPPLIED ACTIVE EQUIPMENT USING 8 POSITION 4-PAIR PATCH CORDS, WITH 12. TELECOMMUNICATIONS RACKS, CABLE MANAGERS, POWER BARS AND PLYWOOD BACKBOARD: A SMALL OUTSIDE DIAMETER. THE PATCH CORDS SHALL BE CMR RATED, FT4, AND STAMPED ACCORDINGLY, AND SHALL BE CONSISTENT WITH THE GRADE AND MANUFACTURER OF THE CABLE BEING WARRANTED. PATCH CORDS TO HAVE STRANDED COPPER CONDUCTORS (WHERE SYSTEM DICTATES) AND DESIGNED TO PROVIDE A MATED-CONNECTION PERFORMANCE THAT EXCEEDS THE 9.1.1. AT THE LAN ROOM — QUANTITIES AS PER TOTAL NO. OF CABLES INSTALLED. PATCH CORDS

LENGTHS ARE TO BE COORDINATED WITH THE IT REPRESENTATIVE. PATCH CORDS COLOUR TO BE:

	LENGTH	CABLE DESIGNATION	TERMINATION	COLOUR
BLUE		DATA 10 FEET	RJ45/RJ45	
YELLOW		WIRELESS ACCESS POINTS 10 FEET	RJ45/RJ45	
WHITE		VOICE 10 FEET	RJ45/RJ45	
GREEN		AUDIO/VISUAL 10 FEET	RJ45/RJ45	
GREY		SECURITY 10 FEET	RJ45/RJ45	
BLACK		INTER-CABINET CONNECTIVITY 10 FEET	RJ45/RJ45	

9.1.2. AT THE WORKSTATION — QUANTITIES AS PER TOTAL NO. OF CABLES INSTALLED. PATCH CORD LENGTHS ARE DEPENDENT ON THE TYPICAL LOCATIONS OF THE FURNITURE ADAPTER ON SYSTEMS FURNITURE. COORDINATE PATCH CORD LENGTH WITH THE IT REPRESENTATIVE PRIOR TO ORDERING, PATCH CORD COLOUR TO BE:

	LENGTH	CABLE DESIGNATION	TERMINATION	(
BLUE		DATA 15 FEET	RJ45/RJ45	
YELLOW		WIRELESS ACCESS POINTS 15 FEET	RJ45/RJ45	
WHITE		VOICE 15 FEET	RJ45/RJ45	
GREEN		AUDIO/VISUAL 15 FEET	RJ45/RJ45	
GREY		SECURITY 15 FEET	RJ45/RJ45	
BLACK		INTER-CABINET CONNECTIVITY 15 FEET	RJ45/RJ45	

9.2. OPTICAL FIBER PATCH CORDS: ALL OPTICAL FIBER BACKBONE CABLE STRANDS SHALL BE CONNECTED TO THE CLIENT SUPPLIED ACTIVE EQUIPMENT USING FIBER PATCH CORDS. THE FIBER PATCH CORDS SHALL BE CMR RATED, FT4. AND STAMPED ACCORDINGLY, FIBER PATCH CORDS SHALL BE CONSISTENT WITH THE GRADE AND MANUFACTURER OF THE FIBER CABLES THAT IS BEING WARRANTED.

9.2.1. DUPLEX FIBRE PATCH CORDS QUANTITIES AND LENGTHS ARE AS FOLLOWS:

END 2	INICTALL AT.	TYPE	LENGTH	END 1
END 2	INSTALL AT:	SM	7 FEET	SC
SC	TR #1	MM 62.5/125 UM	7 FEET	SC
SC	TR #	·		
SC	TR #1	MM 50/125 UM 1GB	7 FEET	SC
SC	TR #1	MM 50/125 UM 10GB	7 FEET	SC

9.3. HORIZONTAL WIRE MANAGEMENT: EACH PATCH PANEL IS TO COME COMPLETE WITH ONE (1) 2U HORIZONTAL MANAGER WHEN NO RACK ELEVATION IS PROVIDED, OTHERWISE QUANTITIES ON RACK ELEVATION DRAWING SHALL SUPERCEDE THIS REQUIREMENT.

10. GROUNDING

PANDUIT CANADA.

10.1. A PROPERLY SIZED COPPER GROUNDING BUSBAR AND ASSOCIATED HARDWARE SHALL BE INSTALLED IN THE I.T. ROOM BY DIVISION 16 (ELECTRICAL). THE BUSBAR SHALL BE PERMANENTLY CONNECTED TO THE BUILDING GROUND SYSTEM BY DIVISION 16 (ELECTRICAL).

LOCAL CODES AND STANDARDS. 10.3. ALL COMPONENTS OF THE GROUNDING AND BONDING INFRASTRUCTURE SHALL BE BY

10.2. PROVIDE GROUNDING AND BONDING IN ACCORDANCE WITH GOOD INDUSTRY PRACTICES.

10.4. GROUNDING AND BONDING INFRASTRUCTURE INSTALLED BY THE COMMUNICATIONS CONTRACTOR SHALL NOT INTERFERE WITH THE EXISTING GROUNDING PRACTICES WITHIN THE CUSTOMER PREMISES.

10.5. A GREEN JACKETED #6 AWG STRANDED COPPER CONDUCTOR SHALL BE USED TO GROUND THE TELECOMMUNICATIONS GROUNDING SYSTEM TO ALL TELECOMMUNICATIONS RACKS, CABINETS, METALLIC PATHWAYS (INCLUDING CABLE TRAYS, CONDUITS, ETC.) AND METALLIC SHEATH OF ALL BACKBONE CABLES (USE APPROPRIATE MANUFACTURER'S BOND CLAMP).

10.6. THE COMMUNICATIONS CONTRACTOR SHALL PROVIDE ONE (1) RACK GROUNDING STRIP C/W MECHANISM. A FULLY SHIELDED MAGNETIC CLOSING MECHANISM SHALL ALSO BE ACCEPTED. # 6 AWG GREEN GROUNDING WIRE CONNECTION BACK TO GROUNDING BUSBAR FOR EACH COMMUNICATIONS RACKS, CABINETS, AND CABLE TRAYS AS DEPICTED ON I.T. CLOSET DETAILED LAYOUT. DO NOT DAISY CHAIN.

10.7. THE COMMUNICATIONS CONTRACTOR SHALL PROVIDE ONE (1) RACK JUMPER KIT FOR EACH ITSELF. PIECE OF NETWORK EQUIPMENT.

10.8. THE COMMUNICATIONS CONTRACTOR SHALL UTILIZE THREAD FORMING SCREWS, BONDING SCREWS, AND ANY OTHER HARDWARE NECESSARY TO COMPLETE THE GROUND SYSTEM.

11. FIRE STOPPING:

11.1. ALL OPENINGS ARE TO BE "FIRE STOPPED" AS REQUIRED PER THE BUILDING AND ELECTRICAL CODES. INSTALL NON-PERMANENT CSA APPROVED INTUMESCENT FIRE STOPPING TO CAP ALL EMPTY SLEEVES AND AROUND CABLES THAT ARE PASSING THROUGH SLEEVES/CORE HOLES LOCATED IN I.T. CLOSET AND TEL. RISER ROOM. ALL FIRE STOPPING MUST MEET OR EXCEED APPLICABLE FEDERAL, PROVINCIAL AND LOCAL BUILDING CODES.

11.2. THE COMMUNICATIONS CONTRACTOR SHALL MAKE GOOD ALL FIRE STOPPING AND WATER PROOFING WHERE FIRE STOPPING AND/OR WATER PROOFING HAS BEEN DISTURBED DURING CABLE 12.11.2. EACH POWER BAR SHALL HAVE 16 NEMA 5-20, 12 IEC C13, AND 2 IEC C19 OUTPUT REMOVAL, OR WHERE FIRE STOPPING AND/OR WATER PROOFING WAS NON-EXISTENT.

11.3. THE COMMUNICATIONS CONTRACTOR SHALL SUBMIT SHOP DRAWINGS, PRODUCT DATA AND DOCUMENTATION FOR FIRE STOPPING AND/OR WATER PROOFING DEVICES PROPOSED FOR USE. INCLUDE ANY FIRE RETARDANT PAINTS TO BE USED.

12.1. COMMUNICATIONS CONTRACTOR TO SUPPLY AND INSTALL THE BELOW EQUIPMENT AS SPECIFIED IN THE COMMUNICATIONS DRAWINGS. COMMUNICATIONS CONTRACTOR TO REUSE EXISTING 12.11.7. VERTICAL PDUs ARE TO BE MOUNTED ON THE REAR SIDES OF THE RACK WITH THE EQUIPMENT AS INDICATED ON THE COMMUNICATIONS DRAWINGS.

12.2. UTILIZE PROPER FASTENERS FOR THE VERTICAL CABLE MANAGERS, POWER BARS AND ALL ACCESSORIES AS PER THE MANUFACTURER'S RECOMMENDATIONS.

12.3. WALL MOUNTED BRACKET:

12.3.1.ALL WALL MOUNT COMMUNICATIONS BRACKETS TO BE SUPPLIED FOR THIS PROJECT SHALL BE BLACK, 19" MOUNTING, WALL MOUNTED WITH SWING OPEN CAPABILITY. BRACKETS SHALL HAVE 10U MOUNTING SPACE, WITH AN ADJUSTABLE DEPTH UP TO

CONSTRUCTION SHALL CONSIST OF A MINIMUM OF 16GA (0.060") STEEL. THE WALL MOUNT BRACKETS SHALL BE TAPPED WITH MOUNTING HOLES AS PER EIA-310-C, SIZE 10-32.

12.4. WALL MOUNTED RACK:

12.4.1.STANDARD SWING OUT, 482 MM (19") HINGED RACK, WELDED FRAME CONSTRUCTED OF MINIMUM 11 GA (0.120") STEEL

12.4.2. RACKS SHALL HAVE A MINIMUM OF 45 STANDARD EIA VERTICAL RACK POSITIONS WITH PERMANENTLY MARKED U-SPACING IDENTIFICATION. 12.4.3. MOUNTING HOLES AS PER EIA-310-C, SIZE 10-32 TAPPED DOUBLE SIDED.

12.4.4. ALL EQUIPMENT RACKS SHALL BE SECURED TO THE WALL (AND FLOOR WHERE APPLICABLE) WITH PROPERLY SIZED HARDWARE. RACKS SHALL MOUNT TO COMMUNICATIONS PLYWOOD BACKBOARD AND ON TOP OF THE FINISHED FLOOR IN ALL TELECOMMUNICATIONS SPACES WHERE APPLICABLE.

12.4.5. RACKS SHALL BE COMPLETE WITH A MINIMUM OF ONE (1) DUAL BOLT GROUND LUG MOUNTING POSITION.

12.5. WALL MOUNTED CABINET: 12.5.1. WALL MOUNTED 482 MM (19") DOUBLE SWING OUT CABINET TO ACCOMMODATE A MINIMUM 16 STANDARD EIA VERTICAL RACK POSITIONS SHALL BE USED.

FULLY WELDED, FABRICATED FROM A MINIMUM OF 16GA. (0.060") STEEL. 12.5.3.

LEXAN FRONT DOOR, 12.5.4. SOLID SIDE PANELS,

12.5.5. 10-32 TAPPED MOUNTING ANGLE STYLE, HINGED CABINET BODY, 12.5.6. 12.5.7. MINIMUM OF ONE (1) 75 C.F.M OR GREATER COOLING FAN,

CLOSING MECHANISMS, AND 12.5.9. ONE (1) DUAL BOLT GROUND LUG

12.6. FLOOR MOUNT 2-POST RACK:

12.6.1.FLOOR MOUNTED, 482mm (19") TWO-POST FRAME WITH WELDED FRAME CONSTRUCTED OF MINIMUM 11 GA. (0.120") STEEL.

VERTICAL CABLE MANAGEMENT PANELS WITH HINGED DOORS WITH NONMAGNETIC

12.6.2. FRAME SHALL HAVE A 45 STANDARD EIA VERTICAL RACK POSITIONS WITH PERMANENTLY MARKED U-SPACING IDENTIFICATION. MOUNTING HOLES AS PER EIA-310-C. 12.6.3. 2-POST RACK SHALL BE COMPLETE WITH A MINIMUM OF ONE (1) DUAL BOLT GROUND LUG MOUNTING POSITION. FRAME SHALL BE PROPERLY LEVELED ONCE IN FINAL POSITION ON TOP OF THE FINISHED FLOOR IN I.T. ROOM.

12.6.4. PROVIDE TWO (2) VERTICAL POWER DISTRIBUTION UNITS (PDU's) PER RACK. PDU'S TO BE INSTALLED AT THE REAR OF THE RACK.

12.7. FLOOR MOUNT 4-POST RACK:

12.7.1.FLOOR MOUNTED, 482 MM (19") FOUR-POST FRAME WITH WELDED FRAME CONSTRUCTED OF MINIMUM 11 GA (0.120") STEEL. 12.7.2. FRAME SHALL HAVE A MINIMUM OF 45 STANDARD EIA VERTICAL RACK POSITIONS

WITH PERMANENTLY MARKED U-SPACING IDENTIFICATION. MOUNTING HOLES AS PER EIA-310-C, SIZE 10-32 TAPPED FRONT AND BACK RAILS. FRAME SHALL BE COMPLETE WITH A MINIMUM OF ONE (1) DUAL BOLT GROUND LUG MOUNTING POSITION.

12.7.5. FRAME SHALL HAVE FOUR (4) LEVELING FEET & SHALL BE PROPERLY LEVELED ONCE IN FINAL POSITION ON TOP OF THE FINISHED FLOOR IN ALL TELECOMMUNICATIONS SPACES.

12.8. FLOOR MOUNT ENCLOSED CABINET: 12.8.1.FLOOR MOUNTED, 482 MM (19") FOUR-POST FRAME WITH WELDED FRAME CONSTRUCTED OF

MINIMUM 11 GA (0.120") STEEL. 12.8.2. FRAME SHALL HAVE A MINIMUM OF 44 STANDARD EIA VERTICAL RACK POSITIONS

WITH PERMANENTLY MARKED U-SPACING IDENTIFICATION. MOUNTING HOLES AS PER EIA-310-C. SIZE 10-32 TAPPED FRONT AND BACK RAILS.

12.8.4. FRAME SHALL HAVE REMOVABLE POSITIONS FOR CABLE ENTRY & COOLING FANS AT TOP AS WELL AS ADEQUATE OPENING IN BASE OF FRAME FOR AIR DISTRIBUTION & CABLE ENTRY. 12.8.5. CABINETS SHALL BE COMPLETE WITH A MINIMUM OF ONE (1) DUAL BOLT GROUND LUG MOUNTING POSITION.

FRAME SHALL HAVE FOUR (4) LEVELING FEET & SHALL BE PROPERLY LEVELED ONCE

IN FINAL POSITION ON TOP OF THE FINISHED FLOOR IN ALL TELECOMMUNICATIONS SPACES. 12.8.7. CABINETS SHALL BE GANGED TOGETHER WITH PROPER GANGING KIT WHEREVER TWO OR MORE CABINETS ARE POSITIONED IN A SIDE-BY-SIDE CONFIGURATION.

12.9. VERTICAL CABLE MANAGERS:

12.9.1. CONSTRUCTED OF MINIMUM 16 GA (0.060") STEEL WITH STIFFENERS RIVETED/WELDED INSIDE

12.9.2. PROVIDE SIZE OF 6" (152mm) / 10" (254mm) / 12" (305mm) WIDE VERTICAL CABLE MANAGER. REFER TO LAN ROOM LAYOUT QUANTITY. 12.9.3. MANAGEMENT PANELS SHALL HAVE A HINGED DOOR WITH NONMAGNETIC CLOSING

12.9.4. OPENINGS FOR CABLE ROUTING SHALL HAVE GROMMETS TO ENSURE SMOOTH TRANSITION OF THE CABLES. 12.9.5. MANAGEMENT PANELS SHALL HAVE LANCETS ALONG THE BACK OF THE CABLE MANAGER TO ALLOW FOR THE FASTENING OF THE CABLE(S) TO THE OUTSIDE OF THE MANAGER

12.10. HORIZONTAL CABLE MANAGERS:

12.10.1. WELDED CONSTRUCTION, FABRICATED OF A MINIMUM OF 16 GA (0.060") STEEL AND SHALL BE A MINIMUM OF 2U AND 76mm (3")D.

12.10.2. PANEL SHALL HAVE HINGED COVER WITH NONMAGNETIC CLOSING MECHANISM. A FULLY SHIELDED MAGNETIC CLOSING MECHANISM SHALL ALSO BE ACCEPTED. 12.10.3. OPENINGS FOR CABLE ROUTING SHALL HAVE GROMMETS TO ENSURE SMOOTH

TRANSITION OF THE CABLES. 12.10.4. INSTALL ONE HORIZONTAL CABLE MANAGER PER ONE PATCH PANEL AND EVERY NETWORK SWITCH WHEN NO RACK ELEVATION IS PROVIDED, OTHERWISE QUANTITIES ON RACK ELEVATION DRAWING SHALL SUPERCEDE THIS REQUIREMENT.

12.11. VERTICAL POWER DISTRIBUTION UNIT (PDU):

12.11.1. FABRICATED FROM 18 GA (0.048") STEEL AND MOUNTABLE INTO 19" EIA CABINET FRAMES OR NETWORK RACKS.

RECEPTACLES AND COME WITH A MINIMUM OF 3 METERS (10 FEET) CORD AND NEMA L14-30P 12.11.3. SHIELDED CORD FEATURES A 300V CAPACITY, 100% COVERAGE ALUMINUM FOIL-POLYESTER TAPE SHIELD, 7 X 28 AWG TINNED COPPER DRAIN WIRE (20 AWG), AND A

DURABLE PVC OUTER COATING. 12.11.4. FEATURES BREAKER PROTECTION WITH RESET BUTTON, THREE-STAGE SURGE PROTECTION, FUSED AND NON-SWITCHED WITH ILLUMINATED POWER SWITCH SHOWING POWER "ON". 12.11.5. THE POWER BAR(S) SHALL BE UL/ULC LISTED.

12.11.6. INSTALL ONE (1) VERTICAL POWER DISTRIBUTION UNIT PER ONE NETWORK RACK/CABINET WHEN NO RACK ELEVATION IS PROVIDED, OTHERWISE QUANTITIES ON RACK ELEVATION DRAWING SHALL SUPERCEDE THIS REQUIREMENT.

CORD END LOCATED AT THE BOTTOM OF THE RACK TO CONNECT TO CLIENT SUPPLIED UPS.

12.12. HORIZONTAL POWER DISTRIBUTION UNIT (PDU): 12.12.1. FABRICATED FROM 18 GA (0.048") STEEL AND MOUNTABLE INTO 19" EIA CABINET FRAMES OR NETWORK RACKS.

12.12.2. EACH POWER BAR SHALL HAVE A MINIMUM 8 NEMA 5-20 OUTPUT RECEPTACLES AND COME WITH A MINIMUM OF 3 METERS (10 FEET) CORD AND NEMA L5-30P INPUT PLUG. 12.12.3. SHIELDED CORD FEATURES A 100V CAPACITY, 100% COVERAGE ALUMINUM FOIL-POLYESTER TAPE SHIELD, 7 X 28 AWG TINNED COPPER DRAIN WIRE (20 AWG), AND A DURABLE PVC OUTER COATING.

12.12.4. FEATURES BREAKER PROTECTION WITH RESET BUTTON, THREE-STAGE SURGE PROTECTION.

12.12.5. THE POWER BAR(S) SHALL BE UL/ULC LISTED.

12.12.6. INSTALL ONE (1) HORIZONTAL POWER DISTRIBUTION UNIT PER ONE NETWORK RACK/CABINET WHEN NO RACK ELEVATION IS PROVIDED, OTHERWISE QUANTITIES ON RACK ELEVATION DRAWING SHALL SUPERCEDE THIS REQUIREMENT.

12.12.7. HORIZONTAL PDUs ARE TO BE MOUNTED ON THE REAR SIDES OF THE RACK WITH THE CORD END LOCATED AT THE BOTTOM OF THE RACK TO CONNECT TO CLIENT SUPPLIED UPS.

13. REMOVAL OF CABLES:

13.1. THE COMMUNICATIONS CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL AND DISPOSAL OF ALL EXISTING DATA. VOICE. AND COAXIAL HORIZONTAL CABLING AND ACCESSORIES. EXCEPT FOR THOSE CABLES THAT PASS THROUGH THE SPACE.

13.2. THE COMMUNICATIONS CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF REMOVED CABLES WHICH ARE TO BE RETAINED AND REINSTALLED. THE COMMUNICATIONS CONTRACTOR IS RESPONSIBLE FOR THE REPAIRS OR REPLACEMENT OF DAMAGED EQUIPMENT WITHOUT ADJUSTMENT TO THE CONTRACT PRICE.

14. COMMUNICATIONS PATHWAYS:

PULL-FORCE AND MINIMUM BEND RADII.

14.1. CABLE TRAYS AND CONDUITS: COMMUNICATIONS CONTRACTOR SHALL UTILIZE CABLE TRAYS, CONDUITS. FURNITURE FEEDS AND RACEWAYS PROVIDED BY DIVISION 16 (ELECTRICAL) FOR COMMUNICATIONS CABLE PATHWAYS. EXERCISE CAUTION WHEN PULLING CABLES IN PATHWAYS TO AVOID DAMAGE TO ANY EXISTING CABLES AND FOLLOW THE MANUFACTURER'S MAXIMUM

14.3. J-HOOK SUPPORT: WHERE CABLE TRAYS AND CONDUITS HAVE NOT BEEN PROVIDED, J-HOOK SUPPORT IS TO BE INSTALLED BY COMMUNICATIONS CONTRACTOR AT A 4' (MAXIMUM) INTERVAL. CABLES SHALL BE RUN SUCH THAT THE SAG BETWEEN SUPPORTS DOES NOT EXCEED 4". SECURE ALL CABLES TO J-HOOKS WITH VELCRO. ALL CABLES SHALL BE COMPLETELY SUPPORTED BY J-HOOKS SO AS TO NOT TRANSFER ANY WEIGHT TO EXISTING FIXTURES OR STRUCTURES IN THE CEILING SPACE. COMMUNICATIONS CONTRACTOR TO SUPPLY AND INSTALL ALL MATERIAL AND ACCOUNT FOR ANY LABOUR INVOLVED. ALL J-HOOKS ARE TO BE INSTALLED PARALLEL TO BUILDING LINES.

14.4. INNERDUCT: COMMUNICATIONS CONTRACTOR SHALL PROVIDE INNERDUCT TO PROTECT FIBER EXCEPT WHERE A DEDICATED FIBER CONDUIT IS INSTALLED THAT IS 1.5" IN DIAMETER OR LESS, OR WHERE ARMORED FIBER CABLING IS SPECIFIED. INNERDUCT SHALL BE CMP (FT6) RATED. FIBER OPTIC CABLES SHALL BE COMPLETELY PROTECTED WITH INNERDUCT FOR THE ENTIRE LENGTH OF THE CABLE RUN. COMMUNICATIONS CONTRACTOR TO SUPPLY AND INSTALL ALL MATERIAL AND ACCOUNT FOR ANY LABOUR INVOLVED. ALL J-HOOKS ARE TO BE INSTALLED PARALLEL TO

14.5. NO. OF CABLES AT 70% FILL RATE:

BUILDING LINES.

4-PAIR UTP CATEGORY 6A	J–HOOK DIA. (INCH)	CROSS-SECTIONAL ARE. (SQ.
15	1	1.07
60	2	3.97
150	3	9.26
220	4	15.48

MUNICIPALITY OF CASSELMAN

ISSUED FOR REVISED 99% REVIEW 2025-02-19

IT IS THE RESPONSIBILITY OF THE APPROPRIATE CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON SITE AND PROMPTLY REPORT ALL ERRORS AND/OR OMISSIONS TO THE CONSULTANT BEFORE WORK COMMENCES.

ISSUED FOR 99% COORDINATION

ISSUED FOR 66% COORDINATION

DESCRIPTION

2023-05-12

ALL WORK IS TO FOLLOW THE OBC 2012 AND ANY OTHER APPLICABLE CODES AND REGULATIONS.

DO NOT SCALE DRAWINGS.

PROJECT NORTH

PROFESSIONAL STAMP

EXP Services Inc.

T: 613.688.1899 100 - 2650 Queensview Drive Ottawa, ON K2B 8H6 Canada

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1 INDUSTRIEL STREET **OFFICE FIT-UP**

DRAWING

COMMUNICATIONS SPECIFICATIONS 1 of 2

PROJECT No:	MRK-23002008-A0	REVISION:
DRAWN:	KL	DATE: MAY 2023
APPROVED:	DL	SCALE: AS SHOWN
DRAWING No:		•

E-09

• BUILDINGS • EARTH & ENVIRONMENT • ENERGY • • INDUSTRIAL • INFRASTRUCTURE • SUSTAINABILITY •

IN)

DIV 27 COMMUNICATIONS SPECIFICATIONS CONTINUATION

1. LABELLING:

1.1. LABELING: ALL LABELING SHALL BE PANDUIT PAN-CODE IDENTIFICATION PRODUCTS FOR NETWORK SYSTEMS UNLESS OTHERWISE INDICATED. LABELING SHALL:

1.1.1. INCLUDE VINYL, MACHINE PRINTED WRAP-AROUND LABELS WITHIN 4 INCHES OF THE ENDS 1.1.2. INCLUDE VINYL OR PVC MACHINE PRINTED LABELS AT ALL PATCH PANELS, IDC TERMINATION BLOCKS, WRING BLOCKS, FACEPLATES, AND EACH END OF THE TELECOMMUNICATIONS CONDUIT.

1.1.3. CONVENTION SHALL FOLLOW ANSI/TIA-606-B "ADMINISTRATION STANDARD FOR TELECOMMUNICATIONS" AND AS PER CLIENT'S PREFERRED LABELING SCHEME. COMMUNICATIONS CONTRACTOR TO COORDINATE ON SITE WITH THE OWNER'S I.T. REPRESENTATIVE FOR ANY PREFERRED LABELING SCHEME.

1.1.4. HAND-WRITTEN LABELS ARE NOT PERMITTED.

1.2. PROVIDE 25% ADDITIONAL LABELS TO BE LEFT IN EACH TELECOMMUNICATIONS ROOM ON SITE FOR FUTURE GROWTH.

14. CLOSE—OUT DOCUMENTATION:

14.1. CABLE TESTING:

14.1.1.100% OF CABLES INSTALLED SHALL BE TESTED AND MUST PASS THE REQUIREMENTS OF THE STANDARDS AS DEFINED WITHIN THIS DOCUMENT. THE COMMUNICATIONS CONTRACTOR SHALL ALSO CERTIFY 100% OF THE INSTALLED CABLES. ANY FAILING CABLES MUST BE DIAGNOSED, AND HAVE CORRECTIVE ACTION TAKEN. THE CORRECTIVE ACTION SHALL BE FOLLOWED WITH A NEW TEST TO PROVE THAT THE CORRECTED LINK MEETS THE PERFORMANCE REQUIREMENTS. THE FINAL AND PASSING TEST RESULT OF THE TESTS FOR ALL LINKS SHALL BE PROVIDED IN THE TEST RESULT DOCUMENTATION.

14.1.2. THE COMMUNICATIONS CONTRACTOR IS REQUIRED TO SUBMIT A CABLE TEST REPORT BASED ON THE CABLE SCHEDULE TO THE COMMUNICATIONS ENGINEER'S REPRESENTATIVE FOR APPROVAL. THE REPORT SHOULD INDICATE FOR EACH INDIVIDUAL CABLE, THE TIME AND DATE OF THE SUCCESSFUL TEST AND THE SIGNATURE OF THE TECHNICIAN WHO PERFORMED THE TEST, LOCATION, CABLE TYPE, CABLE NUMBER AS PER THE CABLE SCHEDULE, AND TESTER MAKE AND

14.1.3. THE COMMUNICATIONS CONTRACTOR TO USE A LEVEL III TESTER THAT IS CAPABLE OF TESTING THE SPECIFIED CABLE TO THE PERFORMANCE LEVEL(S) INDICATED IN THIS DOCUMENT. THE TESTER SHOULD HAVE THE LATEST VERSION OF FIRMWARE AND SOFTWARE TO TEST THE UTP CABLING SYSTEM.

14.2. AS-BUILT DRAWINGS::

14.2.1.THE COMMUNICATIONS CONTRACTOR SHALL BE SUPPLIED WITH, UPON WRITTEN REQUEST, A SOFT COPY OF DRAWINGS BY THE COMMUNICATION ENGINEER'S REPRESENTATIVE FOR THE PURPOSE OF CREATING AS-BUILT DRAWINGS. THE COMMUNICATIONS CONTRACTOR SHALL PREPARE AS-BUILT DRAWINGS IDENTIFYING 100% OF THE INSTALLED CABLES (DATA (AND WIRELESS ACCESS POINT), VOICE AND COAXIAL OUTLETS AND PATCH PANEL/IDC CONNECTIONS). THE AS-BUILTS SHALL INCLUDE ALL ADDITIONAL CABLES INSTALLED DURING THE PROJECT.

14.2.2. IF THE COMMUNICATIONS CONTRACTOR CANNOT COMPLY WITH THIS REQUIREMENT. WILL TRANSFER ALL HAND-DRAWN AS-BUILTS TO AUTOCAD. THE COST FOR THIS SERVICE SHALL BE BASED ON PER DIEM RATES AT THE TIME OF COMPLETION. THE COMMUNICATIONS CONTRACTOR 30. SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH THIS WORK.

14.3. CERTIFICATIONS AND WARRANTY:

14.3.1.THE COMMUNICATIONS CONTRACTOR IS REQUIRED TO PROVIDE A MINIMUM OF A 3-YEAR UNCONDITIONAL PARTS AND LABOUR WARRANTY FOR ALL EQUIPMENT AND LABOUR PROVISIONED UNDER THIS CONTRACT FROM THE DATE OF SUBSTANTIAL COMPLETION, FOR EACH COMMUNICATIONS CABLING SYSTEM.

14.3.2. COMMUNICATIONS CONTRACTOR SHALL BE CURRENTLY AUTHORIZED AND CERTIFIED BY THE END TO END STRUCTURED CABLING SYSTEM SOLUTION MANUFACTURER TO INSTALL AND WARRANTY THE SOLUTION. THE COMMUNICATIONS CONTRACTOR'S TECHNICIANS DESIGNATED TO THE PROJECT MUST BE FULLY TRAINED BY THE MANUFACTURER TO INSTALL THE RESPECTIVE SYSTEM. THE COMMUNICATIONS CONTRACTOR SHALL BE CAPABLE OF ISSUING WARRANTY ON MATERIALS AND WORKMANSHIP. THEY MUST ALSO ISSUE A MANUFACTURER'S WARRANTY IN NAME OF THE CLIENT. THE WARRANTY SHALL SPAN A DURATION OF 25 YEARS AND COVER ALL PRODUCTS WITHIN THE SYSTEM INCLUDING, BUT NOT LIMITED TO JACKS, CABLES, PATCH CORDS, AND CROSS CONNECTS IN THE EVENT THAT THE CERTIFIED SYSTEM CEASES TO OPERATE THE COMMUNICATIONS CONTRACTOR SHALL COMMIT TO PROMPTLY IMPLEMENT CORRECTIVE ACTION. RESPONSE TIME FOR WARRANTY ITEMS SHALL BE 24 HOURS.

14.4. THE PROJECT SHALL NOT BE CONSIDERED COMPLETE AND A HOLDBACK WILL BE RETAINED UNTIL THE CLIENT RECEIVES THE COMMUNICATION ENGINEER'S REPRESENTATIVE APPROVED CLOSE-OUT DOCUMENTATION PACKAGE. THE VALUE FOR THE CLOSE-OUT DOCUMENTATION PACKAGE FOR PAYMENT PURPOSES, SHALL BE SET AT 10% OF THE BASE CONTRACT OR \$10,000; WHICHEVER IS GREATER. THIS AMOUNT WILL BE WITHHELD FROM THE COMMUNICATIONS CONTRACTOR UNTIL TESTING AND CORRECTION OF DEFICIENCIES IS 100% COMPLETE.

14.5. THE COMMUNICATIONS CONTRACTOR SHALL PROVIDE THE CLIENT WITH A LAMINATED, FULL SIZE. AS-BUILT DRAWING FOR EACH FLOOR MOUNTED IN THAT FLOOR'S RESPECTIVE LAN ROOM. WHERE THERE ARE MULTIPLE LAN ROOMS PER FLOOR, PROVIDE ONE LAMINATED, FULL SIZE, AS-BUILT DRAWING IN EACH ROOM ON THAT FLOOR.

15. MISCELLANEOUS ITEMS:

15.1. COMMUNICATIONS COMPONENTS INCLUDING, BUT NOT LIMITED TO OUTLETS, DEVICES, RACKS. CABINETS, BRACKETS AND BACKBOARDS MAY BE RELOCATED PRIOR TO INSTALLATION, FROM THE LOCATIONS SHOWN ON THE CONTRACT DOCUMENTS, TO A MAXIMUM DISTANCE OF 3.05m (10 FEET) WITHOUT ADJUSTMENT TO THE CONTRACT PRICE.

15.2. CABLES WILL BE SUPPORTED SUCH THAT A MINIMUM OF 3 INCHES OF CLEAR VERTICAL SPACE WILL BE MAINTAINED DIRECTLY ABOVE THE CEILING TILES. THIS CLEAR SPACE WILL BE FREE OF CABLES, RACEWAYS AND CABLES AND RACEWAYS SUPPORTS.

15.3. SPIRAL WRAP: CABLES RUNNING FROM SYSTEM FURNITURE FEED POINTS TO THE SYSTEM FURNITURE SHALL BE NEATLY WRAPPED. SIZE THE SPIRAL WRAPPED ACCORDING TO QUANTITY OF CABLES, NO CABLES SHALL BE EXPOSED. COORDINATE LOCATIONS ON ARCHITECTURAL DRAWINGS

15.4. CABLE BUNDLES AND TIES: CABLES SHALL BE ARRANGED IN BUNDLES OF NO MORE THAN 24 CABLES PER BUNDLE. CABLES SHALL BE SECURED IN BUNDLES WITH VELCRO TIE-WRAPS. UNDER NO CIRCUMSTANCES ARE PLASTIC TIE-WRAPS TO BE USED. IF PLASTIC TIE-WRAPS ARE USED, THE COMMUNICATIONS CONTRACTOR SHALL BE REQUIRED TO REMOVE AND REPLACE ALL AFFECTED CABLES AT THEIR OWN EXPENSE.

15.5. DIMENSIONS SHOWN ON DRAWINGS ARE APPROXIMATE. VERIFY DIMENSIONS BY REFERENCE TO SHOP DRAWINGS AND FIELD MEASUREMENTS.

15.6. QUANTITIES OR LENGTHS INDICATED IN ANY OF THE CONTRACT DOCUMENTS ARE APPROXIMATE ONLY AND SHALL NOT BE HELD TO GAUGE OR LIMIT THE WORK.

15.7. COMMUNICATIONS CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH THE FURNITURE AND CARPET INSTALLERS FOR FURNITURE COMMUNICATIONS OUTLETS CABLING CONNECTION.

END OF DIV 27 SPECIFICATIONS

DIV 28 SECURITY SPECIFICATIONS

- THIS SPECIFICATION SHALL BE READ IN CONJUNCTION WITH PROJECT RELATED ARCHITECTURAL, ELECTRICAL AND MECHANICAL DRAWINGS INCLUDING DOOR HARDWARE SCHEDULES AND SPECIFICATIONS.
- 18. CONFORM TO THE REQUIREMENTS OF DIVISIONS 0 AND 1, WHICH APPLY TO AND FORM PART OF ALL SECTIONS OF THE WORK.
- 19. WHERE THERE IS A CONFLICT IN THE REQUIREMENTS OUTLINED IN THIS ELECTRONIC SAFETY AND SECURITY SPECIFICATIONS DOCUMENT, DIVISIONS 54. THE LOCATION, ARRANGEMENT AND CONNECTION OF EQUIPMENT AND O AND 1, ARCHITECTURAL, ELECTRICAL AND MECHANICAL DRAWINGS INCLUDING DOOR HARDWARE SCHEDULES AND SPECIFICATIONS THE MORE STRINGENT AND OR MORE ONEROUS REQUIREMENT SHALL APPLY.
- 20. READ AND COMPLY WITH ALL SECTIONS OF THIS DOCUMENT.
- 21. REFER TO OTHER DIVISIONS AND SECTIONS TO ENSURE A COMPLETE AND OPERATIONAL SYSTEM.
- 22. PROVIDE ELECTRONIC SAFETY AND SECURITY COMPONENTS AND ACCESSORIES WHICH MAY NOT BE SPECIFICALLY SHOWN ON THE DRAWINGS OR STIPULATED IN THE SPECIFICATIONS, BUT ARE REQUIRED TO ENSURE COMPLETE, TURNKEY AND OPERATIONAL SYSTEMS.
- 23. PROVIDE ALL LABOUR, MATERIALS, TOOLS, AND EQUIPMENT REQUIRED FOR THE COMPLETE INSTALLATION, COMMISSIONING AND START-UP OF ELECTRONIC SAFETY AND SECURITY SYSTEMS CALLED FOR IN ALL SECTIONS OF THE CONTRACT DOCUMENTS.
- 24. PROVIDE ALL NECESSARY WIRING, CABLING, LABOUR, TOOLS, EQUIPMENT, AND ANCILLARY MATERIALS REQUIRED TO FURNISH AND INSTALL COMPLETE AND OPERATIONAL ELECTRONIC SAFETY AND SECURITY SYSTEMS.
- 25. SCOPE
- THE FLECTRONIC SAFETY AND SECURITY SYSTEMS SHALL INCLUDE ALL COMPUTER HARDWARE AND SOFTWARE. CONTROL PANELS. INTERFACES. CARD READERS/KEYPADS, ACCESS CARDS, VIDEO RECORDERS, CAMERAS, ALARM SENSING DEVICES, COMMUNICATION DEVICES, ELECTRIC DOOR LOCKING HARDWARE, POWER SUPPLIES, CABLE/WIRE, CONDUIT, RACEWAYS, 60. WHERE EQUIPMENT IS SHOWN TO BE 'ROUGHED IN ONLY' OBTAIN ENCLOSURES, MOUNTING HARDWARE, AND ALL OTHER EQUIPMENT AS INDICATED ON CONTRACT DRAWINGS AND AS SPECIFIED HEREIN. EXCEPT WHERE NOTED TO REUSE EXITING, ALL MATERIALS SHALL BE NEW, COMMERCIAL GRADE AND OF GOOD QUALITY.
- ALL ELECTRONIC SAFETY AND SECURITY SYSTEMS SHALL BE TURNKEY COMPLETE AND FULLY OPERATIONAL. ALL ELECTRONIC SAFETY AND SECURITY SYSTEMS SHALL BE INTEGRATED AS PER THE CONTRACT DRAWINGS AND SPECIFICATIONS.
- 28. ALL CABLES SHALL BE INSTALLED VIA CONDUITS.
- 29. PROVIDE ALL CONDUIT UNLESS OTHERWISE NOTED.
- SUPPLY AND INSTALL ALL CABLE SUPPORTS FOR ALL CABLING. ALL CABLE SUPPORTS SHALL BE INSTALLED FOLLOWING BUILDING LINES, AND IN ACCORDANCE WITH THE BUILDING'S REQUIREMENTS / GUIDELINES.
- 31. CO-ORDINATE ON SITE FOR INTERFERENCES AND WITH OTHER DISCIPLINES TRADES. SUPPLY AND INSTALLATION OF ALL ACTIVE AND PASSIVE HARDWARE AND CABLES AS SPECIFIED WITHIN THIS DOCUMENT TO SUPPORT THE ELECTRONIC SAFETY AND SECURITY SYSTEMS.
- BUT ARE REQUIRED TO MAKE THE ELECTRONIC SAFETY AND SECURITY SYSTEMS TURNKEY AND TO MEET THE INTENT, SUPPLY AND INSTALL SUCH ACTIVE AND PASSIVE HARDWARE AND CABLING AT NO EXTRA COST.

32. WHERE ACTIVE AND PASSIVE HARDWARE AND CABLING IS NOT SPECIFIED

- 33. SUPPLY AND INSTALL ALL EQUIPMENT CABINETS, COMPLETE WITH ALL ACCESSORIES.
- 34. SUPPLY AND INSTALL ALL FIRE STOP MATERIALS / MECHANISMS FOR ALL PENETRATIONS.
- 35. WHILE EVERY ATTEMPT HAS BEEN MADE TO ENSURE ALL INFORMATION IS CORRECT AT THE TIME OF PUBLICATION, THE PRODUCTS SPECIFIED ARE AVAILABLE AND THAT THE PART NUMBERS IDENTIFIED ARE CORRECT, IT IS THE RESPONSIBILITY OF THE ELECTRONIC SAFETY AND SECURITY CONTRACTOR TO VERIFY ALL PART NUMBERS AND TO REPORT ANY ERRORS AND OR OMISSIONS IN THIS SPECIFICATION WITH THEIR BID SUBMISSIONS.
- 36. DIMENSIONS SHOWN ON CONTRACT DRAWINGS ARE APPROXIMATE. VERIFY DIMENSIONS BY REFERENCE TO SHOP DRAWINGS AND FIELD MEASUREMENTS.
- 37. QUANTITIES OR LENGTHS INDICATED IN ANY OF THE CONTRACT DOCUMENTS ARE APPROXIMATE ONLY AND SHALL NOT BE HELD TO GAUGE OR LIMIT THE WORK.
- 38. INCLUDE IN BID ALL LABOUR, MATERIALS, PLANT, TRANSPORTATION, STORAGE COSTS, TRAINING, EQUIPMENT, INSURANCE, TEMPORARY PROTECTION, PERMITS, REVIEWS, BONDING, TAXES AND ALL NECESSARY AND RELATED ITEMS REQUIRED TO PROVIDE A COMPLETE AND OPERATIONAL ELECTRONIC SAFETY AND SECURITY SYSTEMS.

- 40. MENTION IN THE SPECIFICATIONS OR INDICATION ON THE DRAWINGS OF EQUIPMENT, MATERIALS, OPERATION AND METHODS, REQUIRES PROVISION OF THE QUALITY NOTED, THE QUANTITY REQUIRED, AND THE SYSTEMS COMPLETE IN EVERY RESPECT.
- 41. THE SPECIFICATIONS ARE AN INTEGRAL PART OF THE ACCOMPANYING DRAWINGS. ANY ITEM OR SUBJECT OMITTED FROM ONE OR THE OTHER, BUT WHICH IS EITHER MENTIONED OR REASONABLY IMPLIED, SHALL BE CONSIDERED AS PROPERLY AND SUFFICIENTLY SPECIFIED.
- 42. BE COMPLETELY RESPONSIBLE FOR THE ACCEPTABLE CONDITION AND OPERATION OF ALL SYSTEMS, EQUIPMENT AND COMPONENTS FORMING PART OF THE INSTALLATION OR DIRECTLY ASSOCIATED WITH IT. PROMPTLY REPLACE DEFECTIVE MATERIAL, EQUIPMENT AND REPAIR RELATED DAMAGES. THE REPLACEMENT OF EQUIPMENT AND REPAIR TO DAMAGES SHALL BE COORDINATED WITH OTHER TRADES COMPLETED IN A TIMELY FASHION SO AS NOT TO AFFECT THE COMPLETE CONSTRUCTION OF THE ELECTRONIC SAFETY AND SECURITY SYSTEMS AND OR WORK BY OTHERS.

43. LABOUR

- 44. COMPLY WITH ALL PROJECT JOB-SITE REQUIREMENTS FOR THE DURATION OF THE PROJECT.
- 45. DO NOT ASSIGN OR SUB-CONTRACT ANY WORK WITHOUT THE PRIOR WRITTEN CONSENT OF THE PROJECT MANAGER. A LIST OF SUB-CONTRACTORS SHALL BE SUBMITTED WITH THE TENDER RESPONSE.
- 46. FOR ALL WORK RELATED TO THIS PROJECT, THE ELECTRONIC SAFETY AND SECURITY CONTRACTOR SHALL USE ONLY TRADESMEN WHO ARE FULLY TRAINED, QUALIFIED AND EXPERIENCED ON THE INSTALLATION AND COMMISSIONING OF THE ELECTRONIC SAFETY AND SECURITY SYSTEMS.
- 47. PROJECT MANAGEMENT
- 48. PROVIDE COMPLETE PROJECT MANAGEMENT FOR THIS PROJECT.
- 49. DEVELOP A DETAILED GANTT CHART PROJECT PLAN AND SUBMIT TO OWNER AND ELECTRONIC SAFETY AND SECURITY ENGINEER'S REPRESENTATIVE FOR REVIEW AND APPROVAL PRIOR TO START OF PROJECT.
- 50. ATTEND AND CHAIR BIWEEKLY CONSTRUCTION MEETINGS FOR THE DURATION OF THE PROJECT. CONSTRUCTION MEETINGS SHALL BE ON SITE OR VIA CONFERENCE CALL AT THE OWNER'S AND OR ELECTRONIC SAFETY AND SECURITY ENGINEER'S REPRESENTATIVE'S DISCRETION.

- 51. GENERATE AND SUBMIT DETAILED BIWEEKLY CONSTRUCTION PROGRESS REPORTS TO OWNER AND ELECTRONIC SAFETY AND SECURITY ENGINEER'S REPRESENTATIVE. EACH PROGRESS REPORT SHALL INCLUDE ITEMIZED DETAILED DESCRIPTION AND EXTENT OF TASKS COMPLETED, ITEMIZED DETAILED DESCRIPTION AND QUANTIFICATION OF MATERIALS INSTALLED AND LABELED PHOTOS THAT CLEARLY SHOW THE EXTENT OF CONSTRUCTION PROGRESS.
- 52. DRAWINGS, CHANGES AND INSTALLATION
- 53. THE DRAWINGS ARE INTENDED TO SHOW THE GENERAL CHARACTER AND SCOPE OF THE WORK AND NOT THE EXACT DETAILS OF THE INSTALLATION. THE INSTALLATION SHALL BE COMPLETE WITH ALL ACCESSORIES REQUIRED FOR A COMPLETE AND OPERATIVE INSTALLATION.
- MATERIAL AS SHOWN ON THE DRAWINGS REPRESENT A CLOSE APPROXIMATION TO THE INTENT AND REQUIREMENTS OF THE CONTRACT THE RIGHT IS RESERVED BY THE ELECTRONIC SAFETY AND SECURITY ENGINEER'S REPRESENTATIVE TO MAKE REASONABLE CHANGES REQUIRED TO ACCOMMODATE CONDITIONS ARISING DURING THE PROGRESS OF THE WORK, AT NO EXTRA COST.
- 55. CERTAIN DETAILS INDICATED ON THE DRAWINGS ARE GENERAL IN NATURE AND SPECIFIC LABELED DETAIL REFERENCES TO EACH AND EVERY OCCURRENCE OF USE ARE NOT INDICATED, HOWEVER, SUCH DETAILS SHALL BE APPLICABLE TO EVERY OCCURRENCE ON THE DRAWINGS.
- 56. THE LOCATION AND SIZE OF EXISTING SERVICES SHOWN ON THE DRAWINGS ARE BASED ON THE BEST AVAILABLE INFORMATION. THE ELECTRONIC SAFETY AND SECURITY CONTRACTOR SHALL VERIFY THE ACTUAL LOCATION OF EXISTING SERVICES IN THE FIELD BEFORE WORK IS COMMENCED.
- 57. CHANGES AND MODIFICATIONS NECESSARY TO ENSURE CO-ORDINATION AND TO AVOID INTERFERENCE AND CONFLICTS WITH OTHER TRADES. OR TO ACCOMMODATE EXISTING CONDITIONS, SHALL BE MADE AT NO EXTRA COST TO THE CLIENT.
- 58. LEAVE AREAS CLEAR WHERE SPACE IS INDICATED AS RESERVED FOR FUTURE EQUIPMENT, AND EQUIPMENT FOR OTHER TRADES.
- 59. ADEQUATE SPACE AND PROVISIONS SHALL BE LEFT FOR REMOVAL OF COMPONENTS AND SERVICING OF EQUIPMENT, WITH MINIMUM INCONVENIENCE TO THE OPERATION OF SYSTEMS.
- ACCURATE INFORMATION FROM THE ELECTRONIC SAFETY AND SECURITY ENGINEER'S REPRESENTATIVE BEFORE PROCEEDING WITH THE WORK.
- 61. LOCATION OF OUTLETS, LUMINARIES, DIFFUSERS, GRILLES, REGISTERS, THERMOSTATS, SPRINKLERS AND ALL OTHER EQUIPMENT SHOWN ON DRAWINGS (IF SHOWN) IS DIAGRAMMATIC.
- 62. THE ELECTRONIC SAFETY AND SECURITY CONTRACTOR, AT HIS EXPENSE, SHALL REMEDY ANY WORK NOT INSTALLED IN CORRECT LOCATION (AT THE SOLE DISCRETION OF THE ELECTRONIC SAFETY AND SECURITY ENGINEER'S REPRESENTATIVE). THE ELECTRONIC SAFETY AND SECURITY CONTRACTOR IS RESPONSIBLE TO MARK-OUT HIS WORK AND FULLY CO-ORDINATE WITH ALL OTHER TRADES. REVIEW WITH ELECTRONIC SAFETY AND SECURITY ENGINEER'S REPRESENTATIVE PRIOR TO ROUGH IN. PREPARE DIMENSIONED LAYOUTS OF EACH ROOM PRIOR TO ROUGH IN FOR REVIEW BY ELECTRONIC SAFETY AND SECURITY ENGINEER'S REPRESENTATIVE. DO NOT PROCEED WITH ANY WORK UNTIL THE ELECTRONIC SAFETY AND SECURITY ENGINEER'S REPRESENTATIVE HAS REVIEWED AND APPROVED THE LAYOUT DRAWINGS.

63. APPROVED EQUAL

- 64. WHEREVER THE TERM "OR APPROVED EQUAL" IS USED HEREIN, IT IS TO BE UNDERSTOOD THAT REFERENCE TO THE SPECIFIED TRADE NAME, BRAND NAME. MANUFACTURER'S NAME. MODEL NUMBER AND OR CATALOGUE NUMBER HAS BEEN MADE SOLELY FOR THE PURPOSE OF INDICATING THE MINIMUM STANDARD OF QUALITY REQUIRED IN MATERIAL. WORKMANSHIP AND SERVICE. ANY PROPOSED ALTERNATE SHALL BE SUBMITTED FOR REVIEW AND ACCEPTANCE PRIOR TO PROCUREMENT AND INSTALLATION. THE REVIEW AND ACCEPTANCE SHALL BE AT THE SOLE DISCRETION OF THE OWNER AND THEIR ENGINEER'S REPRESENTATIVES.
- 65. PROPOSED SUBSTITUTIONS IN ORDER TO BE ASSESSED MUST INCLUDE
- THE FOLLOWING: 66. DESCRIPTION OF PROPOSED SUBSTITUTION.
- 67. RESPECTIVE COST OF ITEMS ORIGINALLY SPECIFIED AND THE PROPOSED SOLUTION.
- 68. COMPLIANCE WITH THE APPLICABLE BUILDING CODES. STANDARDS AND THE REQUIREMENTS OF JURISDICTIONAL AUTHORITIES.
- 69. AFFECT CONCERNING COMPATIBILITY WITH AND INTERFACE WITH ADJACENT BUILDING MATERIALS AND COMPONENTS.
- 70. COMPLIANCE WITH THE INTENT OF THE CONTRACT DOCUMENTS.
- 71. REASONS FOR THE REQUEST.
- 72. THE ELECTRONIC SAFETY AND SECURITY ENGINEER'S REPRESENTATIVE'S DECISION REGARDING THE ACCEPTANCE OR REJECTION OF THE PROPOSED SUBSTITUTION SHALL BE FINAL. SUBSTITUTIONS MAY BE ACCEPTED IF THE DELIVERY OF THE COMPONENT OR ITEM IS SUCH THAT IT WILL NOT JEOPARDIZE THE CONSTRUCTION SCHEDULE. OTHERWISE SUBSTITUTION WILL NOT BE ALLOWED.
- 73. MATERIALS AND EQUIPMENT SUPPLIED BY THIS DIVISION SHALL BE NEW AND FREE FROM DEFECTS
- 74. ALL EQUIPMENT AND MATERIAL FOR WHICH THERE IS A LISTING SERVICE SHALL BEAR A UL/ULC AND OR CSA LABEL.
- 75. EQUIPMENT SHALL MEET ALL APPLICABLE FCC/CRTC REGULATIONS.
- 76. MATERIALS SHALL HAVE A FLAME SPREAD RATING OF 25 OR LESS AND A SMOKE DEVELOPED RATING OF 50 OR LESS, IN ACCORDANCE WITH NFPA 255.
- 77. CO-OPERATION WITH OTHER DIVISION
- 78. ELECTRONIC SAFETY AND SECURITY CABLING SHALL NOT TOUCH OR BE SUPPORTED FROM PIPING, DUCTWORK, CONDUITS, CEILING SUPPORTS OR ANY OTHER STRUCTURE / EQUIPMENT. ELECTRONIC SAFETY AND SECURITY CABLING SHALL BE SUPPORTED BY LADDER TRAY (WHERE PROVIDED) OR SHALL BE INSTALLED WITHIN CONDUIT (WHERE PROVIDED).
- 79. SUPPLY ALL ITEMS TO BE BUILT IN AMPLE TIME FOR RAPID PROGRESS OF THE WORK. SCHEDULE AND PROCEED WITH WORK AS REQUIRED TO SATISFY THE CONSTRUCTION SCHEDULE.
- 80. ALL CHANGES AND CONNECTIONS TO EXISTING SERVICES SHALL BE MADE ONLY IN A MANNER AND AT A TIME APPROVED BY THE SAFETY AND SECURITY ENGINEER'S REPRESENTATIVE AND OR THE CLIENT SO AS TO AVOID ANY INTERRUPTION OF SUCH SERVICES DURING NORMAL WORKING HOURS. IF NECESSARY, CHANGES AND CONNECTIONS TO EXISTING SERVICES SHALL BE MADE OUTSIDE OF NORMAL WORKING HOURS, AT NO EXTRA COST TO THE CONTRACT.
- 81. WHERE CONNECTIONS ARE MADE TO EXISTING SERVICES, EXISTING FIRE STOPPING SHALL BE MADE GOOD UNDER THIS DIVISION.
- 82. PARTICULAR CARE SHALL BE TAKEN WITH IMPERIAL VERSUS METRIC CONVERSIONS. THIS APPLIES TO ALL SERVICES INCLUDING, BUT NOT LIMITED TO, EQUIPMENT, MATERIAL AND SITE SERVICES IN BOTH NEW AND EXISTING INSTALLATIONS.
- 83. SCHEDULE, ACCESS, PROTECTION AND CLEAN-UP
- 84. THE CONSTRUCTION SCHEDULE PLACES RESTRICTIONS ON THE DURATION OF CONSTRUCTION WITHIN AREAS AND THE DURATION OF SHUT-DOWN OF EQUIPMENT. REFER TO THE GENERAL CONDITIONS FOR ALL REQUIREMENTS.
- 85. REFER TO THE GENERAL CONDITIONS AND CONFORM TO ALL

REQUIREMENTS.

- 86. REFER TO THE SECURITY AND PROTECTION REQUIREMENTS IN THE GENERAL CONDITIONS AND CONFORM TO ALL REQUIREMENTS. THERE SHALL BE NO SMOKING, AND THE SITE SHALL BE KEPT CLEAN AT ALL TIMES.
- 87. CUTTING, PATCHING AND REPAIRING
- 88. IT IS THE RESPONSIBILITY OF THE ELECTRONIC SAFETY AND SECURITY CONTRACTOR TO PERFORM ALL CUTTING, PATCHING AND REPAIR RELATED TO THE ELECTRONIC SAFETY AND SECURITY SYSTEMS WORK INCLUDING ANY PENETRATIONS THROUGH WALLS OR FLOORS.
- 89. WHERE CUTTING, PATCHING AND REPAIR IS THE RESPONSIBILITY OF OTHER TRADES THE ELECTRONIC SAFETY AND SECURITY CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COST ASSOCIATED WITH CUTTING AND PATCHING RELATED TO THE ELECTRONIC SAFETY AND SECURITY SYSTEMS WORK
- INCLUDING ANY PENETRATIONS THROUGH WALLS OR FLOORS. 90. THE ELECTRONIC SAFETY AND SECURITY CONTRACTOR SHALL PAINT ALL VISIBLE ELECTRONIC SAFETY AND SECURITY SYSTEMS CONDUIT TO MATCH
- THE ELECTRONIC SAFETY AND SECURITY CONTRACTOR SHALL COORDINATE THE COLOUR AND LOCATION OF ALL CONDUITS, SECURITY DEVICES AND THEIR HOUSING WITH ARCHITECT AND ARCHITECTURAL DRAWINGS ON SITE PRIOR TO INSTALLATION.
- 92. THIS DIVISION SHALL PROVIDE ITS OWN HOISTING FACILITIES.
- 93. HOISTING FACILITIES PROVIDED BY THE GENERAL CONTRACTOR MAY BE AVAILABLE FOR SUBCONTRACTORS' USE AT NO COST (VERIFY WITH GENERAL CONTRACTOR PRIOR TO BID, OR ASSUME THAT NO HOISTING FACILITIES ARE PROVIDED). IF HOIST FACILITIES ARE INADEQUATE THEN ELECTRONIC SAFETY AND SECURITY CONTRACTOR SHALL PROVIDE AS REQUIRED. ELECTRONIC SAFETY AND SECURITY CONTRACTOR SHALL INFORM GENERAL CONTRACTOR(S) OF REQUIREMENTS BEFORE TENDER CLOSING DATE.
- 94. ALL EQUIPMENT, MATERIAL AND INSTALLATION SHALL CONFORM TO THE LATEST VERSION OF THE APPLICABLE CODES, STANDARDS AND REGULATIONS OF AUTHORITIES HAVING JURISDICTION. IN THE CASE OF CONFLICT OR DISCREPANCY THE MORE STRINGENT CODE. STANDARD OR REGULATION SHALL APPLY.
- 95. PROVIDE SECURITY TAMPERPROOF FASTENERS FOR ALL VISIBLE EXPOSED DEVICES, EQUIPMENT AND COMPONENTS IN ALL AREAS. COORDINATE FASTENER TYPE WITH THE OWNER.
- 96. FIRE STOP
- 97. PROVIDE FIRE STOP AROUND ALL CABLES AND ALL CONDUITS IN ALL FIRE RATED SEPARATIONS AND FIREWALLS TO FORM TIGHT BARRIERS TO RETARD THE PASSAGE OF FLAME AND SMOKE.
- 98. FIRE STOP MATERIALS AND SMOKE SEAL MATERIALS SHALL HAVE A FLAME SPREAD RATING OF 25 OR LESS, NATIONAL FIRE PROTECTION ASSOCIATION (NFPA CLASS "A").
- 99. ALL FIRE STOP SYSTEMS SHALL BE TESTED TO THE LATEST APPLICABLE STANDARDS.
- 100. OBTAIN AND PAY FOR ALL PERMITS AND REVIEW REQUIRED FOR WORK PERFORMED INCLUDING BUT NOT LIMITED TO REVIEW AND APPROVAL BY CSA AND OR LOCAL AUTHORITIES HAVING JURISDICTION. SUBMIT REQUIRED DOCUMENTS AND SHOP DRAWINGS TO AUTHORITIES HAVING JURISDICTION IN ORDER TO OBTAIN APPROVAL FOR THE WORK. PREPARE ANY ADDITIONAL INFORMATION, DETAILS AND DRAWINGS THAT THESE AUTHORITIES MAY REQUIRE.
- 101. SUBMIT DETAILED BIWEEKLY CONSTRUCTION PROGRESS REPORTS TO OWNER AND ELECTRONIC SAFETY AND SECURITY ENGINEER'S REPRESENTATIVE. EACH PROGRESS REPORT SHALL INCLUDE ITEMIZED DETAILED DESCRIPTION AND EXTENT OF TASKS COMPLETED, ITEMIZED DETAILED DESCRIPTION AND QUANTIFICATION OF MATERIALS INSTALLED AND LABELED PHOTOS THAT CLEARLY SHOW THE EXTENT OF CONSTRUCTION PROGRESS.
- 102. KEEP THE SITE AND SURROUNDING AREA CLEAN, SAFE AND FREE FROM DEBRIS AT ALL TIMES.
- 103. ALLOW FOR THE REMOVAL AND RE-INSTALLATION OF ALL FLOOR/CEILING TILES IN AREAS AFFECTED BY THE INSTALLATION. THIS SHALL BE DONE ON A DAILY BASIS FOR ALL AREAS THAT ARE OCCUPIED DURING THE CONSTRUCTION PERIOD. OTHERWISE REMOVE AND RE-INSTALL THE TILES AFTER INSTALLATION IS COMPLETE.
- 104. REPLACE ALL SOILED AND OR DAMAGED CEILING TILES DURING THE INSTALLATION OF ANY WORK DESCRIBED IN THIS DOCUMENT. DAMAGES INCLUDE CHIPPING, BREAKING OR FINGERPRINTS.
- 105. RECTIFY ALL DAMAGES CAUSED DURING INSTALLATION. RECTIFICATION
- SHALL INCLUDE COMPLETE REPLACEMENT OF DAMAGED MATERIAL. 106. PROVIDE COMPLETE AND ADEQUATE TRAINING TO THE OWNER ON ALL ELECTRONIC SAFETY AND SECURITY SYSTEMS. TRAINING SHALL INCLUDE BUT NOT LIMITED TO THE OPERATIONS PERSONNEL ON THE OPERATION AND MAINTENANCE OF ALL ELECTRONIC SAFETY AND SECURITY SYSTEMS. ALL TRAINING SESSIONS ON MINIMUM 4 FLASH DRIVES FOR LATER USE BY OWNER.
- 107. RECORD DRAWINGS
- 108. PROVIDE DETAILED RECORD DRAWINGS OF ALL INSTALLED SYSTEMS. RECORD DRAWINGS SHALL INCLUDE BUT NOT LIMITED TO, DETAILED RISER SCHEMATIC DRAWINGS SHOWING CONNECTIVITY OF ALL SYSTEMS, DETAILED FLOOR PLAN DRAWINGS SHOWING ALL INSTALLED DEVICES, DEVICES SCHEDULES, PROGRAMING SCHEDULES, ETC. RECORD DRAWINGS SHALL BE PROVIDED IN AUTOCAD FORMAT ON FLASH DRIVE.
- 109. SHOP DRAWINGS
- 110. PROVIDE SHOP DRAWINGS FOR ALL MATERIALS FOR REVIEW AND
- APPROVAL PRIOR TO PROCUREMENT OF MATERIALS.
- 111. SHOP DRAWINGS SHALL INCLUDE BUT NOT LIMITED TO: 112. CATALOGUE DATA SHEETS FOR EACH PRODUCT THAT WILL BE PROVIDED
- BY THE CONTRACTOR 113. DETAILED SCHEMATIC RISER DRAWINGS CLEARLY INDICATING THE PHYSICAL AND LOGICAL CONNECTIVITY OF EACH SYSTEM AND HOW EACH PRODUCT

WILL BE IMPLEMENTED IN THE PHYSICAL AND LOGICAL CONNECTIVITY OF

- EACH SYSTEM. 114. AN ITEMIZED SHOP DRAWING INDEX WITH A SUMMERY LIST OF ITEMS BEING SUBMITTED FOR REVIEW. THE LIST SHALL INDICATE ITEM NUMBER, ITEM MANUFACTURE AND MODEL NUMBER AND ITEM NAME AND A REVIEW
- COMMENTS COLUMN. 115. ALL ADDITIONAL REQUESTED INFORMATION AS DETERMINED BY THE

ENGINEER'S REPRESENTATIVE HAS REVIEWED SHOP DRAWINGS.

- ENGINEER'S REPRESENTATIVE 116. INSTALLATION OF ANY EQUIPMENT SHALL NOT START UNTIL AFTER THE
- 117. WHEN REQUESTED, SHOP DRAWINGS SHALL BE SUPPLEMENTED BY DATA EXPLAINING THE THEORY OF OPERATION.
- 119. ALL CABLES, AND EQUIPMENT SHALL BE BONDED TO GROUND AS PER APPLICABLE CODES AND STANDARDS.

118. GROUNDING

121. NOT USED.

120. PATHWAYS

- 122. LABELING
- 123. A CLASS 3 SYSTEM OF ADMINISTRATION AS PER ANSI/TIA/EIA 606 STANDARDS SHALL BE UTILIZED.

- 124. ALL ELEMENTS OF EACH SYSTEM SHALL BE LABELED WITH UNIQUE IDENTIFIERS.
- 125. ALL CABLE AND EQUIPMENT LABELS SHALL MEET THE LEGIBILITY, DEFACEMENT, AND ADHESION REQUIREMENTS SPECIFIED IN ANSI/UL 969. IN ADDITION THE LABELS SHALL MEET THE GENERAL EXPOSURE REQUIREMENTS IN ANSI/UL 969 FOR INDOOR AND OUTDOOR USE.
- 126. CABLE LABELS SHALL BE OF SELF-LAMINATING VINYL CONSTRUCTION WITH A WHITE PRINTING AREA AND A CLEAR TAIL THAT SELF LAMINATES THE PRINTED AREA WHEN WRAPPED AROUND A CABLE. THE CLEAR AREA SHOULD BE OF SUFFICIENT LENGTH TO WRAP AROUND THE CABLE AT LEAST ONE AND ONE-HALF TIMES. THE WIDTH SHALL BE SUFFICIENT TO ACCOMMODATE THE APPROPRIATE LABEL DESIGNATION.
- 127. ALL BACKBONE AND HORIZONTAL CABLES INCLUDING PATCH CORD LABELS SHALL BE PRINTED IN 10 POINT ARIAL NARROW, BLACK, BOLD
- 128. ALL EQUIPMENT LABELS SHALL BE PRINTED IN 14 POINT ARIAL NARROW, BLACK, BOLD FONT.
- 129. ALL HUB AND MAIN CABINETS LABELS SHALL BE BLACK LAMACOID PLATES WITH WHITE 60 POINT ARIAL NARROW, ENGRAVED UPPER CASE LETTERS ENCLOSED BY WHITE BORDER ON.
- 130. ALL LABELS SHALL BE MECHANICALLY PRINTED USING A LASER PRINTER. HAND-WRITTEN LABELS ARE NOT PERMITTED.
- 131. ALL LABELS SHALL BE VISIBLE WHEN INSTALLED.
- 133. ALL DEVICES INCLUDING ALL WIRING SHALL BE TESTED INDIVIDUALLY AND AS INTEGRATED SYSTEMS.
- 134. IDENTIFY ALL COMPONENTS, FUNCTIONS AND SYSTEMS THAT SHALL BE
- 135. DEVELOP DEVICE CHECKLISTS, FUNCTIONAL TEST FORMS AND SYSTEM INTEGRATION TEST FORMS THAT SHALL BE EXECUTED.
- 136. PERFORM PRE-START-UP TESTS, DEVICE TESTS, FUNCTIONAL TESTS, SYSTEM INTEGRATION TESTS. PERFORM RETESTS AS NECESSARY. 137. PROVIDE TESTING AND COMMISSIONING DOCUMENTATION IN SOFT AND
- PRINTED FORMAT FOR ALL SYSTEMS AND THEIR RELATED COMPONENTS TO THE ELECTRONIC SAFETY AND SECURITY ENGINEER'S REPRESENTATIVE PRIOR TO THE COMPLETION OF THE PROJECT OR AT THE ELECTRONIC SAFETY AND SECURITY ENGINEER'S REPRESENTATIVES REQUEST. INCLUDE MAINTENANCE MANUALS AND OPERATING INSTRUCTIONS FOR CLIENT'S STAFF USE.

138. PRODUCT:

- IN CONDUIT AND OR WHERE INSTALLED IN NON-PLENUM RATED AREAS. CONDUCTORS AND CABLES SHALL BE CMP WHERE NOT COMPLETELY INSTALLED IN CONDUIT AND OR INSTALLED IN PLENUM RATED AREAS. ALL CABLE SHALL CONFORM TO THE RECOMMENDATIONS OF THE MANUFACTURERS OF THE ELECTRONIC SAFETY AND SECURITY SYSTEMS.
- 142. CONDUCTORS AND CABLES SHALL BE OUTDOOR RATED WHERE INSTALLED OUTDOOR AND OR INSTALLED IN LOCATIONS WHERE THEY WILL BE EXPOSED TO WEATHER ELEMENTS.
- SECURITY SYSTEMS. 144. ALL WIRING SHALL BE OF PROPER GAUGE, TYPE AND QUANTITY OF CONDUCTORS AS REQUIRED AND AS RECOMMENDED BY THE
- 145. MAKE ANY NECESSARY CHANGES OR ADDITIONS TO ROUTING OF CABLES, PATHWAYS TO ACCOMMODATE STRUCTURAL, MECHANICAL, ELECTRICAL AND ARCHITECTURAL CONDITIONS. WHERE PATHWAYS OR CABLES ARE SHOWN DIAGRAMMATICALLY RUN THEM PARALLEL TO BUILDING COLUMNS. IF IT IS NECESSARY TO RUN CABLES OTHERWISE TO ACCOMMODATE ACCEPTABLE CABLE LENGTHS, WRITTEN PERMISSION MUST BE OBTAINED FROM THE ELECTRONIC SAFETY AND SECURITY ENGINEER'S
- STAMPED ACCORDINGLY.
- 149. CARD READER: MINIMUM 6 CONDUCTOR, AWG 22 SHIELDED CABLE. 150. ELECTRIC STRIKES, MAGLOCKS: MINIMUM 4 CONDUCTOR, AWG 18 CABLE.

- 139. CONDUCTORS AND CABLES
- 140. SUPPLY AND INSTALL CONDUCTORS AND CABLES AS DETAILED IN CONTRACT DOCUMENTS AND AS REQUIRED AND AS RECOMMENDED BY THE MANUFACTURER TO ENSURE PROPER OPERATION ALL DEVICES AND SYSTEMS.
- 141. CONDUCTORS AND CABLES SHALL BE CMR WHERE INSTALLED COMPLETELY
- 143. PROVIDE AND INSTALL SHIELDED CABLES WHERE REQUIRED AND OR RECOMMENDED BY THE MANUFACTURER OF THE ELECTRONIC SAFETY AND

MANUFACTURER TO ENSURE PROPER OPERATION OF ELECTRONIC SAFETY

- AND SECURITY SYSTEMS AND PERIPHERAL DEVICES.
- REPRESENTATIVE PRIOR TO INSTALLATION. 146. ALL CONDUCTORS AND CABLES SHALL BE CSA APPROVED AND SHALL BE
- 147. DOOR CONTACT: MINIMUM 4 CONDUCTOR, AWG 22 OR AS REQUIRED BASED ON DISTANCE FROM CONTROLLER.
- 148. MOTION DETECTOR, GLASS BREAK DETECTOR, KEYPAD: MINIMUM 4 CONDUCTOR, AWG 22 AS REQUIRED BASED ON DISTANCE FROM CONTROLLER.
- 151. VIDEO SURVEILLANCE CAMERAS: 4 PAIR CATEGORY 6 CABLE 152. INTERCOM AND MASER INTERCOMS: 4 PAIR CATEGORY 6 CABLE

MUNICIPALITY OF CASSELMAN

CLIENT

PROJECT NORTH

ISSUED FOR REVISED 99% REVIEW 2025-02-19 ISSUED FOR 99% COORDINATION 2023-06-13 ISSUED FOR 66% COORDINATION 2023-05-12

DATE

IT IS THE RESPONSIBILITY OF THE APPROPRIATE CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON SITE AND PROMPTLY REPORT ALL ERRORS AND/OR OMISSIONS TO THE CONSULTANT BEFORE WORK COMMENCES.

DESCRIPTION

ALL WORK IS TO FOLLOW THE OBC 2012 AND ANY OTHER APPLICABLE CODES AND REGULATIONS.

DO NOT SCALE DRAWINGS.

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PROJECT

Canada

1 INDUSTRIEL STREET **OFFICE FIT-UP**

DRAWING

COMMUNICATIONS AND SECURITY SPECIFICATIONS

REVISION MRK-23002008-A0 MAY 2023 **APPROVED** SCALE: AS SHOWN DRAWING No:

DIV 28 SECURITY SPECIFICATIONS CONTINUATION

153. ACCESS CONTROL SYSTEM

- 154. THE ACCESS CONTROL SYSTEM SHALL BE AS DESCRIBED IN THIS
- SPECIFICATION AND ILLUSTRATED ON THE DRAWINGS. 155. THE ACCESS CONTROL SYSTEM SHALL BE AN EXTENSION OF AND SHALL
- 156. THE SYSTEM SHALL HAVE OF THE FOLLOWING FUNCTIONS:
- 157. REGULATE AND MONITOR ACCESS AT SYSTEM CONTROLLED DOORS.

BE INTEGRATED WITH THE EXISTING ACCESS CONTROL SYSTEM.

- 158. MONITOR CONNECTED DETECTORS (SUPERVISED AND AUXILIARY INPUTS) WITH THE ABILITY TO MANUALLY OR AUTOMATICALLY ARM AND DISARM
- 159. CONTROL EVENT INITIATED DEVICES CONNECTED TO SYSTEM OUTPUTS, SUCH AS ALARMS OR VIDEO RECORDERS, WITH THE ABILITY TO AUTOMATICALLY OR MANUALLY ARM OR DISARM THEM.
- 160. REPORT AN ALARM CONDITION.
- 161. ESTABLISH A HIERARCHY OF ALARM TYPES TO PRIORITIZE HANDLING ALARM CONDITIONS.
- 162. MAINTAIN A COMPREHENSIVE DATABASE RECORDING ALL SITE ACTIVITY.
- 163. PROVIDE ALL ACCESS CONTROL SYSTEM CONTROL PANELS AND ASSOCIATED EQUIPMENT, POWER SUPPLY, CABLING, CONNECTORS, ENCLOSURES, AND ALL OTHER HARDWARE AND SOFTWARE TO PROVIDE A FULLY OPERATIONAL SYSTEM.
- 164. THE ACCESS CONTROL SYSTEM SHALL BE CCURE 9000 ENTERPRISE HARTMANN CONTROL, KANTCH ENTRAPASS CORPORATE, KEYSCAN AURORA MODIFY AND OR LIST APPROVED ACCESS SYSTEM SOFTWARE
- 165. ALL COMPONENTS SHALL BE GOOD QUALITY COMMERCIAL GRADE.
- 166. CONTROLLER: LIST APPROVED DOOR AND INPUT/OUTPUT CONTROLLERS. COMPLETE WITH POWER SUPPLY.
- 167. CREDENTIAL READER: HID RP40, RP10 (FOR MULLION) AND RPK40.
- 168. CREDENTIALS: PROVIDE 100 HID iCLASS® FOBS OR APPROVED EQUIVALENT FOR OWNERS USE.
- 169. MOTION REQUEST TO EXIT DEVICE: KANTECH T.REX-XL2-NL.
- 170. DOOR CONTACTS: FLUSH MOUNTED FOR STEEL AND WOOD DOORS SENTROL 1078.
- 171. PROVIDE CONTROLLER ENCLOSURES FOR ALL CONTROLLERS. ALL CONTROLLER ENCLOSURES SHALL BE A SINGLE KEY LOCKING METAL BOX. EQUIPPED WITH DOOR TAMPER SWITCH.
- 172. POWER SUPPLY: PROVIDE ALL POWER SUPPLIES AS REQUIRED TO FACILITATE COMPLETE TURNKEY SYSTEMS. POWER SUPPLIES SHALL INCLUDE UNINTERRUPTIBLE POWER SUPPLY BATTERY BACKUP TO SUSTAIN OPERATIONS OF ALL SYSTEMS AND RELATED DEVICES FOR MINIMUM 20 MINUTES AFTER POWER FAIL.

173. INTRUSION DETECTION SYSTEM

- 174. PROVIDE ALL INTRUSION DETECTION SYSTEM CONTROL PANELS AND ASSOCIATED EQUIPMENT, POWER SUPPLY, CABLING, CONNECTORS, ENCLOSURES, AND ALL OTHER HARDWARE AND SOFTWARE TO PROVIDE A FULLY OPERATIONAL SYSTEM.
- 175. ALL COMPONENTS SHALL BE GOOD QUALITY COMMERCIAL GRADE CONSISTING OF BUT NOT LIMITED TO THE FOLLOWING DEVICES:
- 176. CONTROLLERS AND ASSOCIATED ENCLOSURES, COMMUNICATORS AND ASSOCIATED ENCLOSURES, PERIPHERAL DEVICES, SENSORS AND ACCESSORIES, KEYPADS, POWER SUPPLIES.
- 177. SYSTEM FUNCTION REQUIREMENTS
- 178. REGULATE AND MONITOR ACCESS AT SYSTEM CONTROLLED DOORS.
- 179. MONITOR CONNECTED DETECTORS (SUPERVISED AND AUXILIARY INPUTS) WITH THE ABILITY TO MANUALLY OR AUTOMATICALLY ARM AND DISARM
- 180. CONTROL EVENT INITIATED DEVICES CONNECTED TO SYSTEM OUTPUTS, SUCH AS ALARMS OR VIDEO RECORDERS, WITH THE ABILITY TO AUTOMATICALLY OR MANUALLY ARM OR DISARM THEM.
- 181. REPORT AN ALARM CONDITION.
- 182. DISTRIBUTE AN ANNUNCIATE DETAILED ZONE SPECIFIC AND SYSTEM TROUBLE ALARM CONDITIONS VIA THE INTERNET, PLAIN OLD TELEPHONE SERVICE (POTS), GSM/GPRS AND EMAIL NOTIFICATION TO REMOTE ALARM MONITORING STATIONS.
- 183. THE INTRUSION DETECTION SYSTEM SHALL PROVIDE THE ABILITY TO ARM OR DISARM INTRUSION ZONES BY: KEYPAD, ACCESS CONTROL, READER, USING CARD AND KEYPAD, DIGITAL INPUT STATE CHANGE, MANUAL OPERATOR CONTROL.
- 184. ALL EXTERIOR EQUIPMENT SHALL BE SEALED AND PROTECTED AND SHALL BE RATED FOR ALL WEATHER CONDITIONS INCLUDING HEAT, COLD, MOISTURE, DUST, AND SAND.
- 185. INTRUSION DETECTION CONTROLLER: DSC POWERSERIES NEO SECURITY CONTROL PANEL HS2016.
- 186. PROVIDE CONTROLLER ENCLOSURES FOR ALL CONTROLLERS. ALL EQUIPPED WITH DOOR TAMPER SWITCH.
- 187. COMMUNICATORS: DSC INTERNET AND HSPA DUAL-PATH ALARM COMMUNICATOR TL2803G(R)(E).
- 188. PANIC BUTTONS: PANIC BUTTON. POTTER ELECTRIC SIGNAL HUBM Universal HOLD UP BUTTON (DPDT)
- 189. WIRELESS PANIC BUTTON: WIRELESS POWERG SECURITY PANIC KEY. (COMPLETE WITH INFRASTRUCTURE.
- 190. GLASS BREAK DETECTOR: DSC BV500GB PIR MOTION DETECTOR & GLASSBREAK SENSOR.
- 191. DSC AMB-300 KEYPADS: DCS FULL MESSAGE LCD HARDWIRED KEYPAD WITH BUILT-IN POWERG TRANSCEIVER & PROX SUPPORT HS2LCDRFP9.
- 192. SIREN: ELK-SS30 193. POWER SUPPLY: PROVIDE ALL POWER SUPPLIES AS REQUIRED TO FACILITATE COMPLETE TURNKEY SYSTEMS. POWER SUPPLIES SHALL INCLUDE UNINTERRUPTIBLE POWER SUPPLY BATTERY BACKUP TO SUSTAIN

OPERATIONS OF ALL SYSTEMS AND RELATED DEVICES FOR MINIMUM 20

- MINUTES AFTER POWER FAIL. 194. VIDEO SURVEILLANCE SYSTEM
- 195. THE NETWORK VIDEO MANAGEMENT SYSTEMS (NVMS) SYSTEM, CAMERAS AND ACCESSORIES SHALL PROVIDE REAL TIME SURVEILLANCE, RECORDING OF REAL TIME EVENTS AND HISTORICAL VIDEO DATA FOR VIDEO EVIDENCE OF A SECURITY EVENT: AND PROVIDE A DETERRENT THROUGHOUT THE FACILITY AND THE SITE AT DESIGNATED LOCATIONS AS REQUIRED IN THE CONTRACT DOCUMENT.
- 196. PROVIDE ALL SECURITY VIDEO CAMERAS, PAN/TILT/ZOOM (PTZ) CAMERAS, MOUNTS, HOUSINGS, POWER SUPPLY SYSTEMS, NETWORK CABLES, CONNECTORS, EQUIPMENT RACKS, MONITORS AND CONSOLES, COMPUTER CONTROLLED NETWORK SWITCHERS, WORKSTATIONS, NETWORK VIDEO RECORDERS, ENCODERS, DECODERS, DISPLAYS, AND ALL OTHER HARDWARE AND SOFTWARE TO PROVIDE A FULLY OPERATIONAL NVMS SYSTEM.
- 197. THE VIDEO SURVEILLANCE SYSTEM SERVER AND NETWORK VIDEO RECORDERS SHALL BE SIZED, EQUIPPED TO RECORD ALL VIDEO STREAMS

- FROM ALL VIDEO SURVEILLANCE CAMERAS AT MINIMUM 15 FRAMES PER SECOND AT 1080P RESOLUTION FOR 30 DAYS.
- 198. NETWORK VIDEO RECORDER: TRENDNET TV-NVR104 COMPLETE WITH 8 TERABYTE HARD DRIVE OR APPROVED EQUAL.
- 199. PROVIDE 1 VIDEO SURVEILLANCE SYSTEM CLIENT SOFTWARE AND LICENCE. COORDINATE WITH THE OWNER'S IT REPRESENTATIVE AND INSTALL THE CLIENT SOFTWARE AND LICENCE ON AN OWNER PROVIDED COMPUTER THAT IS CONNECTED TO THE CORPORATE DATA NETWORK. CONFIGURE THE CLIENT SOFTWARE TO VIEW VIDEO STREAMS FROM ALL VIDEO SURVEILLANCE SYSTEM CAMERAS AND VIEW RECORDED VIDEO STREAMS FROM THE NETWORK VIDEO RECORDER.
- 153. THAT IS CONNECTED TO THE CORPORATE DATA NETWORK. CONFIGURE THE CLIENT SOFTWARE TO VIEW VIDEO STREAMS FROM ALL VIDEO SURVEILLANCE SYSTEM CAMERAS AND VIEW RECORDED VIDEO STREAMS FROM THE NETWORK VIDEO RECORDER.
- 154. VSS CAMERA TYPE F1 INDOOR FIXED CAMERA: AXIS 3MP DOME CAMERA OR APPROVED EQUAL.
- 155. 155. VSS CAMERA TYPE F2 OUTDOOR FIXED CAMERA: AXIS 5MP DOME CAMERA OR APPROVED EQUAL.

156. INTERCOM SYSTEM

- 157. THE INTERCOM SYSTEM SHALL PROVIDE FAST DUPLEX, (HANDS-FREE AT BOTH ENDS) VOICE and VIDEO COMMUNICATION FOR EMPLOYEES AND VISITORS, THE SYSTEM SHALL ASSIST WITH PERSONNEL SAFETY, FACILITY SECURITY, SECURITY SYSTEMS INTEGRATION. OPERATIONAL EFFICIENCY AND MAINTENANCE FUNCTIONS. THE INTERCOM SHALL BE FULLY INTEGRATED WITH THE ACCESS CONTROL SYSTEM.
- 158. THE INTERCOM SYSTEM SHALL BE AIPHONE IX SERIES INTERCOM SYSTEM.
- 159. INTERCOM STATION: AIPHONE IX-DV.
- 160. MASTER INTERCOM STATION: AIPHONE IX-MV7-V
- 161. INPUT OUTPUT RELAY ADAPTER: AIPHONE SBX-IXDV30, IXGW-TGW AND IXW-MAA.

5. SECURITY SYSTEMS INTEGRATION

- a. THE ACCESS CONTROL AND INTERCOM SYSTEM SHALL BE INTEGRATED TO PROVIDE INTEGRATED FUNCTIONS AS DESCRIBED IN THIS SPECIFICATIONS DOCUMENT AND ON CONTRACT DRAWINGS.
- b. ALL MASTER INTERCOM STATIONS SHALL BE INTEGRATED WITH ACCESS CONTROL SYSTEM TO FACILITATE ABILITY TO RELEASE MAIN DOOR VESTIBULE DOOR BY PRESSING INTEGRATED DOOR RELEASE BUTTON ON EACH MASTER INTERCOM.
- c. ALL HARDWARE, CLIENT AND OR SEVER SOFTWARE; SOFTWARE LICENSES SHALL BE PROVIDED AND INSTALLED AND CONFIGURED ON ALL DEVICES TO PROVIDE INTEGRATED FUNCTIONS.
- d. DATA SWITCH: 24-PORT, POE, 10/100/1000BASE-T GIGABIT, STACKABLE MANAGED SWITCH WITH 10GB SFP+ UPLINKS, POE POWER BUDGET TO POWER ALL CONNECTED DEVICES.
- e. CENTRAL MONITORING STATION: DELL OPTIPLEX 5060 SFF PC 8TH GEN INTEL CORE 17-8700 3.2GHZ, 8GB DDR4, 500GB HDD, UHD GRAPHICS 630, DVDRW, 1X USB-C, GIGE, WIN 10 PRO 64-BIT -MOD9T, COMPLETE WITH DUAL 21" LED MONITORS, KEYBOARD AND
- f. KEYBOARD VIDEO MOUSE (KVM) SWITCH: TRIPLITE NETDIRECTOR 8-PORT 1U RACK-MOUNT CONSOLE HDMI KVM SWITCH WITH 17 IN. LCD AND IP REMOTE ACCESS, DUAL RAIL

6. EXECUTION:

- ALL EQUIPMENT SHALL BE INSTALLED AND CONFIGURED IN ACCORDANCE WITH DEVICE AND SYSTEM MANUFACTURER'S INSTALLATION INSTRUCTIONS AND RECOMMENDATIONS, AS PER THE OWNERS' REQUIREMENTS AND AS PER CONTRACT DRAWINGS AND SPECIFICATIONS.
- COORDINATE THE EXACT MOUNT LOCATION OF ALL EQUIPMENT WITH THE ELECTRICAL CONTRACTOR TO ENSURE THAT ALL CONDUITS AND BACK BOXES ARE INSTALLED IN THE OPTIMAL LOCATIONS.
- COORDINATE EXACT MOUNTING LOCATIONS OF ALL EQUIPMENT ON SITE WITH SECURITY ENGINEER'S REPRESENTATIVE AND OWNER.
- 4. SUPPLY AND INSTALL ALL EQUIPMENT WHERE INDICATED ON CONTRACT DRAWINGS AND DOCUMENTS AND AS REQUIRED FOR COMPLETE AND OPERATIONAL SYSTEMS.
- 5. ALL EQUIPMENT SHALL BE INTER-COMPATIBLE.
- 6. BUNDLE AND TIE WIRE AND CABLE WITH CABLE TIES.
- 7. SEPARATE HIGH VOLTAGE (120 VAC AND ABOVE) CABLES FROM LOW VOLTAGE CABLES WITHIN ENCLOSURES.
- RUN WIRE AND CABLE CONTINUOUS FROM DEVICE LOCATION TO THE FINAL POINT OF TERMINATION. NO MID-RUN CABLE SPLICES WILL BE ALLOWED.
- CONTROLLER ENCLOSURES SHALL BE A SINGLE KEY LOCKING METAL BOX. 9. NEATLY ROUTE CABLES PARALLEL OR PERPENDICULAR TO BUILDING LINES.
 - 10. PROVIDE J HOOKS AND OTHER CABLE SUPPORT SYSTEMS (SPACED AT REGULAR INTERVALS) WITHIN ACCESSIBLE CEILING SPACES. FASTEN CABLES TO THE CABLE SUPPORT SYSTEMS AND PROVIDE STRAIN RELIEF TO PROTECT CABLES AND ENSURE COMPLIANCE WITH REQUIRED CABLE
 - 11. SUBMIT SHOP DRAWINGS OF ALL EQUIPMENT TO THE SECURITY ENGINEER'S REPRESENTATIVE FOR APPROVAL PRIOR TO PROCUREMENT AND INSTALLATION.
 - 12. SUPPLY AND INSTALL POWER SUPPLIES AS REQUIRED FOR FULLY FUNCTIONAL SYSTEMS. POWER SUPPLIES SHALL INCLUDE BUT NOT LIMITED TO ALL CONTROLLER POWER SUPPLIES, ALL PERIPHERAL DEVICE POWER SUPPLIES. ALL POWER SUPPLIES SHALL BE INSTALLED TO MANUFACTURES RECOMMENDATIONS AND AS REQUIRED TO FURNISH FULLY FUNCTIONAL SYSTEMS.
 - 13. THE SYSTEMS SHALL HAVE A MINIMUM OF CONTROL PRIMARY POWER AND BACKUP BATTERY. THE BATTERY SHALL BE ABLE TO SUPPORT THE SYSTEM AND DEVICES FOR 24 HOURS CONTINUOUS OPERATION. THE BATTERY INPUT, AUXILIARY, AND ALARM OUTPUTS SHALL BE PROTECTED USING PTC CIRCUIT BREAKERS. ALL OUTPUTS SHALL BE POWER LIMITED.
 - 14. ALLOW FOR NEEDS ASSESSMENT SESSIONS WITH THE OWNER AND DETERMINE THE EXACT OWNER REQUIRED MODES OF OPERATION OF EACH DEVICE AND SYSTEM. CONFIGURE EACH CONFIGURE DEVICE AND SYSTEM TO SUIT THE OWNERS' REQUIREMENTS.
 - 15. ALL EQUIPMENT SHALL BE INSTALLED WITH SUFFICIENT CLEARANCE TO MEET ALL APPLICABLE CODES AND FACILITATE OBSERVATION AND TESTING. ALL EQUIPMENT SHALL BE SECURELY FASTENED WITH APPROPRIATE FITTINGS TO ENSURE POSITIVE GROUNDING AND BE FREE OF GROUND LOOPS.
 - 16. PROVIDE AND INSTALL ALL SOFTWARE AND SOFTWARE LICENSES, HOUSINGS, MOUNTING BRACKETS AND ACCESSORIES FOR COMPLETE OPERATION OF ALL SYSTEMS.
 - 17. COORDINATE THE EXACT MOUNT LOCATION OF DEVICES WITH THE ELECTRICAL CONTRACTOR TO ENSURE THAT ALL CONDUITS AND BACK BOXES ARE INSTALLED IN THE OPTIMAL LOCATIONS.
 - 18. WARRANTY

- a. PROVIDE WARRANTY FOR THE COMPLETED WORK TO BE FREE OF DEFECTS IN WORKMANSHIP AND MATERIALS FOR A PERIOD OF TWO YEARS FROM THE DATE OF SYSTEM ACCEPTANCE.
- b. IF THE WORKMANSHIP OR MATERIALS IS FOUND TO BE DEFECTIVE OR NOT IN ACCORDANCE WITH THE CONTRACT DOCUMENTS DURING THE WARRANTY PERIOD, THE CONTRACTOR SHALL CORRECT IT PROMPTLY WITH FACTORY CERTIFIED TECHNICIANS AT NO COST TO THE OWNER. ALL LABOUR AND MATERIALS SHALL BE PROVIDED BY THE CONTRACTOR.

CLIENT				
MUNICIPALITY OF CASSELMAN				
PROJECT NORTH				

3	ISSUED FOR REVISED 99% REVIEW	2025-02-19			
2	ISSUED FOR 99% COORDINATION	2023-06-13			
1	ISSUED FOR 66% COORDINATION	2023-05-12			
SSUE	DESCRIPTION	DATE			
IT IS THE RESPONSIBILITY OF THE APPROPRIATE CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON SITE AND PROMPTLY REPORT ALL ERRORS AND/OR OMISSIONS TO THE CONSULTANT REPORT WORK COMMENCES					

BEFORE WORK COMMENCES.

ALL WORK IS TO FOLLOW THE OBC 2012 AND ANY OTHER APPLICABLE CODES AND REGULATIONS.

DO NOT SCALE DRAWINGS.

PROFESSIONAL STAMP	

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PROJECT

1 INDUSTRIEL STREET **OFFICE FIT-UP**

DRAWING

SECURITY SPECIFICATIONS 2 of 2

	PROJECT No:	MRK-23002008-A0	REVISION:	
	DRAWN:	KL	DATE:	MAY 2023
	APPROVED:	DL	SCALE:	AS SHOWN
	DRAWING No:		-	