POWER SINGLE LINE DIAGRAM SYMBOLS

###!#)	CKT BREAKER, '###' INDICATES TRIP SETTING	6, '#' INDICATES N	UMBER OF POLES
###/# }	FUSED SWITCH, '###' INDICATES TRIP SETTING, '#' INDICATES NUMBER OF POLES		
,	ENCLOSED CIRCUIT BREAKER		
	ENCLOSED NON-FUSED SWITCH		
	ENCLOSED FUSED SWITCH		
K	KIRK KEY INTERLOCK		
SS	SOLID STATE, ELECTRONIC ADJUSTABLE TRIF	Р	
GFP	GROUND FAULT PROTECTION		
SPD	SURGE PROTECTIVE DEVICE		
DMM	DIGITAL MULTIMETER		
M	UTILITY METER		
	TRANSFORMER		
PANEL NAME	PANELBOARD		
	GROUND		
Ť	GROUND		
⊥_ →	GROUND POTENTIAL TRANSFORMER		
→ ©	POTENTIAL TRANSFORMER	I AND S	SMALL POWER
→ ©	POTENTIAL TRANSFORMER CURRENT TRANSFORMER	I AND S ⊨⊕	SMALL POWER DOUBLE DUPLEX RECEPTACLE, WALL MOUNTED
⊰ <u>اگ</u> ₽0	POTENTIAL TRANSFORMER CURRENT TRANSFORMER WER DISTRIBUTION		DOUBLE DUPLEX RECEPTACLE, WALL
→ ፪ ₽0 ₩	POTENTIAL TRANSFORMER CURRENT TRANSFORMER WER DISTRIBUTION DUPLEX RECEPTACLE, WALL MOUNTED DUPLEX RECEPTACLE, ABOVE BACKSPLASH OF CABINET, COUNTERTOP	₩	DOUBLE DUPLEX RECEPTACLE, WALL MOUNTED DOUBLE DUPLEX RECEPTACLE, ABOVE BACKSPLASH OF CABINET, COUNTERTO OR SINK DOUBLE DUPLEX RECEPTACLE, FLUSH
→ ፪ ₽0 ₩ Ⅲ	POTENTIAL TRANSFORMER CURRENT TRANSFORMER WER DISTRIBUTION DUPLEX RECEPTACLE, WALL MOUNTED DUPLEX RECEPTACLE, ABOVE BACKSPLASH OF CABINET, COUNTERTOP OR SINK DUPLEX RECEPTACLE, FLUSH MTD IN	₩ ₩	DOUBLE DUPLEX RECEPTACLE, WALL MOUNTED DOUBLE DUPLEX RECEPTACLE, ABOVE BACKSPLASH OF CABINET, COUNTERTO OR SINK DOUBLE DUPLEX RECEPTACLE, FLUSH MOUNTED IN CEILING
→ ፪ PO ₩ ₩	POTENTIAL TRANSFORMER CURRENT TRANSFORMER WER DISTRIBUTION DUPLEX RECEPTACLE, WALL MOUNTED DUPLEX RECEPTACLE, ABOVE BACKSPLASH OF CABINET, COUNTERTOP OR SINK DUPLEX RECEPTACLE, FLUSH MTD IN CEILING HALF SWITCHED DUPLEX RECEPTACLE,	⊕ ⊕ ⊕	DOUBLE DUPLEX RECEPTACLE, WALL MOUNTED DOUBLE DUPLEX RECEPTACLE, ABOVE BACKSPLASH OF CABINET, COUNTERTO OR SINK DOUBLE DUPLEX RECEPTACLE, FLUSH MOUNTED IN CEILING SIMPLEX RECEPTACLE, WALL MOUNTED
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→ ⑧ PO () () () () () () () () () ()	POTENTIAL TRANSFORMER CURRENT TRANSFORMER WER DISTRIBUTION DUPLEX RECEPTACLE, WALL MOUNTED DUPLEX RECEPTACLE, ABOVE BACKSPLASH OF CABINET, COUNTERTOP OR SINK DUPLEX RECEPTACLE, FLUSH MTD IN CEILING HALF SWITCHED DUPLEX RECEPTACLE, WALL MOUNTED SPECIAL PURPOSE RECEPTACLE, WALL MOUNTED. NEMA CONFIGURATION AS NOTED ON PLANS SHADING REPRESENTS RECEPTACLE ON LIFE SAFETY BRANCH SHADING REPRESENTS RECEPTACLE ON	₩ ₩ ₩ ₩ ₩ ₩	DOUBLE DUPLEX RECEPTACLE, WALL MOUNTED DOUBLE DUPLEX RECEPTACLE, ABOVE BACKSPLASH OF CABINET, COUNTERTO OR SINK DOUBLE DUPLEX RECEPTACLE, FLUSH MOUNTED IN CEILING SIMPLEX RECEPTACLE, WALL MOUNTED SPECIAL PURPOSE RECEPTACLE, CEILIN MOUNTED NEMA CONFIGURATION AS NOTED ON PLANS
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→ (E) PO (F) (F) (F) (F) (F) (F) (F) (F)	POTENTIAL TRANSFORMER CURRENT TRANSFORMER WER DISTRIBUTION DUPLEX RECEPTACLE, WALL MOUNTED DUPLEX RECEPTACLE, ABOVE BACKSPLASH OF CABINET, COUNTERTOP OR SINK DUPLEX RECEPTACLE, FLUSH MTD IN CEILING HALF SWITCHED DUPLEX RECEPTACLE, WALL MOUNTED SPECIAL PURPOSE RECEPTACLE, WALL MOUNTED. NEMA CONFIGURATION AS NOTED ON PLANS SHADING REPRESENTS RECEPTACLE ON LIFE SAFETY BRANCH SHADING REPRESENTS RECEPTACLE ON NON-LIFE SAFETY BRANCH DISCONNECT SWITCH, REFER TO EQUIPMENT CONNECTION SCHEDULE FOR DISCONNECT TYPE, UON DIRECT CONNECTION, WALL MOUNTED. SUBSCRIPT 'X' INDICATES UNIQUE IDENTIFIER, REFER TO EQUIPMENT CONNECTION SCHEDULE. GROUND BUS BAR FURNITURE OUTLET, WALL MOUNTED PANELBOARD		DOUBLE DUPLEX RECEPTACLE, WALL MOUNTED DOUBLE DUPLEX RECEPTACLE, ABOVE BACKSPLASH OF CABINET, COUNTERTOD OR SINK DOUBLE DUPLEX RECEPTACLE, FLUSH MOUNTED IN CEILING SIMPLEX RECEPTACLE, WALL MOUNTED SPECIAL PURPOSE RECEPTACLE, CEILIN MOUNTED NEMA CONFIGURATION AS NOTED ON PLANS SHADING REPRESENTS RECEPTACLE ON UPS BRANCH SHADING REPRESENTS RECEPTACLE ON UPS BRANCH SHADING REPRESENTS RECEPTACLE WITH ISOLATED GROUND MOTOR, SUBSCRIPT 'X' DENOTES MOTOD DESIGNATION, REFER TO EQUIPMENT CONNECTION SCHEDULE DIRECT CONNECTION, CEILING MOUNTE SUBSCRIPT 'X' INDICATES UNIQUE IDENTIFIER, REFER TO EQUIPMENT CONNECTION SCHEDULE. COMBINATION MOTOR STARTER DISCONNECT MOTOR STARTER

CIRCUITING BLDG-E1MDPHA.10 ------ PANEL DESIGNATION 3#12,#12G,21mmC ------ CONDUIT SIZE - GROUND CONDUCTOR QUANTITY AND SIZE — CIRCUIT CONDUCTOR QUANTITY AND SIZE TAGS AND CALL OUT SYMBOLS <u>#</u> **REVISION CALLOUT** DETAIL CALLOUT A _____ DETAIL DESIGNATION E3.1 SHEET NUMBER KEYNOTE CALLOUT

LIGHTING, LIGHITNG SWITCH				
AF10 - 7ab 、	UPPER CASE LETTERS INDICATE LIG	HTING FIXTURE		
	NUMBER INDICATES CIRCUIT NUMBE INDICATES SWITCHLEG	R, LOWER CASI		
	LIGHTING FIXTURE ON NORMAL BRANCH POWER - CEILING MOUNTED			
	LIGHTING FIXTURE ON NORMAL BRANCH POWER - WALL MOUNTED			
	STRIP LIGHTING FIXTURE ON NORMAL BRANCH POWER	·		
o o	PENDANT LINEAR FIXTURE ON NORMAL BRANCH POWER	• •		
0	DOWNLIGHT LIGHTING FIXTURE ON NORMAL BRANCH POWER - RECESSED MOUNTED	•		
\bigcirc	WALL WASH LIGHTING FIXTURE ON NORMAL BRANCH POWER - ARROW INDICATES DIRECTION OF BEAM	●〉		
ь	WALL SCONCE LIGHTING FIXTURE ON NORMAL BRANCH POWER - WALL MOUNTED	⊢₽		
+	BOLLARD LIGHT FIXTURE ON NORMAL BRANCH POWER	+		
	EXIT SIGN - SINGLE FACE - CEILING MOUNTED	\$€€\$		
	EXIT SIGN - SINGLE FACE - WALL MOUNTED			
HX LL	LOW LEVEL EXIT SIGN - SINGLE FACE - WALL OR DOOR MOUNTED	$\vdash \blacktriangleleft$		
* *	DUAL HEAD EMERGENCY LIGHT WITH INTEGRAL BATTERY PACK - WALL MOUNTED	F		
\$ab	SPST SWITCH, WALL MOUNTED.			
©\$	OCCUPANCY SENSOR, CEILING MOUNTED	ab' INDIC/		
HOS	OCCUPANCY SENSOR, WALL MOUNTED			
VS	VACANCY SENSOR, CEILING MOUNTED	2 - DOUBLE 3 - THREE		
HVS	VACANCY SENSOR, WALL MOUNTED	4 - FOUR W D - WALL B		
	DIMMING CONTROL STATION, SUBSCRIPT 'X	I ' INDICATES TYI		
LCP	LIGHTING CONTROL PANEL			
	SHUNT TRIP PUSH BUTTON			
TC X	TIME CLOCK, SUBSCRIPT 'X' INDICATES UNIC	QUE IDENTIFIER		
DS X	DAYLIGHT SENSOR, CEILING MOUNTED			
PC X	PHOTOCELL			
	1			

0

AUDIOVISUAL SYSTEM

DEVICE LEGEND				
	DEVICE TAG	G — AAA		
ALL AV SYSTEM DEVICES ARE WALL MOUNTED UNLESS OTHERWISE IND				
AVx	AV CONNECTIVITY PLATE	"x" DENOTES	TYPE. REFI	
FBx	FLOOR BOX	"x" DENOTES	TYPE. REFI	
PTx	POKE THROUGH	"x" DENOTES	TYPE. REFI	
TBx	TABLE BOX	"x" DENOTES	TYPE. REFI	
D	DISPLAY		RSF	
TV	TELEVISION OUTLET		RSS	
PRS	PROJECTOR SCREEN		BP	
PRJ	PROJECTOR		S	
CAM	AV SYSTEM CAMERA		SUE	
IRR	INFRARED RADIATOR		LCR	
ANT	ANTENNA		AVF	
ROS	AV SYSTEM ROOM OCCUPANCY	SENSOR	SI	
PS	AV SYSTEM PARTITION SENSOR	1	MIC	
LS	PHOTOMETRIC SENSOR		TS	
BN	BACnet INTERFACE TO AV SYSTI	EM	LI	

١IN	IG & CONTROLS		TELECOMMUNIC	ATION	S SYSTEM] [
RE TY	PE	\triangleleft	WALL MOUNT VOICE OUTLET		FLOOR MOUNT VOICE OUTLET	E-01	ELECTRICAL LEGEND, GENE
SE LE	TTER	•	WALL MOUNT DATA OUTLET		FLOOR MOUNT DATA OUTLET	E-02	ELECTRICAL DEMOLITION P
		◄	WALL MOUNT DATA/VOICE OUTLET		FLOOR MOUNT DATA/VOICE OUTLET	E-03	POWER & SYSTEM SECOND
	LIGHTING FIXTURE ON EMERGENCY BRANCH POWER OR EMERGENCY BALLAST - CEILING MOUNTED	WAP	CEILING MOUNT DATA FOR WIRELESS ACCESS POINT			E-04	ELECTRICAL ROOF LAYOUT-
	LIGHTING FIXTURE ON EMERGENCY	DEVICE LEGE				E-05	5 LIGHITNG SECOND FLOOR L
	BRANCH POWER OR EMERGENCY BALLAST - WALL MOUNTED	▲ x →	→ NUMBER OF DATA JACKS	(/Y 🗕 I	NUMBER OF DATA/VOICE JACKS	E-06	ELECTRICAL SCHEDULE AN
	STRIP LIGHTING FIXTURE ON EMERGENCY		IPT = (1) DATA/VOICE			E-07	ZELECTRICAL DETAILS
	BRANCH POWER OR EMERGENCY BALLAST	MOUNTING:				E-08	
	PENDANT LINEAR FIXTURE ON EMERGENCY BRANCH POWER OR		UNTING HEIGHTS TO BE COORDINATED WITH IN	TERIOR DESIGNE	ER DURING DD PHASE	E-09	COMMUNICATIONS SPECIFIC
	EMERGENCY BALLAST		SECURIT	Y SYST	FM	E-10	COMMUNICATIONS SPECIFIC
	EMERGENCY BRANCH POWER OR EMERGENCY BALLAST - RECESSED					E-11	SECURITY SPECIFICATIONS
	MOUNTED WALL WASH LIGHTING FIXTURE ON	DEVICE LEG			– MOUNTING TAG – SECONDARY ATTRIBUTE	E-12	SECURITY SPECIFICATIONS
	EMERGENCY BRANCH POWER OR EMERGENCY BALLAST - ARROW INDICATES DIRECTION OF BEAM				- SECONDARY ATTRIBUTE		
	WALL SCONCE LIGHTING FIXTURE ON	ALL SECUR	TY SYSTEM DEVICES ARE WALL MOUNTED UNLE	ESS OTHERWISE	INDICATED BY MOUNTING TAG		GE
	EMERGENCY BRANCH POWER OR EMERGENCY BALLAST - WALL MOUNTED	ACP	ACCESS CONTROL PANEL	ADO	AUTO DOOR OPERATOR		
	BOLLARD ON EMERGENCY BRANCH	ALM	ALARM DEVICE	CR	CARD READER		ALL DRAWINGS ARE DIAGRAMMAT ONLY AND MAY BE ALTERED BY TI SHALL BE READ IN CONJUNCTION
	POWER OR EMERGENCY BALLAST	DC	DOOR CONTACT	DCR	DOOR CONTROLLER		DEVICES. ALL EXISTING ELECTRIC CONNECTIONS, SHALL REMAIN UN
	EXIT SIGN - DUAL FACE - CEILING MOUNTED	EL	ELECTRIFIED LOCKSET	EP	ELECTRIFIED PANIC HARDWARE		REQUIRED/IMPACTED BY OTHER V AND/OR PROVIDE TEMPORARY CO
	EXIT SIGN - DUAL FACE - WALL MOUNTED	ES	ELECTRIC STRIKE	GB	GLASS BREAK DETECTOR		ELECTRICAL SYSTEM ARE TO REN MAINTAIN EXISTING FIRE ALARM, I
	SINGLE REMOTE EMERGENCY LIGHT - WALL MOUNTED	IC	INTERCOM	ID	INTRUSION DETECTION DEVICE		CONSTRUCTION STAGE. WHERE D
	DUAL REMOTE EMERGENCY LIGHT - WALL	KP	KEYPAD	KEY	KEY SWITCH		THE SITE AT THE END OF EACH W ALL OPENINGS, IF APPLICABLE, SI
	MOUNTED	ML	MAGNETIC LOCK	MS	MOTION SENSOR	N	MATERIAL REMOVED WILL BE REP INSTALLED AS PER MANUFACTUR
		PB	PUSH BUTTON	PNL	PANEL / CONTROLLER		CONTRACTOR SHALL BE RESPON
ATED	S INDIVIDUAL GANGED SWITCHES AND SWITCH LEGS CONTROLLED, SUBSCRIPT 'X'	PO	PUSH TO OPEN PLATE	PX	POWER TRANSFER		BE DAMAGED, MAKE FULL REPAIR
ES:		[LFE]	LOW FREQUENCY EXCITER	REX	REQUEST TO EXIT DEVICE		CONTRACTOR TO PROVIDE WRITT
LE PC E WAY	LV - LOW VOLTAGE		INFRARED READER	SEN	ALARM SENSOR		RELOCATED/REUSED IN THIS PRO
WAY BOX	P - PILOT LIGHT DIMMER T - WALL BOX TIMER WP - WEATHER PROOF	RDU	REMOTE DISPLAY UNIT	[SPS]	SECURITY SYSTEM POWER SUPPLY		EXPOSED ELECTRICAL CORDS OU
			LOCAL AREA RECEIVER	[SVR]	SERVER		CONTRACTOR SHALL BE RESPON CONSULTANTS, AND THE OWNER. MANNER TO ENSURE CONTINUED
YPE (OR UNIQUE IDENTIFIER		DIRECTIONAL PASSIVE TAG DETECTOR	WKS	SECURITY WORKSTATION	-	CONTRACTOR SHALL IDENTIFY AN
							PULLBOXES, DEVICES AND EQUIP IDENTIFICATION SHALL BE AS PEF LAMACOID TYPE. COORDINATE AL
					CCTV CAMERA, WALL-MOUNTED	10. (CONTRACTOR TO PAY FOR AND C
ER		RFR	RF READER		CCTV CAMERA, CEILING-MOUNTED		IF REQUIRED. CONTRACTOR TO REPORT BACK ⁻
		RFM	RF READER MASTER	RFER	RF ETHERNET READER		OCCUR DURING THE CONSTRUCT
			RF LONG RANGE READER ASSISTANCE REQUEST LED ANNUNCIATOR		LED DOME LIGHT WITH SOUNDER		PHASING AND SCHEDULING OF TH INCLUDE COSTS FOR "OFF-HOURS
<u> </u>		ARL	WITH SOUNDER	PL	PUSH TO LOCK		FOR ALL LUMINAIRES THAT EXCEPT COMPLY WITH RECOMMENDATION
VI	DEVICES		MISCELLANE	OUS DI	EVICES		FIXTURES (THAT EXCEED 150V) SH TO THE CONNECTING MEANS, IDE
		JB	JUNCTION BOX, WALL MOUNTED	CX	CONTACTOR, SUBSCRIPT 'X' INDICATES UNIQUE IDENTIFIER		NEW AND EXISTING ELECTRICAL V THE PLENUM REQUIREMENTS OF
	MOUNTING TAG SECONDARY ATTRIBUTE	JB	JUNCTION BOX, CEILING MOUNTED	R	CONTROL RELAY & REQUIRED INPUT/OUTPUT MODULE	-	
CATE	D BY MOUNTING TAG					 7	
ER TO) AV SYSTEMS DETAILS		DEMC			_	
	AV SYSTEMS DETAILS	< R >	EXISTING TO BE REMOVED		DEMOLITION CONDUIT		
ER TO	AV SYSTEMS DETAILS	< RL >	EXISTING TO BE RELOCATED	L	DEMOLITION EQUIPMENT		
ER TO	AV SYSTEMS DETAILS	< EX >	EXISTING - NEW LOCATION				
2	ROOM SCHEDULING PANEL						
5	ROOM SCHEDULING SIGN		ABBREV	IATION	IS		
	BUTTON PANEL AV SYSTEM SPEAKER		ANALOG		MAIN CIRCUIT BREAKER		
	SUBWOOFER SPEAKER		ARC FAULT CIRCUIT INTERRUPTOR ABOVE FINISHED FLOOR		MOTOR CONTROL CENTER MOTORIZED DAMPER		
	LOCAL CREDENZA RACK		AUTOMATIC TRANSFER SWITCH CLOCK HANGER		MOUNTING HEIGHT NORMALLY CLOSED		
!	AV RACK		CEILING MOUNTED		NORMALLY CLOSED NORMALLY OPEN		
	SHADE/DRAPE INTERFACE TO AV SYSTEM		ELECTRICAL METALLIC TUBING EXPLOSION PROOF		OVER THE COUNTER PAN, TILT, ZOOM		
]	MICROPHONE		EXPLOSION PROOF FURNITURE OR MILLWORK MOUNTED		PAN, TILT, ZOOM SHUNT TRIP		
]	TOUCH SCREEN						
]	LIGHTING INTERFACE TO AV SYSTEM		GROUND FAULT CIRCUIT INTERRUPTER GROUND FAULT INTERRUPTER		OUTLET AT TV HEIGHT. COORDINATE ON SITE. WEATHER PROOF		
			USB TYPE OF RECEPTACLE				
		·		I		—	

IERAL NOTES, AND DRAWING LIST
PLAN
D FLOOR LAYOUT- NEW WORK
NEW WORK
LAYOUT- NEW WORK
ND DIAGRAM
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ENERAL NOTES

TIC ONLY. THE ARRANGEMENTS OF EQUIPMENT SHOWN ARE APPROXIMATIONS THE ENGINEERS TO MEET THE REQUIREMENTS OF THE PROJECT. THESE DRAWINGS NWITH THE CONSULTANT'S, AND MECHANICAL DRAWINGS FOR LOCATION OF ALL CAL SYSTEMS, INCLUDING BUT NOT LIMITED TO EQUIPMENT DEVICES AND INLESS SPECIFICALLY NOTED TO BE REMOVED. DURING CONSTRUCTION IF WORKS, CONTRACTOR TO TEMPORARILY REMOVE/RELOCATE ELECTRICAL SYSTEMS ONNECTIONS ON SITE TO ALLOW CONSTRUCTION OF OTHERS WORKS. EXISTING MAIN FUNCTIONAL DURING THE CONSTRUCTION. EXIT SIGNS AND EMERGENCY LIGHTS IN FULL OPERATION DURING THE ENTIRE DISRUPTION TO LIFE SAFETY SYSTEM ARE REQUIRED, PROVIDE CONTINUOUS IN PERIOD AND ENSURE THAT ALL SYSTEMS ARE REACTIVATED PRIOR TO LEAVING VORKING DAY. HALL BE SEALED WITH APPROVED FIRE STOP MATERIAL. ANY FIREPROOFING PLACED WITH A SUITABLE AND APPROVED FIREPROOFING MATERIAL AND SHALL BE RER'S RECOMMENDATIONS TO APPLICABLE BUILDING AND FIRE CODES.

SIBLE FOR ALL REFINISHING OF DAMAGED BUILDING AREAS AND FINISHES ILINED UNDER SCOPE OF WORK OF THIS PROJECT. SHOULD ANY EXISTING SYSTEM R/REPLACES WITHOUT EXTRA COST, AND TO THE SATISFACTION OF CONSULTANT.

TEN NOTICE TO OWNER FOR ANY SHUTDOWN REQUIRED.

FOR STORAGE AND PROTECTION OF ALL EXISTING ITEMS WHICH WILL BE OJECT.

UTSIDE THE LEASED PREMISES SHALL NOT BE PERMITTED.

SIBLE FOR COORDINATION OF ALL THE WORK WITH ALL OTHER TRADES, R. ALL WORK SHALL BE SCHEDULED AND CARRIED OUT BY THE CONTRACTOR IN A O AND NON-INTERRUPTED OPERATION OF EXISTING FACILITY.

ND LABEL CLEARLY ALL CIRCUITS, WIRING, SERVICES, JUNCTION BOXES, PMENT INSTALLED AND CONNECTED UNDER THE SCOPE OF WORK OF THIS PROJECT. R OWNER'S REQUIREMENTS AND ALL MARKINGS SHALL BE OF NON-ERASEABLE LL LABELING WITH THE OWNER AND CONSULTANT.

OBTAIN ALL REQUIRED PERMITS, FEES, LICENSES, CERTIFICATES OF INSPECTION ETC

TO THE ENGINEER AND OWNER ON ANY ELECTRICAL SYSTEM FAILURES THAT TION PHASE.

HE WORK IS REQUIRED IN ORDER TO MAINTAIN EXISTING BUILDING OPERATIONS. S" WORK.

EED 150V SHOWN, SUPPLY AND INSTALL NEW LUMINAIRES DISCONNECT THAT N SPECIFIED IN CANADIAN ELECTRICAL CODE, RULE 30-308(4). ALL NEW RELOCATED HALL BE MARKED IN A CONSPICUOUS LEGIBLE AND PERMANENT MANNER ADJACENT ENTIFYING THE SPECIFIC PURPOSES.

WIRING AND CABLES EXPOSED WITHIN THE CEILING SPACES SHALL CONFORM TO ONTARIO BUILDING CODE SENTENCE 3.6.4.3. (1).

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MUNICIPALITY OF CASSELMAN

PROJE	CT NORTH	
3	ISSUED FOR REVISED 99% REVIEW	2025-02-19
2	ISSUED FOR 99% COORDINATION	2023-06-13
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ISSUE	DESCRIPTION	DATE

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PROJECT

1 INDUSTRIEL STREET OFFICE FIT-UP

DRAWING

ELECTRICAL LEGEND, GENERAL NOTES, AND DRAWING LIST

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

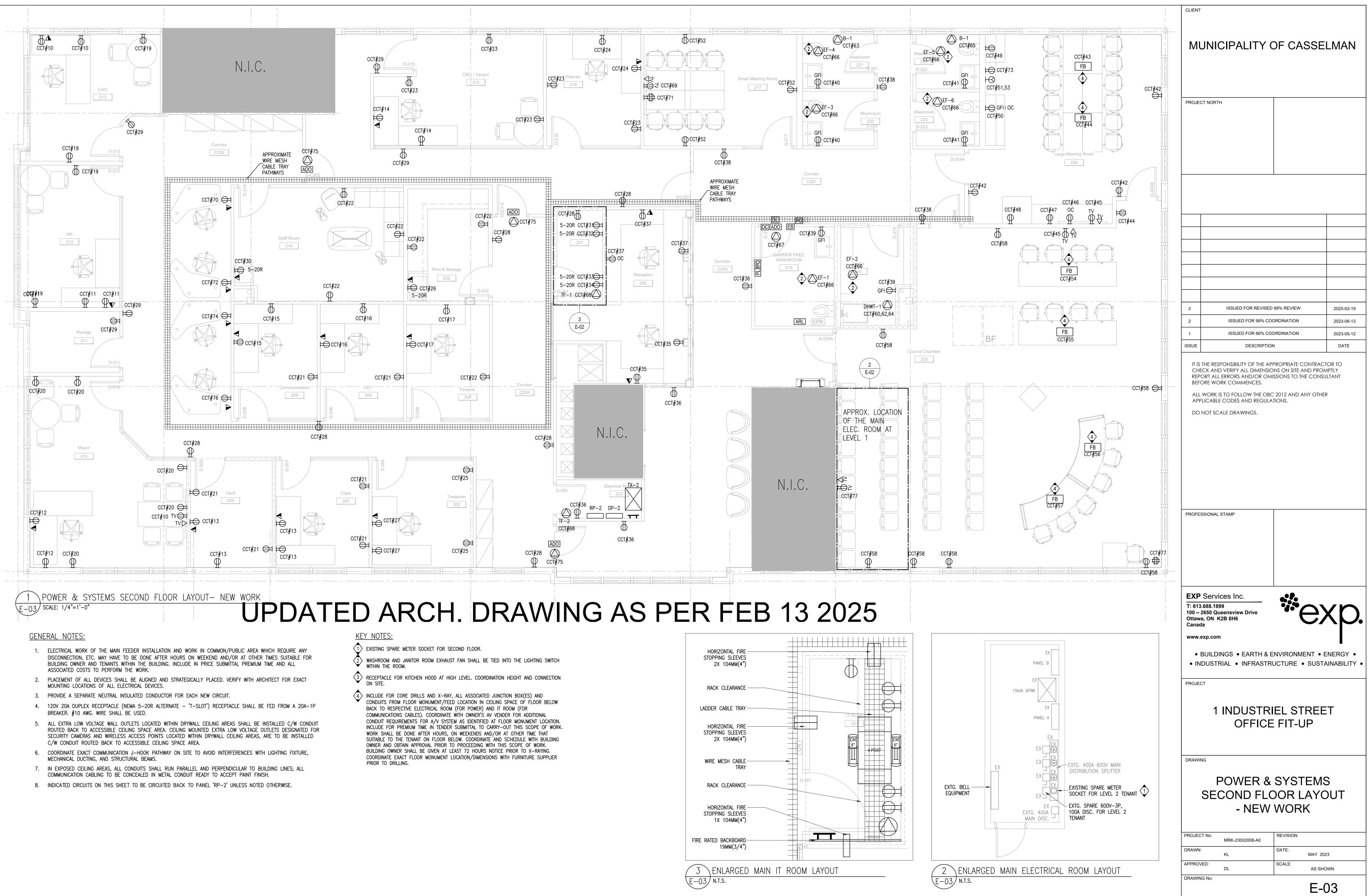
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1 ELECTRICAL DEMOLITION PLAN E-02 scale: 1/4"=1'-0"			

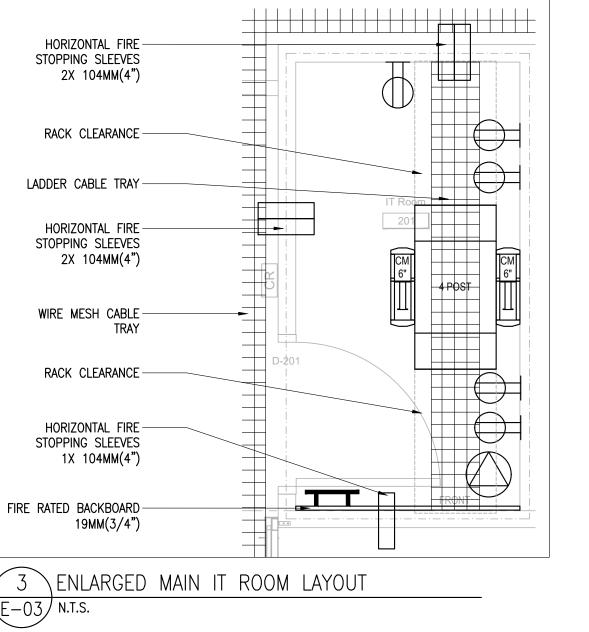
<u>DEMO POWER:</u>

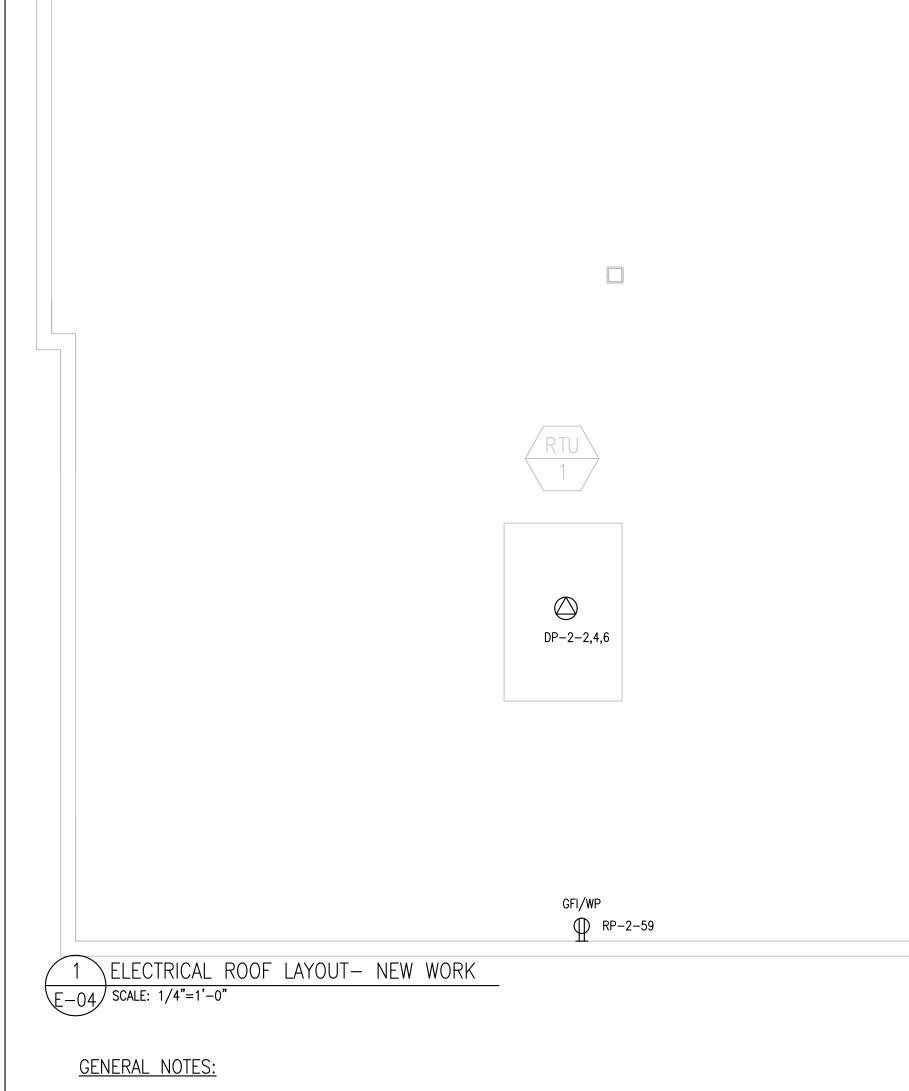
- 1. THIS DEMOLITION DRAWING IS DIAGRAMMATIC AND MAY NOT REPRESENT ALL OF THE DEVICES TO BE REMOVED. IT IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO ENSURE THE COMPLETE REMOVAL/RELOCATION OF POWER AND SYSTEMS IS COMPLETE IN THE AREAS OF SCOPE OF WORK. ALL ELECTRICAL ITEMS IN THIS AREA/ROOM NOT SHOWN WITHIN SCOPE OF WORK AREA ARE TO REMAIN.
- 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.
- 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.
- ALL EXISTING DEVICES TO REMAIN ARE TO BE PROTECTED FROM DUST DEBRIS DURING CONSTRUCTION.
- 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.



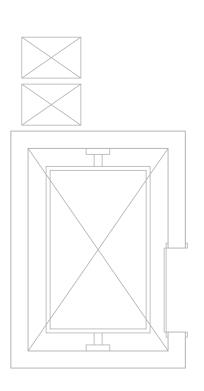
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MUNICIPALITY OF CASSELMAN
PROJECT NORTH
3 ISSUED FOR REVISED 99% REVIEW 2025-02-19 2 ISSUED FOR 99% COORDINATION 2023-06-13
2 ISSUED FOR 99% COORDINATION 2023-06-13 1 ISSUED FOR 66% COORDINATION 2023-05-12
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1 INDUSTRIEL STREET OFFICE FIT-UP
DRAWING
ELECTRICAL DEMOLITION PLAN
PROJECT No: MRK-23002008-A0 REVISION: DRAWN: KL DATE: APPROVED: DL SCALE: DRAWING No: E-02



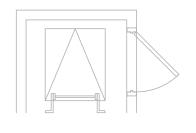




- 1. ELECTRICAL WORK OF THE MAIN FEEDER INSTALLATION AND WORK IN COMMON/PUBLIC AREA WHICH REQUIRE ANY DISCONNECTION, ETC. MAY HAVE TO BE DONE AFTER HOURS ON WEEKEND AND/OR AT OTHER TIMES SUITABLE FOR BUILDING OWNER AND TENANTS WITHIN THE BUILDING. INCLUDE IN PRICE SUBMITTAL PREMIUM TIME AND ALL ASSOCIATED COSTS TO PERFORM THE WORK.
- 2. PROVIDE A SEPARATE NEUTRAL INSULATED CONDUCTOR FOR EACH NEW CIRCUIT.



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DP-2-8,10,12

GFI/WP

PROJECT No:	MRK-23002008-A0	REVISION:
DRAWN:	KL	DATE: MAY 2023
APPROVED:	DL	SCALE: AS SHOWN
DRAWING No:		E-04

ELECTRICAL ROOF LAYOUT - NEW WORK

DRAWING

1 INDUSTRIEL STREET OFFICE FIT-UP

PROJECT

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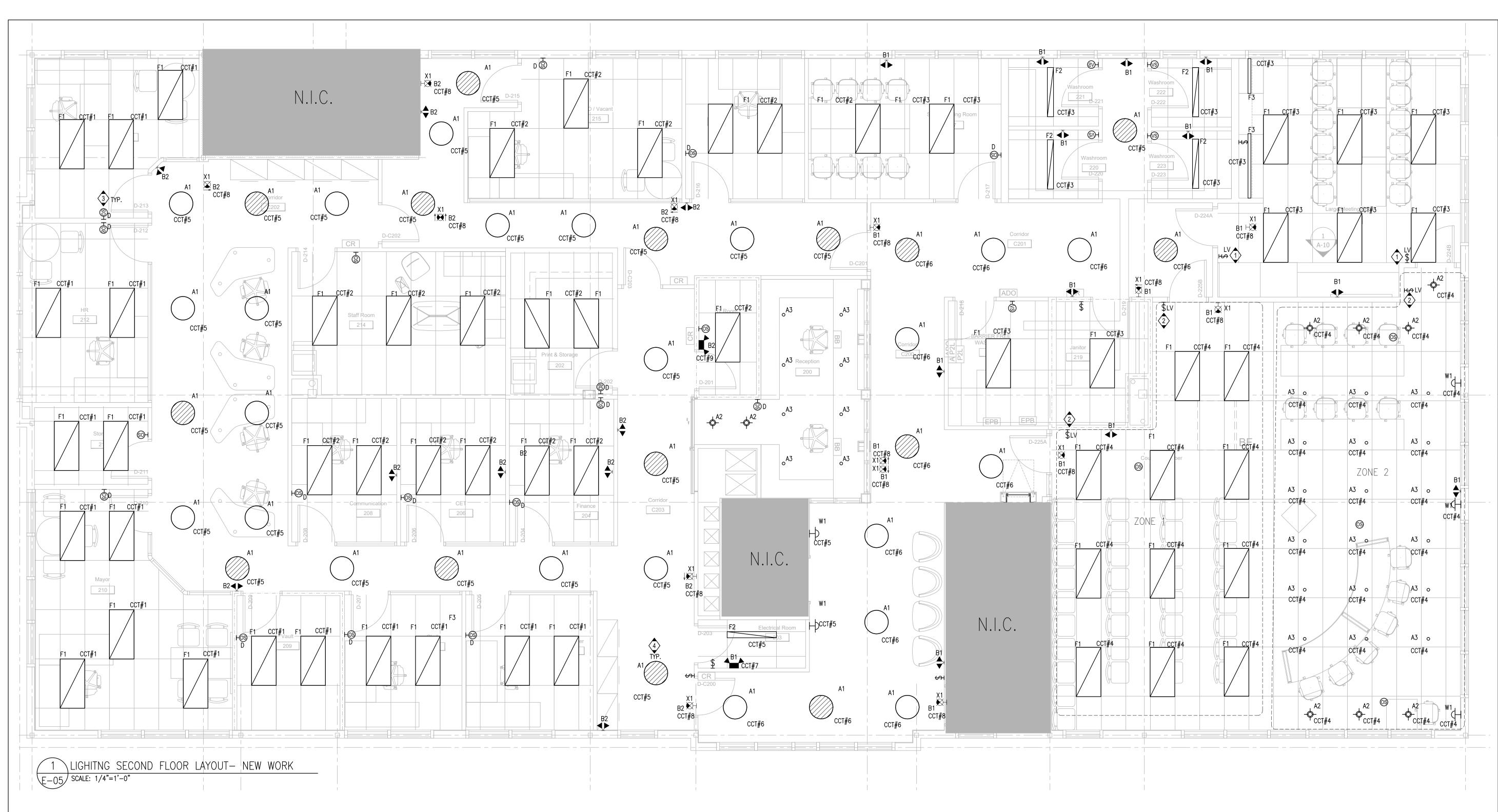
DESCRIPTION IT IS THE RESPONSIBILITY OF THE APPROPRIATE CONTRACTOR TO

ISSUED FOR REVISED 99% REVIEW 2025-02-19 3 2 ISSUED FOR 99% COORDINATION 2023-06-13 ISSUED FOR 66% COORDINATION 2023-05-12 1 ISSUE DATE

MUNICIPALITY OF CASSELMAN

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PROJECT NORTH



<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.
- $\langle 3 \rangle$ 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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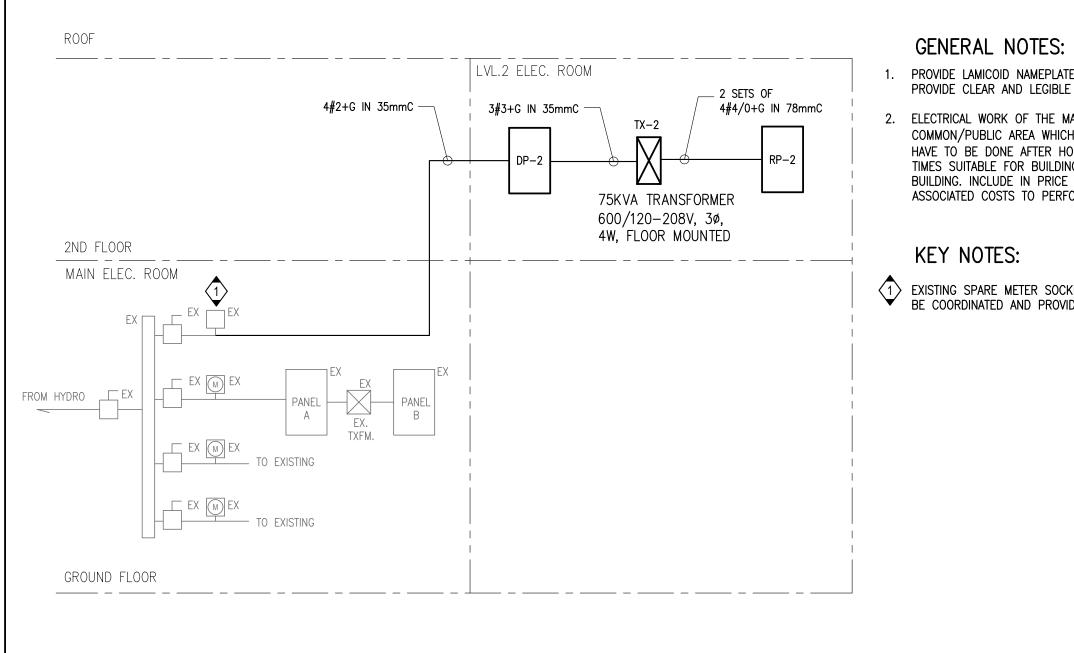
1 INDUSTRIEL STREET OFFICE FIT-UP

DRAWING No:

DRAWING

LIGHTING SECOND FLOOR LAYOUT - NEW WORK

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



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

PROVIDE LAMICOID NAMEPLATE FOR NEW PANELS AND TRANSFORMER. PROVIDE CLEAR AND LEGIBLE WRITTEN DIRECTORY FOR EACH PANEL

2. 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.

EXISTING SPARE METER SOCKET FOR SECOND FLOOR. METER SHALL BE COORDINATED AND PROVIDED BY HYDRO OTTAWA.

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	
Α3	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	

NOTES: 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.

		PANEL DE	SIGNA	TION:	DF	D_2	2			ECT NAME: CIPALITY OF CASSELMAN OFFICE FIT-UP
MAIN BUS: 100A	MAIN BREA	KER: 100A	VO	LTAGE:	347	7/600)V, 3	ø, 4W,	25kA	SURFACE MOUNTED. NEW PANEL
LO/ DESCR	AD IPTION	I	BRKR SIZE	CCT. No.	A	PHAS B		CCT. No.	BRKR SIZE	LOAD DESCRIPTION
TRANSFORMER TX-	-2	2	90A 3P	1 3 5 7	•	•	•	2 4 6 8	20A 3P 25A	RTU–1
				9 11 13		•	•	10 12 14	ЗР	RTU-2
				15				16		
				17	\vdash		-+	18		
				19	ŀ			20		
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				37	╞┿			38		
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				41			•	42		

		PANEL [)ESIGNA	TION:	RP	-2				CT NAME: IPALITY OF CASSELMAN OFFICE FIT-UF
MAIN BUS: 400A	MAIN BREA	AKER: 250	A V	OLTAGE	: 120,	/208V,	30	ø, 4W,	10kA	SURFACE MOUNTED. NEW PAN
LOA DESCRII			BRKR SIZE	CCT. No.	F	PHASE B	с	CCT. No.	BRKR SIZE	LOAD DESCRIPTION
OFFICE LIGHTS			20A	1				2	20A	OFFICE LIGHTS
OFFICE LIGHTS			20A	3				4	20A	OFFICE LIGHTS
CORRIDOR LIGHTS			20A	5	1		•-	6	20A	Corridor Lights
BATTERY UNIT			20A	7	1			8	20A	EXIT SIGNS
BATTERY UNIT			20A	9		•		10	15A	OFFICE RECEPTACLE
OFFICE RECEPTACL	E		15A	11			•-	12	15A	OFFICE RECEPTACLE
OFFICE RECEPTACL	E		15A	13	┤┢──			14	15A	OFFICE RECEPTACLE
OFFICE RECEPTACL	E		15A	15	1	•		16	15A	OFFICE RECEPTACLE
OFFICE RECEPTACL	E		15A	17	1		•-	18	15A	OFFICE RECEPTACLE
OFFICE RECEPTACL	E		15A	19	1			20	15A	OFFICE RECEPTACLE
OFFICE RECEPTACL	E		15A	21				22	15A	OFFICE RECEPTACLE
OFFICE RECEPTACL	E		15A	23	1		•-	24	15A	PRINTER ROOM REC.
TREASURE ROOM R	EC.		15A	25	┤┢──			26	20A	PRINTER REC.
TREASURE ROOM R			15A	27	1	- -		28	15A	CORRIDOR REC.
CORRIDOR REC.			15A	29	1		•-	30	20A	PRINTER REC.
IT ROOM REC.			20A	31	1			32	20A	IT ROOM REC.
IT ROOM REC.			20A	33	1	•		34	20A	IT ROOM REC.
RECEPTION REC.			15A	35	1		 -	36	15A	CORRIDOR REC.
RECEPTION REC.			15A	37]			38	15A	CORRIDOR REC.
WASHROOM REC.			15A	39	1	•		40	15A	WASHROOM REC.
WASHROOM REC.			15A	41	1		•-	42	15A	LARGE MEETING ROOM REC.
LARGE MEETING RC	OM REC.		20A	43	╏┢──			44	20A	LARGE MEETING ROOM REC.
LARGE MEETING RC	OM TV REC.		15A	45	1	•		46	15A	LARGE MEETING ROOM COUNTER REC
LARGE MEETING RC	OM FRIDGE	REC.	15A	47	1		•	48	15A	LARGE MEETING ROOM FRIDGE REC.
LARGE MEETING RC	OM REC.		15A	49]		-	50	15A	LARGE MEETING ROOM COUNTER REC
			40A	51	1	•		52	15A	SMALL MEETING ROOM REC.
LARGE MEETING RA	NGE REC.		2P	53	1		•	54	15A	COUNCIL CHAMBER REC.
COUNCIL CHAMBER	REC.		20A	55].∳			56	20A	COUNCIL CHAMBER REC.
COUNCIL CHAMBER	REC.		20A	57	1	- -		58	15A	COUNCIL CHAMBER REC.
ROOF REC.			20A	59	1		•	60	20A /	
ROOF REC.			20A	61]∳			62		DHWT-1
BASEBOARD HEATE	R		15A	63	1		-	64	3 P	
BASEBOARD HEATE	R		15A	65	1		•	66	15A	EXHAUST FAN
UNIV. WASHROOM [OOR CONTR	OLLER	15A	67]		-	68	15A	TRANSFER FAN
SMALL MEETING RC	OM TV REC.		15A	69	1-	- -	$\left \right $	70	15A	WORK STATION REC.
SMALL MEETING RC	OM REC.		20A	71	1—		-	72	15A	WORK STATION REC.
KITCHEN HOOD REC).		15A	73]∳-		+	74	15A	WORK STATION REC.
ADO			15A	75	1	- -	+	76	15A	WORK STATION REC.
TV REC.			15A	77	1-		-	78	20A	SPARE
SPACE				79]∳-		$\left \right $	80	20A	SPARE
SPACE				81	1	- -	+	82	20A	SPARE
SPACE				83	1⊥	_	∳-	84	20A	SPARE

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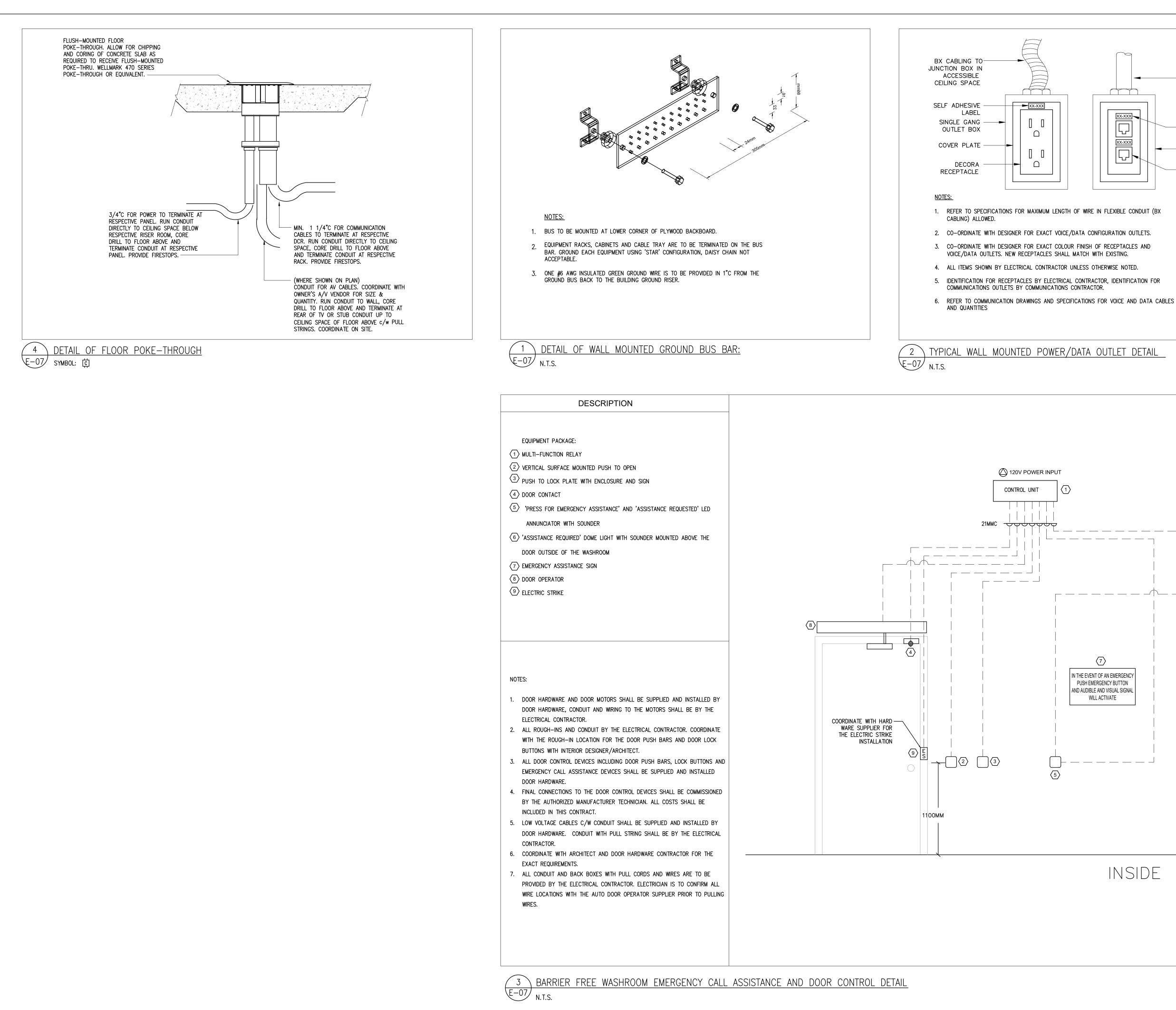
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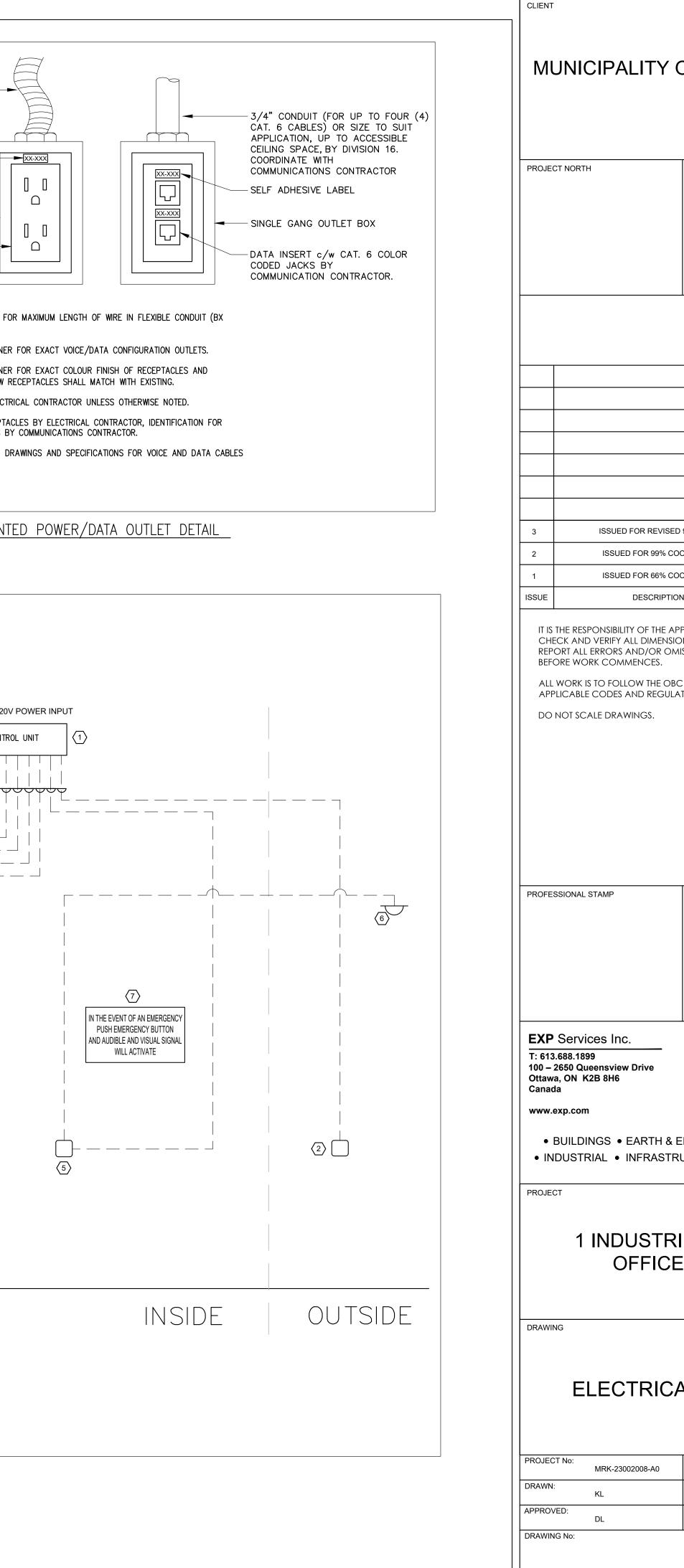
PROJECT

DRAWING

1 INDUSTRIEL STREET OFFICE FIT-UP

ELECTRICAL SCHEDULE AND DIAGRAM PROJECT No: **REVISION:** MRK-23002008-A0 DATE: DRAWN: MAY 2023 KL APPROVED: SCALE: AS SHOWN DL DRAWING No:





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1 INDUSTRIEL STREET OFFICE FIT-UP

ELECTRICAL DETAILS

PROJECT No:	MRK-23002008-A0	REVISION:	
DRAWN:	KL	DATE:	MAY 2023
APPROVED:	DL	SCALE:	AS SHOWN
DRAWING No:			E-07

- 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.
- 6. 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. INSPECTION OF WORK
- 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 DISPOSE. OBTAIN FROM OWNER, LIST OF EXISTING ITEMS TO BE CAREFULLY REMOVED 18.2 SUPPORT AND SECURE CONDUIT AT SPACING IN ACCORDANCE WITH CODE 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 BEING REINSTALLED.
- 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 CONDUCTORS NOT SIZED ON DRAWINGS SHALL BE SIZED IN ACCORDANCE WITH CODE. ELECTRICAL CONTRACTOR MUST RUN SERVICES THROUGH, BE RESPONSIBLE FOR REMOVAL PROVIDE CABLE SUPPORT SYSTEM ACCESSORIES WHICH ARE NOT SPECIFIED HEREIN OR AND REINSTALLATION OF ARCHITECTURAL CEILING TILES, MECHANICAL EQUIPMENT, SHOWN ON DRAWINGS BUT ARE REQUIRED FOR PROPER INSTALLATION. SPRINKLERS, ETC., AS REQUIRED FOR INSTALLATION OF YOUR WORK. IF THE REQUIRED ELECTRICAL WORK IS REQUIRED TO ACCOMMODATE WORK OF OTHER TRADES, AND IF 19.2 INTERIOR CONDUCTORS TO BE "RW90" SINGLE CONDUCTOR TO CSA C22.2 NO. 75, COLOUR REMOVAL OF EXISTING CEILING TILES IS NOT THE RESPONSIBILITY OF OTHERS, BE CODED, 167 DEGREES F. (75 DEGREES C.) RATED, PVC INSULATED AND NYLON COVERED. RESPONSIBLE FOR ALL WORK TO GAIN ACCESS TO THOSE DEVICES THAT NEED TO BE 19.3 CONDUCTORS IN ACCESSIBLE SUSPENDED CEILING SPACES, IN STUD WALL WORKED ON. SECURELY SUPPORT ANY DEVICE/LUMINAIRE LEFT "DANGLING" DUE TO REMOVAL OF SUPPORTING MEANS. RE-INSTALL DEVICES AFTER INSPECTION OF WORK IS CONSTRUCTION TO SUSPENDED CEILING SPACES (MAXIMUM 5' RUN PERMITTED) MAY BE "BX" APPROVED BY CONSULTANT. PRIOR TO REMOVAL OF CEILING TILES OR OTHER DEVICES, TYPE, AC-90 FLEXIBLE ARMOURED CABLE WITH "RW-90" CONDUCTORS AND BARE COPPER INSPECT FOR DAMAGES/WORKING ORDER AND REPORT ANY DEFICIENCIES TO OWNER PRIOR GROUND CONDUCTOR TO CSA C22.2 NO. 51 (BULLETIN NO. 994). PROVIDE PROPER SQUEEZE 24.3 ACCEPTABLE MANUFACTURERS ARE: TO START OF WORK. PATCH AND MAKE GOOD (INCLUDING PAINTING) SURFACES TO MATCH TYPE CONNECTORS AND PLASTIC ANTI-SHORT BUSHINGS AT TERMINATIONS. SUPPORT "BX" FXISTING. IN CEILING SPACES AND IN STUD WALL CONSTRUCTIONWITH STEEL 2 HOLE CABLE STRAPS TO "CODE" REQUIREMENTS.
- 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. HAZARDOUS MATERIALS
- 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.
- 20. OUTLET BOXES, PULLBOXES AND JUNCTION BOXES 15.2 WHEN WORK BEGINS AT SITE, CLEARLY AND ACCURATELY MARK ON A BOUND SET OF 25.2 AS SCHEDULED, PANELBOARDS ARE OF TYPES: WHITE PRINTS OF CONTRACT DRAWINGS, ON A DAILY BASIS, ALL CHANGES AND DEVIATIONS 20.1 PROVIDE CSA APPROVED STAMPED GALVANIZED STEEL OUTLET BOX FOR EACH FROM ROUTING OF AND LOCATIONS OF EQUIPMENT SHOWN ON CONTRACT DRAWINGS, "POW-R-LINE 1", 120/208 V, 3-PHASE AND SINGLE PHASE WITH MINIMUM "BAB" FRAME, LUMINAIRE, FIRE ALARM DEVICE, ETC. REFER TO DRAWINGS FOR LOCATIONS OF OUTLETS. CHANGES AND DEVIATIONS INCLUDING THOSE MADE BY ADDENDA, CHANGE ORDERS, AND BOLT-ON MOULDED CASE CIRCUIT BREAKERS WITH A MINIMUM INTERRUPTING CAPACITY OF CONFIRM EXACT LOCATIONS PRIOR TO ROUGHING-IN. BOXES FOR RIGID STEEL CONDUITS SITE INSTRUCTIONS, AND CHANGES AND DEVIATIONS INDICATED ON SUPPLEMENTAL 10 KA SYMMETRICAL AT 208 V, UNLESS OTHERWISE SCHEDULED. WHERE PANELBOARDS ARE SHALL BE CAST FS/FD TYPES. DRAWINGS ISSUED WITH ADDENDA, CHANGE ORDERS, AND SITE INSTRUCTIONS. MAINTAIN SCHEDULE TO INCLUDE SERIES RATED PROVISIONS, PROVIDE BREAKERS AS RECOMMENDED "AS-BUILT" WHITE PRINTS AT SITE FOR PERIODIC INSPECTION BY CONSULTANT THROUGHOUT 20.2 PROVIDE PULLBOXES AND JUNCTION BOXES WHEREVER NECESSARY TO FACILITATE BY PANEL MANUFACTURER; DURATION OF WORK. PAY PARTICULAR ATTENTION TO ACCURATELY DIMENSIONING CONDUCTOR/CONDUIT INSTALLATIONS. GENERALLY, PROVIDE CONDUIT RUNS EXCEEDING 100' 25.3 WHERE GROUND FAULT CIRCUIT INTERRUPTING (GFCI) TYPE BREAKERS ARE REQUIRED BY LOCATION OF ALL CONCEALED SERVICES TERMINATED FOR FUTURE EXTENSION, ALL BURIED (30 m) IN LENGTH, OR WITH MORE THAN 3, 90 DEGREE BENDS WITH PULLBOX INSTALLED CODE AND/OR SCHEDULED, PROVIDE "QUICKLAG" GROUND FAULT, CSA CLASS "A", GROUP 1, WORK AND SERVICES, AND WORK CONCEALED WITHIN BUILDING IN INACCESSIBLE LOCATIONS. AT CONVENIENT AND SUITABLE INTERMEDIATE ACCESSIBLE LOCATION. PROVIDE JUNCTION COMBINATION THERMAL MAGNETIC BOLT-ON CIRCUIT BREAKERS WITH SOLID-STATE GROUND BOXES AND PULLBOXES SIZED IN ACCORDANCE WITH CODE TO SUIT NUMBER AND SIZE OF 15.3 WHEN WORK ENDS AT SITE, UPDATE A COMPUTER FILE COPY OF CONTRACT FAULT INTERRUPTERS. CONDUITS AND CONDUCTORS. BOXES TO BE GALVANIZED OR PRIME COATED PLATE STEEL DOCUMENT DRAWING SET SO THAT IT REFLECTS ALL DEVIATIONS FROM ORIGINAL COMPLETE WITH SCREW-ON OR HINGED COVERS AND KNOCKOUTS. BOXES MUST BE CONTRACT DOCUMENT DRAWINGS, THUS FORMING A TRUE "AS-BUILT" DRAWING DISK SET. 25.4 PANELBOARDS TO BE EQUIPPED WITH ONE (1) CONTINUOUS BUS BAR PER PHASE. EACH ACCESSIBLE AFTER WORK IS COMPLETE.
- 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 FOLLOWING:
- 16.1.1 SPECIAL RECEPTACLES AND SWITCHES;
- 16.1.2 LUMINAIRES;
- 16.1.3 EXIT SIGN;
- 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. CONDUIT 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.

- 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. CONDUCTORS
- 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.
- 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.
- 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 OWNFR.
 - 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 REQURED: 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 GROUND DUPLEX
 - 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 ONF. 2-POLF. 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;
 - 24.1.6 LOCAL GOVERNING AUTHORITY CODES AND STANDARDS.
 - 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;

24.2.4 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;
- 29.1.9 FREQUENCY OF OPERATION BETWEEN 20 KHZ MINIMUM TO 60 KHZ MAXIMUM, BUT NOT 24.3.4 REX POWER MAGNETICS; BETWEEN 30 KHZ AND 42 KHZ; LAMPS SHALL OPERATE WITHOUT VISIBLE FLICKER; 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.

- 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;
- 25.5.2 DEAD-FRONT CONSTRUCTION TO SHIELD USER FROM ENERGIZED PARTS;
- 25.5.3 ENCLOSURE CONSTRUCTED OF CODE GAUGE, HOT ZINC DIPPED GALVANIZED STEEL CONSTRUCTED IN ACCORDANCE WITH UL 50 REQUIREMENTS: TRIM FOR FLUSH OR SURFACE WALL MOUNTING AS SHOWN; FRONT PANEL TO NOT BE REMOVABLE WITH THE DOOR LOCKED;
- 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.
- LOCKS.
- 25.9 ACCEPTABLE MANUFACTURERS ARE: EATON (CUTLER-HAMMER), SCHNEIDER ELECTRIC (SQUARE D), SIEMENS ELECTRIC LTD OR APPROVED BY OWNER.
- 26. GROUNDING
- 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 CONNECTORS.
- 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.

CLIENT

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;
- 29.1.10 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 LUMINAIRE LOCATIONS PRIOR TO ROUGHING-IN. SUPPORT LUMINAIRES DIRECTLY TO 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, C&M, CAPRI, MIDDAY ETC.
- 30. CLOSEOUT DOCUMENTS
- 30.1 FOLLOWING DOCUMENTS ARE TO BE PROVIDED:
- 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.
- 30.1.2 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 PROJECT.

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
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.

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PROJECT

1 INDUSTRIEL STREET OFFICE FIT-UP

DRAWING

DRAWING No:

ELECTRICAL **SPECIFICATIONS**

OJECT No:	MRK-23002008-A0	REVISION:	
AWN:	KL	DATE:	MAY 2023
PROVED:		SCALE:	

E-08

AS SHOWN

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. 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. OTHERWISE REQUIRED.

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.

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).

3. 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:

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 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

SLACK AT THE OUTLET LOCATION FOR CLIENT TO HAVE THE FLEXIBILITY TO RELOCATE THE OUTLET.

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. TO BE BLUE.

8.2. OPTICAL FIBRE BACKBONE CABLE: FIBER BACKBONE CABLES SHALL BE TERMINATED ONTO 4.8. SECURITY CABLES: UTP, 24 AWG SOLID CONDUCTOR, CMP CABLE. CABLE COLOUR TO BE 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 BLUE. AWAY FROM THE RACK AND SHALL BE MOUNTED AS INDICATED ON DETAIL DRAWINGS.

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 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 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 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.

6. 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.

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 10.4. GROUNDING AND BONDING INFRASTRUCTURE INSTALLED BY THE COMMUNICATIONS FOR COMMUNICATIONS CABLING) OR 1-PORT SIDE ENTRY BOX (IF SYSTEM FURNITURE HAS NO CONTRACTOR SHALL NOT INTERFERE WITH THE EXISTING GROUNDING PRACTICES WITHIN THE OPENING FOR COMMUNICATIONS CABLING) OR TEKNION FURNITURE ADAPTER (IF THE SYSTEM CUSTOMER PREMISES. 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

8.3. 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 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

> 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	COLOU
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	COLOUR
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	TYPE INSTALL AT:	LENGTH	END 1
SC	SM TR #1	7 FEET	SC
SC	MM 62.5/125 UM TR #	7 FEET	SC
SC	MM 50/125 UM 1GB TR #1	7 FEET	SC
SC	MM 50/125 UM 10GB TR #1	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

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).

10.2. PROVIDE GROUNDING AND BONDING IN ACCORDANCE WITH GOOD INDUSTRY PRACTICES, LOCAL CODES AND STANDARDS.

10.3. ALL COMPONENTS OF THE GROUNDING AND BONDING INFRASTRUCTURE SHALL BE BY PANDUIT CANADA.

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:

.3.1. ALL WALL MOUNT COMMUNICATIONS BRACKETS TO BE SUPPLIED FOR THIS PROJECT SHALL BLACK, 19" MOUNTING, WALL MOUNTED WITH SWING OPEN CAPABILITY.	
.3.2. BRACKETS SHALL HAVE 10U MOUNTING SPACE, WITH AN ADJUSTABLE DEPTH UP TO ".	
.3.3. CONSTRUCTION SHALL CONSIST OF A MINIMUM OF 16GA (0.060") STEEL.	
.3.4. THE WALL MOUNT BRACKETS SHALL BE TAPPED WITH MOUNTING HOLES AS PER $A-310-C$, SIZE $10-32$.	
.4. WALL MOUNTED RACK:	
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

LIR 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. 12.5.2. 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, VERTICAL CABLE MANAGEMENT PANELS WITH HINGED DOORS WITH NONMAGNETIC 12.5.8. 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.

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. 12.7.3. 12.7.4. FRAME SHALL BE COMPLETE WITH A MINIMUM OF ONE (1) DUAL BOLT GROUND LUG 4–PA 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. CABINETS SHALL BE GANGED TOGETHER WITH PROPER GANGING KIT WHEREVER TWO 1287 OR MORE CABINETS ARE POSITIONED IN A SIDE-BY-SIDE CONFIGURATION.

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.

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PROTECTION.
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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.

14.1. 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 PULL-FORCE AND MINIMUM BEND RADII.

CLIENT

MUNICIPALITY OF CASSELMAN

12.9. VERTICAL CABLE MANAGERS: 12.9.1. CONSTRUCTED OF MINIMUM 16 GA (0.060") STEEL WITH STIFFENERS RIVETED/WELDED INSIDE FOR ADDITIONAL STRENGTH.

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 INPUT PLUG.

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".

12.12. 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

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:

14. COMMUNICATIONS PATHWAYS:

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 BUILDING LINES.

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

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

PROJE	CT 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
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.

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PROJECT

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:			

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

OF EVERY CABLE, 1.1.2. INCLUDE VINYL OR PVC MACHINE PRINTED LABELS AT ALL PATCH PANELS, IDC TERMINATION BLOCKS, WIRING 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 MODEL.

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

16. GENERAL

- 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 27. 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.
- 32. WHERE ACTIVE AND PASSIVE HARDWARE AND CABLING IS NOT SPECIFIED 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.
- 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.
- 39. INTENT
- 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 FXISTING
- 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
- 116. INSTALLATION OF ANY EQUIPMENT SHALL NOT START UNTIL AFTER THE ENGINEER'S REPRESENTATIVE HAS REVIEWED SHOP DRAWINGS.
- 117. WHEN REQUESTED, SHOP DRAWINGS SHALL BE SUPPLEMENTED BY DATA EXPLAINING THE THEORY OF OPERATION. 118. GROUNDING
- 119. ALL CABLES, AND EQUIPMENT SHALL BE BONDED TO GROUND AS PER APPLICABLE CODES AND STANDARDS.
- 120. PATHWAYS
- 121. NOT USED.
- 122. LABELING
- 123. A CLASS 3 SYSTEM OF ADMINISTRATION AS PER ANSI/TIA/EIA 606 STANDARDS SHALL BE UTILIZED.

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132. COMMISSIONING

SYSTEMS.

143. PROVIDE AND INSTALL SHIELDED CABLES WHERE REQUIRED AND OR RECOMMENDED BY THE MANUFACTURER OF THE ELECTRONIC SAFETY AND SECURITY SYSTEMS.

144. ALL WIRING SHALL BE OF PROPER GAUGE, TYPE AND QUANTITY OF CONDUCTORS AS REQUIRED AND AS RECOMMENDED BY THE MANUFACTURER TO ENSURE PROPER OPERATION OF ELECTRONIC SAFETY AND SECURITY SYSTEMS AND PERIPHERAL DEVICES.

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 REPRESENTATIVE PRIOR TO INSTALLATION.

145. MAKE ANY NECESSARY CHANGES OR ADDITIONS TO ROUTING OF CABLES,

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 COMMISSIONED.

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:

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

141. CONDUCTORS AND CABLES SHALL BE CMR WHERE INSTALLED COMPLETELY 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.

146. ALL CONDUCTORS AND CABLES SHALL BE CSA APPROVED AND SHALL BE STAMPED ACCORDINGLY.

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.

149. CARD READER: MINIMUM 6 CONDUCTOR, AWG 22 SHIELDED CABLE. 150. ELECTRIC STRIKES, MAGLOCKS: MINIMUM 4 CONDUCTOR, AWG 18 CABLE. 151. VIDEO SURVEILLANCE CAMERAS: 4 PAIR CATEGORY 6 CABLE

152. INTERCOM AND MASER INTERCOMS: 4 PAIR CATEGORY 6 CABLE

MUNICIPALITY OF CASSELMAN

PROJECT NORTH ISSUED FOR REVISED 99% REVIEW 2025-02-19 **ISSUED FOR 99% COORDINATION** 2023-06-13 ISSUED FOR 66% COORDINATION 2023-05-12 ISSUE DATE 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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PROJECT

1 INDUSTRIEL STREET OFFICE FIT-UP

DRAWING

COMMUNICATIONS AND SECURITY SPECIFICATIONS

PROJECT No:	MRK-23002008-A0	REVISION:
DRAWN:	KL	DATE: MAY 2023
APPROVED:	DL	SCALE: AS SHOWN
DRAWING No:		- 40

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 BE INTEGRATED WITH THE EXISTING ACCESS CONTROL SYSTEM.

156. THE SYSTEM SHALL HAVE OF THE FOLLOWING FUNCTIONS:

- 157. REGULATE AND MONITOR ACCESS AT SYSTEM CONTROLLED DOORS. 158. MONITOR CONNECTED DETECTORS (SUPERVISED AND AUXILIARY INPUTS) WITH THE ABILITY TO MANUALLY OR AUTOMATICALLY ARM AND DISARM THEM.
- 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 THFM
- 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 CONTROLLER ENCLOSURES SHALL BE A SINGLE KEY LOCKING METAL BOX. 9. NEATLY ROUTE CABLES PARALLEL OR PERPENDICULAR TO BUILDING LINES. 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 MOUSE.
- 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. ELECTRICAL CONTRACTOR TO ENSURE THAT ALL CONDUITS AND BACK BOXES ARE INSTALLED IN THE OPTIMAL LOCATIONS.
- 2. COORDINATE THE EXACT MOUNT LOCATION OF ALL EQUIPMENT WITH THE
- 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.
- 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
- BENDS. 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.

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