

						ı																			Symb	aire Sched ol	Qty	L	_abel	Description
																											1 8		A 3	ALK-LS24-XX-WP2-LS24-W
0.	0 0.0	0.0	0.0	0.0	0.0 0.0	0. 0 0 .	0 0.0	0.0	0.0 0	.0 0.0	0.0 0	.0 0.0	0.0 0	.0 0.0	0.0	0.0 0.0	0 0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0	0.0 0.	0	<u> </u>	•	3	A	AA	ALK-LS24-XX-
♦.	0 0.0	•.0	•.0	0.0	•0.0 • 0.0	O OEXISTON	© • 0.0 _K	•.0	_ PAVEME	ENT COMPO	SITION OF TH	HE DT .		.ο † .ο		0.0 0.0	0 0.0	6.0 6.0	0.0	0. 0 0. 0	0.0	0.0	6. 0 6.	0		-	16 7		C Ξ	IFS-LS1-Q/40K WPV-LS1-W-4
♦.	0 0.0	• . 0	• . 0	• 0.0	6 .0 6 .0	· • •	0 0.0	•.0	6.6RANGL	AR "B",150 BINDER COL	urse aspah.	AB "AB.O				0.1 0.1	1 0.0	† †	o • • • • • • • • • • • • • • • • • • •	6. 0 6. 0	• .0	•0.0	t t .	0 0.0			1		X XX	ALK-LS14-XX-ALK-ALK-ALK-ALK-ALK-ALK-ALK-ALK-ALK-ALK
♦.	0 0.0	• 0.0	•.0	• 0.0	6 .0	 	1 0.1	† 0.1	/		OURSE ASPH		• •	.1 0.1	[†] 0.1	†1	1 0.1	to.1 to.0	o t o.o	6 .0 6 .0	•0.0	•0.0	6 .0 6 .	0 0.0	t. 0 t. 0	.	0.0			ation Summary
•		• .	•	• .	±	<u>+</u> + +	- t	• .	• • •	. • .	• . •	. t.	t t.	. + .	±	t . t .	. +.	± . ± .	. +	t. • .	• .	• .	.	. • .	• . • .	• .	t . •		Label Gas C	anony
	I					0.1 0.1																							Parcel	A
∙0.	0 0.0	७.०	• . 0	0.0	ō.1 b.1	0,2	3 HYDRO3 TRANSFO	ORMER 1		.1 0.1	DRIVE CONCRE	IIIIVO WIINDO	0.2 [†] 0	.3 0.3	0.3	/ FENCE		to.1 to.1	1_2.5 <mark>M.1</mark> HIGH SOLID WOO	0.1 0.1	0.1	0.1	Ō.1 Ō.	1 0.1	to.1 to.0	0.0	b. o • b	.0 0.0	Parcel Proper	ty Line E
₺.	0 0.0	† 0.0	₹.0	to.1	to.1 to.1	0,3	4 0.5	† ./3	†.6 †	.6 0.2	//+	· · · · · · · · · · · · · · · · · · ·	[†] 0.5 [†] 0	.6 0.6	[†] 0.4	SCREEN 0.3 0.2	· † ·	0.2	SCREEN -	<u>0.1</u> 0.1	[†] 0.1	[†] 0.1	[†] 0.1 [†] 0.	1 0.1	†1 †1	† 0.1	b.o b	.0 .0	Proper	ty Line N ty Line W
• 0.	0 0.0	• .0	• . 0	0.1	to.1 to.2	to 3 to .	1.2 N HAND 6 0.9	DRAIL 0.6	2.3	\$(1.5) \$/4	¹ /(0:31 · · · · · · · · · · · · · · · · · · ·	19 2.6	1,4	.2 0.8	to.5	† † † · · · · · · · · · · · · · · · · ·	4 0.3	3 0.2	18		[†] 0.1	[†] 0.2	to.1 to.	1 0.1	† .1 † .1		1 0	.0 0.0	† .0	ty Line VV
				1		-				: 15				.9 1.1				\ \\\	*											.0
										1-STORE	DING-B1 Y BUILDING			GARBAG	GE						(0	08		8						
				A		7 1.		+		254.	ORTONS 14 SQM 54 SQFT.)		3	+FNCL.					MAGNETIC	0.3 0.3	0.4	0.4	0.4 0.	4 0.3	0.3 0.2	0.2	0.1 0	.1 0.1	0.0	2
Ů.	0 0.0	[†] 0.1	0.1	0.2	to.2 to.4	7 1.	8 73.3	MH:	15	(GR	OUP-E) E-87.20			5 MASNETIC F DIGITAL N BO	C 400P MENŮ OARD	5.9 0.9	9 1.0		7 0.5 ——DIGITAL MI		0.5	0.6	to. 7 to.	6 0.5	†o.4 †o.3	0.2	0.2 0	.1 0.1	t.o t	.0
♦.	0 0.0	0. 1	ð.1	0.2	to.3 to.4		2 2.2						⁺ 2	BOL 1.5LO	LARD— DADHNO S VY DUTY A	500 1.2	5	1.5 1.1	1 PRE-ISELL ——CONCRETE	_ OMENU ®N7 E ISLAND	[†] 0.8	Ď.9	ī.	9 0.7	to.5 to.4	[†] 0.3	0.2 0	.1 0.1	t .o t	.0
♦.	0 0.1	[†] 0.1	0.1	[†] 0.2	ф.з <mark>X</mark> ф. 5	5 0 7	1 4	+	to.7 to	S + 0.7	6 S ₀	.6 †.6							BOLLARDS 1.0											
.	0 0.1	[†] 0.1	† 0.2	t _{0.3}	V SIDE V	5 0 9 1.	2 34.3	1.1	1.2 1	.2 1.1	5. 1.0 t	8	05.7 t	.0 1.1	1. 2	1.4	3.1	1.0 2.9	9 1.3	†.2	<u> </u>	* _{2.2}	[†] 2.7 [†] 2.	1 [†] 1.4	1.0 [†] 0.6	† 0.4	d.2 to).1 [†] 0.1	* *	.0
					Щ					- + -			,		\\															i <mark>_</mark> 7
					Ž	1.0										// # / /k										7	0.3 0	1 0.1	0.0 0	.0
† 0.	1 0.1	0.1	0.2	to.3	t.6 t.8	1.2 1.	_PYLON	[†] 3.0	[†] 3.5 [†] 3	.6 3.0	[†] 2.2 [†] 1	.7 1.2	1.0 1	.0 1.0	1.3	1.6	4 8.7	5.2 3.9	1.9	1.8 2.1	3.2	5.5	[†] 7.5 4.	AR N	<u>E-F-</u>	0.5	0.3 to	0.1 [†] 0.1		2.0
Ō.	1 0.1	0.1	0.2	ō.4	to.6 1.0	1.4 2.	SIGN 2 3.4	5.0	6.6	.8 5.2	3.5 2	2.3 1.5	1.107	.0 1.1 PANJED	1.3	1.7 2.	3 3.3	4.0 3.3	3 1.9	1.8 2.2	3.1	6.4	9,XX = 5.	7 2.5	1.4 0.8	<u></u>	b.2 to	ADJAC 1PROPE INSTITU	RTYO O	
† 0.	1 0.1	७.1	0.2	[†] 0.4	t.7 t.2	2 1.8 2.	8 4.6	8.2	12.3 12	2.6 8.7	4.9 3	2.0	1.4		1.3	1.7 2.3	3 3.0	*	2 2.4	[†] 2.2 [†] 2.5	[†] 3.4	[†] 5.5	MH: † . 2	25 8 ² .6	1.5 ō.9	CARTAGE ENCL	b.3 t	.2 [†] 0.1		i Illur
⁺₀.	1 0.1	[†] 0.1	[†] 0.2	[†] 0.4	to.7 to.1	1.7 2.	6 4.2	 † . 4	10.7 M il	A d.:9 2-58	4.5 2	2.7 1.8	1.3 1	.1 1 (11)	4 CLE	RANCE 2.4	4 3.2	- 3.9 - 4.0	3.0	[†] 2.5 [†] 2.4	⁺ 2.8	⁺ 3.8	4.4 3.	LOADING SP 4 hfall 1011	ACE TY1.3 0.8	4.640.NL_	0.3 t	.2 †0.1	t t	.0
						1.4 2.			<u> </u>	+ -	+2 1 +2	+	+	+1 1	BAIN				B [†] 4.2					ASPHALT		لها لها).2 [†] 0.1		
					/			4.3	5.5 5	.0 4.3	3.1 2	. 2 1.5	1.1 1	.0 1.1	1.4								7							
						1.2 1.																				// /\	V			
to.	1 0.1	[†] 0.1	0.2	to.3	to.5 to.7	1.0 1.	3 1.6	1.9	[†] 2.0 [†] 2	.0 1.8	RIGHT OF	W AY 1.0	to.9 to	.9 1.0	1.4	Ž.1 Ž.3	3 5.9	13. MA	7.1	4.0 2.6	2.0	1.6 PATIO	1.5	МН	1.4	to.9	ō.3 † ō	0.2 0.1	6. 0 6	0.0
						1.0 1.																	1.3			+ 4	to.4 to	0.2 0.1	t t	.0
† 0.	1 0.1	[†] 0.1	[†] 0/. 2	to.2	to.3 to.6	5 1.0 1.	4 1.5	1.5	1.4	. 3 1.2	1.0 0	.9 [†] 0.8	†o.8 †o	.9 1.0	1.3	i.8 i.7	7 4.3	7.2 7.9	9 5.0	**************************************	1.7	3,	†	BUILDING-E - STOREY RESTAURA	R J	15	to.3	0.1 0.1	t t	1.0
[†] 0.	1 0.1	[†] 0.1	* 0.2	to.2	.d to.€	1.3 1.	9 2.0	1.8	1.6 1	.4 1.3	1.1 1	.1 1.0	1.0 1	.0 1.1	1.3	†6 †22	2 [†] 3.1	4.2 4.5	3.4	+ HYDRANT + 2.4	1.6	1.6		2105.95 SQ 95.64 SQN	, I	÷.2	b.2 b	0.1 0.1	t .o t	0.0
	1 0.1																											0.1 0.0		i I
						1.8												/ [] / /	/ ^ //		1.0	2.1	2.5							i
	1 0.1	<u>Q</u>		I		3.0	23 2000000 2222220 0000000000														1.8	2 9	[3.9 []		Ō . 1		o.o	0.0 0.0	0. 0 0	1.0
† 0.	1 0.1	0.1	₫.2	0.3	ō.6 1.2	4.6	6.5		A 7 1								စ္				,			15	† . 2	b .1	b.1	0.0 0.0	0.0	.0
♦.	0 6.0	७.0	0. 2	[†] 0.3	to.6 to.3	5.1	3 7.6	12.7									9 1 C F	1.5 1.4	4 1.3	1.2 1.3	1.6	[†] 2.2	2.7		†o . 9	1 . 5	to.2 to	0.0 0.0	t .o t	0.0
to.	1 0.1	AD	७.2	to.3	ō.5 g 1.1	4.0	10000000000000000000000000000000000000	12.0	II II II II II II II I	25.3 25	258011	LABIOLON	GA225.4	24.6 21	3 2.0	4.0 1.9	9 1.5	1.5 1.5	5 1.3	i.2 i.3	1.5	1.9	[†] 2.0	- STOREY RESTAURA 1813.93 SC	NT2 ‡	1.3	to.3 to	0.1 0.0	6. 0 †	.0
• 0.	0 0.1	S. O.	t .2	to.2	DENIII	+ 2.4 00000000000000000000000000000000000	2 2222 2 22222 2 22222 2 22222 2 22222 2	⁺ 6.5	MH: 1	114H :7 511 1.2	MH.:751MH 1 11.4 1:	1.751MH: 1.3 [†] 11.3	751MH:75 11.2 1	51 /4H.: 751M 0.8 ⁵ .4	4H.:7514 6.0	4.75 2.9 1.9	9 1.7	1.9 7.0	2 1.6	i.4 i.4	1.6	[†] 2.1	г	68.52 SQN	,	MH.: 15		ADJACEN PROPERT	NT	
					M Q	1.5	2000000000 2000000000																\supset		t ₀	<u></u>		COMMER 0.0 5 .0		
		X			ME													7/					4							
ð.	0 6.0	300	0.1	0.2	0.2 0.4	1.1 1		ir/vaccu		.9 1.9	1.8 1	.5 1.5	1.7 1	.7 1.7	1.7	1.8 2.1	1 2.9	3.9 4.3	3.3	2.3 1.9	2.0	3.1	4.₽ MH:	15	Ö . 1	0.1	b. 0 b	0.0 0.0	ð.o ð	.0
• 0.	0 0.0	<u></u>		0.1	0.2 0.4	0.9	4 . 7	1.8	1.4 1	.5 1.5	1.2 1	1.0	1.2 1	.3 1.3	1.4	1.8 2.5	5 4.0	† 6.8 † 7.4	4 4.8	[†] 2.9 [†] 2.1	1.8	2.5	[†] 3. [‡]	- STOREY	†o . 1	0.1	b.p b	0.0 0.0	0.0	.0
♦.	0 6.0	•.0	0.1	0.1	0.2 0.4	D .7 1.	2 1.7	7 2.1	1.57 2	· 2.1	1.4 1	1 0.9	1.3		EV1 EV	1 .9 3 .0	0 5.4	10.4 11.	.6 6.4	[†] 3.5 [†] 2.2	1.7	1.6v	1.6	RESTAURA 1814.36 SC	(FT.)	† . 1	ō. <mark>1 </mark>	0.0	5. 0 5	.0
♦.	0 0.0	• . 0	0.1	0.1	to.2 to.3	3- 0.6 1.	1 2.0	3. 3	†2.0 [†] 3	.2 /3.4	ż.4 [†] 1	.3 0.8	1.9	当 1 3 m	1.4	<u>1.</u> 9 3.1	1 5.7	11.3 AA	8 6.8 25	[†] 3.6 [†] 2.2	116	1 3	† .0	68.56 SQN		0.4	b 1 b	0.0 0.0	t t	0.0
• 0.	0 0.0	— • 0.0	0.1	-t _{0.1}	0.1 0.3	0.5 1.	0 12.2	3.7		B		•	3.0 +2	.3 1.4	\$0D				5.5								0 2 0	0.0 0.0	† †	0.0
•	0 0	† n n	• 0	t _{0 1}	to 1 to 3	0.4 0.	9 7 0	† ₃ •	ын• 15	1- ST					AREA				4 3.7		?			6 1 4	"					
							\ ₊			185.89 (2000)	5 SQM SQFT.)		(28)	ENCL 26.66Q M 6.96SQ.FT.)			T			\			· =	MH•				0.0	0.0	
	0 6.0				0.1 0.2	2	6 1.2	1.8		FFE-	OUP-E) -87.20		2.8 2	.1 1.2	ñ	4	6 2.3	N CA C	SOD.4 AREA		1.9	10.7	to . 6 1.	1.2	0.5	0.3	0.1 b	.0 0.0	ð.o ð	.0
• 0.	0 0.0	७.0	0.0	0.0		ō.2 ō.	4 0.7	0.1	†.1 [†] 2		³ 2.9 1 MH: 15	.5 0.7	1.6 1	.4 \$16N	9	1.0	2 1.5	1.9 2.0	1.5	1.2 0.9	0.7	0.5	ō.4 ō.	4 0.3	0.2 0.2	† 0.1 ·	.1 0	0.0 0.0	0.0 C	.0
♦.	0 0.0	• 0.0	0.0	0.0	b.1 b.:	. to.3 to.	5 [†] 0.7	† .5	[†] 0.8 [†] 1	.6 2.1		.0 0.7		.0 0.8	- † . 7	t.// t.9	9 1.0	1.2	3 1.0	ō.9 ō.7	† 0.5	0.4	to.3 to.	2 0.1	ō.1 ō.1	0.1	•.o •	.0 6.0	6. 0 f	.0
♦.	0 0.0		*	5 .0	to.1 to.1	. to.2 to.	4 0.5	0.4	†o.4 †o	.6 [†] 0.8	to.7 to	.5 0.4		.7 0.6	ō.6	0.5 to.6	6 0.7	t.8 \\ t.8	†.7	to.6 to.5	. d	0.3	to.2 to.	1 0.1	[†] 0.1 † 0.0	•0.0	0.0 t	0.0 0.0	t .o t	.0
.	DAY TRI	LIGHT ANGLE	† 0.0	1 0.0	to.1 to.1	- - - -	<u></u>	† 0.2	† 0.2 †	.3 0.3	†.3 †	.3 0.2	†o.4 †o	.4 0.4	0.4	†o.4 †o.4	4 0.4	to.5 to.5	† . 4	† 0.4 † 0.3	0.3	0.2	†o.2 †o.	1 0.1	†.1 † 0	•.0	b.o •		† 0.0 †	0.0
				•	0.0 to 1	† . 1 † . j	1 1 1	† _{0 1}	† ₀ 1 † ₀	.1	† 2 †	1.1 [†] \ 1	† 2 †	.2 h 3	⁺ 0 з	to_3 to_3	3 [†] 1 3	t	3XISTIĀG3	0.2\ FR.9	POSÉD ?	* 1	0.1	1 1	0.0 0.0	h n	0.0	<u> </u>	† n •	0
	1				EXISTING											,F,FT:		\UTII	LITY POLE (TO BE	Loc	ew Ation——		t	1 0.1	• •		∪ L	. •	• •	
Ō.	0 5.0	0.0 	0.0	0.0	U.O 阿 介	IJRANJŢ1 Ō. 	1 0.1	0.1	0.1 0	.1 0.1	†o.1 †o	0.1		.1 0.2	— · · · ·	∪-2 lo.2	2 0. L _/	\) 2 57.5	LOCATED)	U.2 Ö.A.	OLE 0.1	0.1	0.1 0.	о.б т	0.0 b .0	0.0	v.o v	0.0 0.0	o.o t	0.0
			<u> </u>																											

Luminaire Sched	ule						
Symbol	Qty	Label	Description	Lum. Lumens	Lum. Watts	LLF	Filename
	1	Α	ALK-LS24-XX-40K	19210	112.1	0.900	ALK-LS24-XX-40K.IES
+	8	В	WP2-LS24-W_40K	4822	59	0.900	WP2-LS24-W-40K.IES
	3	AA	ALK-LS24-XX-40K	19210	112.1	0.900	ALK-LS24-XX-40K.IES
→	16	С	IFS-LS1-Q/40K-BZ	5878	141	0.900	IFS-LS1-Q/40K-BZ.ies
	7	E	WPV-LS1-W-40K-BR-65571	1286	12.11	0.900	WPV-LS1-W-40K-BR-65571.ies
	1	X	ALK-LS14-XX-40K	12710	74.1	0.900	ALK-LS14-XX-40K.IES
←	1	XX	ALK-LS14-XX-40K	12710	74.1	0.900	ALK-LS14-XX-40K.IES

	Calculation Summary							
	Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
	Gas Canopy	Illuminance	Fc	23.70	27.1	18.6	1.27	1.46
	Parcel A	Illuminance	Fc	2.91	14.1	0.6	4.85	23.50
0	Parcel B	Illuminance	Fc	2.33	13.5	0.4	5.83	33.75
	Property Line E	Illuminance	Fc	0.1	0.2	0.0	0.1	0.2
0	Property Line N	Illuminance	Fc	0.1	0.2	0.0	0.1	7.00
	Property Line W	Illuminance	Fc	0.57	4.5	0.0	N.A.	N.A.

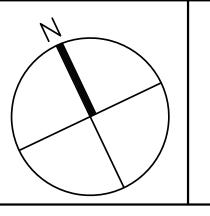
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CHECK AND VERIFY EVERYTHING AND REPORT ALL ERRORS AND
OMMISSONS TO THE ENGINEER

5	02/17/21	FOR TENDER	M.S.B.
4	12/16/20	REVISED FOR SPA COMMENTS	M.S.B.
3	11/10/20	REVISED FOR SPA COMMENTS	M.S.B.
2	06/19/20	REVISED FOR SPA	M.S.B.
1	10/21/19	ISSUED FOR PERMIT	M.S.B.
NO.	DATE	DESCRIPTION	BY

MARK VOID ALL PRINTS DATED PREVIOUS TO FINAL DATE ABOVE

REVISIONS

Road King 432 J, ON PROJECT ADDRESS: 4.28 & 4. Cobourg, Ne≪



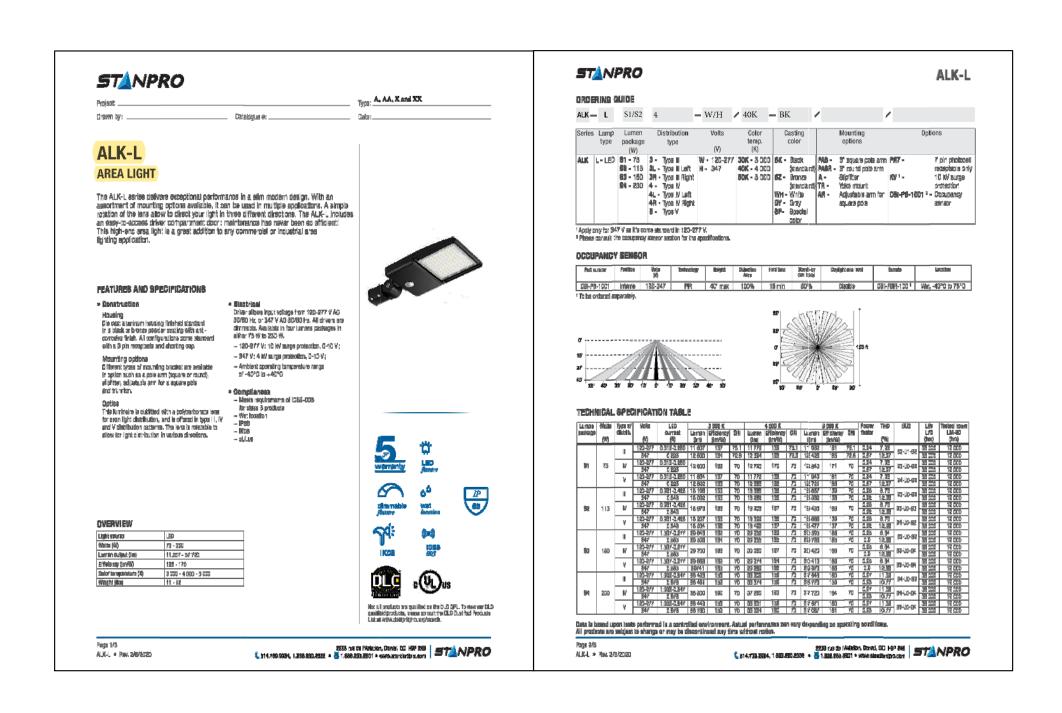


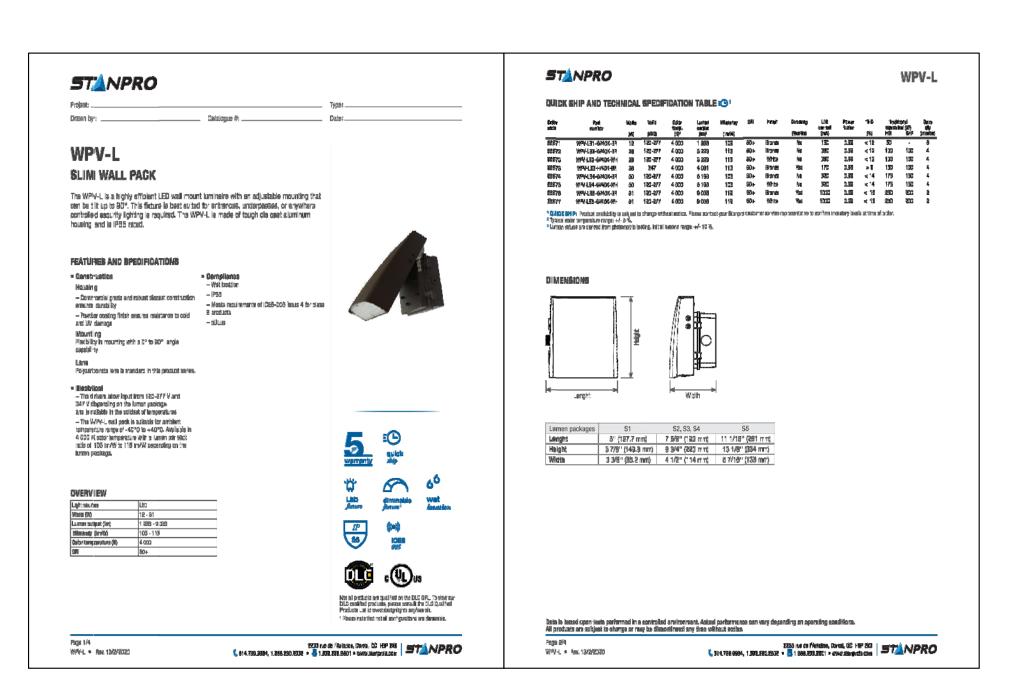
PROJECT TITLE:

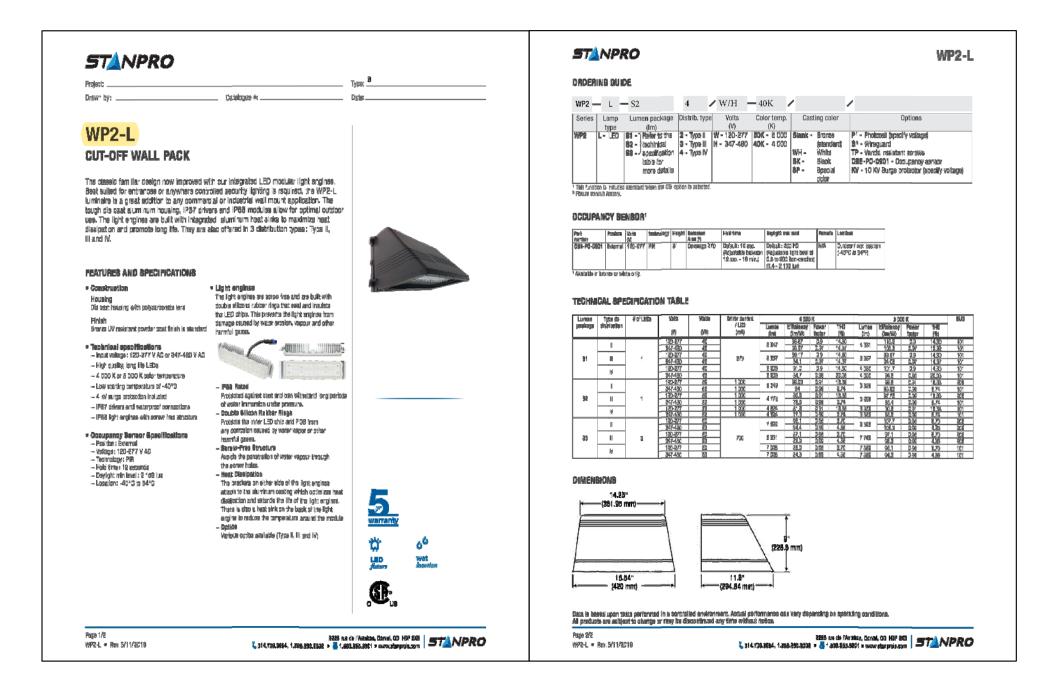
ELECTRICAL LIGHTING CAL

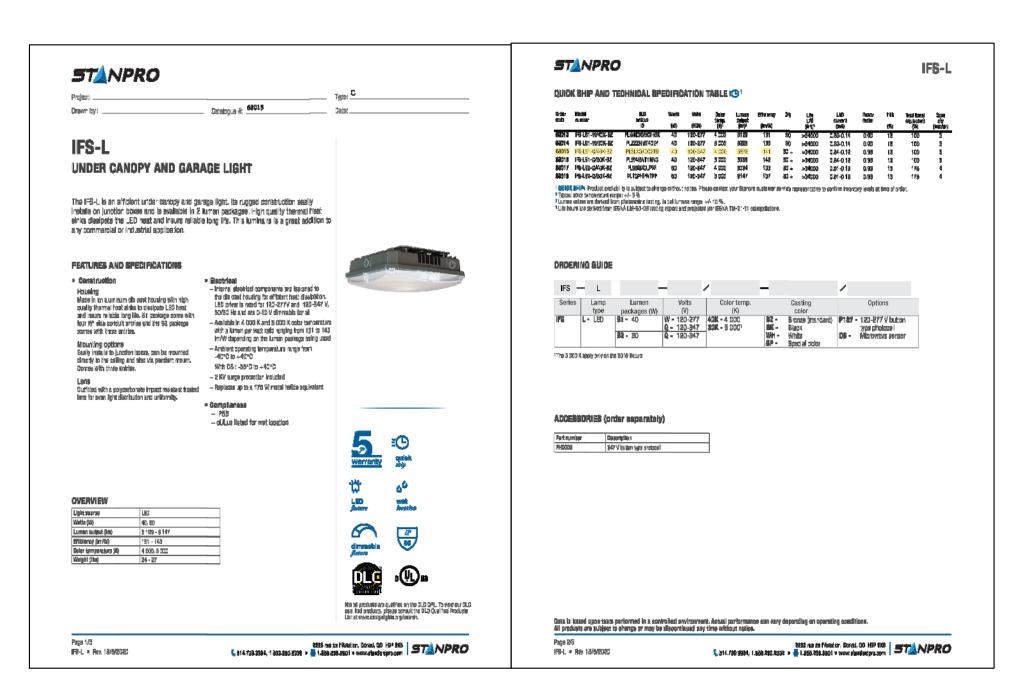
- 1		
	DESIGN: M.S.B.	PROJECT NUMBER: 1914
	DRAWN BY: T.S.	scale: NTS
	CHECKED BY: M.S.B.	DRAWING NUMBER: $F-2$
	November, 2020	

Symbol	Qty	Label	Description	Lum. Lumens	Lum. Watts	LLF	Filename
	1	Α	ALK-LS24-XX-40K	19210	112.1	0.900	ALK-LS24-XX-40K.IES
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	3	AA	ALK-LS24-XX-40K	19210	112.1	0.900	ALK-LS24-XX-40K.IES
->	16	С	IFS-LS1-Q/40K-BZ	5878	141	0.900	IFS-LS1-Q/40K-BZ.ies
	7	E	WPV-LS1-W-40K-BR-65571	1286	12.11	0.900	WPV-LS1-W-40K-BR-65571.ies
	1	X	ALK-LS14-XX-40K	12710	74.1	0.900	ALK-LS14-XX-40K.IES
	1	XX	ALK-LS14-XX-40K	12710	74.1	0.900	ALK-LS14-XX-40K.IES









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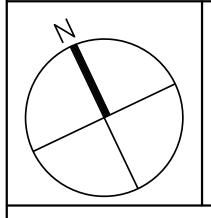
5	02/17/21	FOR TENDER	M.S.B.
4	12/16/20	REVISED FOR SPA COMMENTS	M.S.B.
3	11/10/20	REVISED FOR SPA COMMENTS	M.S.B.
2	06/19/20	REVISED FOR SPA	M.S.B.
1	10/21/19	ISSUED FOR PERMIT	M.S.B.
NO.	DATE	DESCRIPTION	BY

MARK VOID ALL PRINTS DATED PREVIOUS TO FINAL DATE ABOVE

REVISIONS

CLIENT:

PROJECT ADDRESS: 428 & 432 King Road Cobourg, ON



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23-6033 Shawson Dr., Mississauga, ON L5T 1H8 Tel: 647 297 7668 | msbharaj@gmail.com

PROJECT TITLE:

ELECTRICAL
LIGHTING SPECIFICATION

DESIGN: M.S.B.	PROJECT NUMBER: 1914
DRAWN BY: T.S.	scale: NTS
CHECKED BY: M.S.B.	DRAWING NUMBER:
November, 2020	

GENERAL SCOPE OF WORK FURNISH ALL LABOUR, MATERIALS, EQUIPMENT, TOOLS AND SUPPORTS AS WELL AS SUPERVISION TO PROVIDE A COMPLETE INSTALLATION, TESTED AND IN WORKING ORDER, AS SHOWN ON THE THE CONTRACTOR SHALL PERFORM THE WORK STIPULATED IN THE CONTRACT AND ANY OR ALL CONTRACT CHANGES AND CHANGE DIRECTIVES, AND SHALL FURNISH, UNLESS OTHERWISE PROVIDED IN THE CONTRACT, EVERYTHING NECESSARY FOR THE PROPER PERFORMANCE AND

ALL WORK SHALL BE FULLY TESTED, COMMISSIONED AND IN GOOD WORKING ORDER AT TIME OF HAND-OVER TO OWNER. 1.4. MAKE GOOD ANY DAMAGES TO EXISTING EQUIPMENT AND/OR SYSTEM(S). COORDINATE WORK AND WORKING HOURS WITH THE OWNER AND OTHER TRADES TO MINIMIZE DISRUPTION.

2.1. ALL WORK SHALL CONFORM TO THE MOST RECENT ISSUES OF:
2.1.1. THE ONTARIO BUILDING CODE
2.1.2. THE ONTARIO ELECTRICAL SAFETY CODE

THE MINISTRY OF THE ENVIRONMENT
THE NATIONAL ELECTRICAL CODE BYLAWS AND REGULATIONS ISSUED BY THE BUILDING AUTHORITY HAVING JURISDICTION ASHRAE ASME SMACNA

NFPA . TSSA

. COORDINATE AND PAY FOR ALL TSSA INSPECTIONS.

COMPLY WITH THE GENERAL SECTIONS AND APPLICABLE SECTIONS OF THE GENERAL CONTRACT

5.1. WARRANT ALL LABOUR AND MATERIALS INCLUDED IN THIS CONTRACT FOR A PERIOD OF TWO YEARS FROM DATE OF FINAL ACCEPTANCE. ASSUME FULL RESPONSIBILITY FOR LAYOUT OF ALL WORK AND FOR ANY DAMAGE CAUSED TO OWNER OR OTHERS BY IMPROPER CARRYING OUT O

6.1. DRAWINGS SHOW GENERAL INTENT OF THE WORK AND PROPOSED ROUTING ONLY.
6.2. DO NOT SCALE DRAWINGS. CONTRACTOR SHALL CONFIRM ALL DIMENSIONS BY FIELD MEASURE BEFORE PROCEEDING WITH THE WORK.

CONTRACTOR SHALL BE RESPONSIBLE FOR IDENTIFYING POSSIBLE INTERFERENCES AND EXAMINE SITE CONDITIONS TO ENSURE THAT WORK CAN BE SATISFACTORILY CARRIED OUT AS

SHOWN. IF SITE EXAMINATION REVEALS ANY DIFFICULTIES THAT WILL PREVENT THE WORK FROM BEING CARRIED OUT AS DESIGNED THESE MUST BE INDICATED IN THE TENDER PRICE, AND BROUGHT TO THE ATTENTION OF THE ENGINEER.
THE CONTRACTOR SHALL INFORM THE ENGINEER IN WRITING OF ANY ADDITIONAL DIFFICULTIES,
INTERFERENCES AND SITE CONSTRAINTS THAT MAY BE IDENTIFIED DURING THE CONSTRUCTION

7.3. ALL NOISY WORK SHALL BE PERFORMED AFTER NORMAL BUSINESS HOURS: BETWEEN 6PM AND 7AM. MONDAY THROUGH FRIDAY: AND ON WEEKENDS. FRIDAY 6PM THROUGH MONDAY 7AM 7.4. COORDINATE SITE ACCESS AND DELIVERIES WITH LANDLORD AND/OR GENERAL CONTRACTOR.

CLEAN PREMISES DAILY AT THE END OF EACH WORK DAY. 8.2. DO NOT ACCUMULATE EQUIPMENT, TOOLS, DEBRIS AND WASTE MATERIALS ON SITE. REMOVE 8.3. COMPLETELY REMOVE ALL DEBRIS AND RUBBISH FROM SPACE ONCE WORK IS COMPLETE.
8.4. ALL MATERIALS TO BE DISPOSED OF CONSTRUCTION SITE IN ACCORDANCE WITH ALL APPLICABLE

9.1. USE ONLY NEW CSA AND ULC CERTIFIED EQUIPMENT AND MATERIALS UNLESS OTHERWISE INDICATED. 9.2. ONLY FIRST CLASS WORKMANSHIP WILL BE ACCEPTED WITH RESPECT TO STANDARD PRACTICES, SAFETY, ACCESSIBILITY, DURABILITY AND NEATNESS OF INSTALLATION WORK.

10.1. SUBMIT 4 COPIES OF SHOP DRAWINGS, UNLESS OTHERWISE INDICATED, FOR ENGINEER'S REVIEW. 10.2. SUBMIT SHOP DRAWINGS AND PRODUCT DATA FOR ENGINEER'S REVIEW COVERING ALL RELEVANT

DETAILS. DIMENSIONS AND PERFORMANCE. 10.3. SHOP DRAWINGS MUST BE REVIVED, STAMPED AND SIGNED BY THE CONTRACTOR AND THE GENERAL CONTRACTOR PRIOR TO SUBMITTING TO CONSULTANT / ENGINEER FOR REVIEW.

11. CUTTING, PATCHING AND PAINTING REQUIREMENTS
11.1. PROVIDE CUTTING, PATCHING AND PAINTING FOR ALL OPENINGS. USE QUALIFIED TRADES FOR 11.2. SUPPLY AND INSTALL APPROVED FIRESTOPS AS REQUIRED TO MAINTAIN FIRE RATING. 11.3. PIPING AND VENTS THROUGH WALL AND ROOF SHALL BE BY THE MECHANICAL DIVISION

12.1. FOR ALL CORING LESS THEN 3" DIA. CONTRACTOR SHALL BE RESPONSIBLE FOR SCANNING AREA PRIOR TO CORING THROUGH FLOORS/CEILINGS. 12.2. FOR ALL CORING GREATER THEN 3" DIA. CONTRACTOR SHALL BE RESPONSIBLE FOR X-RAYING AREA PRIOR TO CORING THROUGH FLOORS/CEILINGS.

13.1. PROVIDE ACCESS PANELS FOR INSTALLATION BY THE GENERAL CONTRACTOR AND ALL SUB-TRADES WHERE REQUIRED FOR SERVICE OF CONCEALED EQUIPMENT INSTALLED BY THIS

13.2. PROVIDE 12"x12" (300x300mm) ACCESS PANEL TO ACCESS ANY CONCEALED VALVE AND FETTLING AND 24"x24" (600x600mm) TO ACCESS DUCT BALANCING BALANCING DAMPERS, SMOKE/FIRE DAMPERS ETC.

13.3. PROVIDE FIRE RATED ACCESS PANEL WHERE REQUIRED. RATING TO MATCH WALL OR CEILING.

14. PENETRATIONS THROUGH FLOORS AND WALLS
14.1. UNLESS OTHERWISE SPECIFIED ON DRAWINGS, GLASS FIBRE FIRE RETARDANT INSULATION AND FIRESTOP CAULKING SHALL BE PACKED AROUND PIPE OPENINGS IN FLOORS AND WALLS AT TIME OF PIPE INSTALLATION. FIRESTOP CAULKING SHALL BE "3M FIRE BARRIER" FIRETEMP

14.2. APPLY FIRESTOP SYSTEMS IN ACCORDANCE WITH 3M'S INSTRUCTIONS. ALL SYSTEMS SHALL MEET CSA F-SYSTEM RATINGS FOR THE PARTICULAR FIRE RATING OF THE PENETRATED SURFACE. 14.3. FIRESTOPPING CONTRACTOR MUST BE A LICENSED 3M CERTIFIED INSTALLER (REFER TO LIST IN 14.4. MATERIALS SHALL BE ASBESTOS-FREE ELASTOMERIC MATERIALS, TESTED, LISTED AND LABELED BY ULC IN ACCORDANCE WITH CAN 4-S115-M85. AND CAN/ULC-S101-M FOR INSTALLATION IN ULC DESIGNATED FIRE STOPPING AND SMOKE SEAL SYSTEMS, TO PROVIDE A POSITIVE FIRE,

WATER AND SMOKE SEAL AND A FIRE RESISTANCE RATING (FLAME, HOSE STREAM AND TEMPERATURE) NOT LESS THAN THE FIRE RATING FOR SURROUNDING CONSTRUCTION. MATERIALS SHALL BE COMPATIBLE WITH ABUTTING DISSIMILAR MATERIALS AND FINISHES. 14.5. PROVIDE PIPE SLEEVES FOR ALL PIPING PENETRATION THROUGH FLOOR, WALL AND SLAB. PIPE SLEEVE SHALL BE ONE SIZE LARGER THAN PIPE SIZE (MINIMUM).

15. DIELECTRIC ISOLATION
15.1. PROVIDE ISOLATION WHEN USING DISSIMILAR MATERIALS, TO PREVENT GALVANIC ACTION.

16. VIBRATION ISOLATION 16.1. PROVIDE AND INSTALL MINIMUM 3/4" THICK MSN ELASTOMERIC PADS W/MOUNTS UNDER FLOOR MOUNTED HVAC EQUIPMENT AS PER MANUFACTURER RECOMMENDATIONS

17.1. ALL LOW VOLTAGE CONTROL WIRING (<50V) SHALL BE BY THIS DIVISION, TO ELECTRICAL

18.1. ALL PIPING SYSTEMS SHALL BE PRESSURE TESTED TO 860 kPa OR 1.5 TIMES SYSTEM OPERATING PRESSURE FOR A DURATION OF 24 HRS UNLESS OTHERWISE INDICATE

19.1. MAINTAIN A RECORD OF ALL REVISIONS. PREPARE RECORD DRAWINGS IN A NEAT MANNER SHOWING ALL DEVIATIONS IN WORK. ON COMPLETION OF WORK, SUBMIT TO THE ENGINEER ONE HARD COPY OF AS BUILT DRAWINGS AND ELECTRONIC FORMAT DRAWINGS (IN AUTOCAD). 19.2. AUTOCAD FILES WILL BE PROVIDED BY THE ENGINEER AT A COST OF \$50 FOR THE FIRST DRAWING. AND \$25 EACH FOR ALL OTHER DRAWINGS.

20. OPERATION AND MAINTENANCE MANUALS 20.1. SUBMIT FOUR (4) COPIES OF O&M MANUALS TO ENGINEER FOR REVIEW. ALSO INCLUDE 1 COPY IN PDF FORMAT. MANUALS SHALL INCLUDE AS BUILT DRAWINGS (CAD AND PDF FORMAT), APPROVED SHOP DRAWINGS OF ALL NEW EQUIPMENT, TEST AND BALANCING REPORTS, COMMISSIONING REPORTS, WARRANTIES, TRAINING RECORDS, AND OPERATION & MAINTENANCE

21. TESTING, ADJUSTING AND BALANCING (T.A.B.) 21.1. INCLUDE REPORT IN THE OPERATION AND MAINTENANCE MANUALS
21.2. NOTIFY ENGINEER OF ANY DISCREPANCIES GREATER THAN ±5% OF DESIGN VALUES PRIOR OF

22. REMOVE ALL ABANDONED PIPES, HANGERS, INSERTS, CONDUITS, DUCTS AND SERVICES. FIRESTOP AND SEAL ALL AFFECTED AREAS. 23. SEAL AND FIRESTOP ALL WALL, FLOOR AND ROOF PENETRATIONS THROUGH FIRE RATED

24. CONTRACTOR MUST ASSURE THAT REFRIGERANT PIPING CROSSING PASSAGEWAY SHALL NOT BE LESS

HAN 7.25 ft ABOVE THE FLOOR UNLESS THE PIPING IS LOCATED AGAINST THE CEILING OF SUCH SPACE AND PERMITTED BY THE AUTHORITY HAVING JURISDICTION.

25. DUCT FLEXIBLE CONNECTIONS MUST BE INSTALLED AT INLETS AND OUTLETS OF SUPPLY AND

26. CO-CORDINATE ALL DIMENSIONS WITH EQUIPMENT SHOP DRAWINGS.

27. THOROUGHLY INSPECT EXISTING STRUCTURE AND CHECK SITE CONDITIONS WITH CONDITION SHOWN ON CONTRACT DRAWINGS BEFORE PROCEEDING WITH WORK. MAKE ADJUSTMENTS TO WORK TO SUIT EXISTING CONDITION AND IN CONFORMANCE WITH DESIGN INTENT. REPORT ANY DISCREPANCIES TO THE ENGINEER.

9. WELDING SHALL BE UNDERTAKEN BY A COMPANY CERTIFIED BY CANADIAN WELDING BUREAU UNDER REQUIREMENTS OF DIVISION 1 OR DIVISION 2.1 OR W47.1. 30. MATERIALS AND WORK WHICH FAILS TO MEET SPECIFIED REQUIREMENTS WILL BE REJECTED BY THE ENGINEER WHENEVER FOUND AT ANY TIME PRIOR TO FINAL ACCEPTANCE AND REGARDLESS OF PREVIOUS INSPECTIONS. WHEN REJECTED, DEFECTIVE MATERIALS OR WORK SHALL BE PROMPTLY

REMOVED, REPLACED OR REPAIRED TO THE SATISFACTION OF THE ENGINEER AT NO EXPENSE TO

1.1. THE INSTRUCTIONS TO BIDDERS AND THE SUPPLEMENTARY GENERAL CONDITIONS, AS ISSUED SHALL FORM A PART OF THIS SPECIFICATION.

2.1. PROVIDE ALL MATERIALS, TOOLS, EQUIPMENT AND LABOUR SHOWN, NOTED, SPECIFIED OR REQUIRED TO COMPLETE THE WORK. THESE TOGETHER WITH ALL OTHER ITEMS REQUIRED FOR THE PROPER EXECUTION AND COMPLETION OF THE WORK AS IMPLIED AND INTENDED SHALL BE INCLUDED IN THE CONTRACT EXCEPT SUCH ITEMS AS MAY BE HEREINAFTER SPECIFICALLY EXCLUDED FROM THE

THE WORK SHALL GENERALLY CONSIST OF THE FOLLOWING: I. MAIN SERVICE AND DISTRIBUTION. PANELS AND BRANCH CIRCUIT WIRING. WIRING FOR AND CONNECTION OF MECHANICAL EQUIPMENT. PROVISIONS FOR BELL CANADA.

SUPPLY AND INSTALLATION OF LIGHTING FIXTURES AND LAMPS

MATERIALS WHICH ARE SPECIFIED.

DIMENSIONS ON THE JOB.

INSTALLATION AND CONNECTION OF ELECTRICAL HEATING.
SUPPLY AND INSTALLATION OF EMERGENCY LIGHTING SYSTEM.

3.1. ENTIRE WORK SHALL BE EXECUTED USING ONLY SPECIFIED MATERIAL AND APPARATUS, EXCEPT WHERE THE WORDS "OR APPROVED EQUAL" OCCUR.

MATERIALS ARE HEREIN SPECIFICALLY DESCRIBED AND NAMED FOR THE PURPOSE OF ESTABLISHING A STANDARD OF MATERIALS AND WORKMANSHIP TO WHICH THIS DIVISION SHALL ADHERE AND THE CONTRACT PRICE SUBMITTED SHALL BE BASED ON THE USE OF MATERIALS AND EQUIPMENT AS

SPECIFIED HEREIN. 3.3. WHERE THE WORDS "OR APPROVED EQUAL" OCCUR, THIS DIVISION MAY USE MATERIALS OTHER THAN THOSE SPECIFIED PROVIDING THAT THE ENGINEER APPROVED OF THE MAKE AND QUALITY OF THE SUBSTITUTE MATERIALS. IF THIS DIVISION WISHES TO QUOTE ON ALTERNATE MATERIALS AND EQUIPMENT, HE MUST INCLUDE

IN HIS TENDER THE NAME OF THE MANUFACTURER OR SUPPLIER, A COMPLETE DESCRIPTION OF THE SUBSTITUTE MATERIALS & ANY DIFFERENCE IN PRICE. ALTERNATE MATERIALS WILL NOT BE CONSIDERED OR APPROVED AFTER RECEIPT OF TENDERS. SAMPLES OF ALL MATERIALS SHALL BE PRESENTED UPON REQUEST BEFORE MATERIALS ARE ORDERED AND ALL APPROVED MATERIALS USED IN THE JOB SHALL BE IDENTICAL TO THE APPROVED 3.6. MATERIALS NOT SPECIFIED SHALL BE OF A HIGH STANDARD OF QUALITY AT LEAST EQUAL TO OTHER

4.1. DRAWINGS FOR ELECTRICAL WORK ARE IN PART DIAGRAMATIC, INTENDED TO CONVEY THE SCOPE OF WORK AND INDICATE GENERAL ARRANGEMENT OF EQUIPMENT AND CONDUITS, AND APPROXIMATE SIZES AND LOCATIONS OF EQUIPMENT AND OUTLETS. THIS DIVISION SHALL FOLLOW THESE DRAWINGS IN LAYING OUT HIS WORK, CONSULT GENERAL CONSTRUCTION DRAWINGS AFFECTING HIS WORK AND SHALL VERIFY SPACES IN WHICH HIS WORK WILL BE INSTALLED.

5.1. SHOP DRAWINGS SHALL BE SUBMITTED (6 COPIES) FOR ITEMS SUCH AS SWITCHBOARDS, PANEL, TRANSFORMERS, LIGHTING FIXTURES, AND EMERGENCY LIGHTING SYSTEMS.

WHERE JOB CONDITIONS REQUIRE REASONABLE CHANGES TO INDICATED LOCATIONS AND

ARRANGEMENT, THIS DIVISION SHALL MAKE SUCH CHANGES WITHOUT EXTRA COST TO THE OWNER.

DRAWINGS ARE IN GENERAL MADE TO SCALE BUT THIS DIVISION SHALL CHECK AND VERIFY ALL

6.1. MAINTAIN IN THE JOB SITE OFFICE, AN UP TO DATE SET OF DRAWINGS. THESE DRAWINGS SHALL BE MARKED CLEARLY & INDELIBLY IN RED, INDICATING DEVIATIONS FROM & REVISIONS TO ORIGINAL DESIGN OR INTENT. UPON COMPLETION OF CONSTRUCTION, SUBMIT TO THE CONSULTANT THIS SET 6.2. AFTER A REVIEW OF THE MARKED UP SET OF DRAWINGS IS COMPLETE, SUBMIT A SET OF AS-BUILT DRAWINGS TO THE CONSULTANT / LANDLORD FOR TRANSFER TO CADD FILES. INCLUDE FOR CONSULTANTS COST TO UPDATE DRAWINGS TO AS BUILT & PLOT. CONTRACTOR TO CARRY \$500.00

7.1. BEFORE TENDERING, THIS DIVISION SHALL EXAMINE THE CONDITIONS AT THE SITE, THE ARCHITECTURAL, MECHANICAL & STRUCTURAL DRAWINGS, & SHALL MAKE HIMSELF FAMILIAR WITH THE BUILDING CONSTRUCTION, ARCHITECTURAL FINISHES ETC., IN ORDER THAT HIS PRICE MAY INCLUDE EVERY THING NECESSARY FOR THE COMPLETE INSTALLATION OF THE WORK.
THIS DIVISION SHALL CONFER WITH THE OTHER DIVISIONS INSTALLING EQUIPMENT WHICH MAY AFFECT HIS WORK, AND HE SHALL ARRANGE HIS EQUIPMENT IN PROPER RELATION WITH THE OTHER APPARATUS, THE BUILDING CONSTRUCTION AND WITH THE ARCHITECTURAL FINISH. SPECIAL CAR SHALL BE TAKEN IN THE INSTALLATION OF ALL EQUIPMENT WHERE SAME IS CONCEALED, TO SEE TO IT THAT IT COMES WITHIN THE SPECIFIED OR PRESCRIBED FINISHED LINES OF FLOORS, WALLS AND

THIS DIVISION SHALL PROVIDE ALL NECESSARY SLEEVES, INSERTS AND HANGERS, ETC. LOCATE AND SECURELY PLACE SAME.

7.4. INSTALL AND CONNECT ALL MOTOR STARTERS TO BOTH LINE AND LOAD SIDES. MOTORS SHALL BE CONNECTED WITH LIQUID—TITE FLEXIBLE CONDUIT AND STRANDED WIRE.

7.5. ALL REMOTE CONTROL WIRING SHALL BE DONE UNDER DIVISION 15, UNLESS OTHERWISE NOTED. INSTALLATION AND CONNECTIONS OF THERMOSTATS SHALL BE PROVIDED UNDER DIVISION 16. 7.6. SUPPLY DISCONNECTS FOR MECHANICAL & OWNERS EQUIPMENT WHERE REQUIRED BY CODE.

TEMPORARY ELECTRICAL SUPPLY TO BE ARRANGED AND PROVIDED BY DIVISION 16. COORDINATE & VERIFY LOCATION & SIZE WITH PROJECT MANAGER PRIOR TO CLOSING OF TENDER. PROVIDE ALL

9. CODES & REGULATIONS 9.1. THE WORK COVERED BY THIS DIVISION SHALL BE EXECUTED IN STRICT ACCORDANCE WITH THE REQUIREMENTS OF THE PROVINCIAL BUILDING AUTHORITY, ELECTRICAL SAFETY AUTHORITIES, THE CANADIAN ELECTRICAL CODE AND THE LOCAL MUNICIPAL AUTHORITIES. 9.2. IN THE EVENT THAT ANY DEVIATIONS FROM THE ELECTRICAL DRAWINGS ARE NECESSARY. THIS DIVISION SHALL CONSULT WITH THE ENGINEER AND OBTAIN WRITTEN APPROVAL BEFORE PROCEEDING.

9.3. SUBMIT THE REQUISITE NUMBER OF SETS OF PLANS AND SPECIFICATIONS BOTH TO THE PROVINCIAL AUTHORITY INSPECTION DEPARTMENT AND TO THE LOCAL UTILITY.

O.1. THIS DIVISION SHALL GIVE ALL NECESSARY NOTICES AND OBTAIN ALL NECESSARY PERMITS AND PAY
ALL FEES IN ORDEER THAT THE WORK HEREIN SPECIFIED MAY BE CARRIED OUT. HE SHALL
FURNISH ALL USUAL CERTIFICATES NEEDED AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH THE LAWS AND REGULATIONS OF THE AUTHORITIES HAVING JURISDICTION BEFORE FINAL

THIS DIVISION SHALL PROVIDE HIS OWN WORKSHOP AND STORAGE SPACE EQUIPPED WITH HEAT, LIGHT AND TELEPHONE.
11.2. THE LOCATION, DESIGN, CONSTRUCTION AND TYPE OF FINISH OF ALL ACCOMMODATION SHALL BE TO OWNER'S APPROVAL.

11.3. THE CONTRACTOR SHALL AT ALL TIMES HAVE A RESPONSIBLE FOREMAN ON THE PROJECT SITE WHO

IS EXPERIENCED WITH THE SIZE OF THE PROJECT AND IT'S COMPLEXITIES. 12. CUTTING & PATCHING
12.1. WHERE CUTTING OR DRILLING OF STRUCTURAL MEMBERS IS NECESSARY FOR THE INSTALLATION OF SLEEVES, CONDUITS, OUTLET BOXES, ETC., THE WORK SHALL BE DONE BY THIS DIVISION IN A MANNER SATISFACTORY TO THE ARCHITECT. 12.2. ALL PATCHING AND REPAIRS TO RESTORE THE CUT SURFACES TO THEIR ORIGINAL CONDITION SHALL BE DONE BY THIS DIVISION AT HIS OWN EXPENSE AND UNDER THE DIRECTION AND SUPERVISION

AND SUBJECT TO APPROVAL OF THE ENGINEER AND ARCHITECT. 13.1. DURING CONSTRUCTION, THIS DIVISION SHALL KEEP THE PREMISES REASONABLY CLEAR OF RUBBISH, WASTE MATERIALS, ETC., AFTER COMPLETION OF THIS WORK HE SHALL REMOVE ALL RUBBISH, DEBRIS ETC., DUE TO HIS WORK OR HIS EMPLOYEES, SUB—CONTRACTORS, AGENTS, ETC., AND SHALL LEAVE THE PREMISES AND ALL PARTS OF THIS WORK IN GOOD ORDER.

13.2. THE OWNER MAY, IF HE CONSIDERS IT DESIREABLE, AND ON NOTICE TO THIS DIVISION, PROTECT, CLEAN, ETC., AND WORK IN THE COURSE OF CONSTRUCTION AND CHARGE TO EACH OR ANY SUB-TRADE A PROPORTIONATE SHARE OF SUCH WORK AND PROVISION. 14. EXTRAS & OMMISSIONS
14.1. SHOULD ADDITIONAL WORK BE REQURIED, BEYOND THE SCOPE OF THIS CONTRACT, THE

DIVISION SHALL SUBMIT A QUOTATION, IN WRITING OUTLINING THE NATURE OF THE WORK AND THE COSTS WITH A COMPLETE BREAKDOWN OF LABOUR & MATERIALS.

14.2. IT MUST BE CLEARLY UNDERSTOOD THAT NO "EXTRAS" WILL BE RECOGNIZED FOR PAYMENT UNLESS THE WORK HAS BEEN QUOTED ON, AND A WRITTEN ORDER OBTAINED FOR THE OWNER.

15.1. THIS DIVISION SHALL CLEARLY IDENTIFY ALL ELECTRICAL EQUIPMENT SUPPLIED AND/OR INSTALLED BY HIM. ALL PANEL DIRECTORIES SHALL BE TYPEWRITTEN AND ALL OTHER EQUIPMENT SHALL BE PERMANENTLY IDENTIFIED WITH ETCH LAMICOID PLATES SECURELY FASTENED. ADHESIVE TAPE, SUCH AS 'DYMO' WILL NOTE BE ACCEPTED.

16.1. ALL EQUIPMENT SUPPLIED AND/OR INSTALLED BY THIS DIVISION SHALL OPERATE WITHOUT OBJECTIONABLE NOISE OR VIBRATION AND TO THE SATISFACTION OF THE ENGINEER AND OWNER.

16.2. THIS DIVISION SHALL BE RESPONSIBLE FOR CHANGES AND/OR ADDITIONS NECESSARY TO ELIMINATE SUCH DBJECTIONABLE NOISES AND VIBRATIONS WITHOUT EXTRA COST TO TH

17.1. TESTING

17.1. TEST ALL ELECTRICAL SYSTEMS AND SUBMIT REPORTS TO THE OWNER SHOWING ALL TEST
DATA AND RESULTS ENSURING THAT ALL COMPONENTS ARE FUNCTIONING PROPERLY.

17.2. AUXILIARY SYSTEMS SHALL BE INSPECTED, TESTED AND VERIFIED BY THE MANUFACTURER (OR
OTHERS) AND ORIGINAL REPORTS SHALL BE SUBMITTED TO THE OWNER.

17.3. COST OF ALL TESTING SHALL BE BORNE BY THIS DIVISION.

ALL EQUIPMENT SHALL GUARANTEE AND HEREWITH DOES GUARANTEE: 18.1.1. THAT ALL MATERIAL AND WORKMANSHIP USED ON THE JOB ARE IN STRICT ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS.

18.1.2. THAT THE ENTIRE INSTALLATION IS OF THE BEST QUALITY AVAILABLE TO ENSURE FIRST DEFECTS. ANY SUCH DEFECTS, WHICH MAY APPEAR IN ANY OF THE WORK WITHIN ON YEAR AFTER WRITTEN ACCEPTANCE OF THE SAME BY OWNER (ORDINARY WEAR AND TE AND WILLFULL DAMAGE EXCEPTED), SHALL BE REPAIRED AND REPLACED BY THIS DIVISION WITHOUT ANY ADDITIONAL EXPENSE TO THE OWNER. WHERE SUCH DEFECTS OCCUR, THIS

19. METHOD OF WIRING
19.1. EXCEPT WHERE OTHERWISE SPECIFIED ON THE DRAWINGS ALL WIRING IN WALL, FLOORS AND CEILINGS SHALL BE WITH TWH INSULATED CABLES IN THINWALL CONDUIT WITH APPROVED 19.2. UNDERGROUND WIRING SHALL BE 'TWU' INSULATED CABLES IN RIGID, HEAVY WALL PLASTIC CONDUIT SUCH AS 'SCEPTRE' OR APPROVED EQUAL.

DIVISION SHALL BE HELD RESPONSIBLE FOR ALL COSTS INCURRED IN MAKING THE

19.3. MINIMUM CABLE SIZE FOR ALL BRANCH CIRCUIT WIRING SHALL BE NO. 12 B & S GUAGE FOR 347/600V CIRCUITS AND NO. 12 B & S GUAGE FOR 120/208V CIRCUITS. ALL WIRE AND CABLE SHALL HAVE COPPER CONDUCTORS. ELECTRICAL CONTRACTOR TO UPSIZE WIRING AS REQUIRED TO ENSURE VOLTAGE DROP IS IN COMPLIANCE WITH ELECTRICAL AUTHORITIES PROVIDE BOND GROUND WIRE IN EVERY CONDUIT. ALL GROUNDING TO COMPLY WITH THE

20.1. ALL CONDUITS SHALL BE CONCEALED IN FLOOR SLABS, WALLS, CEILING AND FURRED SPACES EXCEPT IN 'SERVICE' ROOMS WHERE CONDUITS MAY BE EXPOSED. CONDUITS RUN IN EARTH OR FILL WHERE SUBJECT TO DAMAGE FOR CIRCUITS OVER 30V SHALL BE RIGID PLASTIC SUCH AS 'SCEPTRE'. ALL OTHER CONDUITS MAY BE THINWALL. IN CONCRETE, USE APPROVED WATER-TITE COUPLINGS AND FITTINGS. CONDUITS STUB-UPS IN EXPOSED AREAS OR SUBJECT TO MECHANICAL DAMAGE SHALL BE RIGID THICK WALL. CONDUIT MUST CLEAR HEATING PIPES, FLUES, ETC., BY AT LEAST 6'. CONDUITS SHALL BE INSTALLED TO PERMIT DRAINAGE OR ACCUMULATED MOISTURE.

21.1. AN DUTLET BOX OF CODE QUALITY AND INDEPENDENTLY SUPPORTED SHALL BE INSTALLED FOR EACH LIGHT SWITCH, DUPLEX RECEPTACLE, ETC. 21.2. ALL DUTLETS IN FINISHED AREAS SHALL BE MOUNTED WITHIN THE FINISHED LINES OF PLASTER, ETC., AND MUST BE PLUMB. NO UNUSED OPENINGS SHALL BE LEFT IN OUTLET

CONDUITS SHALL BE SUPPORTED WITH SOLID CLAMPS. PERFORATED STRAP SHALL NOT BE

BOXES.

21.3. DUTLET BOXES PROVIDED TO CARRY A LIGHTING FIXTURE SHALL BE OF A DESIGN CAPABLE OF SUPPORTING THE FIXTURE AND SHALL BE EQUIPPED WITH SUITABLE FIXTURE STUDS. RECESSED DUTLET BOXES AND ALL JUNCTION BOXES SHALL BE USED. DUTLET BOXES TO BE USED WITH CONDUITS SHALL BE CONDULET FS TYPE.

21.4. THE EXACT HEIGHT AND POSITION OF ALL DUTLETS MUST CONFORM WITH OTHER WORK IN THE AREA AND IT IS THIS SUB-CONTRACTOR'S RESPONSIBILITY TO MOUNT OUTLETS IN SUCH A MANNER TO AVOID INTERFERENCE WITH ALL PIPING, DUCTS, CONDUITS, ETC. DUTLETS FOR LOCAL SWITCHES NEAR SINGLE DOORS SHALL BE ON THE <u>STRIKE</u> SIDE OF THE DOOR,

AS FINALLY HUNG. 21.4.1. MOUNTING HEIGHTS ABOVE FINISHED FLOOR TO CENTRE LINE FOR OUTLET BOXES SHALL BE AS FOLLOWS, UNLESS OTHERWISE SHOWN ON THE DRAWINGS OR OTHERWISE REQUIRED BY THE DWNER:

22.1. STANDARD JUNCTION AND CABLE SUPPORT BOXES SHALL BE INSTALLED WHERE SPECIFIED OR WHERE FOUND NECESSARY FOR THE PROPER PULLING AND ANCHORING OF CABLES, WIRES, ETC., AND WHERE INDICATED ON THE DRAWINGS. WHERE LARGER THAN OUTLET BOXES, THEY SHALL BE OF AN APPROVED DESIGN. IN ALL CASES, THEY SHALL BE ACCESSIBLE AFETER BUILDING IS COMPLETED. THESE BOXES ARE SUBSTANTIALLY CONNECTED TO THE BUILDING CONSTRUCTION AND MUST BE PROVIDED WITH SUITABLE CABLE SUPPORTS 'RUSSELL &

23.1. ALL SINGLE POLE LIGHTING SWITCHES SHALL BE OF THE 'FLUSH TUMBLER' TYPE. WHERE 2 OR MORE SWITCHES ARE LOCATED TOGETHER, GANG BOXES AND GANG PLATES SHALL BE USED.

23.2. HANDLES OF ALL SWITCHES SHALL BE OF A SUITABLE COLOUR TO SUIT THE ARCHITECTURAL TREATMENT IN THE AREA AND THE PLATES USED, AND THE SWITCH SHALL BE MOUNTED SO THAT WHEN HANDLE IS UP, SWITCH SHALL BE IN "ON" POSITION.

23.3. SINGLE POLE LIGHT SWITCHES (FOR 120V.) SHALL BE 'SMITH & STONE' # 1-4621-1.

23.5. SINGLE POLE LIGHT SWITCHES (FOR 347V.) SHALL BE 'SMITH & STONE' # 1-3721-1. 24. DUPLEX RECEPTACLES 24.1. DUPLEX RECEPTACLES SHALL BE 'SMITH & STONE' # 1-1144.
24.2. RECEPTACLES FOR DESIGNATED EQUIPMENT (SEPARATE GROUND) SHALL BE HUBBELL # IG-5262H (OR APPROVED EQUAL).
24.3. DUTDOOR RECEPTACLES SHALL BE 'SMITH & STONE' # 4-5262 WITH S & S WATERPROOF

COVER, # 1-1044 OR 'LEVITON' # 5096 (OR APPROVED EQUAL). 24.4. ACCEPTABLE ALTERNATES TO ABOVE MANUFACTURERS (23 & 24) SHALL BE HUBBELL, OR

25. CUVER PLATES
25.1. ALL COVER PLATES FOR SWITCHES AND RECEPTACLES IN FINISHED AREAS SHALL BE
STAINLESS STEEL. (ALL SWITCHES AND RECEPTACLE DEVICES SHALL BE IVORY PLASTIC).
25.2. COVER PLATES IN UNFINISHED AREAS (SERVICE AND EQUIPMENT ROOMS, ETC.) SHALL BE

PROVIDE AND INSTALL ALL NECESSARY SWITCHGEAR, SPLITTERS, PANELS, CONTACTORS,
TIME SWITCHES, AND DISTRIBUTION EQUIPMENT, ETC., TO PROVIDE A COMPLETE ELECTRICAL
SYSTEM IN THE BUILDING. PROVIDE AL GROUND FIELD CONSISTING OF JUMPERS, GROUND RODS, BUS BARS, & CONNECTION TO ALL METAL EQUIPMENT IN ACCORDANCE WITH THE E.S.A, INCLUDING CONNECTIONS TO GAS & WATER LINES.

26.2. ALL SWITCHGEAR AND PANEL ETC., SHALL BE OF THE SAME MANUFACTURER THROUGHOUT THE 26.3. SECONDARY SWITCHGEAR AND PANELS SHALL BE SCHNEIDER ELECTRIC, SIEMENS OR CUTLER 26.4. DISCONNECT SWITCHES ETC., SHALL BE INDUSTRIAL HEAVY DUTY QUICK-MAKE, QUICK-BREAK TYPE AND HAVE BLADES THAT ARE CLEARLY VISIBLE WITH THE DOOR OPEN. ALL SWITCHES SHALL HAVE A PROVISION FOR PADLOCKING IN THE "OFF" POSITION.

26.5.1. FUSES SHALL BE PROVIDED FOR ALL FUSIBLE DEVICES. 26.5.2. ALL FUSES UP TO 600V. SHALL BE AS FOLLOWS UNLESS OTHERWISE SPECIFIED OR SHOWN ON DRAWINGS: 26.5.2.1. FUSES OVER 600 AMPERES SHALL BE CLASS 'L' HRC FORM 1 BUSSMAN TYPE KTU LIMITRON FUSES.
26.5.2.2. FUSES 600 AMPERES OR LESS SHALL BE CLASS 'K-5' HRC FORM 1 BUSSMAN TYPE FRS (600V.) OR FRN (250V.) FUSETRON DUAL-ELEMENT FUSES.

26.5.3. PROVIDE METAL BOXES, LABELLED 'SPARE FUSES' TO BE LOCATED AT MAIN SERVICE AND EACH DISTRIBUTION THROUGH AND TO CONTAIN 3 SPARE FUSES OF EACH SIZE AND TYPE

26.6.1. ALL PANELS SHALL HAVE COPPER, MAINS & BRANCH BREAKERS SIZING AS PER SCHEDULE
ON DRAWINGS. PANELS SHALL BE EQUIPPED WITH LOCKS IN DOORS AND ALL LOCKS SHALL BE OPERABLE WITH ONE MASTER KEY.

26.6.2. ALL FLUSH MOUNTED PANELS IN AREAS WITH DROPPED CEILINGS SHALL HAVE 2-1" CONDUITS TERMINATED IN CELING SPACE FOR FUTURE WIRING.

26.6.3. ALL PANELS SHALL BE 'TYPE NLAB' WITH BOLT-ON BREAKERS, EXCEPT WHERE OTHERWISE

26.6.4. ALL BREAKERS SHALL BE BOLT-ON TYPE. NO TANDEM OR HALF SIZE BREAKERS SHALL

26.6.4. ALL BREAKERS SHALL BE BULL-UN TIPE. NO TANDER OR HALF SIZE BREAKERS SHALL BE USED.

26.6.5. TWO-POILE AND THREE-POILE BREAKERS SHALL HAVE SIMULTANEOUS TRIPS.

26.6.6. PANEL DIRECTORIES SHALL BE CARDBOARD WITH SPACE FOR TYPED BRANCH CIRCUIT DESIGNATIONS, AND SHALL BE IN A CELLULOID COVERED SLOTTED FRAME PERMANENTLY ATTACHED TO INSIDE OF PANEL DOOR.

26.6.7. PANEL MANUFACTURERES SHALL BE SAME AS SWITCHBOARD MANUFACTURER.

26.7. TIME SWITCHES, CONTACTORS, ETC., THIS DIVISION SHALL SUPPLY AND INSTALL TIME SWITCHES, PUSHBUTTONS, AND MAGNETIC CONTACTORS FOR CONTROL OF LIGHTING AND EQUIPMENT AS SHOWN ON THE DRAWINGS.

26.7.1. TIME SWITCHES SHALL BE INTERMATIC SERIES V45000CR OR V46000 (AS PER DRAWINGS) OR APPROVED EQUAL.

OR APPROVED EQUAL.

26.7.2. MAGNETIC CONTACTORS FOR LIGHTING LOADS SHALL BE SQUARE 'D' CLASS 8903 WITH GENERAL PURPOSE ENCLOSURES OR APPROVED EQUAL.

26.7.3. MAGNETIC CONTACTORS FOR DITHER LOADS, SUCH AS HEATING, ETC., SHALL BE SQUARE 'D' CLASS 8502 WITH GENERAL PURPOSE ENCLOSURES OR APPROVED EQUAL.

26.7.4. PHOTOCELLS SHALL BE INTERMATIC SERIES K1100 OR APPROVED EQUAL.

26.8. DRY TYPE TRANSFORMERS (IF REQUIRED)

26.8.1. DRY TYPE TRANSFORMERS SHALL BE MARCUS, CUTLER HAMMER, DELTA, HAMMOND, SQUARE 'D' OR APPROVED EQUAL, CLASS H, MOUNTED ON RESILIENT PADS TO MINIMIZE VIBRATION, OR WALL MOUNTED WHERE FEASIBLE.

26.8.2. TRANSFORMERS SHALL HAVE 4 - 2 1/2% FULL CAPACITY TAPS ON THE PRIMARY WITH TWO OF THE TAPS ABOVE NORMAL AND TWO BELOW NORMAL VOLTAGE.

26.8.3. TRANSFORMERS SHALL HAVE COPPER WINDINGS & SHALL BE ENERGY EFFICIENT TO COMPLY WITH CSA C802 & ASHRAE 90.1

THIS DIVISION SHALL PROVIDE AND INSTALL A SYSTEM OF CONDUITS, PULL BOXES AND OUTLETS FOR THE USE OF BELL CANADA. RISERS SHALL BE IN THINWALL CONDUIT (E.M.T.) OF SIZES AS SHOWN ON THE ELECTRICAL DRAWINGS.

28. WIRING FOR MECHANICAL EQUIPMENT
28.1. 'MECHANICAL' SHALL DEFINE THAT EQUIPMENT WHICH IS SERVING AS PART OF THE
PLUMBING, DRAINAGE, HEATING, VENTILATION AND AIR CONDITIONING SYSTEMS AS PROVIDED
AND/OR INSTALLED BY DIVISION 15. AND/UK INSTALLED BY DIVISION 15.
MOTORS LARGER THAN 1/2 HP SHALL BE 3 PHASE. THIS DIVISION SHALL WIRE FOR AND CONNECT MOTORS, MANUAL OR MAGNETIC STARTERS AND ISOLATING SWITCHES AS SUPPLIED

ISOLATING SWITCHES FOR ROOF MOUNTED EQUIPMENT SHALL BE WEATHERPROOF TYPE,

SUPPLIED AND INSTALLED BY THIS DIVISION.

28.3. MOTTERS 1/2 HP OR UNDER SHALL BE 120V. THIS DIVISION SHALL WIRE FOR AND CONNECT MOTTERS, MANUAL STARTERS & THERMOSTATS, ETC., AS SUPPLIED BY DIVISION 15 AND AS SHOWN ON DRAWINGS.

29. ELECTRICAL HEATING COMPONENTS 29.1. THIS DIVISION SHALL WIRE FOR, SUPPLY AND INSTALL ELECTRIC HEATING COMPONENTS COMPLETE WITH THERMOSTATS AND OTHER NECESSARY CONTROLS.

29.2. THIS DIVISION SHALL WIRE FOR AND INSTALL BASEBOARD HEATERS WHICH ARE CONNECTED TO ZONE CONTROL THERMOSTATS. THESE HEATERS WILL BE PROVIDED BY DIVISION 16. 29.3. THIS DIVISION SHALL WIRE FOR AND CONNECT DUCT HEATERS AS SUPPLIED AND INSTALLED 29.4. ALL CONTROL WIRING (LOW VOLTAGE) WILL BE BY DIVISION 15.

30.1. THE EMERGENCY LIGHTING SYSTEM SHALL BE AS INDICATED ON DWGS.

THIS DIVISION SHALL PROVIDE AND INSTALL ALL LIGHTING FIXTURES AND LAMPS AS SHOWN L INCANDESCENT LAMPS SHALL BE OF ONE MANUFACTURE AND RATED 120'

31.3. ALL FLUORESCENT LAMPS SHALL BE OF ONE MANUFACTURE AND SHALL BE AS NOTED ON 31.4. BALLASTS FOR FLUORESCENT FIXTURES: ENERGY SAVING, HIGH POWER FACTOR TYPE, RAPID START WITH SOUND RATING "A", WITH THERMAL PROTECTION AUTOMATIC RESET TYPE, AND PRESSURE SENSITIVE CAPACITOR PROTECTION, MANUFACTURED TO STANDARDS OF C.B.M., 31.5. THIS CONTRACTOR SHALL SUPPLY AND INSTALL ALL AUXILIARY SUPPORTS AS REQUIRED,

FIXTURES IN T-BAR CEILINGS SHALL BE SUPPORTED INDEPENDENT OF CEILING.

32. TRENCHING, BACKFILLING, CONCRETE WORK.
32.1. ALL EXCAVATION AND BACKFILLING REQUIRED FOR THE ELECTRICAL WORK WILL BE DONE DIVISION 16. FOR DETAILS REGARDING SOILS AND EXTENT REFER TO DIVISION TWO. OBTAIN THE INSTRUCTIONS OF THE ARCHITECT REGARDING THE TYPE OF SOIL AND ITS EXTENT. 32.2. THE ELECTRICAL CONTRACTOR SHALL SUPPLY & INSTALL ALL DUCTWORK AS INDICATED ON THE DRAWINGS COMPLETE WITH SUPPORTS AND RE-INFORCING BARS, ETC. AS REQUIRED FOR A COMPLETE INSTALLATION. COORDINATE WITH GENERAL CONTRACTOR.

32.3. ALL CIVIL WORK INCLUDING CONCRETE WORK (SUPPLY & INSTALLATION) ASSOCIATED WITH THE ELECTRICAL WORK SHALL BE BY DIVISION 16

33. GROUND FAULT CO-ORDINATION STUDY 33.1. THIS ELECTRICAL CONTRACTOR SHALL SUBMIT VERIFICATION CERTIFICATE OF A COMPLETE GROUND FAULT CO-ORDINATION STUDY FOR THE MAIN SWITCHBOARD AND GROUND FAULT SETTINGS SHALL BE SET ACCORDINGLY.

34.1. THIS ELECTRICAL CONTRACTOR SHALL SUBMIT VERIFICATION CERTIFICATE OF A COMPLETE FUSE COORDINATION STUDY INCLUDING SHORT CIRCUIT CALCULATIONS AND SUITABLE TRIP SETTINGS. THE STUDY SHALL BE PREPARED BASED ON THE INSTALLED UTILITY TRANSFORMER SIZE. ELECTRICAL CONTRACTOR SHALL ALSO SIZE DISTRIBUTION EQUIPMENT INTERRUPTING RATING FOR FULL SERVICE CAPACITY BY OBTAINING UTILITY TRANSFORMER ELECTRICAL

35.1. THIS ELECTRICAL CONTRACTOR SHALL SUBMIT A COMPLETE ARC FLASH STUDY AND SHALL PROVIDE MARKING OF THE ELECTRICAL EQUIPMENT WHERE REQUIRED. THE STUDY SHALL BE

THE CONTRACTOR SHALL SUPPLY AND INSTALL ALL EQUIPMENT AND ACCESSORIES FOR A COMPLETE, ELECTRICALLY SUPERVISED, NON-CODED SINGLE-STAGE ADDRESSABLE FIRE ALARM SYSTEM AS DESCRIBED HEREIN AND AS SHOWN ON THE PLANS. 36.1.2. EQUIPMENT AND ACCESSORIES FURNISHED UNDER THE TERMS OF THIS SPECIFICATION SHALL BE THE STANDARD PRODUCTS OF A SINGLE MANUFACTURER AND SHALL BE EQUAL IN ALL RESPECTS TO THOSE MANUFACTURED BY MIRCOM. CATALOGUE NUMBERS AND MODEL DESIGNATIONS WHICH APPEAR HEREIN INDICATE DESIGN, QUALITY AND TYPE OF MATERIAL, AS WELL AS REQUIRED OPERATING CHARACTERISTICS. ALL EQUIPMENT SHALL BE LISTED BY A NATIONALLY RECOGNIZED FIRE TESTING

36.1.3. ALL COMPONENTS OF THE 'FIRE ALARM SYSTEM' SHALL BE ULC APPROVED AND THE INSTALLATION THEREOF BE SUBJECT TO THE 'STANDARD FOR THE INSTALLATION OF FIRE ALARM SYSTEMS', SYSTEMS OPERATION 36.2.1. ACTUATION OF ANY ALARM INITIATING DEVICE SHALL CAUSE ALL AUDIBLE ALARM DEVICES TO SOUND CONTINUOUSLY. ALARM INITIATING DEVICES SHALL BE GROUPED IN ZONES. THE ZONE OF THE FIRE SHALL BE INDICATED BY THE ELECTRICALLY SUPERVISED LAMP ANNUNCIATOR ON THE

36.3. CONSTRUCTION THE CONTROL PANELS SHALL BE OF MODULAR CONSTRUCTION FOR EASE OF EXPANSION AND SERVICING. EACH INDIVIDUAL FUNCTION SHALL BE ON A REPLACEABLE PLUG-IN PANEL OR MODULE TO ACCOMMODATE FUNCTIONAL CHANGES WHEN REQUIRED. ALL PLUG-IN MODULES AND PANEL CONNECTORS SHALL BE SUPERVISED SO AS TO GIVE A TROUBLE SIGNAL IF REMOVED OR

ALL CIRCUITS EXTENDING FROM THE FIRE ALARM CONTROL UNIT SHALL BE CURRENT LIMITED AND PROTECTED IN ACCORDANCE WITH CANADIAN ELECTRICAL CODE, CLASS 2, WIRING REQUIREMENTS, EXCEPT FOR A.C. SIGNAL CIRCUITS. ALL CIRCUITS
EXTENDING FROM THE FIRE ALARM CONTROL UNIT SHALL BE CURRENT LIMITED AND PROTECTED IN ACCORDANCE WITH CANADIAN ELECTRICAL CODE CLASS 1 WIRING REQUIREMENTS. 36.3.2. THE CONTROL UNIT SHALL CONTAIN THE FOLLOWING FUNCTIONS AND MODULES:

36.4. ALARM RECEIVER

36.4.1. PROVIDE REQUIRED ZONES OF ALARM RECEIVING CIRCUITS. THE WIRING FOR THE ALARM INITIATING DEVICES UP TO AND INCLUDING THE ALARM RELAY COIL SHALL BE SUPERVISED AGAINST AN OPEN CIRCUIT FAULT CONDITION. OPERATION OF AN INITIATING DEVICE SHALL CAUSE AN INDIVIDUAL RED SUPERVISED ALARM ZONE LAMP TO LOCK ON AND SHALL PROVIDE AN ALARM OUTPUT TO OTHER SECTIONS OF THE CONTROL UNIT. CIRCUITRY AND TERMINALS SHALL BE PROVIDED TO CONNECT ADDITIONAL SUPERVISED REMOTE ANNUNCIATION AND ADDITIONAL UNSUPERVISED REMOTE ANNUNCIATION. ANY FAULT CONDITION IN THE WIRING TO ANY REMOTE ANNUNCIATOR SHALL NOT PREVENT ALL OTHER ANNUNCIATORS FROM FUNCTIONING PROPERLY ON ALL ZONES. AN INDIVIDUAL AMBER TROUBLE LAMP SHALL BE PROVIDED FOR EACH ALARM RECEIVING ZONE TO INDICATE THE LOCATION OF ANY FAULTS IN THE WIRING TO INITIATING DEVICES. THE ALARM RECEIVING CIRCUITS SHALL HAVE A CLASS B OPERATION.

36.5.1. PROVIDE REQUIRED AUDIBLE SIGNAL DEVICES. THE WIRING FOR THE AUDIBLE SIGNALS, UP TO AND INCLUDING THE INDIVIDUAL CIRCUIT BREAKERS, SHALL BE SUPERVISED BOTH AGAINST AN OPEN CIRCUIT AND A SHORT CIRCUIT FAULT CONDITION. EITHER FAULT CONDITION SHALL IMMEDIATELY CAUSE ALL TROUBLE SIGNALS TO SOUND WITHOUT CAUSING THE SIGNAL BREAKER TO OPEN, WHILE THE PANEL IS IN THE NORMAL SUPERVISORY STATE.

36.5.2. AN INDIVIDUAL ZONED AMBER TROUBLE LAMP SHALL BE PROVIDED FOR EACH SIGNAL CIRCUIT TO INDICATE THE LOCATION OF ANY FAULTS IN THE WIRING TO THE AUDIBLE SIGNALS OR SIGNAL CIRCUIT BREAKER OPEN CONDITION. TERMINALS SHALL BE PROVIDED FOR CONNECTION OF REMOTE

36.5.3. THE SIGNAL CIRCUITS SHALL HAVE CLASS B OPERATION. 36.6.1. CONTROL PANEL SHALL PROVIDE THE FOLLOWING FUNCTIONS 36.7. LAMP SUPERVISION

36.7.1. THE CURRENT USED TO SUPERVISE LAMPS SHALL BE LOW ENOUGH NOT BE CAUSE THE LAMP FILAMENTS TO GLOW OR DECREASE THE RATED ON-LIFE OF THE LAMP, FAILURE OF AN ALARM LAMP ON THE CONTROL UNIT OR THE REMOTE SUPERVISED ANNUNCIATOR LAMPS SHALL CAUSE THE TROUBLE SIGNAL TO SOUND. THE AMBER 'REMOTE LAMP FAILURE' LAMP ON THE PANEL SHALL INDICATE WHICH REMOTE ANNUNCIATOR HAS A LAMP FAILURE. 36.8. RESET 36.8.1. WHEN THE ALARM INITIATING DEVICES HAVE BEEN RESTORED THE SYSTEM CONTROL SHALL BE

RESET BY DEPRESSING A SINGLE RESET PUSHBUTTON. 36.9.1. AN AMBER TROUBLE LAMP AND DISTINCTIVE AUDIBLE SIGNAL WHICH SHALL OPERATE WHEN ANY OF THE SPECIFIED SUPERVISED TROUBLE CONDITIONS EXIST. THE AUDIBLE PORTION OF THE TROUBLE SIGNAL SHALL BE SILENCED WITH A 'TROUBLE SILENCE' PUSHBUTTON. THE TROUBLE CONDITION IS CORRECTED. TO ELIMINATE ANY CONFUSION ALL VISUAL AND AUDIBLE TROUBLE SIGNALS SHALL

REMAIN OFF DURING THE PROGRESS OF TRUE ALARM. TERMINALS SHALL BE PROVIDED FOR CONNECTION OF REMOTE TROUBLE LAMPS AND AUDIBLE SIGNALS.

36.9.2. SYSTEM WALK TEST FEATURE FOR SINGLE PERSON TEST OF THE SYSTEM.

36.9.3. ALARM VERIFICATION PROGRAMMABLE PER ZONE WITH AUTOMATIC DISCRIMINATION BETWEEN SMOKE DETECTORS AND CONTACT DEVICES. 36.10. SUBSEQUENT ALARMS 36.10.1. AN ALARM FROM ANY RECEIVING CIRCUIT SHALL CAUSE THE AUDIBLE SIGNALS TO SOUND FOR A

FULL PERIOD, WHETHER OR NOT A PREVIOUS ALARM HAS PARTIALLY OR FULLY TIMED OUT BY MEANS OF AN AUTOMATIC TIME LIMIT CUTOUT OR HAS BEEN SILENCED MANUALLY. SILENCING BY ANY MEANS SHALL CAUSE A RED 'SIGNAL SILENCED' LAMP ON THE PANEL TO ILLUMINATE AND THE TROUBLE SIGNAL TO SOUND. 36.11. MANUAL SIGNAL SILENCING
36.11.1. PUSHBUTTON SHALL BE PROVIDED TO SILENCE ALL AUDIBLE ALARM SIGNALS.

36.12. SIGNAL SILENCE INHIBIT
36.12.1. CIRCUITRY SHALL BE PROVIDED TO PREVENT THE SILENCING OF THE FIRE ALARM SIGNALS BY ANY SWITCH (RESET, SIGNAL SILENCE, ETC.) UNTIL DNE MINUTE AFTER THE INITIAL ALARM. 36.13.1. A GROUND FAULT ON ANY EXTERNAL CONDUCTOR WHICH WOULD ADVERSELY AFFECT THE SYSTEM OPERATION, IF A SECOND GROUND OF ZERO OHMS APPEARED, SHALL SOUND A TROUBLE SIGNAL AND ILLUMINATE AN AMBER "GROUND FAULT" INDICATION ON THE PANEL.

36.14.1. SHALL PROVIDE THE FOLLOWING: 24 VOLT DC POWER FOR ALL SYSTEM SUPERVISORY AND CONTROL FUNCTIONS. 36.15. POWER-ON INDICATION 36.15.1. A GREEN 'POWER-ON' INDICATION ON THE PANEL FOR EACH SEPARATE SOURCE OF 120 VOLT AC

INPUT POWER. 36.16.1. THE CONTROL UNIT ALARM AND TROUBLE LAMPS MAY BE TESTED TO LOCATE A LAMP FAILURE BY DEPRESSING THE LAMP TEST PUSHBUTTON.

36.16.2. CONNECTIONS SHALL BE PROVIDED TO TRANSMIT AN ALARM TO A MUNICIPAL SYSTEM. A RED 'FIRE DEPARTMENT' LAMP SHALL INDICATE THIS ALARM FUNCTION. A 'FIRE DEPARTMENT DISCONNECT'

LAMP AND SWITCH SHALL BE PROVIDED. 36.17. STANDBY POWER 36.17.1. SHALL BE 12 GELLED ELECTROLYTE CELLS SERIES CONNECTED WITH SUFFICIENT AMP. HOUR CAPACITY TO OPERATE THE SYSTEM UNDER SUPERVISORY CONDITIONS WITH AC POWER DISCONNECTED FOR 24 HOURS AND AT THE END OF THIS PERIOD OPERATE THE ALARM DEVICES FOR 30 CONSECUTIVE MINUTES. THE BATTERIES SHALL BE THE SEALED-MAINTENANCE-FREE TYPE.

36.18. AUXILIARY RELAY PANEL 36.18.1. CAT. NO. CRM-4 SHALL BE PROVIDED WITH 8 AUXILIARY RELAYS. AN ALARM FROM ANY ALARM RECEIVING CIRCUIT SHALL ENERGIZE THE AUXILIARY RELAYS TO

36.18.2. PERFORM THE AUXILIARY FUNCTIONS. EACH RELAY SHALL BE PLUG-IN AND SUPERVISED AGAINST UNAUTHORIZED REMOVAL BY THE COMMON TROUBLE CIRCUIT. EACH RELAY SHALL HAVE A DUST COVER AND PROVIDE TWO D.P.D.T. (2C) CONTACTS RATED AT 5.0 AMPS. 120 VOLT A/C. ALL
CONTRACTS SHALL BE BROUGHT OUT TO TERMINALS CAPABLE OF ACCEPTING FROM #22 TO #12 AWG WIRE. THESE RELAYS SHALL BE CONNECTED VIA THE FIRE DEPARTMENT DISCONNECT SWITCH THE SYSTEM. SYSTEM. AS WELL AS THE FIRE DEPARTMENT CONNECTION WHEN TESTING THE SYSTEM.

36.22. WIRING

36.19.1 MANUAL PULLSTATION SHALL MATCH EXISTING, RED METAL, OPEN CIRCUIT TYPE WITH CLEARLY VISIBLE BREAK-GLASS AND TOOL OPERATED TEST FEATURE. 36.19.2. AUTOMATIC THERMAL DETECTORS SHALL BE 135 DEGREE C RATE OF RISE OR 135 OR 200 DEGREE C FIXED TEMPERATURE AS SHOWN ON PLANS. 36.19.3. THE PRODUCTS OF COMBUSTION AREA DETECTORS SHALL OPERATE ON THE IONIZATION PRINCIPLE AND SHALL BE ACTIVATED BY THE PRESENCE OF PRODUCTS OF COMBUSTION. THE DETECTOR SHALL BE LISTED BY ULC. THE DETECTOR SHALL BE A PLUG-IN UNIT CONTAINING EQUAL IONIZATION CHAMBERS, AN AMPLIFIER SWITCHING CIRCUIT AND AN INDICATOR LAMP. THE UNIT SHALL CONTAIN NO MOVING PARTS. ONE CHAMBER SHALL BE FOR DETECTION AND THE SECOND CHAMBER SHALL FUNCTION AS A REFERENCE TO STABILIZE THE DETECTOR FOR CHANGES IN TEMPERATURES, HUMIDITY AND PRESSURE.

36.20.1. SIGNALLING DEVICES SHALL MATCH EXISTING AND BE MOUNTED ON 4' SQUARE ELECTRICAL BOX. 36.21.1 THE ANNUNCIATOR SHALL PROVIDE AT LEAST ONE SUPERVISED LAMP INDICATION FOR EACH SUPERVISORY CIRCUIT OR DETECTION CIRCUIT. THE ANNUNCIATOR SHALL CONTAIN A TROUBLE 36.21.2. THE ANNUNCIATOR SHALL BE FLUSH MOUNTED IN MAIN LOBBY AREA FOR REQUIRED ZONES AS SHOWN

36.22.1 THE NORMAL POWER SUPPLY TO THE FIRE ALARM SYSTEM SHALL BE 120/240 VOLTS 60 HZ TAKEN FROM THE BUILDING SERVICE AS CLOSE AS PRACTICAL TO THE MAIN ENTRANCE DISCONNECT. THIS FROM THE BUILDING SERVICE AS CLUSE AS PRACTICAL TO THE MAIN ENTRANCE DISCONNECT. THIS SHALL BE THROUGH AN APPROVED DIVERCURRENT DEVICE ENCLOSED IN A LOCKED STEEL ENCLOSURE TO WHICH NO OTHER CIRCUITS ARE CONNECTED. THE INTERRUPTION OF ONE PHASE SHALL NOT PREVENT OPERATION OF THE OTHER PHASE. THE ENCLOSURE SHALL BE PAINTED RED AND IDENTIFIED IN A PERMANENT MANNER BY THE WORDS "FIRE ALARM SYSTEM".

36.22.2. ALL WIRING SHALL BE INSTALLED TO CONFORM WITH THE REQUIREMENTS OF THE CANADIAN ELECTRICAL CODE, PART I AND APPLICABLE PROVINCIAL CODES. WIRING SHALL BE SIZED IN ACCORDANCE WITH CLASS 2 REQUIREMENTS, EXCEPT FOR A/C SIGNAL CIRCUITS WHERE THE WIRING SHALL BE REPORTED FORM SHALL BE SIZED IN ACCORDANCE WITH CLASS I REQUIREMENTS, BUT SHALL BE PROTECTED FROM MECHANICAL INJURY OR OTHER INJURIOUS CONDITIONS SUCH AS MOISTURE, EXCESSIVE HEAT OR CORROSIVE ACTION IN ACCURDANCE WITH CLASS I REQUIREMENTS. CONDUCTORS SHALL BE SOLID COPPER. THE MINIMUM SIZE OF ANY CONDUCTOR SHALL BE:

COPPER. THE MINIMUM SIZE OF ANY CUMPUCTUR SHALL BET

36.22.3. FOR ALARM RECEIVING CIRCUITS AND REMOTE ANNUNCIATORS #22 AWG. FIVE OR MORE CONDUCTORS

IN A CABLE, #18 AWG, 3 OR 4 CONDUCTORS IN A CABLE AND #14 AWG FOR 1 TO 2 CONDUCTORS IN

A CABLE. IN NO CASE SHALL THE WIRE RESISTANCE IN THESE CIRCUITS EXCEED 50 OHMS.

36.22.4. FOR AUDIBLE SIGNAL CIRCUITS #14 AWG FOR 1 OR 2 CONDUCTORS IN A CABLE OR #18 AWG FOR 3

OR 4 CONDUCTORS IN A CABLE. IN NO CASE SHALL THE VOLTAGE DROP TO ANY SIGNAL EXCEED 10 36.23. VERIFICATION & CERTIFICATION OF FIRE ALARM EQUIPMENT
36.23.1 THE MANUFACTURER SHALL MAKE AN INSPECTION OF THE FIRE ALARM EQUIPMENT, INCLUDING THOSE COMPONENTS NECESSARY TO THE DIRECT OPERATION OF THE SYSTEM SUCH AS MANUAL STATION, THERMAL DETECTORS AND CONTROLS, WHETHER OR NOT MANUFACTURED BY THE MANUFACTURER.

THE INSPECTION SHALL COMPRISE AN EXAMINATION OF SUCH EQUIPMENT FOR THE FOLLOW THAT THE TYPE OF EQUIPMENT INSTALLED IS THAT DESIGNATED BY THE ENGINEER'S SPECIFICATIONS)
THE WIRING CONNECTIONS TO ALL EQUIPMENT COMPONENTS SHOW THAT THE INSTALLER 36.23.1.1.2. UNDERTOOK TO HAVE OBSERVED ULC AND CSA REQUIREMENTS; THAT EQUIPMENT OF THE MANUFACTURER'S MANUFACTURE HAS BEEN INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND THAT ALL SIGNALLING

EVICES OF WHATEVER MANUFACTURER HAVE BEEN OPERATED OR TESTED TO VERIFY

THAT THE SUPERVISORY WIRING OF THOSE ITEMS OF EQUIPMENT CONNECTED TO SUPERVISED CIRCUIT IS OPERATING AND THAT THE GOVERNMENTAL REGULATIONS, IF ANY, NCERNING SUCH SUPERVISORY WIRING, HAVE BEEN MET TO THE SATISFACTION OF INSPECTING OFFICIALS.

36.23.2. THE MANUFACTURER SHALL SUPPLY TO THE ELECTRICAL CONTRACTOR REASONABLE AMOUNTS OF TECHNICAL ASSISTANCE WITH RESPECT TO ANY CHANGES NECESSARY TO CONFORM THE WORK TO PARAGRAPHS I, II, III AND IV ABOVE. DURING THE PERIOD OF INSPECTION BY THE MANUFACTURER,

THE ELECTRICAL CONTRACTOR SHALL MAKE AVAILABLE TO THE MANUFACTURER, ELECTRICIANS AS DESIGNATED BY THE MANUFACTURER.

36.23.3. TO ASSIST THE ELECTRICAL CONTRACTOR IN PREPARING HIS BID, THE MANUFACTURER SHALL

THEIR OPERATION; AND

INDICATE THE NUMBER OF HOURS NECESSARY TO COMPLETE THIS INSPECTION PRIOR TO CLOSING OF 36.24.1 INSPECTION CERTIFICATION
36.24.1 ON COMPLETION OF THE INSPECTION AND WHEN ALL THE ABOVE CONDITIONS HAVE BEEN COMPLIED WITH, THE MANUFACTURER SHALL INSURE TO THE CONSULTING ENGINEER:
36.24.2 A COPY OF THE INSPECTING TECHNICIANS' REPORT SHOWING LOCATION OF EACH DEVICE AND CERTIFYING THE TEST RESULTS OF EACH DEVICE. 36.24.3. A CERTIFICATE OF VERIFICATION CONFIRMING THAT THE INSPECTION HAS BEEN COMPLETED AND SHOWING THE CONDITIONS UPON WHICH SUCH INSPECTION AND CERTIFICATION HAVE BEEN RENDERED.

ALL DRAWINGS, SPECIFICATIONS AND RELATED DOCUMENTS, ARE THE COPYRIGHT PROPERTY OF THE ENGINEER AND MUST BE RETURNED UPON REQUEST. ANY REPRODUCTION OF DRAWINGS, SPECIFICATIONS AND RELATED DOCUMENTS IS PROHIBITED WITHOUT THE ENGINEER'S CONSENT. THE CONTRACTOR SHALL CHECK AND VERIFY EVERYTHING AND REPORT ALL ERRORS AND OMMISSONS TO THE ENGINEER

5	02/17/21	FOR TENDER	M.S.B.
4	12/16/20	REVISED FOR SPA COMMENTS	M.S.B.
3	11/10/20	REVISED FOR SPA COMMENTS	M.S.B.
2	06/19/20	REVISED FOR SPA	M.S.B.
1	10/21/19	ISSUED FOR PERMIT	M.S.B.
NO.	DATE	DESCRIPTION	BY

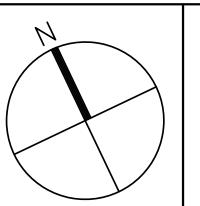
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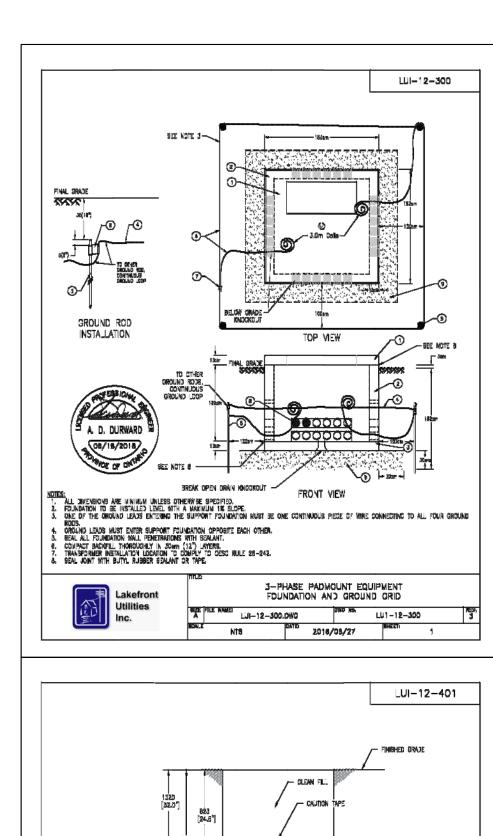
Tel: 647 297 7668 | msbharaj@gmail.com

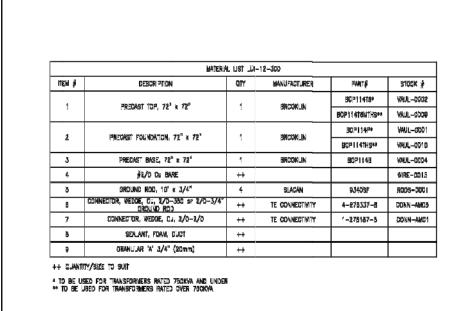
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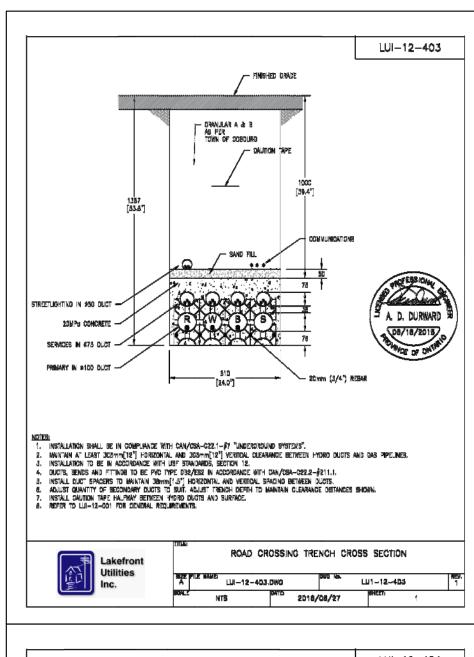
November, 2020

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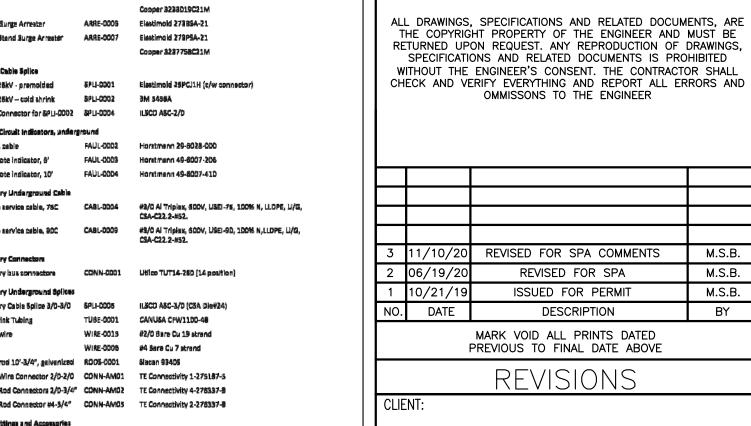


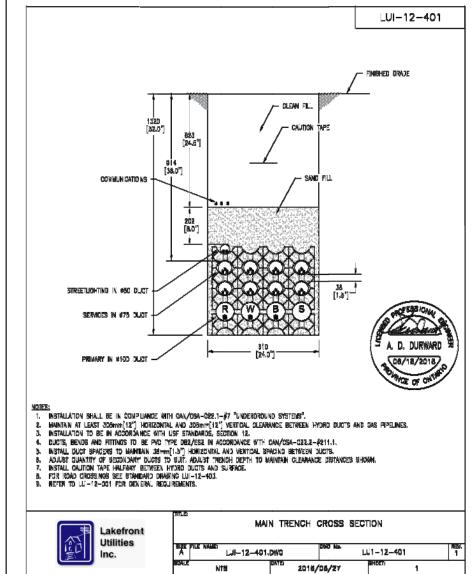


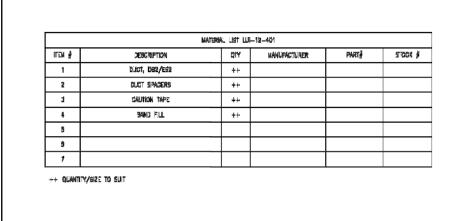


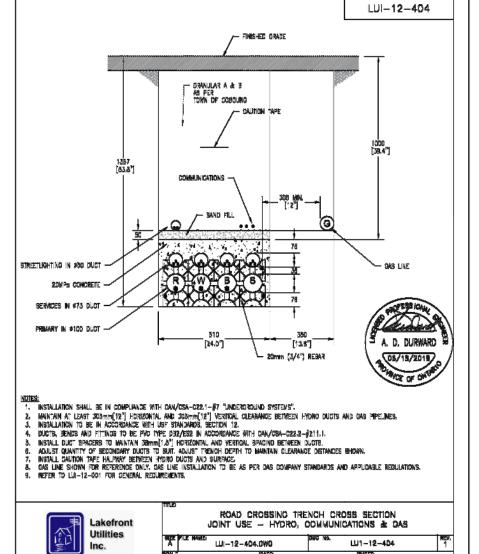
		ATERIAL LIST LUI-	12-403		
ITEM #	DESCRIPTION	gr	MANUFACTUREN	PA₹I∳	SIDCK (
1	DUCT, DB2/ES2	++			
2	DUCT BPACERS	++			
3	REBAR, 20mm (3/4*)	++			
4	CONCRETE, 20MPa	444			
5	SALITION TAPE	++			
В	SAND FILL	++			
7	GRANULAR A	++			
3	CRANULAR B	44			

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	Lakefront Utilities		PROMISION DEVELOPMENT GUIDE			Lakefront Utilities		SUBCIVERON DEVELOPMENT DUIDE
	Inc.		REV 1 - APRIL 2019	1		Inc.		REV 1 - APRIL 2019
4,	MATERIAL SPECIFICATIONS				4.7	Surge Arresters		where the self designed de
	All material supplied and installed	by the Davalop	er must maat LUI apacifications.			Elbow Arrester	ARRE-0005	Elastimoid 2/3E3A-21
			nine the material requirements for each new			****		Copper 3238D19C21M
	Development and obtain Utility ap itemized material list with the des		ordering any material. The Engineer shall submit an			Blahing Surge Arrester	ARRE-0005	Elastimoid 27889A-21
		_	this Guide without written authorisation from LUI. Any			Parking Stand Surge Arrester	ARRE-0007	Elastimo id 278PSA-21
	proposed alternate material shall							Cooper 323775BC21M
	LUI reserves the right to revise the	e material apeci	fications at any time.		4.8	Primary Cable Splice		
	Catagory	Stock Code	Peterletion			#2/0 Al 28kV - premoided	\$PU-0001	Elastimoid 25PCJ1H (c/w connector)
4.1	Primary Switchgoar					#2/O Al 28kV — cold thrink	SPLI-0002	3M 5496A
		d-through lunck	ions are required they will be specified by LUI.			#2/O Al Connector for SPLI-0002	8PLI-0004	ILECO ASC-2/D
					4.8	Faulted Circuit Indicators, under	pround	
	Pad Mount Transformers					FCI, 1ph, cable	FAUL-0002	Horstmann 29-5028-000
	Single phase transformers	DT2	LUI Purchasing Spec (Appendix 8)			1ph remote indicator, 6'	FAUL-0003	Hanstmann 49-6007-206
	Three phase transformers	DT3	LUI Purchasing Spec (Appendix 8)			3ph remote indicator, 10'	FAUL-0004	Horstmann 49-8007-410
	Note – transformers for use in the	Town of Colbo	me shall be dust voltage (27.6-4.16kV) rated.		4.10	Secondary Underground Cable		
4.8	Transformer Bushing Inserts and	Accessories			-	200 jamp service cable, 780	CABL-0004	#2/0 Al Triplax, 500V, USEI-75, 100% N, LLDPE, U/G,
	Bushing Invert, 200A, 28kV	XFMR-0004	Elastimold 2701A4-C\$854			TAN BLUD SHARE ENDING 100	27001-0004	C\$A-C22.2-#52.
	Insulated Parking Bushing, 28kV	XFRM-0007	Eleatimoid 272SOP-CS854			200 samp sarvice cable, 900	CABL-0009	#3/0 Al Triplex, 600V, USEI-90, 100% N,LLDPE, U/Q,
	insulating Cap, 200A, 28kV	XFMR-0008	Elastimoid 273DRQA-CS854					CSA-C22.2-#52.
4.4	Printery Underground Cable				4.11	Secondary Connectors		
	Main Feeder Cable	ÇA BL-0007	1000 mcm Al, 28kV, 1/3 CN, TR-XLPE, LLDPEJ, UD, CSA-C68.5			Secondary but connectors	CONN-0001	Utilico TUT14-250 (14 position)
	Primary Distribution Cable	CA 8L-0003	#2/0 Compact Al, 28kV, 100% CN, TR-KLPE, PVCJ,		4.12	Secondary Underground Splices		
	Linually constituents of the second	W-101-10100	URD, CSA-CSB.5			Secondary Cable Splice 3/0-3/0	SPLI-0005	ILECO ASC-3/D (CSA Die#24)
4.5	Primary Cable Terminations					Haut Shrink Tubing	TUBE-0001	CANUSA CPW1100-48
	Terminations for 1000mcm Al	TERM-0003	3M Cold Shrink QT-III #7958-5-4			Ground wire	WIRE-0015	#2/0 Bare Cu 19 strend
	2-hole lug for 1000 Al						WIRE-0006	#4 Bara Cu 7 strand
	Terminations for #2/0 Al	TERM-0002	3M Cold Shrink QT-III #7553-5-4			Ground rod 10'-3/4", galvanized	RODS-0001	5lacan 93405
	2-hole lug for #2/0 Al		3IVI SC 0020 (CSA dia #24)			Ground Wire Connector 2/0-2/0	CONN-AM01	TE Connectivity 1-275187-5
						Ground Rod Connectors 2/0-3/4"	CONN-AMO2	TE Connectivity 4-275337-8
	200A Load Break Elbows					Ground Rod Connector #4-3/4"	CONN-AM05	TE Connectivity 2-276337-8
	Load Break Elbows for #2/0 Al	EL90-0001	Elastimold 292LR-C-5240C		4.13	Ducts, Fittings and Accessories		
			Cooper LE22BCCD7TCSA			Ducts and fittings shall be PVC Typ	oo II DBZ/ESZ.	IPEX Juper Dust
						Dust spacere shall be steed to fit t	he ducts, with 1	-1/2" spacing between ducts, horizontal and vertical.
193103		9			193103		18	
				<u> </u>				
				l				









2018/08/27

	MATERIAL LIBT LUI-12-464										
mew! #	DESCRIPTION	try	MANUFACTURER	PART∦	SIGOK						
1	DUCT, DBE/ES2	++									
ž	DUST BPACERS	++									
3	MEBAR, 20mm (1/4")	++									
4	CONCRETE, ZOMPa	++									
3	CAUTION TAPE	++									
В	BAND FILL	++									
7	ORANULAR A	++									
3	GRANULAR B	++									

			Greeniae 30307969	
4.14	Present Concrete Foundation -	1 Phase Padmoun	t Transformer	
	Hano	VAUL-DDDS	Brooklin Concrete BCP*105	
	Foundation	VAUL-0003	Breaklin Concrete BCP* 10PC	
4.13	Precest Concrete Foundation -	5 Phase Padmoun	t Transformer	
	3-Phase Transformers & 760kVA	4		
	Вири	VAUL-0004	Brycklin Concrete BCP* 148	
	Foundation	VAUL-0001	Brooklin Concrete BCP1.14P	
	Top qe1	VAUL-0002	Breaklin Concrete BCP* 1418	
	3-Phaga Transformers & 1000k%	<u>/A</u>		
	Base	VAUL-0094	Brooklin Concrete BCP* 148	
	Foundation	VAUL-0010	Brooklin Concrete BCP1141HS	
	Тор	VAUL-0009	Brooklin Concrete BCP* 14T6MTHS	
4.15	Precest Concrete Foundation -	Padrapunt Switch		
	Base	VAUL-0007	Brooklin Concrete BCP3308	
	Foundation	VAUL-0008	Brooklin Concrete BCP380P	
	Top	VAUL-0008	Brooklin Concrete BCP330TC	
4,17	Miscella neous Material			
	Caution Tape	TAPE-0002	182mm (8"), red with black letters "Warning" or "Caution" and "Buried Cables" or "High Voltage"	
			Seton 54557	

Dust ropa

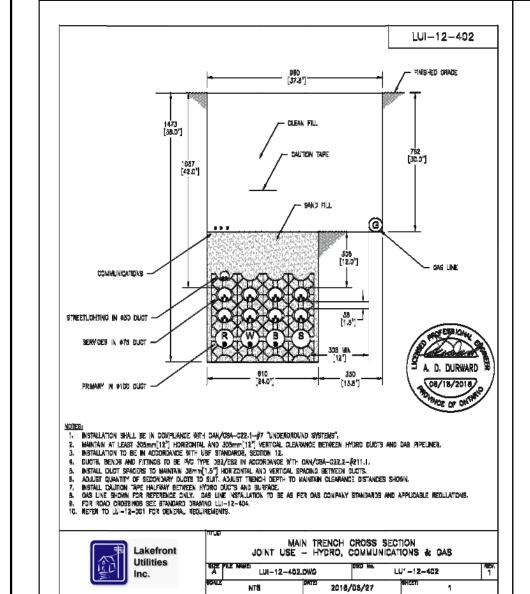
ilaEX Mouopios

20mm (3/4")

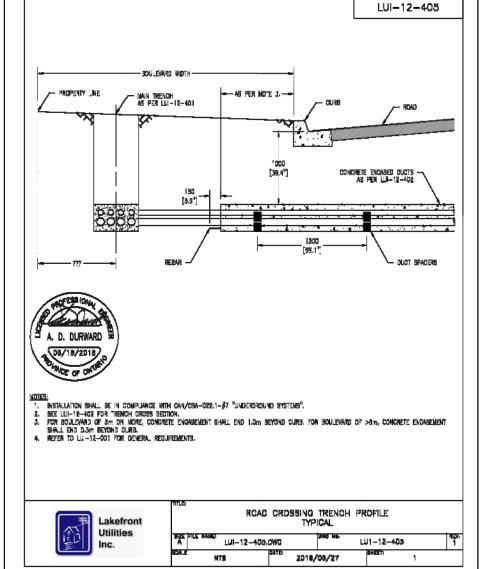
10mm (3/8") polypropylene

DUCT-0008 3M 1402-KR

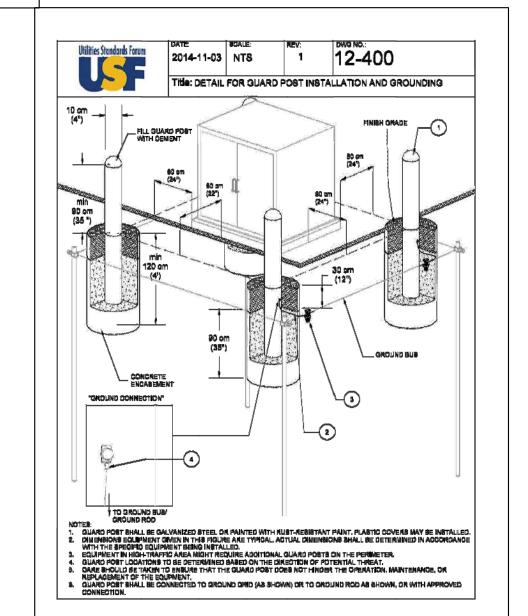




ITEM ∯	DESCRIPTION	হার	MANUFACTURER	PA₹ſ∳	SLOCK (
1	DUCT, DB2/ES2	++			
2	DUCT SPACERS	++			
3	Caution Tape	++			
4	SAND FUL	++			
ŧ					
8					
7					



		MATERIAL LIST LUI-12			
ITEM #	DESCRIPTION	ary	MANUFACTURER	PART#	aloc∢ ∳
		NOT APPLICABLE			





DESIGN | ENGINEERING

23-6033 Shawson Dr., Mississauga, ON L5T 1H8 Tel: 647 297 7668 | msbharaj@gmail.com

PROJECT TITLE:

DESIGN:	PROJECT NUMBER:
M.S.B.	1914
DRAWN BY:	SCALE:
T.S.	NTS
CHECKED BY:	DRAWING NUMBER:
l M.S.B.	
	F-5
DATE:	
November, 2020	