



## **Appendix B**

### **Electrical Depth Supplemental Information**

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**Panelboard Calculations – Panel L4B (Revised)**

PANELBOARD SIZING WORKSHEET												
Panel Tag----->					L4B	Panel Location:			North Electrical Room			
Nominal Phase to Neutral Voltage----->					277				3			
Nominal Phase to Phase Voltage----->					480	Wires:			4			
Pos	Ph.	Load Type	Cat.	Location	Load	Units	I. PF	Watts	VA	Remarks		
1	A	Fluorescent Ltg	3	RM 43-45	1625	w	0.99	1625	1641			
2	A	HID Lighting	4	FRONT/EAST	622.22	w	0.93	622	672			
3	B	Fluorescent Ltg	3	RM 33, 40	2005	w	0.97	2005	2076			
4	B	HID Lighting	4	POLE EAST	788.04	w	0.91	788	870			
5	C	Fluorescent Ltg	3	COR 000	1492	w	0.94	1492	1581			
6	C	HID Lighting	4	POLE SOUTH WEST	1295	w	0.90	1295	1439			
7	A	Fluorescent Ltg	3	RM 50-55	1206	w	0.99	1206	1221			
8	A	HID Lighting	4	POLE WEST	1480	w	0.90	1480	1644			
9	B	Fluorescent Ltg	3	STAIR WEST	314	w	0.98	314	320			
10	B	Incandescent Ltg	5	GARDEN SOUTH	750	w	1.00	750	750			
11	C	Fluorescent Ltg	3	STAIR SOUTH	216	w	0.98	216	220			
12	C	space				w	1.00	0	0			
13	A	space				w	1.00	0	0			
14	A	space				w	1.00	0	0			
15	B	space				w	1.00	0	0			
16	B	space				w	1.00	0	0			
17	C	space				w	1.00	0	0			
18	C	space				w	1.00	0	0			
19	A	space				w	1.00	0	0			
20	A	space				w	1.00	0	0			
21	B	space				w	1.00	0	0			
22	B	space				w	1.00	0	0			
23	C	space				w	1.00	0	0			
24	C	space				w	1.00	0	0			
25	A	space				w	1.00	0	0			
26	A	space				w	1.00	0	0			
27	B	space				w	1.00	0	0			
28	B	space				w	1.00	0	0			
29	C	space				w	1.00	0	0			
30	C	space				w	1.00	0	0			
31	A	space				w	1.00	0	0			
32	A	space				w	1.00	0	0			
33	B	space				w	1.00	0	0			
34	B	space				w	1.00	0	0			
35	C	space				w	1.00	0	0			
36	C	space				w	1.00	0	0			
37	A	space				w	1.00	0	0			
38	A	space				w	1.00	0	0			
39	B	space				w	1.00	0	0			
40	B	space				w	1.00	0	0			
41	C	space				w	1.00	0	0			
42	C	space				w	1.00	0	0			
PANEL TOTAL								11.8	12.4	Amps= 15.0		
PHASE LOADING												
PHASE TOTAL					A			kW	kVA	% Total	Amps	% +/-
PHASE TOTAL					B			4.9	5.2	42%	18.7	24.94%
PHASE TOTAL					C			3.9	4.0	32%	14.5	-3.10%
PHASE TOTAL								3.0	3.2	26%	11.7	-21.84%
LOAD CATEGORIES												
					Connected		Demand					
					kW	kVA	DF	kW	kVA	PF		
1	receptacles				0.0	0.0	0.70	0.0	0.0			
2	computers				0.0	0.0	0.90	0.0	0.0			
3	fluorescent lighting				6.9	7.1	1.00	6.9	7.1	0.97		
4	HID lighting				4.2	4.6	1.00	4.2	4.6	0.90		
5	incandescent lighting				0.8	0.8	1.00	0.8	0.8	1.00		
6	HVAC fans				0.0	0.0	0.80	0.0	0.0			
7	heating				0.0	0.0	1.25	0.0	0.0			
8	kitchen equipment				0.0	0.0	0.80	0.0	0.0			
Total Demand Loads								11.8	12.4			
Spare Capacity					25%			2.9	3.1			
Total Design Loads								14.7	15.5	0.95	Amps= 18.7	
Total Design Loads											Amps=	



**Panelboard Calculations – Panel L1NA (Revised)**

PANELBOARD SIZING WORKSHEET											
Panel Tag----->					L1NA	Panel Location:			North Electrical Room		
Nominal Phase to Neutral Voltage----->					277				3		
Nominal Phase to Phase Voltage----->					480	Wires:			4		
Pos	Ph.	Load Type	Cat.	Location	Load	Units	I. PF	Watts	VA	Remarks	
1	A	spare				w	1.00	0	0		
2	A	Fluorescent Ltg	3	RM 100A, 114,120	1124	w	0.97	1124	1164		
3	B	spare				w	1.00	0	0		
4	B	Fluorescent Ltg	3	R 115-19, 121-24	2578	w	0.95	2578	2711		
5	C	spare				w	1.00	0	0		
6	C	Fluorescent Ltg	3	R 100B-C,131-2	1485	w	0.97	1485	1526		
7	A	spare				w	1.00	0	0		
8	A	Fluorescent Ltg	3	RM 110, 130	2017	w	0.98	2017	2058		
9	B	spare				w	1.00	0	0		
10	B	Fluorescent Ltg	3	RM 132A-E, 138	3079	w	0.95	3079	3248		
11	C	spare				w	1.00	0	0		
12	C	Fluorescent Ltg	3	R 139, 9A-E, 140, A	1512	w	0.95	1512	1595		
13	A	spare				w	1.00	0	0		
14	A	Fluorescent Ltg	3	STRS 1ST TO 2ND	38	w	0.98	38	39		
15	B	spare				w	1.00	0	0		
16	B	Fluorescent Ltg	3	SCNS NORTH	57	w	0.98	57	58		
17	C	spare				w	1.00	0	0		
18	C	spare				w	1.00	0	0		
19	A	spare				w	1.00	0	0		
20	A	spare				w	1.00	0	0		
21	B	spare				w	1.00	0	0		
22	B	spare				w	1.00	0	0		
23	C	spare				w	1.00	0	0		
24	C	spare				w	1.00	0	0		
25	A	space				w	1.00	0	0		
26	A	space				w	1.00	0	0		
27	B	space				w	1.00	0	0		
28	B	space				w	1.00	0	0		
29	C	space				w	1.00	0	0		
30	C	space				w	1.00	0	0		
31	A	space			0	w	1.00	0	0		
32	A	space			0	w	1.00	0	0		
33	B	space			0	w	1.00	0	0		
34	B	space			0	w	1.00	0	0		
35	C	space			0	w	1.00	0	0		
36	C	space			0	w	1.00	0	0		
37	A	space			0	w	1.00	0	0		
38	A	space			0	w	1.00	0	0		
39	B	space			0	w	1.00	0	0		
40	B	space			0	w	1.00	0	0		
41	C	space			0	w	1.00	0	0		
42	C	space			0	w	1.00	0	0		
PANEL TOTAL								11.9	12.4	Amps= 14.9	
PHASE LOADING											
PHASE TOTAL			A				kW	kVA	% Total	Amps	% +/-
PHASE TOTAL			B				3.2	3.3	26%	11.8	-21.11%
PHASE TOTAL			C				5.7	6.0	49%	21.7	45.59%
PHASE TOTAL							3.0	3.1	25%	11.3	-24.48%
LOAD CATEGORIES											
					Connected			Demand			
					kW	kVA	DF	kW	kVA	PF	
1	receptacles				0.0	0.0	0.70	0.0	0.0		
2	computers				0.0	0.0	0.90	0.0	0.0		
3	fluorescent lighting				11.9	12.4	1.00	11.9	12.4	0.96	
4	HID lighting				0.0	0.0	1.00	0.0	0.0		
5	incandescent lighting				0.0	0.0	1.00	0.0	0.0		
6	HVAC fans				0.0	0.0	0.80	0.0	0.0		
7	heating				0.0	0.0	1.25	0.0	0.0		
8	kitchen equipment				0.0	0.0	0.80	0.0	0.0		
Total Demand Loads								11.9	12.4		
Spare Capacity					25%			3.0	3.1		
Total Design Loads								14.9	15.5	0.96	Amps= 18.7
Total Design Loads											Amps=



**Panelboard Calculations – Panel L1SA (Revised)**

PANELBOARD SIZING WORKSHEET												
Panel Tag----->					L1SA	Panel Location:			South Electrical Room			
Nominal Phase to Neutral Voltage----->					277				3			
Nominal Phase to Phase Voltage----->					480	Wires:			4			
Pos	Ph.	Load Type	Cat.	Location	Load	Units	I. PF	Watts	VA	Remarks		
1	A	Fluorescent Ltg	3	R 161,70,52, COR	3124	w	0.98	3124	3201			
2	A	spare				w	1.00	0	0			
3	B	Fluorescent Ltg	3	RM 156, 62-69	2184	w	0.95	2184	2294			
4	B	spare				w	1.00	0	0			
5	C	Fluorescent Ltg	3	R 173,74,75,81,84	1780	w	0.95	1780	1872			
6	C	spare				w	1.00	0	0			
7	A	Fluorescent Ltg	3	RM 151A-J	2269	w	0.98	2269	2373			
8	A	spare				w	1.00	0	0			
9	B	Fluorescent Ltg	3	RM 151D,E,144,43	2850	w	0.97	2850	2938			
10	B	spare				w	1.00	0	0			
11	C	spare				w	1.00	0	0			
12	C	spare				w	1.00	0	0			
13	A	spare				w	1.00	0	0			
14	A	spare				w	1.00	0	0			
15	B	Fluorescent Ltg	3	ATR CAFE	216	w	0.98	216	220			
16	B	spare				w	1.00	0	0			
17	C	Fluorescent Ltg	3	SCNS ATR NORTH	57	w	0.98	57	58			
18	C	spare				w	1.00	0	0			
19	A	Fluorescent Ltg	3	DISPLAY WALL	48	w	0.98	48	49			
20	A	spare				w	1.00	0	0			
21	B	space				w	1.00	0	0			
22	B	space				w	1.00	0	0			
23	C	space				w	1.00	0	0			
24	C	space				w	1.00	0	0			
25	A	space				w	1.00	0	0			
26	A	space				w	1.00	0	0			
27	B	space				w	1.00	0	0			
28	B	space				w	1.00	0	0			
29	C	space				w	1.00	0	0			
30	C	space				w	1.00	0	0			
31	A	space			0	w	1.00	0	0			
32	A	space			0	w	1.00	0	0			
33	B	space			0	w	1.00	0	0			
34	B	space			0	w	1.00	0	0			
35	C	space			0	w	1.00	0	0			
36	C	space			0	w	1.00	0	0			
37	A	space			0	w	1.00	0	0			
38	A	space			0	w	1.00	0	0			
39	B	space			0	w	1.00	0	0			
40	B	space			0	w	1.00	0	0			
41	C	space			0	w	1.00	0	0			
42	C	space			0	w	1.00	0	0			
PANEL TOTAL								12.5	13.0	Amps= 15.7		
PHASE LOADING												
PHASE TOTAL			A					5.4	5.6	43%	20.3	29.71%
PHASE TOTAL			B					5.3	5.5	42%	19.7	25.77%
PHASE TOTAL			C					1.8	1.9	15%	7.0	-55.48%
LOAD CATEGORIES												
		Connected				Demand						
		kW	kVA	DF	kW	kVA	PF					
1	receptacles	0.0	0.0	0.70	0.0	0.0						
2	computers	0.0	0.0	0.90	0.0	0.0						
3	fluorescent lighting	12.5	13.0	1.00	12.5	13.0	0.96					
4	HID lighting	0.0	0.0	1.00	0.0	0.0						
5	incandescent lighting	0.0	0.0	1.00	0.0	0.0						
6	HVAC fans	0.0	0.0	0.80	0.0	0.0						
7	heating	0.0	0.0	1.25	0.0	0.0						
8	kitchen equipment	0.0	0.0	0.80	0.0	0.0						
Total Demand Loads					12.5	13.0						
Spare Capacity		25%			3.1	3.3						
Total Design Loads					15.7	16.3	0.96	Amps=	19.6			
Total Design Loads								Amps=				



**Panelboard Calculations – Panel L2NA(Revised)**

PANELBOARD SIZING WORKSHEET												
Panel Tag----->				L2NA	Panel Location:			North Electrical Room				
Nominal Phase to Neutral Voltage----->				277				3				
Nominal Phase to Phase Voltage----->				480	Wires:			4				
Pos	Ph.	Load Type	Cat.	Location	Load	Units	I. PF	Watts	VA	Remarks		
1	A	spare				w	1.00	0	0			
2	A	Fluorescent Ltg	3	R 210-212	1896	w	0.97	1896	1948			
3	B	spare				w	1.00	0	0			
4	B	Fluorescent Ltg	3	R 213-214	3498	w	0.95	3498	3688			
5	C	spare				w	1.00	0	0			
6	C	Fluorescent Ltg	3	R 204-06, 238-41	3357	w	0.95	3357	3532			
7	A	spare				w	1.00	0	0			
8	A	Fluorescent Ltg	3	RM 200, 231-32	3023	w	0.97	3023	3126			
9	B	spare				w	1.00	0	0			
10	B	Fluorescent Ltg	3	ATR STR 2ND 3RD	38	w	0.98	38	39			
11	C	spare				w	1.00	0	0			
12	C	spare				w	1.00	0	0			
13	A	spare				w	1.00	0	0			
14	A	spare				w	1.00	0	0			
15	B	spare				w	1.00	0	0			
16	B	spare				w	1.00	0	0			
17	C	spare				w	1.00	0	0			
18	C	spare				w	1.00	0	0			
19	A	spare				w	1.00	0	0			
20	A	spare				w	1.00	0	0			
21	B	space				w	1.00	0	0			
22	B	space				w	1.00	0	0			
23	C	space				w	1.00	0	0			
24	C	space				w	1.00	0	0			
25	A	space				w	1.00	0	0			
26	A	space				w	1.00	0	0			
27	B	space				w	1.00	0	0			
28	B	space				w	1.00	0	0			
29	C	space				w	1.00	0	0			
30	C	space				w	1.00	0	0			
31	A	space			0	w	1.00	0	0			
32	A	space			0	w	1.00	0	0			
33	B	space			0	w	1.00	0	0			
34	B	space			0	w	1.00	0	0			
35	C	space			0	w	1.00	0	0			
36	C	space			0	w	1.00	0	0			
37	A	space			0	w	1.00	0	0			
38	A	space			0	w	1.00	0	0			
39	B	space			0	w	1.00	0	0			
40	B	space			0	w	1.00	0	0			
41	C	space			0	w	1.00	0	0			
42	C	space			0	w	1.00	0	0			
PANEL TOTAL								11.8	12.3	Amps= 14.8		
PHASE LOADING												
PHASE TOTAL				A				4.9	5.1	41%	18.3	23.44%
PHASE TOTAL				B				3.5	3.7	30%	13.4	-9.37%
PHASE TOTAL				C				3.4	3.5	29%	12.8	-14.07%
LOAD CATEGORIES												
		Connected				Demand						
		kW	kVA	DF	kW	kVA	PF					
1	receptacles	0.0	0.0	0.70	0.0	0.0						
2	computers	0.0	0.0	0.90	0.0	0.0						
3	fluorescent lighting	11.8	12.3	1.00	11.8	12.3	0.96					
4	HID lighting	0.0	0.0	1.00	0.0	0.0						
5	incandescent lighting	0.0	0.0	1.00	0.0	0.0						
6	HVAC fans	0.0	0.0	0.80	0.0	0.0						
7	heating	0.0	0.0	1.25	0.0	0.0						
8	kitchen equipment	0.0	0.0	0.80	0.0	0.0						
Total Demand Loads					11.8	12.3						
Spare Capacity		25%			3.0	3.1						
Total Design Loads					14.8	15.4	0.96	Amps=	18.5			
Total Design Loads								Amps=				



**Panelboard Calculations – Panel L2SA (Revised)**

PANELBOARD SIZING WORKSHEET											
Panel Tag----->					L2SA	Panel Location:			South Electrical Room		
Nominal Phase to Neutral Voltage----->					277				3		
Nominal Phase to Phase Voltage----->					480	Wires:			4		
Pos	Ph.	Load Type	Cat.	Location	Load	Units	I. PF	Watts	VA	Remarks	
1	A	Fluorescent Ltg	3	R 262, 262 A-M	3096	w	0.95	3096	3243		
2	A	spare				w	0.95	0	0		
3	B	Fluorescent Ltg	3	R 260, 261	2752	w	0.94	2752	2928		
4	B	spare				w	0.94	0	0		
5	C	Fluorescent Ltg	3	R 256-258	3197	w	0.98	3197	3318		
6	C	spare				w	0.98	0	0		
7	A	Fluorescent Ltg	3	R 248, 54	2699	w	0.95	2699	2831		
8	A	spare				w	0.95	0	0		
9	B	Fluorescent Ltg	3	R 243, 245, 42, 46	3543	w	0.95	3543	3736		
10	B	spare				w	1.00	0	0		
11	C	Fluorescent Ltg	3	R 200, 280, 255	2862	w	0.98	2862	2920		
12	C	spare				w	1.00	0	0		
13	A	Fluorescent Ltg	3	DOWN BALC	144	w	0.98	144	147		
14	A	spare				w	1.00	0	0		
15	B	Fluorescent Ltg	3	SCNS BALC	38	w	0.98	38	39		
16	B	spare				w	1.00	0	0		
17	C	spare				w	1.00	0	0		
18	C	spare				w	1.00	0	0		
19	A	spare				w	1.00	0	0		
20	A	spare				w	1.00	0	0		
21	B	spare				w	1.00	0	0		
22	B	spare				w	1.00	0	0		
23	C	spare				w	1.00	0	0		
24	C	spare				w	1.00	0	0		
25	A	spare				w	1.00	0	0		
26	A	spare				w	1.00	0	0		
27	B	spare				w	1.00	0	0		
28	B	spare				w	1.00	0	0		
29	C	spare				w	1.00	0	0		
30	C	spare				w	1.00	0	0		
31	A	spare			0	w	1.00	0	0		
32	A	spare			0	w	1.00	0	0		
33	B	spare			0	w	1.00	0	0		
34	B	spare			0	w	1.00	0	0		
35	C	spare			0	w	1.00	0	0		
36	C	spare			0	w	1.00	0	0		
37	A	spare			0	w	1.00	0	0		
38	A	spare			0	w	1.00	0	0		
39	B	spare			0	w	1.00	0	0		
40	B	spare			0	w	1.00	0	0		
41	C	spare			0	w	1.00	0	0		
42	C	spare			0	w	1.00	0	0		
PANEL TOTAL								18.3	19.2	Amps= 23.1	
PHASE LOADING											
PHASE TOTAL			A				kW	kVA	% Total	Amps	% +/-
PHASE TOTAL			B				5.9	6.2	32%	22.5	-2.61%
PHASE TOTAL			C				6.3	6.7	35%	24.2	4.94%
PHASE TOTAL							6.1	6.2	33%	22.5	-2.33%
LOAD CATEGORIES											
					Connected			Demand			
					kW	kVA	DF	kW	kVA	PF	
1	receptacles				0.0	0.0	0.70	0.0	0.0		
2	computers				0.0	0.0	0.90	0.0	0.0		
3	fluorescent lighting				18.3	19.2	1.00	18.3	19.2	0.98	
4	HID lighting				0.0	0.0	1.00	0.0	0.0		
5	incandescent lighting				0.0	0.0	1.00	0.0	0.0		
6	HVAC fans				0.0	0.0	0.80	0.0	0.0		
7	heating				0.0	0.0	1.25	0.0	0.0		
8	kitchen equipment				0.0	0.0	0.80	0.0	0.0		
Total Demand Loads								18.3	19.2		
Spare Capacity					25%			4.6	4.8		
Total Design Loads								22.9	24.0	0.98	Amps= 28.8
Total Design Loads											Amps=



**Panelboard Calculations – Panel L3SA (Revised)**

PANELBOARD SIZING WORKSHEET												
Panel Tag----->					L3SA	Panel Location:			South Electrical Room			
Nominal Phase to Neutral Voltage----->					277				3			
Nominal Phase to Phase Voltage----->					480	Wires:			4			
Pos	Ph.	Load Type	Cat.	Location	Load	Units	I. PF	Watts	VA	Remarks		
1	A	Fluorescent Ltg	3	R 374,75,78	3083	w	0.95	3083	3250			
2	A	Fluorescent Ltg	3	R 355G	880	w	0.90	880	978			
3	B	Fluorescent Ltg	3	R 361,62,63	3583	w	0.96	3583	3720			
4	B	Fluorescent Ltg	3	R 355F	660	w	0.90	660	733			
5	C	Fluorescent Ltg	3	R 373, CORR F-H	2039	w	0.98	2039	2089			
6	C	Fluorescent Ltg	3	R 355E	880	w	0.90	880	978			
7	A	Fluorescent Ltg	3	R 346,7,54	2918	w	0.95	2918	3064			
8	A	Fluorescent Ltg	3	R 355C	880	w	0.90	880	978			
9	B	Fluorescent Ltg	3	R 343,44,45,45A	4191	w	0.95	4191	4429			
10	B	Fluorescent Ltg	3	R 355B	880	w	0.90	880	978			
11	C	space			0	w	1.00	0	0			
12	C	Fluorescent Ltg	3	R 355A	1760	w	0.90	1760	1956			
13	A	HVAC Fans	6	HT TRACE CT	1040	w	0.95	1040	1095			
14	A	Fluorescent Ltg	3	ATR DWN NOR	504	w	0.98	504	514			
15	B	HVAC Fans	6	HT TRACE CT	1040	w	0.95	1040	1095			
16	B	Fluorescent Ltg	3	SCNS BALC	38	w	0.98	38	39			
17	C	space			0	w	1.00	0	0			
18	C	Fluorescent Ltg	3	DÉCOR PEND	184	w	0.98	184	188			
19	A	space				w	1.00	0	0			
20	A	space				w	1.00	0	0			
21	B	space				w	1.00	0	0			
22	B	space				w	1.00	0	0			
23	C	space				w	1.00	0	0			
24	C	space				w	1.00	0	0			
25	A	space				w	1.00	0	0			
26	A	space				w	1.00	0	0			
27	B	space				w	1.00	0	0			
28	B	space				w	1.00	0	0			
29	C	space				w	1.00	0	0			
30	C	space				w	1.00	0	0			
31	A	space			0	w	1.00	0	0			
32	A	space			0	w	1.00	0	0			
33	B	space			0	w	1.00	0	0			
34	B	space			0	w	1.00	0	0			
35	C	space			0	w	1.00	0	0			
36	C	space			0	w	1.00	0	0			
37	A	space			0	w	1.00	0	0			
38	A	space			0	w	1.00	0	0			
39	B	space			0	w	1.00	0	0			
40	B	space			0	w	1.00	0	0			
41	C	space			0	w	1.00	0	0			
42	C	space			0	w	1.00	0	0			
PANEL TOTAL								24.6	26.1	Amps= 31.4		
PHASE LOADING												
PHASE TOTAL							A	9.3	9.9	38%	35.7	13.62%
PHASE TOTAL							B	10.4	11.0	42%	39.7	26.46%
PHASE TOTAL							C	4.9	5.2	20%	18.8	-40.07%
LOAD CATEGORIES												
					Connected		Demand					
					kW	kVA	DF	kW	kVA	PF		
1	receptacles				0.0	0.0	0.70	0.0	0.0			
2	computers				0.0	0.0	0.90	0.0	0.0			
3	fluorescent lighting				22.5	23.9	1.00	22.5	23.9	0.94		
4	HID lighting				0.0	0.0	1.00	0.0	0.0			
5	incandescent lighting				0.0	0.0	1.00	0.0	0.0			
6	HVAC fans				2.1	2.2	0.80	1.7	1.8	0.95		
7	heating				0.0	0.0	1.25	0.0	0.0			
8	kitchen equipment				0.0	0.0	0.80	0.0	0.0			
Total Demand Loads								24.1	25.6			
Spare Capacity					25%			6.0	6.4			
Total Design Loads								30.2	32.1	0.94		
Total Design Loads										Amps= 38.6		



**Panelboard Calculations – Panel E4B (Revised)**

PANELBOARD SIZING WORKSHEET												
Panel Tag----->				E4B	Panel Location:			North Electrical Room				
Nominal Phase to Neutral Voltage----->				277				3				
Nominal Phase to Phase Voltage----->				480	Wires:			4				
Pos	Ph.	Load Type	Cat.	Location	Load	Units	I. PF	Watts	VA	Remarks		
1	A	Fluorescent Ltg	3	VIVR EMERG	593	w	0.99	593	599			
2	A	HID Lighting	4	REAR EXTERIOR	129	w	1.00	129	129			
3	B	Fluorescent Ltg	3	MECH/ELEC NORTH	1365	w	0.99	1365	1379			
4	B	Fluorescent Ltg	3	2ND FL N EMERG	1621	w	0.98	1621	1681			
5	C	Fluorescent Ltg	3	2ND FL S EMERG	1267	w	0.98	1267	1321			
6	C	HID Lighting	4	EAST ENT EMERG	198	w	0.92	198	216			
7	A	Fluorescent Ltg	3	ELEV ROOM	130	w	0.99	130	131			
8	A	HID Lighting	4	WEST EMERG	556	w	0.91	556	614			
9	B	space				w	1.00	0	0			
10	B	HID Lighting	4	GARDEN EMERG	703	w	0.90	703	781			
11	C	Fluorescent Ltg	3	N STAIR EMERG	1937.22	w	0.98	1937	1977			
12	C	space				w	1.00	0	0			
13	A	Fluorescent Ltg	3	S STAIR EMERG	1900.22	w	0.98	1900	1939			
14	A	space				w	1.00	0	0			
15	B	Fluorescent Ltg	3	1ST FL N EMERG	1238	w	0.98	1238	1295			
16	B	Fluorescent Ltg	3	VESTIBULE LTG	184	w	0.98	184	188			
17	C	Fluorescent Ltg	3	1ST FL S EMERG	1515	w	0.98	1515	1575			
18	C	Fluorescent Ltg	3	BASEMENT EMERG	1175	w	0.98	1175	1226			
19	A	space				w	1.00	0	0			
20	A	space				w	1.00	0	0			
21	B	space				w	1.00	0	0			
22	B	space				w	1.00	0	0			
23	C	space				w	1.00	0	0			
24	C	space				w	1.00	0	0			
25	A	space				w	1.00	0	0			
26	A	space				w	1.00	0	0			
27	B	space				w	1.00	0	0			
28	B	space				w	1.00	0	0			
29	C	space				w	1.00	0	0			
30	C	space				w	1.00	0	0			
31	A	space				w	1.00	0	0			
32	A	space				w	1.00	0	0			
33	B	space				w	1.00	0	0			
34	B	space				w	1.00	0	0			
35	C	space				w	1.00	0	0			
36	C	space				w	1.00	0	0			
37	A	space				w	1.00	0	0			
38	A	space				w	1.00	0	0			
39	B	space				w	1.00	0	0			
40	B	space				w	1.00	0	0			
41	C	space				w	1.00	0	0			
42	C	space				w	1.00	0	0			
PANEL TOTAL								14.5	15.0	Amps= 18.1		
PHASE LOADING								kW	kVA	% Total	Amps	% +/-
PHASE TOTAL								A				
PHASE TOTAL								B				
PHASE TOTAL								C				
LOAD CATEGORIES								Connected		Demand		
					kW	kVA	DF	kW	kVA	PF		
1		receptacles			0.0	0.0	0.70	0.0	0.0			
2		computers			0.0	0.0	0.90	0.0	0.0			
3		fluorescent lighting			12.9	13.3	1.00	12.9	13.3	0.97		
4		HID lighting			1.6	1.7	1.00	1.6	1.7	0.91		
5		incandescent lighting			0.0	0.0	1.00	0.0	0.0			
6		HVAC fans			0.0	0.0	0.80	0.0	0.0			
7		heating			0.0	0.0	1.25	0.0	0.0			
8		kitchen equipment			0.0	0.0	0.80	0.0	0.0			
Total Demand Loads									14.5	15.0		
Spare Capacity									25%	3.8	3.8	
Total Design Loads									18.1	18.8	0.98	Amps= 22.8
Total Design Loads												Amps=





**Panelboard Calculations – Panel E4P (Revised)**

PANELBOARD SIZING WORKSHEET											
Panel Tag----->				E4P	Panel Location:			Electrical Room			
Nominal Phase to Neutral Voltage----->				277				3			
Nominal Phase to Phase Voltage----->				480	Wires:			4			
Pos	Ph.	Load Type	Cat.	Location	Load	Units	I. PF	Watts	VA	Remarks	
1	A	spare				w	1.00	0	0		
2	A	Fluorescent Ltg	3	EM 3RD FL COL N	1318	w	0.98	1318	1372		
3	B	spare				w	1.00	0	0		
4	B	Fluorescent Ltg	3	EM 3RD FL COL S	1399	w	0.98	1399	1458		
5	C	Fluorescent Ltg	3	EM ATR DWN	720	w	0.98	720	735		
6	C	spare				w	1.00	0	0		
7	A	Fluorescent Ltg	3	RM 401	325	w	0.98	325	332		
8	A	spare				w	0.98	0	0		
9	B	spare				w	1.00	0	0		
10	B	spare				w	1.00	0	0		
11	C	spare				w	1.00	0	0		
12	C	spare				w	1.00	0	0		
13	A	spare				w	1.00	0	0		
14	A	spare				w	1.00	0	0		
15	B	spare				w	1.00	0	0		
16	B	spare				w	1.00	0	0		
17	C	spare				w	1.00	0	0		
18	C	spare				w	1.00	0	0		
19	A	spare				w	1.00	0	0		
20	A	spare				w	1.00	0	0		
21	B	spare				w	1.00	0	0		
22	B	spare				w	1.00	0	0		
23	C	spare				w	1.00	0	0		
24	C	spare				w	1.00	0	0		
25	A	spare				w	1.00	0	0		
26	A	spare				w	1.00	0	0		
27	B	spare				w	1.00	0	0		
28	B	spare				w	1.00	0	0		
29	C	spare				w	1.00	0	0		
30	C	spare				w	1.00	0	0		
31	A	spare			0	w	1.00	0	0		
32	A	spare			0	w	1.00	0	0		
33	B	spare			0	w	1.00	0	0		
34	B	spare			0	w	1.00	0	0		
35	C	spare			0	w	1.00	0	0		
36	C	spare			0	w	1.00	0	0		
37	A	spare			0	w	1.00	0	0		
38	A	spare			0	w	1.00	0	0		
39	B	spare			0	w	1.00	0	0		
40	B	spare			0	w	1.00	0	0		
41	C	spare			0	w	1.00	0	0		
42	C	spare			0	w	1.00	0	0		
PANEL TOTAL								3.8	3.9	Amps= 4.7	
PHASE LOADING											
PHASE TOTAL			A				kW	kVA	% Total	Amps	% +/-
PHASE TOTAL			B				1.6	1.7	44%	6.1	31.16%
PHASE TOTAL			C				1.4	1.5	37%	5.3	12.27%
PHASE TOTAL							0.7	0.7	19%	2.7	-43.43%
LOAD CATEGORIES											
		Connected				Demand					
		kW	kVA	DF	kW	kVA	PF				
1	receptacles	0.0	0.0	0.70	0.0	0.0					
2	computers	0.0	0.0	0.90	0.0	0.0					
3	fluorescent lighting	3.8	3.9	1.00	3.8	3.9	0.97				
4	HID lighting	0.0	0.0	1.00	0.0	0.0					
5	incandescent lighting	0.0	0.0	1.00	0.0	0.0					
6	HVAC fans	0.0	0.0	0.80	0.0	0.0					
7	heating	0.0	0.0	1.25	0.0	0.0					
8	kitchen equipment	0.0	0.0	0.80	0.0	0.0					
Total Demand Loads					3.8	3.9					
Spare Capacity		25%			0.9	1.0					
Total Design Loads					4.7	4.9	0.97	Amps=	5.9		
Total Design Loads								Amps=			



**Panelboard Calculations – Panel DM4P (Revised)**

PANELBOARD SIZING WORKSHEET												
Panel Tag----->					DM4P	Panel Location:			North Electrical Room			
Nominal Phase to Neutral Voltage----->					277				3			
Nominal Phase to Phase Voltage----->					480	Wires:			4			
Pos	Ph.	Load Type	Cat.	Location	Load	Units	I. PF	Watts	VA	Remarks		
1	A	Fluorescent Ltg	3	LEC CHALK	470	w	0.99	470	475			
2	A	Fluorescent Ltg	3	LEC SPEAKER	188	w	0.99	188	190			
3	B	Fluorescent Ltg	3	LEC CEN FRONT	174	w	0.98	174	178			
4	B	Fluorescent Ltg	3	LEC LEFT FRON	116	w	0.98	116	118			
5	C	Fluorescent Ltg	3	LEC RIGHT FRON	174	w	0.98	174	178			
6	C	Fluorescent Ltg	3	LEC SCONCES	152	w	0.98	152	155			
7	A	space			0	w	1.00	0	0			
8	A	Fluorescent Ltg	3	ATR DOWN COR	1517	w	0.98	1517	1548			
9	B	Fluorescent Ltg	3	ATR WALL COR	1110	w	0.98	1110	1133			
10	B	Fluorescent Ltg	3	HUM WALL	750	w	1.00	750	750			
11	C	Fluorescent Ltg	3	HUM ACCENT	150	w	1.00	150	150			
12	C	Fluorescent Ltg	3	HUM ACCENT	150	w	1.00	150	150			
13	A	space				w	1.00	0	0			
14	A	space				w	1.00	0	0			
15	B	space				w	1.00	0	0			
16	B	space				w	1.00	0	0			
17	C	space				w	1.00	0	0			
18	C	space				w	1.00	0	0			
19	A	space				w	1.00	0	0			
20	A	space				w	1.00	0	0			
21	B	space				w	1.00	0	0			
22	B	space				w	1.00	0	0			
23	C	space				w	1.00	0	0			
24	C	space				w	1.00	0	0			
25	A	space				w	1.00	0	0			
26	A	space				w	1.00	0	0			
27	B	space				w	1.00	0	0			
28	B	space				w	1.00	0	0			
29	C	space				w	1.00	0	0			
30	C	space				w	1.00	0	0			
31	A	space			0	w	1.00	0	0			
32	A	space			0	w	1.00	0	0			
33	B	space			0	w	1.00	0	0			
34	B	space			0	w	1.00	0	0			
35	C	space			0	w	1.00	0	0			
36	C	space			0	w	1.00	0	0			
37	A	space			0	w	1.00	0	0			
38	A	space			0	w	1.00	0	0			
39	B	space			0	w	1.00	0	0			
40	B	space			0	w	1.00	0	0			
41	C	space			0	w	1.00	0	0			
42	C	space			0	w	1.00	0	0			
PANEL TOTAL								5.0	5.0	Amps= 6.0		
PHASE LOADING								kW	kVA	% Total	Amps	% +/-
PHASE TOTAL					A			2.2	2.2	44%	8.0	32.13%
PHASE TOTAL					B			2.2	2.2	43%	7.9	30.09%
PHASE TOTAL					C			0.6	0.6	13%	2.3	-62.22%
LOAD CATEGORIES					Connected			Demand				
					kW	kVA	DF	kW	kVA	PF		
1		receptacles			0.0	0.0	0.70	0.0	0.0			
2		computers			0.0	0.0	0.90	0.0	0.0			
3		fluorescent lighting			5.0	5.0	1.00	5.0	5.0	0.99		
4		HID lighting			0.0	0.0	1.00	0.0	0.0			
5		incandescent lighting			0.0	0.0	1.00	0.0	0.0			
6		HVAC fans			0.0	0.0	0.80	0.0	0.0			
7		heating			0.0	0.0	1.25	0.0	0.0			
8		kitchen equipment			0.0	0.0	0.80	0.0	0.0			
Total Demand Loads								5.0	5.0			
Spare Capacity					25%			1.2	1.3			
Total Design Loads								6.2	6.3	0.99	Amps= 7.6	
Total Design Loads											Amps=	

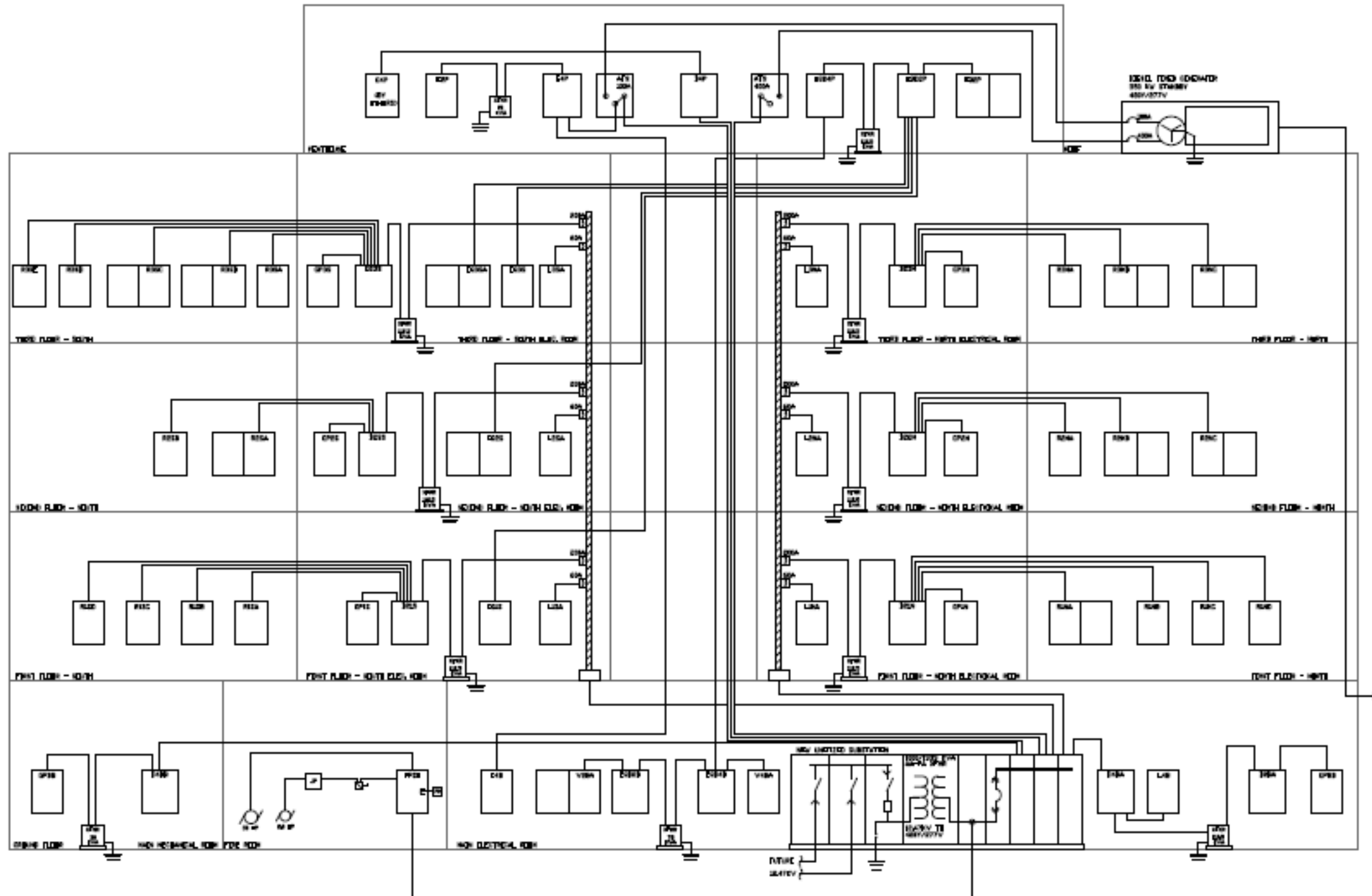


**Panelboard Calculations – Panel EDM4P (Revised)**

PANELBOARD SIZING WORKSHEET												
Panel Tag----->					EDM4P	Panel Location:			North Electrical Room			
Nominal Phase to Neutral Voltage----->					277				3			
Nominal Phase to Phase Voltage----->					480	Wires:			4			
Pos	Ph.	Load Type	Cat.	Location	Load	Units	I. PF	Watts	VA	Remarks		
1	A	Fluorescent Ltg	3	LEC DOWN FRONT	124	w	0.98	124	127			
2	A	Fluorescent Ltg	3	LEC CEN MIDDLE	174	w	0.98	174	178			
3	B	Fluorescent Ltg	3	LEC LEFT MIDDLE	174	w	0.98	174	178			
4	B	Fluorescent Ltg	3	LEC RIGHT MIDDLE	232	w	0.98	232	237			
5	C	Fluorescent Ltg	3	LEC CEN BACK	348	w	0.98	348	355			
6	C	Fluorescent Ltg	3	LEC VEST	68	w	0.98	68	69			
7	A	Fluorescent Ltg	3	LEC LEFT BACK	174	w	0.98	174	178			
8	A	Fluorescent Ltg	3	LEC RIGHT BACK	232	w	0.98	232	237			
9	B	Fluorescent Ltg	3	ATR DOWN COR	962	w	0.98	962	962			
10	B	Fluorescent Ltg	3	HUM EMERG DOWN	1200	w	0.98	1200	1224			
11	C	Fluorescent Ltg	3	LEC DOWN RAMP	217	w	0.98	217	221			
12	C	Fluorescent Ltg	3	LEC DOWN BACK	403	w	0.98	403	411			
13	A	space		LEC STAIRS	37.8	w	1.00	38	38			
14	A	space		LEC RAMP	100.8	w	1.00	101	101			
15	B	space				w	1.00	0	0			
16	B	space				w	1.00	0	0			
17	C	space				w	1.00	0	0			
18	C	space				w	1.00	0	0			
19	A	space				w	1.00	0	0			
20	A	space				w	1.00	0	0			
21	B	space				w	1.00	0	0			
22	B	space				w	1.00	0	0			
23	C	space				w	1.00	0	0			
24	C	space				w	1.00	0	0			
25	A	space				w	1.00	0	0			
26	A	space				w	1.00	0	0			
27	B	space				w	1.00	0	0			
28	B	space				w	1.00	0	0			
29	C	space				w	1.00	0	0			
30	C	space				w	1.00	0	0			
31	A	space			0	w	1.00	0	0			
32	A	space			0	w	1.00	0	0			
33	B	space			0	w	1.00	0	0			
34	B	space			0	w	1.00	0	0			
35	C	space			0	w	1.00	0	0			
36	C	space			0	w	1.00	0	0			
37	A	space			0	w	1.00	0	0			
38	A	space			0	w	1.00	0	0			
39	B	space			0	w	1.00	0	0			
40	B	space			0	w	1.00	0	0			
41	C	space			0	w	1.00	0	0			
42	C	space			0	w	1.00	0	0			
PANEL TOTAL								4.4	4.5	Amps= 5.5		
PHASE LOADING												
PHASE TOTAL			A					kW	kVA	% Total	Amps	% +/-
PHASE TOTAL			B					0.8	0.9	19%	3.1	-43.30%
PHASE TOTAL			C					2.6	2.6	58%	9.5	73.36%
PHASE TOTAL								1.0	1.1	23%	3.8	-30.06%
LOAD CATEGORIES												
					Connected			Demand				
					kW	kVA	DF	kW	kVA	PF		
1	receptacles				0.0	0.0	0.70	0.0	0.0			
2	computers				0.0	0.0	0.90	0.0	0.0			
3	fluorescent lighting				4.3	4.4	1.00	4.3	4.4	0.98		
4	HID lighting				0.0	0.0	1.00	0.0	0.0			
5	incandescent lighting				0.0	0.0	1.00	0.0	0.0			
6	HVAC fans				0.0	0.0	0.80	0.0	0.0			
7	heating				0.0	0.0	1.25	0.0	0.0			
8	kitchen equipment				0.0	0.0	0.80	0.0	0.0			
Total Demand Loads								4.3	4.4			
Spare Capacity					25%			1.1	1.1			
Total Design Loads								5.4	5.5	0.98	Amps= 6.6	
Total Design Loads											Amps=	



Riser Diagram - Existing



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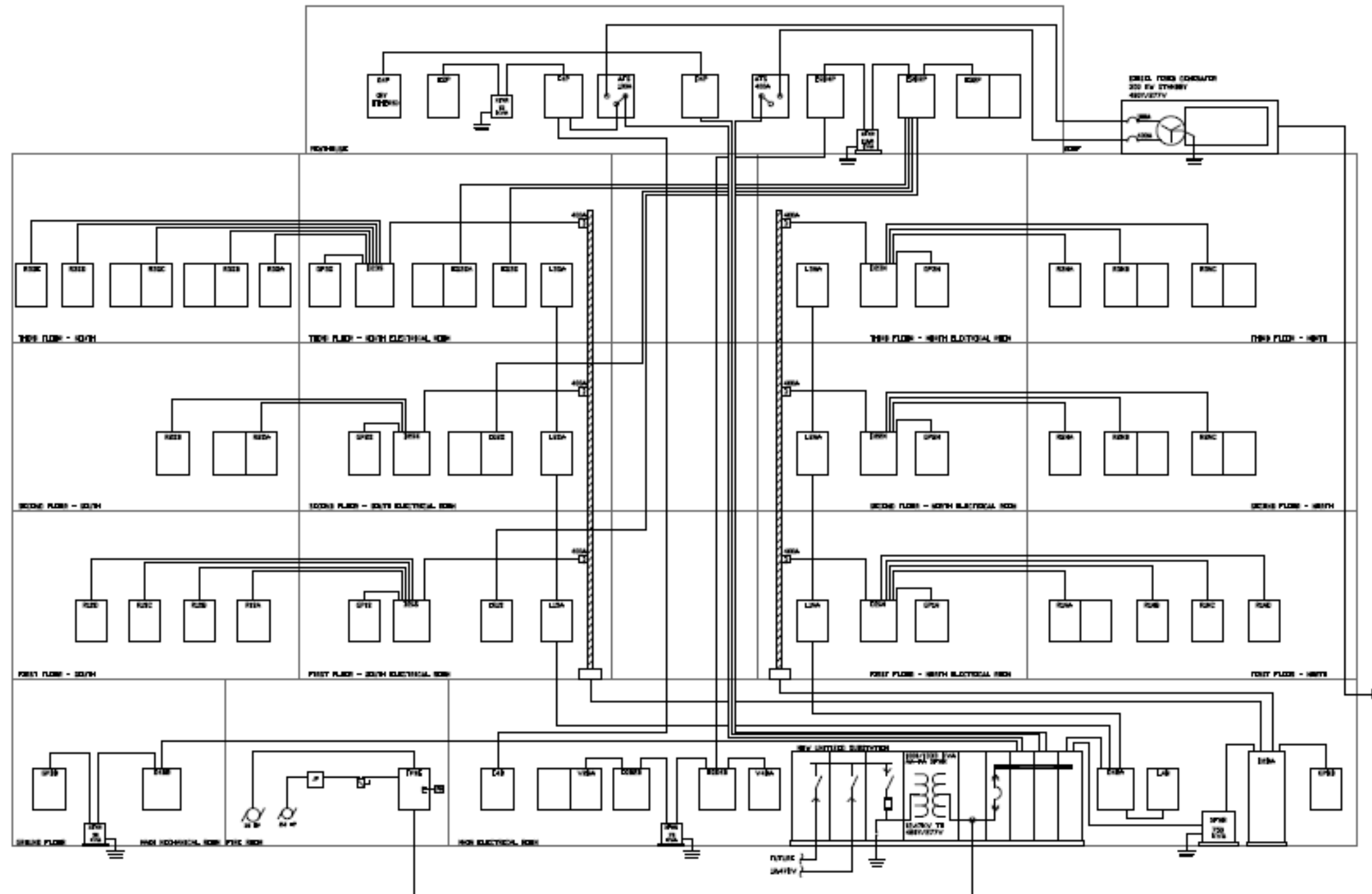
**Riser Diagram – Existing with Affected Equipment Highlighted**



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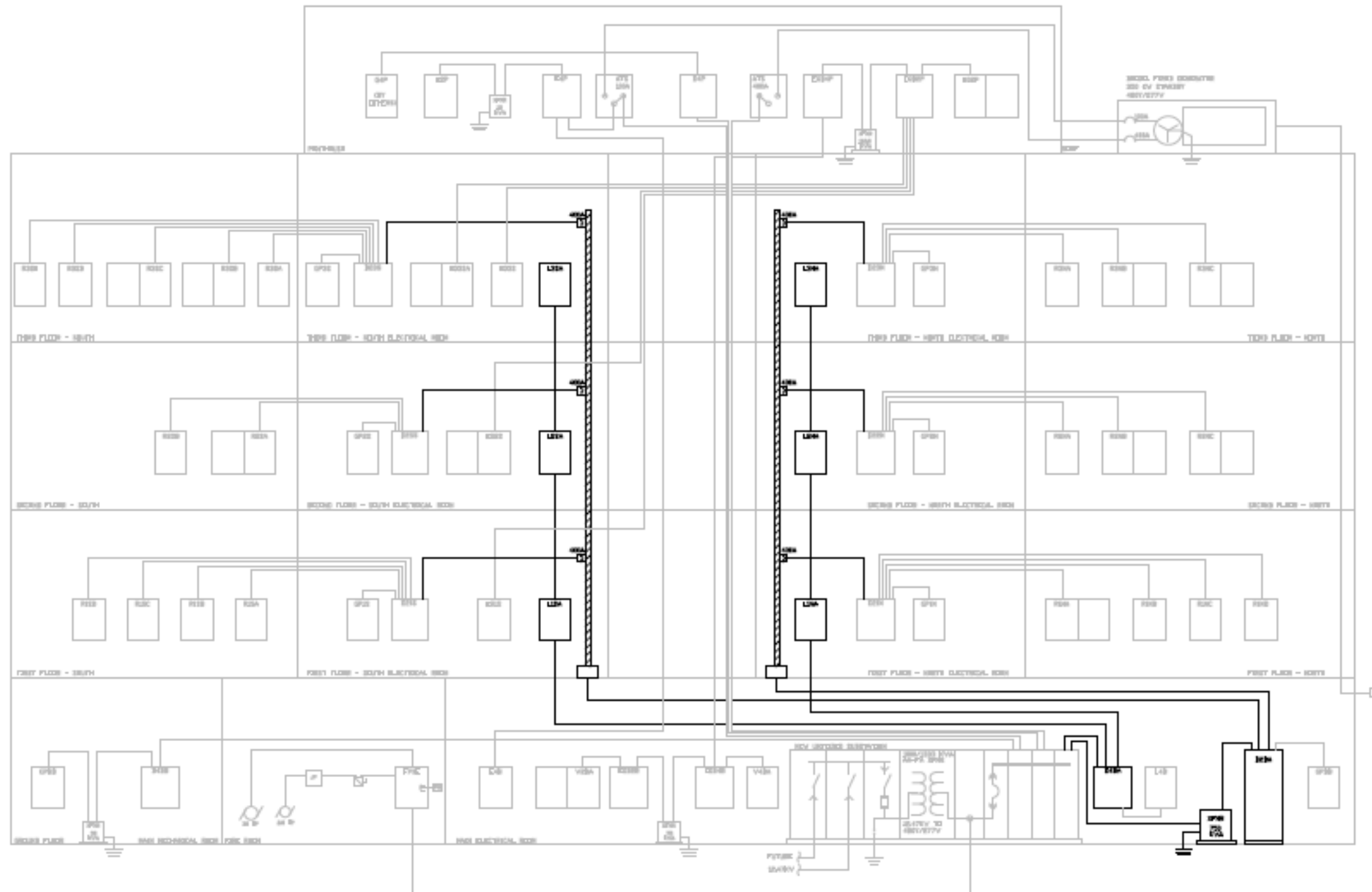
Riser Diagram - Proposed



Access to File: P:\Thesis AutoCAD Files\new riser diagram.dwg



**Riser Diagram – Proposed with Affected Equipment Highlighted**



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**Central Transformer – Quick Estimate for Sizing**

<b>Panelboard</b>	<b>Rating</b>	<b>Amps</b>	<b>Max Demand</b>	<b>Notes</b>
GPBA	150A	150	31200	
GPBB	100A	100	20800	
GP1N	100A	100	20800	
R1NA	225A	225	46800	
R1NB	60A	60	12480	
R1NC	60A	60	12480	
R1ND	60A	60	12480	
GP1S	100A	100	20800	
R1SA	60A	60	12480	
R1SB	60A	60	12480	
R1SC	60A	60	12480	
R1SD	60A	60	12480	
GP2N	100A	100	20800	
R2NA	60A	60	12480	
R2NB	150A	150	31200	
R2NC	150A	150	31200	
GP2S	100A	100	20800	
R2SA	150A	150	31200	
R2SB	60A	60	12480	
GP3N	100A	100	20800	
R3NA	60A	60	12480	
R3NB	150A	150	31200	
R3NC	150A	150	31200	
GP3S	100A	100	20800	
R3SA	100A	100	20800	
R3SB	150A	150	31200	
R3SC	225A	225	46800	
R3SD	60A	60	12480	
R3SE	100A	100	20800	
D2BA	400A	400	39520	*Subtracts GPBA and DM2P
DM2P	60A	60	12480	

<b>Total VA</b>	<b>688480</b>
<b>Demand Factor</b>	<b>0.7</b>
<b>Spare Capacitiv</b>	<b>1.15</b>
<b>Total VA</b>	<b>554226.4</b>
<b>Xfmr KVA Rating</b>	<b>750 KVA</b>





**Central Transformer– Detailed Sizing Calculations**

Panel	Receptacles		Total Motor Loads		Four Plex Receptacles		Number 4 Outlets		J Outlets		Strip Receptacles		Disconnects for Lab Equip.		Lighting	Total
	Label	#	VA	Motor VA	Motor W	#	VA	#	VA	#	VA	Length	VA	#	VA	VA
GPBA	23	4140	1210.59	939	1	360		0		0	81	9720	0	0	0	15431
GPBB	8	1440	6852	6306		0		0	1	1920		0		0	0	10212
GP1N	56	10080	1296	976.8	4	1440		0	3	5760		0		0	0	18576
R1NA	31	5580	0	0	8	2880		0		0	314	37680	0	0	0	46140
R1NB	35	6300	0	0	2	720		0		0		0		0	0	7020
R1NC	43	7740	0	0	12	4320		0		0		0		0	0	12060
R1ND	27	4860	0	0	6	2160		0		0		0		0	0	7020
GP1S	58	10440	600	420	7	2520		0	9	17280		0		0	0	30840
R1SA	20	3600	0	0	0	0		0	0	0		0		0	0	3600
R1SB	42	7560	0	0	4	1440		0	0	0		0		0	0	9000
R1SC	40	7200	0	0	1	360		0	0	0		0		0	0	7560
R1SD	21	3780	0	0	3	1080		0	2	3840		0		0	0	8700
GP2N	33	5940	696	556.8	4	1440		0	1	1920		0	6	11520	0	21516
R2NA	36	6480	0	0	1	360	2.5	4800	1	1920	23	2760		0	0	16320
R2NB	105	18900	0	0	16	5760		0	3	5760	22.5	2700		0	0	33120
R2NC	34	6120	0	0	11	3960		0	3	5760	41	4920		0	0	20760
GP2S	49	8820	0	0	14	5040		0		0		0	6	11520	0	25380
R2SA	45	8100	0	0	12	4320	2	3840	2	3840	42	5040	2	3840	0	28980
R2SB	79	14220	0	0	3	1080		0		0		0		0	0	15300
GP3N	44	7920	1296	1021.8	5	1800		0	3	5760		0	4.5	8640	0	25416
R3NA	61	10980	0	0	2	720		0	1	1920	8	960		0	0	14580
R3NB	45	8100	0	0	5	1800	3	5760	2	3840	45.5	5460		0	0	24960
R3NC	41	7380	0	0	2	720	4	7680	2	3840	58	6960		0	0	26580
GP3S	40	7200	480	384	4	1440		0		0		0		0	0	9120
R3SA	81	14580	0	0	8	2880		0	2	3840	17	2040	3	5760	0	29100
R3SB	38	6840	0	0	5	1800	2	3840	2	3840	76	9120		0	0	25440
R3SC	63	11340	0	0	0	0	20	38400	5	9600		0		0	0	59340
R3SD	32	5760	0	0	4	1440	1	1920	1	1920	11.5	1380		0	0	12420
R3SE	48	8640	0	0	3	1080	2	3840	2	3840	50	6000		0	0	23400
D2BA	0	0	0	0	0	0	0	0	0	0	0	0	14	26880		26880
DM2P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16865	16865
<b>Total</b>	<b>1278</b>	<b>230040</b>	<b>12430.59</b>	<b>10604.4</b>	<b>147</b>	<b>52920</b>	<b>36.5</b>	<b>70080</b>	<b>45</b>	<b>86400</b>	<b>789.5</b>	<b>94740</b>	<b>35.5</b>	<b>68160</b>	<b>16865</b>	<b>631636</b>

<b>Total Demand Load</b>	<b>447785.59</b>
<b>Spare Capacity</b>	<b>1.15</b>
<b>Total VA</b>	<b>514953.43</b>
<b>Xfmr KVA Rating</b>	<b>750 KVA</b>



**Central Transformer– Detailed Motor Calculations**

Panel	Motor 1							Motor 2							Motor 3							Motor 4							Motor 5						
	Label	Motor HP	#	FLC	Voltage	PF	VA	W	Motor HP	#	FLC	Voltage	PF	VA	W	Motor HP	#	FLC	Voltage	PF	VA	W	Motor HP	#	FLC	Voltage	PF	VA	W	Motor HP	#	FLC	Voltage	PF	VA
GPBA	0.05	2	1.25	120	1.00	300	300	-	1	0.088	120	0.85	10.59	9	0.2	1	5	120	0.70	600	420	0.1	1	2.5	120	0.70	300	210	-	-	-	-	-	0	0
GPBB	0.1	1	2.5	120	0.70	300	210	0.25	1	5.8	120	0.80	696	557	0.08	2	2.2	120	0.70	528	370	0.17	1	4.4	120	0.70	528	370	-	2	20	120	1.00	4800	4800
GP1N	0.2	1	5	120	0.70	600	420	0.25	1	5.8	120	0.80	696	557	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0
R1NA	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0
R1NB	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0
R1NC	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0
R1ND	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0
GP1S	0.2	1	5	120	0.70	600	420	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0
R1SA	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0
R1SB	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0
R1SC	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0
R1SD	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0
GP2N	0.25	1	5.8	120	0.80	696	556.8	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0
R2NA	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0
R2NB	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0
R2NC	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0
GP2S	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0
R2SA	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0
R2SB	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0
GP3N	0.1	1	2.5	120	0.70	300	210	0.25	1	5.8	120	0.80	696	556.8	0.05	2	1.25	120	0.85	300	255	-	-	-	-	-	0	0	-	-	-	-	-	0	0
R3NA	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0
R3NB	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0
R3NC	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0
GP3S	0.14	1	4	120	0.80	480	384	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0
R3SA	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0
R3SB	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0
R3SC	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0
R3SD	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0
R3SE	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0
D2BA	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0
DM2P	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0



**Breakdown of Electrical Take-Off for Existing Equipment**

Existing Circuit Breakers:

<u>FLOOR LEVEL</u>	<u>ROOM NAME</u>	<u>FROM</u>	<u>TO</u>	<u>SIZE</u>	<u>COST</u>
1st Floor	SOUTH ELEC. ROOM	SOUTH BUS DUCT	L1SA	60A	\$1,084.05
1st Floor	SOUTH ELEC. ROOM	SOUTH BUS DUCT	D21S	200A	\$2,786.40
2nd Floor	SOUTH ELEC. ROOM	SOUTH BUS DUCT	L2SA	60A	\$1,084.05
2nd Floor	SOUTH ELEC. ROOM	SOUTH BUS DUCT	D22S	200A	\$2,786.40
3rd Floor	SOUTH ELEC. ROOM	SOUTH BUS DUCT	L3SA	60A	\$1,084.05
3rd Floor	SOUTH ELEC. ROOM	SOUTH BUS DUCT	D23S	200A	\$2,786.40
1st Floor	NORTH ELEC. ROOM	NORTH BUS DUCT	L1NA	60A	\$1,084.05
1st Floor	NORTH ELEC. ROOM	NORTH BUS DUCT	D21N	200A	\$2,786.40
2nd Floor	NORTH ELEC. ROOM	NORTH BUS DUCT	L2NA	60A	\$1,084.05
2nd Floor	NORTH ELEC. ROOM	NORTH BUS DUCT	D22N	200A	\$2,786.40
3rd Floor	NORTH ELEC. ROOM	NORTH BUS DUCT	L3NA	60A	\$1,084.05
3rd Floor	NORTH ELEC. ROOM	NORTH BUS DUCT	D23N	200A	\$2,786.40
<b>Total</b>					\$23,222.70

Existing Panelboards:

<u>TAG</u>	<u>VOLTAGE SYSTEM</u>	<u>MAIN SIZE</u>	<u>MLO OR MCB?</u>	<u>FLOOR LEVEL</u>	<u>ROOM NAME</u>	<u>REMARKS</u>	<u>COST</u>
L1SA	480Y/277V, 3 PH, 4W	60	MLO	FIRST FLOOR	SOUTH ELEC. ROOM	-	\$2,841.75
L2SA	480Y/277V, 3 PH, 4W	60	MLO	SECOND FLOOR	SOUTH ELEC. ROOM	-	\$2,841.75
L3SA	480Y/277V, 3 PH, 4W	60	MLO	THIRD FLOOR	SOUTH ELEC. ROOM	-	\$2,841.75
L1NA	480Y/277V, 3 PH, 4W	60	MLO	FIRST FLOOR	NORTH ELEC. ROOM	-	\$2,841.75
L2NA	480Y/277V, 3 PH, 4W	60	MLO	SECOND FLOOR	NORTH ELEC. ROOM	-	\$2,841.75
D4BA	480Y/277V, 3 PH, 4W	400	MCB	BASEMENT	MAIN ELEC. ROOM	-	\$8,066.25
D2BA	208Y/120V, 3 PH, 4W	400	MCB	BASEMENT	MAIN ELEC. ROOM	-	\$8,066.25
<b>Total</b>							\$30,341.25



Existing Feeders:

FROM	TO	NO. OF SETS	CONDUIT		CONDUCTORS (PER SET)									COST
			(PER SET)		PHASE CONDUCTORS			NEUTRAL CONDUCTORS			GROUND CONDUCTORS			
			SIZE	LENGTH	No.	SIZE	LENGTH	No.	SIZE	LENGTH	No.	SIZE	LENGTH	
SWB-1	South Bus Duct	2	3"	230	3	350KCMIL	240	1	350KCMIL	240	1	1AWG	240	\$38,623.77
South Bus Duct	L1SA	1	1"	6	3	6AWG	10	1	6AWG	10	1	10AWG	10	\$110.04
South Bus Duct	XFMR A	1	2"	6	3	3/0AWG	10	0	3/0AWG	10	1	6AWG	10	\$294.81
XFMR A	D21S	1	3 1/2"	6	3	600KCMIL	10	1	600KCMIL	10	1	3AWG	10	\$1,063.53
South Bus Duct	L2SA	1	1"	6	3	6AWG	10	1	6AWG	10	1	10AWG	10	\$110.04
South Bus Duct	XFMR B	1	2"	6	3	3/0AWG	10	0	3/0AWG	10	1	6AWG	10	\$294.81
XFMR B	D22S	1	3 1/2"	6	3	600KCMIL	10	1	600KCMIL	10	1	3AWG	10	\$1,063.53
South Bus Duct	L3SA	1	1"	6	3	6AWG	10	1	6AWG	10	1	10AWG	10	\$110.04
South Bus Duct	XFMR C	1	2"	6	3	3/0AWG	10	0	3/0AWG	10	1	6AWG	10	\$294.81
XFMR C	D23S	1	3 1/2"	6	3	600KCMIL	10	1	600KCMIL	10	1	3AWG	10	\$1,063.53
SWB-1	North Bus Duct	1	3"	95	3	350KCMIL	105	1	350KCMIL	105	1	1AWG	105	\$8,305.81
North Bus Duct	L1NA	1	1"	6	3	6AWG	10	1	6AWG	10	1	10AWG	10	\$110.04
North Bus Duct	XFMR D	1	2"	6	3	3/0AWG	10	0	3/0AWG	10	1	6AWG	10	\$294.81
XFMR D	D21N	1	3 1/2"	6	3	600KCMIL	10	1	600KCMIL	10	1	3AWG	10	\$1,063.53
North Bus Duct	L2NA	1	1"	6	3	6AWG	10	1	6AWG	10	1	10AWG	10	\$110.04
North Bus Duct	XFMR E	1	2"	6	3	3/0AWG	10	0	3/0AWG	10	1	6AWG	10	\$294.81
XFMR E	D22N	1	3 1/2"	6	3	600KCMIL	10	1	600KCMIL	10	1	3AWG	10	\$1,063.53
North Bus Duct	L3NA	1	1"	6	3	6AWG	10	1	6AWG	10	1	10AWG	10	\$110.04
North Bus Duct	XFMR F	1	2"	6	3	3/0AWG	10	0	3/0AWG	10	1	6AWG	10	\$294.81
XFMR F	D23N	1	3 1/2"	6	3	600KCMIL	10	1	600KCMIL	10	1	3AWG	10	\$1,063.53
SWB-1	D4BA	1	3 1/2"	30	3	600KCMIL	35	1	600KCMIL	35	1	3AWG	35	\$3,998.16
D4BA	XFMR G	1	2"	6	3	3/0AWG	10	0	3/0AWG	10	1	6AWG	10	\$294.81
XFMR G	D2BA	1	3 1/2"	6	3	600KCMIL	10	1	600KCMIL	10	1	3AWG	10	\$1,063.53
													<b>Total</b>	\$61,096.37



Existing Bus Duct:

<u>BUILDING SIDE</u>	<u>LENGTH</u>	<u>VOLTAGE</u>	<u>RATING</u>	<u>COST</u>
SOUTH	40	480Y/277V	600A	\$11,340.00
NORTH	40	480Y/277V	600A	\$11,340.00
<b>Total</b>				<b>\$22,680.00</b>

Existing Transformers:

<u>Label</u>	<u>Level</u>	<u>Room</u>	<u>KVA Rating</u>	<u>Primary Voltage</u>	<u>Secondary Voltage</u>	<u>Type</u>	<u>Temp. Rise</u>	<u>Taps</u>	<u>Mounting</u>	<u>Cost</u>
A	1st Floor	South Electrical	112.5	480Δ	208Y/120	Dry Type	150 °C	(4) 2.5%	Floor Mounted With Pad	\$8,118.90
B	2nd Floor	South Electrical	112.5	480Δ	208Y/120	Dry Type	150 °C	(4) 2.5%	Floor Mounted With Pad	\$8,118.90
C	3rd Floor	South Electrical	112.5	480Δ	208Y/120	Dry Type	150 °C	(4) 2.5%	Floor Mounted With Pad	\$8,118.90
D	1st Floor	North Electrical	112.5	480Δ	208Y/120	Dry Type	150 °C	(4) 2.5%	Floor Mounted With Pad	\$8,118.90
E	2nd Floor	North Electrical	112.5	480Δ	208Y/120	Dry Type	150 °C	(4) 2.5%	Floor Mounted With Pad	\$8,118.90
F	3rd Floor	North Electrical	112.5	480Δ	208Y/120	Dry Type	150 °C	(4) 2.5%	Floor Mounted With Pad	\$8,118.90
G	Basement	Main Electrical	112.5	480Δ	208Y/120	Dry Type	150 °C	(4) 2.5%	Floor Mounted With Pad	\$8,118.90
<b>Total</b>										<b>\$56,832.30</b>



**Breakdown of Electrical Take-Off for Existing Equipment**

Proposed Circuit Breakers:

<u>FLOOR LEVEL</u>	<u>ROOM NAME</u>	<u>FROM</u>	<u>TO</u>	<u>SIZE</u>	<u>COST</u>
1st Floor	SOUTH ELEC. ROOM	SOUTH BUS DUCT	D21S	400A	\$5,089.50
2nd Floor	SOUTH ELEC. ROOM	SOUTH BUS DUCT	D22S	400A	\$5,089.50
3rd Floor	SOUTH ELEC. ROOM	SOUTH BUS DUCT	D23S	400A	\$5,089.50
1st Floor	NORTH ELEC. ROOM	NORTH BUS DUCT	D21N	400A	\$5,089.50
2nd Floor	NORTH ELEC. ROOM	NORTH BUS DUCT	D22N	400A	\$5,089.50
3rd Floor	NORTH ELEC. ROOM	NORTH BUS DUCT	D23N	400A	\$5,089.50
<b>Total</b>					\$30,537.00

Proposed Panelboards:

<u>TAG</u>	<u>VOLTAGE SYSTEM</u>	<u>MAIN SIZE</u>	<u>MLO OR MCB?</u>	<u>FLOOR LEVEL</u>	<u>ROOM NAME</u>	<u>REMARKS</u>	<u>COST</u>
L1SA	480Y/277V, 3 PH, 4W	100	MLO	FIRST FLOOR	SOUTH ELEC. ROOM	FEED THROUGH	\$2,841.75
L2SA	480Y/277V, 3 PH, 4W	100	MLO	SECOND FLOOR	SOUTH ELEC. ROOM	FEED THROUGH	\$2,841.75
L3SA	480Y/277V, 3 PH, 4W	100	MLO	THIRD FLOOR	SOUTH ELEC. ROOM	FEED THROUGH	\$2,841.75
L1NA	480Y/277V, 3 PH, 4W	100	MLO	FIRST FLOOR	NORTH ELEC. ROOM	FEED THROUGH	\$2,841.75
L2NA	480Y/277V, 3 PH, 4W	100	MLO	SECOND FLOOR	NORTH ELEC. ROOM	FEED THROUGH	\$2,841.75
L3NA	480Y/277V, 3 PH, 4W	100	MLO	THIRD FLOOR	NORTH ELEC. ROOM	FEED THROUGH	\$2,841.75
D2BA	208Y/120V, 3 PH, 4W	2500	MCB	BASEMENT	MAIN ELEC. ROOM	SWITCHBOARD	\$32,711.85
<b>Total</b>							\$49,762.35



Proposed Feeders:

FROM	TO	NO. OF SETS	CONDUIT		CONDUCTORS (PER SET)									COST
			(PER SET)		PHASE CONDUCTORS			NEUTRAL CONDUCTORS			GROUND CONDUCTORS			
			SIZE	LENGTH	No.	SIZE	LENGTH	No.	SIZE	LENGTH	No.	SIZE	LENGTH	
SWB-1	D4BA	1	2 1/2"	30	3	4/0AWG	35	1	4/0AWG	35	1	4AWG	35	\$1,903.74
D4BA	L1SA	1	1 1/4"	245	3	3AWG	255	1	3AWG	255	1	8AWG	255	\$5,025.78
L1SA	L2SA	1	1 1/4"	10	3	3AWG	15	1	3AWG	15	1	8AWG	15	\$259.07
L2SA	L3SA	1	1 1/4"	10	3	3AWG	15	1	3AWG	15	1	8AWG	15	\$259.07
D4BA	L1NA	1	1 1/4"	110	3	3AWG	120	1	3AWG	120	1	8AWG	120	\$2,321.19
L1NA	L2NA	1	1 1/4"	10	3	3AWG	15	1	3AWG	15	1	8AWG	15	\$259.07
L2NA	L3NA	1	1 1/4"	10	3	3AWG	15	1	3AWG	15	1	8AWG	15	\$259.07
SWB-1	XFMR	3	3"	15	3	400KCMIL	10	0	400KCMIL	10	1	2/0AWG	10	\$2,631.89
XFMR	D2BA	7	3"	6	3	500KCMIL	10	1	500KCMIL	10	1	350KCMIL	10	\$6,907.95
D2BA	South Bus Duct	4	3"	230	3	350KCMIL	240	1	350KCMIL	240	1	3/0AWG	240	\$80,228.34
South Bus Duct	D21S	2	2"	10	3	3/0AWG	15	1	3/0AWG	15	1	3AWG	15	\$1,148.31
South Bus Duct	D22S	2	2"	10	3	3/0AWG	15	1	3/0AWG	15	1	3AWG	15	\$1,148.31
South Bus Duct	D23S	2	2"	10	3	3/0AWG	15	1	3/0AWG	15	1	3AWG	15	\$1,148.31
D2BA	North Bus Duct	4	3"	95	3	350KCMIL	105	1	350KCMIL	105	1	3/0AWG	105	\$34,527.33
North Bus Duct	D21N	2	2"	10	3	3/0AWG	15	1	3/0AWG	15	1	3AWG	15	\$1,148.31
North Bus Duct	D22N	2	2"	10	3	3/0AWG	15	1	3/0AWG	15	1	3AWG	15	\$1,148.31
North Bus Duct	D23N	2	2"	10	3	3/0AWG	15	1	3/0AWG	15	1	3AWG	15	\$1,148.31
													<b>Total</b>	\$141,472.34



Proposed Bus Duct:

<u>BUILDING SIDE</u>	<u>LENGTH</u>	<u>VOLTAGE</u>	<u>RATING</u>	<u>COST</u>
SOUTH	40	208Y/120V	1200A	\$18,360.00
NORTH	40	208Y/120V	1200A	\$18,360.00
<b>Total</b>				\$36,720.00

Proposed Transformer:

<u>Label</u>	<u>Level</u>	<u>Room</u>	<u>KVA Rating</u>	<u>Primary Voltage</u>	<u>Secondary Voltage</u>	<u>Type</u>	<u>Temp. Rise</u>	<u>Taps</u>	<u>Mounting</u>	<u>Cost</u>
AA	Basement	Main Electrical	750	480Δ	208Y/120	Dry Type	150 °C	(4) 2.5%	Floor Mounted With Pad	\$46,737.00





**Copper to Aluminum Feeders – Full Calculations and Measurements**

Start	End	Wires (CLF)	Conduit (LF)	Copper Pricing									Aluminum Pricing										
				# of Sets	Phase		Neutral		Ground		Conduit		Total	# of Sets	Phase		Neutral		Ground		Conduit		Total
					Size	Price/CLF	Size	Price/CLF	Size	Price/CLF	Size	Price/LF			Size	Price/CLF	Size	Price/CLF	Size	Price/CLF	Size	Price/LF	
SWB-1	NORTH DUCT	1.05	95	2	350KCMIL	1,305.45	350KCMIL	1,305.45	1AWG	386.10	3"	25.45	16,611.62	2	500KCMIL	641.25	500KCMIL	641.25	2/0AWG	265.95	3"	25.45	10,780.02
NORTH DUCT	L1NA	0.1	6	1	6AWG	159.30	6AWG	159.30	10AWG	81.68	1"	6.36	110.04	1	4AWG	121.50	4AWG	121.50	8AWG	81.68	1 1/4"	8.29	106.50
NORTH DUCT	XFMR 1	0.1	6	1	3/0AWG	696.60	-	0.00	6AWG	159.30	2"	11.65	294.81	1	250KCMIL	388.80	-	0.00	4AWG	121.50	2 1/2"	21.40	257.18
XFMR 1	D21N	0.1	6	1	600KCMIL	2,133.00	600KCMIL	2,133.00	3AWG	264.60	3 1/2"	30.65	1,063.53	2	250KCMIL	388.80	250KCMIL	388.80	1AWG	201.15	2 1/2"	21.40	608.04
D21N	GP1N	0.15	10	1	2AWG	317.25	2AWG	317.25	8AWG	116.10	1 1/4"	8.29	290.66	1	1AWG	201.15	1AWG	201.15	6AWG	98.55	1 1/2"	9.75	232.94
D21N	R1NA	0.55	50	1	4/0AWG	845.10	4/0AWG	845.10	4AWG	224.78	2 1/2"	21.40	3,052.72	1	300KCMIL	484.65	300KCMIL	484.65	2AWG	155.93	2 1/2"	21.40	2,221.86
D21N	R1NB	0.65	60	1	6AWG	159.30	6AWG	159.30	10AWG	81.68	1"	6.36	848.78	1	4AWG	121.50	4AWG	121.50	8AWG	81.68	1 1/4"	8.29	866.33
D21N	R1NC	0.9	85	1	6AWG	159.30	6AWG	159.30	10AWG	81.68	1"	6.36	1,187.46	1	4AWG	121.50	4AWG	121.50	8AWG	81.68	1 1/4"	8.29	1,215.47
D21N	R1ND	0.75	70	1	6AWG	159.30	6AWG	159.30	10AWG	81.68	1"	6.36	984.25	1	4AWG	121.50	4AWG	121.50	8AWG	81.68	1 1/4"	8.29	1,005.99
NORTH DUCT	L2NA	0.1	6	1	6AWG	159.30	6AWG	159.30	10AWG	81.68	1"	6.36	110.04	1	4AWG	121.50	4AWG	121.50	8AWG	81.68	1 1/4"	8.29	106.50
NORTH DUCT	XFMR 2	0.1	6	1	3/0AWG	696.60	-	0.00	6AWG	159.30	2"	11.65	294.81	1	250KCMIL	388.80	-	0.00	4AWG	121.50	2 1/2"	21.40	257.18
XFMR 2	D22N	0.1	6	1	600KCMIL	2,133.00	600KCMIL	2,133.00	3AWG	264.60	3 1/2"	30.65	1,063.53	2	250KCMIL	388.80	250KCMIL	388.80	1AWG	201.15	2 1/2"	21.40	608.04
D22N	GP2N	0.25	20	1	1AWG	386.10	1AWG	386.10	6AWG	159.30	1 1/2"	9.75	620.87	1	2/0AWG	265.95	2/0AWG	265.95	4AWG	121.50	2"	11.65	529.34
D22N	R2NA	0.9	85	1	6AWG	159.30	6AWG	159.30	10AWG	81.68	1"	6.36	1,187.46	1	4AWG	121.50	4AWG	121.50	8AWG	81.68	1 1/4"	8.29	1,215.47
D22N	R2NB	0.4	35	1	1/0AWG	464.40	1/0AWG	464.40	6AWG	159.30	2"	11.65	1,214.53	1	3/0AWG	309.15	3/0AWG	309.15	4AWG	121.50	2"	11.65	951.01
D22N	R2NC	0.7	65	1	1/0AWG	464.40	1/0AWG	464.40	6AWG	159.30	2"	11.65	2,169.11	1	3/0AWG	309.15	3/0AWG	309.15	4AWG	121.50	2"	11.65	1,707.95
NORTH DUCT	L3NA	0.1	6	1	6AWG	159.30	6AWG	159.30	10AWG	81.68	1"	6.36	110.04	1	4AWG	121.50	4AWG	121.50	8AWG	81.68	1 1/4"	8.29	106.50
NORTH DUCT	XFMR 3	0.1	6	1	3/0AWG	696.60	-	0.00	6AWG	159.30	2"	11.65	294.81	1	250KCMIL	388.80	-	0.00	4AWG	121.50	2 1/2"	21.40	257.18
XFMR 3	D23N	0.1	6	1	600KCMIL	2,133.00	600KCMIL	2,133.00	3AWG	264.60	3 1/2"	30.65	1,063.53	2	250KCMIL	388.80	250KCMIL	388.80	1AWG	201.15	2 1/2"	21.40	608.04
D23N	GP3N	0.1	6	1	2AWG	317.25	2AWG	317.25	8AWG	116.10	1 1/4"	8.29	188.24	1	1AWG	201.15	1AWG	201.15	6AWG	98.55	1 1/2"	9.75	148.80
D23N	R3NA	0.55	50	1	6AWG	159.30	6AWG	159.30	10AWG	81.68	1"	6.36	713.31	1	4AWG	121.50	4AWG	121.50	8AWG	81.68	1 1/4"	8.29	726.67
D23N	R3NB	0.6	55	1	1/0AWG	464.40	1/0AWG	464.40	6AWG	159.30	2"	11.65	1,850.92	1	3/0AWG	309.15	3/0AWG	309.15	4AWG	121.50	2"	11.65	1,455.64
D23N	R3NC	0.5	45	1	1/0AWG	464.40	1/0AWG	464.40	6AWG	159.30	2"	11.65	1,532.72	1	3/0AWG	309.15	3/0AWG	309.15	4AWG	121.50	2"	11.65	1,203.32
SWB-1	SOUTH DUCT	2.4	230	2	350KCMIL	1,305.45	350KCMIL	1,305.45	1AWG	386.10	3"	25.45	38,623.77	2	500KCMIL	641.25	500KCMIL	641.25	2/0AWG	265.95	3"	25.45	25,294.41
SOUTH DUCT	L1SA	0.1	6	1	6AWG	159.30	6AWG	159.30	10AWG	81.68	1"	6.36	110.04	1	4AWG	121.50	4AWG	121.50	8AWG	81.68	1 1/4"	8.29	106.50
SOUTH DUCT	XFMR 4	0.1	6	1	3/0AWG	696.60	-	0.00	6AWG	159.30	2"	11.65	294.81	1	250KCMIL	388.80	-	0.00	4AWG	121.50	2 1/2"	21.40	257.18



Start	End	Wires (CLF)	Conduit (LF)	Copper Pricing										Aluminum Pricing									
				Number of Sets	Phase		Neutral		Ground		Conduit		Total	Number of Sets	Phase		Neutral		Ground		Conduit		Total
					Size	Price/CLF	Size	Price/CLF	Size	Price/CLF	Size	Price/LF			Size	Price/CLF	Size	Price/CLF	Size	Price/CLF	Size	Price/LF	
XFMR 4	D21S	0.1	6	1	600KCMIL	2,133.00	600KCMIL	2,133.00	3AWG	264.60	3 1/2"	30.65	1,063.53	2	250KCMIL	388.80	250KCMIL	388.80	1AWG	201.15	2 1/2"	21.40	608.04
D21S	GP1S	0.1	6	1	2AWG	317.25	2AWG	317.25	8AWG	116.10	1 1/4"	8.29	188.24	1	1AWG	201.15	1AWG	201.15	6AWG	98.55	1 1/2"	9.75	148.80
D21S	R1SA	0.65	60	1	6AWG	159.30	6AWG	159.30	10AWG	81.68	1"	6.36	848.78	1	4AWG	121.50	4AWG	121.50	8AWG	81.68	1 1/4"	8.29	866.33
D21S	R1SB	1.05	100	1	6AWG	159.30	6AWG	159.30	10AWG	81.68	1"	6.36	1,390.67	1	4AWG	121.50	4AWG	121.50	8AWG	81.68	1 1/4"	8.29	1,424.96
D21S	R1SC	0.55	50	1	6AWG	159.30	6AWG	159.30	10AWG	81.68	1"	6.36	713.31	1	4AWG	121.50	4AWG	121.50	8AWG	81.68	1 1/4"	8.29	726.67
D21S	R1SD	1	95	1	6AWG	159.30	6AWG	159.30	10AWG	81.68	1"	6.36	1,322.93	1	4AWG	121.50	4AWG	121.50	8AWG	81.68	1 1/4"	8.29	1,355.13
SOUTH DUCT	L2SA	0.1	6	1	6AWG	159.30	6AWG	159.30	10AWG	81.68	1"	6.36	110.04	1	4AWG	121.50	4AWG	121.50	8AWG	81.68	1 1/4"	8.29	106.50
SOUTH DUCT	XFMR 5	0.1	6	1	3/0AWG	696.60	-	0.00	6AWG	159.30	2"	11.65	294.81	1	250KCMIL	388.80	-	0.00	4AWG	121.50	2 1/2"	21.40	257.18
XFMR 5	D22S	0.1	6	1	600KCMIL	2,133.00	600KCMIL	2,133.00	3AWG	264.60	3 1/2"	30.65	1,063.53	2	250KCMIL	388.80	250KCMIL	388.80	1AWG	201.15	2 1/2"	21.40	608.04
D22S	GP2S	0.1	6	1	1/0AWG	464.40	1/0AWG	464.40	6AWG	159.30	2"	11.65	271.59	1	3/0AWG	309.15	3/0AWG	309.15	4AWG	121.50	2"	11.65	205.71
D22S	R2SA	0.45	40	1	1/0AWG	464.40	1/0AWG	464.40	6AWG	159.30	2"	11.65	1,373.63	1	3/0AWG	309.15	3/0AWG	309.15	4AWG	121.50	2"	11.65	1,077.17
D22S	R2SB	1	95	1	2AWG	317.25	2AWG	317.25	8AWG	116.10	1 1/4"	8.29	2,172.56	1	1AWG	201.15	1AWG	201.15	6AWG	98.55	1 1/2"	9.75	1,829.12
SOUTH DUCT	L3SA	0.1	6	1	6AWG	159.30	6AWG	159.30	10AWG	81.68	1"	6.36	110.04	1	4AWG	121.50	4AWG	121.50	8AWG	81.68	1 1/4"	8.29	106.50
SOUTH DUCT	XFMR 6	0.1	6	1	3/0AWG	696.60	-	0.00	6AWG	159.30	2"	11.65	294.81	1	250KCMIL	388.80	-	0.00	4AWG	121.50	2 1/2"	21.40	257.18
XFMR 6	D23S	0.1	6	1	600KCMIL	2,133.00	600KCMIL	2,133.00	3AWG	264.60	3 1/2"	30.65	1,063.53	2	250KCMIL	388.80	250KCMIL	388.80	1AWG	201.15	2 1/2"	21.40	608.04
D23S	GP3S	0.1	6	1	2AWG	317.25	2AWG	317.25	8AWG	116.10	1 1/4"	8.29	188.24	1	1AWG	201.15	1AWG	201.15	6AWG	98.55	1 1/2"	9.75	148.80
D23S	R3SA	0.5	45	1	2AWG	317.25	2AWG	317.25	8AWG	116.10	1 1/4"	8.29	1,065.56	1	1AWG	201.15	1AWG	201.15	6AWG	98.55	1 1/2"	9.75	890.19
D23S	R3SB	0.65	60	1	1/0AWG	464.40	1/0AWG	464.40	6AWG	159.30	2"	11.65	2,010.02	1	3/0AWG	309.15	3/0AWG	309.15	4AWG	121.50	2"	11.65	1,581.80
D23S	R3SC	0.85	80	1	4/0AWG	845.10	4/0AWG	845.10	4AWG	224.78	2 1/2"	21.40	4,776.20	1	300KCMIL	484.65	300KCMIL	484.65	2AWG	155.93	2 1/2"	21.40	3,492.15
D23S	R3SD	0.75	70	1	6AWG	159.30	6AWG	159.30	10AWG	81.68	1"	6.36	984.25	1	4AWG	121.50	4AWG	121.50	8AWG	81.68	1 1/4"	8.29	1,005.99
D23S	R3SE	0.3	25	1	2AWG	317.25	2AWG	317.25	8AWG	116.10	1 1/4"	8.29	622.76	1	1AWG	201.15	1AWG	201.15	6AWG	98.55	1 1/2"	9.75	514.62
SWB-1	D4P	2	190	2	350KCMIL	1,305.45	350KCMIL	1,305.45	1AWG	386.10	3"	25.45	32,101.65	2	500KCMIL	641.25	500KCMIL	641.25	2/0AWG	265.95	3"	25.45	20,993.85
D4P	G4P	0.2	15	1	1AWG	386.10	1AWG	386.10	6AWG	159.30	1 1/2"	9.75	486.95	1	2/0AWG	265.95	2/0AWG	265.95	4AWG	121.50	2"	11.65	411.82
SWB-1	D4BA	0.35	30	1	600KCMIL	2,133.00	600KCMIL	2,133.00	3AWG	264.60	3 1/2"	30.65	3,998.16	2	250KCMIL	388.80	250KCMIL	388.80	1AWG	201.15	2 1/2"	21.40	2,513.30
D4BA	XFMR 7	0.1	6	1	3/0AWG	696.60	-	0.00	6AWG	159.30	2"	11.65	294.81	1	250KCMIL	388.80	-	0.00	4AWG	121.50	2 1/2"	21.40	257.18
XFMR 7	D2BA	0.1	6	1	600KCMIL	2,133.00	600KCMIL	2,133.00	3AWG	264.60	3 1/2"	30.65	1,063.53	2	250KCMIL	388.80	250KCMIL	388.80	1AWG	201.15	2 1/2"	21.40	608.04



Start	End	Wires (CLF)	Conduit (LF)	Copper Pricing									Aluminum Pricing											
				Number of Sets	Phase		Neutral		Ground		Conduit		Total	Number of Sets	Phase		Neutral		Ground		Conduit		Total	
					Size	Price/CLF	Size	Price/CLF	Size	Price/CLF	Size	Price/LF			Size	Price/CLF	Size	Price/CLF	Size	Price/CLF	Size	Price/LF		
D2BA	GPBA	0.1	6	1	2AWG	317.25	2AWG	317.25	8AWG	116.10	1 1/4"	8.29	188.24	1	1AWG	201.15	1AWG	201.15	6AWG	98.55	1 1/2"	9.75	148.80	
D4BA	L4B	0.1	6	1	6AWG	159.30	6AWG	159.30	10AWG	81.68	1"	6.36	110.04	1	4AWG	121.50	4AWG	121.50	8AWG	81.68	1 1/4"	8.29	106.50	
SWB-1	D4BB	2.8	270	1	1/0AWG	464.40	1/0AWG	464.40	6AWG	159.30	2"	11.65	8,792.96	1	3/0AWG	309.15	3/0AWG	309.15	4AWG	121.50	2"	11.65	6,948.32	
D4BB	XFMR 8	0.1	6	1	6AWG	159.30	-	0.00	10AWG	81.68	3/4"	5.01	86.01	1	4AWG	121.50	-	0.00	8AWG	81.68	1 1/4"	8.29	94.35	
XFMR 8	GPBB	0.1	6	1	2AWG	317.25	2AWG	317.25	8AWG	116.10	1 1/4"	8.29	188.24	1	1AWG	201.15	1AWG	201.15	6AWG	98.55	1 1/2"	9.75	148.80	
SWB-1	ATS 100	2	190	1	2AWG	317.25	2AWG	317.25	8AWG	116.10	1 1/4"	8.29	4,345.11	1	1AWG	201.15	1AWG	201.15	6AWG	98.55	1 1/2"	9.75	3,658.23	
GEN	ATS 100	0.7	65	1	2AWG	317.25	2AWG	317.25	8AWG	116.10	1 1/4"	8.29	1,508.36	1	1AWG	201.15	1AWG	201.15	6AWG	98.55	1 1/2"	9.75	1,265.76	
ATS 100	E4P	0.15	10	1	2AWG	317.25	2AWG	317.25	8AWG	116.10	1 1/4"	8.29	290.66	1	1AWG	201.15	1AWG	201.15	6AWG	98.55	1 1/2"	9.75	232.94	
E4P	XFMR 9	0.1	6	1	10AWG	81.68	-	0.00	10AWG	81.68	3/4"	5.01	62.72	1	10AWG	65.75	-	0.00	8AWG	81.68	3/4"	5.01	57.94	
XFMR 9	E2P	0.1	6	1	8AWG	116.10	8AWG	116.10	10AWG	81.68	3/4"	5.01	84.66	1	6AWG	98.55	6AWG	98.55	8AWG	81.68	1"	6.36	85.74	
E4P	E4B	2	190	1	6AWG	159.30	6AWG	159.30	10AWG	81.68	1"	6.36	2,645.87	1	4AWG	121.50	4AWG	121.50	8AWG	81.68	1 1/4"	8.29	2,710.26	
SWB-1	ATS 400	2	190	1	600KCMIL	2,133.00	600KCMIL	2,133.00	3AWG	264.60	3 1/2"	30.65	23,415.75	2	250KCMIL	388.80	250KCMIL	388.80	1AWG	201.15	2 1/2"	21.40	15,156.45	
GEN	ATS 400	0.7	65	1	600KCMIL	2,133.00	600KCMIL	2,133.00	3AWG	264.60	3 1/2"	30.65	8,149.55	2	250KCMIL	388.80	250KCMIL	388.80	1AWG	201.15	2 1/2"	21.40	5,240.57	
ATS 400	EQD4P	0.15	10	1	600KCMIL	2,133.00	600KCMIL	2,133.00	3AWG	264.60	3 1/2"	30.65	1,625.94	2	250KCMIL	388.80	250KCMIL	388.80	1AWG	201.15	2 1/2"	21.40	954.86	
EQD4P	EQD4B	2	195	1	350KCMIL	1,305.45	350KCMIL	1,305.45	4AWG	224.78	3"	25.45	15,855.41	1	500KCMIL	641.25	500KCMIL	641.25	2AWG	155.93	3"	25.45	10,404.11	
EQD4B	V4BA	0.1	6	1	6AWG	159.30	6AWG	159.30	10AWG	81.68	1"	6.36	110.04	1	4AWG	121.50	4AWG	121.50	8AWG	81.68	1 1/4"	8.29	106.50	
EQD4B	XFMR 10	0.1	6	1	1/0AWG	464.40	-	0.00	6AWG	159.30	1 1/2"	9.75	213.73	1	3/0AWG	309.15	-	0.00	4AWG	121.50	2"	11.65	174.80	
XFMR 10	EQD2B	0.1	6	1	250KCMIL	1,008.45	250KCMIL	1,008.45	4AWG	224.78	2 1/2"	21.40	554.24	1	350KCMIL	503.55	350KCMIL	503.55	2AWG	155.93	3"	25.45	369.70	
EQD2B	V2BA	0.1	6	1	1/0AWG	464.40	1/0AWG	464.40	6AWG	159.30	2"	11.65	271.59	1	3/0AWG	309.15	3/0AWG	309.15	4AWG	121.50	2"	11.65	205.71	
EQD4P	XFMR 11	0.1	6	1	3/0AWG	696.60	-	0.00	6AWG	159.30	2"	11.65	294.81	1	250KCMIL	388.80	-	0.00	4AWG	121.50	2 1/2"	21.40	257.18	
XFMR 11	EQD2P	0.1	6	1	600KCMIL	2,133.00	600KCMIL	2,133.00	3AWG	264.60	3 1/2"	30.65	1,063.53	2	250KCMIL	388.80	250KCMIL	388.80	1AWG	201.15	2 1/2"	21.40	608.04	
EQD2P	EQ1S	1.4	135	1	6AWG	159.30	6AWG	159.30	10AWG	81.68	1"	6.36	1,864.82	1	4AWG	121.50	4AWG	121.50	8AWG	81.68	1 1/4"	8.29	1,913.76	
EQD2P	EQ2S	1.25	120	1	4/0AWG	845.10	4/0AWG	845.10	4AWG	224.78	2 1/2"	21.40	7,074.17	1	300KCMIL	484.65	300KCMIL	484.65	2AWG	155.93	2 1/2"	21.40	5,185.86	
EQD2P	EQ3S	1.1	105	1	1/0AWG	464.40	1/0AWG	464.40	6AWG	159.30	2"	11.65	3,441.89	1	3/0AWG	309.15	3/0AWG	309.15	4AWG	121.50	2"	11.65	2,717.21	
EQD2P	EQ3SA	1.1	105	1	1/0AWG	464.40	1/0AWG	464.40	6AWG	159.30	2"	11.65	3,441.89	1	3/0AWG	309.15	3/0AWG	309.15	4AWG	121.50	2"	11.65	2,717.21	
EQD2P	EQ2P	0.15	10	1	4/0AWG	845.10	4/0AWG	845.10	4AWG	224.78	2 1/2"	21.40	754.75	1	300KCMIL	484.65	300KCMIL	484.65	2AWG	155.93	2 1/2"	21.40	528.15	
<b>Total Copper Cost</b>													222,195.49	<b>Total Aluminum Cost</b>										157,434.85



## 20A Breaker Time-Current Trip Curve

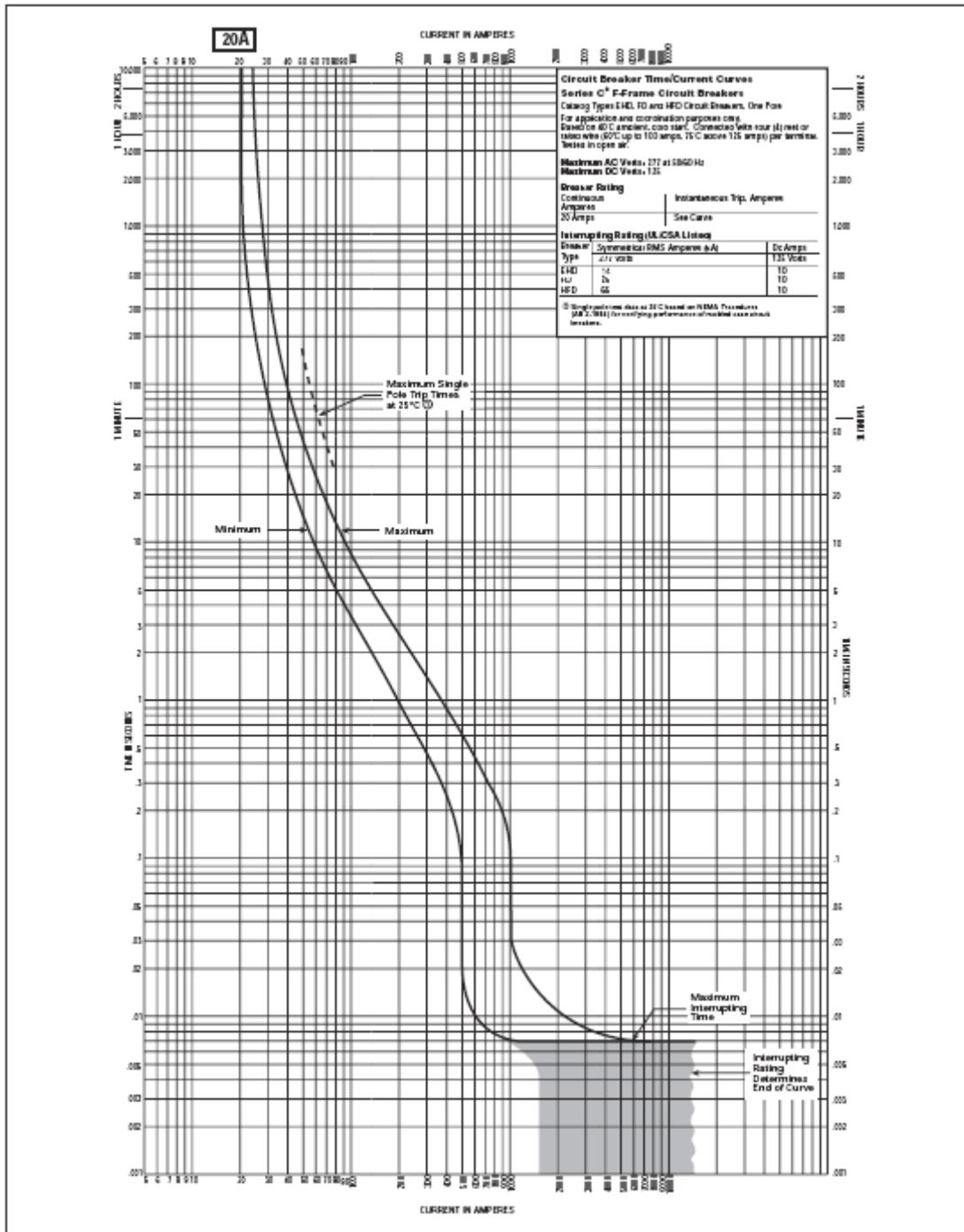


FIGURE 2. TYPES EHD, FD AND HFD 20 AMPERES — CURVE NO. SC-4424-88A



### 60A Breaker Time-Current Trip Curve

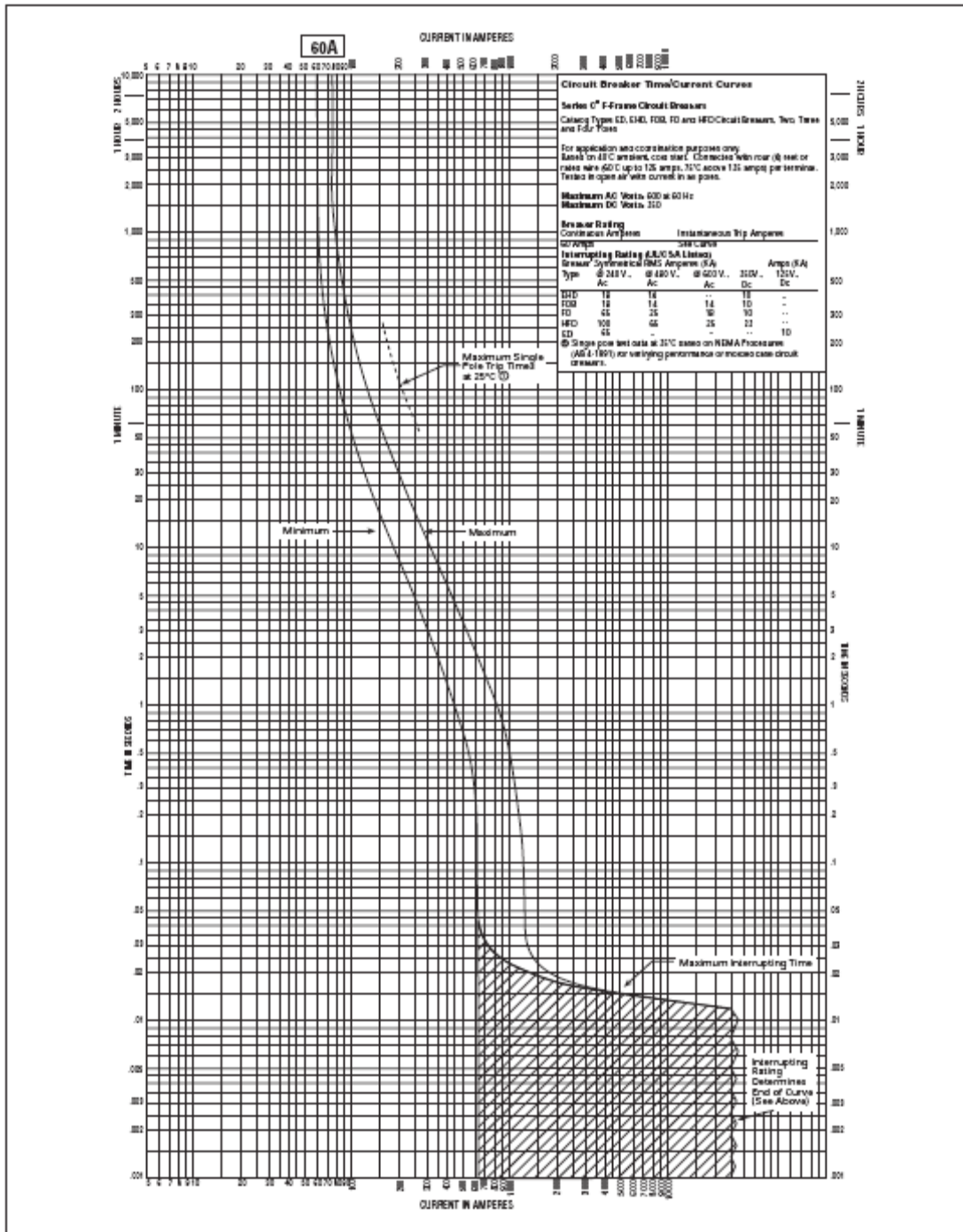


FIGURE 25. TYPES ED, EHD, FDB, FD AND HFD 60 AMPERES — CURVE NO. SC-4142-87B



## 400A Breaker Time-Current Trip Curve

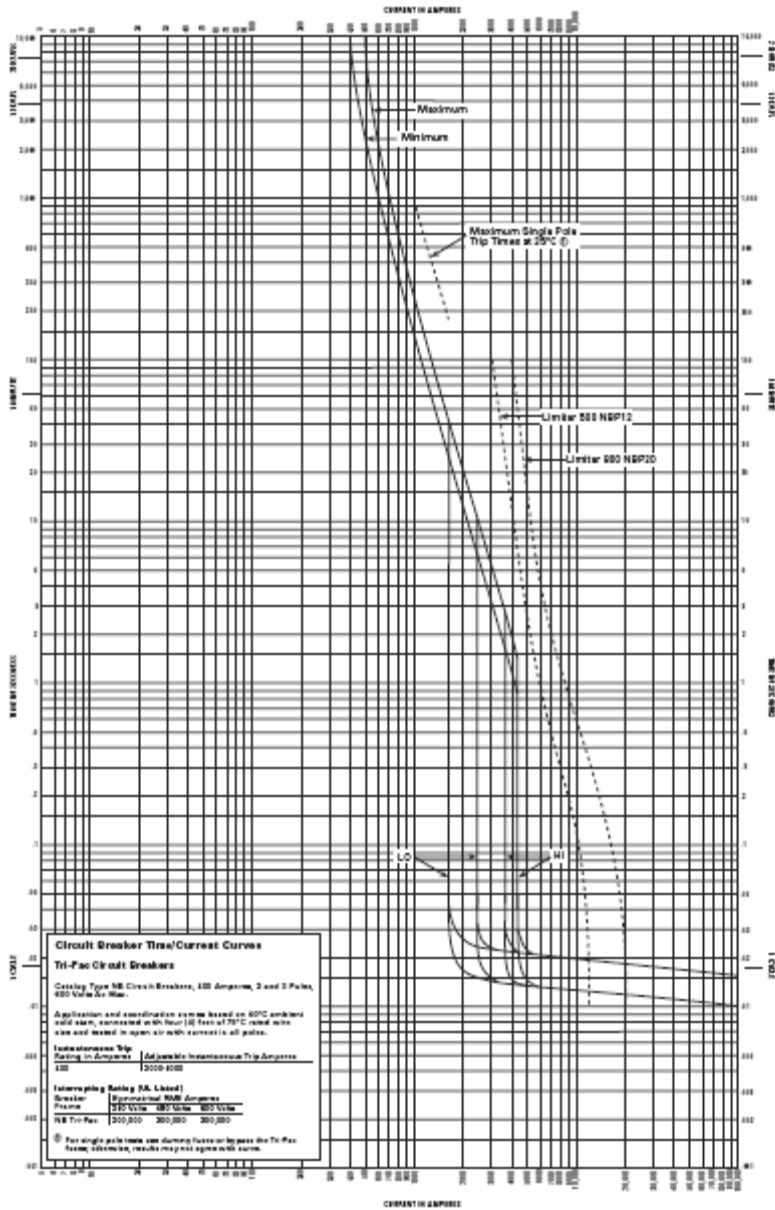
Application Data  
 29-167C

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### AB DE-ION Tri-Pac® Circuit Breakers

Type NB, 400 Amperes, 2 and 3 Poles



Curve No. SC-3594-76B

October 1997





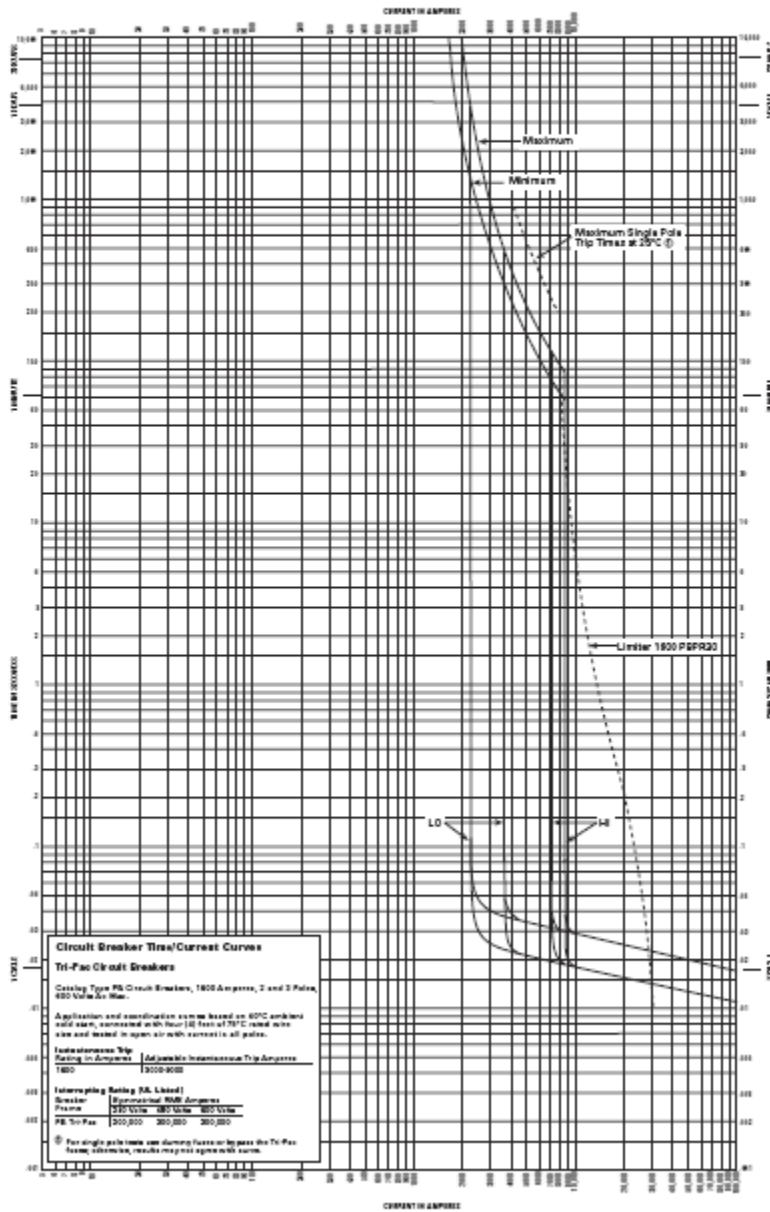
## 1600A Breaker Time-Current Trip Curve

Application Data  
 29-167C

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### AB DE-ION Tri-Pac<sup>®</sup> Circuit Breakers Type PB, 1600 Amperes, 2 and 3 Poles



Curve No. SC-3604-76B

October 1997