MINIMUM WIRE SIZE CHART

BREAKER SIZE	MIN. CONDUCTOR	MIN. CONDUIT	MAX. CONDUCTOR LENGTH (FEET) TO INSURE VOLTAGE DROP DOES NOT EXCEED '14 F.B.C. STANDARDS (LOAD ASSUMED = 80% BREAKER RATING)		
			VOLTAGE/PHASE		
			120/1*	208/1*	208/3**
15	#12	1/2"	75	130	
20	#12	1/2"	56	98	
30	#10	3/4"	63	108	
40	#8	1"	72	125	
50	#6	1"	92	159	
60	#6	1"	77	133	
70	#4	1 1/4"		180	138
80	#4	1 1/4"		157	121
90	#3	1 1/4"		173	133
100	#3	1 1/4"		156	120
110	#1	1 1/2"		222	171
125	#1	1 1/2"		195	150
150	1/0	1 1/2"			167
175	2/0	2"			172
200	3/0	2"			190
225	4/0	2 1/2"			212
250	250 MCM	2 1/2"			222
275	300 MCM	2 1/2"			243
300	350 MCM	3"			257
350	2/0	EA. OF (2) 2"			172
400	3/0	EA. OF (2) 2"			190
500	250 MCM	EA. OF (2) 2 1/2"			222
600	350 MCM	EA. OF (2) 3"			257
700	500 MCM	EA. OF (2) 3 1/2"			318
800	300 MCM	EA. OF (3) 2 1/2"			250
1000	400 MCM	EA. OF (3) 3"			273
1200	350 MCM	EA. OF (4) 3"			263
3000	500 MCM	EA. OF (8) 3 1/2"			297
4000	600 MCM	EA. OF (10) 4"			326

CONTRACTOR TO VERIFY VOLTAGE DROP IF CONDUCTOR/BREAKER COMBINATION INSTALLED IS NOT AS LISTED ABOVE

CONTRACTOR TO UP-SIZE CONDUIT & CONDUCTORS TO ALLOW MAX. VOLTAGE DROP OF 2% FOR FEEDER CIRCUITS AND MAX. OF 3% FOR BRANCH CIRCUITS IF INSTALLED LENGTHS EXCEEDS THOSE LISTED ABOVE.

* DISTANCES INDICATED ALLOW FOR A MAX. OF 3% VOLTAGE DROP FOR BRANCH CIRCUITS IN COMPLIANCE WITH 2014 FLORIDA ENERGY CODE.

** DISTANCES INDICATED ALLOW FOR A MAX. OF 2% VOLTAGE DROP FOR FEEDER CIRCUITS IN COMPLIANCE WITH 2014 FLORIDA ENERGY CODE.

FAULT CURRENT STUDY

UTILITY VOLTAGE: 208 | TRANSFORMER KVA: 750 | UTILITY ORIGIN FAULT: 34285

FEEDER						SOURCE	ORIGIN		DESTINATION	
ORIGIN	DESTINATION	LENGTH	WIRE	SIZE	SETS		X/R RATIO	FAULT	X/R RATIO	FAULT
UTILITY	MDP	35	CU	500	8	UTILITY	15.00	34285	11.02	32970
MDP	SFL	20	CU	4/0	1	UTILITY	11.02	32970	3.15	26897
MDP	A	95	CU	4/0	1	UTILITY	11.02	32970	1.28	14295
MDP	B	95	CU	1	1	UTILITY	11.02	32970	0.55	8374
MDP	C	225	CU	1	1	UTILITY	11.02	32970	0.39	3817
MDP	D	20	CU	4/0	1	UTILITY	11.02	32970	3.15	26897
MDP	ATS-EQUP	20	CU	1/0	1	UTILITY	11.02	32970	1.81	24480
ATS-EQUIP	E	5	CU	1/0	1	UTILITY	1.81	24480	1.55	22613
E	EA	185	CU	1/0	1	UTILITY	1.55	22613	0.49	4960
E	SGP	110	CU	6	1	UTILITY	1.55	22613	0.17	2466
MDP	ATS-EM	10	CU	1	1	UTILITY	11.02	32970	2.45	28012
ATS-EM	EM	5	CU	1	1	UTILITY	2.45	28012	1.83	25447
MDP	F	105	CU	4/0	1	UTILITY	11.02	32970	1.22	13395
MDP	H	95	CU	1	1	UTILITY	11.02	32970	0.55	8374
MDP	L	105	CU	500	1	UTILITY	11.02	32970	2.58	16445
MDP	M	105	CU	4/0	1	UTILITY	11.02	32970	1.22	13395
MDP	P	30	CU	4/0	1	UTILITY	11.02	32970	2.45	24337
MDP	Q	180	CU	4/0	1	UTILITY	11.02	32970	0.97	9030
MDP	R	225	CU	4/0	1	UTILITY	11.02	32970	0.90	7532
MDP	MC1	135	CU	350	3	UTILITY	11.02	32970	2.91	22590
MDP	MC2	75	CU	350	3	UTILITY	11.02	32970	3.98	26440

VOLTAGE DROP STUDY

FEEDERS

FEEDER									
ORIGIN	DESTINATION	VOLTAGE	PHASE	LENGTH	LOAD	SETS	SIZE	TYPE	VOLTAGE DROP (%)
UTILITY	MDP	208	3	35	2218	8	500	CU	0.17
MDP	SFL	208	3	20	89	1	4/0	CU	0.25
MDP	A	208	3	95	126	1	4/0	CU	0.68
MDP	B	208	3	95	43	1	1	CU	0.62
MDP	C	208	3	225	23	1	1	CU	0.73
MDP	D	208	3	20	74	1	4/0	CU	0.24
MDP	ATS-EQUIP	208	3	20	137	1	1/0	CU	0.41
ATS-EQUIP	E	208	3	5	137	1	1/0	CU	0.47
E	EA	208	3	185	68	1	1/0	CU	1.54
E	SGP	208	3	110	18	1	6	CU	1.14
MDP	ATS-EM	208	3	10	27	1	1	CU	0.20
ATS-EM	EM	208	3	5	27	1	1	CU	0.22
MDP	F	208	3	105	80	1	4/0	CU	0.53
MDP	H	208	3	95	28	1	1	CU	0.46
MDP	L	208	3	105	214	1	500	CU	0.58
MDP	M	208	3	105	153	1	4/0	CU	0.86
MDP	P	208	3	30	133	1	4/0	CU	0.34
MDP	Q	208	3	180	90	1	4/0	CU	0.87
MDP	R	208	3	225	110	1	4/0	CU	1.23
MDP	MC1	208	3	135	646	3	350	CU	0.92
MDP	MC2	208	3	75	302	3	350	CU	0.37

SUMMARY OF LOADS

Description	Connected (kVA)	Demand Factor	Demand (kVA)
1 Lighting	44.0	1.25	55.0
2 Air Conditioning	140.4	1.00	140.4
3 Refrigeration (units)	220.6		
(cases)	82.5		
(non-coincident)	76.6		
(Total)	379.6	1.00	303.0
4 Kitchen Equipment	259.4	0.65	168.6
5 Misc. Equipment	110.1	1.00	110.1
6 Receptacles (1st 10.0 kW)	10.0	1.00	10.0
(Remaining)	22.7	0.50	11.3
(Total)	32.7		21.3
Total kVA	966.2	0.83	798.5
Total Amps	2684		2218

ELECTRICAL CHARACTERISTICS

VOLTAGE : 120/208 VOLTS 3PH. 4 WIRE LOADS
MAIN SWITCHGEAR RATING: 100,000 A.I.C.
MIN. FEEDER BREAKER RATING TO BE 100,000 A.I.C.

MAXIMUM AVAILABLE FAULT CURRENT VALUE PROVIDED BY LOCAL UTILITY IS 34,285 AMPS
THE CURRENT SYSTEM IS DESIGNED AND BRACED FOR A FAULT CURRENT OF 100,000 AMPS SYMM.

MAIN SWITCHBOARD SCHEDULE

SQUARE 'D' 3000 AMP FRAME SWITCHBOARD RATED 100,000 AIC SYM

CKT. NO.	OVERCURRENT DEVICE FRAME	TRIP	POLES	DEVICE SERVED	CONNECTED VA PHASE A	PHASE B	PHASE C	TOTAL CONNECTED
	3000	3000	3	MAIN CIRCUIT BREAKER	330736	319773	315665	966173
1	225	225	3	PANEL 'A'	31296	37964	37940	107200
2	100	100	3	PANEL 'C'	3456	4153	4262	11872
3	225	225	3	PANEL 'D'	8845	8416	9251	26512
4	800	800	3	PANEL 'MC1'	76924	79174	76446	232545
5	600	600	3	PANEL 'MC2'	36226	36226	36228	108684
6	225	150	3	PANELS 'E' & 'EA'	17408	15846	15930	49184
7	225	125	3	PANEL 'EM'	3159	2790	1885	7834
8	225	225	3	SPARE				0
9	225		3	SPACE ONLY				0
10	225	225	3	PANEL 'F'	12999	9476	6055	28530
11	100	100	3	PANEL 'H'	2774	2880	2940	8594
12	100	100	3	PANEL 'B'	10541	10003	6124	26668
13	225	225	3	SPARE				0
14				BUSSED SPACE(UNUSABLE)				0
15	100	100	3	SPARE				0
16	400	400	3	PANEL 'L'	39520	39520	39520	118560
17	100	100	3	SPARE				0
18	225		3	SPACE ONLY				0
19	100	60	3	SPD				0
20	225	225	3	PANEL 'M'	31483	16872	24999	73353
21	225	225	3	PANEL 'P'	22911	24422	21455	68789
22	225	225	3	PANEL 'Q'	9966	12045	10481	32512
23	225	225	3	PANEL 'R'	13548	[illegible]	13527	39526
24	225	225	3	PANEL 'SFL'	9657	[illegible]	8622	25812
25				BUSSED SPACE(UNUSABLE)				0
26	225		3	SPACE ONLY				0
27	225		3	SPACE ONLY				0
28	225		3	SPACE ONLY				0
29	225		3	SPACE ONLY				0
30	225		3	SPACE ONLY				0
31	225		3	SPACE ONLY				0
								0

NOTE:
COORDINATE ALL ELECTRICAL CONNECTIONS TO MOTOR CENTER WITH MANUFACTURER REPRESENTATIVES

* THIS UNIT IS SUPPLIED WITH DISCONNECT SWITCH TO BE WIRED BY CONTRACTOR. CONTRACTOR TO VERIFY EXACT EQUIPMENT REQUIREMENTS PRIOR TO ROUGH-IN AND CONTACT ENGINEER FOR DIRECTIONS IF REQUIREMENTS ARE DIFFERENT THAN IN THESE DOCUMENTS.

NOTES:

1. ALL CONDUCTORS SHALL BE COPPER UNLESS NOTED OTHERWISE.
   - ALL CONDUCTORS IN DRY/DAMP LOCATIONS SHALL BE THHN OR EQUAL.
   - ALL CONDUCTORS UNDERGROUND OR IN WET LOCATIONS SHALL BE THWN-2 OR EQUAL.
2. CONTRACTOR TO VERIFY MAXIMUM BREAKER SIZES WITH ACTUAL EQUIPMENT NAME PLATES, PRIOR TO ORDERING BREAKERS.
3. CONTRACTOR TO PROVIDE PLAQUES AT ALL LOCATIONS TO IDENTIFY POINTS OF SERVICE IN ACCORDANCE WITH NEC 230-2
4. *AUTOMATIC TRANSFER SWITCHES (ATS) ARE ONAN/ASCO. MDP CIRCUIT BREAKER FEEDING RESPECTIVE ATS TO BE SELECTED TO PROVIDE ATS 100KAIC RATING (MIN.) ACCEPTABLE BREAKER TYPES BY MANUFACTURER:*

   FOR XFER SW.s RATED 40-[illegible] AMPS:
   SQ'D': HD, HG, HJ, HL, JD, [illegible], JJ, & JL
   SIEMENS: CED6, CFD6, CJD6, & [illegible]JD6
   GE: SEL, SFL, TEC, TECL, [illegible], TEML, & TFL

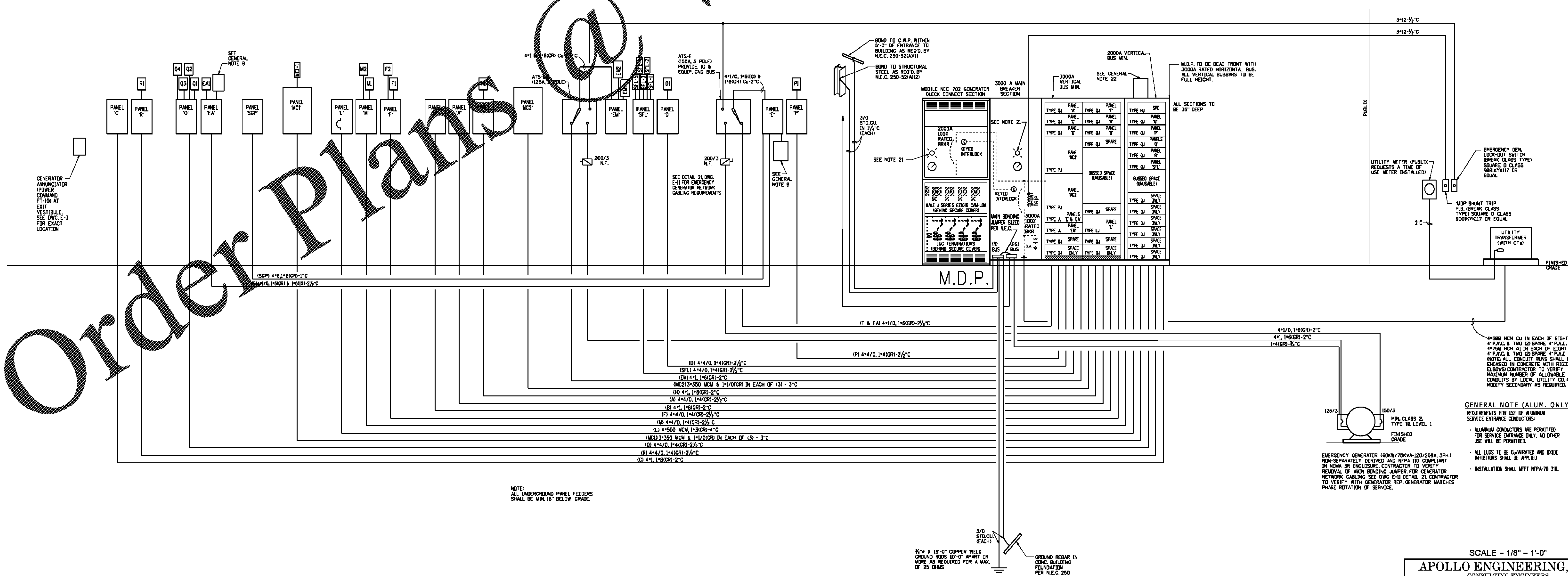
   FOR XFER SW.s RATED 150-260 AMPS:
   SQ'D': HD, HG, HJ, HL, JD, JG, JJ, & JL
   SIEMENS: CED6, CFD6, [illegible]D6, CDL6, SCJD6, & SCLD6
   GE: SEL, SFL, [illegible], TEC, TECL, TEL, TEML, & TFL
5. SEE PANELBOARD SCHEDULE SHEET E-16 FOR PANELBOARD AIC MINIMUM RATING
6. NO INTEGRAL CONTACTORS PERMITTED
7. UTILITY TRANSFORMER SHOWN HERE IS PROTOTYPE DESIGN. ELECTRICAL CONTRACTOR TO SEE CIVIL UTILITY PLANS FOR EXACT LOCATION FOR BIDDING AND INSTALLATION. ELECTRICAL CONTRACTOR TO COORDINATE ALL UTILITY REQUIREMENTS.
8. EDCO SURGE SUPPRESSION UNIT BY ELECTRICAL CONTRACTOR. MODEL #HP208Y-RMU100. CONTACT KENICK, INC. 1 800-362-9997 REFERENCE PUBLIX STORE NUMBER WITH ORDER.
9. ELECTRICAL CONTRACTOR FIELD MARK ALL SWITCHGEAR AND PANELBOARDS WITH A WARNING CONCERNING THE POTENTIAL ARC FLASH HAZARD. PER NFPA 70 SECTION 110-16. COORDINATE REQUIREMENTS WITH THE AHJ.
10. ELECTRICAL CONTRACTOR TO COORDINATE WITH GENERATOR FIELD REP THAT THE GENERATOR PHASE ROTATION MATCHES THE UTILITY SERVICE.
11. GENERATOR OUTPUT BREAKERS ARE SQ 'D' TYPE HCL. CONTRACTOR TO SELECT PANEL EM BREAKERS TO PROVIDE SELECTIVE COORDINATION PER NFPA-70-700.27.
12. ALL CIRCUIT BREAKERS TO BE ARRANGED AS INDICATED ON PANEL SCHEDULE. ANY DEVIATION MUST BE APPROVED BY THE ENGINEER.
13. *WHERE SERIES RATING IS APPLIED, THE SERIES RATING COMBINATION INTERRUPTING RATING SHALL BE FIELD MARKED ON THE RESPECTIVE PANELBOARD PER NFPA 70, 240.86 AND 110.22. SUBMITTALS SHALL INCLUDE MANUFACTURERS' SERIES RATING CHART. CHARTS SHALL INCLUDE VOLTAGE RATING FOR EACH TYPE OF BREAKER INVOLVED (i.e. 120/208 OR SIMILAR FOR 1 PH.)*
14. ALL PANELBOARD BUSSING, NEUTRAL/GROUND BUSSES TO BE COPPER. USE OF BRANCH MOUNTED MAIN CIRCUIT BREAKER IS NOT ALLOWED.
15. *ALL BREAKERS IN AN 800 AMP FRAME OR LARGER SHALL BE ELECTRONIC TRIP. TRIP UNIT SHALL PROVIDE LTD, LTPU, STD, STPU, AND INST. ADJUSTMENTS. SUBMITTALS SHALL INCLUDE TIME/CURRENT CURVES (TCC) AND TCC No. FOR ALL ADJUSTABLE BREAKERS.*
16. SELECTIVE COORDINATION IS A REQUIREMENT FOR ALL ELECTRONIC/ADJUSTABLE CIRCUIT BREAKERS AS WELL AS ANY FEEDER AND BRANCH BREAKERS ASSOCIATED WITH THE ELECTRONIC/ADJUSTABLE CIRCUIT BREAKERS. ADDITIONALLY THE [illegible] SYSTEM SHALL BE SELECTIVELY COORDINATED PER NFPA 70-700.27 AND NFPA 70-701.27. THE ELECTRICAL CONTRACTOR SHALL CONTACT PUBLIX REP AND PROVIDE TO PUBLIX ENGINEER OF RECORD THE INSTALLED UTILITY TRANSFORMER SIZE AND SERVICE LATERAL CONDUCTOR TYPE AND QTY. AT WHICH TIME A SELECTIVE COORDINATION STUDY WILL BE PERFORMED BY PUBLIX. THE BREAKER SETTINGS WILL BE PROVIDED TO THE ELECTRICAL CONTRACTOR FOR FINAL ADJUSTMENT WITHIN TWO WEEKS AFTER RECEIPT OF THE FIELD INFORMATION. THE REQUEST FOR THE CIRCUIT BREAKER SETTINGS SHALL BE AFTER PERMANENT POWER AND INSTALLATION OF THE REFRIGERATION MACHINE ROOM. UPON COMPLETION OF THE COORDINATION STUDY ANY CIRCUIT BREAKERS PROVIDED BY THE ELECTRICIAN THAT DO NOT COORDINATE, SHALL BE CHANGED (AT NO COST TO PUBLIX) TO CIRCUIT BREAKERS THAT PROVIDE PROPER SELECTIVE COORDINATION. THE ELECTRICAL CONTRACTOR SHALL MAKE ALL CIRCUIT BREAKER ADJUSTMENTS AND HAVE THE PUBLIX ELECTRICAL REPRESENTATIVE WITNESS AND CONFIRM PROPER ADJUSTMENT PRIOR TO TCO/CO.
17. ELECTRICAL CONTRACTOR TO PROVIDE INDEPENDENT, 3RD PARTY INSULATION MEGGER TESTING ON ALL SERVICE LATERALAND GENERATOR FEEDERS. THE TEST SHOULD BE PERFORMED AFTER THE CONDUCTOR INSTALLATION IN THE CONDUIT AND BEFORE ANY CONDUCTOR TERMINATION. MEGGER INSULATION TESTING SHALL BE IN ACCORDANCE TO RECOGNIZED ANSI/NETA STANDARDS. MEGGER INSULATION TEST RESULTS SHALL BE RECORDED IN A SPREADSHEET FORMAT ALONG WITH RECORDING DATE, TIME, AMBIENT TEMPERATURE, AND HUMIDITY AT THE TIME OF TEST. THE SPREADSHEET SHALL BE SENT TO THE ENGINEER OF RECORD AT THE SAME TIME THE FIELD INFORMATION IS SUPPLIED TO ENGINEER OF RECORD FOR THE COORDINATION STUDY. ANY RESISTANCE VALUES OF TEST CABLES FOUND OUTSIDE OF CABLE MANUFACTURER/ANSI/NETA STANDARDS SHALL BE REPLACED AT NO COST TO THE OWNER. IF ANY CABLES ARE REPLACED, ALL CABLES IN THE RESPECTIVE SERVICE LATERAL AND FEEDER SHALL BE RETESTED. SEE ADDITIONAL REQUIREMENTS IN ELECTRICAL SPECIFICATION, DIVISION 26 00 00, SECTION 1.4.5 AND SECTION 2.21.
18. ELECTRICAL CONTRACTOR TO PROVIDE AND INSTALL THE FOLLOWING HARDWARE FOR PROPER INSTALLATION OF CONDUCTORS FOR THE 500KW GENERATOR. (WHEN 500KW GENERATOR IS USED)

    BURNDY YA36A3 COMPRESSION CONNECTORS FOR 600 MCM CONDUCTORS

    BURNDY YA32A3 COMPRESSION CONNECTORS FOR 400 MCM CONDUCTORS

    ½"x2" STAINLESS STEEL BOLTS

    ½" STAINLESS STEEL NUTS, WASHERS, AND LOCK WASHERS
19. ELECTRICAL CONTRACTOR TO PROVIDE SIGNAGE AT THE MDP INDICATING THE 60KW NATURAL GAS EMERGENCY GENERATOR AND 500KW DIESEL OPTIONAL STANDBY GENERATOR SIZE AND LOCATION IN ACCORDANCE WITH NFPA 70-700.7A AND 70-702.7A. ELECTRICAL CONTRACTOR TO PROVIDE SIGNAGE AT MDP PER NFPA 70-700.7B AND 70-702.7B FOR BOTH GENERATORS.
20. ELECTRICAL CONTRACTOR TO PROVIDE A FAULT CURRENT PLAQUE AT THE MDP PER NFPA 70-110.24. PRIOR TO ENERGIZING THE SERVICE CONFIRM EXACT FAULT CURRENT WITH THE UTILITY AND PROVIDE IN WRITING TO THE ENGINEER OF RECORD ALONG WITH THE CABLE INSULATION MEGGER TEST REQUIREMENTS FROM NOTE 17 AND SELECTIVE COORDINATION REQUIRED FIELD INFORMATION OF NOTE 16.
21. ALL CIRCUIT BREAKERS 1200 AMPS OR HIGHER SHALL COMPLY WITH NFPA 70-240.87 ARC ENERGY REDUCTION. THE ONLY ACCEPTABLE METHOD TO REDUCE CLEARING TIME IS 240.87(B)(3), AN ENERGY REDUCING MAINTENANCE SWITCH WITH LOCAL STATUS INDICATOR.
22. APT SURGE SUPPRESSION UNIT BY ELECTRICAL CONTRACTOR. MODEL TE02XAS10E1-RM. CONTACT ROBERT STANLEY WITH EMERSON/APT AT 1-800-237-4567.



GENERAL NOTE (ALUM. ONLY)

REQUIREMENTS FOR USE OF ALUMINUM SERVICE ENTRANCE CONDUCTORS:

- ALUMINUM CONDUCTORS ARE PERMITTED FOR SERVICE ENTRANCE ONLY. NO OTHER USE WILL BE PERMITTED.
- ALL LUGS TO BE Cu/Al RATED AND OXIDE INHIBITORS SHALL BE APPLIED
- INSTALLATION SHALL MEET NFPA-70 310.

SCALE = 1/8" = 1'-0"

APOLLO ENGINEERING, LLC
CONSULTING ENGINEERS
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TO THE BEST OF MY KNOWLEDGE, THE SPECIFICATIONS AND PLANS SHOWN HEREIN COMPLY WITH THE APPLICABLE MINIMUM BUILDING CODES IN EFFECT AT THIS TIME.

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ELECTRICAL RISER DIAGRAM
EAST COBB PUBLIX - #1745
EAST COBB CROSSING SHOPPING CENTER
ROSEWELL ROAD
MARIETTA, GA 30062

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