

WHAT IS A SINGLE-LINE DIAGRAM?

A single-line diagram (SLD) is a concise representation of an electrical power distribution system within a facility. It illustrates the layout of incoming utility power, including ratings, protective devices, and conductors that distribute electricity to various panels and loads. The diagram provides a overview that is essential for safety analysis, maintenance, and identifying potential hazards. Single-line diagrams are typically displayed or stored within the facility electrical rooms.

Key features of a single-line diagram include:

Schematic Representation: It shows how power flows through the system, making it easier to understand the overall electrical layout.

Compliance Requirements: Various codes and standards, such as NFPA 70B, NEC 408.4, and OSHA 1910.147, mandate that facilities maintain accurate single-line diagrams and panel schedules to ensure safety and compliance.

Panel Schedules: Panel schedules keep mathematical track of the electrical system's load flow & capacity. By showing the current load on each circuit, panel schedules assist in planning for future electrical needs. Panel schedules assist in efficient troubleshooting and maintenance, minimizing downtime.

Safety and Maintenance: The SLD is crucial for implementing lockout/tagout procedures, short-circuit current analysis, and coordinating protective devices to enhance workplace safety.

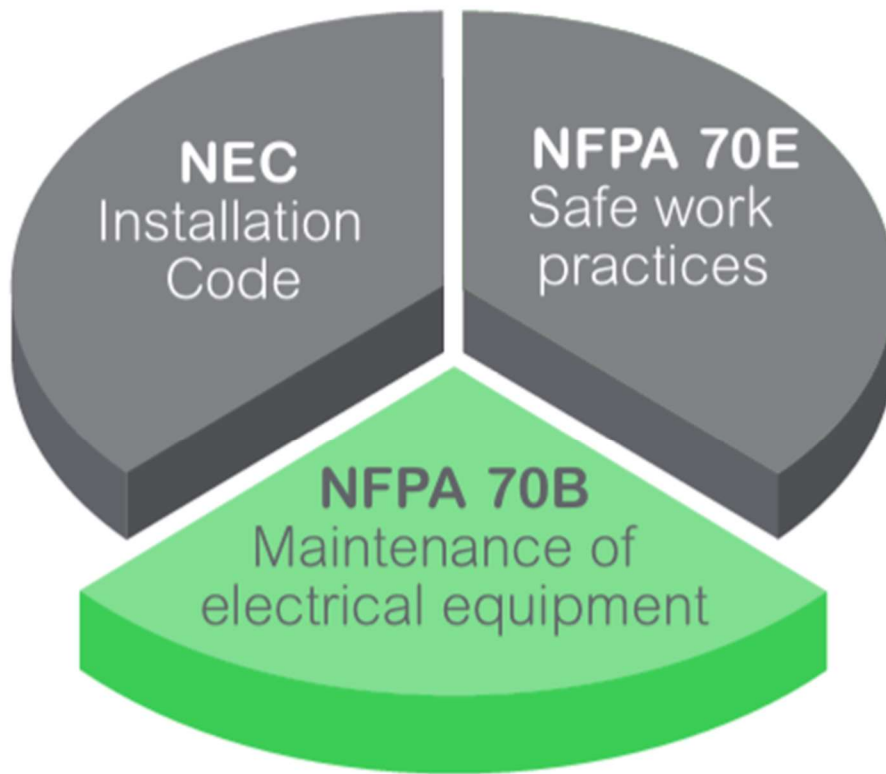
Supplementary Documentation: While the SLD is important, it is often accompanied by other electrical documentation like riser diagrams, arc flash studies, and maintenance plans, which provide a more comprehensive understanding of the electrical system.

Responsibility for Safety: Employers are responsible for maintaining workplace safety, which includes providing training, enforcing safety procedures, and ensuring that qualified workers perform electrical tasks according to established standards.

Overall, a single-line diagram is a vital tool for ensuring the safe and efficient operation of electrical systems in any facility.

The following SLD examples shown are for visual reference only.

A comprehensive approach to electrical safety



The National Electrical Code (NEC), NFPA 70B, and NFPA 70E are interrelated documents that provide guidelines and requirements for electrical installations and safety, including the use and maintenance of single-line diagrams (SLDs). Here's how they relate to one another:

NEC (National Electrical Code):

The NEC is a comprehensive set of standards for electrical wiring and installations in the United States. It outlines the requirements for safe electrical design, installation, and inspection to protect people and property from electrical hazards.

Within the NEC, specific sections address the need for accurate electrical documentation, including panel schedules and single-line diagrams. For instance, NEC

408.4 requires that panel schedules be maintained, which often accompanies single-line diagrams to provide a complete understanding of an electrical system.

NFPA 70B:

NFPA 70B focuses on the maintenance of electrical equipment and systems. It emphasizes the importance of documenting electrical systems through accurate and up-to-date single-line diagrams.

Chapter 6 of NFPA 70B specifically mandates that facilities maintain these diagrams as part of their preventive maintenance programs. This ensures that the electrical system is understood and managed effectively, contributing to safety and reliability.

NFPA 70E:

NFPA 70E is centered around electrical safety in the workplace. It provides guidelines for safe work practices, including requirements for lockout/tagout procedures and risk assessments.

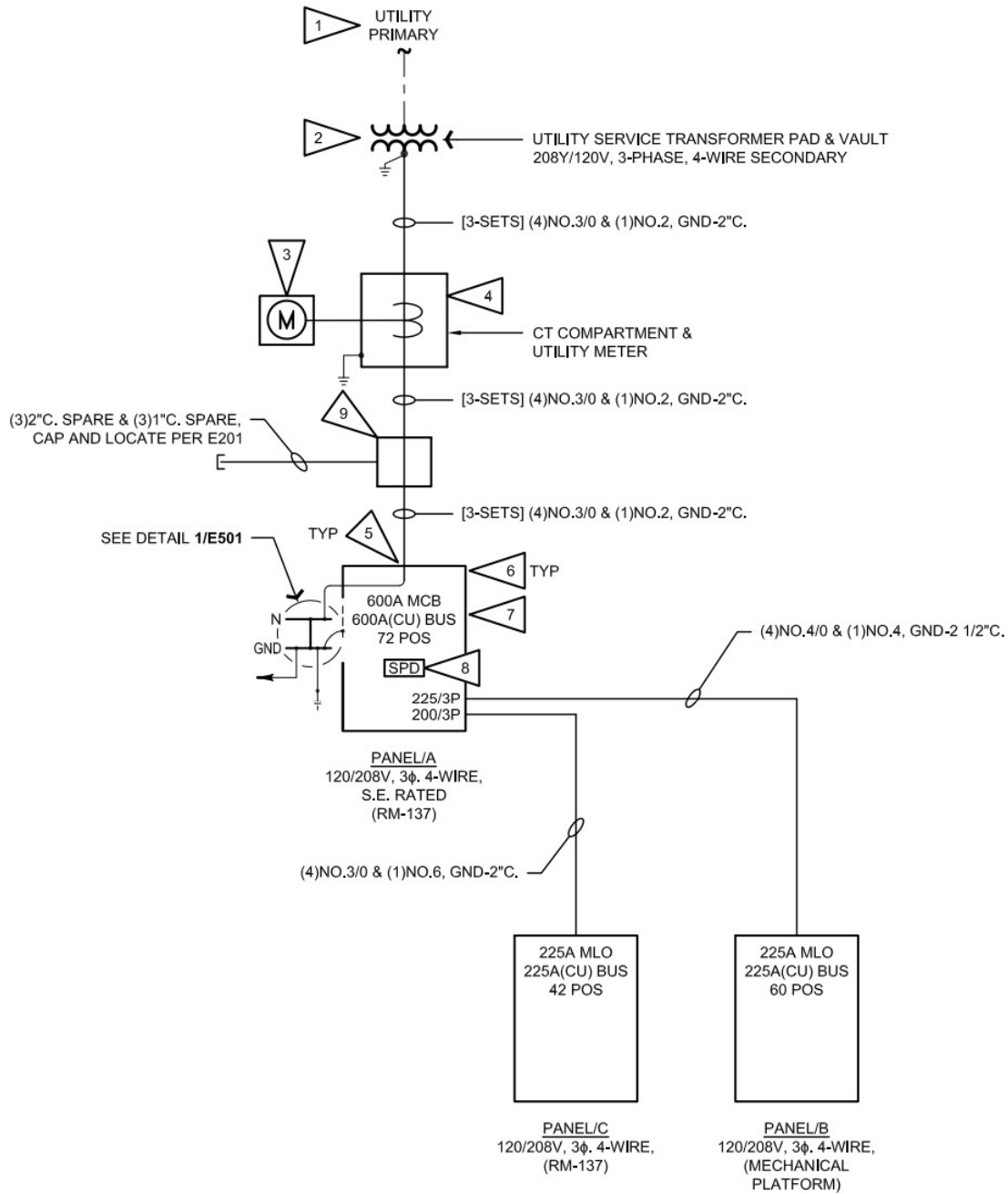
A crucial aspect of NFPA 70E is the requirement for a reliable single-line diagram to develop effective lockout/tagout procedures. It helps ensure that workers can safely isolate electrical systems before performing maintenance or repairs, thereby reducing the risk of electrical accidents.

Compliance and Safety: All three documents emphasize the importance of maintaining accurate single-line diagrams for compliance with electrical safety regulations and standards.

Documentation: The NEC outlines the necessity for proper documentation, while NFPA 70B focuses on maintenance documentation, and NFPA 70E emphasizes safety procedures that rely on such documentation.

Holistic Approach: Together, these standards create a holistic approach to electrical system management, ensuring that installations are safe, maintained properly, and that workers are protected during electrical work.

In summary, the NEC, NFPA 70B, and NFPA 70E collectively promote best practices for electrical installations and safety, with single-line diagrams playing a vital role in compliance and risk management.



SPACES ABOUT ELECTRICAL EQUIPMENT
SHALL MEET NEC 110.26; SEE PANEL
SCHEDULES FOR ADDITIONAL WORK

SPECIFIC ELECTRICAL EQUIPMENT (PANELS, DISCONNECTS, ETC.) ARE TO BE DESIGNATED WITH AN EQUIPMENT IDENTIFIER, AS INDICATED. A NAMEPLATE SHALL BE INSTALLED ON EACH UNIT INDICATING IDENTIFIER, VOLTAGE AND PHASE, AND SERVING POWER SOURCE. NAMEPLATE SHALL BE PHENOLIC ENGRAVED TYPE WITH BLACK LETTERING ON WHITE BACKGROUND, 1/4" MINIMUM TEXT HEIGHT.

ONE-LINE DIAGRAM

NOT TO SCALE

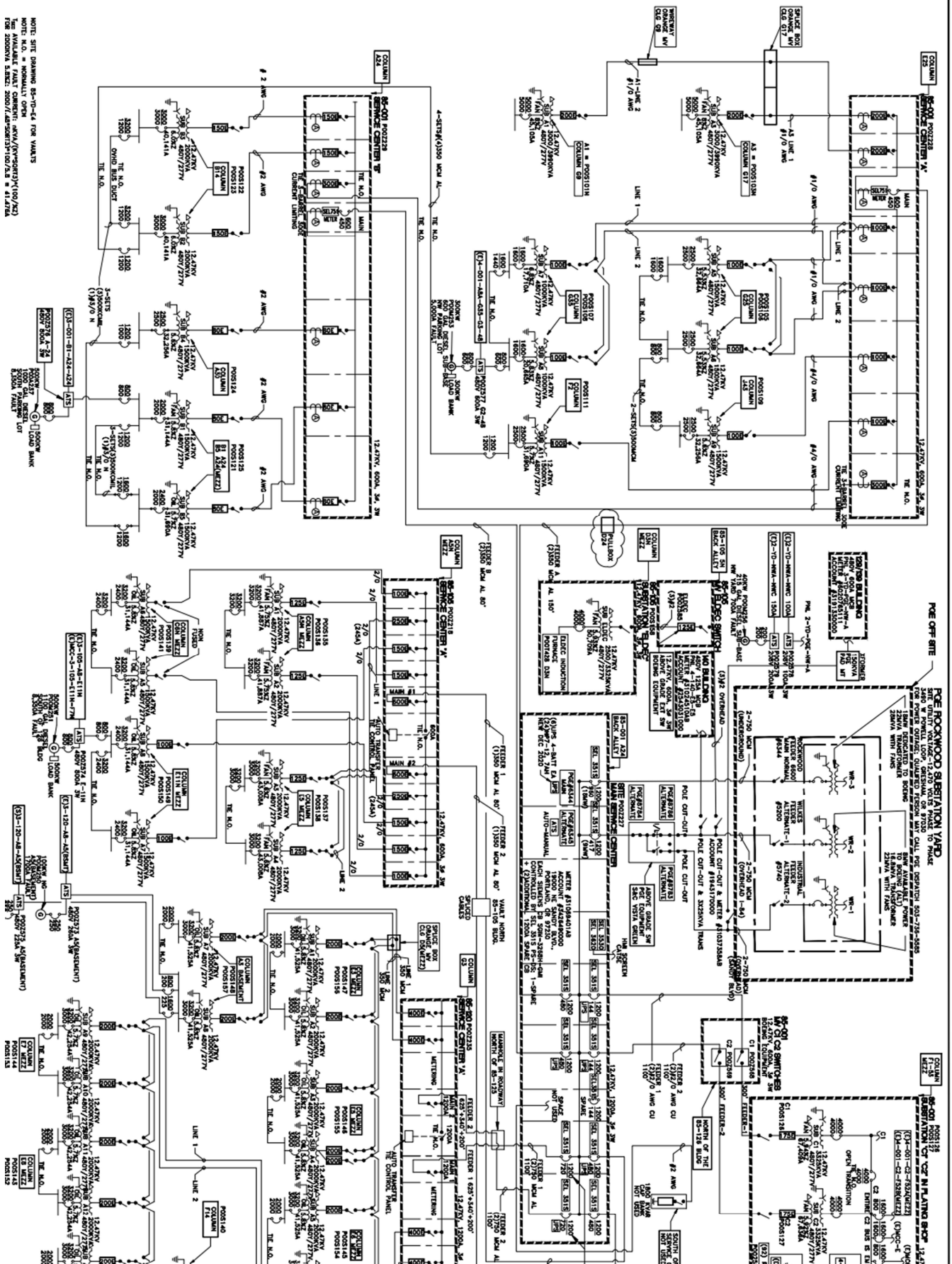


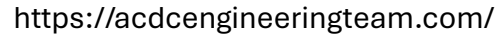
17 STUB AND CAP CONDUITS FOR FUTURE PORTABLE(S) AND/OR CONSESSIONS STAND(S). FOR LOCATION AND FURTHER INFORMATION SEE **EO.4** & **EO.5**.

ONE-LINE DIAGRAM

SCALE: NOT TO SCALE

NOTE: SITE DRAWING 85-70-64 FOR WANTS
NOTE: N.O. = NOTICALLY OPEN
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1,2	Panel 4MDP	RM 102	PANEL SCHEDULE						PROJECT: name					
277/480V, 3Ph, 4W.			800A Cu Bus		800A MCB LSI-EM		SE RATE FLOOR MOUNTED DIST. PANEL CONSTR.(I-LINE STYL 24-Mar-25							
Ckt. No.	Description / Location	Load (VA)	Load Type	C/B Amp	# Pole	Phase	C/B Amp	# Pole	Load (VA)	Load Type	Description / Location	Ckt. No.		
3	1 Panel 4MFT	9,390	S	400	3	A	70	3	17,091	H	RTU-1 ROOFTOP GAS FIRED	2		
	3 ---(+Panel 2MFT1)	5,984	S	LSI-EM	-	B	--	-	17,091	H	---(20 TON)	4		
	5 ---	2,787	S	--	-	C	--	-	17,091	H	---	6		
3	7 Panel 4OFC	9,028	S	200	3	A	70	3	17,091	H	RTU-2 ROOFTOP GAS FIRED	8		
	9 ---(+Panel 2OFC1)	7,774	S	LSI-EM	-	B	--	-	17,091	H	---(20 TON)	10		
	11 ---	6,788	S	--	-	C	--	-	17,091	H	---	12		
3	13 Panel 4SHP	9,028	S	200	3	A	70	3	17,091	H	RTU-3 ROOFTOP GAS FIRED	14		
	15 ---(+Panel 2SHP1)	7,774	S	LSI-EM	-	B	--	-	17,091	H	---(20 TON)	16		
	17 ---	6,788	S	--	-	C	--	-	17,091	H	---	18		
4	19 PROVISIONS	SPARE		200	3	A	70	3	17,091	H	RTU-4 ROOFTOP GAS FIRED	20		
	21 ---			LSI-EM	-	B	--	-	17,091	H	---(20 TON)	22		
	23 ---			--	-	C	--	-	17,091	H	---	24		
6	25 ELEVATOR	16,343	LM	90	3	A		3			SPACE	26		
	27 --- (30HP)	16,343	LM	--	-	B		-			SPACE	28		
	29 ---	16,343	LM	--	-	C		-			SPACE	30		
5	31 CMC-1 CENT MIST COLLECTION	9,418	M	70	3	A	20	3	3,878	H	RTU-5 ROOFTOP GAS FIRED	32		
	33 --- (25HP ROOF)	9,418	M	--	-	B	--	-	3,878	H	---(5 TON)	34		
	35 --- (VFD BY MECH)	9,418	M	--	-	C	--	-	3,878	H	---	36		
	37 SPACE				3	A	25	3	6,648	H	RTU-6 ROOFTOP GAS FIRED	38		
	39 SPACE				-	B	--	-	6,648	H	---(5 TON)	40		
	41 SPACE				-	C	--	-	6,648	H	---	42		
Total Connected Load: Ph A		132,097 VA		477 A										
Total Connected Load: Ph B		126,183 VA		455 A										
Total Connected Load: Ph C		121,014 VA		437 A										
"Maximum" Phase Connected Load: Ph A		132,097 VA			22,860 A rms Available Fault Duty									
Total Connected Load (3 X Maximum):		396.3 KVA		476.7 AMPS	25K A.I.C.									
						Total Demand Load:		394.2 KVA		474 AMPS				
		Connected Loads	Subfed Loads (S)	Total Loads	Demand Factor	Demand Load								
G	General (Non-Continuous)	0	1,176	1,176	100%	1,176								
L	Lighting	0	14,305	14,305	125%	17,881								
R	Receptacles - to 10 KVA	0	11,880	10,000	100%	10,000	Accessories:							
	over 10 KVA		0	1,880	50%	940								
K	Kitchen	0	7,200	7,200	100%	7,200								
H	Heating	236,669	24,888	261,557	100%	261,557								
M	Motors	28,254	5,892	34,146	100%	34,146								
LM	Largest Motor	49,029	0	49,029	125%	61,286								
WH	Water Heater	0	0	0	125%	0	Provide Integral TVSS Unit							
C	Continuous General Load	0	0	0	125%	0	Provide Integral Digital Multi-Meter							
U	<User Defined Load Type>	0	0	0	100%	0								
TOTALS		313,952 VA	65,341 VA	379,293 VA	394,186 VA									
NOTES:														
1. SOURCE = UTILITY EST. 500 KVA 2.3%Z TRANSFORMER (SEE SINGLE LINE FOR 800 AMP FEEDER INFORMATION)														
2. SEE SINGLE-LINE DRAWING FOR ADDITIONAL INFORMATION														
3. ELECTRONIC TRIP TYPE LSI PLUS ENERGY MANAGEMENT METER WITH MICROLOGIC 5.2E TRIP UNIT AND HAVE LOCK ON/LOCK OFF														
4. PROVIDE (2) 2" RACEWAY TO MFT STUB PER PLANS; CAP WITH POLY PULL ROPE; LABEL														
5. PROVIDE BREAKER LOCK + WP FLEX EXTENDED TO UNIT (DISC BY MECH)														
6. PROVIDE BREAKER LOCK + ELEVATOR RATED SHUNT TYPE FUSED DISCONNECT PER NEC 620 REMAINING BY ELEV CONTRACTOR														