



September 1, 2024

ARC FLASH HAZARD STUDY

PREPARED FOR:

[REDACTED]

[REDACTED]

PREPARED BY:

[REDACTED]

ELECTRICAL ENGINEER, PE

[REDACTED]

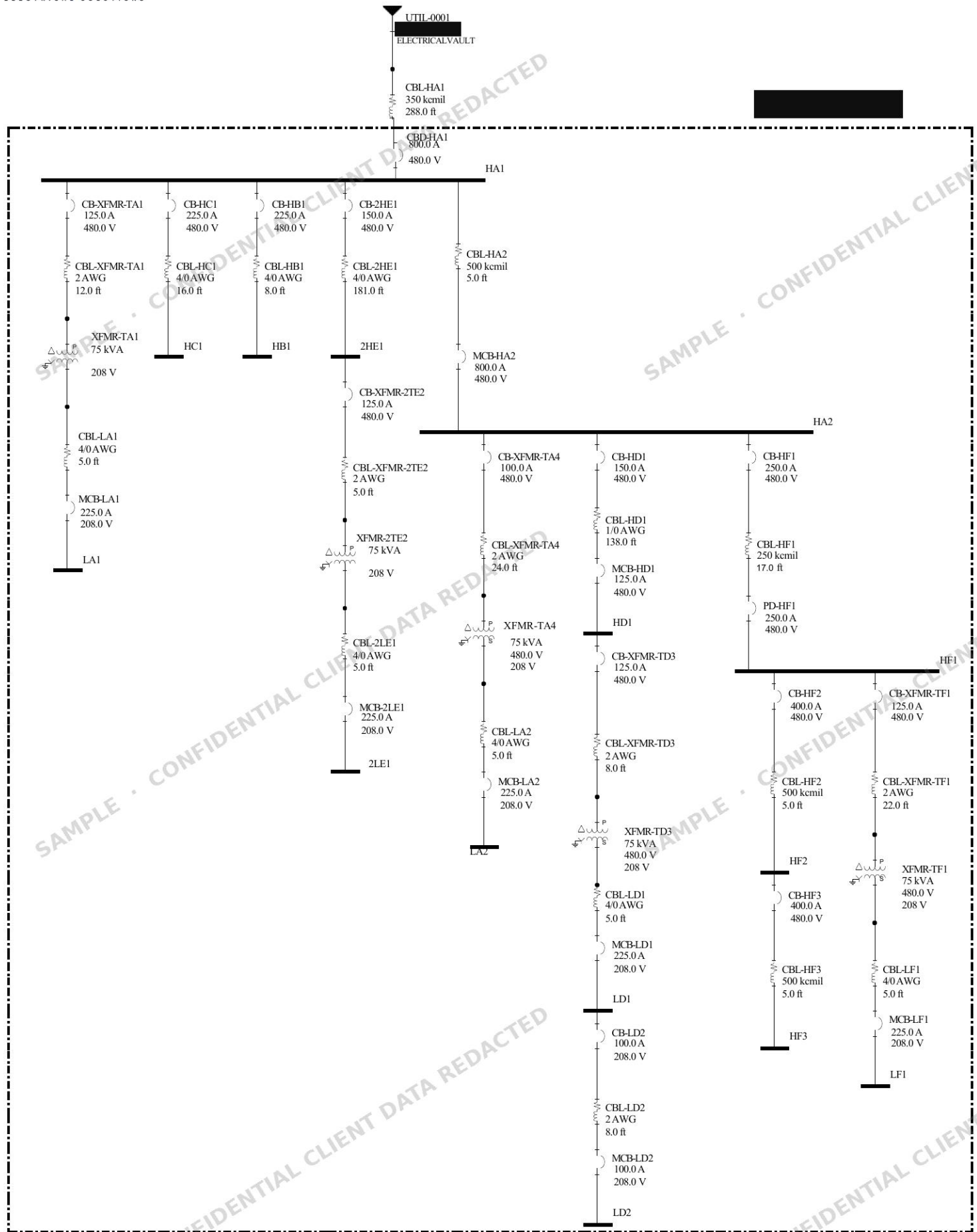
4. PRELIMINARY DATA

- Equipment included is based upon Single-Line Diagrams (SLD) received by [REDACTED]
- Review existing construction drawings, shop drawings, or SLDs to collect data required to develop the SLD models. Documentation will be supplemented by the [REDACTED] Owner's Representative, to assist with any data which could be necessary during the Arc Flash Hazard Analysis of the [REDACTED]
- Data collection will be performed primarily by [REDACTED] Any additional data the engineering consultant requires to coordinate with the Owner's Rep and any future site visits.
- Importance: The results of the study analyses are highly dependent on the accuracy of the study data. Modifications or clarifications of study data will likely alter study results.

5. SCOPE OF WORK

- Provide engineering design analysis for the entire electrical system using SKM Power Tools.
- Perform an Arc Flash Hazard Analysis to calculate the incident energy near applicable electrical distribution equipment, including switchboards, panelboards, control panels, motor control centers, bus ducts, transfer switches, and bus tap switches. The analysis will be performed for a system operating under normal conditions.
- Short circuit, breaker, and coordination study is included for the incoming service electrical equipment only.
- Determine work boundaries per the NFPA 70E Guidelines for Electrical Safety in the workplace. Boundaries to be set include a Restricted Approach, a Limited Approach, and Arc Flash Protection Boundary.
- Determine the minimum Personal Protective clothing and Equipment (PPE) required while working on live electrical distribution equipment with the flash boundaries. Equipment under 1.2 cal/cm² shall include labels indicating no PPE is required. This applies primarily to equipment disconnects with ampacities 100A, 60A, 30A respectively.
- Prepare equipment labeling print files displaying pertinent arc flash analysis information and hazard warning. Equipment labels will be printed and handed over to [REDACTED] All labels will be affixed to equipment by [REDACTED]





	Bus Name	Protective Device Name	Bus kV	Bus Bolted Fault (kA)	Bus Arcing Fault (kA)	Prot Dev Bolted Fault (kA)	Prot Dev Arcing Fault (kA)	Trip/Delay Time (sec.)	Equip Type	Arc Flash Boundary (in)	Working Distance (in)	Incident Energy (cal/cm2)	PPE Level / Notes (*N)
1	2HE1	CB-2HE1	0.48	7.28	5.49	7.28	5.49	0.0167	PNL	6	18	0.20	
2													
3	2LE1	MCB-2LE1	0.208	4.60	1.69	4.60	1.69	0.023	PNL	3	18	0.09	(*N3)
4													
5	HA1	MaxTripTime @2.0s	0.48	11.49	8.82	11.49	8.82	2	PNL	161	18	40.0	(*N2) (*N9)
6													
7	HA2	MaxTripTime @2.0s	0.48	11.43	8.77	11.43	8.77	2	PNL	161	18	39.7	(*N2) (*N9)
8													
9	HB1	CB-HB1	0.48	11.21	8.60	11.21	8.60	0.0167	PNL	8	18	0.33	
10													
11	HC1	CB-HC1	0.48	10.95	8.39	10.95	8.39	0.0167	PNL	8	18	0.32	
12													
13	HD1	MCB-HD1	0.48	6.74	5.07	6.74	5.07	0.0167	PNL	6	18	0.19	
14													
15	HF1	PD-HF1	0.48	10.89	8.35	10.89	8.35	0.0161	PNL	8	18	0.30	
16													
17	HF2	CB-HF2	0.48	10.77	8.25	10.77	8.25	0.0167	PNL	8	18	0.31	
18													
19	HF3	CB-HF3	0.48	10.66	8.16	10.66	8.16	0.0167	PNL	8	18	0.31	
20													
21	LA1	MCB-LA1	0.208	5.09	2.19	5.09	2.19	0.0174	PNL	3	18	0.08	
22													
23	LA2	MCB-LA2	0.208	5.00	2.15	5.00	2.15	0.0174	PNL	3	18	0.08	
24													
25	LD1	MCB-LD1	0.208	4.47	1.64	4.47	1.64	0.0247	PNL	4	18	0.09	(*N3)
26													
27	LD2	MCB-LD2	0.208	4.23	1.79	4.23	1.79	0.0167	PNL	3	18	0.07	
28													



WARNING

Arc Flash and Electric Shock Risk

Appropriate PPE Required

0.20 cal/cm² INCIDENT ENERGY AT **18 in**
480 VAC NOMINAL SYSTEM VOLTAGE
6 in FLASH PROTECTION BOUNDARY
42 in LIMITED APPROACH
12 in RESTRICTED APPROACH

EQUIPMENT ID:

2HE1



Warning: Changes in equipment settings or system configuration will invalidate the calculated values and PPE requirements



DANGER

NO SAFE PPE EXISTS

ENERGIZED WORK PROHIBITED

40.0 cal/cm² INCIDENT ENERGY AT **18 in**
480 VAC NOMINAL SYSTEM VOLTAGE
161 in FLASH PROTECTION BOUNDARY
42 in LIMITED APPROACH
12 in RESTRICTED APPROACH

EQUIPMENT ID:

HA1



Warning: Changes in equipment settings or system configuration will invalidate the calculated values and PPE requirements



WARNING

Arc Flash and Electric Shock Risk

Appropriate PPE Required

0.09 cal/cm² INCIDENT ENERGY AT **18 in**
208 VAC NOMINAL SYSTEM VOLTAGE
3 in FLASH PROTECTION BOUNDARY
42 in LIMITED APPROACH
12 in RESTRICTED APPROACH

EQUIPMENT ID:

2LE1



Warning: Changes in equipment settings or system configuration will invalidate the calculated values and PPE requirements



DANGER

NO SAFE PPE EXISTS

ENERGIZED WORK PROHIBITED

39.7 cal/cm² INCIDENT ENERGY AT **18 in**
480 VAC NOMINAL SYSTEM VOLTAGE
161 in FLASH PROTECTION BOUNDARY
42 in LIMITED APPROACH
12 in RESTRICTED APPROACH

EQUIPMENT ID:

HA2



Warning: Changes in equipment settings or system configuration will invalidate the calculated values and PPE requirements



WARNING

Arc Flash and Electric Shock Risk

Appropriate PPE Required

0.33 cal/cm² INCIDENT ENERGY AT **18 in**
480 VAC NOMINAL SYSTEM VOLTAGE
8 in FLASH PROTECTION BOUNDARY
42 in LIMITED APPROACH
12 in RESTRICTED APPROACH

EQUIPMENT ID:

HB1



Warning: Changes in equipment settings or system configuration will invalidate the calculated values and PPE requirements



WARNING

Arc Flash and Electric Shock Risk

Appropriate PPE Required

0.19 cal/cm² INCIDENT ENERGY AT **18 in**
480 VAC NOMINAL SYSTEM VOLTAGE
6 in FLASH PROTECTION BOUNDARY
42 in LIMITED APPROACH
12 in RESTRICTED APPROACH

EQUIPMENT ID:

HD1



Warning: Changes in equipment settings or system configuration will invalidate the calculated values and PPE requirements



WARNING

Arc Flash and Electric Shock Risk

Appropriate PPE Required

0.32 cal/cm² INCIDENT ENERGY AT **18 in**
480 VAC NOMINAL SYSTEM VOLTAGE
8 in FLASH PROTECTION BOUNDARY
42 in LIMITED APPROACH
12 in RESTRICTED APPROACH

EQUIPMENT ID:

HC1



Warning: Changes in equipment settings or system configuration will invalidate the calculated values and PPE requirements



WARNING

Arc Flash and Electric Shock Risk

Appropriate PPE Required

0.30 cal/cm² INCIDENT ENERGY AT **18 in**
480 VAC NOMINAL SYSTEM VOLTAGE
8 in FLASH PROTECTION BOUNDARY
42 in LIMITED APPROACH
12 in RESTRICTED APPROACH

EQUIPMENT ID:

HF1



Warning: Changes in equipment settings or system configuration will invalidate the calculated values and PPE requirements



WARNING

Arc Flash and Electric Shock Risk

Appropriate PPE Required

0.31 cal/cm² INCIDENT ENERGY AT **18 in**
480 VAC NOMINAL SYSTEM VOLTAGE
8 in FLASH PROTECTION BOUNDARY
42 in LIMITED APPROACH
12 in RESTRICTED APPROACH

EQUIPMENT ID:

HF2



Warning: Changes in equipment settings or system configuration will invalidate the calculated values and PPE requirements



WARNING

Arc Flash and Electric Shock Risk

Appropriate PPE Required

0.08 cal/cm² INCIDENT ENERGY AT **18 in**
208 VAC NOMINAL SYSTEM VOLTAGE
3 in FLASH PROTECTION BOUNDARY
42 in LIMITED APPROACH
12 in RESTRICTED APPROACH

EQUIPMENT ID:

LA1



Warning: Changes in equipment settings or system configuration will invalidate the calculated values and PPE requirements



WARNING

Arc Flash and Electric Shock Risk

Appropriate PPE Required

0.31 cal/cm² INCIDENT ENERGY AT **18 in**
480 VAC NOMINAL SYSTEM VOLTAGE
8 in FLASH PROTECTION BOUNDARY
42 in LIMITED APPROACH
12 in RESTRICTED APPROACH

EQUIPMENT ID:

HF3



Warning: Changes in equipment settings or system configuration will invalidate the calculated values and PPE requirements



WARNING

Arc Flash and Electric Shock Risk

Appropriate PPE Required

0.08 cal/cm² INCIDENT ENERGY AT **18 in**
208 VAC NOMINAL SYSTEM VOLTAGE
3 in FLASH PROTECTION BOUNDARY
42 in LIMITED APPROACH
12 in RESTRICTED APPROACH

EQUIPMENT ID:

LA2



Warning: Changes in equipment settings or system configuration will invalidate the calculated values and PPE requirements



WARNING

Arc Flash and Electric Shock Risk

Appropriate PPE Required

0.09 cal/cm² INCIDENT ENERGY AT **18 in**
208 VAC NOMINAL SYSTEM VOLTAGE
4 in FLASH PROTECTION BOUNDARY
42 in LIMITED APPROACH
12 in RESTRICTED APPROACH

EQUIPMENT ID:

LD1

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Warning: Changes in equipment settings or system configuration will invalidate the calculated values and PPE requirements



WARNING

Arc Flash and Electric Shock Risk

Appropriate PPE Required

0.08 cal/cm² INCIDENT ENERGY AT **18 in**
208 VAC NOMINAL SYSTEM VOLTAGE
3 in FLASH PROTECTION BOUNDARY
42 in LIMITED APPROACH
12 in RESTRICTED APPROACH

EQUIPMENT ID:

LF1

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Warning: Changes in equipment settings or system configuration will invalidate the calculated values and PPE requirements



WARNING

Arc Flash and Electric Shock Risk

Appropriate PPE Required

0.07 cal/cm² INCIDENT ENERGY AT **18 in**
208 VAC NOMINAL SYSTEM VOLTAGE
3 in FLASH PROTECTION BOUNDARY
42 in LIMITED APPROACH
12 in RESTRICTED APPROACH

EQUIPMENT ID:

LD2

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Warning: Changes in equipment settings or system configuration will invalidate the calculated values and PPE requirements

