VOLTAGE DROP CALCULATION FROM TRANSFORMER TO MAIN DISCONNECT:	
SOURCE	= AC, 3Φ
VOLTAGE	= 208,0
COND. MATERIAL	= PVC
POWER FACTOR	= 0,90
COND. TEMP.	= 75°C
CONDUCTOR METAL	= COPPER
COND. PER PHASE	= 1
WIRE SIZE	= 600 MCM
LOAD	= 86,8 AMPS
LENGTH (1-WAY)	= 80,0 FEET
RESULT:	
THE VOLTAGE DROP = 0.22%, 0.45V L-L.	

VOLTAGE DROP CALCULATION FROM MAIN DISCONNECT TO PP1:	
SOURCE	= AC, 3Φ
VOLTAGE	= 208,0
COND. MATERIAL	= STEEL
POWER FACTOR	= 0,90
COND. TEMP.	= 75°C
CONDUCTOR METAL	= COPPER
COND. PER PHASE	= 1
WIRE SIZE	= 600 MCM
LOAD	= 86,8 AMPS
LENGTH (1-WAY)	= 25,0 FEET
RESULT:	
THE VOLTAGE DROP = 0.08%, 0.16V L-L.	

VOLTAGE DROP CALCULATION TO FARTHEST BRANCH CIRCUIT: PP3-35,37	
SOURCE	= AC, 1Φ
VOLTAGE	= 208,0
COND. MATERIAL	= PVC
POWER FACTOR	= 0,90
COND. TEMP.	= 75°C
CONDUCTOR METAL	= COPPER
COND. PER PHASE	= 2
WIRE SIZE	= #10
LOAD	= 0.968 KVA
LENGTH (1-WAY)	= 160,0 FEET
RESULT:	
THE VOLTAGE DROP = 0.39%, 0.82V.	

VOLTAGE DROP CALCULATION TO PP1 = 0.22%+0,08% = 0,30%

VOLTAGE DROP CALCULATION TO FARTHEST BRANCH CIRCUIT: 0.39%

TOTAL PERCENT VOLTAGE DROP = 0.30% + 0.39% = 0,69%

2 E-6 OVERALL VOLTAGE DROP

N.T.S.

FAULT CURRENT CALCULATION FOR MAIN DISCONNECT

AMPS SHORT CIRCUIT FROM ELECTRICAL UTILITIES = 43,237 A RMS

WIRE IS: 600 AWG
NUMBER OF CONDUCTORS PER PHASE: 1
CONDUCTOR LENGTH 'L': 80'
CONDUCTOR C VALUE: 22,965 (#CONDUCTORS PER PHASE x C = 22,965)

$$f = \frac{1.73 \times L \times I}{C \times E_{L-L}} = \frac{1.73 \times 80 \times 43,237}{22,965 \times 208} = 1.253$$

$$M = \frac{1}{1+f} = \frac{1}{1+1.253} = 0.444$$

I_{SCA} = AVAILABLE FROM UTILITY x M = 43,237 x 0.444 = 19,197 A RMS

I_{SCA} MOTOR CONTRIBUTION = $\frac{\text{MOTOR kVA} \times 1000}{1.73 \times E_{L-L} \times 0.25 \text{ MOTOR Zpu}}$ = NEGLIGIBLE

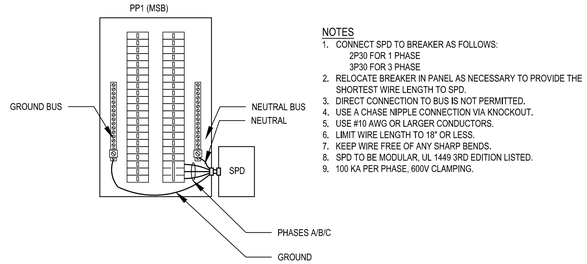
I_{SCA} TOTAL = I_{SCA} = AVAILABLE FROM UTILITY + I_{SCA} MOTOR CONTRIBUTION = 19,197 A RMS AT BUILDING MAIN

MINIMUM BREAKER A.I.C. RATING = 22,000 A.I.C.

L = LENGTH (feet) OF CIRCUIT TO FAULT
C = CONSTANT VALUE FOR CONDUCTORS – FOR PARALLEL RUNS MULTIPLY "C" VALUE BY NUMBER OF CONDUCTORS PER PHASE
I = AVAILABLE SHORT CURRENT IN AMPERES AT BEGINNING OF CIRCUIT

3 E-6 MAIN DISCONNECT FAULT CURRENT CALCULATION

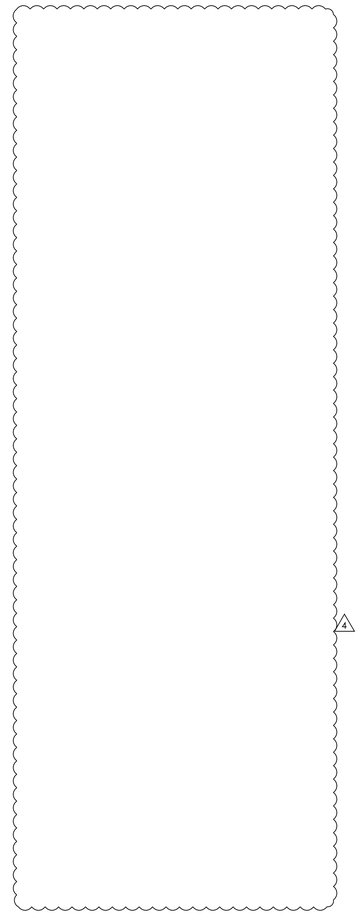
N.T.S.

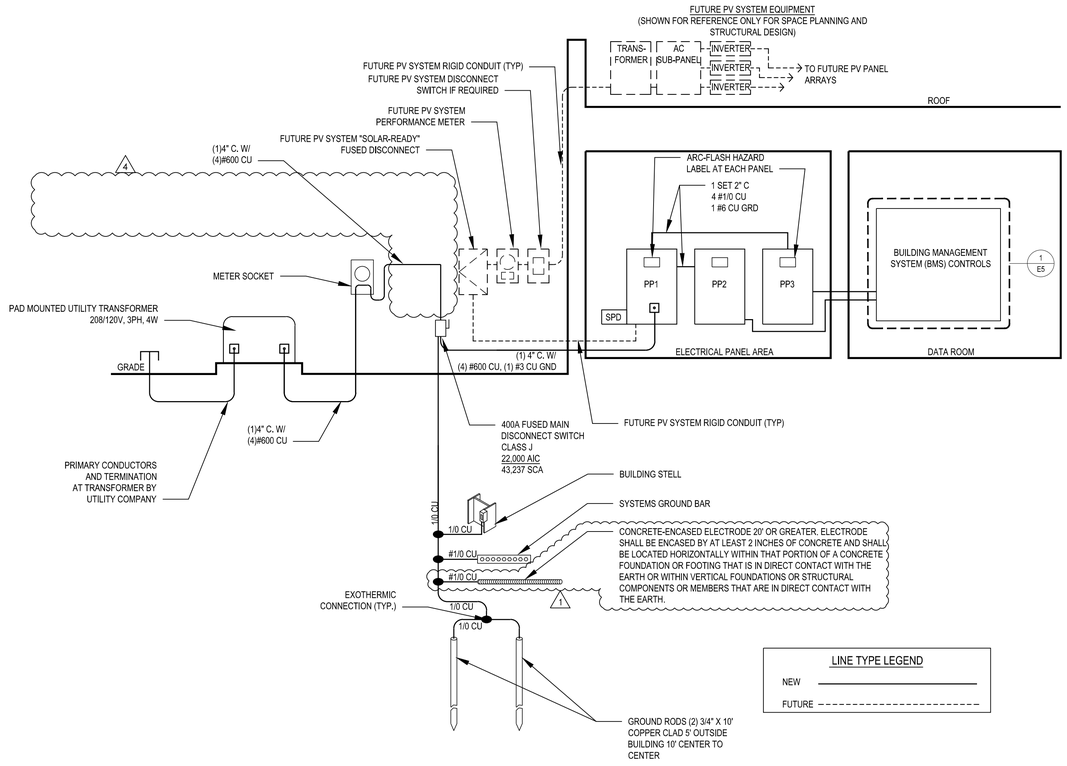


NOTES
1. CONNECT SPD TO BREAKER AS FOLLOWS:
   2P30 FOR 1 PHASE
   3P30 FOR 3 PHASE
2. RELOCATE BREAKER IN PANEL AS NECESSARY TO PROVIDE THE SHORTEST WIRE LENGTH TO SPD.
3. DIRECT CONNECTION TO BUS IS NOT PERMITTED.
4. USE A CHASE NIPPLE CONNECTION VIA KNOCKOUT.
5. USE #10 AWG OR LARGER CONDUCTORS.
6. LIMIT WIRE LENGTH TO 18" OR LESS.
7. KEEP WIRE FREE OF ANY SHARP BENDS.
8. SPD TO BE MODULAR, UL 1449 3RD EDITION LISTED.
9. 100 KA PER PHASE, 600V CLAMPING.

4 E-6 ELECTRICAL SERVICE SURGE PROTECTION

N.T.S.





1 E-6 ELECTRICAL RISER DIAGRAM

N.T.S.

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SIGNED BY:

STATE OF MISSOURI
JERMAINE F. WILLIAMS
NUMBER PE-2021014472
PROFESSION ENGINEER
Jermaine F Williams
2022.12.21 16:44:36-05'00'

PRYOR ROAD & LOWENSTEIN DRIVE

908 NW PRYOR ROAD
LEE'S SUMMIT, MO 64081

EBI JOB #4121000090

ISSUE	DATE	DESCRIPTION
0	03/02/2022	PERMIT
1	04/11/2022	PERMIT REVISIONS
2	8/18/2022	ASI #1 - CONSTRUCTION SET
3	10/10/2022	PARAPET RFI #12
4	12/21/2022	STORM SWITCH REMOVAL

CHASE

PRYOR & LOWENSTEIN
PROTOTYPE VERSION 20.4

CONTENTS

ONE-LINE DIAGRAM & ELECTRICAL SYSTEM DETAILS

02/04/2022

SHEET

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