

HORIZONTAL SCALE IN FEET
 0 NTS

CIRCUIT SCHEMATIC & POWER SERVICE DATA - CONTROL CENTER E

LEGEND:

- WOOD POLE, EXISTING, WITH 1 NEW LED LUMINAIRE, 30' HEIGHT
- WOOD POLE WITH 1 LED LUMINAIRE, 30' HEIGHT
- BRONZE SHOEBOX POLE WITH 1 LED LUMINAIRE, 15' HEIGHT
- BRONZE SHOEBOX POLE WITH 2 LED LUMINAIRES, 15' HEIGHT
- UNDERPASS LED WALLPACK FIXTURE
- TRANSFORMER (BY CPP)
- PULL BOX / JUNCTION BOX
- CIRCUIT WIRE (SINGLE-PHASE, 3-WIRE SYSTEM)

LIGHT FIXTURE IDENTIFICATION NO.
 E#-##
 CONTROL CENTER CIRCUIT NO. POLE NO. WITHIN CIRCUIT

PULL BOX / JUNCTION BOX IDENTIFICATION NO.
 PB-E#
 PULL BOX / JUNCTION BOX NO. WITHIN CIRCUIT (SEE NOTE 2) CONTROL CENTER

POWER SERVICE DATA									
POWER SERVICE	LINE VOLTAGE (VOLTS)	CONNECTED LOAD (KVA)	SERVICE ENTRANCE CABLE (AWG)	ENCLOSURE RATING (AMPS)	CIRCUIT NO.	CIRCUIT LOAD (AMPS)	CIRCUIT FUSE SIZE (AMPS)	CIRCUIT CABLE SIZE (AWG)	MAINTAINING AGENCY
E	240V (SINGLE PHASE, 3-WIRE)	30.3	4	200	1	3.80	20	8	ODOT
	240V (SINGLE PHASE, 3-WIRE)				2	3.65	20	8	
	240V (SINGLE PHASE, 3-WIRE)				3-7	8.8	20	8	
	240V (SINGLE PHASE, 3-WIRE)				8	11.2	20	8	
	240V (SINGLE PHASE, 3-WIRE)				9-15	8.8	20	8	
	120V (SINGLE PHASE, 3-WIRE)				16	0.42	20	8	

- NOTES:**
- "CIRCUIT CABLE SIZE" REFERS TO THE WIRE AWG COMING OUT OF THE CONTROL CENTER FOR EACH CIRCUIT.
 - ONLY PULL BOXES / JUNCTION BOXES FOR BRANCH CIRCUITS AND JUNCTION BOXES BREAKING UP LONG CONDUIT RUNS ARE SHOWN IN THE CIRCUIT SCHEMATIC.
 - THE CONTRACTOR SHALL INSTALL THE CONDUIT, TRANSFORMER, CONDUCTORS AND POLES; CONNECTIONS AT THE TRANSFORMER SHALL BE INSTALLED BY CPP FORCES.

Project		Catalog #		Type	
Prepared by		Notes		Date	



Streetworks

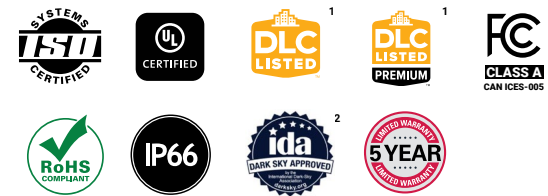
USSSL LED

Area / Site Luminaire

Product Features



Product Certifications



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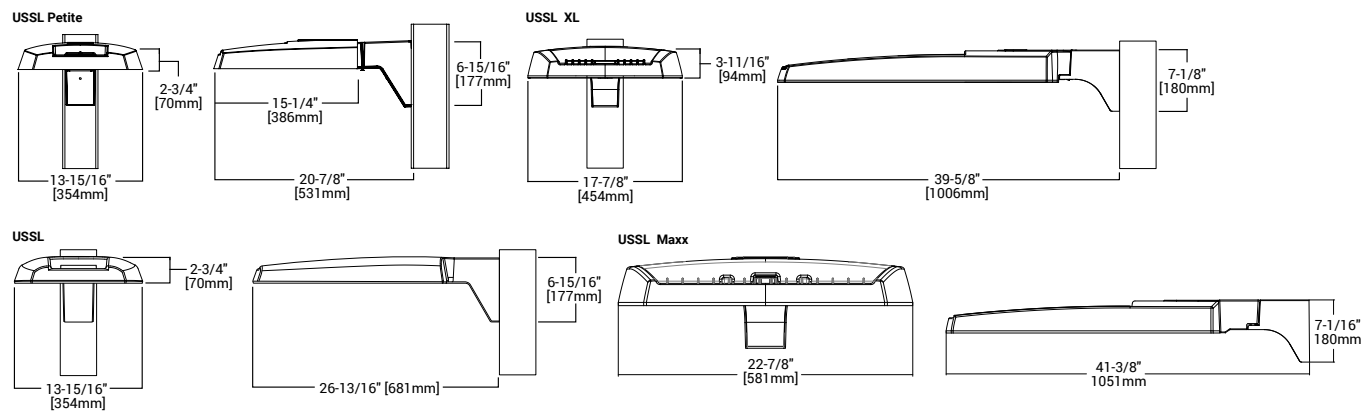
Quick Facts

- Lumen packages range from 4,800 - 84,000 lumens (35W - 588W)
- Replaces 70W up to 1,000W HID equivalents
- Efficacies up to 160 lumens per watt
- Energy and maintenance savings up to 85% versus HID solutions
- Standard universal quick mount arm with universal drill pattern

Connected Systems

- WaveLinx

Dimensional Details



NOTES:
 1. Visit <https://www.designlights.org/search/> to confirm qualification. Not all product variations are DLC qualified.
 2. IDA Certified for 3000K CCT and warmer only.

Ordering Information


SAMPLE NUMBER: USSL-XL-C75-D-UNV-T4-SA-BZ

Product Family ^{1,2}	Light Engine ⁴	Driver	Voltage	Distribution	Mounting	Color
USSL-P=USSL Petite BAA-USSL-P=USSL Petite BAA Compliant ³ TAA-USSL-P=USSL Petite TAA Compliant ³	C014=(1 LED) Approx. 40% Output C016=(1 LED) Approx. 60% Output C018=(1 LED) Approx. 80% Output C01=(1 LED) Full Output	D=Dimming (0-10V)	U=Universal (120-277V) 9=347V 8=480V ⁵ H=347-480V D=DuraVolt (277-480V) ^{5,6}	T2=Type II T3=Type III T4=Type IV T5=Type V	SA=Standard Versatile Arm MA=Mast Arm FMA= Fixed Mast Arm ²⁸ WM=Wall Mount Arm ADJA-WM=Adjustable Arm - Wall Mount ADJA=Adjustable Arm - Pole Mount ADJS=Adjustable Arm - Slipfitter, 3in vertical tenon ³⁰ SP2= Adjustable Arm - Slipfitter, 2 3/8" vertical tenon ^{28,30}	BZ=Bronze AP=Grey BK=Black DP=Dark Platinum GM=Graphite Metallic WH=White
USSL=USSL BAA-USSL=USSL BAA Compliant ³ TAA-USSL=USSL TAA Compliant ³	C01=(1 LED) Full Output C027=(2 LED) Approx. 70% Output C029=(2 LED) Approx. 90% Output C02=(2 LED) Full Output					
USSL-XL=USSL XL BAA-USSL-XL=USSL XL BAA Compliant ³ TAA-USSL-XL=USSL XL TAA Compliant ³	C047=(4 LED) Approx. 70% Output C049=(4 LED) Approx. 90% Output C04=(4 LED) Full Output C069=(6 LED) Approx. 90% Output C06=(6 LED) Full Output					
USSL-M=USSL Maxx BAA-USSL-M= USSL Maxx BAA Compliant ³ TAA-USSL-M=USSL Maxx TAA Compliant ³	C097=(9 LED) Approx. 65% Output C098=(9 LED) Approx. 75% Output C099=(9 LED) Approx. 90% Output C09=(9 LED) Full Output					

Options (Add as Suffix)	Accessories (Order Separately) ^{20,21}
<p>7030=70 CRI / 3000K CCT ⁷ 7050=70 CRI / 5000K CCT ⁷ CC=Coastal Construction finish ³¹ HSS=House Side Shield ⁸ L90=Optics Rotated 90° Left ²⁸ R90=Optics Rotated 90° Right ²⁸ 10MSP=10kV MOV Surge Protective Device 10K=10kV UL 1449 Fused Surge Protective Device 20MSP=20kV MOV Surge Protective Device 20K=Series 20kV UL 1449 Surge Protective Device HA=50°C High Ambient Temperature ⁹ TH=Tool-less Door Hardware PER=NEMA 3-PIN Twistlock Photocontrol Receptacle ¹¹ PER7=NEMA 7-PIN Twistlock Photocontrol Receptacle¹¹ 4=NEMA 3-PIN Twistlock Photocontrol Receptacle ¹¹ 4N7=NEMA 7-PIN Twistlock Photocontrol Receptacle ¹¹ MS/DIM-L08= Dimming Motion and Daylight Sensor, IR Remote Programmable, < 8' Mounting Height ^{12,13,22} MS/DIM-L20=Dimming Motion and Daylight Sensor, IR Remote Programmable, 8' - 20' Mounting ^{12,13} MS/DIM-L40=Dimming Motion and Daylight Sensor, IR Remote Programmable, 21' - 40' Mounting ^{12,13} SPB1=Dimming Motion and Daylight Sensor, Bluetooth Programmable, < 8' Mounting Height ^{12,14,22} SPB2=Dimming Motion and Daylight Sensor, Bluetooth Programmable, 8' - 20' Mounting Height ^{12,14,28,29} SPB4=Dimming Motion and Daylight Sensor, Bluetooth Programmable, 21' - 40' Mounting Height ^{12,14,28} ZW=WaveLinx-enabled 4-PIN Twistlock Receptacle ¹² ZD=SR Driver-enabled 4-PIN Twistlock Receptacle ¹² ZW-SWPD4XX=WaveLinx Pro, Dimming Motion and Daylight, WAC Programmable, 7' - 15' Mounting ^{12,15,16,17,22} ZW-SWPD5XX=WaveLinx Pro, Dimming Motion and Daylight, WAC Programmable, 15' - 40' Mounting ^{12,15,16,17,28,29} ZD-SWPD4XX=WaveLinx Pro, SR Driver, Dimming Motion and Daylight, WAC Programmable, 7' - 15' Mounting ^{12,15,16,17,22} ZD-SWPD5XX=WaveLinx Pro, SR Driver, Dimming Motion and Daylight, WAC Programmable, 15' - 40' Mounting ^{12,15,16,17,28,29} (See Table Below)=LumenSafe Integrated Network Security Camera ^{18,19} DXXXXX=Department of Transportation - Customer specific details ²⁸ UXXXXX=Utility - Customer specific details ²⁹</p>	<p>USSLSA-XX=Standard Arm Mounting Kit ²² USSLMA-XX=Mast Arm Mounting Kit ²² USSLWM-XX=Wall Mount Kit ²² USSL-ADJA-XX=Adjustable Arm - Pole Mount Kit ²² USSL-ADJS-XX=Adjustable Arm - Slipfitter Kit ²² USSL-ADJA-WM-XX=Adjustable Arm - Wall Mount Kit ²² USSLXLSA-XX=Standard Arm Mounting Kit ²⁹ USSLXLMA-XX= Mast Arm Mounting Kit ²⁹ USSLXLWM-XX=Wall Mount Kit ²⁹ USSL-XL-ADJA-XX=Adjustable Arm - Pole Mount Kit ²⁹ USSL-XL-ADJS-XX=Adjustable Arm - Slipfitter Kit ²⁹ USSL-XL-ADJA-WM-XX=Adjustable Arm - Wall Mount Kit ²⁹ USSL-M-ADJA-XX=Adjustable Arm - Pole Mount Kit ²⁸ USSL-M-ADJS-XX=Adjustable Arm - Slipfitter Kit ²⁸ USSL-M-ADJA-WM-XX=Adjustable Arm - Wall Mount Kit ²⁸ MA1010-XX=Single Tenon Adapter for 3-1/2" O.D. Tenon MA1011-XX=2@180° Tenon Adapter for 3-1/2" O.D. Tenon MA1017-XX=Single Tenon Adapter for 2-3/8" O.D. Tenon MA1018-XX=2@180° Tenon Adapter for 2-3/8" O.D. Tenon SRA238=Tenon Adapter from 3" to 2-3/8" USSL/COB-FDV=Full Drop Visor ²³ USSLXL/COB-FDV=Full Drop Visor ¹⁸ HS/VERD=House Side Shield Kit ^{8,24} VGS-F/B=Vertical Glare Shield Kit, Front/Back ²⁴ VGS-SIDE=Vertical Glare Shield Kit, Side ²⁴ OA/RA1013=Photocontrol Shorting Cap OA/RA1014=NEMA Photocontrol - 120V OA/RA1016=NEMA Photocontrol - Multi-Tap 105-285V OA/RA1201=NEMA Photocontrol - 347V OA/RA1027=NEMA Photocontrol - 480V FSIR-100=Wireless Configuration Tool for Occupancy Sensor ²⁵ WOLC-7P-10A=WaveLinx Outdoor Control Module (7-PIN) ²⁷ SWPD4-XX=WaveLinx Wireless Sensor, 7' - 15' Mounting Height ^{15,16,17,22,26} SWPD5-XX=WaveLinx Wireless Sensor, 15' - 40' Mounting Height ^{15,16,17,28,29}</p>

- NOTES:**
- DesignLights Consortium® Qualified. Refer to www.designlights.org Qualified Products List under Family Models for details.
 - Customer is responsible for engineering analysis to confirm pole and fixture compatibility for all applications. Refer to installation instructions IB500002EN and pole white paper WP513001EN for additional support information.
 - Only product configurations with these designated prefixes are built to be compliant with the Buy American Act of 1933 (BAA) or Trade Agreements Act of 1979 (TAA), respectively. Please refer to DOMESTIC.PREFERENCES website for more information. Components shipped separately may be separately analyzed under domestic preference requirements.
 - Standard 4000K CCT and 70CRI.
 - 480V not to be used with ungrounded or impedance grounded systems.
 - DuraVolt drivers feature added protection from power quality issues such as loss of neutral, transients and voltage fluctuations. Visit www.signify.com/duravolt for more information.
 - Use dedicated IES files on product website for non-standard CCTs.
 - Option will come factory-installed. House Side Shield not suitable with T5 distribution. Not available with USSL-C60 lumen package.
 - Not available with USSL-C60 lumen package. Not available with USSL-P-C25 lumen package.
 - Coastal construction finish salt spray tested to over 5,000-hours per ASTM B117, with a scribe rating of 9 per ASTM D1654. Not available with TH option.
 - If DuraVolt (DV) is specified, use a photocontrol that matches the input voltage used.
 - Controls system is not available in combination with a photocontrol receptacle (4 or 4N7) or another controls system (MS, SPB, ZD, or ZW). Option not available with DuraVolt (DV) voltage option.
 - Utilizes the Wattstopper sensor FSP-211. Sensor color white unless specified otherwise via PDR. To field-configure, order FSIR-100 accessory separately.
 - Utilizes the Wattstopper sensor FSP-3XX series. Sensor color determined by product finish. See Sensor Color Reference Table. Field-configures via mobile application. See Controls section for details.
 - Sensor passive infrared (PIR) may be overly sensitive when operating below -20°C (-4°F).
 - For the device to be field-configurable, requires WAC Gateway components WAC-PoE and WPOE-120 in appropriate quantities. Only compatible with WaveLinx system and software and requires system components to be installed for operation. See website for more WaveLinx application information.
 - Replace XX with sensor color (WH, BZ, or BK).
 - Only available in USSL-XL configurations C75, C100, C125, C150, or C175.
 - Not available with 347V, 480V, DV, or HA options. Consult LumenSafe system product pages for additional details and compatibility information.
 - Replace XX with paint color.
 - For BAA or TAA requirements, Accessories sold separately will be separately analyzed under domestic preference requirements. Consult factory for further information.
 - Not for use with USSL-XL or USSL-M configurations.
 - Only for use with USSL. Not applicable to USSL-M, USSL-XL, or USSL-P.
 - Must order one per optic/LED when ordering as a field-installable accessory (1, 2, 4, 6 or 9).
 - This tool enables adjustment to Motion Sensor (MS) parameters including high and low modes, sensitivity, time delay, cutoff and more. Consult your lighting representative for more information.
 - Requires 4-PIN twistlock receptacle (ZD or ZW) option.
 - Requires 7-PIN NEMA twistlock photocontrol receptacle (4N7) option. The WOLC-7 cannot be used in conjunction with other controls systems (MS, ZD, ZW or LWR). Operates on 120-347V input voltages.
 - Only available for USSL-M configurations.
 - Only for use with USSL-XL.
 - Fixed for USSL-M

LumenSafe Integrated Network Security Camera Technology Options (Add as Suffix)

Product Family	Camera Type	Data Backhaul
L=LumenSafe Technology 	H=Dome Camera, High Res Z=Dome Camera, Remote PTZ	C=Cellular, Customer Installed SIM Card A=Cellular, Factory Installed AT&T SIM Card V=Cellular, Factory Installed Verizon SIM Card S=Cellular, Factory Installed Sprint SIM Card E=Ethernet Networking

Energy and Performance Data

[View USSL-P IES files](#)

[View USSL IES files](#)

[View USSL-XL IES files](#)

Power and Lumens

Product Family	USSL Petite				USSL				USSL XL				USSL Maxx					
Light Engine	C014	C016	C018	C01	C01	C027	C029	C02	C047	C049	C04	C069	C06	C097	C098	C099	C09	
Power (Watts)	35	49	73	94	52	96	131	153	176	217	264	285	346	346.00	418.10	486.60	587.50	
Input Current @ 120V (A)	0.29	0.41	0.61	0.79	0.43	0.80	1.09	1.32	1.50	1.84	2.21	2.38	2.92	2.89	3.49	4.06	4.90	
Input Current @ 277V (A)	0.13	0.18	0.27	0.35	0.19	0.35	0.48	0.57	0.66	0.82	0.97	1.04	1.25	1.26	1.51	1.72	2.06	
Input Current @ 347V (A)	0.11	0.16	0.23	0.29	0.17	0.30	0.41	0.48	0.54	0.66	0.79	0.84	1.02	1.00	1.21	1.40	1.70	
Input Current @ 480V (A)	0.08	0.12	0.17	0.22	0.12	0.22	0.30	0.35	0.40	0.48	0.57	0.62	0.74	0.73	0.88	1.00	1.21	
Distribution ¹																		
Type II	4000K Lumens	4,775	6,717	9,542	11,521	7,123	13,205	17,172	20,083	26,263	31,231	36,503	41,349	48,876	50,349	59,444	68,447	79,322
	BUG Rating	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G4	B4-U0-G4	B4-U0-G4	B4-U0-G5	B4-U0-G5	B4-U0-G5	B4-U0-G5	B5-U0-G5
	Lumens per Watt	138	137	131	122	137	138	131	131	149	144	138	145	141	146	142	141	135
	3000K Lumens ¹	4,869	6,595	9,369	11,312	6,994	12,965	16,860	19,718	25,786	30,664	35,840	40,598	47,989	49,437	58,368	67,208	77,886
Type III	4000K Lumens	4,782	6,727	9,556	11,538	7,111	13,183	17,144	20,050	26,120	31,061	36,304	41,124	48,610	50,162	59,223	68,193	79,027
	BUG Rating	B1-U0-G2	B1-U0-G2	B2-U0-G3	B2-U0-G3	B1-U0-G2	B2-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B3-U0-G5	B4-U0-G5	B4-U0-G5	B4-U0-G5	B4-U0-G5	B5-U0-G5	B5-U0-G5
	Lumens per Watt	138	137	131	123	137	137	131	131	148	143	138	144	140	145	142	140	135
	3000K Lumens ¹	4,695	6,605	9,383	11,329	6,982	12,944	16,832	19,686	25,646	30,497	35,645	40,377	47,727	49,254	58,151	66,958	77,596
Type IV	4000K Lumens	4,880	6,865	9,752	11,774	7,088	13,140	17,087	19,984	26,098	31,035	36,274	41,089	48,569	50,575	59,711	68,754	79,678
	BUG Rating	B1-U0-G2	B1-U0-G2	B2-U0-G3	B2-U0-G3	B1-U0-G3	B2-U0-G4	B2-U0-G4	B3-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5	B4-U0-G5	B4-U0-G5	B4-U0-G5	B4-U0-G5	B5-U0-G5
	Lumens per Watt	141	140	134	125	136	137	130	131	148	143	137	144	140	146	143	141	136
	3000K Lumens ¹	4,792	6,740	9,575	11,561	6,959	12,901	16,777	19,621	25,624	30,471	35,615	40,343	47,687	49,659	58,630	67,510	78,235
Type V	4000K Lumens	5,067	7,128	10,126	12,226	7,576	14,045	18,264	21,360	28,129	33,450	39,097	44,287	52,349	53,531	63,201	72,773	84,335
	BUG Rating	B3-U0-G2	B3-U0-G2	B4-U0-G3	B4-U0-G3	B3-U0-G3	B4-U0-G3	B4-U0-G4	B5-U0-G4	B5-U0-G5	B5-U0-G5	B5-U0-G5	B5-U0-G5	B5-U0-G5	B5-U0-G5	B5-U0-G5	B5-U0-G5	B5-U0-G5
	Lumens per Watt	146	145	139	130	146	146	139	140	160	154	148	155	151	155	151	150	144
	3000K Lumens ¹	4,975	6,999	9,942	12,004	7,438	13,790	17,932	20,972	27,618	32,843	38,387	43,483	51,398	52,562	62,057	71,455	82,808

NOTES:
1. For 3000K, 5000K or HSS data, refer to published IES files.

Lumen Maintenance

Configuration	TM-21 Lumen Maintenance (50,000 Hours)	Theoretical L70 (Hours)
USSL and USSL Petite at 25°C	91.30%	> 194,000
USSL and USSL Petite at 40°C	87.59%	> 134,000
USSL XL at 25°C	91.40%	> 204,000
USSL XL at 40°C	89.41%	> 158,000
USSL Maxx at 25°C	91.40%	> 204,000
USSL Maxx at 40°C	89.41%	> 158,000

Sensor Color Reference Table (SPBx)

Housing Finish	Sensor Color
AP=Grey	Grey
BZ=Bronze	Bronze
BK=Black	Black
DP=Dark Platinum	Grey
GM=Graphite Metallic	Black
WH=White	White

Lumen Multiplier

Ambient Temperature	Lumen Multiplier
10°C	1.02
15°C	1.01
25°C	1.00
40°C	0.99

VOLTAGE DROP CALCULATION WORKSHEET

1/12/2024

PROJECT: CCG3A CLEVELAND

LIGHTING PILLAR: CC-E

CIRCUIT DESIGNATION: E-1

CIRCUIT VOLTAGE: 240

NUMBER OF LAMPS (TOTAL): 22

TOTAL LOAD: 3.796 Amps

CONNECTED LOAD (KVA): 0.91104

CIRCUIT FUSE SIZE(AMPS) (125% OF MAX INPUT): 4.745

USE 20AMP BREAKER

LAMP TYPE & QUANTITIES: 18 @ 35W LED, 4 @ 70W LED

POLE NUMBERS:

Wire Size (AWG)	Resistance Per 1,000 Meters (Ohms)
8	0.764

Lamp Type	Lamp Current Including at 240 Volts	
35W LED	0.1460	Amps Each
70W LED	0.2920	Amps Each

Wire Size Used: 2 - 8 AWG (Phase & Neutral)

NO. OF BRANCHES: 1

SECTION NO.	FROM	TO	(I) CURRENT (Amps)	LENGTH OF WIRE	(Z) IMPEDANCE (Ohms)	(V) VOLTAGE DROP (Volts)
1	CC-E	PB1	3.80	115	0.176	0.67
2	PB1	PB8	0.58	120	0.183	0.11
3	PB8	E1	0.15	55	0.084	0.01
4	PB8	PB3	0.44	25	0.038	0.02
5	PB3	E3	0.15	25	0.038	0.01
6	PB3	E5	0.29	100	0.153	0.04
7	E5	E7	0.15	55	0.084	0.01
8	PB1	E9	1.17	255	0.390	0.46
9	E9	E11	1.02	110	0.168	0.17
10	E11	E13	0.88	110	0.168	0.15
11	E13	PB6	0.73	110	0.168	0.12
12	PB6	E15	0.29	40	0.061	0.02
13	E15	E17	0.15	95	0.145	0.02
14	PB6	E19	0.44	145	0.222	0.10
15	E19	E21	0.29	100	0.153	0.04
16	E21	E23	0.15	95	0.145	0.02
17	PB5	E25	1.46	115	0.176	0.26
18	E25	E27	1.31	115	0.176	0.23
19	E27	E29	1.17	125	0.191	0.22
20	E29	E31	1.02	125	0.191	0.20
21	E31	E33	0.88	130	0.199	0.17
22	E33	E35	0.73	130	0.199	0.15
23	E35	E37	0.58	130	0.199	0.12
24	E37	E39	0.44	130	0.199	0.09
25	E39	E41	0.29	125	0.191	0.06
26	E41	E43	0.15	120	0.183	0.03
27					0.000	0.00
28					0.000	0.00
29					0.000	0.00

TOTAL VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop of Sections) Volts **3.47**

PERCENT VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop/240 V)x100% % **1.45**

FORMULAS:

$Z = (2) * (\text{Length}) * (0.001) * (\text{Cable Resistance})$

$V = (Z) \text{ impedance} * (I) \text{ Lamp Current Including @ 240 V}$

VOLTAGE DROP CALCULATION WORKSHEET

1/12/2024

PROJECT: CCG3A CLEVELAND

LIGHTING PILLAR: CC-E

CIRCUIT DESIGNATION: E-2

CIRCUIT VOLTAGE: 240

NUMBER OF LAMPS (TOTAL): 22

TOTAL LOAD: 3.65 Amps

CONNECTED LOAD (KVA): 0.876

CIRCUIT FUSE SIZE (AMPS) (125% OF MAX INPUT): 4.5625

USE 20AMP BREAKER

LAMP TYPE & QUANTITIES: 19 @ 35W LED, 3 @ 70W LED

POLE NUMBERS:

Wire Size (AWG)	Resistance Per 1,000 Meters (Ohms)
8	0.764

Lamp Type	Lamp Current Including at 240 Volts	
35W LED	0.1460	Amps Each
70W LED	0.2920	Amps Each

Wire Size Used: 2 - 8 AWG (Phase & Neutral)

NO. OF BRANCHES: 1

SECTION NO.	FROM	TO	(I) CURRENT (Amps)	LENGTH OF WIRE	(Z) IMPEDANCE (Ohms)	(V) VOLTAGE DROP (Volts)
1	CC-E	PB1	3.65	115	0.176	0.64
2	PB1	PB8	0.58	120	0.183	0.11
3	PB8	E2	0.15	10	0.015	0.00
4	PB8	E4	0.44	60	0.092	0.04
5	E4	E6	0.29	55	0.084	0.02
6	E6	E8	0.15	65	0.099	0.01
7	PB1	E10	1.02	310	0.474	0.48
8	E10	E12	0.88	110	0.168	0.15
9	E12	E14	0.73	110	0.168	0.12
10	E14	PB6	0.58	40	0.061	0.04
11	PB6	E16	0.29	75	0.115	0.03
12	E16	E18	0.15	60	0.092	0.01
13	PB6	E20	0.29	210	0.321	0.09
14	E20	E22	0.15	85	0.130	0.02
15	PB5	E24	1.61	65	0.099	0.16
16	E24	E26	1.46	120	0.183	0.27
17	E26	E28	1.31	120	0.183	0.24
18	E28	E30	1.17	130	0.199	0.23
19	E30	E32	1.02	135	0.206	0.21
20	E32	E34	0.88	135	0.206	0.18
21	E34	E36	0.73	135	0.206	0.15
22	E36	E38	0.58	135	0.206	0.12
23	E38	E40	0.44	130	0.199	0.09
24	E40	E42	0.29	125	0.191	0.06
25	E42	E44	0.15	130	0.199	0.03
26					0.000	0.00
27					0.000	0.00
28					0.000	0.00
29					0.000	0.00

TOTAL VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop of Sections) Volts **3.51**

PERCENT VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop/240 V)x100% % **1.46**

FORMULAS:

$Z = (2) * (\text{Length}) * (0.001) * (\text{Cable Resistance})$

$V = (Z) \text{ impedance} * (I) \text{ Lamp Current Including @ 240 V}$

VOLTAGE DROP CALCULATION WORKSHEET

1/12/2024

PROJECT: CCG3A CLEVELAND

LIGHTING PILLAR: CC-E

CIRCUIT DESIGNATION: E-3

CIRCUIT VOLTAGE: 240

#OF POWER PACKS (TOTAL): 22

TOTAL LOAD: 8.8 Amps

CONNECTED LOAD (KVA): 2.112

CIRCUIT FUSE SIZE(AMPS) (125% OF MAX INPUT): 11

USE 20AMP BREAKER

LAMP TYPE & QUANTITIES: 22 @ 96W

POLE NUMBERS:

Wire Size (AWG)	Resistance Per 1,000 Meters (Ohms)
8	0.764

Lamp Type	Lamp Current Including at 240 Volts	
96W	0.4000	Amps Each
		Amps Each

Wire Size Used: 2 - 8 AWG (Phase & Neutral)

NO. OF BRANCHES: 1

SECTION NO.	FROM	TO	(I) CURRENT (Amps)	LENGTH OF WIRE	(Z) IMPEDANCE (Ohms)	(V) VOLTAGE DROP (Volts)
1	CC-E	PB1	8.80	115	0.176	1.55
2	PB1	PB5	8.80	205	0.313	2.76
3	PB5	PANEL1A	8.80	70	0.107	0.94
4	PANEL1A	PANEL1B	8.40	2	0.003	0.03
5	PANEL1B	PANEL2A	8.00	2	0.003	0.02
6	PANEL2A	PANEL2B	7.60	2	0.003	0.02
7	PANEL2B	PANEL3A	7.20	2	0.003	0.02
8	PANEL3A	PANEL3B	6.80	2	0.003	0.02
9	PANEL3B	PANEL4A	6.40	2	0.003	0.02
10	PANEL4A	PANEL4B	6.00	2	0.003	0.02
11	PANEL4B	PANEL5A	5.60	2	0.003	0.02
12	PANEL5A	PANEL5B	5.20	2	0.003	0.02
13	PANEL5B	PANEL6A	4.80	2	0.003	0.01
14	PANEL6A	PANEL6B	4.40	2	0.003	0.01
15	PANEL6B	PANEL7A	4.00	2	0.003	0.01
16	PANEL7A	PANEL7B	3.60	2	0.003	0.01
17	PANEL7B	PANEL8A	3.20	2	0.003	0.01
18	PANEL8A	PANEL8B	2.80	2	0.003	0.01
19	PANEL8B	PANEL9A	2.40	2	0.003	0.01
20	PANEL9A	PANEL9B	2.00	2	0.003	0.01
21	PANEL9B	PANEL10A	1.60	2	0.003	0.00
22	PANEL10A	PANEL10B	1.20	2	0.003	0.00
23	PANEL10B	PANEL11A	0.80	2	0.003	0.00
24	PANEL11A	PANEL11B	0.40	2	0.003	0.00
25					0.000	0.00
26					0.000	0.00
27					0.000	0.00
28					0.000	0.00

TOTAL VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop of Sections) Volts **5.53**

PERCENT VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop/240 V)x100% % **2.30**

FORMULAS:

$Z = (2) * (Length) * (0.001) * (Cable Resistance)$

$V = (Z \text{ impedance}) * (I) \text{ Lamp Current Including @ 240 V}$

VOLTAGE DROP CALCULATION WORKSHEET

1/12/2024

PROJECT: CCG3A CLEVELAND

LIGHTING PILLAR: CC-E

CIRCUIT DESIGNATION: E-4

CIRCUIT VOLTAGE: 240

#OF POWER PACKS (TOTAL): 22

TOTAL LOAD: 8.8 Amps

CONNECTED LOAD (KVA): 2.112

CIRCUIT FUSE SIZE (AMPS) (125% OF MAX INPUT): 11

USE 20AMP BREAKER

LAMP TYPE & QUANTITIES: 22 @ 96W

POLE NUMBERS:

Wire Size (AWG)	Resistance Per 1,000 Meters (Ohms)
8	0.764

Lamp Type	Lamp Current Including at 240 Volts	
96W	0.4000	Amps Each
		Amps Each

Wire Size Used: 2 - 8 AWG (Phase & Neutral)

NO. OF BRANCHES: 1

SECTION NO.	FROM	TO	(I) CURRENT (Amps)	LENGTH OF WIRE	(Z) IMPEDANCE (Ohms)	(V) VOLTAGE DROP (Volts)
1	CC-E	PB1	8.80	115	0.176	1.55
2	PB1	PB5	8.80	205	0.313	2.76
3	PB5	PANEL1A	8.80	121	0.185	1.63
4	PANEL1A	PANEL1B	8.40	2	0.003	0.03
5	PANEL1B	PANEL2A	8.00	2	0.003	0.02
6	PANEL2A	PANEL2B	7.60	2	0.003	0.02
7	PANEL2B	PANEL3A	7.20	2	0.003	0.02
8	PANEL3A	PANEL3B	6.80	2	0.003	0.02
9	PANEL3B	PANEL4A	6.40	2	0.003	0.02
10	PANEL4A	PANEL4B	6.00	2	0.003	0.02
11	PANEL4B	PANEL5A	5.60	2	0.003	0.02
12	PANEL5A	PANEL5B	5.20	2	0.003	0.02
13	PANEL5B	PANEL6A	4.80	2	0.003	0.01
14	PANEL6A	PANEL6B	4.40	2	0.003	0.01
15	PANEL6B	PANEL7A	4.00	2	0.003	0.01
16	PANEL7A	PANEL7B	3.60	2	0.003	0.01
17	PANEL7B	PANEL8A	3.20	2	0.003	0.01
18	PANEL8A	PANEL8B	2.80	2	0.003	0.01
19	PANEL8B	PANEL9A	2.40	2	0.003	0.01
20	PANEL9A	PANEL9B	2.00	2	0.003	0.01
21	PANEL9B	PANEL10A	1.60	2	0.003	0.00
22	PANEL10A	PANEL10B	1.20	2	0.003	0.00
23	PANEL10B	PANEL11A	0.80	2	0.003	0.00
24	PANEL11A	PANEL11B	0.40	2	0.003	0.00
25					0.000	0.00
26					0.000	0.00
27					0.000	0.00
28					0.000	0.00

TOTAL VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop of Sections) Volts **6.21**

PERCENT VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop/240 V)x100% % **2.59**

FORMULAS:

$Z = (2) * (Length) * (0.001) * (Cable Resistance)$

$V = (Z \text{ impedance}) * (I) \text{ Lamp Current Including @ 240 V}$

VOLTAGE DROP CALCULATION WORKSHEET

1/12/2024

PROJECT: CCG3A CLEVELAND

LIGHTING PILLAR: CC-E

CIRCUIT DESIGNATION: E-5

CIRCUIT VOLTAGE: 240

#OF POWER PACKS (TOTAL): 22

TOTAL LOAD: 8.8 Amps

CONNECTED LOAD (KVA): 2.112

CIRCUIT FUSE SIZE (AMPS) (125% OF MAX INPUT): 11

USE 20AMP BREAKER

LAMP TYPE & QUANTITIES: 22 @ 96W

POLE NUMBERS:

Wire Size (AWG)	Resistance Per 1,000 Meters (Ohms)
8	0.764

Lamp Type	Lamp Current Including at 240 Volts	
96W	0.4000	Amps Each
		Amps Each

Wire Size Used: 2 - 8 AWG (Phase & Neutral)

NO. OF BRANCHES: 1

SECTION NO.	FROM	TO	(I) CURRENT (Amps)	LENGTH OF WIRE	(Z) IMPEDANCE (Ohms)	(V) VOLTAGE DROP (Volts)
1	CC-E	PB1	8.80	115	0.176	1.55
2	PB1	PB5	8.80	205	0.313	2.76
3	PB5	PANEL1A	8.80	174	0.266	2.34
4	PANEL1A	PANEL1B	8.40	2	0.003	0.03
5	PANEL1B	PANEL2A	8.00	2	0.003	0.02
6	PANEL2A	PANEL2B	7.60	2	0.003	0.02
7	PANEL2B	PANEL3A	7.20	2	0.003	0.02
8	PANEL3A	PANEL3B	6.80	2	0.003	0.02
9	PANEL3B	PANEL4A	6.40	2	0.003	0.02
10	PANEL4A	PANEL4B	6.00	2	0.003	0.02
11	PANEL4B	PANEL5A	5.60	2	0.003	0.02
12	PANEL5A	PANEL5B	5.20	2	0.003	0.02
13	PANEL5B	PANEL6A	4.80	2	0.003	0.01
14	PANEL6A	PANEL6B	4.40	2	0.003	0.01
15	PANEL6B	PANEL7A	4.00	2	0.003	0.01
16	PANEL7A	PANEL7B	3.60	2	0.003	0.01
17	PANEL7B	PANEL8A	3.20	2	0.003	0.01
18	PANEL8A	PANEL8B	2.80	2	0.003	0.01
19	PANEL8B	PANEL9A	2.40	2	0.003	0.01
20	PANEL9A	PANEL9B	2.00	2	0.003	0.01
21	PANEL9B	PANEL10A	1.60	2	0.003	0.00
22	PANEL10A	PANEL10B	1.20	2	0.003	0.00
23	PANEL10B	PANEL11A	0.80	2	0.003	0.00
24	PANEL11A	PANEL11B	0.40	2	0.003	0.00
25					0.000	0.00
26					0.000	0.00
27					0.000	0.00
28					0.000	0.00

TOTAL VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop of Sections) Volts **6.92**

PERCENT VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop/240 V)x100% % **2.89**

FORMULAS:

$Z = (2) * (Length) * (0.001) * (Cable Resistance)$

$V = (Z \text{ impedance}) * (I) \text{ Lamp Current Including @ 240 V}$

VOLTAGE DROP CALCULATION WORKSHEET

1/12/2024

PROJECT: CCG3A CLEVELAND

LIGHTING PILLAR: CC-E

CIRCUIT DESIGNATION: E-6

CIRCUIT VOLTAGE: 240

#OF POWER PACKS (TOTAL): 22

TOTAL LOAD: 8.8 Amps

CONNECTED LOAD (KVA): 2.112

CIRCUIT FUSE SIZE (AMPS) (125% OF MAX INPUT): 11

USE 20AMP BREAKER

LAMP TYPE & QUANTITIES: 22 @ 96W

POLE NUMBERS:

Wire Size (AWG)	Resistance Per 1,000 Meters (Ohms)
8	0.764

Lamp Type	Lamp Current Including at 240 Volts	
96W	0.4000	Amps Each
		Amps Each

Wire Size Used: 2 - 8 AWG (Phase & Neutral)

NO. OF BRANCHES: 1

SECTION NO.	FROM	TO	(I) CURRENT (Amps)	LENGTH OF WIRE	(Z) IMPEDANCE (Ohms)	(V) VOLTAGE DROP (Volts)
1	CC-E	PB1	8.80	115	0.176	1.55
2	PB1	PB5	8.80	205	0.313	2.76
3	PB5	PANEL1A	8.80	223	0.341	3.00
4	PANEL1A	PANEL1B	8.40	2	0.003	0.03
5	PANEL1B	PANEL2A	8.00	2	0.003	0.02
6	PANEL2A	PANEL2B	7.60	2	0.003	0.02
7	PANEL2B	PANEL3A	7.20	2	0.003	0.02
8	PANEL3A	PANEL3B	6.80	2	0.003	0.02
9	PANEL3B	PANEL4A	6.40	2	0.003	0.02
10	PANEL4A	PANEL4B	6.00	2	0.003	0.02
11	PANEL4B	PANEL5A	5.60	2	0.003	0.02
12	PANEL5A	PANEL5B	5.20	2	0.003	0.02
13	PANEL5B	PANEL6A	4.80	2	0.003	0.01
14	PANEL6A	PANEL6B	4.40	2	0.003	0.01
15	PANEL6B	PANEL7A	4.00	2	0.003	0.01
16	PANEL7A	PANEL7B	3.60	2	0.003	0.01
17	PANEL7B	PANEL8A	3.20	2	0.003	0.01
18	PANEL8A	PANEL8B	2.80	2	0.003	0.01
19	PANEL8B	PANEL9A	2.40	2	0.003	0.01
20	PANEL9A	PANEL9B	2.00	2	0.003	0.01
21	PANEL9B	PANEL10A	1.60	2	0.003	0.00
22	PANEL10A	PANEL10B	1.20	2	0.003	0.00
23	PANEL10B	PANEL11A	0.80	2	0.003	0.00
24	PANEL11A	PANEL11B	0.40	2	0.003	0.00
25					0.000	0.00
26					0.000	0.00
27					0.000	0.00
28					0.000	0.00

TOTAL VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop of Sections) Volts **7.58**

PERCENT VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop/240 V)x100% % **3.16**

FORMULAS:

$Z = (2) * (Length) * (0.001) * (Cable Resistance)$

$V = (Z \text{ impedance}) * (I) \text{ Lamp Current Including @ 240 V}$

VOLTAGE DROP CALCULATION WORKSHEET

1/12/2024

PROJECT: CCG3A CLEVELAND

LIGHTING PILLAR: CC-E

CIRCUIT DESIGNATION: E-7

CIRCUIT VOLTAGE: 240

#OF POWER PACKS (TOTAL): 22

TOTAL LOAD: 8.8 Amps

CONNECTED LOAD (KVA): 2.112

CIRCUIT FUSE SIZE (AMPS) (125% OF MAX INPUT): 11

USE 20AMP BREAKER

LAMP TYPE & QUANTITIES: 22 @ 96W

POLE NUMBERS:

Wire Size (AWG)	Resistance Per 1,000 Meters (Ohms)
8	0.764

Lamp Type	Lamp Current Including at 240 Volts	
96W	0.4000	Amps Each

Wire Size Used: 2 - 8 AWG (Phase & Neutral)

NO. OF BRANCHES: 1

SECTION NO.	FROM	TO	(I) CURRENT (Amps)	LENGTH OF WIRE	(Z) IMPEDANCE (Ohms)	(V) VOLTAGE DROP (Volts)
1	CC-E	PB1	8.80	115	0.176	1.55
2	PB1	PB5	8.80	205	0.313	2.76
3	PB5	PANEL1A	8.80	275	0.420	3.70
4	PANEL1A	PANEL1B	8.40	2	0.003	0.03
5	PANEL1B	PANEL2A	8.00	2	0.003	0.02
6	PANEL2A	PANEL2B	7.60	2	0.003	0.02
7	PANEL2B	PANEL3A	7.20	2	0.003	0.02
8	PANEL3A	PANEL3B	6.80	2	0.003	0.02
9	PANEL3B	PANEL4A	6.40	2	0.003	0.02
10	PANEL4A	PANEL4B	6.00	2	0.003	0.02
11	PANEL4B	PANEL5A	5.60	2	0.003	0.02
12	PANEL5A	PANEL5B	5.20	2	0.003	0.02
13	PANEL5B	PANEL6A	4.80	2	0.003	0.01
14	PANEL6A	PANEL6B	4.40	2	0.003	0.01
15	PANEL6B	PANEL7A	4.00	2	0.003	0.01
16	PANEL7A	PANEL7B	3.60	2	0.003	0.01
17	PANEL7B	PANEL8A	3.20	2	0.003	0.01
18	PANEL8A	PANEL8B	2.80	2	0.003	0.01
19	PANEL8B	PANEL9A	2.40	2	0.003	0.01
20	PANEL9A	PANEL9B	2.00	2	0.003	0.01
21	PANEL9B	PANEL10A	1.60	2	0.003	0.00
22	PANEL10A	PANEL10B	1.20	2	0.003	0.00
23	PANEL10B	PANEL11A	0.80	2	0.003	0.00
24	PANEL11A	PANEL11B	0.40	2	0.003	0.00
25					0.000	0.00
26					0.000	0.00
27					0.000	0.00
28					0.000	0.00

TOTAL VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop of Sections)

Volts

8.28

PERCENT VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop/240 V)x100%

%

3.45

FORMULAS:

$Z = (2) * (\text{Length}) * (0.001) * (\text{Cable Resistance})$

$V = (Z \text{ impedance}) * (I) \text{ Lamp Current Including @ 240 V}$

VOLTAGE DROP CALCULATION WORKSHEET

1/12/2024

PROJECT: CCG3A CLEVELAND

LIGHTING PILLAR: CC-E

CIRCUIT DESIGNATION: E-8

CIRCUIT VOLTAGE: 240

#OF POWER PACKS (TOTAL): 28

TOTAL LOAD: 11.2 Amps

CONNECTED LOAD (KVA): 2.688

CIRCUIT FUSE SIZE(AMPS) (125% OF MAX INPUT): 14

USE 20AMP BREAKER

LAMP TYPE & QUANTITIES: 28 @ 96W

POLE NUMBERS:

Wire Size (AWG)	Resistance Per 1,000 Meters (Ohms)
8	0.764

Lamp Type	Lamp Current Including at 240 Volts	
96W	0.4000	Amps Each

Wire Size Used: 2 - 8 AWG (Phase & Neutral)

NO. OF BRANCHES: 1

SECTION NO.	FROM	TO	(I) CURRENT (Amps)	LENGTH OF WIRE	(Z) IMPEDANCE (Ohms)	(V) VOLTAGE DROP (Volts)
1	CC-E	PBE1	11.20	115	0.176	1.97
2	PBE1	PBE24	11.20	382	0.584	6.54
3	PBE24	PANEL1A	11.20	5	0.008	0.09
4	PANEL1A	PANEL1B	10.80	2	0.003	0.03
5	PANEL1B	PANEL2A	10.40	2	0.003	0.03
6	PANEL2A	PANEL2B	10.00	2	0.003	0.03
7	PANEL2B	PANEL3A	9.60	2	0.003	0.03
8	PANEL3A	PANEL3B	9.20	2	0.003	0.03
9	PANEL3B	PANEL4A	8.80	2	0.003	0.03
10	PANEL4A	PANEL4B	8.40	2	0.003	0.03
11	PANEL4B	PANEL5A	8.00	2	0.003	0.02
12	PANEL5A	PANEL5B	7.60	2	0.003	0.02
13	PANEL5B	PANEL6A	7.20	2	0.003	0.02
14	PANEL6A	PANEL6B	6.80	2	0.003	0.02
15	PANEL6B	PANEL7A	6.40	2	0.003	0.02
16	PANEL7A	PANEL7B	6.00	2	0.003	0.02
17	PANEL7B	PANEL8A	5.60	2	0.003	0.02
18	PANEL8A	PANEL8B	5.20	2	0.003	0.02
19	PANEL8B	PANEL9A	4.80	2	0.003	0.01
20	PANEL9A	PANEL9B	4.40	2	0.003	0.01
21	PANEL9B	PANEL10A	4.00	2	0.003	0.01
22	PANEL10A	PANEL10B	3.60	2	0.003	0.01
23	PANEL10B	PANEL11A	3.20	2	0.003	0.01
24	PANEL11A	PANEL11B	2.80	2	0.003	0.01
25	PANEL11B	PANE12A	2.40	2	0.003	0.01
26	PANEL12A	PANEL12B	2.00	2	0.003	0.01
27	PANEL12B	PANEL13A	1.60	2	0.003	0.00
28	PANEL13A	PANEL13B	1.20	2	0.003	0.00
29	PANEL13B	PANEL14A	0.80	2	0.003	0.00
30	PANEL14A	PANEL14B	0.40	2	0.003	0.00
31					0.000	0.00
32					0.000	0.00
33					0.000	0.00
34					0.000	0.00

TOTAL VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop of Sections)

Volts

9.05

PERCENT VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop/240 V)x100%

%

3.77

FORMULAS:

$Z = (2) * (\text{Length}) * (0.001) * (\text{Cable Resistance})$

$V = (Z) * (\text{impedance}) * (I) \text{ Lamp Current Including @ 240 V}$

VOLTAGE DROP CALCULATION WORKSHEET

1/12/2024

PROJECT: CCG3A CLEVELAND

LIGHTING PILLAR: CC-E

CIRCUIT DESIGNATION: E-9

CIRCUIT VOLTAGE: 240

#OF POWER PACKS (TOTAL): 22

TOTAL LOAD: 8.8 Amps

CONNECTED LOAD (KVA): 2.112

CIRCUIT FUSE SIZE (AMPS) (125% OF MAX INPUT): 11

USE 20AMP BREAKER

LAMP TYPE & QUANTITIES: 22 @ 96W

POLE NUMBERS:

Wire Size (AWG)	Resistance Per 1,000 Meters (Ohms)
8	0.764

Lamp Type	Lamp Current Including at 240 Volts	
96W	0.4000	Amps Each

Wire Size Used: 2 - 8 AWG (Phase & Neutral)

NO. OF BRANCHES: 1

SECTION NO.	FROM	TO	(I) CURRENT (Amps)	LENGTH OF WIRE	(Z) IMPEDANCE (Ohms)	(V) VOLTAGE DROP (Volts)
1	CC-E	PBE1	8.80	115	0.176	1.55
2	PBE1	PBE21	8.80	424	0.648	5.70
3	PBE21	PANEL1A	8.80	58	0.089	0.78
4	PANEL1A	PANEL1B	8.40	2	0.003	0.03
5	PANEL1B	PANEL2A	8.00	2	0.003	0.02
6	PANEL2A	PANEL2B	7.60	2	0.003	0.02
7	PANEL2B	PANEL3A	7.20	2	0.003	0.02
8	PANEL3A	PANEL3B	6.80	2	0.003	0.02
9	PANEL3B	PANEL4A	6.40	2	0.003	0.02
10	PANEL4A	PANEL4B	6.00	2	0.003	0.02
11	PANEL4B	PANEL5A	5.60	2	0.003	0.02
12	PANEL5A	PANEL5B	5.20	2	0.003	0.02
13	PANEL5B	PANEL6A	4.80	2	0.003	0.01
14	PANEL6A	PANEL6B	4.40	2	0.003	0.01
15	PANEL6B	PANEL7A	4.00	2	0.003	0.01
16	PANEL7A	PANEL7B	3.60	2	0.003	0.01
17	PANEL7B	PANEL8A	3.20	2	0.003	0.01
18	PANEL8A	PANEL8B	2.80	2	0.003	0.01
19	PANEL8B	PANEL9A	2.40	2	0.003	0.01
20	PANEL9A	PANEL9B	2.00	2	0.003	0.01
21	PANEL9B	PANEL10A	1.60	2	0.003	0.00
22	PANEL10A	PANEL10B	1.20	2	0.003	0.00
23	PANEL10B	PANEL11A	0.80	2	0.003	0.00
24	PANEL11A	PANEL11B	0.40	2	0.003	0.00
25					0.000	0.00
26					0.000	0.00
27					0.000	0.00
28					0.000	0.00

TOTAL VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop of Sections) Volts **8.31**

PERCENT VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop/240 V)x100% % **3.46**

FORMULAS:

$Z = (2) * (Length) * (0.001) * (Cable Resistance)$

$V = (Z \text{ impedance}) * (I) \text{ Lamp Current Including @ 240 V}$

VOLTAGE DROP CALCULATION WORKSHEET

1/12/2024

PROJECT: CCG3A CLEVELAND

LIGHTING PILLAR: CC-E

CIRCUIT DESIGNATION: E-10

CIRCUIT VOLTAGE: 240

#OF POWER PACKS (TOTAL): 22

TOTAL LOAD: 8.8 Amps

CONNECTED LOAD (KVA): 2.112

CIRCUIT FUSE SIZE (AMPS) (125% OF MAX INPUT): 11

USE 20AMP BREAKER

LAMP TYPE & QUANTITIES: 22 @ 96W

POLE NUMBERS:

Wire Size (AWG)	Resistance Per 1,000 Meters (Ohms)
8	0.764

Lamp Type	Lamp Current Including at 240 Volts	
96W	0.4000	Amps Each

Wire Size Used: 2 - 8 AWG (Phase & Neutral)

NO. OF BRANCHES: 1

SECTION NO.	FROM	TO	(I) CURRENT (Amps)	LENGTH OF WIRE	(Z) IMPEDANCE (Ohms)	(V) VOLTAGE DROP (Volts)
1	CC-E	PBE1	8.80	115	0.176	1.55
2	PBE1	PBE21	8.80	424	0.648	5.70
3	PBE21	PANEL1A	8.80	115	0.176	1.55
4	PANEL1A	PANEL1B	8.40	2	0.003	0.03
5	PANEL1B	PANEL2A	8.00	2	0.003	0.02
6	PANEL2A	PANEL2B	7.60	2	0.003	0.02
7	PANEL2B	PANEL3A	7.20	2	0.003	0.02
8	PANEL3A	PANEL3B	6.80	2	0.003	0.02
9	PANEL3B	PANEL4A	6.40	2	0.003	0.02
10	PANEL4A	PANEL4B	6.00	2	0.003	0.02
11	PANEL4B	PANEL5A	5.60	2	0.003	0.02
12	PANEL5A	PANEL5B	5.20	2	0.003	0.02
13	PANEL5B	PANEL6A	4.80	2	0.003	0.01
14	PANEL6A	PANEL6B	4.40	2	0.003	0.01
15	PANEL6B	PANEL7A	4.00	2	0.003	0.01
16	PANEL7A	PANEL7B	3.60	2	0.003	0.01
17	PANEL7B	PANEL8A	3.20	2	0.003	0.01
18	PANEL8A	PANEL8B	2.80	2	0.003	0.01
19	PANEL8B	PANEL9A	2.40	2	0.003	0.01
20	PANEL9A	PANEL9B	2.00	2	0.003	0.01
21	PANEL9B	PANEL10A	1.60	2	0.003	0.00
22	PANEL10A	PANEL10B	1.20	2	0.003	0.00
23	PANEL10B	PANEL11A	0.80	2	0.003	0.00
24	PANEL11A	PANEL11B	0.40	2	0.003	0.00
25					0.000	0.00
26					0.000	0.00
27					0.000	0.00
28					0.000	0.00

TOTAL VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop of Sections) Volts **9.08**

PERCENT VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop/240 V)x100% % **3.78**

FORMULAS:

$Z = (2) * (\text{Length}) * (0.001) * (\text{Cable Resistance})$

$V = (Z \text{ impedance}) * (I) \text{ Lamp Current Including @ 240 V}$

VOLTAGE DROP CALCULATION WORKSHEET

1/12/2024

PROJECT: CCG3A CLEVELAND

LIGHTING PILLAR: CC-E

CIRCUIT DESIGNATION: E-11

CIRCUIT VOLTAGE: 240

#OF POWER PACKS (TOTAL): 22

TOTAL LOAD: 8.8 Amps

CONNECTED LOAD (KVA): 2.112

CIRCUIT FUSE SIZE (AMPS) (125% OF MAX INPUT): 11

USE 20AMP BREAKER

LAMP TYPE & QUANTITIES: 22 @ 96W

POLE NUMBERS:

Wire Size (AWG)	Resistance Per 1,000 Meters (Ohms)
8	0.764

Lamp Type	Lamp Current Including at 240 Volts	
96W	0.4000	Amps Each

Wire Size Used: 2 - 8 AWG (Phase & Neutral)

NO. OF BRANCHES: 1

SECTION NO.	FROM	TO	(I) CURRENT (Amps)	LENGTH OF WIRE	(Z) IMPEDANCE (Ohms)	(V) VOLTAGE DROP (Volts)
1	CC-E	PBE1	8.80	115	0.176	1.55
2	PBE1	PBE21	8.80	424	0.648	5.70
3	PBE21	PANEL1A	8.80	172	0.263	2.31
4	PANEL1A	PANEL1B	8.40	2	0.003	0.03
5	PANEL1B	PANEL2A	8.00	2	0.003	0.02
6	PANEL2A	PANEL2B	7.60	2	0.003	0.02
7	PANEL2B	PANEL3A	7.20	2	0.003	0.02
8	PANEL3A	PANEL3B	6.80	2	0.003	0.02
9	PANEL3B	PANEL4A	6.40	2	0.003	0.02
10	PANEL4A	PANEL4B	6.00	2	0.003	0.02
11	PANEL4B	PANEL5A	5.60	2	0.003	0.02
12	PANEL5A	PANEL5B	5.20	2	0.003	0.02
13	PANEL5B	PANEL6A	4.80	2	0.003	0.01
14	PANEL6A	PANEL6B	4.40	2	0.003	0.01
15	PANEL6B	PANEL7A	4.00	2	0.003	0.01
16	PANEL7A	PANEL7B	3.60	2	0.003	0.01
17	PANEL7B	PANEL8A	3.20	2	0.003	0.01
18	PANEL8A	PANEL8B	2.80	2	0.003	0.01
19	PANEL8B	PANEL9A	2.40	2	0.003	0.01
20	PANEL9A	PANEL9B	2.00	2	0.003	0.01
21	PANEL9B	PANEL10A	1.60	2	0.003	0.00
22	PANEL10A	PANEL10B	1.20	2	0.003	0.00
23	PANEL10B	PANEL11A	0.80	2	0.003	0.00
24	PANEL11A	PANEL11B	0.40	2	0.003	0.00
25					0.000	0.00
26					0.000	0.00
27					0.000	0.00
28					0.000	0.00

TOTAL VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop of Sections) Volts **9.84**

PERCENT VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop/240 V)x100% % **4.10**

FORMULAS:

$Z = (2) * (\text{Length}) * (0.001) * (\text{Cable Resistance})$

$V = (Z \text{ impedance}) * (I) \text{ Lamp Current Including @ 240 V}$

VOLTAGE DROP CALCULATION WORKSHEET

1/12/2024

PROJECT: CCG3A CLEVELAND

LIGHTING PILLAR: CC-E

CIRCUIT DESIGNATION: E-12

CIRCUIT VOLTAGE: 240

#OF POWER PACKS (TOTAL): 22

TOTAL LOAD: 8.8 Amps

CONNECTED LOAD (KVA): 2.112

CIRCUIT FUSE SIZE (AMPS) (125% OF MAX INPUT): 11

USE 20AMP BREAKER

LAMP TYPE & QUANTITIES: 22 @ 96W

POLE NUMBERS:

Wire Size (AWG)	Resistance Per 1,000 Meters (Ohms)
8	0.764

Lamp Type	Lamp Current Including at 240 Volts	
96W	0.4000	Amps Each

Wire Size Used: 2 - 8 AWG (Phase & Neutral)

NO. OF BRANCHES: 1

SECTION NO.	FROM	TO	(I) CURRENT (Amps)	LENGTH OF WIRE	(Z) IMPEDANCE (Ohms)	(V) VOLTAGE DROP (Volts)
1	CC-E	PBE1	8.80	115	0.176	1.55
2	PBE1	PBE21	8.80	424	0.648	5.70
3	PBE21	PANEL1A	8.80	226	0.345	3.04
4	PANEL1A	PANEL1B	8.40	2	0.003	0.03
5	PANEL1B	PANEL2A	8.00	2	0.003	0.02
6	PANEL2A	PANEL2B	7.60	2	0.003	0.02
7	PANEL2B	PANEL3A	7.20	2	0.003	0.02
8	PANEL3A	PANEL3B	6.80	2	0.003	0.02
9	PANEL3B	PANEL4A	6.40	2	0.003	0.02
10	PANEL4A	PANEL4B	6.00	2	0.003	0.02
11	PANEL4B	PANEL5A	5.60	2	0.003	0.02
12	PANEL5A	PANEL5B	5.20	2	0.003	0.02
13	PANEL5B	PANEL6A	4.80	2	0.003	0.01
14	PANEL6A	PANEL6B	4.40	2	0.003	0.01
15	PANEL6B	PANEL7A	4.00	2	0.003	0.01
16	PANEL7A	PANEL7B	3.60	2	0.003	0.01
17	PANEL7B	PANEL8A	3.20	2	0.003	0.01
18	PANEL8A	PANEL8B	2.80	2	0.003	0.01
19	PANEL8B	PANEL9A	2.40	2	0.003	0.01
20	PANEL9A	PANEL9B	2.00	2	0.003	0.01
21	PANEL9B	PANEL10A	1.60	2	0.003	0.00
22	PANEL10A	PANEL10B	1.20	2	0.003	0.00
23	PANEL10B	PANEL11A	0.80	2	0.003	0.00
24	PANEL11A	PANEL11B	0.40	2	0.003	0.00
25					0.000	0.00
26					0.000	0.00
27					0.000	0.00
28					0.000	0.00

TOTAL VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop of Sections) Volts **10.57**

PERCENT VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop/240 V)x100% % **4.40**

FORMULAS:

$Z = (2) * (\text{Length}) * (0.001) * (\text{Cable Resistance})$

$V = (Z \text{ impedance}) * (I) \text{ Lamp Current Including @ 240 V}$

VOLTAGE DROP CALCULATION WORKSHEET

1/12/2024

PROJECT: CCG3A CLEVELAND

LIGHTING PILLAR: CC-E

CIRCUIT DESIGNATION: E-13

CIRCUIT VOLTAGE: 240

#OF POWER PACKS (TOTAL): 22

TOTAL LOAD: 8.8 Amps

CONNECTED LOAD (KVA): 2.112

CIRCUIT FUSE SIZE (AMPS) (125% OF MAX INPUT): 11

USE 20AMP BREAKER

LAMP TYPE & QUANTITIES: 22 @ 96W

POLE NUMBERS:

Wire Size (AWG)	Resistance Per 1,000 Meters (Ohms)
8	0.764

Lamp Type	Lamp Current Including at 240 Volts	
96W	0.4000	Amps Each

Wire Size Used: 2 - 8 AWG (Phase & Neutral)

NO. OF BRANCHES: 1

SECTION NO.	FROM	TO	(I) CURRENT (Amps)	LENGTH OF WIRE	(Z) IMPEDANCE (Ohms)	(V) VOLTAGE DROP (Volts)
1	CC-E	PBE1	8.80	115	0.176	1.55
2	PBE1	PBE21	8.80	424	0.648	5.70
3	PBE21	PANEL1A	8.80	284	0.434	3.82
4	PANEL1A	PANEL1B	8.40	2	0.003	0.03
5	PANEL1B	PANEL2A	8.00	2	0.003	0.02
6	PANEL2A	PANEL2B	7.60	2	0.003	0.02
7	PANEL2B	PANEL3A	7.20	2	0.003	0.02
8	PANEL3A	PANEL3B	6.80	2	0.003	0.02
9	PANEL3B	PANEL4A	6.40	2	0.003	0.02
10	PANEL4A	PANEL4B	6.00	2	0.003	0.02
11	PANEL4B	PANEL5A	5.60	2	0.003	0.02
12	PANEL5A	PANEL5B	5.20	2	0.003	0.02
13	PANEL5B	PANEL6A	4.80	2	0.003	0.01
14	PANEL6A	PANEL6B	4.40	2	0.003	0.01
15	PANEL6B	PANEL7A	4.00	2	0.003	0.01
16	PANEL7A	PANEL7B	3.60	2	0.003	0.01
17	PANEL7B	PANEL8A	3.20	2	0.003	0.01
18	PANEL8A	PANEL8B	2.80	2	0.003	0.01
19	PANEL8B	PANEL9A	2.40	2	0.003	0.01
20	PANEL9A	PANEL9B	2.00	2	0.003	0.01
21	PANEL9B	PANEL10A	1.60	2	0.003	0.00
22	PANEL10A	PANEL10B	1.20	2	0.003	0.00
23	PANEL10B	PANEL11A	0.80	2	0.003	0.00
24	PANEL11A	PANEL11B	0.40	2	0.003	0.00
25					0.000	0.00
26					0.000	0.00
27					0.000	0.00
28					0.000	0.00

TOTAL VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop of Sections) Volts **11.35**

PERCENT VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop/240 V)x100% % **4.73**

FORMULAS:

$Z = (2) * (\text{Length}) * (0.001) * (\text{Cable Resistance})$

$V = (Z \text{ impedance}) * (I) \text{ Lamp Current Including @ 240 V}$

VOLTAGE DROP CALCULATION WORKSHEET

1/12/2024

PROJECT: CCG3A CLEVELAND

LIGHTING PILLAR: CC-E

CIRCUIT DESIGNATION: E-14

CIRCUIT VOLTAGE: 240

#OF POWER PACKS (TOTAL): 22

TOTAL LOAD: 8.8 Amps

CONNECTED LOAD (KVA): 2.112

CIRCUIT FUSE SIZE (AMPS) (125% OF MAX INPUT): 11

USE 20AMP BREAKER

LAMP TYPE & QUANTITIES: 22 @ 96W

POLE NUMBERS:

Wire Size (AWG)	Resistance Per 1,000 Meters (Ohms)
8	0.764

Lamp Type	Lamp Current Including at 240 Volts	
96W	0.4000	Amps Each

Wire Size Used: 2 - 8 AWG (Phase & Neutral)

NO. OF BRANCHES: 1

SECTION NO.	FROM	TO	(I) CURRENT (Amps)	LENGTH OF WIRE	(Z) IMPEDANCE (Ohms)	(V) VOLTAGE DROP (Volts)
1	CC-E	PBE1	8.80	115	0.176	1.55
2	PBE1	PBE26	8.80	209	0.319	2.81
3	PBE26	PANEL1A	8.80	5	0.008	0.07
4	PANEL1A	PANEL1B	8.40	2	0.003	0.03
5	PANEL1B	PANEL2A	8.00	2	0.003	0.02
6	PANEL2A	PANEL2B	7.60	2	0.003	0.02
7	PANEL2B	PANEL3A	7.20	2	0.003	0.02
8	PANEL3A	PANEL3B	6.80	2	0.003	0.02
9	PANEL3B	PANEL4A	6.40	2	0.003	0.02
10	PANEL4A	PANEL4B	6.00	2	0.003	0.02
11	PANEL4B	PANEL5A	5.60	2	0.003	0.02
12	PANEL5A	PANEL5B	5.20	2	0.003	0.02
13	PANEL5B	PANEL6A	4.80	2	0.003	0.01
14	PANEL6A	PANEL6B	4.40	2	0.003	0.01
15	PANEL6B	PANEL7A	4.00	2	0.003	0.01
16	PANEL7A	PANEL7B	3.60	2	0.003	0.01
17	PANEL7B	PANEL8A	3.20	2	0.003	0.01
18	PANEL8A	PANEL8B	2.80	2	0.003	0.01
19	PANEL8B	PANEL9A	2.40	2	0.003	0.01
20	PANEL9A	PANEL9B	2.00	2	0.003	0.01
21	PANEL9B	PANEL10A	1.60	2	0.003	0.00
22	PANEL10A	PANEL10B	1.20	2	0.003	0.00
23	PANEL10B	PANEL11A	0.80	2	0.003	0.00
24	PANEL11A	PANEL11B	0.40	2	0.003	0.00
25					0.000	0.00
26					0.000	0.00
27					0.000	0.00
28					0.000	0.00

TOTAL VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop of Sections) Volts **4.71**

PERCENT VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop/240 V)x100% % **1.96**

FORMULAS:

$Z = (2) * (\text{Length}) * (0.001) * (\text{Cable Resistance})$

$V = (Z \text{ impedance}) * (I) \text{ Lamp Current Including @ 240 V}$

VOLTAGE DROP CALCULATION WORKSHEET

1/12/2024

PROJECT: CCG3A CLEVELAND

LIGHTING PILLAR: CC-E

CIRCUIT DESIGNATION: E-15

CIRCUIT VOLTAGE: 240

#OF POWER PACKS (TOTAL): 22

TOTAL LOAD: 8.8 Amps

CONNECTED LOAD (KVA): 2.112

CIRCUIT FUSE SIZE (AMPS) (125% OF MAX INPUT): 11

USE 20AMP BREAKER

LAMP TYPE & QUANTITIES: 22 @ 96W

POLE NUMBERS:

Wire Size (AWG)	Resistance Per 1,000 Meters (Ohms)
8	0.764

Lamp Type	Lamp Current Including at 240 Volts	
96W	0.4000	Amps Each

Wire Size Used: 2 - 8 AWG (Phase & Neutral)

NO. OF BRANCHES: 1

SECTION NO.	FROM	TO	(I) CURRENT (Amps)	LENGTH OF WIRE	(Z) IMPEDANCE (Ohms)	(V) VOLTAGE DROP (Volts)
1	CC-E	PBE1	8.80	115	0.176	1.55
2	PBE1	PBE26	8.80	209	0.319	2.81
3	PBE26	PANEL1A	8.80	57	0.087	0.77
4	PANEL1A	PANEL1B	8.40	2	0.003	0.03
5	PANEL1B	PANEL2A	8.00	2	0.003	0.02
6	PANEL2A	PANEL2B	7.60	2	0.003	0.02
7	PANEL2B	PANEL3A	7.20	2	0.003	0.02
8	PANEL3A	PANEL3B	6.80	2	0.003	0.02
9	PANEL3B	PANEL4A	6.40	2	0.003	0.02
10	PANEL4A	PANEL4B	6.00	2	0.003	0.02
11	PANEL4B	PANEL5A	5.60	2	0.003	0.02
12	PANEL5A	PANEL5B	5.20	2	0.003	0.02
13	PANEL5B	PANEL6A	4.80	2	0.003	0.01
14	PANEL6A	PANEL6B	4.40	2	0.003	0.01
15	PANEL6B	PANEL7A	4.00	2	0.003	0.01
16	PANEL7A	PANEL7B	3.60	2	0.003	0.01
17	PANEL7B	PANEL8A	3.20	2	0.003	0.01
18	PANEL8A	PANEL8B	2.80	2	0.003	0.01
19	PANEL8B	PANEL9A	2.40	2	0.003	0.01
20	PANEL9A	PANEL9B	2.00	2	0.003	0.01
21	PANEL9B	PANEL10A	1.60	2	0.003	0.00
22	PANEL10A	PANEL10B	1.20	2	0.003	0.00
23	PANEL10B	PANEL11A	0.80	2	0.003	0.00
24	PANEL11A	PANEL11B	0.40	2	0.003	0.00
25					0.000	0.00
26					0.000	0.00
27					0.000	0.00
28					0.000	0.00

TOTAL VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop of Sections) Volts **5.41**

PERCENT VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop/240 V)x100% % **2.25**

FORMULAS:

$Z = (2) * (\text{Length}) * (0.001) * (\text{Cable Resistance})$

$V = (Z \text{ impedance}) * (I) \text{ Lamp Current Including @ 240 V}$

VOLTAGE DROP CALCULATION WORKSHEET

1/12/2024

PROJECT: CCG3A CLEVELAND

LIGHTING PILLAR: CC-E

CIRCUIT DESIGNATION: E-16

CIRCUIT VOLTAGE: 120

TOTAL LOAD: 0.42 Amps

CONNECTED LOAD (KVA): 0.0504

CIRCUIT FUSE SIZE(AMPS) (125% OF MAX INPUT): 0.525

USE 20AMP BREAKER

Wire Size (AWG)	Resistance Per 1,000 Meters (Ohms)
8	0.764

Lamp Type	Lamp Current Including at 240 Volts	
IRRIGATION	0.4200	Amps Each

Wire Size Used: 2 - 8 AWG (Phase & Neutral)

NO. OF BRANCHES: 1

SECTION NO.	FROM	TO	(I) CURRENT (Amps)	LENGTH OF WIRE	(Z) IMPEDANCE (Ohms)	(V) VOLTAGE DROP (Volts)
1	CC-E	PB1	0.42	115	0.176	0.07
2	PB1	PB6	0.42	580	0.886	0.37
3	PB6	IRR PNL	0.42	40	0.061	0.03
4					0.000	0.00
5					0.000	0.00
6					0.000	0.00
7					0.000	0.00
8					0.000	0.00

TOTAL VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop of Sections)

Volts

0.47

PERCENT VOLTAGE DROP OF CIRCUIT: (Total Voltage Drop/120 V)x100%

%

0.39

FORMULAS:

$Z = (2) * (\text{Length}) * (0.001) * (\text{Cable Resistance})$

$V = (Z) \text{ impedance} * (I) \text{ Lamp Current Including @ 120 V}$