



BUC-EE'S

A DEVELOPMENT OF

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Saline County, AR

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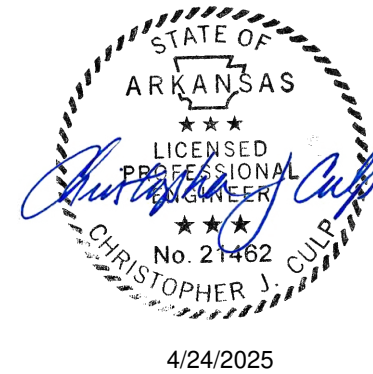
**BUC-EE'S TRAVEL CENTER
BENTON, ARKANSAS**
74K - L - 2024 - Q2
INTERSTATE 30 & STATE HIGHWAY 229
BENTON, ARKANSAS 72019

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EXPIRES 12/31/2025

ISSUE/REVISION LOG:		
No.	DESCRIPTION	DATE
3	Revision 3 - Owner Changes	04/23/2025



ISSUED FOR REVIEW: 05/14/2024

ISSUED FOR BID: 05/14/2024

ISSUED FOR PERMIT: 05/14/2024

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FA2.00

FIRE ALARM CALCULATIONS

LSL PROJECT NUMBER: 2024-107.000

BENTON, ARKANSAS

NAC VOLTAGE DROP CALCULATIONS

Project Name: BUC-EE'S BENTON ARKANSAS Date: 4/15/2024
Project Number: 2450001433 Panel: RPS2
Nominal system voltage: 20.4 Min. device voltage: 16

B1 Southwest Sales Floor		Device		Current Draw (A)	Qty.	Subtotal Current Draw (A)
Wire Type:	#14/2 plp cable (6120u)	115 cd Ceiling Horn/Strobe	0.187	2	0.374	
Wire Resistance:	2.43 ohms/1000'	95 cd Ceiling Horn/Strobe	0.165	2	0.330	
Circuit Length:	475 feet	75 cd WP Wall Horn/Strobe	0.176	2	0.352	
Device Mfg:	Notifier	75 cd Ceiling Horn/Strobe	0.143	2	0.286	
Circuit Output (Amps):	3				0.000	
Voltage Drop:	3.10 volts				0.000	
End of line Voltage:	17.30 volts				0.000	
Voltage Drop %:	15.19%				0.000	
Total circuit resistance:	2.309 ohms				0.000	
Resistance Max:	3.28 ohms				0.000	

Max. Circuit Length: 675 feet Totals: 8 1.342

B2 Convenience Warehouse		Device		Current Draw (A)	Qty.	Subtotal Current Draw (A)
Wire Type:	#12 stranded (thhn)	15 cd Ceiling Horn/Strobe	0.041	3	0.123	
Wire Resistance:	1.98 ohms/1000'	30 cd Ceiling Horn/Strobe	0.090	3	0.270	
Circuit Length:	525 feet	110 cd WP Wall Horn/Strobe	0.212	1	0.212	
Device Mfg:	Notifier	75 cd WP Wall Horn/Strobe	0.176	1	0.176	
Circuit Output (Amps):	3				0.000	
Voltage Drop:	3.65 volts				0.000	
End of line Voltage:	16.75 volts				0.000	
Voltage Drop %:	17.88%				0.000	
Total circuit resistance:	2.079 ohms				0.000	
Resistance Max:	2.51 ohms				0.000	

Max. Circuit Length: 633 feet Totals: 14 1.754

B3 Convenience Warehouse		Device		Current Draw (A)	Qty.	Subtotal Current Draw (A)
Wire Type:	#14/2 plp cable (6120u)	75 cd WP Wall Horn/Strobe	0.176	2	0.352	
Wire Resistance:	2.43 ohms/1000'	15 cd Ceiling Horn/Strobe	0.041	2	0.082	
Circuit Length:	525 feet	75 cd Ceiling Horn/Strobe	0.143	4	0.572	
Device Mfg:	Notifier	30 cd WP Wall Horn/Strobe	0.107	1	0.107	
Circuit Output (Amps):	3	30 cd Ceiling Horn/Strobe	0.090	3	0.270	
Voltage Drop:	3.53 volts				0.000	
End of line Voltage:	16.87 volts				0.000	
Voltage Drop %:	17.30%				0.000	
Total circuit resistance:	2.552 ohms				0.000	
Resistance Max:	3.16 ohms				0.000	

Max. Circuit Length: 655 feet Totals: 12 1.363

B4 Women's Restroom		Device		Current Draw (A)	Qty.	Subtotal Current Draw (A)
Wire Type:	#14/2 plp cable (6120u)	15 cd Ceiling Horn/Strobe	0.041	1	0.041	
Wire Resistance:	2.43 ohms/1000'	95 cd Ceiling Horn/Strobe	0.165	1	0.165	
Circuit Length:	225 feet	15 cd Ceiling Strobe	0.041	12	0.492	
Device Mfg:	Notifier				0.000	
Circuit Output (Amps):	3				0.000	
Voltage Drop:	0.76 volts				0.000	
End of line Voltage:	19.64 volts				0.000	
Voltage Drop %:	3.74%				0.000	
Total circuit resistance:	1.064 ohms				0.000	
Resistance Max:	6.30 ohms				0.000	

Max. Circuit Length: 1,297 feet Totals: 14 0.698

**6 REMOTE POWER SUPPLY P2 - VOLTAGE DROP
NTS**

Project:
Panel:
Location:

Battery Calculator

Buc-ee's Benton, Arkansas

RPS2

Electrical Room 145

Quantity	Device	Standby (Amps)		Alarm (Amps)	
		Current	Total Current	Total Current	
1	NAC Panel	0.156000	0.156000	0.1850	0.185000
1	CIRCUIT B1	0.000000	1.3420	1.3420	1.342000
1	CIRCUIT B2	0.000000	1.7540	1.7540	1.754000
1	CIRCUIT B3	0.000000	1.3830	1.3830	1.383000
1	CIRCUIT B4	0.000000	0.6980	0.6980	0.698000
0	CIRCUIT B5	0.000000	0.0000	0.0000	0.000000
0	CIRCUIT B6	0.000000	0.0000	0.0000	0.000000
Totals:		0.156000		5.362000	5.362000

Standby	
Total System Standby Current (Amps)	0.156
x Required Standby Time (hr)	24
Required Standby Capacity (Amp-hr)	3.744

Alarm	
Total System Alarm Current (Amps)	5.362
x Required Alarm Time (hr)	0.083
Required Alarm Capacity (Amp-hr)	0.445
(1) Expressed in decimals of an hour.	
Total Required Capacity (Amp-hr) =	4.189
Optional Safety Factor	20%
Required Battery Capacity (Amp-hr)	6

**4 REMOTE POWER SUPPLY P2 - BATTERY CALCULATIONS
NTS**

NAC VOLTAGE DROP CALCULATIONS

Project Name: BUC-EE'S BENTON ARKANSAS Date: 4/15/2024
Project Number: 2450001433 Panel: RPS1
Nominal system voltage: 20.4 Min. device voltage: 16

B1 Men's Restroom 122		Device		Current Draw (A)	Qty.	Subtotal Current Draw (A)
Wire Type:	#14/2 plp cable (6120u)	15 cd Ceiling Strobe	0.041	18	0.738	
Wire Resistance:	2.43 ohms/1000'	75 cd Ceiling Horn/Strobe	0.143	2	0.286	
Circuit Length:	225 feet	30 cd Ceiling Strobe	0.063	1	0.063	
Device Mfg:	Notifier				0.000	
Circuit Output (Amps):	3				0.000	
Voltage Drop:	1.19 volts				0.000	
End of line Voltage:	19.21 volts				0.000	
Voltage Drop %:	5.83%				0.000	
Total circuit resistance:	1.094 ohms				0.000	
Resistance Max:	4.05 ohms				0.000	

Max. Circuit Length: 833 feet Totals: 21 1.097

B2 Women's Restroom 120		Device		Current Draw (A)	Qty.	Subtotal Current Draw (A)
Wire Type:	#14/2 plp cable (6120u)	15 cd Ceiling Horn/Strobe	0.041	3	0.123	
Wire Resistance:	2.43 ohms/1000'	30 cd Ceiling Horn/Strobe	0.090	2	0.180	
Circuit Length:	330 feet	75 cd Ceiling Horn/Strobe	0.143	3	0.429	
Device Mfg:	Notifier	15 cd Ceiling Strobe	0.041	21	0.861	
Circuit Output (Amps):	3				0.000	
Voltage Drop:	2.55 volts				0.000	
End of line Voltage:	17.65 volts				0.000	
Voltage Drop %:	12.32%				0.000	
Total circuit resistance:	1.604 ohms				0.000	
Resistance Max:	2.76 ohms				0.000	

Max. Circuit Length: 568 feet Totals: 29 1.593

B3 Merchandise Storage 139		Device		Current Draw (A)	Qty.	Subtotal Current Draw (A)
Wire Type:	#14/2 plp cable (6120u)	15 cd Ceiling Horn/Strobe	0.041	3	0.123	
Wire Resistance:	2.43 ohms/1000'	30 cd Ceiling Horn/Strobe	0.090	1	0.090	
Circuit Length:	300 feet	75 cd Ceiling Horn/Strobe	0.143	4	0.572	
Device Mfg:	Notifier	115 cd Ceiling Horn/Strobe	0.187	2	0.374	
Circuit Output (Amps):	3				0.000	
Voltage Drop:	1.69 volts				0.000	
End of line Voltage:	18.71 volts				0.000	
Voltage Drop %:	8.29%				0.000	
Total circuit resistance:	1.458 ohms				0.000	
Resistance Max:	3.80 ohms				0.000	

Max. Circuit Length: 781 feet Totals: 10 1.159

B4 Gift Sales 2 108		Device		Current Draw (A)	Qty.	Subtotal Current Draw (A)
Wire Type:	#14/2 plp cable (6120u)	75 cd Ceiling Horn/Strobe	0.143	5	0.715	
Wire Resistance:	2.43 ohms/1000'	95 cd Ceiling Horn/Strobe	0.165	2	0.330	
Circuit Length:	450 feet	30 cd Ceiling Horn/Strobe	0.090	3	0.270	
Device Mfg:	Notifier	115 cd Ceiling Horn/Strobe	0.187	1	0.187	
Circuit Output (Amps):	3				0.000	
Voltage Drop:	3.28 volts				0.000	
End of line Voltage:	17.12 volts				0.000	
Voltage Drop %:	16.10%				0.000	
Total circuit resistance:	2.187 ohms				0.000	
Resistance Max:	2.93 ohms				0.000	

Max. Circuit Length: 603 feet Totals: 11 1.323

B5 South Floor		Device		Current Draw (A)	Qty.	Subtotal Current Draw (A)
Wire Type:	#12 stranded (thhn)	95 cd Ceiling Horn/Strobe	0.165	3	0.495	
Wire Resistance:	1.98 ohms/1000'	115 cd Ceiling Horn/Strobe	0.187	4	0.748	
Circuit Length:	475 feet				0.000	
Device Mfg:	Notifier				0.000	
Circuit Output (Amps):	3				0.000	
Voltage Drop:	2.34 volts				0.000	
End of line Voltage:	18.06 volts				0.000	
Voltage Drop %:	11.46%				0.000	
Total circuit resistance:	1.881 ohms				0.000	
Resistance Max:	3.54 ohms				0.000	

Max. Circuit Length: 894 feet Totals: 7 1.243

B6 #12 stranded (thhn)		Device		Current Draw (A)	Qty.	Subtotal Current Draw (A)
Wire Type:	#12 stranded (thhn)			0.000	0	0.000
Wire Resistance:	1.98 ohms/1000'			0.000	0	0.000
Circuit Length:	feet			0.000	0	0.000
Device Mfg:	Notifier			0.000	0	0.000
Circuit Output (Amps):	3			0.000	0	0.000
Voltage Drop:	0.00 volts			0.000	0	0.000
End of line Voltage:	20.40 volts			0.000	0	0.000
Voltage Drop %:	0.00%			0.000	0	0.000
Total circuit resistance:	0.000 ohms			0.000	0	0.000
Resistance Max:	#DIV/0!			0.000	0	0.000

Max. Circuit Length: #DIV/0! feet Totals: 0 0.000

Calculations based on lump sum method.
Voltage drop = Circuit length x 2 x total circuit current x wire resistance (per ft.)
End of line voltage = Panel voltage - voltage drop
Voltage drop % = Voltage drop divided by panel voltage

**5 REMOTE POWER SUPPLY P1 - VOLTAGE DROP
NTS**

Project:
Panel:
Location:

Battery Calculator					
Buc-ee's Benton, Arkansas					
RPS1					
Electrical Room 145					
Quantity	Device	Standby (Amps)		Alarm (Amps)	
		Current	Total Current	Total Current	
1	NAC Panel	0.156000	0.156000	0.1850	0.185000
1	CIRCUIT B1	0.000000	1.0870	1.0870	1.087000
1	CIRCUIT B2	0.000000	1.5930	1.5930	1.593000
1	CIRCUIT B3	0.000000	1.1590	1.1590	1.159000
1	CIRCUIT B4	0.000000	1.5920	1.5920	1.592000
1	CIRCUIT B5	0.000000	1.2430	1.2430	1.243000
0	CIRCUIT B6	0.000000	0.0000	0.0000	0.000000
Totals:		0.156000		5.526000	
Standby					
Total System Standby Current (Amps)		0.156			
x Required Standby Time (hr)		24			
Required Standby Capacity (Amp-hr)		3.744			
Alarm					
Total System Alarm Current (Amps)		5.526			
x Required Alarm Time (hr)		0.083			
Required Alarm Capacity (Amp-hr)		0.459			
(1) Expressed in decimals of an hour.					
Total Required Capacity (Amp-hr) = 4.203					
Optional Safety Factor					20%
Required Battery Capacity (Amp-hr)		5.04		6	