



NORTH CAROLINA D.O.T. PEDESTRIAN FERRY

Electrical Loads Analysis

Prepared for: NCDOT • Raleigh, NC

Ref: 16109-003-300-1

Rev. A

May 9, 2017

PREPARED BY

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REVISIONS

REV	DESCRIPTION	DATE	APPROVED
-	Initial Release	3/3/17	WNA 40918
A	Elimination of paralleling per Addendum 2	5/9/17	WNA 40918

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1 PURPOSE

This report documents the electrical loads analysis for the North Carolina D.O.T. Pedestrian Ferry. The subject vessel is a new design for a 92 ft x 26 ft x 11.5 ft high speed catamaran which will be owned and operated by the North Carolina Department of Transportation (NCDOT).

2 PROCEDURE

An electrical loads analysis was performed for transit summer, transit winter, shore power, and emergency operation conditions. These conditions detail the electrical supply requirements throughout the vessel operating modes. The transit summer day and winter night load conditions determined the load which must be supplied for normal cruising operation with differences mainly in the lighting and heating, ventilation, and air conditioning loads. The shore power load condition considers only loads required for minimal operation while docked with no propulsion power while connected to shore power. It also includes pumps that will only be operational while at the dock, such as the sewage discharge pump. The emergency operating load condition considered the connected load of all emergency loads as well as the factored loads of equipment that will likely continue operation through an emergency condition.

The electrical system shall consist of two 40kW ship service generators. Only one will be used at any given time. The two units shall have the ability to be started, connected to a dead bus, and shut down from the Pilothouse. The electrical system shall include three 24V and one 12V DC systems in addition to the ship service generators.

Motor horsepower values were converted to kW based on data in [1]. Each load was assigned a Duty Factor (DF) for each operational mode. These are based on guidance in References [2], [3], [4], operational requirements, and generally accepted marine practice. Duty Factors are considered to be the proportion of rated load at which the item operates multiplied by the proportion of a typical 24 hour period during which the item operates. Symbolically, $DF = (\text{Operating Power}/\text{Rated Power}) \times (\text{hours of operation per day}/24 \text{ hours})$.

3 CONCLUSIONS

The highest load case considered in this analysis is the transit summer due to high HVAC loads. A single generator is loaded at 89% in this load case. The emergency load case is well within the limits of a single generator at a 69% loading. The shore power condition is within the capacity of the proposed 60A, 208V 3-phase supply. The electrical loads analysis is shown in Appendix A.

4 REFERENCES

- [1] J. W. Carpenter, NFPA-70 National Electric Code, Article 430 - Motors, Motor Circuits, and Controllers, Quincy, MA: NFPA, 2011.
- [2] US Coast Guard, NVIC 2-89, Guide for Electrical Installations on Merchant Vessels and Mobile Offshore Drilling Units, Washington, DC: USCG, 1989.
- [3] US Naval Sea Systems Command (NAVSEA), "Design Data Sheet: Electric Power Load

Analysis (ELPA) for Surface Ships DDS 310-1 Rev. 1," Washington, DC, 9/17/12.

[4] SNAME, T&R Bulletin 3-11, Marine Steam Power Plant Heat Balance Practices, New York, NY: SNAME.

[5] Elliott Bay Design Group, "Electrical One-Line Diagram," 16109-003-320-0, Rev. A, May 9, 2017.

Appendix A

Electrical Loads Analysis

Ckt No.	Description	Connected Load			Demand Load											
		HP	kW	KVA	DF	Summer kW	(KVA)	DF	Winter kW	(KVA)	DF	Shore kW	(KVA)	DF	Emergency kW	(KVA)
3 PH, 4W, 208/120V, 60Hz																
Switchboard																
P201	Panel - P201 Stbd Side Power Panel		36.49	44.80		14.62	18.35		8.20	10.30		6.18	7.47		13.45	16.99
P202	Panel - P202 Port Side Power Panel		46.19	53.28		21.78	26.03		17.32	20.16		8.92	10.51		14.52	17.50

Load Scenario	Connected		Summer		Winter		Shore		Emergency		
	Units	kW	KVA	kW	KVA	kW	KVA	kW	KVA	kW	KVA
Total Load Summary		82.68	98.08	36.40	44.38	25.51	30.45	15.09	17.99	27.97	34.49
Percentage of 40 kW Machine Rating				89%		61%		36%		69%	

Load and Generator Summary

Generator Rating	KW	KVA	KW	KVA
Generator No. 1	40.00	50.00	40.00	50.00
Generator No. 2	40.00	50.00	40.00	50.00
Total Generator Capacity =	80.00	100.00	80.00	100.00

Ckt No.	Description	Connected Load			Demand Load											
		HP	kW	KVA	Summer			Winter			Shore			Emergency		
					DF	kW	(KVA)	DF	kW	(KVA)	DF	kW	(KVA)	DF	kW	(KVA)
3 PH, 4W, 208/120V, 60Hz Distribution																
Panel - P201 Stbd Side Power Panel																
1	Panel - L201 Stbd Side Lighting Panel		9.45	10.81		1.68	1.99		1.68	1.99		3.46	3.87		1.01	1.15
2	SEWAGE DISCHARGE PUMP	2.00	1.91	2.58	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.38	0.52	0.00	0.00	0.00
3	FIRE PUMP	7.50	6.74	8.64	0.10	0.67	0.86	0.00	0.00	0.00	0.00	0.00	0.00	1.00	6.74	8.64
4	STBD ENG RM SUPPLY FAN	5.00	4.49	5.98	1.00	4.49	5.98	1.00	4.49	5.98	0.50	2.24	2.99	1.00	4.49	5.98
5	SPARE															
6	HEAT PUMP #1 STBD PASS DK		4.50	5.63	0.60	2.70	3.38	0.10	0.45	0.56	0.00	0.00	0.00	0.00	0.00	0.00
7	HEAT PUMP #3 STBD PASS DK		4.50	5.63	0.60	2.70	3.38	0.10	0.45	0.56	0.00	0.00	0.00	0.00	0.00	0.00
8	HEAT PUMP #5 STBD PH		2.50	3.13	0.60	1.50	1.88	0.10	0.25	0.31	0.00	0.00	0.00	0.00	0.00	0.00
9	24DC1 BATTERY CHARGER		2.41	2.41		0.88	0.88		0.88	0.88		0.09	0.09		1.21	1.21
10	SPARE															
11	SPARE															
12	SPARE															
13	SPACE															
14	SPACE															
15	SPACE															
16	SPACE															
17	SPACE															
18	SPACE															
Totals			36.49	44.80		14.62	18.35		8.20	10.30		6.18	7.47		13.45	16.99

Ckt No.	Description	Connected Load			Demand Load											
		HP	kW	KVA	Summer			Winter			Shore			Emergency		
					DF	kW	(KVA)	DF	kW	(KVA)	DF	kW	(KVA)	DF	kW	(KVA)
3 PH, 4W, 208/120V, 60Hz Distribution																
Panel - P202 Port Side Power Panel																
1	Panel - L202 Port Side Lighting Panel		9.79	10.96		2.36	2.71		2.16	2.48		3.41	3.77		1.86	2.28
2	Panel - L203 Pilothouse Lighting Panel		12.20	12.98		4.50	4.93		5.99	6.47		2.41	2.71		7.00	7.96
3	SPARE															
4	PORT ENG RM SUPPLY FAN	5.00	4.49	5.98	1.00	4.49	5.98	1.00	4.49	5.98	0.50	2.24	2.99	1.00	4.49	5.98
5	ON DEMAND WATER HEATER		4.10	4.10	0.50	2.05	2.05	0.50	2.05	2.05	0.00	0.00	0.00	0.00	0.00	0.00
6	HEAT PUMP #2 PORT PASS DK		4.50	5.63	0.60	2.70	3.38	0.10	0.45	0.56	0.00	0.00	0.00	0.00	0.00	0.00
7	HEAT PUMP #4 PORT PASS DK		4.50	5.63	0.60	2.70	3.38	0.10	0.45	0.56	0.00	0.00	0.00	0.00	0.00	0.00
8	HEAT PUMP #6 PORT PH		2.50	3.13	0.60	1.50	1.88	0.10	0.25	0.31	0.25	0.63	0.78	0.00	0.00	0.00
9	24DC2 BATTERY CHARGER		2.41	2.41		0.88	0.88		0.88	0.88		0.09	0.09		0.88	0.88
10	ANTIFOULING SYSTEM		0.15	0.19	0.90	0.14	0.17	0.90	0.14	0.17	0.90	0.14	0.17	0.90	0.14	0.17
11	POTABLE WATER PUMP #1	0.75	0.78	1.14	0.60	0.47	0.69	0.60	0.47	0.69	0.00	0.00	0.00	0.20	0.16	0.23
12	POTABLE WATER PUMP #2	0.75	0.78	1.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	SPARE															
14	SPARE															
15	SPACE															
16	SPACE															
17	SPACE															
18	SPACE															
Totals			46.19	53.28		21.78	26.03		17.32	20.16		8.92	10.51		14.52	17.50

Ckt No.	Description	Connected Load			Demand Load											
		HP	kW	KVA	Summer			Winter			Shore			Emergency		
					DF	kW	(KVA)	DF	kW	(KVA)	DF	kW	(KVA)	DF	kW	(KVA)
3 PH, 4W, 208/120V, 60Hz Distribution																
Panel - L201 Stbd Side Lighting Panel																
1	LIGHTS, MN DK STBD		0.30	0.33	0.80	0.24	0.27	0.80	0.24	0.27	0.10	0.03	0.03	1.00	0.30	0.33
2	LIGHTS, ENG RM/JET RM/TANK RM		0.17	0.18	1.00	0.17	0.18	1.00	0.17	0.18	1.00	0.17	0.18	1.00	0.17	0.18
3	RECEPTS, PASS DECK STBD #1		0.23	0.25	0.30	0.07	0.08	0.30	0.07	0.08	0.00	0.00	0.00	0.30	0.07	0.08
4	RECEPTS, PASS DECK STBD #2		0.23	0.25	0.30	0.07	0.08	0.30	0.07	0.08	0.00	0.00	0.00	0.30	0.07	0.08
5	GFCI RECEPTS, ENG RM/JET RM/TANK RM		0.27	0.30	0.10	0.03	0.03	0.10	0.03	0.03	0.10	0.03	0.03	0.10	0.03	0.03
6	GFCI RECEPTS, EXT MN DK		0.18	0.20	0.10	0.02	0.02	0.10	0.02	0.02	0.10	0.02	0.02	0.10	0.02	0.02
7	REFRIGERATOR		0.60	0.75	0.30	0.18	0.23	0.30	0.18	0.23	0.30	0.18	0.23	0.30	0.18	0.23
8	MICROWAVE		1.40	1.75	0.20	0.28	0.35	0.20	0.28	0.35	0.20	0.28	0.35	0.00	0.00	0.00
9	COFFEE MAKER		1.50	1.88	0.30	0.45	0.56	0.30	0.45	0.56	0.30	0.45	0.56	0.00	0.00	0.00
10	GFCI RECEPTS, FOOD SERVICES		0.45	0.50	0.10	0.05	0.05	0.10	0.05	0.05	0.10	0.05	0.05	0.10	0.05	0.05
11	FIRE DAMPER CONTROL		0.03	0.04	0.90	0.03	0.03	0.90	0.03	0.03	0.90	0.03	0.03	1.00	0.03	0.04
12	SPARE															
13	ME3 BATTERY CHARGER		0.45	0.50	0.10	0.05	0.05	0.10	0.05	0.05	0.40	0.18	0.20	0.10	0.05	0.05
14	ME4 BATTERY CHARGER		0.45	0.50	0.10	0.05	0.05	0.10	0.05	0.05	0.40	0.18	0.20	0.10	0.05	0.05
15	ME3 BLOCK HEATER		1.50	1.58	0.00	0.00	0.00	0.00	0.00	0.00	0.60	0.90	0.95	0.00	0.00	0.00
16	ME4 BLOCK HEATER		1.50	1.58	0.00	0.00	0.00	0.00	0.00	0.00	0.60	0.90	0.95	0.00	0.00	0.00
17	STBD GEN BATTERY CHARGER		0.20	0.22	0.10	0.02	0.02	0.10	0.02	0.02	0.40	0.08	0.09	0.10	0.02	0.02
18	SPARE															
19	SPARE															
20	SPACE															
21	SPACE															
22	SPACE															
23	SPACE															
24	SPACE															
25	SPACE															
26	SPACE															
27	SPACE															
28	SPACE															
29	SPACE															
30	SPACE															
Totals			9.45	10.81		1.68	1.99		1.68	1.99	3.46	3.87		1.01	1.15	

Ckt No.	Description	Connected Load			Demand Load											
		HP	kW	KVA	Summer			Winter			Shore			Emergency		
					DF	kW	(KVA)	DF	kW	(KVA)	DF	kW	(KVA)	DF	kW	(KVA)
3 PH, 4W, 208/120V, 60Hz Distribution																
Panel - L202 Port Side Lighting Panel																
1	LIGHTS, MN DK PORT		0.30	0.33	0.80	0.24	0.27	0.80	0.24	0.27	0.10	0.03	0.03	1.00	0.30	0.33
2	LIGHTS, ENG RM/JET RM/TANK RM		0.17	0.18	1.00	0.17	0.18	1.00	0.17	0.18	1.00	0.17	0.18	1.00	0.17	0.18
3	RECEPTS, PASS DECK PORT #1		0.23	0.25	0.30	0.07	0.08	0.30	0.07	0.08	0.00	0.00	0.00	0.30	0.07	0.08
4	RECEPTS, PASS DECK PORT #2		0.23	0.25	0.30	0.07	0.08	0.30	0.07	0.08	0.00	0.00	0.00	0.30	0.07	0.08
5	GFCI RECEPTS, ENG RM/JET RM/TANK RM		0.23	0.25	1.00	0.23	0.25	0.10	0.02	0.03	0.10	0.02	0.03	0.10	0.02	0.03
6	GFCI RECEPTS, EXT MN DK		0.18	0.20	0.10	0.02	0.02	0.10	0.02	0.02	0.10	0.02	0.02	0.10	0.02	0.02
7	HAND DRYER, HEAD		1.20	1.26	0.10	0.12	0.13	0.10	0.12	0.13	0.00	0.00	0.00	0.00	0.00	0.00
8	HAND DRYER, ADA HEAD		1.20	1.26	0.20	0.24	0.25	0.20	0.24	0.25	0.00	0.00	0.00	0.00	0.00	0.00
9	PASSENGER SPACE EXHAUST FAN	1.50	1.47	2.02	0.50	0.74	0.90	0.50	0.74	0.90	0.50	0.74	0.90	0.50	0.74	1.01
10	GFCI RECEPTS, HEADS		0.14	0.15	0.10	0.01	0.02	0.10	0.01	0.02	0.00	0.00	0.00	0.10	0.01	0.02
11	ADA VISUAL MESSAGING SCREEN		0.16	0.20	1.00	0.16	0.20	1.00	0.16	0.20	0.00	0.00	0.00	1.00	0.16	0.20
12	FIRE DETECTION SYSTEM, PORT		0.20	0.22	1.00	0.20	0.22	1.00	0.20	0.22	1.00	0.20	0.22	1.00	0.20	0.22
13	ME1 BATTERY CHARGER		0.45	0.50	0.10	0.05	0.05	0.10	0.05	0.05	0.40	0.18	0.20	0.10	0.05	0.05
14	ME2 BATTERY CHARGER		0.45	0.50	0.10	0.05	0.05	0.10	0.05	0.05	0.40	0.18	0.20	0.10	0.05	0.05
15	ME1 BLOCK HEATER		1.50	1.58	0.00	0.00	0.00	0.00	0.00	0.00	0.60	0.90	0.95	0.00	0.00	0.00
16	ME2 BLOCK HEATER		1.50	1.58	0.00	0.00	0.00	0.00	0.00	0.00	0.60	0.90	0.95	0.00	0.00	0.00
17	PORT GEN BATTERY CHARGER		0.20	0.22	0.10	0.02	0.02	0.10	0.02	0.02	0.40	0.08	0.09	0.10	0.02	0.02
18	SPARE															
19	SPARE															
20	SPARE															
21	SPACE															
22	SPACE															
23	SPACE															
24	SPACE															
25	SPACE															
26	SPACE															
27	SPACE															
28	SPACE															
29	SPACE															
30	SPACE															
Totals			9.79	10.96		2.36	2.71		2.16	2.48	3.41	3.77		1.86	2.28	

Ckt No.	Description	Connected Load			Demand Load											
		HP	kW	KVA	Summer			Winter			Shore			Emergency		
					DF	kW	(KVA)	DF	kW	(KVA)	DF	kW	(KVA)	DF	kW	(KVA)
3 PH, 4W, 208/120V, 60Hz Distribution																
Panel - L203 Pilothouse Lighting Panel																
1	PH HEATED WINDOWS	3.30	3.30		0.00	0.00	0.00	0.10	0.33	0.33	0.00	0.00	0.00	0.00	0.00	0.00
2	SEARCH LIGHT	0.45	0.50		1.00	0.45	0.50	1.00	0.45	0.50	0.00	0.00	0.00	1.00	0.45	0.50
3	LTS PH/UPDK	0.17	0.18		0.30	0.05	0.06	0.30	0.05	0.06	0.10	0.02	0.02	0.70	0.12	0.13
4	FLOOD/DK LIGHT CONTROL CABINET	1.00	1.11		0.00	0.00	0.00	0.20	0.20	0.22	0.10	0.10	0.11	1.00	1.00	1.11
5	FIRE DETECTION PANEL	0.24	0.24		0.10	0.02	0.02	0.10	0.02	0.02	0.90	0.22	0.22	0.30	0.07	0.07
6	RECEPTS, PH	0.27	0.30		0.10	0.03	0.03	0.10	0.03	0.03	0.10	0.03	0.03	0.30	0.08	0.09
7	RECEPTS, PH CONSOLE	0.27	0.30		0.10	0.03	0.03	0.10	0.03	0.03	0.10	0.03	0.03	0.30	0.08	0.09
8	GFCI RECEPTS, UP DK	0.18	0.20		0.10	0.02	0.02	0.10	0.02	0.02	0.10	0.02	0.02	0.00	0.00	0.00
9	WIPERS (3)	0.60	0.75		0.10	0.06	0.08	0.30	0.18	0.23	0.00	0.00	0.00	0.50	0.30	0.38
10	CCTV MONITORS	0.16	0.18		0.90	0.15	0.16	0.90	0.15	0.16	0.90	0.15	0.16	1.00	0.16	0.18
11	ADA VISUAL MESSAGING SYSTEM	0.10	0.11		1.00	0.10	0.11	1.00	0.10	0.11	1.00	0.10	0.11	1.00	0.10	0.11
12	BILGE ALARM AND CONTROL SYSTEM	0.24	0.27		1.00	0.24	0.27	1.00	0.24	0.27	1.00	0.24	0.27	1.00	0.24	0.27
13	24DC3 BATTERY CHARGER	1.70	1.70			1.09	1.09		1.09	1.09		0.28	0.28		1.63	1.63
14	12DC1 BATTERY CHARGER	0.19	0.19			0.09	0.09		0.09	0.09		0.08	0.08		0.18	0.18
15	PA/GA SYSTEM	0.60	0.67		0.70	0.42	0.47	0.70	0.42	0.47	0.10	0.06	0.07	0.70	0.42	0.47
16	CCTV EQUIP RACK WITH UPS	0.60	0.67		1.00	0.60	0.67	1.00	0.60	0.67	1.00	0.60	0.67	1.00	0.60	0.67
17	RADAR 1	0.24	0.27		1.00	0.24	0.27	1.00	0.24	0.27	0.00	0.00	0.00	1.00	0.24	0.27
18	PH DEFROSTER	1.40	1.40		0.30	0.42	0.42	0.90	1.26	1.26	0.00	0.00	0.00	0.60	0.84	1.18
19	MARINE CHARTING SYSTEM	0.24	0.30		1.00	0.24	0.30	1.00	0.24	0.30	1.00	0.24	0.30	1.00	0.24	0.30
20	WIFI SYSTEM WITH UPS	0.25	0.35		1.00	0.25	0.35	1.00	0.25	0.35	1.00	0.25	0.35	1.00	0.25	0.35
21	SPARE															
22	SPARE															
23	SPACE															
24	SPACE															
25	SPACE															
26	SPACE															
27	SPACE															
28	SPACE															
29	SPACE															
30	SPACE															
Totals		12.20	12.98		4.50	4.93		5.99	6.47		2.41	2.71		7.00	7.96	

Ckt No.	Description	Connected Load			Demand Load											
		HP	kW	KVA	Summer			Winter			Shore			Emergency		
					DF	kW	(KVA)	DF	kW	(KVA)	DF	kW	(KVA)	DF	kW	(KVA)
12VDC Distribution																
Panel 12DC1 - Pilothouse																
1	VHF RADIO #1	0.03	0.03		0.40	0.01	0.01	0.40	0.01	0.01	0.10	0.00	0.00	0.90	0.02	0.02
2	VHF RADIO #2	0.03	0.03		0.10	0.00	0.00	0.10	0.00	0.00	0.10	0.00	0.00	0.60	0.02	0.02
3	LOUD HAILER	0.06	0.06		0.10	0.01	0.01	0.10	0.01	0.01	0.10	0.01	0.01	1.00	0.06	0.06
4	DEPTH SOUNDER/WEATHER DISPLAYS	0.02	0.02		0.90	0.02	0.02	0.90	0.02	0.02	0.90	0.02	0.02	1.00	0.02	0.02
5	GPS CHART PLOTTER	0.05	0.05		0.90	0.05	0.05	0.90	0.05	0.05	0.90	0.05	0.05	1.00	0.05	0.05
6	DIGITAL COMPASS	0.01	0.01		0.90	0.01	0.01	0.90	0.01	0.01	0.90	0.01	0.01	1.00	0.01	0.01
7	SPARE															
8	SPARE															
9	SPARE															
10	SPARE															
11	SPACE															
12	SPACE															
13	SPACE															
14	SPACE															
Totals		0.19	0.19		0.09	0.09		0.09	0.09		0.08	0.08		0.18	0.18	

Ckt No.	Description	Connected Load			Demand Load										
		HP	kW	KVA	Summer			Winter			Shore			Emergency	
24VDC Distribution															
Panel 24DC1 - Stbd Jet Rm															
1	ME1/2 CONTROL POWER PRIMARY	0.20	0.20	1.00	0.20	0.20	1.00	0.20	0.20	0.00	0.00	0.00	1.00	0.20	0.20
2	ME3/4 CONTROL POWER SECONDARY	0.20	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	WJ1 CONTROL POWER PRIMARY	0.25	0.25	1.00	0.25	0.25	1.00	0.25	0.25	0.00	0.00	0.00	1.00	0.25	0.25
4	WJ2 CONTROL POWER PRIMARY	0.25	0.25	1.00	0.25	0.25	1.00	0.25	0.25	0.00	0.00	0.00	1.00	0.25	0.25
5	WJ3 CONTROL POWER SECONDARY	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	WJ4 CONTROL POWER SECONDARY	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	BILGE PUMPS, VOID 2S & STBD TANK RM	0.33	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.33	0.33
8	BILGE PUMPS, STBD ENG RM	0.33	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	BILGE PUMP, STBD JET RM	0.17	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	SUPPLY FAN, STBD JET RM	0.18	0.18	1.00	0.18	0.18	1.00	0.18	0.18	0.50	0.09	0.09	1.00	0.18	0.18
11	SPARE														
12	SPACE														
13	SPACE														
14	SPACE														
Totals		2.41	2.41		0.88	0.88		0.88	0.88		0.09	0.09		1.21	1.21

Ckt No.	Description	Connected Load			Demand Load										
		HP	kW	KVA	Summer			Winter			Shore			Emergency	
24VDC Distribution															
Panel 24DC2 - Port Jet Rm															
1	ME1/2 CONTROL POWER SECONDARY	0.20	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	ME3/4 CONTROL POWER PRIMARY	0.20	0.20	1.00	0.20	0.20	1.00	0.20	0.20	0.00	0.00	0.00	1.00	0.20	0.20
3	WJ1 CONTROL POWER SECONDARY	0.25	0.25	1.00	0.25	0.25	1.00	0.25	0.25	0.00	0.00	0.00	1.00	0.25	0.25
4	WJ2 CONTROL POWER SECONDARY	0.25	0.25	1.00	0.25	0.25	1.00	0.25	0.25	0.00	0.00	0.00	1.00	0.25	0.25
5	WJ3 CONTROL POWER PRIMARY	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	WJ4 CONTROL POWER PRIMARY	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	BILGE PUMPS, VOID 2P & PORT TANK RM	0.33	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	BILGE PUMPS, PORT ENG RM	0.33	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	BILGE PUMP, PORT JET RM	0.17	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	SUPPLY FAN, PORT JET RM	0.18	0.18	1.00	0.18	0.18	1.00	0.18	0.18	0.50	0.09	0.09	1.00	0.18	0.18
11	SPARE														
12	SPACE														
13	SPACE														
14	SPACE														
Totals		2.41	2.41		0.88	0.88		0.88	0.88		0.09	0.09		0.88	0.88

Ckt No.	Description	Connected Load			Demand Load										
		HP	kW	KVA	Summer			Winter			Shore			Emergency	
24VDC Distribution															
Panel 24DC3 - Pilothouse															
1	RADAR 2	0.27	0.27	1.00	0.27	0.27	1.00	0.27	0.27	0.00	0.00	0.00	1.00	0.27	0.27
2	INTEGRATED ALARM SYSTEM	0.20	0.20	1.00	0.20	0.20	1.00	0.20	0.20	0.00	0.00	0.00	1.00	0.20	0.20
3	AIS	0.25	0.25	1.00	0.25	0.25	1.00	0.25	0.25	0.00	0.00	0.00	1.00	0.25	0.25
4	NAV LIGHTS AND CONTROL PANEL	0.03	0.03	1.00	0.03	0.03	1.00	0.03	0.03	0.00	0.00	0.00	1.00	0.03	0.03
5	ELECTRIC HORN	0.50	0.50	0.10	0.05	0.05	0.10	0.05	0.05	0.00	0.00	0.00	1.00	0.50	0.50
6	TANK MONITORING SYSTEM	0.10	0.10	0.30	0.03	0.03	0.30	0.03	0.03	0.30	0.03	0.03	0.30	0.03	0.03
7	FOG SIGNAL TIMER	0.10	0.10	0.10	0.01	0.01	0.10	0.01	0.01	0.00	0.00	0.00	1.00	0.10	0.10
8	WATERJET CONTROL AND MONITORING	0.25	0.25	1.00	0.25	0.25	1.00	0.25	0.25	1.00	0.25	0.25	1.00	0.25	0.25
9	SPARE														
10	SPARE														
11	SPACE														
12	SPACE														
13	SPACE														
14	SPACE														
Totals		1.70	1.70		1.09	1.09		1.09	1.09		0.28	0.28		1.63	1.63