ELLIOTT BAY DESIGN GROUP



9/21/2026

LARGE CLASS ENFORCEMENT VESSEL

Weight Estimate

Prepared for: Alaska Wildlife Troopers | Anchorage, AK

Ref: 24065-200-833-0

Rev. -

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General Notes

1. This document is intended to support the contract design stability assessment and provide context for bidders.
2. This document is not intended for regulatory review.

Revisions

Rev	Description	Date	Approved
–	Initial issue	09/21/2026	SKW 55707

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1. Purpose

This report presents the weight estimate for a new large class enforcement vessel to be built for Alaska Wildlife Troopers. This report is not intended for USCG submittal. The weight estimate was developed to determine the vessel lightship weight and centers of gravity (CG) based on the guidelines published in Reference [1] and the suggested weight margins from Reference [2].

2. Vessel Identification

Type:	Large Enforcement Vessel
Owner:	Alaska Wildlife Troopers
Hull Material:	Steel
Superstructure Material:	Aluminum
Length, overall:	96'-3/8"
Length, Design Load Waterline:	91'-7 7/8"
Beam, over guards:	28'-0"
Beam, at max draft:	26'-10"
Depth, at side:	11'-9"
Draft, at DLWL:	7'-9"
Typical Frame Spacing:	24"

3. Procedure

The weight estimate was created using a Microsoft Excel spreadsheet and is based on the contract technical package [3]. The spreadsheet sums the known and calculated structural, equipment, and outfit weights of the vessel in groups using the Ship Work Breakdown System (SWBS). These groups are shown in Table 1.

Table 1: SWBS groups

SWBS No.	Description
100	Hull Structure
200	Propulsion Plant
300	Electric Plant
400	Command & Surveillance
500	Auxiliary Systems
600	Outfit & Furnishings
700	Mission Equipment

For the 100 SWBS group hull structure, the weight and centers of gravity were taken from the 3D Rhino structural model [4]. Per EBDG standards, 3% of the steel weight is assumed for roll and weld allowances. The 200, 300, 500, and 600 SWBS groups were itemized based on known equipment and vessel arrangements. The 400 SWBS group was represented as a single weight item based on a parametric weight assessment of several similar vessels.

All weight items are given a maturity index that matches the level of confidence in the weight or center of the item. Margins are assigned based on the maturity index and the SWBS group the weight item is associated with. The following table shows the applied margins.

Table 2: Maturity index and associated margins

Weight Group	Maturity Index				
	1	2	3	4	5
Hull Structure	15%	8%	5%	2%	0%
Propulsion Plant	15%	9%	6%	2%	0%
Electric Plant	20%	12%	8%	2%	0%
Command & Surveillance	20%	12%	8%	2%	0%
Auxiliary Systems	20%	12%	8%	2%	0%
Outfit & Furnishings	20%	12%	8%	2%	0%

The maturity indices are assigned based on the following rubric:

1. Lowest confidence in estimate value. Used for very early phase estimates, rules of thumb, parametrics, swags, etc.
2. Slightly increased confidence. Used for values based on some degree of design work, early equipment selections, etc.
3. Moderate confidence. Used this for weights derived from contract level design package, vendor weights for selected equipment, etc.
4. High Confidence. Used for weights derived from detail design information (e.g. ShipConstructor outputs for structural weight, pipe spool lengths, etc.).
5. Scale weight of the item at installation.

4. Given and Assumed Parameters

- Weights are in pounds and long tons (2,240lb).
- Origin is the intersection of Frame 0 (positive forward), centerline (positive starboard), and baseline (positive up).
- Normally wet systems include the weight of the entrained fluid.
- Lightship weight includes a vertical center of gravity 5% margin, or roughly 0.55ft.
- A service life margin (SLM) of 15% of the total lightship weight and a 2% increase in VCG is assumed.

5. Conclusions

Below is the calculated vessel lightship weight and centers of gravity, before service life margin.

Weight	170.0	LT
LCG	39.00	ft aft of FR 0 (+ aft)
TCG	0.12	ft off centerline (+ stbd)
VCG	11.61	ft above baseline (+ up)

6. References

[1] Society of Naval Architects and Marine Engineers, "Weight Estimating and Margins Manual," T&R Bulletin 7-08, Alexandria, Virginia, 2022.

[2] NAVSEA, "Margin Management and Procedures for U.S. Navy Small Craft," Report No. 60-196, Norfolk, VA, 1988.

[3] Elliott Bay Design Group, "Specification," 24065-200-832-0, Seattle, WA, 2026.

[4] Elliott Bay Design Group, "Rhino Structural Model," 24065_3D Hull Structure.3dm, 2026.

Appendix A

Weight Estimate

Lightship Weight Summary

Group	Description	Weight lb	Weight LT	Margin lb	Margin LT	Margin %	Weight w/ Margin lb	Weight w/ Margin LT	LCG ft fwd FR 0	TCG ft stbd CL	VCG ft ABL	Weight Fraction	Maturity Index*
100	Hull Structure	211,313	94.3	11,313	5.1	5.4%	222,626	99.4	40.00	0.10	9.91	58.5%	2.9
200	Propulsion Plant	37,337	16.7	3,045	1.4	8.2%	40,382	18.0	40.62	-1.08	8.75	10.6%	2.4
300	Electric Plant	10,180	4.5	1,432	0.6	14.1%	11,612	5.2	36.46	-0.89	8.28	3.0%	2.0
400	Command & Surveillance	1,500	0.7	180	0.1	12.0%	1,680	0.8	33.00	0.00	29.00	0.4%	2.0
500	Auxiliary Systems	48,117	21.5	5,472	2.4	11.4%	53,590	23.9	42.38	1.40	12.09	14.1%	2.3
600	Outfit & Furnishings	45,005	20.1	5,880	2.6	13.1%	50,885	22.7	30.58	0.04	16.84	13.4%	2.0
	Lightship Weight (no margin)	353,452	157.8	-	-	-	-	-	39.00	0.12	11.06	**100%**	2.4
	Weight Estimate Margin	-	-	27,322	12.2	7.7%	-	-	-	-	-	-	-
	VCG Margin: Percent	-	-	-	-	-	-	-	-	-	5%	-	-
	VCG Margin: Value	-	-	-	-	-	-	-	-	-	0.55	-	-
	Lightship Weight w/ Margin	-	-	-	-	-	380,775	170.0	39.00	0.12	11.61	-	-
	Service Life Margin (SLM):												
	Percent	-	-	-	-	15%	-	-	-	-	2%	-	-
	Value	-	-	57,116	25.5	-	-	-	-	-	0.23	-	-
	Total Lightship Weight w/ SLM	-	-	-	-	-	437,891	195.5	39.00	0.12	11.84	-	-

* Maturity index reflects the level of confidence in the estimated weights, rated from 1 to 5 with 5 being the highest level of confidence.

SWBS No.	Hull Structure Description	Qty.	Qty. Unit	Unit Wt. lb	Total Wt. lb	LCG ft fwd FR 0	TCG ft stbd CL	VCG ft ABL	Maturity (1-5)	Margin
100	Estimate for Roll and Weld	-	-	-	6,484	40.00	0.10	9.91	3.0	-
110	Shell & Supporting Structure	-	-	-	88,773	41.52	0.02	6.30	3.0	-
120	Hull Structural Bulkheads	-	-	-	31,580	44.93	0.03	8.05	3.0	-
130	Hull Decks	-	-	-	38,389	42.53	0.18	12.45	2.9	-
140	Hull Platforms & Flats	-	-	-	845	79.67	0.00	9.50	2.0	-
150	Deck House Structure	-	-	-	23,935	22.84	-0.13	22.40	2.9	-
160	Special Structures	-	-	-	0					-
170	Masts, Kingposts, & Service Platforms	-	-	-	321	31.39	0.00	36.47	3.0	-
180	Foundations	-	-	-	20,986	39.59	0.64	8.70	2.1	-
190	Special Purpose Systems	-	-	-	0					-
SWBS Group Subtotal		-	-	-	211,313	40.00	0.10	9.91	2.9	5.4%
Applied Margin		-	-	-	11,313	40.03	0.12	9.93	-	-
SWBS Group Total w/ Margin		-	-	-	222,626	40.00	0.10	9.91	-	-

100	Hull Structure, General									
101.0	Estimate for Roll and Weld	3%		216,142	6,484	40.00	0.10	9.91	3	5%

110	Shell & Supporting Structure									
112.0	Shell Plating									
	Bottom Shell and Bulwark (5/16" PL)	4,463	ft²	12.75	56,903	42.55	0.03	7.31	3	5%
	BT Tunnel	17	ft²	15.30	260	79.86	0.00	2.96	3	5%
	Bottom Stiffeners (5x3x1/4" FLG PL)	422.0	ft²	10.20	4,304	39.51	0.00	4.45	3	5%
	Outboard Bkts (1/4"PL)	34.0	ft²	10.20	347	39.69	0.00	3.90	3	5%
	Bottom Girders (5/16" FLG PL)	187.00	ft²	12.75	2,384	35.00	0.00	3.04	3	5%
	Long'l Gird xsom to Fr 6 (14x3x5/16" FLG PL)	40.88	ft²	12.75	521	4.94	0.00	6.53	3	5%
	Bulwark Structure	364.1	ft²	12.75	4,642	35.61	0.00	2.73	3	5%
	Stringers (5/16"PL)	66.0	ft²	12.75	842	77.40	0.00	8.37	3	5%
	Fwd/skeg Stem Bar	17.0	ft²	51.00	867	57.40	0.00	5.89	3	5%

SWBS No.	Hull Structure Description	Qty.	Qty. Unit	Unit Wt. lb	Total Wt. lb	LCG ft fwd FR 0	TCG ft stbd CL	VCG ft ABL	Maturity (1-5)	Margin
	Skeg Str	80.0	ft²	12.75	1,020	9.00	0.00	1.50	1	15%
	Bilge Keels	104	ft²	10.20	1,061	33.00	0.00	3.50	2	8%
	CVK (30x7/16" web)	181	ft²	17.85	3,231	48.13	0.00	1.40	3	5%
	CVK (6x3/4" FLG)	36	ft²	30.60	1,105	48.11	0.00	2.67	3	5%
	CVK Brackets (1/4" PL)	220.00	ft²	10.20	2,244	52.16	0.00	1.75	3	5%
	CVK xsom to Fr 6 (16x3/8" web)	21	ft²	15.30	322	4.53	0.00	4.71	3	5%
	CVK xsom to Fr 6 (6x1/2" FLG)	8	ft²	20.40	153	4.64	0.00	5.40	3	5%
	CVK xsom to Fr 6 Brackets (1/4" PL)	11	ft²	10.20	117	4.77	0.00	4.71	3	5%
	Stanchions (4" Sch 40 Pipe)	53	ft	10.79	575	32.53	0.54	7.02	2	8%
	Ring Frames (5x1/4" Diaphragm)	432	ft²	10.20	4,406	41.01	0.00	7.96	3	5%
	Ring Frame Stiffeners (3x1/4" FLG)	203	ft²	10.20	2,071	41	0.00	8.06	3	5%
	Transom Verticals (4x3x1/4" L)	43	ft²	10.20	444	-2	0.00	9.30	3	5%
	Clips (4x5/16 FB)	10	ft²	12.75	128	-1	0.00	6.42	3	5%
	Misc Tank Stiff Clips 1/4" PL	81	ft²	10.20	826	47	0.00	8.03	3	5%
120	**Hull Structural Bulkheads**									
	Long'l BHDs (1/4" PL)	953	ft²	10.20	9,718	42.11	0.00	7.28	3	5%
	Collision BHD (5/16" PL)	98	ft²	12.75	1,254	84.00	0.00	12.11	3	5%
	Transverse BHDs (1/4" PL)	1,238	ft²	10.20	12,628	43.59	0.02	7.88	3	5%
	Non-Tight Transverse BHDs (1/4" PL)	312	ft²	10.20	3,182	33.75	0.00	8.31	3	5%
	Breasthook/Forepeak Str (1/4"PL)	101	ft²	10.20	1,030	86.82	0.00	12.47	3	5%
	WT BHD Stiffeners (4x4x1/4" L)	307	ft²	10.20	3,131	42.77	-0.01	7.77	3	5%
	Non-Tight BHD Stiffeners (3x5/16" FB)	50	ft²	12.75	638	36.26	1.14	8.03	3	5%
130	**Hull Decks**									
	Main Deck (5/16" PL)	1,980	ft²	12.75	25,245	36.31	-0.04	12.02	3	5%
	Foc'sle Deck (5/16" PL)	157	ft²	12.75	2,002	84.06	1.34	16.98	3	5%
	Doghouse sides and top (1/4"PL)	128	ft²	10.20	1,306	78.72	3.01	16.44	3	5%

SWBS No.	Hull Structure Description	Qty.	Qty. Unit	Unit Wt. lb	Total Wt. lb	LCG ft fwd FR 0	TCG ft stbd CL	VCG ft ABL	Maturity (1-5)	Margin
	Main Dk Stiffs (5x3x1/4" L and 3x2x1/4L)	431.0	ft²	10.20	4,396	40.82	-0.03	11.86	3	5%
	Foc'sle Deck Stiffeners (4x3x1/4" L)	48.5	ft²	10.20	495	84.40	1.33	16.75	3	5%
	Girders, Under Hs (12x3x1/4" FLG PL)	99.76	ft²	10.20	1,018	24.75	-0.08	11.41	3	5%
	Girders, Under Wk Dk (12x3x5/16" FLG PL)	50.10	ft²	12.75	639	52.46	-0.22	11.41	3	5%
	Main Dk Long'l Girders IWO Stairs (5/16"PL)	42.00	ft²	12.75	536	19.00	1.58	11.44	3	5%
	Wear Deck Supports (1/4"), Stainless	229.01	ft²	10.20	2,336	56.43	0.00	12.43	1	15%
	Misc Deck Edge Bkts (1/4" PL)	41.0	ft²	10.20	418	55.42	0.00	11.17	3	5%
140	**Hull Platforms & Flats**									
	Bow thruster room flat (1/4"PL) + stiffs@20%	83	ft²	10.20	845	79.67	0.00	9.50	2	8%
150	**Deck House Structure**									
	House Front (5/16" PL AL)	374	ft²	4.41	1,649	37.97	0.00	20.85	3	5%
	House Sides, Ends (1/4" PL AL)	1,174	ft²	3.53	4,142	18.62	-0.38	20.52	3	5%
	Upper Decks (1/4" PL AL)	1,774	ft²	3.53	6,259	20.46	0.11	24.73	3	5%
	Internal Bulkheads (1/4" PL AL)	832	ft²	3.53	2,935	24.22	-0.20	20.08	3	5%
	Coaming (1/4" PL AL)	444	ft²	3.53	1,566	25.03	0.04	26.34	3	5%
	Coaming Stiffeners	0.2	ft²	1,565.62	235	17.37	0.03	21.45	2	8%
	Bridge Top Coaming Brackets	49	ft²	3.53	174	37.20	0.00	32.19	2	8%
	Upper Xverse/Long'l Girders (12x3x1/4" L, AL)	115	ft²	3.53	406	19.19	-0.19	19.74	3	5%
	Upper Top Long'l Girders (12x3x1/4" L, AL)	64	ft²	3.53	226	14.14	0.00	27.65	3	5%
	Bridge Top Long'l Girders (11x3x1/4" L, AL)	31	ft²	3.53	111	33.40	0.00	31.19	3	5%
	Mast Supports (6x4x3/8" L, AL)	10	ft²	5.29	53	31.26	0.00	31.43	3	5%
	Front End Stiffeners (6x4x3/8" L, AL)	107	ft	5.12	548	38.07	0.00	16.20	2	8%
	Front End Stiffeners, Abv Main (3x2x1/4" L, AL)	52	ft	1.40	73	38.37	-0.08	25.40	2	8%
	Side Stiffeners (4x3x1/4" L, AL)	355	ft	1.99	707	21.10	-0.66	15.97	2	8%
	Side Stiffeners, Abv Upper (3x2x1/4" L, AL)	410	ft	1.40	574	21.98	-0.29	24.68	2	8%

SWBS No.	Hull Structure Description	Qty.	Qty. Unit	Unit Wt. lb	Total Wt. lb	LCG ft fwd FR 0	TCG ft stbd CL	VCG ft ABL	Maturity (1-5)	Margin
	Aft End Stiffeners (3x2x1/4" L, AL)	144	ft	1.40	202	6.00	-0.08	20.00	3	5%
	Side Window Headers, Abv (3x3/8" FB, AL)	61	ft	1.32	81	18.69	3.20	24.14	3	5%
	Side Window Headers, Blw (3x2x1/4" L, AL)	50	ft	1.40	71	20.59	2.84	19.95	3	5%
	End Window Headers, Abv (3x3/8" FB, AL)	34	ft	1.32	46	38.33	-1.14	30.67	3	5%
	End Window Headers, Blw (3x2x1/4" L, AL)	27	ft	1.40	38	37.67	0.00	26.80	3	5%
	Side Door Headers, Abv (3x2x1/4" L, AL)	4	ft	1.40	6	25.00	10.17	18.65	3	5%
	PH Front Mullions (6x2x1/4 Sq Tube, AL)	71	ft	4.41	312	38	0	16	3	5%
	PH Front Horiz Girder (14x4x5/16 Sq Tube, AL)	27	ft²	4.41	119	37	0	24	3	5%
	Upper Deck Stiffeners (3x2x1/4" L, AL)	839	ft	1.40	1,171	18.26	0.13	20.21	3	5%
	Upper Deck Top Stiffeners (3x2x1/4" L, AL)	496	ft	1.40	692	15.20	0.00	28.06	3	5%
	PH Top Stiffeners (3x2x1/4" L, AL)	223	ft	1.40	311	33.14	0.00	31.68	3	5%
	Internal Bulkhead Stiffeners (3x2x1/4" L, AL)	691	ft	1.40	966	24.22	-0.20	20.08	2	8%
	House Stanchions (4" Sch 40 Pipe, AL)	31	ft	3.73	115	-0.62	0.00	16.32	3	5%
	Crane Pedestal	1	qty	150	150	8.00	-9.01	24.21	2	8%
160	**Special Structures**									
170	**Masts, Kingposts, & Service Platforms**									
	Mast	121	ft²	2.65	321	31.39	0.00	36.47	3	5%
180	**Foundations**									
181.0	Swimstep									
182.0	Propulsion Plant Foundations	20%		40,381.81	5,720	40.62	0.00	3.00	2	8%
	Engine Girder 1/2" PL	15		20.40	306	39.39	0.00	3.13	3	5%
	Engine Girder 3/8" PL	106		15.30	1,622	31.39	0.00	3.13	3	5%
	Strut Bkts	28		15.30	428	6.77	0.00	5.55	3	5%
183.0	Electric Plant Foundations	15%		11,612.00	1,742	36.46	-0.89	8.28	2	8%

SWBS No.	Hull Structure Description	Qty.	Qty. Unit	Unit Wt. lb	Total Wt. lb	LCG ft fwd FR 0	TCG ft stbd CL	VCG ft ABL	Maturity (1-5)	Margin
184.0	Command & Surveillance Foundations	30%		1,500.00	450	33.00	0.00	29.00	2	8%
185.0	Auxiliary Systems Foundations	20%		53,589.51	10,718	42.38	1.40	12.09	2	8%

SWBS No.	200 Propulsion Plant Description	Qty.	Qty. Unit	Unit Wt. lb	Total Wt. lb	LCG ft fwd FR 0	TCG ft stbd CL	VCG ft ABL	Maturity (1-5)	Margin
200	Propulsion Plant, General	-	-	-	0					-
220	Energy Generating Systems	-	-	-	0					-
223	Main Propulsion Batteries	-	-	-	640	34.00	0.00	3.50	1.0	-
230	Propulsion Units	-	-	-	11,264	40.50	0.00	4.50	2.0	-
241	Propulsion Reduction Gears	-	-	-	3,175	38.00	0.00	3.50	1.0	-
243	Propulsion Shafting	-	-	-	10,246	49.72	0.00	10.95	2.7	-
251	Combustion Air System				0					
252	Propulsion Control System	-	-	-	0					-
256	Circulating & Cooling Sea Water System	-	-	-	2,708	39.29	-0.39	3.14	2.7	-
259	Uptakes (Inner Casing)	-	-	-	8,634	31.51	-3.95	16.20	3.0	-
261	Fuel Service System	-	-	-	0					-
264	Lube Oil Fill, Transfer, & Purification	-	-	-	670	51.05	-8.69	8.48	2.0	-
290	Special Purpose Systems	-	-	-	0					-
SWBS Group Subtotal		-	-	-	37,337	40.73	-1.10	8.84	2.4	8.2%
Applied Margin		-	-	-	3,045	39.35	-0.87	7.58	-	-
SWBS Group Total w/ Margin		-	-	-	40,382	40.62	-1.08	8.75	-	-
200	**Propulsion Plant, General**									
220	**Energy Generating Systems**									
223	**Main Propulsion Batteries**									
223.0	Main Propulsion Batteries									
	Battery	4	qty	160	640	34.00	0.00	3.50	1	15%
230	**Propulsion Units**									
230.0	Main Engines	2	qty	5,317.00	10,634	40.50	0.00	4.50	2	9%
	Oil, coolant	1		630.00	630	40.50	0.00	4.50	2	9%

SWBS No.	200 Propulsion Plant Description	Qty.	Qty. Unit	Unit Wt. lb	Total Wt. lb	LCG ft fwd FR 0	TCG ft stbd CL	VCG ft ABL	Maturity (1-5)	Margin
241	**Propulsion Reduction Gears**									
241.0	Propulsion Reduction Gears	2	qty	1,587.33	3,175	38.00	0.00	3.50	1	15%
243	**Propulsion Shafting**									
	4" Line Shaft	2	qty	485.50	971	391.02	0.00	3.15	3	6%
	5" Tail Shaft	2	qty	1,611.60	3,223	14.75	0.00	28.52	3	6%
	Craft Roller Bearing S1 BCH 400	2	qty	83.60	167	32.63	0.00	3.15	3	6%
	Coupling	4	qty	100.00	400	27.74	0.00	3.08	3	6%
	Bulkhead Seal	2	qty	50.00	100	26.06	0.00	3.04	3	6%
	Craft Roller Bearing S1 BCH 500	2	qty	175.90	352	25.29	0.00	3.03	3	6%
	Ecology Box	2	qty	100.00	200	23.13	0.00	2.31	3	6%
	Stern Tube	13	ft	96.12	1,280	18.34	0.00	2.92	3	6%
	Duramax 1788 MP Stuffing Box	2	qty	60.00	120	22.44	0.00	2.98	3	6%
	Stern Tube Bearing - Duramax Cutlass Code Earth	2	qty	76.00	152	15.72	0.00	2.86	3	6%
	Strut Bearing - Duramax Cutlass Code Earth	2	qty	76.00	152	62.75	0.00	2.69	3	6%
	Strut	0.8	ft^3	490.00	409	5.80	0.00	3.42	3	6%
245	**Propulsors**									
245.0	Propulsors									
	Propellers	2	qty	1,200.00	2,400	3.33	0.00	2.67	2	9%
	Nuts	4	qty	30.00	120	3.00	0.00	2.67	2	9%
	Rope Guard	4	qty	50.00	200	3.33	0.00	2.67	2	9%
251	**Combustion Air System**									
252	**Propulsion Control System**									
252.0	Propulsion Control System									
256	**Circulating & Cooling Sea Water System**									
256.0	Fernstrum Grid Cooler - D1057U	2	qty	103.00	206	37.89	0.00	0.91	3	6%

SWBS No.	200 Propulsion Plant Description	Qty.	Qty. Unit	Unit Wt. lb	Total Wt. lb	LCG ft fwd FR 0	TCG ft stbd CL	VCG ft ABL	Maturity (1-5)	Margin
	Fernstrum Grid Cooler - D1057U - Entrained Water	6	gal	8.30	52	37.89	0.00	0.91	3	6%
	Head Tank	15	gal	8.30	125	46.00	0.00	10.00	2	9%
	Fernstrum D851	2	qty	79.00	158	42.60	0.00	0.87	3	6%
	Fernstrum D851-Z - Entrained Water	5	gal	8.30	41	42.60	0.00	0.87	3	6%
	Head Tank	15	gal	8.30	125	42.00	0.00	10.00	2	9%
	Fernstrum CN1051U-Z	2	qty	69.00	138	40.73	0.00	0.93	3	6%
	Fernstrum CN1051U-Z - Entrained Water	4	gal	8.30	31	40.73	0.00	0.93	3	6%
	Head Tank	5	gal	8.30	42	38.00	0.00	10.00	2	9%
	Guard Plates - 3/8" PL	43	ft²	15.30	654	40.71	0.00	0.74	3	6%
	2 1/2" Pipe To/From Generator	119	ft	5.79	690	41.61	-1.54	3.72	3	6%
	Joints/Valves/Fittings	25%		689.98	172	26.39	0.00	2.55	2	9%
	Entrained Water in Piping	21	gal	8.30	172	26.39	0.00	2.55	2	9%
	Vents - 1/2	80	ft	0.85	68	41.92	0.00	10.83	2	9%
	Shunt Tank Piping - 1/2"	40	ft	0.85	34	41.92	0.00	10.83	2	9%
259	**Uptakes (Inner Casing)**									
259.0	Uptakes (Inner Casing)									
	8" Pipe, CS, Sch 20	56.1	ft	22.36	1,254	29.58	-5.83	18.83	3	6%
	8" Pipe, Fittings	1.0	lump	626.7	627	29.58	-5.83	18.83	3	6%
	8" Expansion Joint	7.0	ea	50.0	350	29.58	-5.83	18.83	3	6%
	4" Pipe, CS, Sch 40	63.8	ft	10.79	688	31.53	-6.65	17.81	3	6%
	4" Pipe, Fittings	1.0	lump	238.75	239	31.53	-6.65	17.81	3	6%
	4" Expansion Joint	7.0	ea	30.00	210	31.53	-6.65	17.81	3	6%
	Insulation	738.8	sq ft	5.00	3,694	31.62	-4.64	14.93	3	6%
	Engine Silencer	2.0	ea	265.00	530	35.83	-0.28	9.86	3	6%
	Generator Silencer	2.0	ea	45.00	90	32.71	-3.05	10.26	3	6%
	8" Pipe, SS	6.4	ft	22.36	143	28.50	-9.10	33.33	3	6%
	4" Pipe, SS	6.3	ft	10.79	68	28.31	-9.12	33.29	3	6%
	ER Ventilation									
259.1	Supply Fan	2.0	qty	60.00	120	29.99	8.82	13.29	3	6%

SWBS No.	200 Propulsion Plant Description	Qty.	Qty. Unit	Unit Wt. lb	Total Wt. lb	LCG ft fwd FR 0	TCG ft stbd CL	VCG ft ABL	Maturity (1-5)	Margin
	Adjustable Speed Drive	2.0	qty	5.00	10	29.99	8.82	13.29	3	6%
	Supply Damper	2.0	qty	33.00	66	29.92	8.81	12.17	3	6%
	Moisture Eliminator	1.0	qty	90.00	90	30.00	10.17	20.29	3	6%
	Discharge Fire Damper	1.0	qty	40.00	40	27.00	-10.17	18.79	3	6%
	Ducting	160.2	ft²	2.60	416	38.13	8.83	10.10	3	6%
261	**Fuel Service System**									
	Covered in 540 section to match drawing number									
264	**Lube Oil Fill, Transfer, & Purification**									
	Lube Oil Tank	1	qty	150.00	100	53.00	-7.42	10.17	2	9%
	Lube Oil Fill Hose & Hose Reel	1	qty	95.00	95	50.71	-8.92	10.34	2	9%
	Lube Oil Piping & Valves	1	lump	100.00	100	50.71	-8.92	10.34	2	9%
	Lube Oil Pump	1	qty	90.10	90	50.71	-8.92	10.34	2	9%
	Waste Oil Hose & Hose Reel	1	qty	95.00	95	50.70	-8.92	6.03	2	9%
	Waste Oil Piping & Valves	1	lump	100.00	100	50.70	-8.92	6.03	2	9%
	Waste Oil Pump	1	qty	90.10	90	50.70	-8.92	6.03	2	9%
290	**Special Purpose Systems**									

SWBS No.	300 Electric Plant Description	Qty.	Qty. Unit	Unit Wt. lb	Total Wt. lb	LCG ft fwd FR 0	TCG ft stbd CL	VCG ft ABL	Maturity (1-5)	Margin
300	Electric Plant, General	-	-	-	2,000	30.00	0.00	8.50	1.0	-
302	Motors & Controllers	-	-	-	0					-
310	Electric Power Generation	-	-	-	5,000	40.37	-2.05	4.96	3.0	-
320	Power Distribution Systems	-	-	-	2,130	29.43	0.52	14.15	1.0	-
324	Switchgear & Panels	-	-	-	650	44.51	0.00	8.85	1.2	-
325	Propulsion Switchboards	-	-	-	0					-
330	Lighting System	-	-	-	250	54.17	0.00	17.00	1.0	-
340	Power Generation Support Systems	-	-	-	150	42.00	-3.00	5.00	1.0	-
390	Special Purpose Systems	-	-	-	0					-
SWBS Group Subtotal		-	-	-	10,180	36.67	-0.94	8.12	2.0	14.1%
Applied Margin		-	-	-	1,432	34.99	-0.50	9.37	-	-
SWBS Group Total w/ Margin		-	-	-	11,612	36.46	-0.89	8.28	-	-

300	**Electric Plant, General**									
300.0	Electric Plant, General	1	lump	2,000.00	2,000	30.00	0.00	8.50	1	20%
302	**Motors & Controllers**									
310	**Electric Power Generation**									
311.0	Ship Service Power Generation									
	Northern Lights 99kW	2	qty	2,400.00	4,800	40.42	-2.00	5.00	3	8%
313.0	Batteries & Service Facilities	2	qty	100.00	200	39.33	-3.17	4.00	2	12%
320	**Power Distribution Systems**									
321.0	Ship Service Power Cable	1	qty	1,600.00	1,600	33.33	0.00	17.00	1	20%
	Isolation Transformer	1	qty	500.00	500	18.33	2.00	5.00	1	20%
	Shore Power Connection Box	1	qty	30.00	30	6.00	3.50	15.00	1	20%

SWBS No.	300 Electric Plant Description	Qty.	Qty. Unit	Unit Wt. lb	Total Wt. lb	LCG ft fwd FR 0	TCG ft stbd CL	VCG ft ABL	Maturity (1-5)	Margin
324	**Switchgear & Panels**									
324.0	Switchgear & Panels									
	Main Switchboard	1	qty	500.00	500	41.67	0.00	7.00	1	20%
	Panels	1	qty	150.00	150	54.00	0.00	15.00	2	12%
325	**Propulsion Switchboards**									
330	**Lighting System**									
332.0	Lighting Fixtures	1	lump	250.00	250	54.17	0.00	17.00	1	20%
340	**Power Generation Support Systems**									
342.0	Diesel Support Systems	1	lump	150.00	150	42.00	-3.00	5.00	1	20%
390	**Special Purpose Systems**									

SWBS No.	400 Command & Surveillance Description	Qty.	Qty. Unit	Unit Wt. lb	Total Wt. lb	LCG ft fwd FR 0	TCG ft stbd CL	VCG ft ABL	Maturity (1-5)	Margin
400	Command & Surveillance, General	-	-	-	1,500	33.00	0.00	29.00	2.0	-
410	Command & Control Systems	-	-	-	0					-
420	Navigation Systems	-	-	-	0					-
430	Interior Communications	-	-	-	0					-
440	Exterior Communications	-	-	-	0					-
450	Surveillance Systems, Surface & Air	-	-	-	0					-
460	Surveillance Systems (Underwater)	-	-	-	0					-
470	Countermeasure Systems	-	-	-	0					-
480	Fire Control Systems	-	-	-	0					-
490	Special Purpose Systems	-	-	-	0					-
SWBS Group Subtotal		-	-	-	1,500	33.00	0.00	29.00	2.0	12.0%
Applied Margin		-	-	-	180	33.00	0.00	29.00	-	-
SWBS Group Total w/ Margin		-	-	-	1,680	33.00	0.00	29.00	-	-

400	Command & Surveillance, General									
401.0	Command & Surveillance, General	1	lump	1,500.00	1,500	33.00	0.00	29.00	2	12%

SWBS No.	500 Auxiliary Systems Description	Qty.	Qty. Unit	Unit Wt. lb	Total Wt. lb	LCG ft fwd FR 0	TCG ft stbd CL	VCG ft ABL	Maturity (1-5)	Margin
500	Auxiliary Systems, General	-	-	-	0					-
506	Vents, Fills, and Sounds	-	-	-	1,248	38.65	0.03	10.59	3.0	-
513	Machinery Space Ventilation System	-	-	-	800	40.00	0.00	13.00	1.0	-
514	HVAC Systems	-	-	-	2,695	29.17	3.05	15.10	1.5	-
521	Firemain & Flushing (Sea Water) System	-	-	-	1,914	48.26	-1.36	9.79	3.0	-
526	Scuppers & Deck Drains	-	-	-	744	20.30	-0.66	21.44	2.0	-
528	Black and Gray water Drains	-	-	-	594	13.05	-2.69	8.15	2.7	-
529	Bilge & Ballast Systems	-	-	-	1,970	35.85	-1.67	3.20	3.0	-
533	Potable Water	-	-	-	1,192	48.90	4.27	7.04	3.0	-
540	Fuels & Lubricants, Handling & Storage	-	-	-	1,545	37.87	-5.12	4.51	3.0	-
551	Compressed Air Systems	-	-	-	385	16.44	1.56	7.71	1.0	-
555	Fire Extinguishing System	-	-	-	1,350	24.88	4.83	5.50	2.0	-
556	Hydraulic Fluid System	-	-	-	2,131	70.00	3.51	6.73	1.5	-
561	Steering Control Systems	-	-	-	800	0.00	0.00	8.00	1.0	-
568	Maneuvering Systems (thrusters)	-	-	-	9,805	4.94	0.00	5.38	1.9	-
580	Mechanical Handling Systems	-	-	-	13,196	58.76	2.39	18.66	2.9	-
581	Anchor Handling & Stowage System	-	-	-	4,988	84.84	1.68	17.81	2.0	-
582	Mooring & Towing Systems	-	-	-	1,180	38.95	0.00	12.50	2.0	-
583	Lifesaving and Safety Equipment	-	-	-	0					-
590	Special Purpose Systems	-	-	-	1,580	64.31	9.43	15.44	1.4	-
SWBS Group Subtotal		-	-	-	48,117	42.50	1.39	12.13	2.3	11.4%
Applied Margin		-	-	-	5,472	41.27	1.44	11.73	-	-
SWBS Group Total w/ Margin		-	-	-	53,590	42.38	1.40	12.09	-	-

500	Auxiliary Systems, General									
501.0	Auxiliary Systems, General	0	qty	3,882.79		44.00	0.00	12.50	1	20%

506	Vents, Fills, and Sounds

SWBS No.	500 Auxiliary Systems Description	Qty.	Qty. Unit	Unit Wt. lb	Total Wt. lb	LCG ft fwd FR 0	TCG ft stbd CL	VCG ft ABL	Maturity (1-5)	Margin
	BW Tank Vent									
	3" CS Pipe (hull)	12.1	ft	7.58	92	9.02	5.89	10.95	3	8%
	Joints/Fittings/Valves	0.25	%	91.88	23	9.02	5.89	10.95	3	8%
	3" CPVC	16	ft	2.12	34	6.49	8.40	20.03	3	8%
	3" CPVC Fittings	0.15	%	34.20	5	6.49	8.40	20.03	3	8%
	3" Carbon Steel (top)	3.68	ft	7.58	28	6.37	8.40	29.87	3	8%
	3" CS Fitting (top)	0.15	%	27.88	4	6.37	8.40	29.87	3	8%
	Inverted Vent Check	1	qty	15.00	15	5.74	8.40	-30.60	3	8%
	BW Tank Discharge									
	1 1/2" CS Pipe	20	ft	2.72	54	10.89	-8.56	9.39	3	8%
	1 1/2" CS Fittings/Valves	25%	%	53.88	13	10.89	-8.56	9.39	2	12%
	Sea Chest Vent									
	2" Cu-Ni Pipe	35	ft	2.60	91	26.52	0.00	11.46	3	8%
	2" Cu-Ni Fittings	0.15	%	91.00	14	26.52	0.00	11.46	3	8%
	2" CS Pipe	8	ft	3.65	27	26.52	0.00	13.26	3	8%
	2" CS Fittings	0.15	%	27.38	4	26.52	0.00	13.26	3	8%
	Fuel									
	Day Tank Vent - 2 1/2" CS Pipe	5	ft	5.79	29	29.53	0.00	13.29	3	8%
	Day Tank Vent - Fittings	0.15	%	28.95	4	29.53	0.00	13.29	3	8%
	Day Tank Vent - Inverted Vent Check	2	qty	10.00	20	29.53	0.00	13.29	3	8%
	Day Tank Sounding Tube - 1 1/2" CS Pipe	18	ft	2.72	50	29.33	0.00	7.39	3	8%
	Day Tank Sounding Tube - Flush Cap	2	qty	3.50	7	29.33	0.00	7.39	3	8%
	Aft Storage Tank Fill - 2" CS Pipe	20	ft	3.65	73	36.85	0.00	8.93	3	8%
	Aft Storage Tank Fill - 2" CS Fittings	0.15	%	73.00	11	36.85	0.00	8.93	3	8%
	Aft Storage Tank Vent - 2 1/2" CS Pipe	5	ft	5.79	29	36.09	0.00	13.37	3	8%
	Aft Storage Tank Vent - Fitting	0.15	%	28.95	4	36.09	0.00	13.37	3	8%
	Aft Storage Tank Vent - Inverted Vent Check	2	qty	10.00	20	36.09	0.00	13.37	3	8%
	Aft Storage Tank Sounding Tube - 1 1/2" CS Pipe	18	ft	2.72	50	36.73	0.00	7.39	3	8%
	Aft Storage Tank Sounding Tube - Flush Cap	2	qty	3.50	7	36.73	0.00	7.39	3	8%
	Fwd Storage Tank Fill - 2" CS Pipe	20	ft	3.65	74	67.17	0.00	9.23	3	8%
	Fwd Storage Tank Fill - 2" CS Fittings	0.15	%	74.22	11	67.17	0.00	9.23	3	8%

SWBS No.	500 Auxiliary Systems Description	Qty.	Qty. Unit	Unit Wt. lb	Total Wt. lb	LCG ft fwd FR 0	TCG ft stbd CL	VCG ft ABL	Maturity (1-5)	Margin
	Fwd Storage Tank Vent - 2 1/2" CS Pipe	5	ft	5.79	29	67.56	0.00	13.37	3	8%
	Fwd Storage Tank Vent - Fittings	0.15	%	28.95	4	67.56	0.00	13.37	3	8%
	Fwd Storage Tank Vent - Inverted Vent Check	2	qty	10.00	20	67.56	0.00	13.37	3	8%
	Fwd Storage Tank Sounding Tube - 1 1/2" CS Pipe	18	ft	2.72	48	59.04	0.00	7.60	3	8%
	Fwd Storage Tank Sounding Tube - Flush Cap	2	qty	3.50	7	59.04	0.00	7.60	3	8%
	Oil									
	Lube Oil Fill - 1 1/2" CS Pipe	9	ft	2.72	25	53.38	-10.58	11.18	3	8%
	Lube Oil Fill - 1 1/2" CS Fittings	0.15	%	24.93	4	53.38	-10.58	11.18	3	8%
	Lube Oil Souding Tube - 1 1/2" CS Pipe	4	ft	2.72	10	53.58	-8.52	10.18	3	8%
	Lube Oil Sounding Tube - Flush Cap	1	qty	3.50	4	53.58	-8.52	10.18	3	8%
	Lube Oil Vent - Elbow	1	qty	0.90	1	53.32	-5.72	11.52	3	8%
	Lube Oil Vent - Vent Head	1	qty	2.87	3	53.32	-5.72	11.52	3	8%
	Waste Oil Discharge - 1" CS Pipe	14	ft	1.68	24	52.17	-10.16	9.24	3	8%
	Waste Oil Discharge - Fittings	0.15	%	23.80	4	52.17	-10.16	9.24	3	8%
	Waste Oil Sounding Tube	4	ft	2.72	11	52.33	-8.60	4.71	3	8%
	Waste Oil Sounding Tube - Cap	1	qty	0.54	1	52.33	-8.60	4.71	3	8%
	Waste Oil Vent - 1 1/2" CS Pipe	5	ft	2.72	14	53.80	-5.72	9.77	3	8%
	Waste Oil Vent Fittings	0.15	%	13.60	2	53.80	-5.72	9.77	3	8%
	Waste Oil Vent Head	1	qty	2.87	3	53.80	-5.72	9.77	3	8%
	Hydraulic Oil Sounding Tube	4	ft	2.72	11	69.00	4.67	6.00	3	8%
	Hydraulic Oil Sounding Tube - Cap	1	qty	0.54	1	69.00	4.67	6.00	2	12%
	Hydraulic Oil Vent - 1 1/2" CS Pipe	5	ft	2.72	14	69.00	4.67	6.00	2	12%
	Hydraulic Oil Vent Fittings	0.15	%	13.60	2	69.00	4.67	6.00	2	12%
	Hydraulic Oil Vent Head	1	qty	2.87	3	69.00	4.67	6.00	2	12%
	Fresh Water									
	Fresh Water Fill - 1 1/2" CS Pipe	34	ft	2.72	92	55.49	0.00	10.54	3	8%
	Fresh Water Fill - Fittings	0.15	%	92.34	14	55.49	0.00	10.54	3	8%
	Fresh Water Vent - 1 1/2" Pipe	31	ft	2.72	83	56.16	0.00	11.35	3	8%
	Fresh Water Vent - Fitting	0.15	%	83.07	12	56.16	0.00	11.35	3	8%
	Fresh Water Vent - Inverted Vent Check	2	qty	5.00	10	56.16	0.00	11.35	3	8%

SWBS No.	500 Auxiliary Systems Description	Qty.	Qty. Unit	Unit Wt. lb	Total Wt. lb	LCG ft fwd FR 0	TCG ft stbd CL	VCG ft ABL	Maturity (1-5)	Margin
513	**Machinery Space Ventilation System**									
	Void vent fan, intake, gooseneck/ball check	4	qty	200.00	800	40.00	0.00	13.00	1	20%
514	**HVAC Systems**									
	Olympia 105	1	qty	245.00	245	24.00	7.98	4.50	2	12%
	Carrier Air handler unit	1	qty	243.00	243	32.00	5.00	22.00	2	12%
	Superstructure Estimated Ducting	1	qty	300.00	300	26.00	1.00	19.00	2	12%
	Hydronic piping and pumps	1	qty	200.00	200	24.00	7.98	6.50	1	20%
	Void and ER hydronic unit heaters and tubing	6	qty	70.00	420	45.00	0.00	10.66	2	12%
	Mud room hydronic unit heater and piping	1	qty	70.00	70	13.00	-4.00	18.50	2	12%
	Main deck electric heaters	4	qty	20.00	80	22.00	0.00	14.67	2	12%
	Upper deck electric heaters	6	qty	20.00	120	22.00	0.00	22.83	2	12%
	Condenser for air handler and tubing	1	qty	150.00	150	26.00	-8.00	35.00	1	20%
	Hydronic heater exhaust stack and hull pen.	1	qty	200.00	200	24.00	13.00	11.17	1	20%
	Entrained Water	80	gal	8.34	667	29.17	3.05	15.10	1	20%
521	**Firemain & Flushing (Sea Water) System**									
	Fire pump	1	qty	229.00	229	53.20	-3.92	8.31	3	8%
	Fire Monitor Pump	1	qty	599.00	599	53.18	-3.58	5.47	3	8%
	Fire monitor	1	qty	16.00	16	88.95	3.17	20.81	3	8%
	Nozzle for fire monitor	1	qty	7.25	7	88.95	3.17	20.81	3	8%
	2 1/2" CuNi Fire Monitor Pipe	50	ft	3.00	150	78.65	-2.58	11.19	3	8%
	Joints/ Valves/Fittings	25%		150.00	38	78.65	-2.58	11.19	3	8%
	Fire station #3	1	qty	83.52	84	77.53	6.05	14.22	3	8%
	1 -1/2" CuNi to FS 3	36	ft	1.76	64	71.61	-3.20	10.86	3	8%
	Joints/ Valves/Fittings	25%		63.76	16	71.61	-3.20	10.86	3	8%
	Fire station #1	1	qty	76.9	77	53.49	2.17	6.31	3	8%
	1 1/2" CuNi to FS 1	10	ft	1.76	18	53.49	0.78	9.67	3	8%

SWBS No.	500 Auxiliary Systems Description	Qty.	Qty. Unit	Unit Wt. lb	Total Wt. lb	LCG ft fwd FR 0	TCG ft stbd CL	VCG ft ABL	Maturity (1-5)	Margin
	Joints/ Valves/Fittings	25%		18.20	5	53.49	0.78	9.67	3	8%
	Fire station #4	1	qty	83.52	84	37.346	-9.192583	14.28083	3	8%
	2 1/2" CuNi to FS 4	21	ft	3.00	62	48.76	7.70	10.86	3	8%
	Joints/ Valves/Fittings	25%		61.56	15	48.76	7.70	10.86	3	8%
	1 1/2" CuNi to FS 4	6	ft	1.76	10	37.34	9.19	11.04	3	8%
	Joints/ Valves/Fittings	25%		9.94	2	37.34	9.19	11.04	3	8%
	Fire Station #2	1	qty	76.9	77	28	2.7	7.5	3	8%
	2 1/2" CuNi to FS 2	13	ft	3.00	39	31.92	7.70	10.86	3	8%
	Joints/ Valves/Fittings	25%		39.49	10	31.92	7.70	10.86	3	8%
	1 1/2" CuNi to FS 2	8	ft	1.76	13	25.33	5.25	9.50	3	8%
	Joints/ Valves/Fittings	25%		13.39	3	25.33	5.25	9.50	3	8%
	Fire Station #5	1	qty	83.52	84	5.67475	-2.285833	15.28083	3	8%
	2" CuNi to FS 5	35	ft	2.60	90	13.03	2.89	11.10	3	8%
	Joints/ Valves/Fittings	25%		90.21	23	13.03	2.89	11.10	3	8%
	1 1/2" CuNi to FS 5	1	ft	1.76	2	5.67	-2.81	15.28	3	8%
	Joints/ Valves/Fittings	25%		1.84	0	5.67	-2.81	15.28	3	8%
	Fire Station #6	1	qty	83.52	84	5.67475	-3.331667	23.275	3	8%
	1 1/2" CuNi to FS 6	8	ft	1.76	14	5.675	-3.331667	19.28083	3	8%
526	**Scuppers & Deck Drains**									
	Deck Drain Scuppers	14	qty	10.00	140	20.30	-0.66	21.44	2	12%
	Piping - 2" Galv CS	165	ft	3.65	604	20.30	-0.66	21.44	2	12%
528	**Black and Gray water Drains**									
	2" CS Pipe	10	ft	3.65	37	19.63	-0.73	12.91	3	8%
	Joints/Valves Fittings	25%		36.50	9	19.63	-0.73	12.91	3	8%
	Sink Connections	3	qty	4.28	13	19.63	-0.73	12.91	3	8%
	Toilet Connections	2	qty	5.78	12	19.63	-0.73	12.91	3	8%
	Shower Connections	2	qty	3.90	8	19.63	-0.73	12.91	3	8%
	Washing Machine	1	qty	3.90	4	19.63	-0.73	12.91	3	8%
	2" CPVC Pipe	35	ft	0.78	28	19.63	-0.73	12.91	3	8%

SWBS No.	500 Auxiliary Systems Description	Qty.	Qty. Unit	Unit Wt. lb	Total Wt. lb	LCG ft fwd FR 0	TCG ft stbd CL	VCG ft ABL	Maturity (1-5)	Margin
	Joints/Valves Fittings	25%		4.28	1	19.63	-0.73	12.91	3	8%
	3" CPVC Pipe	42	ft	1.54	64	19.63	-0.73	12.91	3	8%
	Joints/Valves Fittings	25%		4.28	1	19.63	-0.73	12.91	3	8%
	Sewage Discharge Pump	1	qty	45.00	45	11.35	-6.44	5.58	3	8%
	1/4" Stainless Steel Drip Tray	18	ft²	10.20	184	11.35	-6.44	5.58	2	12%
	Black Water Tank	1	qty	190.00	190	9.02	0.00	6.84	3	8%
529	**Bilge & Ballast Systems**									
	Bilge Pump	2	qty	60.00	120	27.21	-7.48	5.53	3	8%
	Bilge Pump strainer	2	qty	50.71	101	27.21	-7.48	5.53	3	8%
	Bilge manifold	6	ft	7.66	47	27.32	-1.82	5.30	3	8%
	Stop Check Valves	7	ea	12.00	84	27.32	-1.82	5.30	3	8%
	Rose box strainer	7	qty	7.00	49.00	47.24	-2.19	2.51	3	8%
	Swing check valve	2	qty	23.00	46.00	27.32	-1.82	5.30	3	8%
	Gate valve	2	qty	18.00	36.00	27.32	-1.82	5.30	3	8%
	Buttefly Valve	2	qty	12.00	24.00	27.32	-1.82	5.30	3	8%
	Bilge System 2" CS Pipe	205	ft	3.65	747.03	44.27	-1.20	2.61	3	8%
	Joints/Fittings	25%		747.03	186.76	44.27	-1.20	2.61	3	8%
	Independent Bilge Suction	16	ft	3.65	58.40	29.00	-6.00	4.00	3	8%
	Sea Chest									
	12" SCH 80	3.5	ft	88.63	310.21	27.17	0.00	2.20	3	8%
	6" XXS	0.6667	ft	53.16	35.44	27.17	1.00	2.20	3	8%
	1/2" Plate	1.669	ft²	20.40	34.05	27.17	2.00	2.20	3	8%
	3/8" Pl	0.9981	ft²	15.30	15.27	27.17	3.00	2.20	3	8%
	2" Gate Valve	2	qty	38.00	76.00	27.17	3.00	2.20	3	8%
533	**Potable Water**									
	Hot water Heater	1	qty	91.00	91	21.33	8.28	5.62	3	8%
	Hot Water Expansion Tank	1	qty	48.00	48	19.04	8.74	7.40	3	8%

SWBS No.	500 Auxiliary Systems Description	Qty.	Qty. Unit	Unit Wt. lb	Total Wt. lb	LCG ft fwd FR 0	TCG ft stbd CL	VCG ft ABL	Maturity (1-5)	Margin
	Potable Water Pressure Tank	1	qty	227.00	227	52.76	7.86	5.94	3	8%
	Potable Water Pump	2	qty	60.00	120	53.51	4.57	5.63	3	8%
	Watermaker	1	qty	190.00	190	53.17	5.10	7.92	3	8%
	Potable Water Tank	2	qty	190.00	380	59.18	0.00	6.44	3	8%
	1-1/4" Copper pipe, hull (cold)	12	ft	1.04	13	54.37	1.13	5.60	3	8%
	Joints/Valves/Fittings	25%		12.57	3.14	54.37	1.13	5.60	3	8%
	1" Copper pipe, hull (cold)	61	ft	0.84	51	37.82	6.61	9.62	3	8%
	Joints/Valves/Fittings	25%		51.45	12.86	37.82	6.61	9.62	3	8%
	3/4" Copper pipe, hull (hot)	12.5	ft	0.64	8.01	22.60	5.95	10.33	3	8%
	Joints/Valves/Fittings	25%		8.01	2.00	22.60	5.95	10.33	3	8%
	1" Boiler Supply and Return	10.208	ft	0.84	8.54	23.88	8.25	6.05	3	8%
	Joints/Valves/Fittings	25%		8.54	2.14	23.88	8.25	6.05	3	8%
	1" uponor hepex tube (cold)	45	ft	0.30	14	20.42	-0.74	18.73	3	8%
	Joints/Valves/Fittings	25%		13.52	3.38	20.42	-0.74	18.73	3	8%
	3/4" uponor hepex tube (cold)	24	ft	0.22	5	11.25	3.06	19.25	3	8%
	Joints/Valves/Fittings	25%		5.23	1.31	11.25	3.06	19.25	3	8%
	1/2" uponor hepex tube (cold)	38	ft	0.08	3	24.14	1.10	18.95	3	8%
	Joints/Valves/Fittings	25%		3.06	0.77	24.14	1.10	18.95	3	8%
	3/4" uponor hepex tube (hot)	15	ft	0.22	3	22.50	1.76	18.21	3	8%
	Joints/Valves/Fittings	25%		3.24	0.81	22.50	1.76	18.21	3	8%
	1/2" uponor hepex tube (hot)	53	ft	0.08	4	22.59	0.41	19.14	3	8%
540	**Fuels & Lubricants, Handling & Storage**									
	Fuel Oil Transfer Pump	2	qty	94.50	189.00	29.54	-8.75	5.33	3	8%
	2" CS Pipe	175	ft	3.65	640.80	39.10	-5.34	4.58	3	8%
	Joints/Fittings/Valves	25%		640.80	160.20	39.10	-5.34	4.58	3	8%
	1 1/2" CS Pipe	46	ft	2.72	125.57	30.61	-3.10	3.52	3	8%
	Joints/Fittings/Valves	25%		125.57	31.39	30.61	-3.10	3.52	3	8%
	1 1/4" CS Pipe	25	ft	2.27	57.20	36.99	-1.73	3.69	3	8%
	Joints/Fittings/Valves	25%		57.20	14.30	36.99	-1.73	3.69	3	8%

SWBS No.	500 Auxiliary Systems Description	Qty.	Qty. Unit	Unit Wt. lb	Total Wt. lb	LCG ft fwd FR 0	TCG ft stbd CL	VCG ft ABL	Maturity (1-5)	Margin
	1" CS Pipe	22	ft	1.68	37.66	36.77	-1.99	3.59	3	8%
	Joints/Fittings/Valves	25%		37.66	9.42	36.77	-1.99	3.59	3	8%
	3/4" CS Pipe	20	ft	1.13	22.34	36.48	1.26	3.61	3	8%
	Joints/Fittings/Valves	25%		22.34	5.58	36.48	1.26	3.61	3	8%
	1/2" CS Pipe	26	ft	0.85	22.30	37.71	-1.42	4.02	3	8%
	Joints/Fittings/Valves	25%		22.30	5.58	37.71	-1.42	4.02	3	8%
	1/4" Copper	7	ft	0.13	0.94	25.75	9.37	3.49	3	8%
	Joints/Fittings/Valves	25%		0.94	0.24	25.75	9.37	3.49	3	8%
	Fuel Centrifuge	1	qty	222.67	222.67	46.43	-5.75	4.90	3	8%
551	**Compressed Air Systems**									
	Air Compressor	1	qty	300.00	300	16.00	2.00	6.50	1	20%
	Black pipe 1/2"	100	ft	0.85	85	18.00	0.00	12.00	1	20%
555	**Fire Extinguishing System**									
	Fixed gas system for ER and Tool Rm	1		1,350.00	1,350	24.88	4.83	5.50	2	12%
556	**Hydraulic Fluid System**									
	Hydraulic Power Pack	1	qty	1,100.00	1,100	70.00	4.00	6.00	1	20%
	Hydraulic Piping (assumed 1")	120	ft	2.17	260	70.00	0.00	12.00	2	12%
	Hydraulic Oil	100	gal	7.71	771	70.00	4.00	6.00	2	12%
561	**Steering Control Systems**									
	Hyraulic Steering System	2		400.00	800	0.00	0.00	8.00	1	20%
568	**Maneuvering Systems (thrusters)**									
	Rudders	2		4,600.00	9,200	0.00	0.00	5.50	2	12%
	Bow Thruster	1		350.00	350	80.00	0.00	4.00	1	20%
	Bow Thruster Tunnel	17		15.30	255	80.00	0.00	2.83	1	20%
580	**Mechanical Handling Systems**									

SWBS No.	500 Auxiliary Systems Description	Qty.	Qty. Unit	Unit Wt. lb	Total Wt. lb	LCG ft fwd FR 0	TCG ft stbd CL	VCG ft ABL	Maturity (1-5)	Margin
	Skiff Crane	1		3,900.00	3,900	66.00	0.00	21.00	3	8%
	Crane Boom Stowed	1		6,700.00	6,700	56.00	6.00	19.67	3	8%
	Crane Base	102		15.30	1,561	66.00	0.00	8.31	3	8%
	Skiff Cradle	1		650.00	650	55.00	-8.00	12.50	1	20%
	Stores Crane	1		385.00	385	10.57	-9.00	29.83	2	12%
581	**Anchor Handling & Stowage System**									
	Anchor	1	qty	694.45	694	88.00	-1.00	14.50	2	12%
	Windlass	1	qty	3,200.00	3,200	84.00	2.50	18.50	2	12%
	Wire Rope	800	ft	0.72	576	84.00	2.50	18.50	2	12%
	Chain	41	ft	4.06	166	85.00	2.50	18.50	2	12%
	Hawse Pipe	3	ft	65.00	211	88.00	-2.68	15.80	3	8%
	Sheave	1	qty	100.00	100	87.00	-1.50	17.80	2	12%
	Pelican hook	1	qty	40.00	40	87.00	-1.50	17.80	2	12%
582	**Mooring & Towing Systems**									
	Deck Chocks	10		60.00	600	42.00	0.00	12.50	2	12%
	Deck Cleats	10		50.00	500	42.00	0.00	12.50	2	12%
	Towing Bitts Aft	2		40.00	80	-3.00	0.00	12.50	2	12%
583	**Lifesaving and Safety Equipment**									
590	**Special Purpose Systems**									
	Pot Launcher	1		600.00	600	59.00	10.00	15.50	2	12%
	Pot Davit	1		800.00	800	66.00	10.00	15.50	1	20%
	350gal gas tank	1		180.00	180	74.50	5.00	15.00	1	20%

SWBS No.	600 Outfit & Furnishings Description	Qty.	Qty. Unit	Unit Wt. lb	Total Wt. lb	LCG ft fwd FR 0	TCG ft stbd CL	VCG ft ABL	Maturity (1-5)	Margin
600	Outfit & Furnishings, General	-	-	-	9,360	20.35	-0.38	18.51	2.0	-
610	Ship Fittings	-	-	-	338	-2.78	0.00	8.45	2.0	-
612	Rails, Stanchions, & Lifelines	-	-	-	1,808	16.00	0.00	25.17	3.0	-
621	Non-structural Bulkhead	-	-	-	4,470	22.24	-0.38	21.69	3.0	-
622	Floor Plates & Gratings	-	-	-	3,940	39.00	0.00	4.00	2.0	-
623	Ladders	-	-	-	795	42.66	0.74	13.38	3.0	-
624	Non-structural Closures	-	-	-	1,300	19.15	2.21	21.03	2.0	-
625	Airports, Fixed Portlights, & Windows	-	-	-	3,963	27.88	0.95	26.21	2.0	-
630	Preservatives & Coverings	-	-	-	732	19.78	0.11	16.94	2.0	-
631	Painting	-	-	-	5,343	40.00	0.10	9.91	1.0	-
633	Cathodic Protection	-	-	-	300	30.00	0.00	3.00	1.0	-
634	Deck Covering	-	-	-	6,345	52.96	0.02	12.99	1.2	-
635	Hull Insulation	-	-	-	5,280	23.10	-0.02	22.63	2.6	-
637	Sheathing	-	-	-	0					-
640	Outfitting	-	-	-	0					-
680	Cargo Stowage	-	-	-	0					-
681	Lifesaving Equipment	-	-	-	1,032	22.39	-0.77	19.57	2.0	-
690	Special Purpose Systems	-	-	-	0					-
SWBS Group Subtotal		-	-	-	45,005	30.20	0.04	16.99	2.0	13.1%
Applied Margin		-	-	-	5,880	33.46	0.05	15.76	-	-
SWBS Group Total w/ Margin		-	-	-	50,885	30.58	0.04	16.84	-	-

600	Outfit & Furnishings, General									
600.0	Outfit & Furnishings, General	0	qty	995		22.00	0.00	18.50	2	12%
601.0	General Arrangement - Outfit & Furnishings Drawings									
	Hold									
	Workshop									
	Shelving	1	lump	150	150	20.00	0.00	8.17	2	12%

SWBS No.	600 Outfit & Furnishings Description	Qty.	Qty. Unit	Unit Wt. lb	Total Wt. lb	LCG ft fwd FR 0	TCG ft stbd CL	VCG ft ABL	Maturity (1-5)	Margin
	Workbench	1	qty	150	150	24.00	-7.17	7.00	2	12%
	Tools	1	lump	300	300	19.42	-8.33	8.33	2	12%
	Tool cabinet	1	qty	75	75	19.42	-8.33	8.33	2	12%
	Main Deck									
	Galley									
	Electric range w/ hood	1	qty	150	150	36.33	-4.75	13.20	2	12%
	Double-basin sink	1	qty	40	40	32.33	-1.50	14.20	2	12%
	Double-door refrigerator	1	qty	350	350	25.00	-4.83	15.20	2	12%
	Cabinets, shelving	1	lump	400	400	34.00	-5.00	15.20	2	12%
	Pantry									
	Shelving w/ doors	2	qty	150	300	20.00	-7.17	15.20	2	12%
	Upright freezer	1	qty	175	175	25.00	-8.08	15.20	2	12%
	Mess									
	Bench seating	1	lump	350	350	33.00	5.00	14.00	2	12%
	Tables	2	qty	75	150	33.00	5.00	14.70	2	12%
	Coffee/hot water maker	1	qty	35	35	29.50	0.67	15.50	2	12%
	Head									
	Toilet	1	qty	80	80	15.00	-8.00	13.00	2	12%
	Sink/Faucet	1	qty	40	40	18.00	-4.50	14.20	2	12%
	Shower	1	qty	150	150	18.00	-8.00	15.50	2	12%
	Cabinet	1	qty	30	30	18.00	-4.00	17.00	2	12%
	Stateroom									
	Double bunk, two mattresses	1	qty	350	350	17.00	5.00	16.50	2	12%
	Storage drawers	2	qty	100	200	18.50	5.00	13.00	2	12%
	Lockers	2	qty	100	200	23.00	5.00	15.50	2	12%
	Mud Room									
	Lockers	1	lump	1,200	1,200	10.00	5.50	15.50	2	12%
	Bench	1	qty	75	75	7.00	-6.00	14.00	2	12%
	Stackable washer/dryer	1	qty	200	200	12.17	-7.50	14.50	2	12%
	Upper Deck									

SWBS No.	600 Outfit & Furnishings Description	Qty.	Qty. Unit	Unit Wt. lb	Total Wt. lb	LCG ft fwd FR 0	TCG ft stbd CL	VCG ft ABL	Maturity (1-5)	Margin
	Staterooms									
	Double bunk, two mattresses	4	qty	350	1,400	16.00	0.00	24.50	2	12%
	Storage drawers	8	qty	100	800	16.00	0.00	21.00	2	12%
	Lockers	8	qty	100	800	17.00	-1.00	23.50	2	12%
	Captain Desk and Chair	1	qty	100	100	25.75	-5.00	22.00	2	12%
	Head									
	Toilet	1	qty	80	80	22.00	8.00	22.00	2	12%
	Sink/Faucet	1	qty	40	40	22.00	4.00	23.20	2	12%
	Shower	1	qty	150	150	24.00	8.00	24.00	2	12%
	Cabinet	1	qty	30	30	22.00	4.00	25.50	2	12%
	Bridge Deck									
	Pilot House									
	Chairs	2	qty	80	160	33.50	3.00	27.50	2	12%
	Console	1	qty	300	300	37.00	0.00	25.50	2	12%
	Settee	1	qty	150	150	28.00	-5.58	27.00	2	12%
	Bookcase	1	qty	100	100	27.00	-5.58	27.50	2	12%
	Misc. equip, manuals, charts, flags	1	lump	100	100	36.00	0.00	25.50	2	12%
610	**Ship Fittings**									
610.0	Ship Fittings									
	Swim step plating, 1" Fiberglass	48	ft²	3.00	143	-3.33	0.00	8.67	2	12%
	Swim step brackets	19	ft²	10.20	195	-2.37	0.00	8.29	2	12%
612	**Rails, Stanchions, & Lifelines**									
612.0	Rails, Stanchions, & Lifelines	904	ft	2.00	1,808	16.00	0.00	25.17	3	8%
621	**Non-structural Bulkhead**									
621.0	Non-structural Bulkhead									
	Main Deck Joinery BHDs	532	ft²	2.50	1,331	22.33	-0.81	15.46	3	8%
	Upper and PH Deck Joinery BHDs	1,256	ft²	2.50	3,139	22.20	-0.20	24.33	3	8%

SWBS No.	600 Outfit & Furnishings Description	Qty.	Qty. Unit	Unit Wt. lb	Total Wt. lb	LCG ft fwd FR 0	TCG ft stbd CL	VCG ft ABL	Maturity (1-5)	Margin
622	**Floor Plates & Gratings**									
	Hull floor plates and gratings, AL	788	ft²	5.00	3,940	39.00	0.00	4.00	2	12%
623	**Ladders**									
623.0	Ladders									
	Stair (Eng Room to Main)	25	ft²	11.22	281	19.61	1.49	10.43	3	8%
	Stair (Fwd Hold to Main, Main to Focsle)	27	ft²	11.22	299	77.85	0.00	11.21	3	8%
	Stair (Main to Upper)	29	ft²	3.88	113	20.20	1.49	18.58	3	8%
	Stair (Upper to PH)	26	ft²	3.88	103	27.75	0.00	22.07	3	8%
624	**Non-structural Closures**									
624.0	Non-structural Closures									
	Main Deck									
	Weathertight Doors, 72"x36"	2	qty	250	500	15.40	5.63	15.53	2	12%
	Doors 78"x28"	2	qty	50	100	13.49	-0.10	15.36	2	12%
	Upper Deck									
	Weathertight Door, 75"x38"	1	qty	250	250	6.00	0.00	23.71	2	12%
	Door, 78"x28"	1	qty	50	50	26.67	1.42	23.58	2	12%
	Bridge Deck									
	Weathertight Doors, 75"x28"	2	qty	200	400	32.52	0.00	27.32	2	12%
625	**Airports, Fixed Portlights, & Windows**									
625.0	Airports, Fixed Portlights, & Windows									
	Fwd PH Windows	87	ft²	20	1,741	38.32	0.00	28.75	2	12%
	Aft PH Windows	26	ft²	20	530	26.67	1.58	29.58	2	12%
	Upper Deck Windows	46	ft²	20	922	15.85	1.97	26.53	2	12%
	Main Deck Windows	38	ft²	20	770	19.51	1.45	17.76	2	12%
630	**Preservatives & Coverings**									

SWBS No.	600 Outfit & Furnishings Description	Qty.	Qty. Unit	Unit Wt. lb	Total Wt. lb	LCG ft fwd FR 0	TCG ft stbd CL	VCG ft ABL	Maturity (1-5)	Margin
630.0	Preservatives & Coverings									
	Leveling Compound									
	Main Deck within house	603	ft²	0.50	302	21.91	0.05	12.09	2	12%
	Upper Deck	860	ft²	0.50	430	18.29	0.16	20.33	2	12%
631	**Painting**									
631.0	Painting	2.4%	lump	222,626	5,343	40.00	0.10	9.91	1	20%
633	**Cathodic Protection**									
633.0	Cathodic Protection	1		300.00	300	30.00	0.00	3.00	1	20%
634	**Deck Covering**									
634.0	Deck Covering									
	Main Deck Wear Deck Wood	951	ft²	5.99	5,699	56.33	0.00	12.50	1	20%
	Main Deck Flooring	603	ft²	0.50	302	21.91	0.05	12.09	3	8%
	Upper Deck Flooring	389	ft²	0.50	194	17.83	-0.17	20.33	3	8%
	PH Flooring and Supports	200	ft²	0.75	150	32.78	1.05	23.83	3	8%
635	**Hull Insulation**									
635.0	Hull Insulation									
	House Thermal	2,987	ft²	1.00	2,987	22.95	0.00	20.93	3	8%
	Main Deck Overhead	585	ft²	1.74	1,019	22.37	0.05	19.58	2	12%
	Upper Deck Overhead	405	ft²	1.74	705	17.59	-0.25	27.58	2	12%
	PH Overhead	327	ft²	1.74	570	31.98	0.00	30.83	2	12%
681	**Lifesaving Equipment**					**LCG**	**TCG**	**VCG**		
	Lifejackets	20	qty	1.20	24	20.00	0.00	13.00	2	12%
	Immersion suits	16	qty	15.00	240	20.00	0.00	13.00	2	12%
	Life buoys	3	qty	5.00	15	20.00	0.00	15.00	2	12%
	Life buoy mounts	3	qty	5.00	15	20.00	0.00	15.00	2	12%
	Liferafts, 12-person	2	qty	220.00	440	16.75	0.00	31.00	2	12%

SWBS No.	600 Outfit & Furnishings Description	Qty.	Qty. Unit	Unit Wt. lb	Total Wt. lb	LCG ft fwd FR 0	TCG ft stbd CL	VCG ft ABL	Maturity (1-5)	Margin
	Pilot House equpiment	1	qty	6.00	10	32.00	0.00	23.00	2	12%
	Upper Deck Fire Extinguishers	3	qty	13.50	41	20.00	2.00	22.00	2	12%
	Upper Deck Fire Station hose	20	m	0.20	4	6.00	-1.00	22.80	2	12%
	Upper Deck Fire Station mount	1	qty	2.00	2	6.00	-1.00	22.80	2	12%
	Main Deck Fire Station hoses	60	m	0.20	12	40.00	6.00	14.00	2	12%
	Main Deck Fire Station mount	3	qty	2.00	6	40.00	6.00	14.00	2	12%
	Main Deck Fire Extinguishers	2	qty	13.50	27	31.00	1.00	14.00	2	12%
	Main Deck Line Thrower	1	qty	1.00	1	6.00	-7.00	14.00	2	12%
	Main Deck First Aid Kit	1	qty	3.00	3	20.00	-4.00	14.00	2	12%
	Hold Fire Extinguishers	3	qty	13.50	41	52.00	0.00	4.50	2	12%
	Hold Wheeled Fire Extinguishers	2	qty	70.00	140	32.00	-7.00	3.50	2	12%
	Hold Fire Station hoses	40	m	0.20	8	40.00	0.00	4.50	2	12%
	Hold Fire Station mounts	2	qty	2.00	4	40.00	0.00	4.50	2	12%
690	**Special Purpose Systems**									