Royal Canadian Mounted Police / Gendarmerie royale du Canada

RETURN BIDS TO:
RETOURNER LES SOUMISSIONS A :

Procurement & Contracting Services
Bid Receiving Unit
VISITOR'S CENTRE - Main Entrance
73 Leikin Drive, Mailstop #15
Ottawa, Ontario K1A 0R2
Canada
Attn: Shannon Plunkett

Services d'acquisitions et des marchés
Module de réception des soumissions
CENTRE DES VISITEURS - Entrée Principale
73 promenade Leikin, arrêt postal nº15
Ottawa (Ontario) K1A 0R2
Canada
A/S : Shannon Plunkett

SOLICITATION AMENDMENT

MODIFICATION DE L'INVITATION

The referenced document is hereby revised; unless otherwise indicated, all other terms and conditions of the Solicitation remain the same.

Ce document est par la présente révisé; sauf indication contraire, les modalités de l'invitation demeurent les mêmes.

Comments: - Commentaries :

Title – Sujet Transport d'un patrouilleur de la GRC		**Date** 31 octobre 2016
Solicitation No. – Nº de l'invitation 201605344/B		**Amendment No. –** **Nº de la modification** 004
Client Reference No. - No. De Référence du Client 201605344		
Solicitation Closes – L'invitation prend fin		
At /à :	14 h	EST (Eastern Standard Time) HNE (heure normale de l'Est)
On / le :	17 novembre 2016	
Delivery - Livraison	**Taxes - Taxes**	**Duty – Droits**
Destination of Goods and Services – Destinations des biens et services		
Instructions See herein — Voir aux présentes		
Address Inquiries to – **Adresser toute demande de renseignements à** Anna Rozanski (anna.rozanski@rcmp-grc.gc.ca)		
Telephone No. – No. de téléphone 613-843-6972	**Facsimile No. – No. de télécopieur** 613-825-0082	

Delivery Required – **Livraison exigée**	**Delivery Offered** – **Livraison proposée**
Vendor/Firm Name, Address and Representative – Raison sociale, adresse et représentant du fournisseur/de l'entrepreneur:	
Telephone No. – No. de téléphone	**Facsimile No. – No. de télécopieur**
Name and title of person authorized to sign on behalf of Vendor/Firm (type or print) – Nom et titre de la personne autorisée à signer au nom du fournisseur/de l'entrepreneur (taper ou écrire en caractères d'imprimerie)	
Signature	**Date**

Canada

La présente modification vise à :

- répondre aux questions reçues pendant la période de soumission;
- modifier l'invitation en conséquence, le cas échéant.

QUESTIONS ET RÉPONSES

Question 1: Dans les exigences en matière d'assurance énoncées à l'annexe B de la DP, il est dit que l'entrepreneur doit souscrire une assurance pour protéger les biens de l'État à leur coût de remplacement (nouveau) dont le montant ne doit pas être inférieur à 10 000 000,00 $. Pouvez-vous confirmer que le coût de remplacement ne dépassera pas 10 000 000 $? Si le coût dépassait ce montant, quel serait-il?

Réponse 1: La GRC ne peut pas confirmer que le coût de remplacement ne dépassera pas 10 000 000 $. Le coût de remplacement (nouveau) exact n'est pas connu. Le montant précisé, 10 000 000 $, est la meilleure estimation établie par la GRC, excluant le coût de l'équipement embarqué.

Question 2: Le Zodiac et les radeaux de sauvetage seront-ils également transportés? Est-ce que l'équipement à l'intérieur du patrouilleur sera arrimé pour le séjour en mer?

Réponse 2: Tout l'équipement embarqué sera transporté avec le patrouilleur, tel qu'expliqué au point 7, *Obligations de l'entrepreneur*, de l'annexe A, Énoncé des travaux.

Question 3: Les antennes UHF et VHF doivent-elles être enlevées pour le transport?

Réponse 3: Tout l'équipement embarqué sera transporté avec le patrouilleur, tel qu'expliqué au point 7, *Obligations de l'entrepreneur*, de l'annexe A, Énoncé des travaux.

Questions 4: Est-ce qu'il y a des restrictions quant au levage du vaisseau?

Réponse 4: Les documents sont fournis dans les pages qui suivent de la présente modification pour permettre la détermination des dispositifs de levage. (Les documents sont disponibles en anglais seulement.) Ces documents et la réponse à la question 5 ci-après devraient permettre d'effectuer le calcul du centre de gravité du vaisseau, tel que demandé à la question 2 de la modification 003 de la DP.

Question 5: Quelle est la quantité de carburant à bord?

Réponse 5: Le réservoir 1 contient 963 litres de carburant diésel et le réservoir 2 en contient 970 litres. (Le réservoir 4 contient 98 litres d'eau fraîche et le réservoir 5, 98 litres.)

Question 6: Une date de transport hâtive serait-elle vue plus favorablement qu'une date de transport tardive?

Réponse 6: Non, un transport effectué plus tôt ne serait pas vu d'un œil plus favorable qu'un transport effectué plus tard. Voir à cet égard le point Méthode de sélection à la page 8 de la DP, qui dit ce qui suit : «Une soumission doit respecter les exigences de la demande de soumissions et satisfaire à tous les critères d'évaluation techniques obligatoires pour être déclarée recevable. La soumission recevable avec le prix évalué le plus bas sera recommandée pour attribution d'un contrat. »

Question 7: De quelle manière les options (modes de transport) autres que l'option privilégiée seront-elles évaluées?

Réponse 7: Les autres modes de transport sont évalués au critère d'évaluation technique obligatoire CO5. Le critère est davantage clarifié à la modification 1 ci-après.

MODIFICATIONS À L'INVITATION

1) Aux pages 27-28, D2.2 Tableau des critères obligatoires,

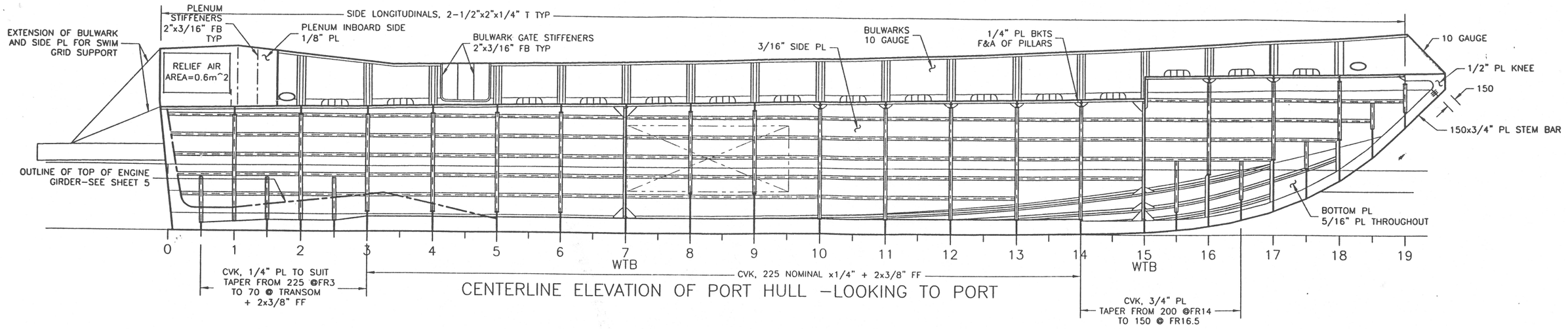
Supprimer:

M5	La méthode de transport privilégiée pour le patrouilleur est le transport à bord d'un navire de plus grande dimension. Toutefois, d'autres moyens de transport pourraient être pris en considération s'ils sont plus rentables et que le niveau de risque est équivalent. Si le soumissionnaire propose un moyen de transport différent de la méthode privilégiée, le soumissionnaire doit démontrer que sa méthode n'implique pas un plus haut niveau de risque.	

Insérer:

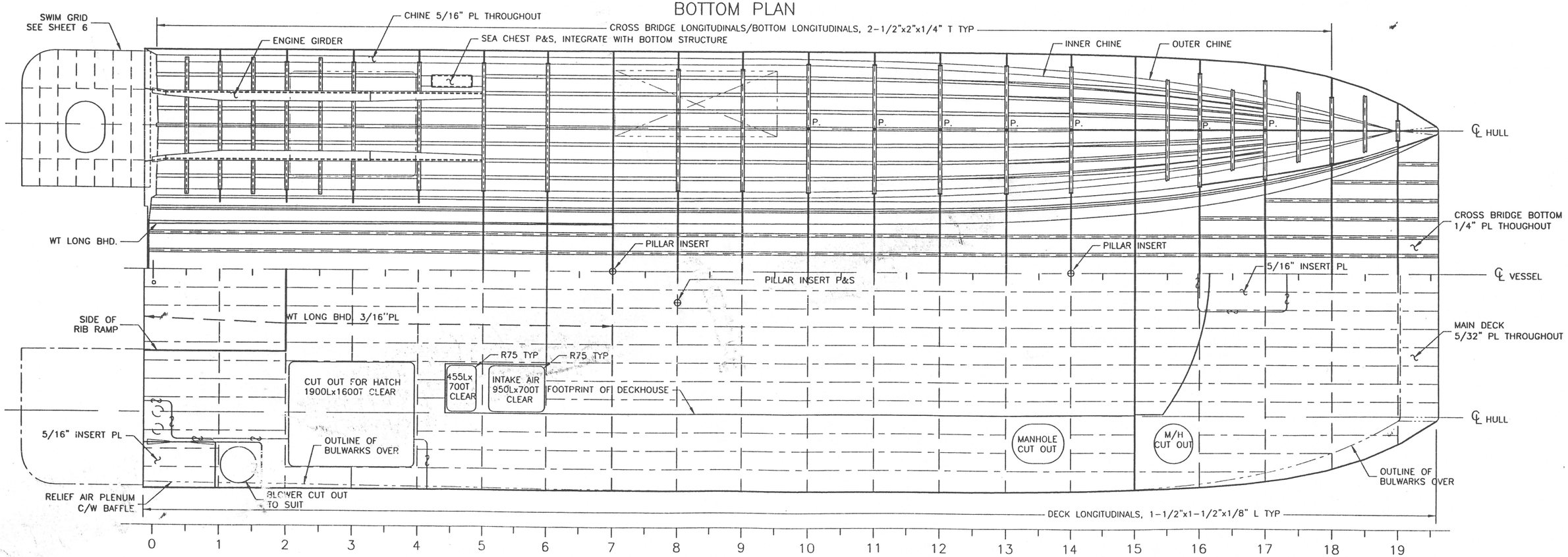
M5	La méthode de transport privilégiée pour le patrouilleur est le transport à bord d'un navire de plus grande dimension. Toutefois, d'autres moyens de transport pourraient être pris en considération. Si le soumissionnaire propose un moyen de transport différent de la méthode privilégiée, le soumissionnaire doit fournir une description détaillée de tous les risques qui se posent et expliquer de quelle manière chacun de ces risques sera atténué. La GRC déterminera, à son entière discrétion, si le mode de transport de rechange proposé n'implique pas un plus haut niveau de risque et si les stratégies d'atténuation formulées par l'entrepreneur sont acceptables.	

2) La date de clôture de l'invitation est reportée au 17 novembre 2016, tel qu'indiqué à la page 1 de la présente modification. L'avis d'appel d'offres diffusé à l'adresse https://achatsetventes.gc.ca/donnees-sur-l-approvisionnement/appels-d-offres/PW-16-00750146 a été modifié en conséquence.



CENTERLINE ELEVATION OF PORT HULL -LOOKING TO PORT

BOTTOM PLAN



DECK PLAN

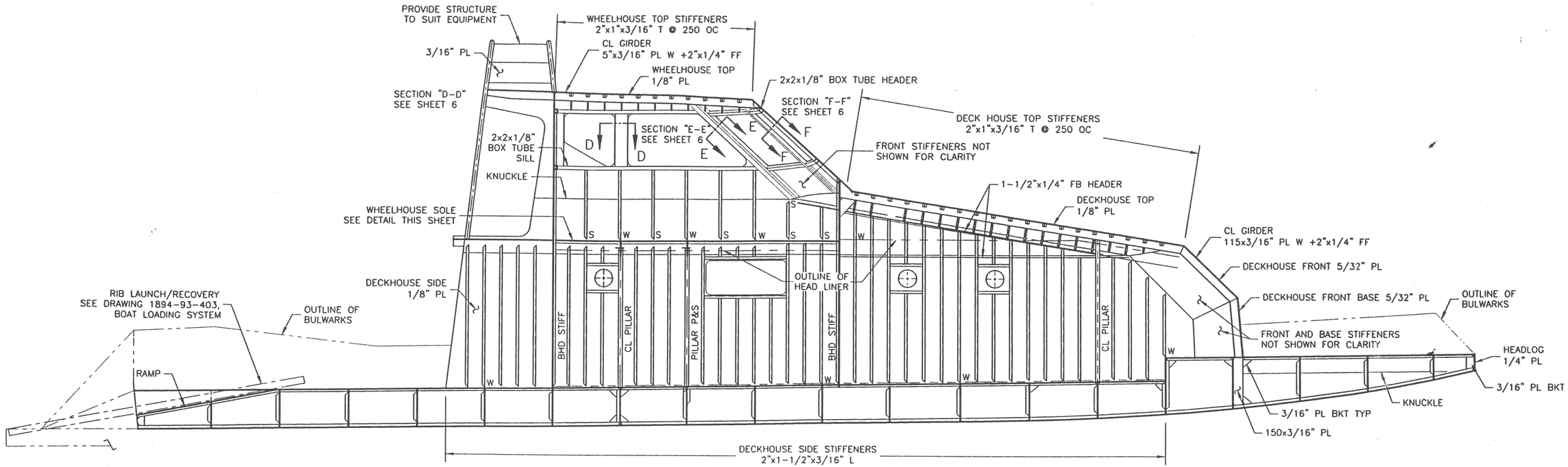
0 1 2 3 4 5

METRES

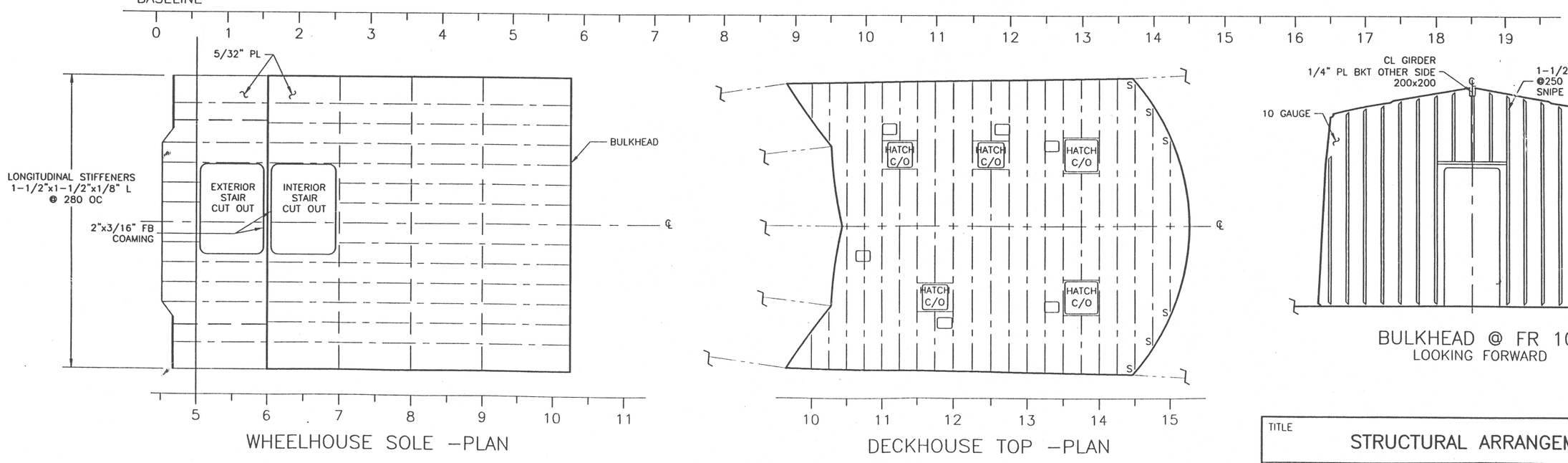
TITLE: STRUCTURAL ARRANGEMENT

SCALE	PROJECT No.	DWG. No.	SHEET
1:60	201-133	21010	3 OF 8

ROBERT ALLAN LTD. REV. 2



CENTERLINE ELEVATION –LOOKING TO PORT



WHEELHOUSE SOLE –PLAN

DECKHOUSE TOP –PLAN

BULKHEAD @ FR 10.25
LOOKING FORWARD

TITLE: STRUCTURAL ARRANGEMENT			
SCALE: 1:60	PROJECT No.: 201-133	DWG. No.: 21010	SHEET: 2 OF 8
ROBERT ALLAN LTD.			REV.: 2

E.Y.E. MARINE CONSULTANTS
Suite 1, 327 Prince Albert Road, Dartmouth, Nova Scotia, Canada B2Y 1N7
Tel: (902) 463-8940
Fax: (902) 463-6319

"MURRAY"

TRIM AND STABILITY BOOKLET

DRAFT

BY: E.Y.E. MARINE CONSULTANTS
FOR: A.F. THERIAULT & SON LTD.
DATE: 15 MARCH 2005
JOB NO: 04060

H:\04Files\04060\STAB-COVER.wp

TABLE OF CONTENTS

1

GENERAL PARTICULARS

PRINCIPAL PARTICULARS

Vessel Name:	'MURRAY'
Type:	Patrol Vessel
Built	A.F. Theriault 2005
Length, Overall	19.75m
Length Between Perpendiculars	17.60m
Length on Waterline	17.68m
Beam	6.70m
Depth	1.99m
Draft	0.70m
No. of Crew	4

2

NOMENCLATURE AND DATUMS

NOMENCLATURE AND DATUMS

a	- Aft of midships
B.O.K.	- Bottom of keel
Critical Height	- Vertical distance from the waterline to the critical point.
Critical Points	- Points on the vessel which would cause progressive flooding if immersed.
Deck Imm	- The angle at which any point of the weather deck is submerged.
Depth	- Distance from the origin to the waterplane and measured perpendicular to the waterplane. It is used in place of "draft" which becomes undefined at significant angles of heel.
Displ. (MT)	- The total weight of the vessel in Metric tons
f	- Forward of midships
FSM	- Free surface moment
GML	- The longitudinal metacentre (used for trim calculations only)
GMT	- The transverse geometric metacentre (i.e. the distance from the vessel's VCG to the metacentre)
GM Upright	- The GM of the vessel if it were at zero heel (may not be the current loading)
KML	- The distance from the baseline to the longitudinal metacentre.
KMT	- The distance from the baseline to the transverse metacentre.
KN	- The righting arm calculated for various angles assuming the VCG = 0. Must be corrected for free surface to determine the actual righting arm.

LCB	- The longitudinal centre of buoyancy measured from the origin.
LCF	- The longitudinal centre of flotation measured from the origin.
LCG	- The longitudinal centre of gravity measured from the origin.
Max FSM	- The maximum free surface of a tank (may not be the current loading).
Moment/deg Trim	- Moment to change trim 1 degree
Origin	- The origin is the intersection of the three orthogonal co-ordinate axes (see datum points)
SpGr	- Specific Gravity: weight of a liquid relative to FW (i.e SW is 1.025, FO is 0.87)
TCB	- Transverse centre of buoyancy
TCG	- Transverse centre of gravity.
VCB	- Vertical centre of buoyancy above keel.
VCG	- Vertical centre of gravity above keel
Weight/cm	- Weight, in MT, required to sink vessel 1 cm.

ORIGIN PLANES

Vertical: Baseline (BL) is as defined on enclosed datums drawing

Perpendiculars: Planes located at the aft and fwd draft mark locations
Aft perpendicular located 8.808m aft of midships.
Fwd perpendicular located 8.788m fwd of midships as defined on enclosed datums drawing

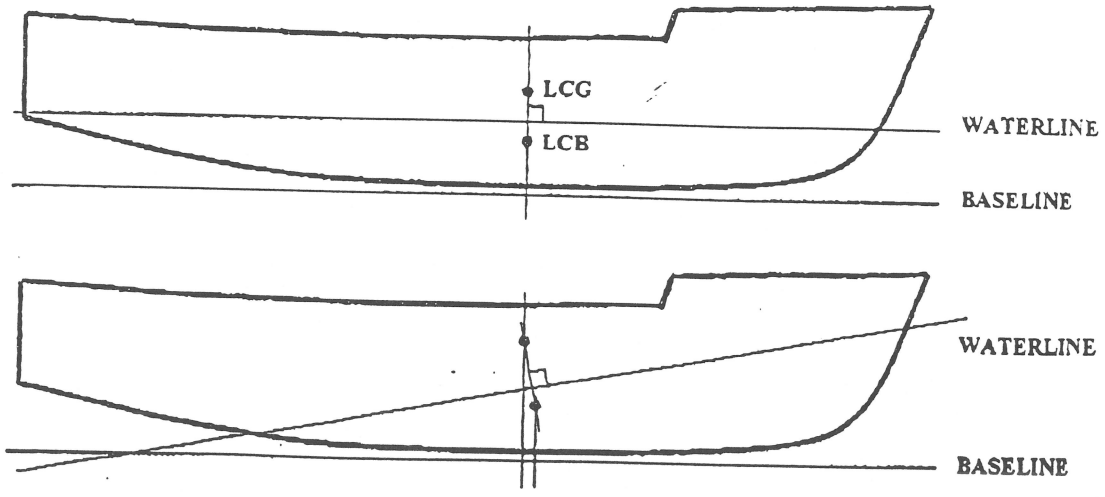
Transverse: The centerline of the vessel with starboard designated as positive.

Longitudinal: Midships – a plane 194mm aft of frame 9 as defined on enclosed datums drawing.

NOTE: Weights centers are measured in the plan of the vessel, i.e. along the baseline or centerline.

All references are in "Boat Co-ordinates" (baseline, etc.) If the waterplane is not parallel to the baseline (trimmed or heeled condition) then the line between the LCG and LCB, which is perpendicular to the waterplane, cannot be perpendicular to the baseline plane. Hence, if the LCG and LCB are separated vertically then equal and parallel references from the origin on the baseline plane cannot be equal and parallel on the waterplane.

The important point to remember is that the definition of equilibrium is: ***RA (Righting Arm) = 0***



3

NOTES TO MASTER

'MURRAY'

Notes to Master Regarding Stability and Loading of Vessel

1. Compliance with the stability criteria indicated does not ensure immunity against capsizing regardless of the circumstances, or absolve the master from his responsibilities. Masters should, therefore, exercise prudence and good seamanship having regard to the season of the year, weather forecasts and the navigational zone and should take the appropriate action as to speed and course warranted by the prevailing circumstances.

2. Care should be taken to ensure that the cargo allocated to the vessel is capable of being stowed so that the compliance with the criteria can be achieved. If necessary, the amount should be limited to the extent that ballast weight may be required.

3. Before a voyage commences care should be taken to ensure cargo and pieces of equipment have been properly stowed or lashed so as to minimize the possibility of both longitudinal and lateral shifting while as sea under the effect of acceleration caused by rolling and pitching.

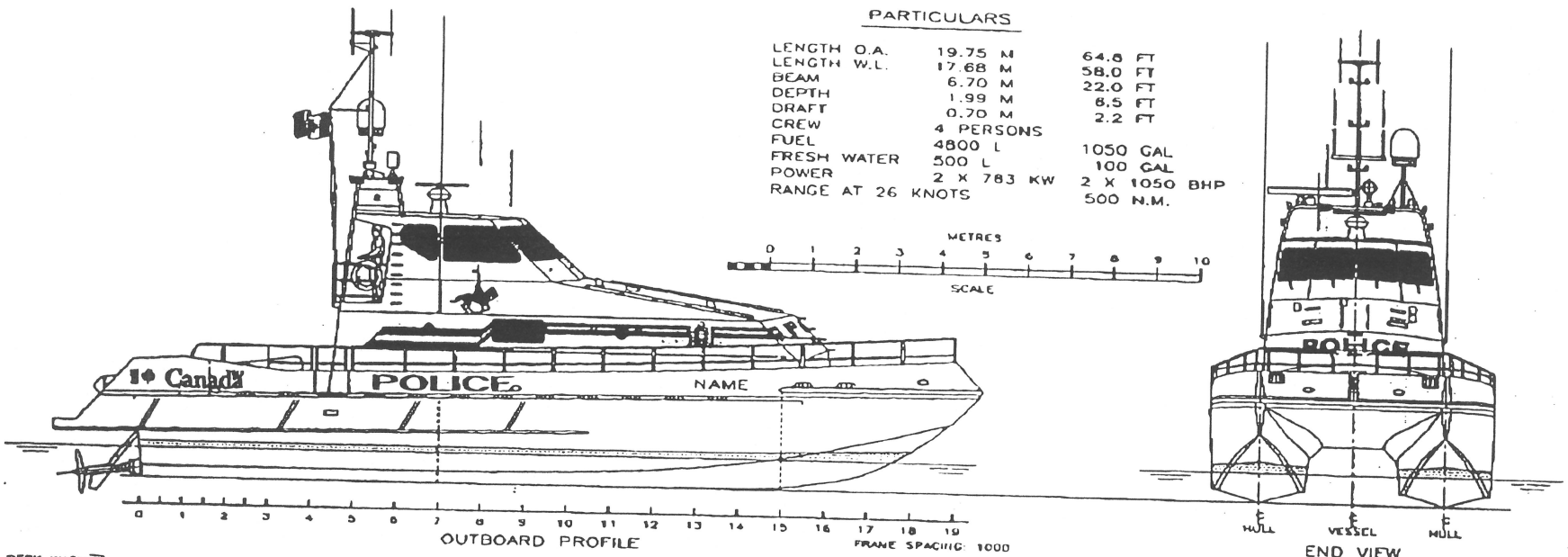
4. The stability of this vessel has been evaluated according to TP7301, Stab 6. As this vessel is a a catamaran, the maximum righting arm occurs at a lesser engle than stated in the regulations and the point of vanishing stability occurs at 36.92 degrees in the port arrival condition. Because the upright GM exceeds the required value by approximately 40 times and the area under the curve to 40 degrees (or when RA=0) exceeds the required value by approximately 5 times, the vessel has sufficient righting energy to operate safely.

4

GENERAL ARRANGEMENT

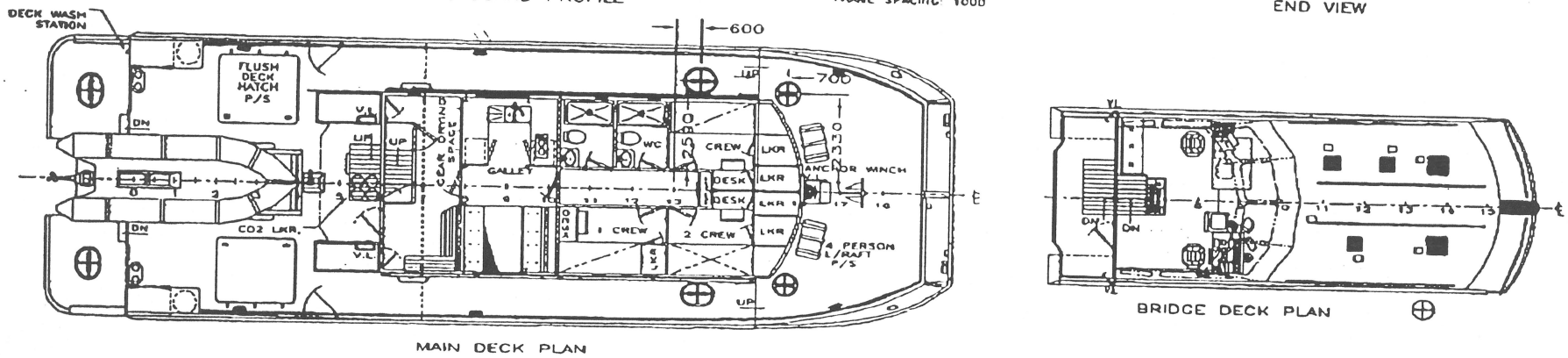
PARTICULARS

LENGTH O.A.	19.75 M	64.8 FT
LENGTH W.L.	17.68 M	58.0 FT
BEAM	6.70 M	22.0 FT
DEPTH	1.99 M	6.5 FT
DRAFT	0.70 M	2.2 FT
CREW	4 PERSONS	
FUEL	4800 L	1050 GAL
FRESH WATER	500 L	100 GAL
POWER	2 X 783 KW	2 X 1050 BHP
RANGE AT 26 KNOTS		500 N.M.



OUTBOARD PROFILE

END VIEW



MAIN DECK PLAN

BRIDGE DECK PLAN

'MURRAY'

GENERAL ARRANGEMENT

5

DRAFT MARKS AND DATUMS

PARTICULARS

LENGTH O.A.	19.75 M	64.8 FT
LENGTH W.L.	17.68 M	58.0 FT
BEAM	6.70 M	22.0 FT
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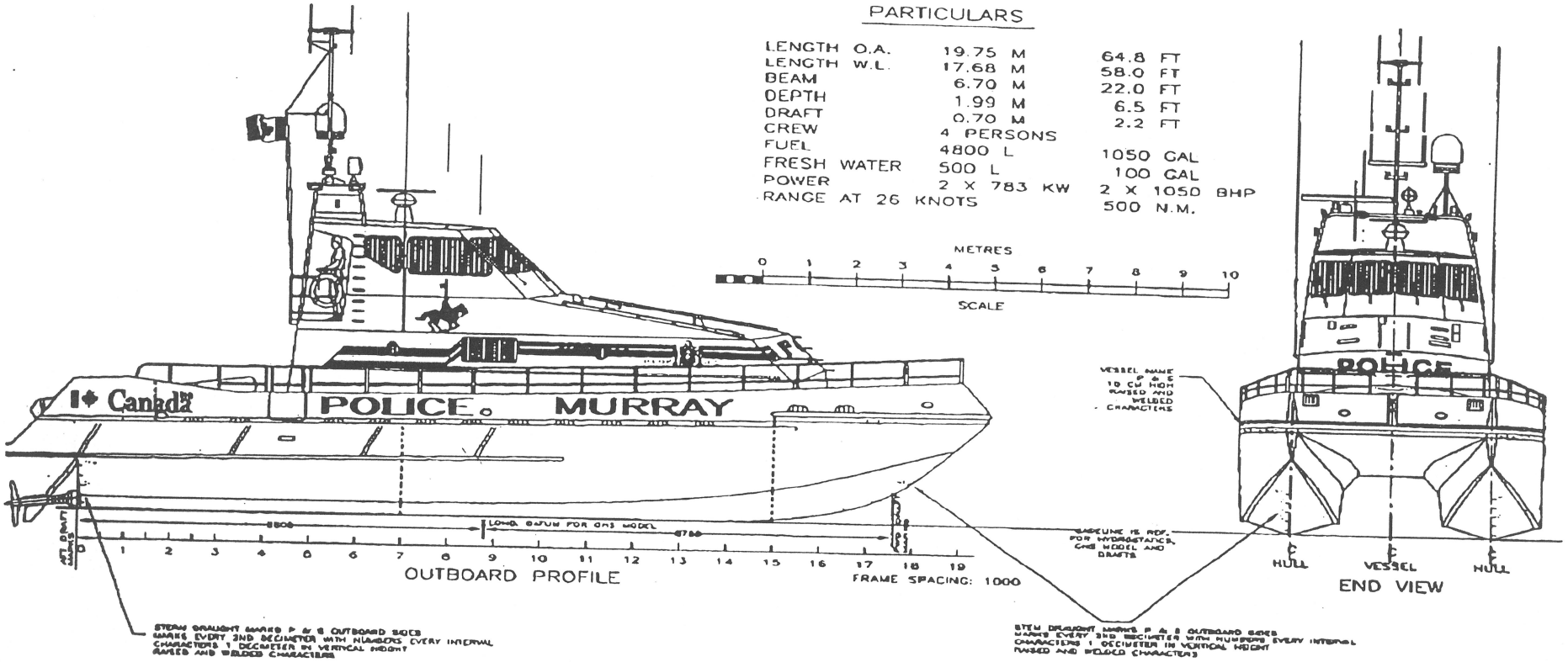


'MURRAY'

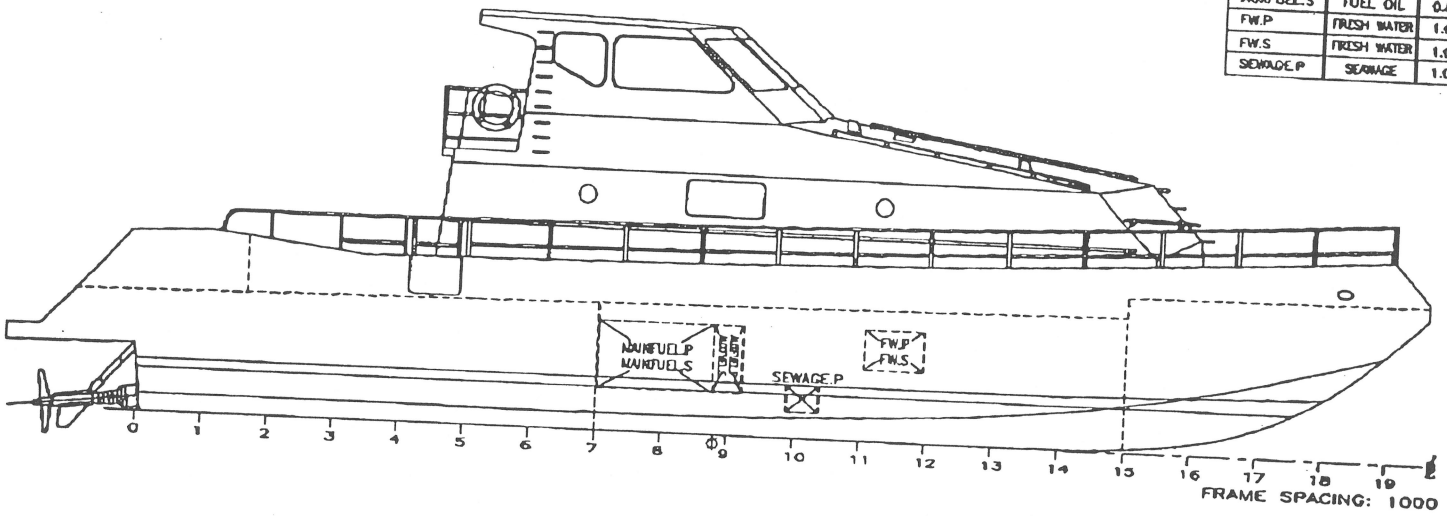
LOCATION OF DRAFT MARKS AND DATUMS

6

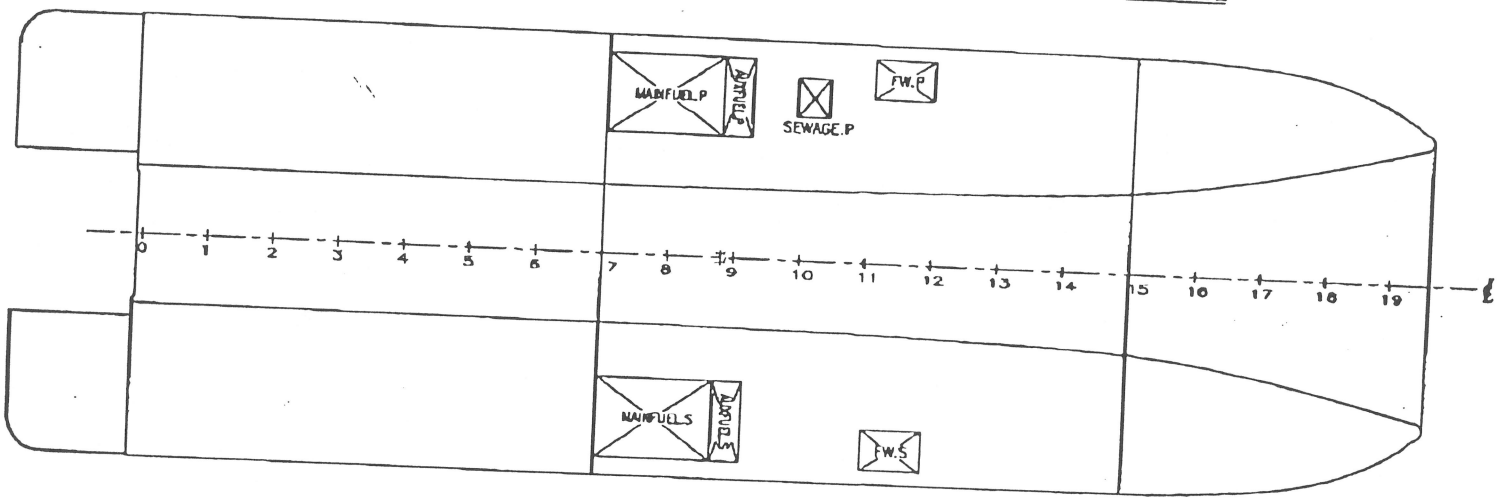
TANK CAPACITIES

TANK CAPACITIES

TANK	CONTENTS	SPECIFIC GRAVITY	WEIGHT (MT)	LCG (M)	TCG (M)	VCG (M)
MAINFUEL.P	FUEL OIL	0.870	1.86	0.916a	2.441p	1.182
MAINFUEL.S	FUEL OIL	0.870	1.86	0.916a	2.441s	1.182
AUXFUEL.P	FUEL OIL	0.870	0.48	0.184f	2.441p	1.182
AUXFUEL.S	FUEL OIL	0.870	0.48	0.184f	2.441s	1.182
FW.P	FRESH WATER	1.000	0.25	2.696f	2.816p	1.617
FW.S	FRESH WATER	1.000	0.25	2.696f	2.816s	1.617
SEWAGE.P	SEWAGE	1.025	0.12	1.334f	2.485p	0.609



PROFILE



PLAN

'MURRAY'
TANK CAPACITIES

05-03-15 11:25:24
GHS 8.06A

E.Y.E. Marine Consultants
MURRAY

TANK STATUS
Trim: zero, Heel: zero

Part	Load	SpGr	Weight (MT)	LCG	TCG	VCG	FSM
MAINFUEL.S	1.000	0.870	1.86	0.916a	2.441s	1.182	0.22
MAINFUEL.P	1.000	0.870	1.86	0.916a	2.441p	1.182	0.22
AUXFUEL.S	1.000	0.870	0.48	0.184f	2.441s	1.182	0.06
AUXFUEL.P	1.000	0.870	0.48	0.184f	2.441p	1.182	0.06
FW.S	1.000	1.000	0.25	2.696f	2.816s	1.417	0.01
FW.P	1.000	1.000	0.25	2.696f	2.816p	1.417	0.01
SEWAGE.P	1.000	1.025	0.12	1.334f	2.485p	0.609	0.01
Total Tanks------->			5.30	0.325f	0.056p	1.191	0.59

Distances in METERS. Moments in M.-MT.

TANK CHARACTERISTICS
No Trim, No Heel
Tank: MAINFUEL.P, Contents: FUEL OIL at 0.870 Specific Gravity

Snding	Volume LITERS	Weight METRIC TON	Center of Gravity LCG	TCG	VCG	GML	FSM M.-MT
0	0	0.00					
20	35	0.03	0.916a	2.355p	0.660	12.88	0.13
40	70	0.06	0.916a	2.360p	0.670	6.50	0.14
60	107	0.09	0.916a	2.365p	0.680	4.38	0.15
80	143	0.12	0.916a	2.370p	0.691	3.31	0.16
100	181	0.16	0.916a	2.375p	0.701	2.67	0.17
120	219	0.19	0.916a	2.380p	0.711	2.25	0.18
140	258	0.22	0.916a	2.386p	0.722	1.94	0.19
160	298	0.26	0.916a	2.391p	0.732	1.71	0.20
180	338	0.29	0.916a	2.396p	0.743	1.53	0.21
200	379	0.33	0.916a	2.401p	0.753	1.39	0.22
220	421	0.37	0.916a	2.406p	0.764	1.25	0.22
240	462	0.40	0.916a	2.410p	0.774	1.14	0.22
260	503	0.44	0.916a	2.413p	0.784	1.05	0.22
280	545	0.47	0.916a	2.416p	0.795	0.97	0.22
300	586	0.51	0.916a	2.419p	0.805	0.90	0.22
320	628	0.55	0.916a	2.421p	0.815	0.84	0.22
340	669	0.58	0.916a	2.422p	0.825	0.79	0.22
360	710	0.62	0.916a	2.424p	0.836	0.74	0.22
380	752	0.65	0.916a	2.425p	0.846	0.70	0.22
400	793	0.69	0.916a	2.427p	0.856	0.67	0.22
420	834	0.73	0.916a	2.428p	0.866	0.63	0.22
440	876	0.76	0.916a	2.429p	0.876	0.60	0.22
460	917	0.80	0.916a	2.430p	0.886	0.58	0.22
480	959	0.83	0.916a	2.431p	0.896	0.55	0.22
500	1000	0.87	0.916a	2.432p	0.906	0.53	0.22
520	1041	0.91	0.916a	2.432p	0.917	0.51	0.22
540	1083	0.94	0.916a	2.433p	0.927	0.49	0.22
560	1124	0.98	0.916a	2.434p	0.937	0.47	0.22
580	1165	1.01	0.916a	2.434p	0.947	0.45	0.22
600	1207	1.05	0.916a	2.435p	0.957	0.44	0.22
620	1248	1.09	0.916a	2.435p	0.967	0.42	0.22
640	1290	1.12	0.916a	2.436p	0.977	0.41	0.22
660	1331	1.16	0.916a	2.436p	0.987	0.40	0.22
680	1372	1.19	0.916a	2.437p	0.997	0.38	0.22
700	1414	1.23	0.916a	2.437p	1.007	0.37	0.22
720	1455	1.27	0.916a	2.437p	1.017	0.36	0.22
740	1496	1.30	0.916a	2.438p	1.027	0.35	0.22
760	1538	1.34	0.916a	2.438p	1.037	0.34	0.22
780	1579	1.37	0.916a	2.438p	1.047	0.33	0.22
800	1621	1.41	0.916a	2.439p	1.057	0.33	0.22
820	1662	1.45	0.916a	2.439p	1.067	0.32	0.22
840	1703	1.48	0.916a	2.439p	1.077	0.31	0.22

Soundings in mm.-------Other distances in METERS.----------
MAINFUEL.P Reference Point: Long.= 0.916a Trans.= 2.450p Vert.= 0.650
(Zero Sounding is at the Reference Point.)

TANK CHARACTERISTICS, continued
No Trim, No Heel
Tank: MAINFUEL.P, Contents: FUEL OIL at 0.870 Specific Gravity

Snding	Volume LITERS	Weight METRIC TON	Center of Gravity LCG	TCG	VCG	GML	FSM M.-MT
860	1745	1.52	0.916a	2.439p	1.087	0.30	0.22
880	1786	1.55	0.916a	2.440p	1.097	0.30	0.22
900	1827	1.59	0.916a	2.440p	1.107	0.29	0.22
920	1869	1.63	0.916a	2.440p	1.117	0.28	0.22
940	1910	1.66	0.916a	2.440p	1.127	0.28	0.22
960	1952	1.70	0.916a	2.441p	1.137	0.27	0.22
980	1993	1.73	0.916a	2.441p	1.147	0.26	0.22
1000	2034	1.77	0.916a	2.441p	1.157	0.26	0.22
1020	2076	1.81	0.916a	2.441p	1.168	0.25	0.22
1040	2117	1.84	0.916a	2.441p	1.178	0.25	0.22
1060	2137	1.86	0.916a	2.441p	1.182		

Soundings in mm.-------Other distances in METERS.----------
MAINFUEL.P Reference Point: Long.= 0.916a Trans.= 2.450p Vert.= 0.650
(Zero Sounding is at the Reference Point.)

TANK CHARACTERISTICS
No Trim, No Heel
Tank: MAINFUEL.S, Contents: FUEL OIL at 0.870 Specific Gravity

Snding	Volume LITERS	Weight METRIC TON	Center of Gravity LCG	TCG	VCG	GML	FSM M.-MT
0	0	0.00					
20	35	0.03	0.916a	2.355s	0.660	12.88	0.13
40	70	0.06	0.916a	2.360s	0.670	6.50	0.14
60	107	0.09	0.916a	2.365s	0.680	4.38	0.15
80	143	0.12	0.916a	2.370s	0.691	3.31	0.16
100	181	0.16	0.916a	2.375s	0.701	2.67	0.17
120	219	0.19	0.916a	2.380s	0.711	2.25	0.18
140	258	0.22	0.916a	2.386s	0.722	1.94	0.19
160	298	0.26	0.916a	2.391s	0.732	1.71	0.20
180	338	0.29	0.916a	2.396s	0.743	1.53	0.21
200	379	0.33	0.916a	2.401s	0.753	1.39	0.22
220	421	0.37	0.916a	2.406s	0.764	1.25	0.22
240	462	0.40	0.916a	2.410s	0.774	1.14	0.22
260	503	0.44	0.916a	2.413s	0.784	1.05	0.22
280	545	0.47	0.916a	2.416s	0.795	0.97	0.22
300	586	0.51	0.916a	2.419s	0.805	0.90	0.22
320	628	0.55	0.916a	2.421s	0.815	0.84	0.22
340	669	0.58	0.916a	2.422s	0.825	0.79	0.22
360	710	0.62	0.916a	2.424s	0.836	0.74	0.22
380	752	0.65	0.916a	2.425s	0.846	0.70	0.22
400	793	0.69	0.916a	2.427s	0.856	0.67	0.22
420	834	0.73	0.916a	2.428s	0.866	0.63	0.22
440	876	0.76	0.916a	2.429s	0.876	0.60	0.22
460	917	0.80	0.916a	2.430s	0.886	0.58	0.22
480	959	0.83	0.916a	2.431s	0.896	0.55	0.22
500	1000	0.87	0.916a	2.432s	0.906	0.53	0.22
520	1041	0.91	0.916a	2.432s	0.917	0.51	0.22
540	1083	0.94	0.916a	2.433s	0.927	0.49	0.22
560	1124	0.98	0.916a	2.434s	0.937	0.47	0.22
580	1165	1.01	0.916a	2.434s	0.947	0.45	0.22
600	1207	1.05	0.916a	2.435s	0.957	0.44	0.22
620	1248	1.09	0.916a	2.435s	0.967	0.42	0.22
640	1290	1.12	0.916a	2.436s	0.977	0.41	0.22
660	1331	1.16	0.916a	2.436s	0.987	0.40	0.22
680	1372	1.19	0.916a	2.437s	0.997	0.38	0.22
700	1414	1.23	0.916a	2.437s	1.007	0.37	0.22
720	1455	1.27	0.916a	2.437s	1.017	0.36	0.22
740	1496	1.30	0.916a	2.438s	1.027	0.35	0.22
760	1538	1.34	0.916a	2.438s	1.037	0.34	0.22
780	1579	1.37	0.916a	2.438s	1.047	0.33	0.22
800	1621	1.41	0.916a	2.439s	1.057	0.33	0.22
820	1662	1.45	0.916a	2.439s	1.067	0.32	0.22
840	1703	1.48	0.916a	2.439s	1.077	0.31	0.22

Soundings in mm.-------Other distances in METERS.----------
MAINFUEL.S Reference Point: Long.= 0.916a Trans.= 2.450s Vert.= 0.650
(Zero Sounding is at the Reference Point.)

TANK CHARACTERISTICS, continued
No Trim, No Heel
Tank: MAINFUEL.S, Contents: FUEL OIL at 0.870 Specific Gravity

Snding	Volume LITERS	Weight METRIC TON	Center of Gravity LCG	TCG	VCG	GML	FSM M.-MT
860	1745	1.52	0.916a	2.439s	1.087	0.30	0.22
880	1786	1.55	0.916a	2.440s	1.097	0.30	0.22
900	1827	1.59	0.916a	2.440s	1.107	0.29	0.22
920	1869	1.63	0.916a	2.440s	1.117	0.28	0.22
940	1910	1.66	0.916a	2.440s	1.127	0.28	0.22
960	1952	1.70	0.916a	2.441s	1.137	0.27	0.22
980	1993	1.73	0.916a	2.441s	1.147	0.26	0.22
1000	2034	1.77	0.916a	2.441s	1.157	0.26	0.22
1020	2076	1.81	0.916a	2.441s	1.168	0.25	0.22
1040	2117	1.84	0.916a	2.441s	1.178	0.25	0.22
1060	2137	1.86	0.916a	2.441s	1.182		

Soundings in mm.-------Other distances in METERS.----------
MAINFUEL.S Reference Point: Long.= 0.916a Trans.= 2.450s Vert.= 0.650
(Zero Sounding is at the Reference Point.)

TANK CHARACTERISTICS
No Trim, No Heel
Tank: AUXFUEL.P, Contents: FUEL OIL at 0.870 Specific Gravity

Snding	Volume LITERS	Weight METRIC TON	Center of Gravity LCG	TCG	VCG	GML	FSM M.-MT
0	0	0.00					
20	9	0.01	0.184f	2.355p	0.660	0.85	0.03
40	18	0.02	0.184f	2.360p	0.670	0.43	0.04
60	27	0.02	0.184f	2.365p	0.680	0.29	0.04
80	37	0.03	0.184f	2.370p	0.691	0.22	0.04
100	47	0.04	0.184f	2.375p	0.701	0.18	0.04
120	56	0.05	0.184f	2.380p	0.711	0.15	0.05
140	66	0.06	0.184f	2.386p	0.722	0.13	0.05
160	77	0.07	0.184f	2.391p	0.732	0.11	0.05
180	87	0.08	0.184f	2.396p	0.743	0.10	0.05
200	98	0.08	0.184f	2.401p	0.753	0.09	0.06
220	108	0.09	0.184f	2.406p	0.764	0.08	0.06
240	119	0.10	0.184f	2.410p	0.774	0.08	0.06
260	130	0.11	0.184f	2.413p	0.784	0.07	0.06
280	140	0.12	0.184f	2.416p	0.795	0.06	0.06
300	151	0.13	0.184f	2.419p	0.805	0.06	0.06
320	161	0.14	0.184f	2.421p	0.815	0.06	0.06
340	172	0.15	0.184f	2.422p	0.825	0.05	0.06
360	183	0.16	0.184f	2.424p	0.836	0.05	0.06
380	193	0.17	0.184f	2.425p	0.846	0.05	0.06
400	204	0.18	0.184f	2.427p	0.856	0.04	0.06
420	215	0.19	0.184f	2.428p	0.866	0.04	0.06
440	225	0.20	0.184f	2.429p	0.876	0.04	0.06
460	236	0.21	0.184f	2.430p	0.886	0.04	0.06
480	247	0.21	0.184f	2.431p	0.896	0.04	0.06
500	257	0.22	0.184f	2.432p	0.906	0.03	0.06
520	268	0.23	0.184f	2.432p	0.917	0.03	0.06
540	279	0.24	0.184f	2.433p	0.927	0.03	0.06
560	289	0.25	0.184f	2.434p	0.937	0.03	0.06
580	300	0.26	0.184f	2.434p	0.947	0.03	0.06
600	310	0.27	0.184f	2.435p	0.957	0.03	0.06
620	321	0.28	0.184f	2.435p	0.967	0.03	0.06
640	332	0.29	0.184f	2.436p	0.977	0.03	0.06
660	342	0.30	0.184f	2.436p	0.987	0.03	0.06
680	353	0.31	0.184f	2.437p	0.997	0.03	0.06
700	364	0.32	0.184f	2.437p	1.007	0.02	0.06
720	374	0.33	0.184f	2.437p	1.017	0.02	0.06
740	385	0.33	0.184f	2.438p	1.027	0.02	0.06
760	396	0.34	0.184f	2.438p	1.037	0.02	0.06
780	406	0.35	0.184f	2.438p	1.047	0.02	0.06
800	417	0.36	0.184f	2.439p	1.057	0.02	0.06
820	428	0.37	0.184f	2.439p	1.067	0.02	0.06
840	438	0.38	0.184f	2.439p	1.077	0.02	0.06

Soundings in mm.-------Other distances in METERS.----------
AUXFUEL.P Reference Point: Long.= 0.184f Trans.= 2.450p Vert.= 0.650
(Zero Sounding is at the Reference Point.)

TANK CHARACTERISTICS, continued
No Trim, No Heel
Tank: AUXFUEL.P, Contents: FUEL OIL at 0.870 Specific Gravity

Snding	Volume LITERS	Weight METRIC TON	Center of Gravity LCG	TCG	VCG	GML	FSM M.-MT
860	449	0.39	0.184f	2.439p	1.087	0.02	0.06
880	460	0.40	0.184f	2.440p	1.097	0.02	0.06
900	470	0.41	0.184f	2.440p	1.107	0.02	0.06
920	481	0.42	0.184f	2.440p	1.117	0.02	0.06
940	491	0.43	0.184f	2.440p	1.127	0.02	0.06
960	502	0.44	0.184f	2.441p	1.137	0.02	0.06
980	513	0.45	0.184f	2.441p	1.147	0.02	0.06
1000	523	0.46	0.184f	2.441p	1.157	0.02	0.06
1020	534	0.46	0.184f	2.441p	1.168	0.02	0.06
1040	545	0.47	0.184f	2.441p	1.178	0.02	0.06
1060	550	0.48	0.184f	2.441p	1.182		

Soundings in mm.-------Other distances in METERS.----------
AUXFUEL.P Reference Point: Long.= 0.184f Trans.= 2.450p Vert.= 0.650
(Zero Sounding is at the Reference Point.)

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E.Y.E. Marine Consultants
MURRAY

TANK CHARACTERISTICS
No Trim, No Heel
Tank: AUXFUEL.S, Contents: FUEL OIL at 0.870 Specific Gravity

Snding	Volume LITERS	Weight METRIC TON	Center of Gravity LCG	TCG	VCG	GML	FSM M.-MT
0	0	0.00					
20	9	0.01	0.184f	2.355s	0.660	0.85	0.03
40	18	0.02	0.184f	2.360s	0.670	0.43	0.04
60	27	0.02	0.184f	2.365s	0.680	0.29	0.04
80	37	0.03	0.184f	2.370s	0.691	0.22	0.04
100	47	0.04	0.184f	2.375s	0.701	0.18	0.04
120	56	0.05	0.184f	2.380s	0.711	0.15	0.05
140	66	0.06	0.184f	2.386s	0.722	0.13	0.05
160	77	0.07	0.184f	2.391s	0.732	0.11	0.05
180	87	0.08	0.184f	2.396s	0.743	0.10	0.05
200	98	0.08	0.184f	2.401s	0.753	0.09	0.06
220	108	0.09	0.184f	2.406s	0.764	0.08	0.06
240	119	0.10	0.184f	2.410s	0.774	0.08	0.06
260	130	0.11	0.184f	2.413s	0.784	0.07	0.06
280	140	0.12	0.184f	2.416s	0.795	0.06	0.06
300	151	0.13	0.184f	2.419s	0.805	0.06	0.06
320	161	0.14	0.184f	2.421s	0.815	0.06	0.06
340	172	0.15	0.184f	2.422s	0.825	0.05	0.06
360	183	0.16	0.184f	2.424s	0.836	0.05	0.06
380	193	0.17	0.184f	2.425s	0.846	0.05	0.06
400	204	0.18	0.184f	2.427s	0.856	0.04	0.06
420	215	0.19	0.184f	2.428s	0.866	0.04	0.06
440	225	0.20	0.184f	2.429s	0.876	0.04	0.06
460	236	0.21	0.184f	2.430s	0.886	0.04	0.06
480	247	0.21	0.184f	2.431s	0.896	0.04	0.06
500	257	0.22	0.184f	2.432s	0.906	0.03	0.06
520	268	0.23	0.184f	2.432s	0.917	0.03	0.06
540	279	0.24	0.184f	2.433s	0.927	0.03	0.06
560	289	0.25	0.184f	2.434s	0.937	0.03	0.06
580	300	0.26	0.184f	2.434s	0.947	0.03	0.06
600	310	0.27	0.184f	2.435s	0.957	0.03	0.06
620	321	0.28	0.184f	2.435s	0.967	0.03	0.06
640	332	0.29	0.184f	2.436s	0.977	0.03	0.06
660	342	0.30	0.184f	2.436s	0.987	0.03	0.06
680	353	0.31	0.184f	2.437s	0.997	0.03	0.06
700	364	0.32	0.184f	2.437s	1.007	0.02	0.06
720	374	0.33	0.184f	2.437s	1.017	0.02	0.06
740	385	0.33	0.184f	2.438s	1.027	0.02	0.06
760	396	0.34	0.184f	2.438s	1.037	0.02	0.06
780	406	0.35	0.184f	2.438s	1.047	0.02	0.06
800	417	0.36	0.184f	2.439s	1.057	0.02	0.06
820	428	0.37	0.184f	2.439s	1.067	0.02	0.06
840	438	0.38	0.184f	2.439s	1.077	0.02	0.06

Soundings in mm.-------Other distances in METERS.----------
AUXFUEL.S Reference Point: Long.= 0.184f Trans.= 2.450s Vert.= 0.650
(Zero Sounding is at the Reference Point.)

TANK CHARACTERISTICS, continued
No Trim, No Heel
Tank: AUXFUEL.S, Contents: FUEL OIL at 0.870 Specific Gravity

Snding	Volume LITERS	Weight METRIC TON	Center of Gravity LCG	TCG	VCG	GML	FSM M.-MT
860	449	0.39	0.184f	2.439s	1.087	0.02	0.06
880	460	0.40	0.184f	2.440s	1.097	0.02	0.06
900	470	0.41	0.184f	2.440s	1.107	0.02	0.06
920	481	0.42	0.184f	2.440s	1.117	0.02	0.06
940	491	0.43	0.184f	2.440s	1.127	0.02	0.06
960	502	0.44	0.184f	2.441s	1.137	0.02	0.06
980	513	0.45	0.184f	2.441s	1.147	0.02	0.06
1000	523	0.46	0.184f	2.441s	1.157	0.02	0.06
1020	534	0.46	0.184f	2.441s	1.168	0.02	0.06
1040	545	0.47	0.184f	2.441s	1.178	0.02	0.06
1060	550	0.48	0.184f	2.441s	1.182		

Soundings in mm.-------Other distances in METERS.----------
AUXFUEL.S Reference Point: Long.= 0.184f Trans.= 2.450s Vert.= 0.650
(Zero Sounding is at the Reference Point.)

TANK CHARACTERISTICS
No Trim, No Heel
Tank: FW.P, Contents: FRESH WATER at 1.000 Specific Gravity

Snding	Volume LITERS	Weight METRIC TON	Center of Gravity LCG	TCG	VCG	GML	FSM M.-MT
0	0	0.00					
20	1	0.00	2.696f	2.816p	1.114	6.75	0.00
40	3	0.00	2.696f	2.816p	1.128	3.38	0.00
60	8	0.01	2.696f	2.816p	1.141	2.25	0.00
80	14	0.01	2.696f	2.816p	1.154	1.69	0.00
100	21	0.02	2.696f	2.816p	1.167	1.27	0.01
120	30	0.03	2.696f	2.816p	1.180	0.95	0.01
140	38	0.04	2.696f	2.816p	1.191	0.77	0.01
160	47	0.05	2.696f	2.816p	1.202	0.64	0.01
180	56	0.06	2.696f	2.816p	1.213	0.56	0.01
200	65	0.07	2.696f	2.816p	1.225	0.49	0.01
220	75	0.07	2.696f	2.816p	1.236	0.44	0.01
240	85	0.08	2.696f	2.816p	1.247	0.40	0.01
260	95	0.10	2.696f	2.816p	1.258	0.37	0.01
280	106	0.11	2.696f	2.816p	1.269	0.34	0.02
300	116	0.12	2.696f	2.816p	1.281	0.32	0.02
320	127	0.13	2.696f	2.816p	1.292	0.30	0.02
340	138	0.14	2.696f	2.816p	1.303	0.26	0.02
360	149	0.15	2.696f	2.816p	1.314	0.24	0.02
380	160	0.16	2.696f	2.816p	1.324	0.22	0.01
400	170	0.17	2.696f	2.816p	1.334	0.20	0.01
420	180	0.18	2.696f	2.816p	1.344	0.18	0.01
440	189	0.19	2.696f	2.816p	1.353	0.17	0.01
460	198	0.20	2.696f	2.816p	1.362	0.15	0.01
480	207	0.21	2.696f	2.816p	1.371	0.14	0.01
500	216	0.22	2.696f	2.816p	1.380	0.13	0.01
520	224	0.22	2.696f	2.816p	1.389	0.12	0.01
540	232	0.23	2.696f	2.816p	1.397	0.11	0.01
560	239	0.24	2.696f	2.816p	1.405	0.09	0.00
580	245	0.24	2.696f	2.816p	1.410	0.06	0.00
600	248	0.25	2.696f	2.816p	1.414	0.04	0.00
620	250	0.25	2.696f	2.816p	1.417	0.01	0.00
640	251	0.25	2.696f	2.816p	1.417		

Soundings in mm.-------Other distances in METERS.----------
FW.P Reference Point: Long.= 2.696f Trans.= 2.816p Vert.= 1.101
(Zero Sounding is at the Reference Point.)

TANK CHARACTERISTICS
No Trim, No Heel
Tank: FW.S, Contents: FRESH WATER at 1.000 Specific Gravity

Snding	Volume LITERS	Weight METRIC TON	Center of Gravity LCG	TCG	VCG	GML	FSM M.-MT
0	0	0.00					
20	1	0.00	2.696f	2.816s	1.114	6.75	0.00
40	3	0.00	2.696f	2.816s	1.128	3.38	0.00
60	8	0.01	2.696f	2.816s	1.141	2.25	0.00
80	14	0.01	2.696f	2.816s	1.154	1.69	0.00
100	21	0.02	2.696f	2.816s	1.167	1.27	0.01
120	30	0.03	2.696f	2.816s	1.180	0.95	0.01
140	38	0.04	2.696f	2.816s	1.191	0.77	0.01
160	47	0.05	2.696f	2.816s	1.202	0.64	0.01
180	56	0.06	2.696f	2.816s	1.213	0.56	0.01
200	65	0.07	2.696f	2.816s	1.225	0.49	0.01
220	75	0.07	2.696f	2.816s	1.236	0.44	0.01
240	85	0.08	2.696f	2.816s	1.247	0.40	0.01
260	95	0.10	2.696f	2.816s	1.258	0.37	0.01
280	106	0.11	2.696f	2.816s	1.269	0.34	0.02
300	116	0.12	2.696f	2.816s	1.281	0.32	0.02
320	127	0.13	2.696f	2.816s	1.292	0.30	0.02
340	138	0.14	2.696f	2.816s	1.303	0.26	0.02
360	149	0.15	2.696f	2.816s	1.314	0.24	0.02
380	160	0.16	2.696f	2.816s	1.324	0.22	0.01
400	170	0.17	2.696f	2.816s	1.334	0.20	0.01
420	180	0.18	2.696f	2.816s	1.344	0.18	0.01
440	189	0.19	2.696f	2.816s	1.353	0.17	0.01
460	198	0.20	2.696f	2.816s	1.362	0.15	0.01
480	207	0.21	2.696f	2.816s	1.371	0.14	0.01
500	216	0.22	2.696f	2.816s	1.380	0.13	0.01
520	224	0.22	2.696f	2.816s	1.389	0.12	0.01
540	232	0.23	2.696f	2.816s	1.397	0.11	0.01
560	239	0.24	2.696f	2.816s	1.405	0.09	0.00
580	245	0.24	2.696f	2.816s	1.410	0.06	0.00
600	248	0.25	2.696f	2.816s	1.414	0.04	0.00
620	250	0.25	2.696f	2.816s	1.417	0.01	0.00
640	251	0.25	2.696f	2.816s	1.417		

Soundings in mm.-------Other distances in METERS.----------
FW.S Reference Point: Long.= 2.696f Trans.= 2.816s Vert.= 1.101
(Zero Sounding is at the Reference Point.)

TANK CHARACTERISTICS
No Trim, No Heel
Tank: SEWAGE.P, Contents: SEWAGE at 1.025 Specific Gravity

Snding	Volume LITERS	Weight METRIC TON	Center of Gravity LCG	TCG	VCG	GML	FSM M.-MT
0	0	0.00					
10	3	0.00	1.334f	2.485p	0.411	1.94	0.01
20	6	0.01	1.334f	2.485p	0.416	0.97	0.01
30	9	0.01	1.334f	2.485p	0.421	0.65	0.01
40	11	0.01	1.334f	2.485p	0.426	0.48	0.01
50	14	0.01	1.334f	2.485p	0.431	0.39	0.01
60	17	0.02	1.334f	2.485p	0.436	0.32	0.01
70	20	0.02	1.334f	2.485p	0.441	0.28	0.01
80	23	0.02	1.334f	2.485p	0.446	0.24	0.01
90	26	0.03	1.334f	2.485p	0.451	0.22	0.01
100	28	0.03	1.334f	2.485p	0.456	0.19	0.01
110	31	0.03	1.334f	2.485p	0.461	0.18	0.01
120	34	0.04	1.334f	2.485p	0.466	0.16	0.01
130	37	0.04	1.334f	2.485p	0.471	0.15	0.01
140	40	0.04	1.334f	2.485p	0.476	0.14	0.01
150	43	0.04	1.334f	2.485p	0.481	0.13	0.01
160	46	0.05	1.334f	2.485p	0.486	0.12	0.01
170	48	0.05	1.334f	2.485p	0.491	0.11	0.01
180	51	0.05	1.334f	2.485p	0.496	0.11	0.01
190	54	0.06	1.334f	2.485p	0.501	0.10	0.01
200	57	0.06	1.334f	2.485p	0.506	0.10	0.01
210	60	0.06	1.334f	2.485p	0.511	0.09	0.01
220	63	0.06	1.334f	2.485p	0.516	0.09	0.01
230	65	0.07	1.334f	2.485p	0.521	0.08	0.01
240	68	0.07	1.334f	2.485p	0.526	0.08	0.01
250	71	0.07	1.334f	2.485p	0.531	0.08	0.01
260	74	0.08	1.334f	2.485p	0.536	0.07	0.01
270	77	0.08	1.334f	2.485p	0.541	0.07	0.01
280	80	0.08	1.334f	2.485p	0.546	0.07	0.01
290	83	0.08	1.334f	2.485p	0.551	0.07	0.01
300	85	0.09	1.334f	2.485p	0.556	0.06	0.01
310	88	0.09	1.334f	2.485p	0.561	0.06	0.01
320	91	0.09	1.334f	2.485p	0.566	0.06	0.01
330	94	0.10	1.334f	2.485p	0.571	0.06	0.01
340	97	0.10	1.334f	2.485p	0.576	0.06	0.01
350	100	0.10	1.334f	2.485p	0.581	0.06	0.01
360	103	0.11	1.334f	2.485p	0.586	0.05	0.01
370	105	0.11	1.334f	2.485p	0.591	0.05	0.01
380	108	0.11	1.334f	2.485p	0.596	0.05	0.01
390	111	0.11	1.334f	2.485p	0.601	0.05	0.01
400	114	0.12	1.334f	2.485p	0.606	0.05	0.01
410	115	0.12	1.334f	2.485p	0.609		

Soundings in mm.-------Other distances in METERS.----------
SEWAGE.P Reference Point: Long.= 1.334f Trans.= 2.485p Vert.= 0.406
(Zero Sounding is at the Reference Point.)

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HYDROSTATIC PROPERTIES

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E.Y.E. Marine Consultants
MURRAY

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HYDROSTATIC PROPERTIES
No Trim, No Heel, VCG = 0.000

Draft@ Origin	Displacement Weight(MT)	Buoyancy-Ctr. LCB	VCB	Weight/ CM	LCF	Moment/ CM trim	KML	KMT
0.250	6.64	1.800a	0.164	0.51	1.834a	0.50	131.87	38.943
0.275	8.02	1.827a	0.181	0.58	1.976a	0.57	124.36	37.126
0.300	9.50	1.837a	0.197	0.60	1.854a	0.59	109.94	32.342
0.325	11.01	1.830a	0.213	0.61	1.768a	0.62	98.43	28.426
0.350	12.56	1.809a	0.229	0.62	1.660a	0.64	89.71	25.623
0.375	14.12	1.789a	0.243	0.63	1.608a	0.66	81.94	23.064
0.400	15.70	1.768a	0.258	0.64	1.559a	0.67	75.57	20.988
0.425	17.30	1.746a	0.272	0.64	1.513a	0.69	70.21	19.269
0.450	18.91	1.723a	0.286	0.65	1.467a	0.71	65.72	17.830
0.475	20.54	1.699a	0.300	0.66	1.392a	0.73	62.39	16.696
0.500	22.19	1.674a	0.314	0.66	1.359a	0.74	58.84	15.601
0.525	23.85	1.650a	0.328	0.67	1.326a	0.76	55.76	14.652
0.550	25.52	1.627a	0.342	0.67	1.293a	0.77	53.05	13.820
0.575	27.20	1.604a	0.355	0.68	1.221a	0.79	51.28	13.168
0.600	28.91	1.580a	0.369	0.68	1.196a	0.81	49.00	12.495
0.625	30.63	1.557a	0.383	0.69	1.170a	0.82	46.97	11.895
0.650	32.35	1.535a	0.396	0.69	1.144a	0.83	45.15	11.357
0.675	34.09	1.513a	0.410	0.70	1.119a	0.84	43.48	10.869
0.700	35.84	1.492a	0.424	0.70	1.095a	0.85	41.92	10.422
0.725	37.61	1.471a	0.437	0.71	1.030a	0.88	41.04	10.070
0.750	39.39	1.449a	0.451	0.71	1.012a	0.89	39.64	9.688
0.775	41.17	1.428a	0.464	0.72	0.993a	0.90	38.36	9.339
0.800	42.97	1.408a	0.478	0.72	0.975a	0.91	37.17	9.018
0.825	44.77	1.390a	0.491	0.72	0.963a	0.92	35.97	8.732
0.850	46.58	1.373a	0.505	0.72	0.945a	0.93	34.96	8.466
0.875	48.39	1.356a	0.518	0.73	0.927a	0.94	34.02	8.218
0.900	50.22	1.338a	0.531	0.74	0.864a	0.96	33.67	8.026
0.925	52.06	1.321a	0.545	0.74	0.849a	0.97	32.80	7.805
0.950	53.91	1.304a	0.558	0.74	0.826a	0.98	31.91	7.612
0.975	55.86	1.302a	0.573	0.83	1.729a	1.34	42.21	8.204
1.000	57.94	1.317a	0.588	0.83	1.711a	1.35	41.04	7.959

Distances in METERS.-----Specific Gravity = 1.025.----------Moment in M.-MT.
Trim is per 17.60M.

Draft is from BL.

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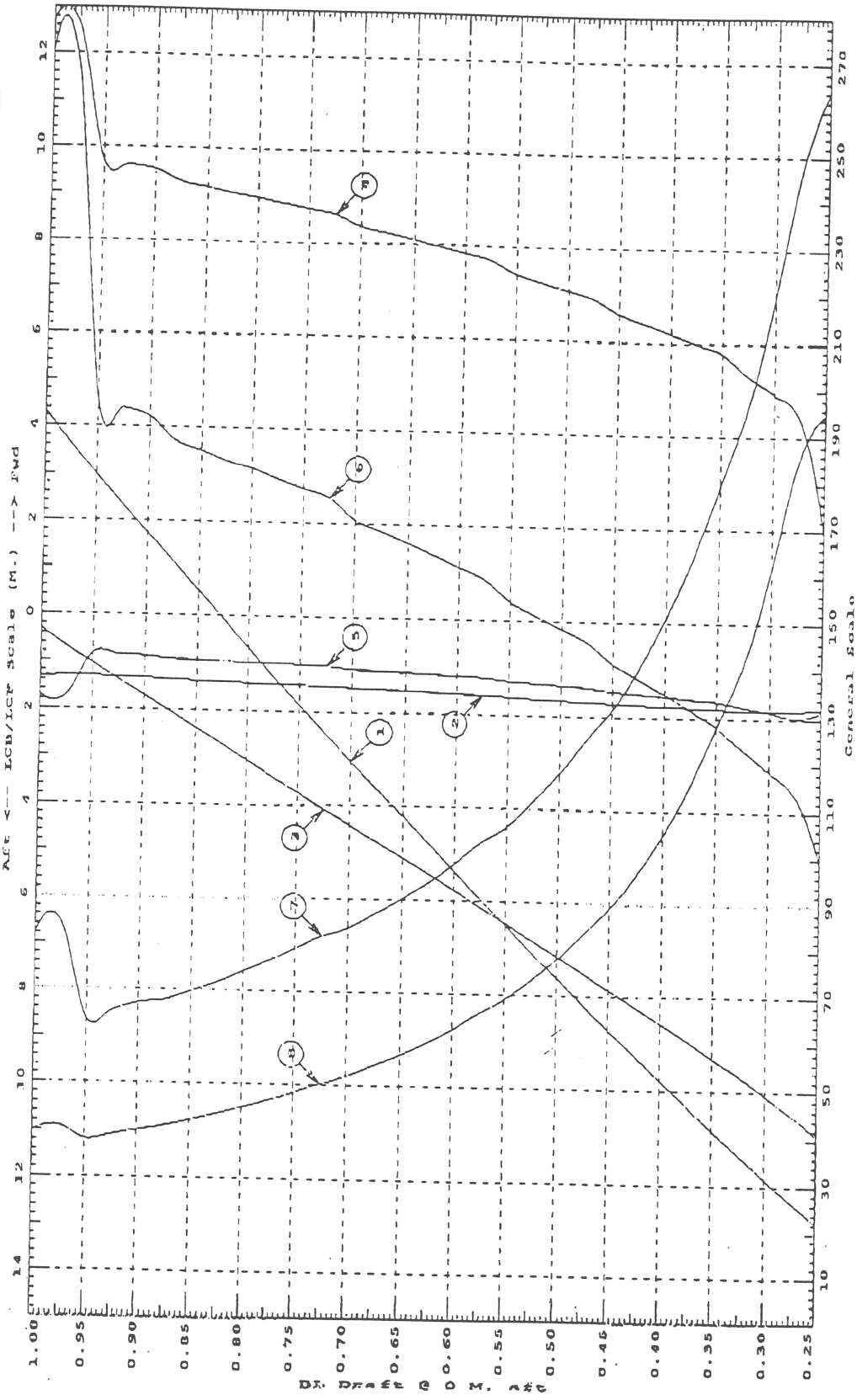
MURRAY

HYDROSTATIC PROPERTIES at LEVEL TRIM



(1) Displacement 1=.3 MT
(2) LCB (use top scale)
(3) VCB (KB) 1=.004 M.
(4) Immersion 1=.003 MT/CM
(4) WPA 1=.293 Sq.M.
(5) LCF (use top scale)
(6) Moment/Trim 1=.005 M.-MT/CM
(7) KML 1=.5 M.
(8) KMT 1=.2 M.

Specific Gravity = 1.025 Assumed KG = 0.00 M.
Trim is per 17.596 M. "K" = Baseline

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CROSS CURVES OF STABILITY
Showing righting arms in heel at VCG = 0.00
Trim: zero at zero heel (trim righting arm held at zero)

Displacement METRIC TONS	Heel Angles in Degrees 5.00s	10.00s	20.00s	30.00s	40.00s
30.00	1.059s	1.994s	2.450s	2.488s	2.471s
32.00	1.005s	1.923s	2.452s	2.489s	2.473s
34.00	0.957s	1.859s	2.454s	2.490s	2.474s
36.00	0.915s	1.798s	2.456s	2.493s	2.473s
38.00	0.878s	1.742s	2.458s	2.496s	2.471s
40.00	0.846s	1.689s	2.461s	2.499s	2.468s
42.00	0.817s	1.639s	2.463s	2.503s	2.465s
44.00	0.792s	1.593s	2.466s	2.505s	2.462s
46.00	0.769s	1.548s	2.469s	2.507s	2.459s
48.00	0.748s	1.506s	2.472s	2.508s	2.455s
50.00	0.729s	1.465s	2.474s	2.508s	2.451s
52.00	0.712s	1.427s	2.467s	2.507s	2.447s
54.00	0.696s	1.391s	2.446s	2.504s	2.443s
56.00	0.681s	1.359s	2.411s	2.501s	2.438s
58.00	0.668s	1.328s	2.371s	2.495s	2.432s
60.00	0.656s	1.299s	2.331s	2.488s	2.424s

METRIC TONS	50.00s	60.00s	@ Flooding Arm	Angle
30.00	2.365s	2.166s		
32.00	2.364s	2.163s		
34.00	2.361s	2.159s		
36.00	2.358s	2.154s	2.154s	60.00s
38.00	2.354s	2.149s	2.195s	58.03s
40.00	2.349s	2.143s	2.245s	55.51s
42.00	2.343s	2.137s	2.288s	53.12s
44.00	2.337s	2.131s	2.337s	50.00s
46.00	2.331s	2.124s	2.355s	48.48s
48.00	2.324s	2.118s	2.385s	46.00s
50.00	2.318s	2.111s	2.413s	43.52s
52.00	2.312s	2.104s	2.447s	40.00s
54.00	2.306s	2.098s	2.460s	38.20s
56.00	2.299s	2.091s	2.480s	34.88s
58.00	2.292s	2.084s	2.491s	31.22s
60.00	2.285s	2.077s	2.491s	27.36s

Distances in METERS.---Specific Gravity = 1.025.---

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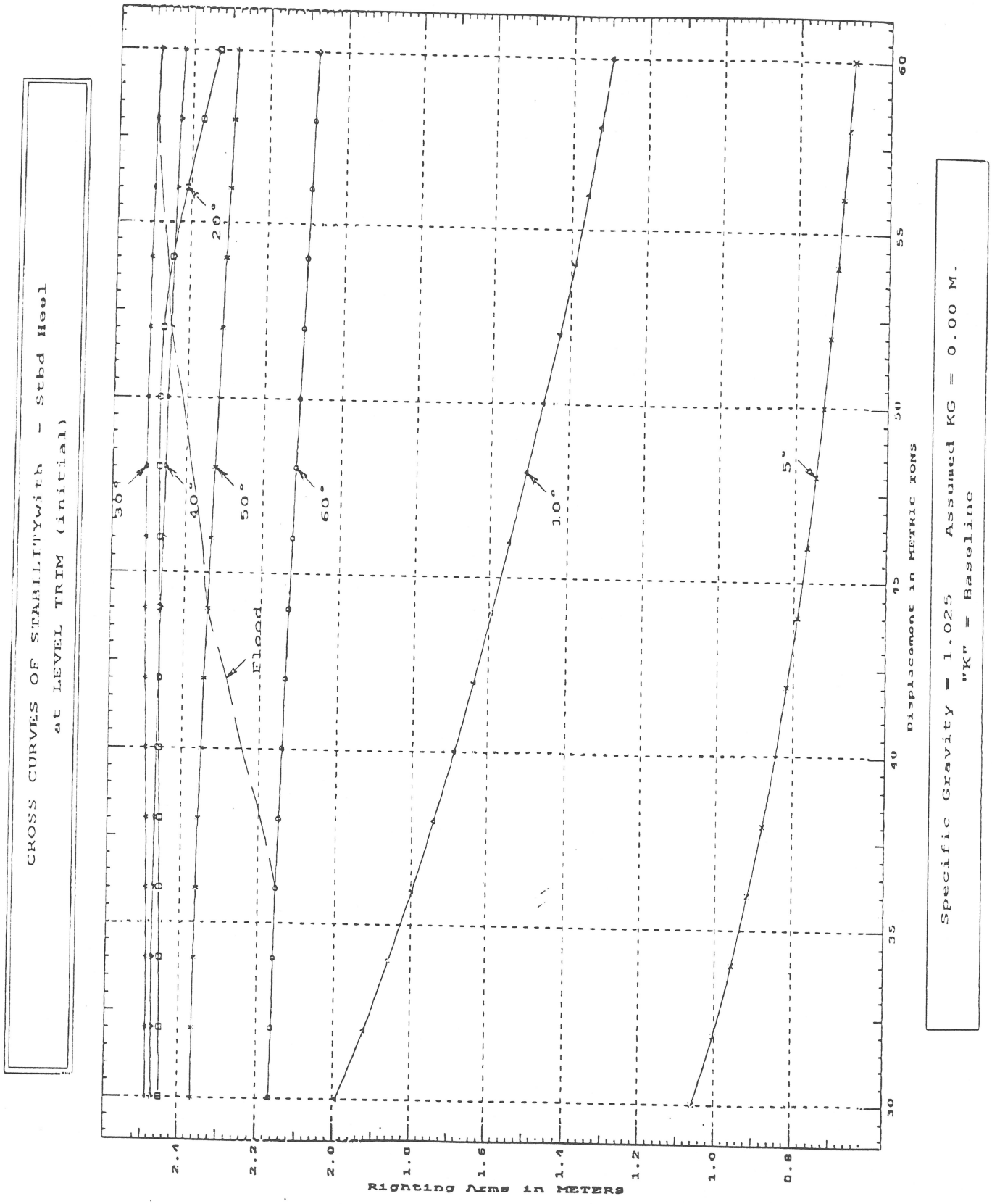
MURRAY



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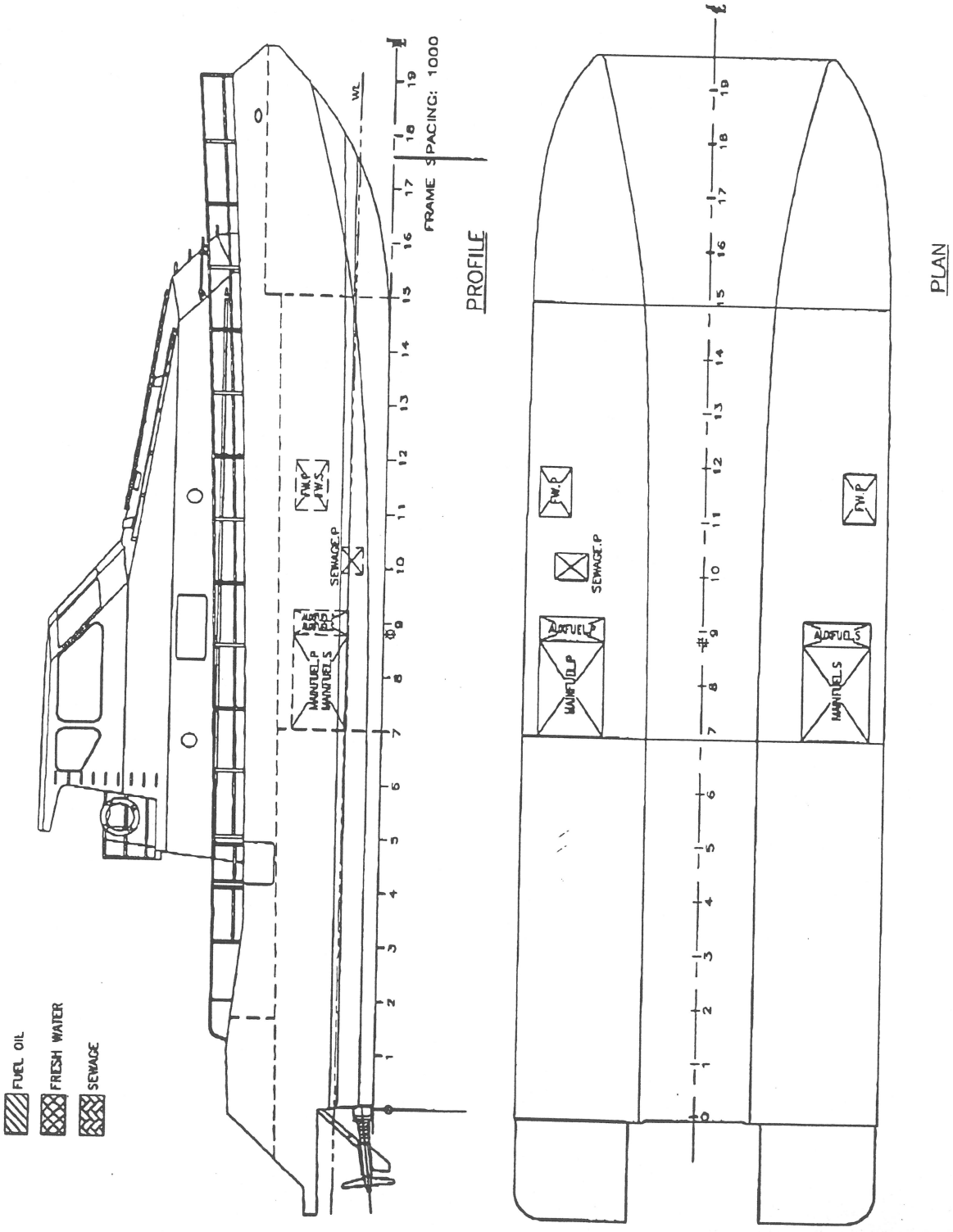
INTACT LOADING CONDITIONS

EYE Marine Consultants
"MURRAY"

CONDITION NUMBER 1
LIGHTSHIP
*** NON OPERATIONAL CONDITION ***



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MURRAY

CONDITION NUMBER 1

LIGHTSHIP **Non Operational Condition**
WEIGHT STATUS
Trim: Aft 0.119/17.596, Heel: Port 0.28 deg.

Part	Weight(MT)	LCG	TCG	VCG	FSM
WEIGHT	34.59	1.766a	0.033p	4.135	

Load	SpGr	Weight(MT)	LCG	TCG	VCG
Total Tanks--------->		0.00			
Distances in METERS.----------					0.00
					Moments in M.-MT.

HYDROSTATIC REPORT ON THE EQUILIBRIUM WATERLINE
DISPLACEMENT and WATERPLANE STATUS
BL draft: 0.615 @ 8.79f, 0.734 @ 8.81a
Trim: Aft 0.119/17.596, Heel: Port 0.28 deg.

Part	SpGr	Displ(MT)	LCB	TCB	VCB	RefHt
HULL	1.025	34.59	1.791a	0.051p	0.415	-0.674

Part	SpGr	WPA	LCF	TCF	BML	BMT
Total Waterplane---->	1.025	67.5	1.184a	0.014p	41.35	10.244

	MT/CM	M.-MT/CM	GML	GMT
	0.69	0.74	37.63	6.524
Distances in METERS.----------				

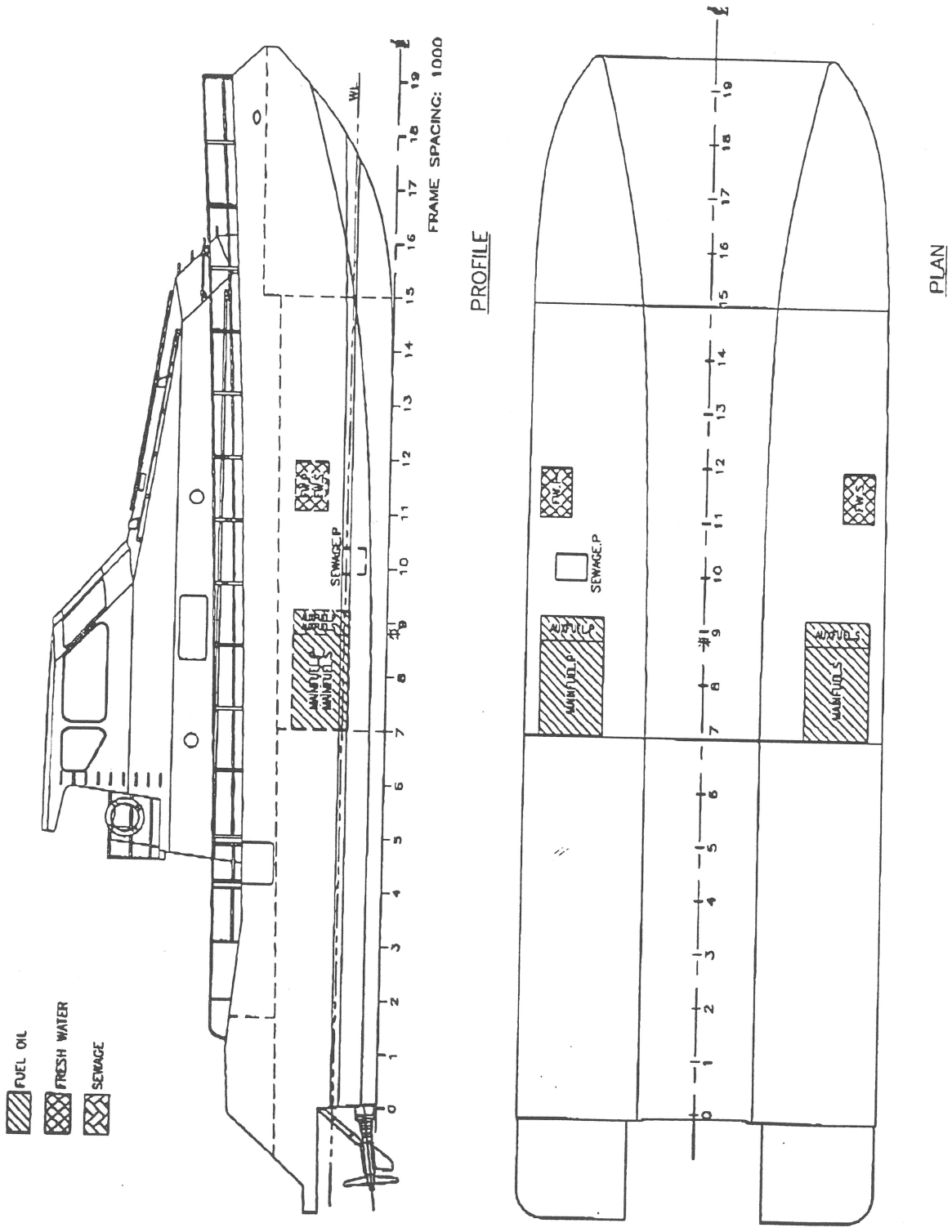
HYDROSTATIC PROPERTIES
Trim: Aft 0.119/17.596, Heel: Port 0.28 deg., VCG = 4.135

Draft@ Origin	Displacement Weight(MT)	Buoyancy-Ctr. LCB	VCB	Weight/ Moment/ CM	LCF	CM trim	GML	GMT
0.674	34.59	1.791a	0.415	0.69	1.184a	0.74	37.63	6.524

Distances in METERS.-----Specific Gravity = 1.025.----------Moment in M.-MT.
Trim is per 17.60M.
Draft is from BL.

DRAFT REPORT
BL draft: 0.615 @ 8.79f, 0.734 @ 8.81a

CONDITION NUMBER 2
FULLY LOADED DEPARTURE
*** WORST OPERATING ***



CONDITION NUMBER 2
FULLY LOADED DEPARTURE
WEIGHT STATUS
Trim: Aft 0.067/17.596, Heel: Port 0.18 deg.

Part	Load	SpGr	Weight(MT)	LCG	TCG	VCG	FSM
LIGHT SHIP			34.59	1.766a	0.033p	4.135	
CREW			0.40	0.375a	0.250s	4.155	
Total Fixed--------->			34.99	1.750a	0.030p	4.135	
MAINFUEL.S	0.980	0.870	1.82	0.917a	2.441s	1.172	0.22
MAINFUEL.P	0.920	0.870	1.71	0.917a	2.441p	1.141	0.22
AUXFUEL.S	0.950	0.870	0.45	0.184f	2.441s	1.157	0.06
AUXFUEL.P	0.950	0.870	0.45	0.184f	2.441p	1.157	0.06
FW.S	0.950	1.000	0.24	2.696f	2.816s	1.403	0.00
FW.P	0.950	1.000	0.24	2.696f	2.816p	1.403	0.00
Total Tanks--------->			4.92	0.364a	0.055s	1.181	0.55
Total Weight-------->			39.91	1.579a	0.019p	3.771	
Free Surface Adjustment---------->						0.014	
Adjusted CG---------->				1.579a	0.019p	3.785	

Distances in METERS.----------Moments in M.-MT.

HYDROSTATIC REPORT ON THE EQUILIBRIUM WATERLINE
DISPLACEMENT and WATERPLANE STATUS
BL draft: 0.720 @ 8.79f, 0.787 @ 8.81a
Trim: Aft 0.067/17.596, Heel: Port 0.18 deg.

Part	SpGr	Displ(MT)	LCB	TCB	VCB	RefHt
HULL	1.025	39.91	1.591a	0.029p	0.455	-0.753

Part	SpGr	WPA	LCF	TCF	BML	BMT
Total Waterplane---->	1.025	69.2	1.036a	0.013p	38.10	9.084

MT/CM	M.-MT/CM	GML	GMT
0.71	0.79	34.78	5.768

Distances in METERS.----------

HYDROSTATIC PROPERTIES
Trim: Aft 0.067/17.596, Heel: Port 0.18 deg., VCG = 3.771

Draft@ Origin	Displacement Weight(MT)	Buoyancy-Ctr. LCB	VCB	Weight/ CM	Moment/ LCF	CM trim	GML	GMT
0.753	39.91	1.591a	0.455	0.71	1.036a	0.79	34.78	5.768

Distances in METERS.-----Specific Gravity = 1.025.----------Moment in M.-MT.
Trim is per 17.60M.
Draft is from BL.
True Free Surface included.

DRAFT REPORT
BL draft: 0.720 @ 8.79f, 0.787 @ 8.81a

CCG STABILITY ASSESSMENT

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RIGHTING ARMS vs HEEL ANGLE

Fixed CG: LCG = 1.750a TCG = 0.030p VCG = 4.135

Origin Depth	Degrees of Trim	Heel	Displacement Weight(MT)	Righting Arms in Trim	in Heel	--> Area	Flood Pt --Height
0.753	0.22a	0.00	39.90	0.000	0.019s	0.0000	1.405(1)
0.753	0.22a	0.18p	39.91	0.000	0.000p	-0.0000	1.397(1)
0.751	0.23a	2.50p	39.91	0.000	0.237p	0.0048	1.288(1)
0.747	0.24a	3.84p	39.90	0.000	0.375p	0.0119	1.226(1)
0.742	0.23a	5.18p	39.90	0.000	0.519p	0.0224	1.167(1)
0.728	0.21a	7.68p	39.91	0.000	0.788p	0.0508	1.058(1)
0.705	0.22a	10.18p	39.90	0.000	1.031p	0.0905	0.951(1)
0.668	0.24a	12.68p	39.90	0.000	1.213p	0.1395	0.853(1)
0.652	0.26a	13.49p	39.91	0.000	1.258p	0.1569	Deck Imm.
0.614	0.31a	15.18p	39.91	0.000	1.327p	0.1951	0.761(1)
0.592	0.37a	15.95p	39.91	0.000	1.340p	0.2130	0.734(1)
0.523	0.45a	17.68p	39.91	0.000	1.276p	0.2526	0.697(1)
0.413	0.47a	20.18p	39.90	0.000	1.139p	0.3056	0.663(1)
0.303	0.49a	22.68p	39.90	0.000	1.002p	0.3524	0.628(1)
0.192	0.51a	25.18p	39.90	0.000	0.863p	0.3930	0.592(1)
0.081	0.53a	27.68p	39.91	0.000	0.723p	0.4276	0.555(1)
-0.023	0.55a	30.00p	39.90	0.000	0.593p	0.4543	0.518(1)
-0.031	0.55a	30.18p	39.91	0.000	0.583p	0.4561	0.515(1)
-0.143	0.59a	32.68p	39.90	0.000	0.441p	0.4784	0.473(1)
-0.253	0.64a	35.18p	39.91	0.000	0.299p	0.4946	0.427(1)
-0.363	0.71a	37.68p	39.90	0.000	0.156p	0.5045	0.378(1)
-0.462	0.78a	40.00p	39.90	0.000	0.022p	0.5082	0.329(1)
-0.469	0.78a	40.18p	39.91	0.000	0.012p	0.5082	0.325(1)
-0.478	0.79a	40.38p	39.91	0.000	0.000p	0.5082	0.320(1)
-0.575	0.86a	42.68p	39.90	0.000	-0.133p	0.5056	0.269(1)
-0.678	0.96a	45.18p	39.90	0.000	-0.279p	0.4966	0.210(1)
-0.780	1.06a	47.68p	39.89	0.000	-0.425p	0.4812	0.149(1)
-0.879	1.16a	50.18p	39.91	0.000	-0.572p	0.4595	0.086(1)
-0.977	1.27a	52.68p	39.90	0.000	-0.718p	0.4313	0.022(1)
-1.011	1.31a	53.55p	39.91	0.000	-0.769p	0.4200	-0.000(1)
-1.073	1.38a	55.18p	39.90	0.000	-0.864p	0.3968	-0.042(1)
-1.167	1.49a	57.68p	39.90	0.000	-1.009p	0.3559	-0.106(1)
-1.257	1.59a	60.18p	39.91	0.002a	-1.151p	0.3088	-0.171(1)

Distances in METERS.----Specific Gravity = 1.025.---------Area in M.-Rad.

Note: The Center of Gravity shown above is for the Fixed Weight of 34.99 MT. As the tank load centers shift with heel and trim, the total Center of Gravity varies. The righting arms shown above include the effect of the C.G. variation.

Critical Point		LCP	TCP	VCP
(1) Exhaust Plenum	FLOOD	7.883a	2.650	2.189

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LIN----------CCG STAB 6 CRITERION----------		Min/Max--------		Attained	
(1) GM Upright	>	0.150	M.	5.774	P
(2) Area from Equilibrium to abs 30 deg or Flood	>	0.0550	M.-Rad	0.4543	P
(3) Area from Equilibrium to abs 40 deg or RAzero	>	0.0900	M.-Rad	0.5082	P
(4) Area from abs 30 deg to abs 40 or RAzero	>	0.0300	M.-Rad	0.0539	P
(5) Angle from abs 0 deg to MaxRA	>	25.00	deg	15.95	F
(6) Righting Arm at abs 30 deg or MaxRA	>	0.200	M.	0.593	P
(7) Angle from abs 0 deg to Deck/margin Immersion	>	0.00	deg	13.49	P

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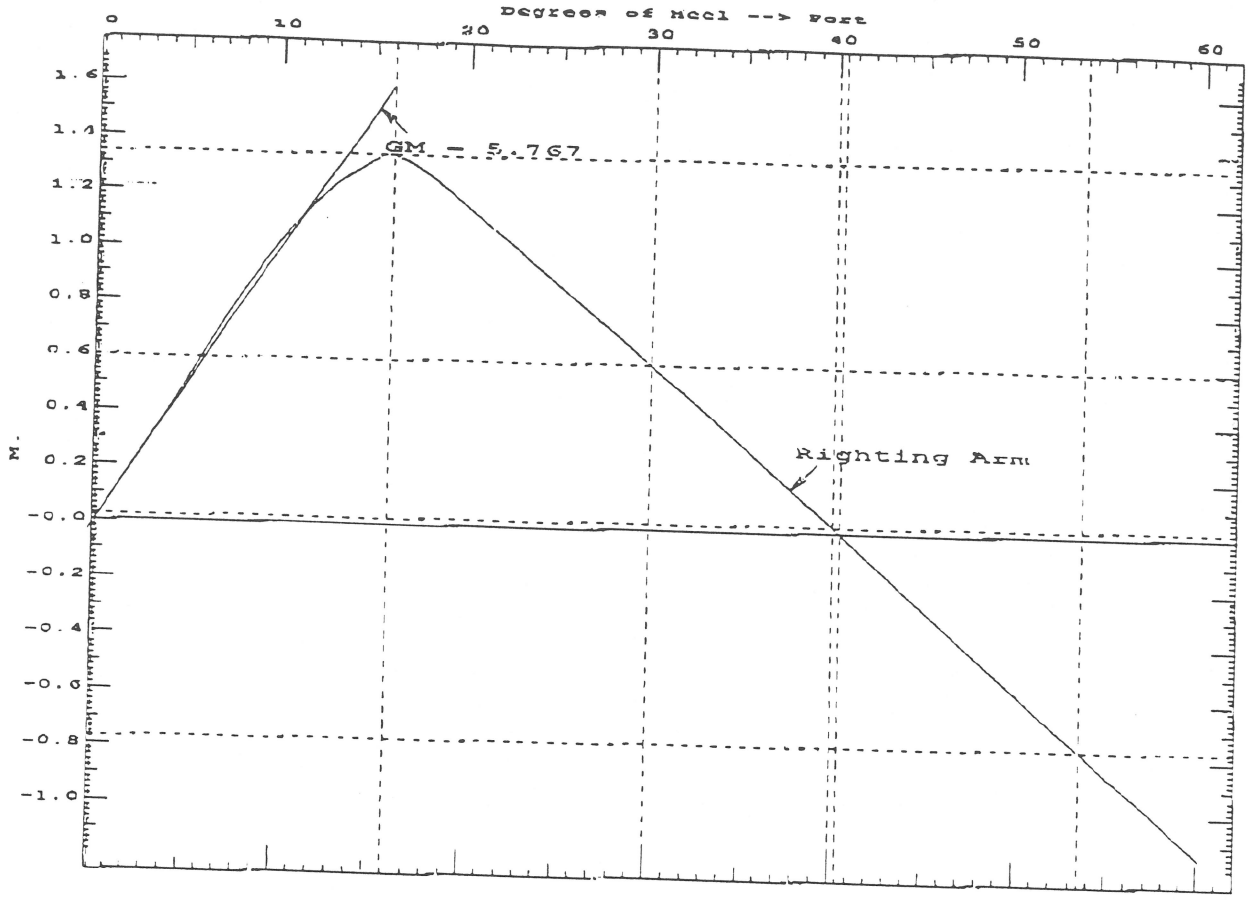
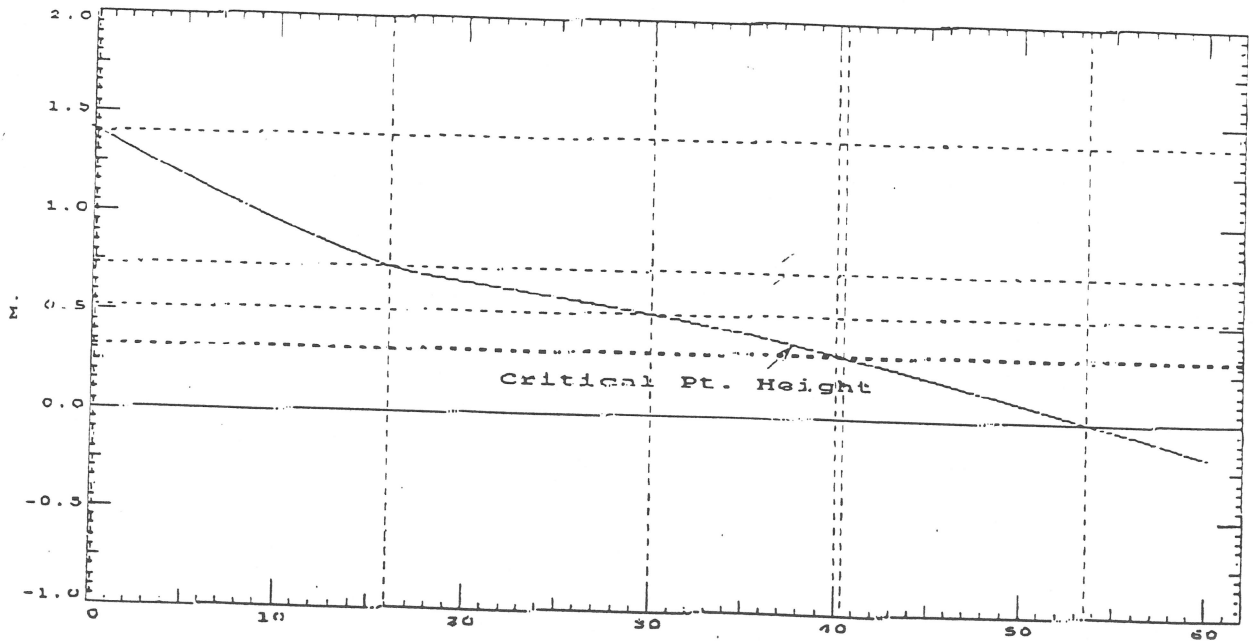
MURRAY





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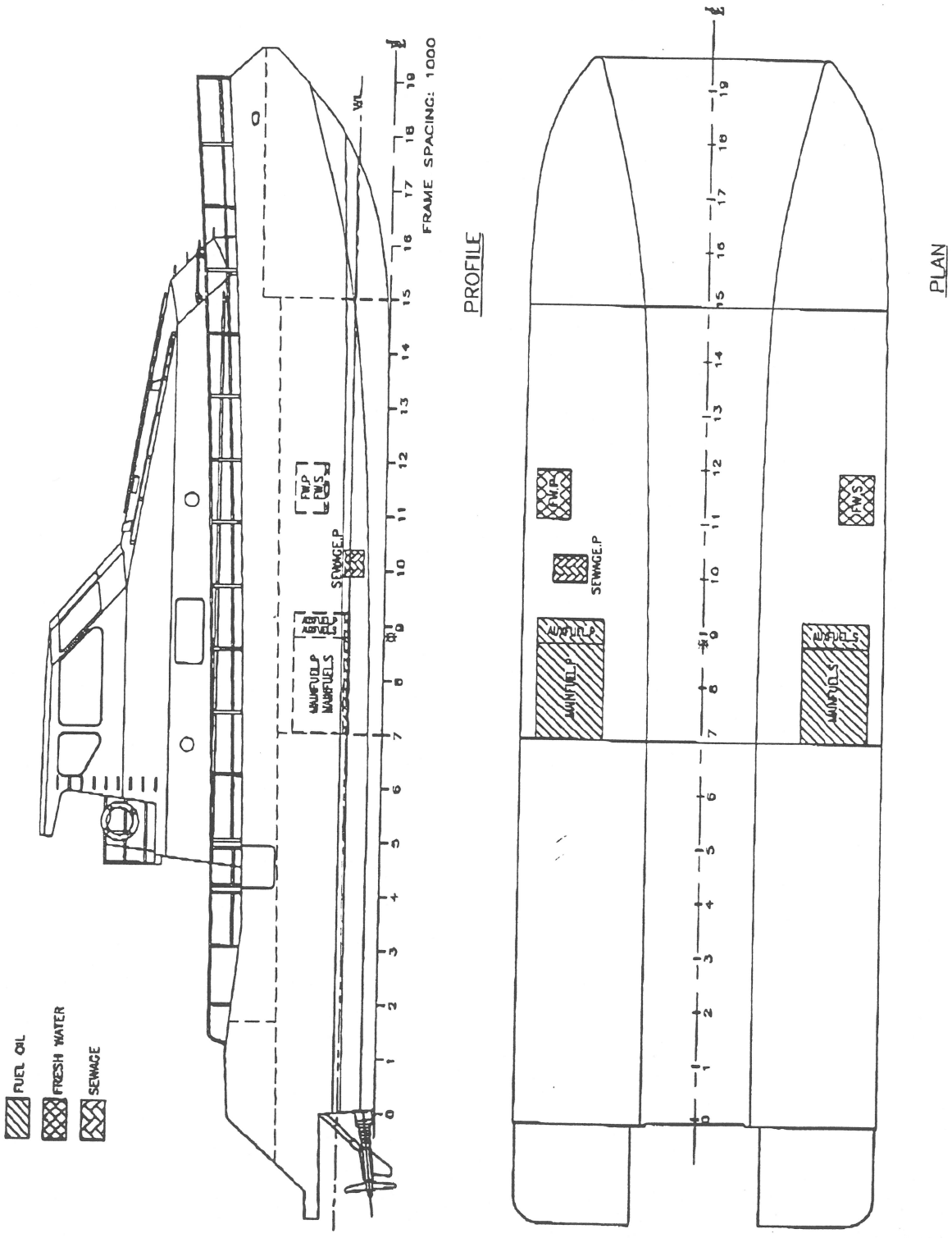
"MURRAY"

CONDITION NUMBER 3
PORT ARRIVAL



CONDITION NUMBER 3
PORT ARRIVAL
WEIGHT STATUS
Trim: Aft 0.106/17.596, Heel: Port 0.32 deg.

Part	Load	SpGr	Weight(MT)	LCG	TCG	VCG	FSM
LIGHT SHIP			34.59	1.766a	0.033p	4.135	
CREW			0.40	0.375a	0.250s	4.155	
Total Fixed---------->			34.99	1.750a	0.030p	4.135	
MAINFUEL.S	0.100	0.870	0.19	0.930a	2.375s	0.710	0.17
MAINFUEL.P	0.100	0.870	0.19	0.930a	2.385p	0.710	0.18
AUXFUEL.S	0.100	0.870	0.05	0.183f	2.375s	0.710	0.04
AUXFUEL.P	0.100	0.870	0.05	0.183f	2.385p	0.710	0.05
FW.S	0.100	1.000	0.03	2.690f	2.814s	1.173	0.01
FW.P	0.100	1.000	0.03	2.690f	2.817p	1.173	0.01
SEWAGE.P	0.900	1.025	0.11	1.334f	2.485p	0.588	0.01
Total Tanks---------->			0.62	0.083a	0.427p	0.726	0.46
Total Weight--------->			35.61	1.721a	0.037p	4.075	
Free Surface Adjustment---------->						0.013	
Adjusted CG---------->				1.721a	0.037p	4.088	

Distances in METERS.----------Moments in M.-MT.

HYDROSTATIC REPORT ON THE EQUILIBRIUM WATERLINE
DISPLACEMENT and WATERPLANE STATUS
BL draft: 0.637 @ 8.79f, 0.743 @ 8.81a
Trim: Aft 0.106/17.596, Heel: Port 0.32 deg.

Part	SpGr	Displ(MT)	LCB	TCB	VCB	RefHt
HULL	1.025	35.62	1.743a	0.057p	0.423	-0.690

Part	SpGr	WPA	LCF	TCF	BML	BMT
Total Waterplane---->	1.025	67.8	1.160a	0.015p	40.57	9.976

MT/CM	M.-MT/CM	GML	GMT
0.69	0.75	36.91	6.323

Distances in METERS.----------

HYDROSTATIC PROPERTIES
Trim: Aft 0.106/17.596, Heel: Port 0.32 deg., VCG = 4.075

Draft@ Origin	Displacement Weight(MT)	Buoyancy-Ctr. LCB	VCB	Weight/ CM	Moment/ LCF	CM trim	GML	GMT
0.690	35.62	1.743a	0.423	0.69	1.160a	0.75	36.91	6.323

Distances in METERS.-----Specific Gravity = 1.025.----------Moment in M.-MT.
Trim is per 17.60M.
Draft is from BL. True Free Surface included.

DRAFT REPORT
BL draft: 0.637 @ 8.79f, 0.743 @ 8.81a

CCG STABILITY ASSESSMENT

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RIGHTING ARMS vs HEEL ANGLE

Fixed CG: LCG = 1.750a TCG = 0.030p VCG = 4.135

Origin Depth	Degrees of Trim	Heel	Displacement Weight(MT)	Righting Arms in Trim	in Heel	--> Area	Flood Pt --Height
0.690	0.34a	0.00	35.61	0.000	0.037s	0.0000	1.452(1)
0.690	0.34a	0.32p	35.61	0.000	0.000p	-0.0001	1.437(1)
0.687	0.36a	2.50p	35.61	0.000	0.245p	0.0045	1.335(1)
0.684	0.38a	3.91p	35.62	0.000	0.402p	0.0125	1.267(1)
0.678	0.39a	5.32p	35.61	0.000	0.565p	0.0244	1.202(1)
0.662	0.41a	7.82p	35.62	0.000	0.853p	0.0553	1.090(1)
0.634	0.43a	10.32p	35.61	0.000	1.088p	0.0977	0.986(1)
0.590	0.48a	12.82p	35.62	0.000	1.250p	0.1487	0.890(1)
0.557	0.55a	14.13p	35.60	0.000	1.298p	0.1778	Deck Imm.
0.542	0.58a	14.62p	35.60	0.000	1.304p	0.1890	0.826(1)
0.517	0.64a	15.32p	35.62	0.000	1.293p	0.2049	0.805(1)
0.411	0.68a	17.82p	35.61	0.000	1.153p	0.2588	0.768(1)
0.303	0.68a	20.32p	35.61	0.000	1.003p	0.3062	0.735(1)
0.195	0.69a	22.82p	35.61	0.000	0.852p	0.3467	0.700(1)
0.085	0.69a	25.32p	35.61	0.000	0.701p	0.3805	0.665(1)
-0.025	0.70a	27.82p	35.61	0.000	0.549p	0.4078	0.628(1)
-0.121	0.70a	30.00p	35.61	0.000	0.417p	0.4261	0.595(1)
-0.135	0.71a	30.32p	35.61	0.000	0.398p	0.4284	0.590(1)
-0.246	0.72a	32.82p	35.61	0.000	0.247p	0.4425	0.550(1)
-0.356	0.75a	35.32p	35.61	0.000	0.096p	0.4500	0.507(1)
-0.425	0.77a	36.92p	35.62	0.000	0.000p	0.4513	0.477(1)
-0.465	0.79a	37.82p	35.62	0.000	-0.055p	0.4509	0.460(1)
-0.559	0.84a	40.00p	35.61	0.000	-0.186p	0.4463	0.417(1)
-0.573	0.85a	40.32p	35.62	0.000	-0.206p	0.4452	0.410(1)
-0.679	0.92a	42.82p	35.61	0.000	-0.358p	0.4329	0.357(1)
-0.784	1.00a	45.32p	35.60	0.000	-0.512p	0.4139	0.302(1)
-0.887	1.08a	47.82p	35.61	0.000	-0.666p	0.3882	0.245(1)
-0.989	1.16a	50.32p	35.60	0.000	-0.820p	0.3558	0.187(1)
-1.088	1.24a	52.82p	35.60	0.002a	-0.974p	0.3167	0.129(1)
-1.184	1.32a	55.32p	35.61	0.000	-1.127p	0.2708	0.069(1)
-1.279	1.40a	57.82p	35.61	0.000	-1.277p	0.2184	0.009(1)
-1.293	1.41a	58.21p	35.62	0.000	-1.300p	0.2097	0.000(1)
-1.371	1.48a	60.32p	35.62	0.000	-1.426p	0.1594	-0.052(1)

Distances in METERS.----Specific Gravity = 1.025.---------Area in M.-Rad.

Note: The Center of Gravity shown above is for the Fixed Weight of 34.99 MT. As the tank load centers shift with heel and trim, the total Center of Gravity varies. The righting arms shown above include the effect of the C.G. variation.

Critical Point		LCP	TCP	VCP
(1) Exhaust Plenum	FLOOD	7.883a	2.650	2.189

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LIM----------CCG STAB 6 CRITERION----------	Min/Max		Attained	
(1) GM Upright	>	0.150 M.	6.333	P
(2) Area from Equilibrium to abs 30 deg or Flood	>	0.0550 M.-Rad	0.4262	P
(3) Area from Equilibrium to abs 40 deg or RAzero	>	0.0900 M.-Rad	0.4514	P
(4) Area from abs 30 deg to abs 40 or RAzero	>	0.0300 M.-Rad	0.0252	F
(5) Angle from abs 0 deg to MaxRA	>	25.00 deg	14.62	F
(6) Righting Arm at abs 30 deg or MaxRA	>	0.200 M.	0.417	P
(7) Angle from abs 0 deg to Deck/margin Immersion	>	0.00 deg	14.13	P

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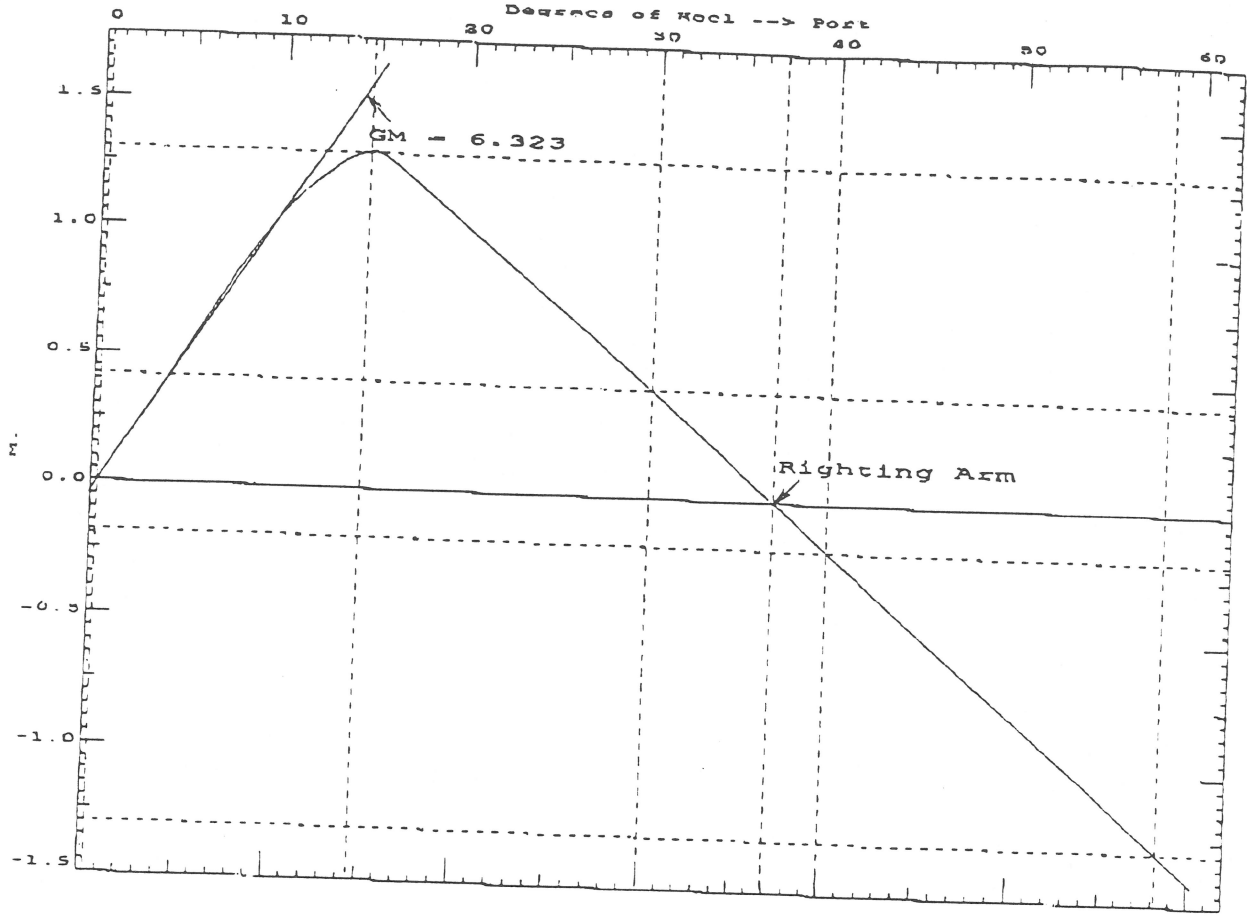
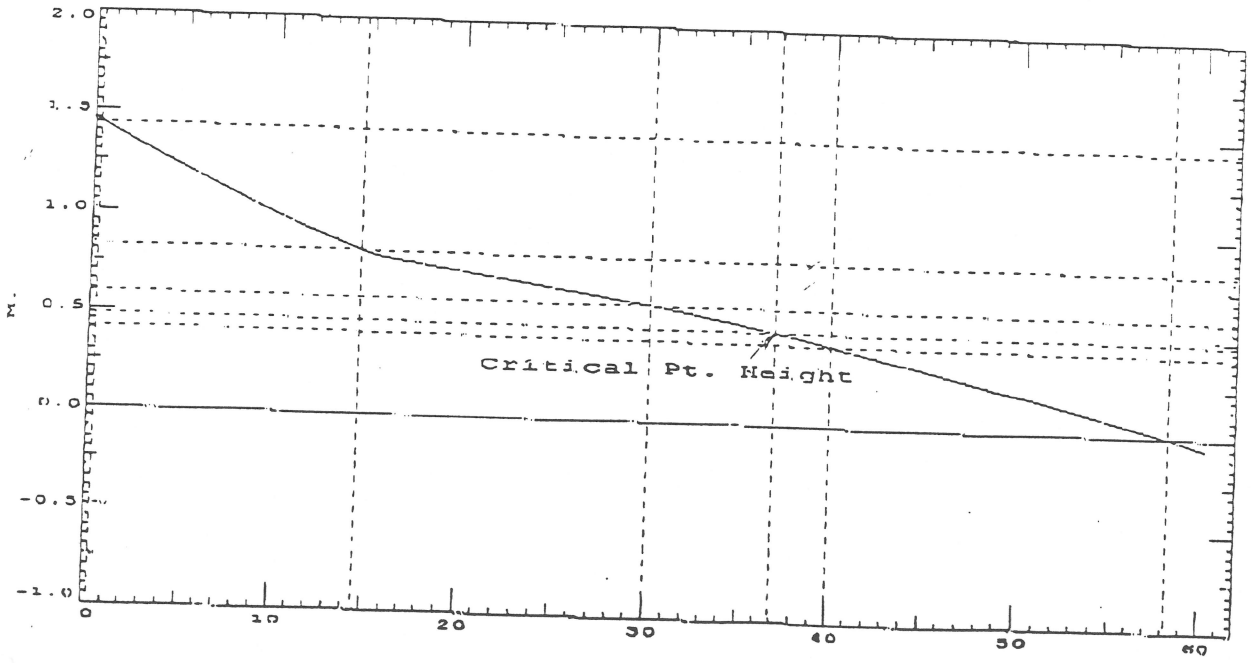
MURRAY





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STABILITY CALCULATION WORKED EXAMPLE

STABILITY CALCULATION WORKED EXAMPLE

The following is a manual calculation of condition #3, Arrival Condition, to show the differences which may occur due to simplifying the calculations.

The major simplifications are:

1. Upright hydrostatics used without effect of heel or trim

2. Cross Curves are for zero trim

Generally a manual calculation is a conservative estimate of the stability of the vessel. Differences will exist if the vessel is trimmed.

'MURRAY'

Condition: 3, PORT ARRIVAL CONDITION

Consumables Remaining: 10 %

DESCRIPTION	%	MAX FSM	Δ WEIGHT	LCG	L.MMT	VCG	V.MMT
Light Ship			34.59	1.77	61.09	4.14	143.03
Crew & Effects			0.40	0.38	0.15	4.18	1.66
Tanks:							
MAINFUEL.P	10%	0.22	0.19	0.92	0.17	0.71	0.13
MAINFUEL.S	10%	0.22	0.19	0.92	0.17	0.71	0.13
AUXFUEL.P	10%	0.06	0.05	-0.18	-0.01	0.71	0.04
AUXFUEL.S	10%	0.06	0.05	-0.18	-0.01	0.71	0.04
FW.P	10%	0.01	0.03	-2.70	-0.07	1.17	0.03
FW.S	10%	0.01	0.03	-2.70	-0.07	1.17	0.03
SEWAGE.P	90%	0.01	0.11	-1.33	-0.15	0.59	0.06
Total:		0.59	35.63	1.72	61.28	4.07	145.16

'MURRAY'

Condition: 3, PORT ARRIVAL CONDITION

Consumables Remaining: 10 %

Mean Draft (hydrostatics)	0.70 m	LCG (weight table)	1.72 m
MCT cm (hydrostatics)	0.85 m-tonnes	LCB (hydrostatics)	1.50 m
LCF (hydrostatics)	1.10 m	BG (LCB-LCG)	-0.21 m
L BTWN MKS (particulars)	17.60 m	TR. MMT. (Δ*BG)	-7.48 m-tonnes
AFT MKS AFT OF MIDSHIPS	8.81 m	TRIM	-0.088 m
FWD MKS FWD OF MIDSHIPS	8.79 m	TRIM AFT	-0.0386 m
L AFT LCF (AFT MKS-LCF)	7.71 m	TRIM FWD	0.0495 m
L FWD LCF (FWD MKS+LCF)	9.89 m		
KG (VCG weight table)	4.07 m		
KM (hydrostatics)	10.48 m		
GM (KM-KG)	6.40 m		
FS (Total FSM/Δ)	0.02 m		
GM Fluid (GM-FS)	6.38 m		
		DRAFT AFT	0.74 m
		DRAFT FWD	0.65 m

TRIM = [Trim Moment/MCT 1cm]/100
Trim aft/fwd = L/LBM*TRIM
Draft aft/fwd = Mean Draft -TRIM aft/fwd

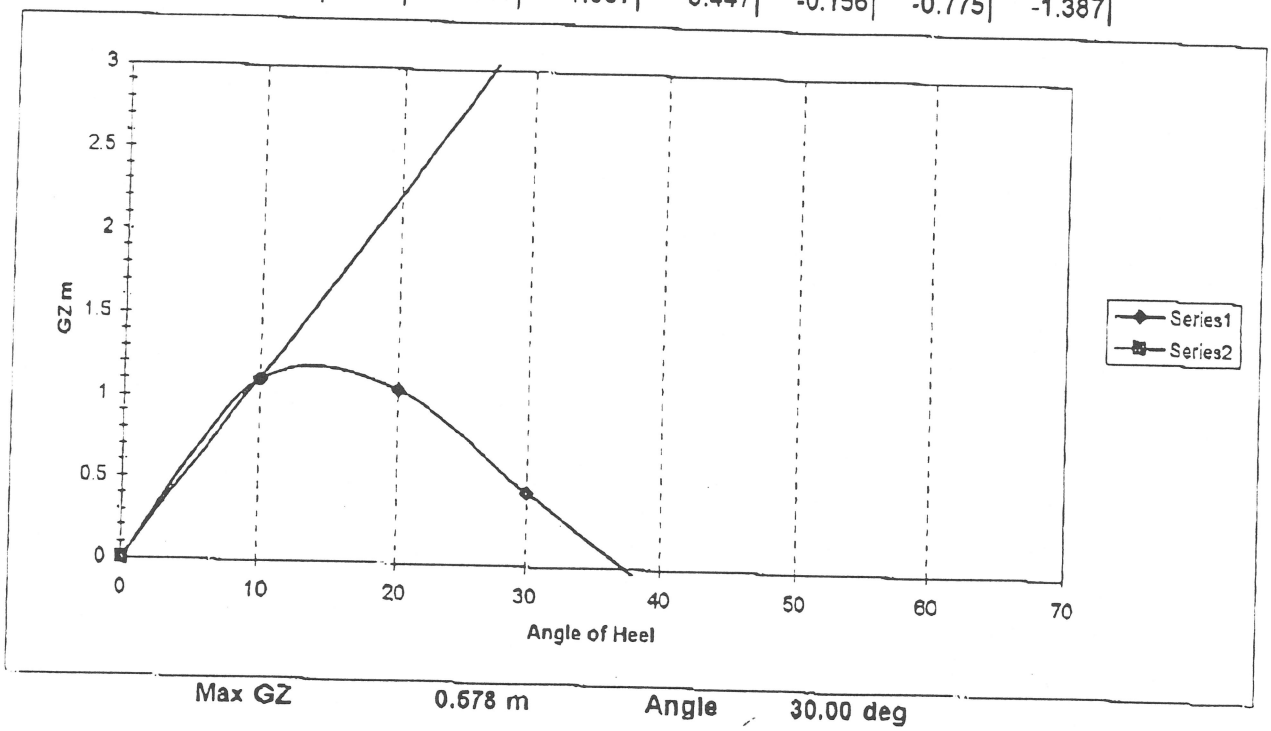
'MURRAY'

Condition: 3, PORT ARRIVAL CONDITION

Consumables Remaining: 10 %

Displacement	35.63 tonnes
GM (fluid)	**6.38 m**
KG (actual)	4.07 m
FS	0.02 m
KG' (fluid) = KG + FS	4.09 m

Angle	0	10	20	30	40	50	60
KN (cross curves)		1.809	2.456	2.492	2.473	2.359	2.155
GZ = KN-(KG' fluid)sinΘ	0	1.099	1.057	0.447	-0.156	-0.775	-1.387



Max GZ	**0.678 m**	**Angle**	**30.00 deg**
GZ @10	1.099 m	Angle	10.00 deg
GZ @20	1.057 m	Angle	20.00 deg
GZ @30	0.447 m	Angle	30.00 deg
GZ @40	-0.156 m	Angle	40.00 deg

Area Under Curve	**0-30**	3/8(0+3*GZ@10+3*GZ@20+1*GZ@30)*10/57.3	**0.452** m-Rad
	0-40	1/3(0+4*GZ@10+2*GZ@20+4*GZ@30+GZ@40)*10/57.3	**0.473** m-Rad
	30-40	area 0-30 - area 0-40	**0.021** m-Rad

'MURRAY'

Condition:

Consumables Remaining: %

DESCRIPTION	%	MAX FSM	Δ WEIGHT	LCG	L.MMT	VCG	V.MMT
Light Ship			34.59	1.77	61.09	4.14	143.03
Tanks:							
MAINFUEL.P							
MAINFUEL.S							
AUXFUEL.P							
AUXFUEL.S							
FW.P							
FW.S							
SEWAGE.P							
Total:							

'MURRAY'

Condition:

Consumables Remaining: %

Mean Draft (hydrostatics)		m	LCG (weight table)	m
MCT cm (hydrostatics)		m-tonnes	LCB (hydrostatics)	m
LCF (hydrostatics)		m	BG (LCB-LCG)	m
L BTWN MKS (particulars)	17.60	m	TR. MMT. (Δ*BG)	m-tonnes
AFT MKS AFT OF MIDSHIPS		m	TRIM	m
FWD MKS FWD OF MIDSHIPS		m	TRIM AFT	m
L AFT LCF (AFT MKS-LCF)		m	TRIM FWD	m
L FWD LCF (FWD MKS+LCF)		m		
KG (VCG weight table)		m		
KM (hydrostatics)		m		
GM (KM-KG)		m		
FS (Total FSM/Δ)		m		
GM Fluid (GM-FS)		m		

[(ROK AFT + ROK FWD)/2]	0	m
DRAFT AFT		m
DRAFT FWD		m

TRIM = [Trim Moment/MCT 1cm]/100
Trim aft/fwd = L/LBM*TRIM
Draft aft/fwd = Mean Draft -TRIM aft/fwd

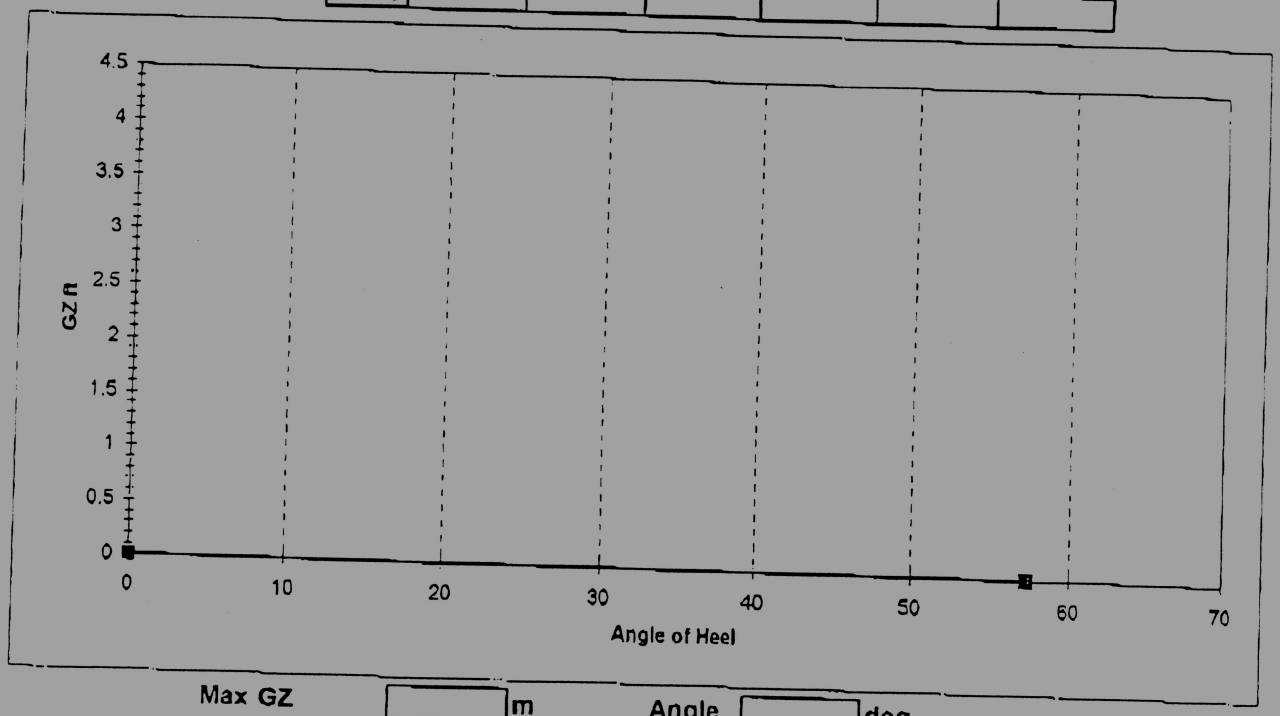
'MURRAY'

Condition:

Consumables Remaining: %

Displacement		tonnes
GM (fluid)		m
KG (actual)		m
FS		m
KG' (fluid) = KG + FS		m

Angle							
GZ = (KN-KG' fluid)sin⊖	0						



Max GZ	m	Angle	deg
GZ @10	m	Angle	deg
GZ @20	m	Angle	deg
GZ @30	m	Angle	deg
GZ @40	m	Angle	deg

Area Under Curve 0-30	3/8(0+3*GZ@10+3*GZ@20+1*GZ@30)*10/57.3		m-Rad
0-40	1/3(0+4*GZ@10+2*GZ@20+4*GZ@30+GZ@40)*10/57.3		m-Rad
30-40	area 0-30 - area 0-40		m-Rad

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INCLINING EXPERIMENT REPORT

E.Y.E. MARINE CONSULTANTS
Suite 1, 327 Prince Albert Road, Dartmouth, Nova Scotia, Canada B2Y 1N7
Tel: (902) 463-8940
Fax: (902) 463-6319

"MURRAY"

INCLINING EXPERIMENT

Transport Canada / Transports Canada

APPROVED - APPROUVÉ

ON THE AUTHORITY OF THE CANADA SHIPPING ACT AND REGULATIONS MADE THEREUNDER.

EN VERTU DE LA LOI SUR LA MARINE MARCHANDE DU CANADA ET DES RÈGLEMENTS CONNEXES.

ON BEHALF OF THE BOARD OF STEAMSHIP INSPECTION DEPARTMENT OF TRANSPORT.

POUR LE COMPTE DU BUREAU D'INSPECTION DE NAVIRES À VAPEUR. MINISTÈRE DES TRANSPORTS.

FEB 2 5 2005

DATE

SUBJECT TO THE ACCURACY OF THE BASIC DATA BEING THE RESPONSIBILITY OF THE OWNER. HIS NAVAL ARCHITECT OR THE SHIP-BUILDER.

SOUS RÉSERVE QU'IL INCOMBE AU PROPRIÉTAIRE, À SON ARCHITECTE NAVAL OU AU CONSTRUCTEUR DE NAVIRES DE S'ASSURER QUE LES DONNÉES DE BASES SONT PRÉCICES.

TRANSPORT CANADA TRANSPORTS CANADA MARINE SAFETY SÉCURITÉ MARITIME CANADA Dartmouth, N.S.

BY: E.Y.E. MARINE CONSULTANTS
FOR: A.F. THERIAULT & SON LTD.
DATE: 21 FEBRUARY 2005
JOB NO: 04060

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"MURRAY"
Inclining Report

This is the report of the inclining of the vessel "Murray" which was performed on January 9th 2005 in Meteghan River commencing at 9:00 AM

REPRESENTATIVES

Jerry Peet	EYE Marine Consultants
Dave Lutwick	EYE Marine Consultants
Mike Orr	Transport Canada
Graham Oakley	A.F. Theriault
George Kwan	PWGSC

LOCATION

A.F. Theriault Wharf, Meteghan River, NS

WEATHER CONDITIONS

Sea conditions were relatively calm, the vessel was free to incline throughout the test.
The gangway was removed and the mooring lines were slack.
Snow and ice was removed from all decks and house tops.

INCLINING WEIGHTS

Inclining weights consisted of steel drums filled with concrete.
The weights were certified by a TCMS inspector.
Calibration Certificate for the scale used to measure the weights is included.

(See attached sketch for location of inclining weights)

Inclining Wt Id	Wt (lbs)	Wt(t)
1	1120.0	0.508
2	1160.0	0.526
3	1120.0	0.508
4	1160.0	0.526

HYDROMETER READING

Measured Specific Gravity of water = 1.0075

DRAFT MARKS and FREEBOARDS

Note : Freeboards were recorded at vessel in inches and converted to metric

	Aft Marks (m)	Fwd Marks (m)	Aft Freeboard (m)	Mid Freeboard (m)	Fwd Freeboard (m)
Port	0.740	0.680	1.181	1.295	1.819
Stbd	0.725	0.675	1.175	1.308	1.819
Ave	0.733	0.678	0.721	0.682	0.617
Dist to Datum	8.808aft	8.788fwd	6.621aft	0.576aft	10.877fwd

Measured freeboard in metres

Draft in metres from avg. freeboard measurements

- Drafts obtained from mid and fwd freeboard readings were not included due to erroneous results and large error occuring when included. All other drafts were input into the computer for least square analysis. Results confirmed maximum error of +/- 3mm which was determined to be within the accuracy of the measurement

- Heel =0.13deg to port determined from the aft draft marks

"MURRAY"
Inclining Report

PENDULUM LENGTHS

	Length (in)	Length (m)
Aft Pendulum =	115.500	2.934
Fwd Pendulum =	87.625	2.226
Ave Pendulum Length	101.563	2.580

PENDULUM DEFLECTIONS

GENERAL DATA			AFT PEND. 2.934	FWD PEND. 2.226	
Shift No.	Weight (t)	Distance (m)	Deflection (mm)	Deflection (mm)	Direction of Shift
1	0.508	3.962	27.000	20.000	Stbd-Port
2	0.526	3.962	26.500	23.000	Stbd-Port
3	0.526	3.962	25.000	23.000	Port-Stbd
4	0.508	3.962	29.000	20.000	Port-Stbd
5	0.508	3.962	24.500	22.500	Port-Stbd
6	0.526	3.962	28.500	21.500	Port-Stbd
7	0.526	3.962	26.000	21.500	Stbd-Port
8	0.508	3.962	28.500	22.500	Stbd-Port
Averages	0.517	3.962	26.875	21.750	

CALCULATION OF GMTM

Average Pendulum Length = L = 2.580 m

Average Pendulum Deflection = defl = 0.024 m

Average Weight = w = 0.517 t

Average Shift = d = 3.962 m

GMTM = $\frac{w \times d \times L}{defl}$ = **220.198** t-m Input to Computer

displ = 35.74 t Displacement at inclining

GM = $\frac{GMTM}{displ}$ = **6.161 m**

"MURRAY"
Inclining Report

CONDITION OF TANKS DURING INCLINING

Tanks were completely empty during inclining. Tanks were sounded to confirm this.

WEIGHTS TO BE ADDED/REMOVED

Weights to be added -	Engine Room Insulation
	Aft Deck Boat
	Anchor Rope on FWD Winch
	30 gallons of Hydraulic Fluid in Hydraulic Tank
	Ceiling Panels (Crew's Mess, Wet Locker, Wheelhouse)
	CO_2 Doors and Battery Doors
	Engine Room Grates
	Radar and Electronics
	Fluids in Systems
	Table in Gallery
	Wheelhouse Setee
	ER Intake Covers
Weights to be removed -	5 personnel
	Inclining weights
	Inclining experiment equipment
	4 Off 2" x 8" planks, 10' long
	Tools in Galley (20 lbs)
	Tools in Wheelhouse (45lbs)
Bilges-	All bilges dry

DRAFTS used to establish Waterline

Location	Given	Used	Error
8.808a	0.733	0.730	0.003
6.621a	0.721	0.724	-0.003
8.788f	0.678	0.678	0.000

Distances in METERS.---Drafts from Baseline---

WEIGHT and DISPLACEMENT STATUS
Baseline draft: 0.704 @ Origin
Trim: Aft 0.17 deg., Heel: Port 0.13 deg.

Part		Weight(MT)	LCG	TCG	VCG	FSM
WEIGHT		35.74	1.598a	0.015p	4.103	
	Load SpGr	Weight(MT)	LCG	TCG	VCG	
Total Tanks--------->		0.00				0.00
		Displ(MT)	LCB	TCB	VCB	
HULL	1.008	35.74	1.609a	0.023p	0.428	
Righting Arms:			0.000	0.000s		

Distances in METERS.----------Moments in M.-MT.

** Condition at Inclining **

Baseline draft: 0.704 @ Origin

HYDROSTATIC PROPERTIES
Trim: Aft 0.17 deg., Heel: Port 0.13 deg., VCG = 4.103

Draft@ Origin	Displacement Weight(MT)	Buoyancy-Ctr. LCB	VCB	CM	LCF	Moment/ Deg trim	GML	GMT
0.704	35.74	1.609a	0.428	0.69	1.118a	22.90	36.71	6.162

Distances in METERS.-----Specific Gravity = 1.008.----------Moment in M.-MT.
Draft is from Baseline.

The Following items were aboard and included in the Lightship:
Fluids in systems

Weights to Add or Deduct to Obtain Lightship

WEIGHT and DISPLACEMENT STATUS
Baseline draft: 0.687 @ Origin
Trim: Aft 0.17 deg., Heel: Port 0.13 deg.

Part	Weight(MT)	LCG	TCG	VCG
Vessel as Inclined	35.74	1.598a	0.015p	4.103
Inclining Weights#1	-0.51	3.566a	2.796s	2.465
Inclining Weights#2	-0.53	1.764a	2.796s	2.502
Inclining Weights#3	-0.51	2.736a	2.782p	2.488
Inclining Weights#4	-0.53	0.990a	2.782p	2.512
2 Men and Incline Equip F	-0.17	1.444f	0.000	3.087
2 Men and Incline Equip A	-0.23	4.375a	0.000	3.004
Personnel on board	-0.09	8.000f	0.000	4.046
2x8-10' Long Wood Planks	-0.09	2.240a	0.000	1.955
Tools in Galley	-0.01	0.250f	0.985p	3.040
Life Rafts	-0.10	7.593f	0.000	3.300
Life Raft	0.10	8.069a	0.000	2.189
Tools in Wheelhouse	-0.02	1.000a	0.000	4.720
Port E.R. Flooring	0.03	3.805a	2.200p	0.500
Stbd E.R. Flooring	0.03	3.805a	2.200p	0.500
Port E.R. Insulation	0.25	5.305a	2.200p	2.100
Stbd E.R. Insulation	0.25	5.305a	2.200s	2.100
RIB	0.50	7.805a	0.000	2.000
Anchor Rode	0.06	7.915f	0.000	3.300
Hydraulic Tank W/Oil	0.14	3.805a	3.000p	1.500
Ceiling in Mess	0.01	0.195f	0.000	4.000
Ceiling in Wet Locker	0.01	1.805a	0.000	4.000
Ceiling in Wheelhouse	0.03	0.805a	0.000	6.000
Setee in Wheelhouse	0.03	2.805a	2.000p	5.000
Electronics in Wheelhouse	0.04	2.805a	1.000p	5.000
Dining Table	0.01	0.195a	2.000s	3.000
Spares	0.03	2.305a	0.000	2.000
CO2 Locker Door	0.01	2.805a	0.000	3.000
ER INtake Covers	0.02	3.630a	0.000	3.160
Wet Locker Furnishings	0.02	1.805a	0.000	3.000
Interior Furnishings	0.03	0.195a	0.000	3.000
Towing Rope	0.01	4.305a	1.000p	2.500
Life Rings	0.01	0.000	0.000	3.202
Scanner Arm 4ft	0.01	1.855a	0.000	6.635
Scanner Arm 6ft	0.01	3.474a	1.091s	7.236
Total Weight-------->	34.59	1.766a	0.033p	4.135

	SpGr	Displ(MT)	LCB	TCB	VCB	RefHt
HULL	1.008	34.59	1.626a	0.024p	0.419	-0.687
Righting Arms:			0.151f	0.018s		

Distances in METERS.

05-02-18 09:13:44
GHS 8.06A

E.Y.E. Marine Consultants
MURRAY

WEIGHT STATUS
Trim: Aft 0.17 deg., Heel: Port 0.13 deg.

Part	Weight(MT)	LCG	TCG	VCG
WEIGHT	34.59	1.766a	0.033p	4.135

Distances in METERS.