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1713 Bedford Row  
Halifax, N.S./Halifax, (N.É.)  
B3J 1T3  
Bid Fax: (902) 496-5016

**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 - Commentaires**

**Vendor/Firm Name and Address**  
**Raison sociale et adresse du  
fournisseur/de l'entrepreneur**

**Issuing Office - Bureau de distribution**  
Acquisitions  
1713 Bedford Row  
Halifax, N.S./Halifax, (N.É.)  
B3J 3C9

<b>Title - Sujet</b> CCGS SAMBRO REFIT	
<b>Solicitation No. - N° de l'invitation</b> F5561-132413/A	<b>Amendment No. - N° modif.</b> 003
<b>Client Reference No. - N° de référence du client</b> F5561-13-2413	<b>Date</b> 2013-08-19
<b>GETS Reference No. - N° de référence de SEAG</b> PW-\$HAL-403-9048	
<b>File No. - N° de dossier</b> HAL-3-71097 (403)	<b>CCC No./N° CCC - FMS No./N° VME</b>
<b>Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2013-08-27</b>	<b>Time Zone</b> Fuseau horaire Atlantic Daylight Saving Time ADT
<b>F.O.B. - F.A.B.</b> <b>Plant-Usine:</b> <input type="checkbox"/> <b>Destination:</b> <input checked="" type="checkbox"/> <b>Other-Autre:</b> <input type="checkbox"/>	
<b>Address Enquiries to: - Adresser toutes questions à:</b> Brow, Theresa	<b>Buyer Id - Id de l'acheteur</b> hal403
<b>Telephone No. - N° de téléphone</b> (902) 496-5166 ( )	<b>FAX No. - N° de FAX</b> (902) 496-5016
<b>Destination - of Goods, Services, and Construction:</b> <b>Destination - des biens, services et construction:</b>	

**Instructions: See Herein**

**Instructions: Voir aux présentes**

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

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## Amend 003

This is attachment to Amendment 002. To correct and clarify specification and drawings.

Here are the required updates for CCGS Sambro refit.

Tank Inspections (HD-02) - For clarification, please see Appendix A-3 with the newly attached PDF.

Pumps Survey (HD-05) – Corrected photos have been attached to revised spec.

### **Added Item: L-03-4**

The seven (7) lamps located in the engine room spaces will require fabrication of mounting brackets to secure them to the vessel.

### **Added item: HD-06-6**

All hydraulic components of the steering system are to be inspected and repaired where necessary. Presently, there is a leaking 3/8” stainless steel fitting, which shall be repaired. Additional repairs to the hydraulic system shall be through PWGSC 1379 action.

**APPENDIX 1 TO ANNEX "F"****PRICING DATA SHEET**

The Pricing Data sheet will be provided with the minutes of the bidders conference as a Solicitation Amendment and will be titled **Pricing Data Sheet**.

Spec#	Description	Material	Labour	Total
H-01	Services  Electrical Power per Kwh \$ _____ Gangways per day \$ _____ Garbage Removal per day \$ _____ Shelter/Enclosure per day \$ _____ Sea Trail per hour \$ _____			
H-02	Anchorage/Mooring & Towing			
HD-01	Docking/Undocking			
HD-02	Hull Repair & Tank Inspection			
HD-03	Painting			
HD-04	Anodes			
HD-05	Pumps Survey			
HD-06	Steering Gear Inspection (Survey Item)			
HD-07	Propulsion Shafts			
HD-08	Trim Tabs			
HD-09	Protection Against Sea & Load Lines			
L-01	Alternator Overhaul			
L-02	Main Engine Starter			
L-03	Interior Lighting			
TOTAL COST				



Fisheries and Oceans  
Canada  
Canadian Coast Guard

Pêches et Océans  
Canada  
Garde côtière canadienne

## CANADIAN COAST GUARD



### REFIT SPECIFICATION

#### CCGC SAMBRO

**SPECIFICATION NO. 13-S044-008-1**

September 3, 2013

SAMBRO, NOVA SCOTIA



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## GENERAL NOTES

### 1. On-Site Coast Guard Technical Authority (CGTA):

All the specified work, as well as all work arising, shall be completed to the satisfaction of On-site CGTA. Unless otherwise advised, this will be the Vessel Maintenance Manager (VMM) of the vessel, or his designated representative. Upon completion of each item of the specification, the CGTA shall be notified so that he/she may inspect the work prior to the complete closing up of any work. Failure to give notification does not absolve Contractor of the responsibility of providing CGTA the opportunity to inspect any item. Inspection of any item by the CGTA does not substitute for any required inspection by Transport Canada Marine Safety Branch (TCMS), Public Works and Government Services Canada (PWGSC) or Health Canada (HC).

### 2. Safety:

There is a safety annex attached to this specification entitled "FLEET SAFETY MANUAL REQUIREMENTS". In addition to the detailed requirements within the specification, this annex contains excerpts from the "FLEET SAFETY MANUAL", Edition 4, version 1 that are applicable to contracted refit and dry-docking situations. If Contractors do not already have copies of this reference, they will be made available upon request.

It is noted in the annex, that all contracted work shall be conducted in compliance with the requirements of the Canada Labour Code, Part 2. Potential Contractors shall include with their bids the name of their Safety Manager or Supervisor who will ensure that these requirements for workplace safety are met.

### 3. Sub-Contractors:

All conditions, stipulations etc. listed in the General Notes apply to any Sub-Contractors employed by the Main Contractor to carry out work on any Specification Item.

### 4. Schedule:

At the Pre-Refit Meeting, the successful Contractor shall provide a Production Bar Chart or Schedule showing commencement and completion dates for each item in this specification. This document shall highlight any critical dates and be capable of showing the effects of late completion date of the work package. Contractor shall provide updated Production Schedules to the CGTA and PWGSC Contracting Authority whenever the schedule is revised.

## GENERAL NOTES (CONTINUED)

### 5. Daily Service Fee:

Contractor shall allow sufficient time to complete all the 'known' work described in this specification. Contractors shall bid the total price of their estimated daily service fees, plus a unit price for adjustment purposes. The Contractor shall provide sufficient personnel, materiel, and equipment resources to complete the specified work, including the allowance for arisings, within the period of the contract. Extra effort required due to the Contractor's failure to maintain his production schedule will not be paid for by CCG.

### 6. Chemist's Certificates:

Contractor shall supply CGTA with Marine Chemist's Certificates in accordance with TCMS TP 3177E before any cleaning, painting or hot work is commenced in confined spaces or machinery compartments. Certificates shall clearly state the type of work permitted, duration of certificate and the following air test information: toxic gas level in PPM, % LEL (percentage lower explosive limit) and % O<sub>2</sub> (percentage oxygen). Each certificate must be signed and dated by the marine chemist or qualified person carrying out the test. All certificates shall be renewed as required by the regulations. Contractor and his sub-Contractors are advised that any work carried out in confined spaces as defined by the Canada Labour Code (CLC) and relevant provincial legislation must fully comply with all provisions therein.

Contractor and his sub-contractors are advised that any work carried out in confined and / or enclosed spaces as defined by the Canadian Labour Code Part II (CLC), the Marine Occupational Health & Safety Regulations (MOSH) and the relevant provincial legislation shall be fully complied with.

<http://www.tc.gc.ca/media/documents/marinesafety/tp3177e.pdf>

Canadian Labour Code <http://laws.justice.gc.ca/en/L-2/index.html>

MOSH <http://laws.justice.gc.ca/en/L-2/SOR-87-183/index.html>

### 7. Welding:

Contractor shall be currently certified by the Canadian Welding Bureau in accordance with Standard W47.1-1983 "Certification of Companies for Fusion Welding of Steel Structures," Division 1, 2.1 or 2.2. Where welding is required on aluminium superstructure CCG specification for ALUMINIUM WELDING (TP 9415E) will apply and Contractor shall be qualified to CWB 47.2 for aluminium welding. All personnel performing welding shall be approved by the Canadian Welding Bureau. All sub-contractors shall be currently certified by CWB as above + Division 3. When a sub-contractor is certified to Division 3, then the primary Contractor shall have a certified Quality Assurance Program in place that introduces and maintains proper control of the sub-contractor's performance. Any welding near bearings or electronic equipment shall have its work locally grounded. No welding shall be undertaken on the vessel without the direct permission of the CGTA.



## GENERAL NOTES (CONTINUED)

### 8. Electrical:

All electrical installations or renewals shall be in accordance with the latest editions of the following Marine electrical standards:

TP 127E - Ship Safety Electrical Standards

<http://www.tc.gc.ca/eng/marinesafety/tp-tp127-menu-263.htm>

IEEE Standard 45 - Recommended Practice for Electrical Installation on Shipboard. [http://standards.ieee.org/develop/wg/45\\_WG.html](http://standards.ieee.org/develop/wg/45_WG.html)

### 9. Hotwork Ventilation and Containment:

During all known work and work arisings that involve hotwork, Contractor shall ensure that all dust, debris, gas and smoke generated by the work is evacuated from the vessel by the most direct method.

Each item that involves hotwork shall have a defined zone which shall be kept sealed off from the rest of the vessel during the complete work period that involves the generation of welding gases, smoke, and grinding dust etc. These zones shall be indicated in the items contained within the known work package. All extra work arisings that involve hotwork shall have a zone determined using the same logic. The zone shall be limited to the space(s) where the hotwork is being done, boundary areas where fire watches are required, and the access routes between the zone and the exterior of the vessel for workers, welding and cutting equipment and ventilation ductwork.

In areas where occupied accommodations and or workplaces cannot be completely isolated from personal access a double sealed door (air lock) arrangement shall be erected to minimize ingress of the contaminants into occupied areas. A ventilation extraction point shall be located as near as practical to the inside door on the worksite side to reduce the egress into the air lock and subsequently the accommodations and/or workspaces.

All doorways within the affected area that are not being worked or require access for fire watch activities shall be sealed off to prevent all containments from getting in. Passageway branches that connect to the zone shall be sealed off. Contractor shall completely clean all surfaces and fabrics within a compartment that are not suitably protected.

## GENERAL NOTES (CONTINUED)

### 10. Protection:

Contractor shall provide adequate temporary protection for any equipment or areas affected by his work. Contractor shall take proper precautions to maintain in a proper state of preservation any machinery, equipment, fittings, stores or items of outfit (furnishings, linings, deck coverings, etc.) which might become damaged by exposure, movement of materials, paint, sand, grit or shot blasting, airborne particles from sand, grit or shot blasting, welding, grinding, burning, gouging and painting. Any damage shall be the responsibility of the Contractor to repair or renew.

### 11. Auxiliary Services:

Contractor shall include in quotation the costs of any and all transportation, rigging, staging, slinging, cramage, removals, and installations of parts and equipment such as may be required to carry out work.

### 12. Enclosures and Heating:

Contractor shall provide all enclosures and heating required to carry out all the scheduled work, taking into account the nature of the work, the time of year the refit is, and the weather conditions for that time of year in Contractor's geographic area. Examples of where heating and enclosures could be required include but are not limited to painting, shaft withdrawal, and tank cleaning.

### 13. Service Conditions:

Unless specified otherwise, all components, materials and installations supplied by or carried out by the Contractor shall be adequate to meet the following service conditions:

In areas that are exposed to the elements:

- outside air temperature of minus (-) 400 C to plus (+) 350 C;
- wind velocity of 50 knots;
- water temperature of minus (-) 20 C to plus (+) 300 C;
- shock loading of 2.5g horizontal, 1.5g vertical.

All new components, materials and installations within the ship shall be adequate to withstand the specified shock loading accelerations.

## GENERAL NOTES (CONTINUED)

### 14. Hotwork & Fire Watches:

Any item of work involving the use of heat in its execution requires that the Contractor advise the CGTA prior to starting such heating and upon its completion. Contractor shall provide sufficient suitable fire extinguishers and a fire watch during any such heating and until the work has cooled. The fire watch shall be arranged such that all sides of surfaces being worked on are visible and accessible. Ship's extinguishers are not to be used except in an emergency. Should the Contractor have to use ship's extinguishers in an emergency they are to be recharged and re-certified by a local facility, of CCG's choice, at Contractor's cost. Contractor shall provide suitable fire retardant coverings to protect wire ways, cables, equipment and structure from welding slag, splatter etc.

### 15. Relocations:

Any piping, manholes, parts and/or equipment requiring temporary relocation to carry out specified work, or to gain access, shall be refitted upon completion with new jointing, anti-seize compound, clamps and brackets as applicable (Contractor supply - CFM). All equipment and systems, so disturbed, shall be tested to prove correct function and fluid integrity upon completion. Defects shall be corrected at Contractor's cost. Note: It shall be Contractor's responsibility to identify, to the CGTA, equipment and systems that are to be tested to verify correct function, prior to being disturbed for required work.

### 16. Lighting:

Temporary lighting and/or temporary ventilation required by Contractor to carry out any item of this specification shall be supplied, installed and maintained in safe working condition by the Contractor and removed on completion of the related work. Naked light bulbs or tubes shall not be used as temporary lighting inside the vessel. All lights used in the vessel shall be supplied with approved guards.

### 17. Cleanup:

Contractor shall ensure that all spaces, compartments, and areas where work has been carried out, or Shipyard staff and Sub-Contractors has used for transit routes, are left in "as clean a condition as found" when the vessel commenced refit. This includes both internal and external areas of work, as well as any affected adjacent spaces outside the principle areas of work. All rags, debris, and associated garbage generated by the shipyard staff and Sub-Contractors while on board shall be removed to the garbage container(s) each day. Costs associated with the removal of dirt, debris, and garbage shall be included in the Contractor's quote.

## **GENERAL NOTES (CONTINUED)**

### **18. Inspection:**

Contractor shall be responsible for calling in the services of TCMS, and Health Canada Surveyors when and as required for survey and inspection items. All TCMS surveyors called in by the Contractor shall be asked to sign-off the CGTA's Inspection Log Book for all items surveyed. Where the approval of Environment Canada (EC) or any other authority is required by law or by work contained in this specification, Contractor shall be responsible for obtaining and keeping a record of these approvals. Two (2) copies of all approvals and records shall be given to the CGTA.

### **19. Painting:**

Unless specified otherwise, replacement and/or disturbed steelwork shall be given a minimum of two (2) coats of marine primer immediately upon completion of work. Contractor shall inform the CGTA of the area to be primed so the CGTA can advise the Contractor of the suitable primer to be used. Lead-based paints shall not be used. Prior to painting, all new and disturbed steelwork shall be power tool cleaned as a minimum standard of surface preparation. The Contractor shall arrange for the PWGSC Contracting Authority to be notified after the first coat of paint is fully cured so that it may be inspected prior to the application of the second coat. Failure to do so shall result in another coat being applied at the Contractor's expense.

### **20. Materials & Tools:**

All materials, unless otherwise specified, shall be supplied by the Contractor. Contractor is to supply all necessary tools and equipment to perform the specified work. Special ship-specific tools, as required, will be issued by and returned to the CGTA. Contractor shall be responsible for removing the tools from their stored location aboard the vessel, and returning them and securing them in place when finished. Otherwise, ship's tools and equipment will not be available for Contractor's use.

### **21. Reference Material:**

CGTA may have provided information in this specification and attachments (engineering drawings, pictures, etc.) as guidance information only. All drawings, pictures, dimensions, descriptions, locations, measurements, engineering values, materials, etc. listed or implied shall be verified by Contractor, prior to any work or fabrication commencing. All discrepancies shall be recorded and reported to the CGTA and Vessel Engineer as soon as possible. Any changes to the specified work, due to the above, shall be resolved between Contractor and CGTA prior to work starting.

The overhaul and installation of all machinery and equipment specified herein shall be as per the manufacturers' applicable instructions, drawings and specifications.

## GENERAL NOTES (CONTINUED)

### 22. Measurements:

All dimensional measurements shall be taken and recorded in inches. Unless otherwise specified, the dimensions shall be taken and reported in thousandths of an inch (0.000"). All measuring devices shall be described on the submitted reporting sheets. All reported dimensions shall be either typed or printed in a neat legible manner, and shall include the name of the person who took the readings. Contractor shall be responsible to ensure all testing and measurement equipment (mechanical or electronic) required to complete the specified work is calibrated and that calibration certificates for said devices shall be submitted to PWGSC Contracting Authority prior to final inspection or witnessing of tests.

All tests results, calibrations, measurements, trials and readings shall be properly tabulated, compiled and three (3) typewritten copies shall be provided; two copies to CCG Technical Services and one copy to the PWGSC Contracting Authority. All test and trials shall be performed to the satisfaction of the CGTA and TCMS inspector.

### 23. Co-operation:

During the period that the ship is in refit, members of the ship's complement, Coast Guard technical staff, and service specialists may be carrying out repairs to, maintenance of, or modifications of various ships' equipment not covered in this specification. The Contractor shall not deny access to the vessel to these persons. Every effort will be taken to ensure that this Coast Guard controlled work will not interfere or conflict with that being carried out by the Contractor.

### 24. Fire Safety Systems:

Whenever any work is being carried out involving the ship's firefighting or fire detecting system, it shall be done in such a way as to leave the vessel and all persons aboard with adequate protection against fire at all times. This may be accomplished by removal or disarming of only a portion of the system at a time, by replacement with spares while work is in progress, or by other reasonable means acceptable to CGTA.

Note: Contractor shall notify CGTA prior to deactivation and upon reactivation of fire fighting and/or fire detecting systems.

### 25. Smoking:

The Public Service Smoking Policy forbids smoking in Government ships in all areas inside the ship where shipyard personnel will be working. Contractor shall inform workers of this policy and ensure that it is complied with.

## **GENERAL NOTES (CONTINUED)**

### **26. Access:**

The vessel's washroom is out of bounds to Contractor's personnel except to perform work as required by the specifications. Contractors shall ensure that no workers bring meals onboard the ship.

## GENERAL NOTES (CONTINUED)

### Additional Information

1. The CCGC SAMBRO is a 52' "Arun Class" Coast Guard Search And Rescue (S.A.R.) lifeboat.
2. Vessel particulars are as follows:

Vessel Location	Sambro, Nova Scotia
Year Built	1996
Yard	Hike Metal Products Wheatley, Ont.
Length Overall	15.77 Metres
Breadth Molded	5.20 Metres
Draft	2.04 Metres
Engines	3408 Caterpillar 08rg0251 & 08rg0252
Plates 5mm and over	Aluminium 5086-H32 or 5083-
Plates under 5mm	Aluminium 5052-H32
Pipes and Extrusions	Aluminium 6061-T6 or 6351-T6
Stainless Steel (SS)	316
3. New or disturbed joints (i.e. flanged) shall be secured using new stainless steel (SS) bolts and new stainless steel locking nuts. All stainless steel flanges to be bonded through their bolting arrangement. Dissimilar metal flanges, piping, or valves shall be fully isolated from each other using a non conducting gasket material. When adding a dissimilar metal attachment between two similar metal flanges/piping, a bonding strip shall be attached between the two similar metals (do not bond to dissimilar metal). Bonding straps shall be made from the similar metal to which they are bonding to.
4. All disturbed gaskets are to be replaced with a new gasket made of equivalent material.
5. With the mast lowered, the vessel will have a height of 8.25 meters from the bottom of its keel to the highest point. The Contractor shall be responsible for identifying a suitable lifting point, on the mast, which is capable of supporting its weight, while it is being lowered and raised. The Contractor shall be responsible for any damages caused during the lifting and lowering of the mast.
6. Contractor shall take note that items in this specification are not detailed (i.e. piping, electrical, metal work, etc.) and require viewing in order to bid. Although not mandatory it is strongly recommended that the Contractor arrange a site visit to exam the CCGC SAMBRO located at the Canadian Coast Guard (CCG) SAR Station in Sambro, Nova Scotia prior to submitting a bid. Bidders who do not view the vessel in order to determine the scope of work will be evaluated as if they had attended the site visit and are fully aware of the vessels existing condition prior to the refit.

## H-01 SERVICES

Contractor is responsible for additional connections required when moving the vessel between dry-dock and alongside berth at their premises. Services are required for the full refit/dry-dock period.

The Contractor shall quote a global price and daily rates for all services supplied to the vessel during the dry-docking period for adjustment purposes.

### 1. Electrical Power

- 1.1 Shore power facilities shall be supplied and installed on the vessel using a single 100 amp source with CFM cables and fittings. The vessel requires one (1): 100 amp, 240 VAC, 60 hz connection. Contractor shall quote a 1000 Kilowatt hour (KWH) flat rate for power connection for the refit period. Contractor shall provide a unit cost per day for power connection for prorated adjustments.
- 1.2 A ground cable shall be attached to the vessel's hull and the Contractor shall ensure compliance as per the Transport Canada Marine Safety Bulletin – "Grounding Safety in Drydock".

<http://www.tc.gc.ca/eng/marinesafety/bulletins-1989-06-eng.htm>

### 2. Gangways

- 2.1 Contractor shall supply and erect a gangway, complete with safety nets and guard rails as per Provincial regulations. Gangway to land on main deck aft and shall be illuminated during the dark hours when work is being conducted.

Reference web site;

<http://www.gov.ns.ca/lwd/healthandsafety/docs/FishSafe.pdf>

- 2.2 Any movement of the gangway for the convenience of the Contractor shall be at the expense of the Contractor.



## **H-01 SERVICES (CONTINUED)**

### **3. Garbage Removal**

- 3.1 All garbage containers (vessel's waste baskets or Contractor supplied containers) shall be emptied out on a daily basis. Contractor shall remove their own daily garbage from work areas of the vessel. Cost shall be included in quote.
- 3.2 Contractor to ensure all spaces, compartments and areas of the vessel, external and internal, are left in as clean a condition as found. Removing dirt, debris, and associated materials to be included in their bid.

### **4. Berthing**

- 4.1 Berthing and mooring facilities shall be provided in accordance to the Fleet Safety Manual as provided in the attached safety annex.
- 4.2 During refit, while not dry-docked; vessel shall be berthed at Contractor's wharf. There shall be sufficient water beneath the vessel that it shall not touch bottom at any time (upright and afloat).
- 4.3 Shipyard is responsible for all movements of the vessel during the refit period; including arrangements and costs of linehandlers, tugs, pilots, initial tying up, any movement of the vessel during refit and letting go of lines from Contractor's wharf on vessel departure from yard upon completion of refit.

### **5. Shelter / Enclosure**

- 5.1 The Contractor shall provide a protective shelter (enclosed heated building preferred) around the vessel prior to any work commencing, the shelter shall remain for the entire refit period. With the mast lowered, the vessel will have a height (bottom of keel to highest point) of approximately 8.3 meters. The shelter shall be heated and enclose all external work areas around the entire vessel including the superstructure and mast.
- 5.2 The shelter will provide full protection while work is performed during inclement weather. The shelter will also prevent unwanted debris, particles and/or materials (i.e. grinding debris, sponge blast, paint chips, etc) from leaving the immediate work area and provide the Contractor with the ability to recover the above and dispose of them in an approved manner.

## H-01 SERVICES (CONTINUED)

### 6. Sea Trial

- 6.1 Bidders shall include a "2-hour" sea trial in their bid price. The vessel will be operated by CCG personell under the Contractor's direction. The aim of the sea trial shall be to prove the safe and correct function of all systems and equipment that have been worked on, added or disturbed as part of the refit.

### 7. Quality Control

- 7.1 Contractor shall have a proven quality assurance program in place or is presently working on a system that may meet CSA series of Quality assurance program standards. This requirement will provide the CGTA with a concise record of all pertinent information requested during the vessel refit.
- 7.2 Contractor shall provide a typewritten report of all test, trials, calibrations, measurements, etc. taken, whether identified or implied in this specification. Contractor shall compile the individual readings for each specification item into a report with copies of the workers original notes and provide a copy to the Vessel Maintenance Manager upon completion of the refit.  
VMM for CCGC Sambro is:  
Todd Smith  
(902) 426-2798  
todd.smith@dfo-mpo.gc.ca
- 7.3 The final report is not meant to be a formal document, but rather a concise record of all reading taken. If the specification item does not require any readings then a simple note saying so will suffice.

## **H-02 ANCHORAGE, MOORING & TOWING**

- H-02-1      The capstain is to be inspected by a TCMS surveyor and CGTA. Any work raised by an unsatisfactory result is to be addressed via PWGSC 1379 action.

## HD-01 DOCKING / UNDOCKING

- HD-01-1 Contractor shall dock the vessel and allow sufficient service days to perform both the work described in this specification as well as a margin of time to cover work arising. Contractor shall quote a unit cost per service day. Contractor shall prepare blocks and necessary shoring to maintain true alignment of the vessel's hull and machinery throughout the dry-docking period. Upon completion of all specified work the Contractor shall undock the vessel.
- HD-01-2 A docking plan (Appendix A2) is available on board the vessel or from Integrated Technical Services, Marine Engineering. The Contractor is responsible for ensuring all loaned drawings are returned, in their original condition, upon completion of work.
- HD-01-3 Vessel Particulars:
- |                        |   |
|------------------------|---|
| Length O.A.            | 15.77 Metres  |
| Breadth Molded         | 5.18 Metres   |
| Draft                  | 2.05 Metres   |
| Operating Displacement | 35.5 Tonne  |
| Fuel Capacity          | 3178 Litres   |
| Hull construction      | Aluminum  |
| Electrical System      | 24 VDC, 12 VDC sub system<br>240 VAC Shore Connection |
- HD-01-4 The vessel shall be docked so that all docking plugs, transducers, anodes and sea inlet grids are clear and accessible. Contractor shall ensure adequate clearance below the keel for performing work specified and shall advise in their bid, the minimum clearance expected. If any hull fittings are covered, the Contractor is responsible for all labour and materials required for making alternative arrangements for draining tanks, removal of docking plugs, blasting/painting of hull and/or moving blocks to gain access to areas of specified work.

## HD-02 HULL REPAIRS & TANK INSPECTION

- HD-02-1 Contractor shall contact the local TCMS office and request their inspector view the void spaces listed below. (See Appendix A3 for Tank Locations) Contractor is to provide TCMS office with a minimum 48 hours' notice prior to requiring them on site. Void spaces shall be inspected by TCMS and viewed upon completion of gas freeing. Any repairs indicated by TCMS and approved by the CGTA shall be through PWGSC 1379 action.

Name (According to Div.3)	Location (DWG 95004-45)	TC Item Reference (Div.3)
No.8 Double Bottom	#21 Port	3L009
No.9 Double Bottom	#21 Stbd	3L010
No.9 Double Bottom	#22 Port	3L011
No.17 Wing	#4 Port	3L022
No.18 Wing	#5 Stbd	3L023
No.18 Wing	#13 Port	3L024
No.19 Wing	#13 Stbd	3L025
No.20 Wing	#20 Port	3L027
No.21 Wing	#19 Stbd	3L031

- HD-02-2 Contractor shall open the void spaces listed and remove strapping, dunnage bags, foam chips and gas free the internal areas. All void spaces listed in Division 3 report shall be certified gas free by a qualified person for entrance and hotwork when required. Three (3) copies of gas free certificate shall be supplied to CGTA before any inspection or repair work is started. Contractor shall remove all debris ashore. All work shall be completed to the satisfaction of the CGTA.
- HD-02-3 There is a gouge, on the port side of the vessel. The gouge is roughly 3 metres in length, located outside voids 21-22 Port. Contractor is to quote separately but include with the overall bid, the infilling of the gouge. This solution is pending TCMS approval. Any additional expenses are to be completed via PWGSC 1379 action.
- HD-02-4 At the time of viewing Contractors shall note all interferences (i.e. pipes, brackets, wires, paneling, etc.) in way of the manhole covers and include removal and re-installation in their quote.
- HD-02-5 This is a priority item. Efforts are to be made to have inspections completed within first two weeks of contract start date. This is to allow time to address any deficiencies identified.

## HD-02 HULL REPAIRS & TANK INSPECTION (CONTINUED)

- HD-02-6 Contractor shall remove polystyrene chips and dunnage bags from the listed void spaces. Contractor shall identify on each bag the void spaces from which they were removed and record the total number of bags removed from individual void spaces. These bags are held in place by cargo webbing bolted to the frames of the void spaces. Some of these bags may have opened and the chips become loose in the space, these shall be recovered and resealed in the dunnage bags belonging to that void space. Contractors shall supply and install est. 6 new dunnage bags (6 mil plastic- 72 litres) in their bid.
- HD-02-7 Contractor shall inspect all manhole covers and renew missing and defective bolts. Contractor quote separately but include with the overall bid, on renewing ten (10) M8 stainless steel (SS) bolts 32mm long with SS washers and the removal and installation of 10 CFM helicoil inserts. Blind holes shall be visually examined for damage and repaired (i.e. fill by weld and re-tapped) where required through PWGSC 1379 action.
- HD-02-8 Contractor shall request a credit against the vessel's division 3 report from TCMS after their inspector has given approval for all internal void spaces.
- HD-02-9 After receiving inspection approval from TCMS, Contractor shall reinstall all dunnage bags in their proper location, as identified above in item number HD-02-6,. Prior to re-installing the dunnage bags the Contractor shall remove all foreign materials (i.e. debris, metal, welding rods, etc.) from the void spaces.
- HD-02-10 After CGTA completes a final inspection, contractor shall reinstall manhole covers to their original locations using new CFM gasket material and new CFM bolts where required.
- HD-02-11 Contractor quote separately but include with the overall bid, pressure testing the void spaces for TCMS, normal practice requires pressurizing the spaces to 2.5cm (confirm with TCMS) of water gauge and held for a period of time of at least one (1) hour. Contractor shall follow the recommendation of TCMS regarding system pressure and time required for acceptance. Contractor shall issue a credit if the above work is not required.
- HD-02-12 Acceptance shall be based on TCMS approval for this specification item. Acceptance shall also be based on the satisfaction of the CGTA.

## HD-03 PAINTING

### ARUN Class Vessel Square Areas

Wetted hull	85 m <sup>2</sup>
Above water line to deck	65 m <sup>2</sup>
Wheel house	43 m <sup>2</sup>
Flying bridge	10 m <sup>2</sup>
Main deck	42 m <sup>2</sup>

The contractor shall prepare and apply the coating system in accordance with the manufacturer's manuals and recommendations. As part of the Contractor's Q & A process, the following information shall be recorded for all painted areas:

- Provide a list of batch numbers with correspondent dates of manufacture.
- Record the quantity and type of any solvent added.
- Measure and record the ambient conditions.
- Record details of spray tips and pressures.
- WFT gauge readings to be taken on a regular basis during application.
- Using a calibrated DFT gauge, fifteen (15) measurements per 10 m<sup>2</sup>. are to be taken and recorded. Upon agreement of consistency with the CGTA, fifteen (15) measurements per 95 m<sup>2</sup>. are to be taken and recorded.
- All recorded information is to be typewritten and three (3) copies are to be given to the CGTA.

- CCGC SAMBRO



## HD-03-2 UNDERWATER HULL

1. All underwater hull surfaces including rudder, sea suction inlets, overboard outlets and sea bays are to be cleaned of all loose scale, salts, and marine growth. This work is to be carried out immediately on drydocking using a high pressure, fresh water wash. High pressure washing equipment shall be adjusted to not less than 3000 psi, and no greater than 5000 psi operating pressure, in accordance with Surface Preparation Standard SSPC.SP14.  
<http://www.sspc.org/market-place/standards/surface-preparation-sp/sspc-sp-14-nace-no-8-industrial-blast-cleaning.html/>.
2. Contractor shall assume that the wetted hull area is fouled with shell and weed growth. All such surface contaminants and spent antifoulant coating shall be removed with no undue or excessive damage to the underlying coating. Copies of invoices, detailing disposal, shall be provided to CGTA.
3. It is estimated that 10m<sup>2</sup> of the underwater hull-coating system has failed. These areas will here in after be referred to as "bare areas". The total wetted hull surface from the keel to the water line, approx. 85 m<sup>2</sup> is to be prepared and coated as follows; all bare areas are to be solvent cleaned SSPC-SP-1 and surface to be etched chemically with C-prep B10-degreaser or suitable substitution. Edges to be feathered back (smooth finish) to sound existing coating. The CGTA shall witness the point at which sound existing coating is obtained. If satisfactory feathering can not be achieved by solvent cleaning and /or chemical etching, feathering is to be completed by other suitable means. The end result is to be tight and sound existing coating with no loose or lifting material around periphery of bare areas.
4. All bare areas, after proper preparation as witnessed by the CGTA, are to be coated with one coat of Intershield 300ENA300/A (Bronze) applied at 5.9 mils dry (9.8 mils wet). This is to be followed by one coat of Tie Coat Intergard 263 FAJ034/A (Light Grey) applied at 5.0 mils dry (8.8 mils wet) over the entire wetted hull. After coating has properly set ("thumb print soft), two coats of Trilux II (Red) Top Coat shall be applied at 2.0 mils dry (3.9 wet) each, to the entire wetted hull area. Initial Trilux II coating shall have a slight contrast to the final coat. Contractor shall paint all draft marks using white enamel paint. Dry coat thicknesses are cumulative. Contractor shall adhere to the manufacturer's specifications and recommendations for applying the above coatings.
5. Inside of sea bays (sea wells) and underwater grids are to be treated as per underwater hull.

## **HD-03-2 UNDERWATER HULL (CONTINUED)**

6. The Contractor shall plug all deck openings and discharges as well as taking other measures necessary to prevent any liquids from contaminating areas being prepared or coated. The Contractor shall also take measures to ensure no damage, unnecessary cleaning or any repair results from either the hull preparation process or coating applications. Measures are also to be taken to ensure that surfaces and equipment other than those specified are not coated by over spray and that any inlets or discharges in the shell will not be blocked by the coating.
7. Deck machinery and other equipment susceptible to damage by coating material are to be protected. All portholes, hull doors, freeing ports, hull openings, anodes, transducers, propeller and shaft and rudder stocks are to be covered by suitable materials to prevent damage or entry of foreign materials when sandblasting, grinding or painting is in progress.

### **NOTE TO THE CONTRACTOR:**

Applicable to all coating systems within this specification; International paints (existing coatings) shall be used except where Ameron Non Skid coating is addressed in section #15 or approval for an alternative coating is obtained from the CGTA in writing. The Contractor is to strictly adhere to the manufacturer's instructions in regard to the application of each coating with relation to humidity, temperature, mixing and application.

## HD-04 ANODES

- HD-04-1 Contractor and CGTA shall identify the anodes requiring replacement as soon as possible once the vessel has been removed from the water and washed. Anodes required will be replaced with similar style as existing (see fig HD-04-Fig. 1 – HD-04-Fig. 4)
- HD-04-2 Contractor shall remove the required anodes and their securing straps and prepare the backing plates to receive the new anodes. Contractor shall prep and paint the hull and transom areas where the anodes were removed prior to installing the new anodes as per the paint spec HD-03
- HD-04-3 Contractor shall quote separately but include with the overall bid, to supply and install twelve (12) new bolt-on 10kg zinc anodes with aluminum securing straps, figure HD-04-Fig. 1. Contractor shall install the new anodes as per their existing arrangement on the vessel hull, transom and Trim tabs.
- HD-04-4 Contractor shall supply and install four (4) new collar type anodes as shown in figure HD-04-Fig. 2, two per shaft. Contractor shall install the new shaft anodes in the location identified by the CGTA.
- HD-04-5 Contractor shall supply and install two (2) new bolt on 2.25 kg zinc anodes, one per rudder figure HD-04-Fig. 3. All areas shall be prepared as identified in paragraph 1 above. Contractor shall cut one (1) 10kg anode in half and install one half on each trim tab as per existing arrangement, Figure HD-04-Fig. 4.
- HD-04-6 Any variance from number of anodes quoted versus number required shall be adjusted through PWGSC 1379 action

#### HD-04 ANODES (CONTINUED)



Figure HD-04-Fig. 1 - 10 Kg Zinc Hull /Transom anode



Figure HD-04-Fig. 2 - Collar type shaft anode

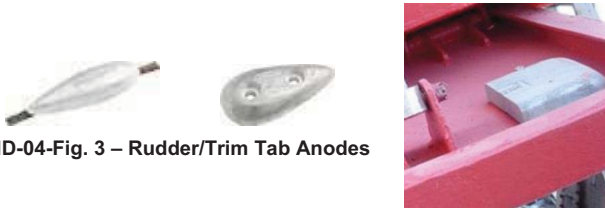


Figure HD-04-Fig. 3 – Rudder/Trim Tab Anodes



HD-04-Fig. 4 – Stern view of vessel

## HD-05 PUMPS SURVEY

- HD-05-1 The intent of this specification item is to prove the correct operation of the pumps included in HD-05-2 and HD-05-3. Prior to commencing work, operation is to be confirmed, and current/insulation readings are to be provided (where applicable) before and after servicing. Testing of the fire pump requires the vessel to be in water.
- HD-05-2 The following pumps shall be disconnected, and laid out for inspection by TCMS. Contractor is to clean all fittings, remove all gaskets and seals and reinstall with new gaskets and seals.
- Jabsco Fire Pump
  - 2 X Jabsco 150/475 Engine Driven Bilge Pumps (Port and Stbd.).
- HD-05-3 The Rule 3700 Submersible Pumps (Port and Stbd.) are to be functionally tested. In the event they fail to operate, a new unit is to be fitted. This additional work will be funded via 1379 action.
- HD-05-4 Contractor shall notify the CGTA of the inspection date and time so that the vessel engineer can be on hand to operate the systems if required. Contractor shall, if the CGTA is not present, have the TCMS inspector sign off all inspection work in the vessel's blue book. Upon successful inspection a credit for four-year survey shall be obtained.
- HD-05-5 Any additional work or parts required to be viewed by the onsite engineer and any work or parts required will be rectified by PWGSC 1379 action. See pictures of fire pump below.
- HD-05-6 Acceptance for each pump shall be based on a successful function test, demonstrating the pump operating without restriction and to the satisfaction of the TCMS inspector and the CGTA.

## HD-05 PUMPS INSPECTION (CONTINUED)



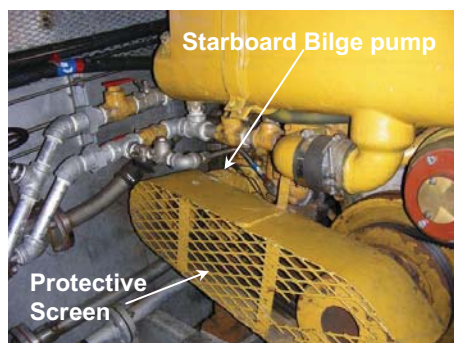
HD-05-Fig. 1 – Fire Pump looking aft



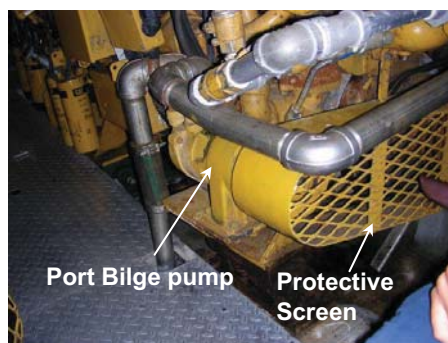
HD-05-Fig. 2 – Fire Pump Piping



HD-05-Fig. 3&F4 – Engine Room Submersible Pumps (Port Left, Stbd Right)



HD-05-Fig. 5 - Starboard Main Engine



HD-05-Fig. 6 - Port Main Engine

## HD-06 STEERING GEAR INSPECTION (SURVEY ITEM)

- HD-06-1 Contractor shall contact the local TCMS office and provide 48 hours' notice to arrange for their inspector to inspect the two rudders, rudder shafts and three shaft bearings as per the vessels Division 3 inspection report.
- HD-06-2 Contractor shall erect all necessary staging and rigging / rigging points necessary to work on both rudders. Upon completion of work identified below, contractor shall remove all staging and rigging.
- HD-06-3 Contractor shall visually inspect the port and starboard rudders for damage (dents, chips, paint flaking, etc.) in the presence of the CGTA prior to any repair work commencing. Contractor is responsible for all removals pertaining to the rudder repairs. Repairs to the rudders shall be through PWGSC 1379 action.
- HD-06-4 Contractor shall remove both rudders at their jumping collar. Contractor in consultation with the CGTA and TCMS inspector shall determine whether or not to remove the thordon bearings, based on the wear down reading. Contractor shall provide a cost in their quote for the thordon bearing removals and installation of CG supplied thordon bearings. Contractor shall follow manufacturer's recommendation for installation and verify all measurements before installing the new bearings. Completion of work is to be to the satisfaction of TCMS surveyor and CGTA.
- 1 Upper shaft bearing  
Dommel (2 3/4 inch x 3 3/8 inch) press fit with housing
  - 2 Rudder trunk bearing  
Hornad (3 1/4 inch x 4 1/4 inch) secured in trunk

### THORDON BEARINGS :

BEARINGS MACHINED TO FOLLOWING SPECIFICATIONS :

CODE NAME	SIZE, I.D. x O.D.	MACHINED SIZE, I.D. x O.D.	LENGTH
SXL (TOP)	2-3/4" x 3-3/8"	2.804"/2.809" x 3.394"/3.399"	100mm
SXL (BTM)	3-1/4" x 4-1/4"	3.315"/3.320" x 4.273"/4.278"	160mm



#### HD-06 STEERING GEAR INSPECTION (CONTINUED)

- HD-06-5 Contractor shall clearly identify each rudder's fitted bolts and nuts with respect to their original location prior to removal. Contractor shall prepare (cleaning, blasting, etching) both rudders for painting as per HD-03 Painting for Underwater Hull. Upon completion of all work identified in this section Contractor shall re-install both rudders. All fitted bolts and nuts shall be reinstalled to their original locations upon re-assembly. Contractor shall supply and spot weld stainless steel locking wire across the 4 sets of 3 fitted bolts to prevent the bolts from loosening after re-installation.
- HD-06-6 All hydraulic components of the steering system are to be inspected and repaired where necessary. Presently, there is a leaking 3/8" stainless steel fitting, which shall be repaired. Additional repairs to the hydraulic system shall be through PWGSC 1379 action.
- HD-06-7 Acceptance shall be based on the approval of TCMS inspector and to the satisfaction of the CGTA.



Figure HD-06-Fig. 1 Extended spindle for emergency steering.



## HD-06 STEERING GEAR INSPECTION (CONTINUED)



Figure HD-06-Fig. 2 Rudders with view of rudder stocks.

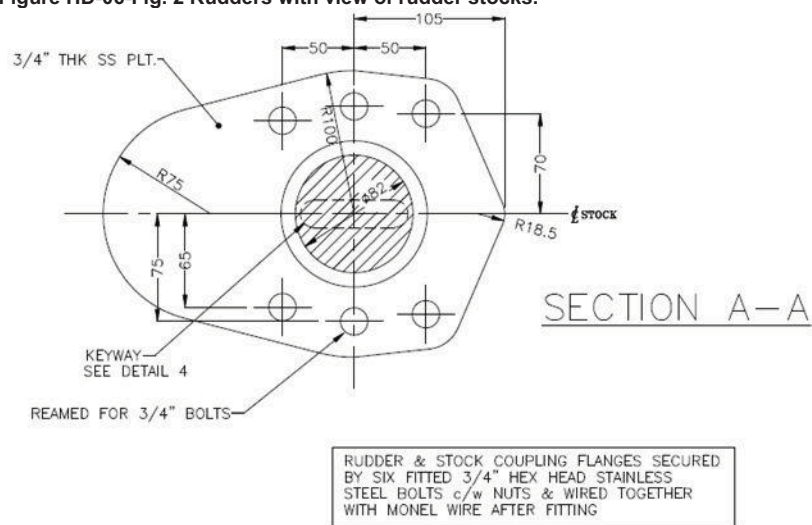


Figure HD-06-Fig. 3 – Rudder jumping collar flange drawing

## HD-06 STEERING GEAR INSPECTION (CONTINUED)

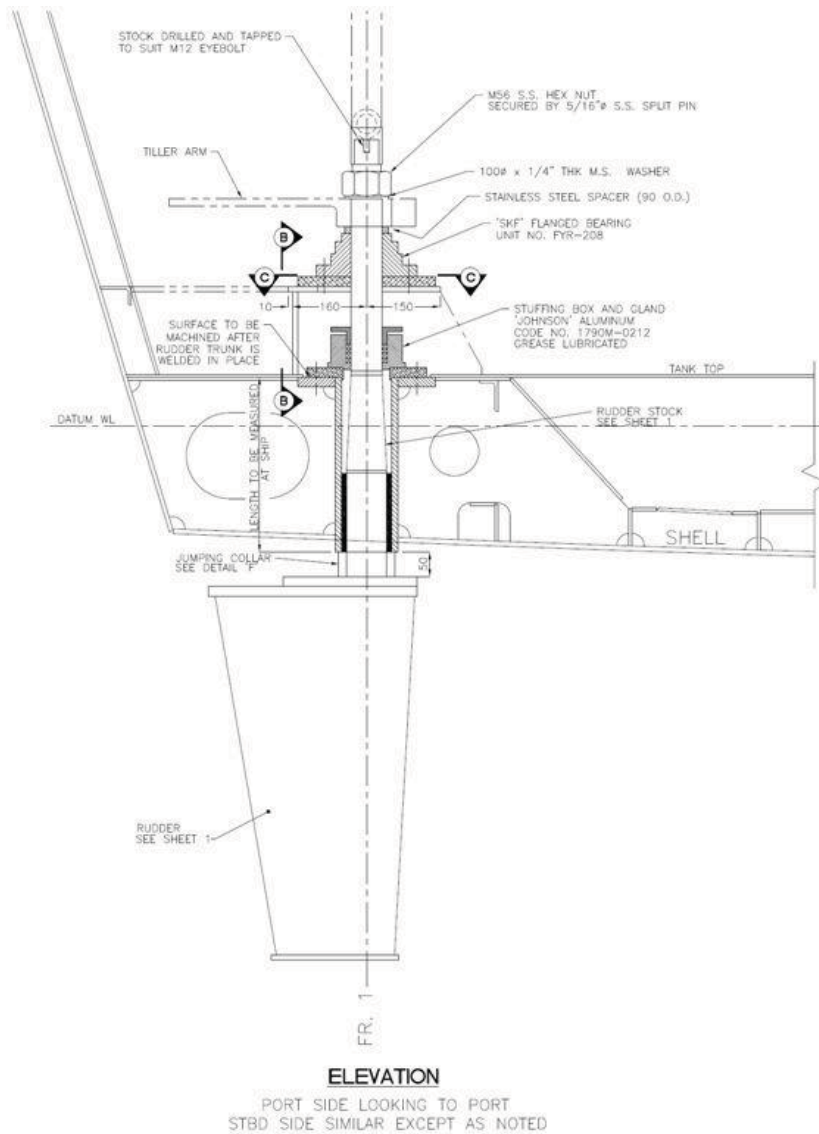


Figure HD-06-Fig. 4 Rudder Drawing - Elevation

## HD-06 STEERING GEAR INSPECTION (CONTINUED)

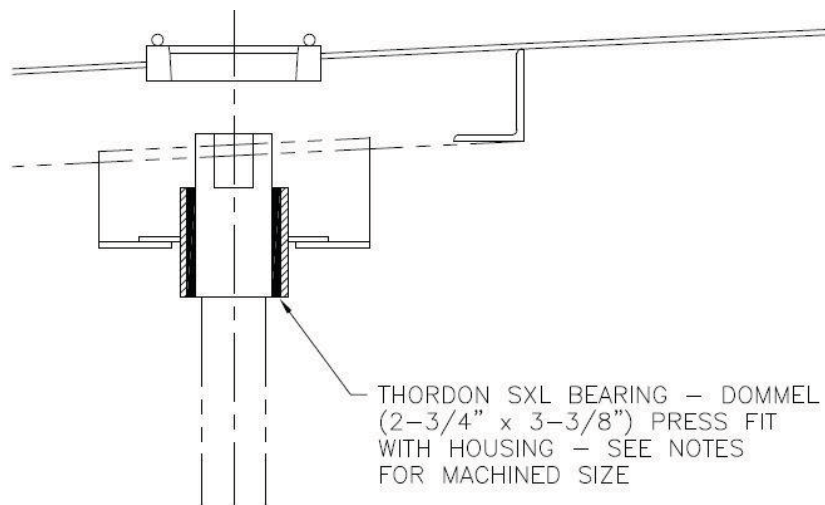


Figure HD-06-Fig. 5 Rudder Drawing – Upper Bearing

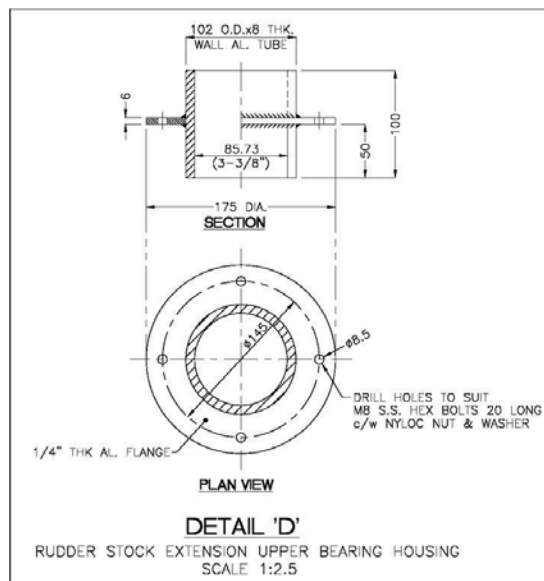


Figure HD-06-6 Rudder Drawing – Upper Bearing Detail

## HD-06 STEERING GEAR INSPECTION (CONTINUED)

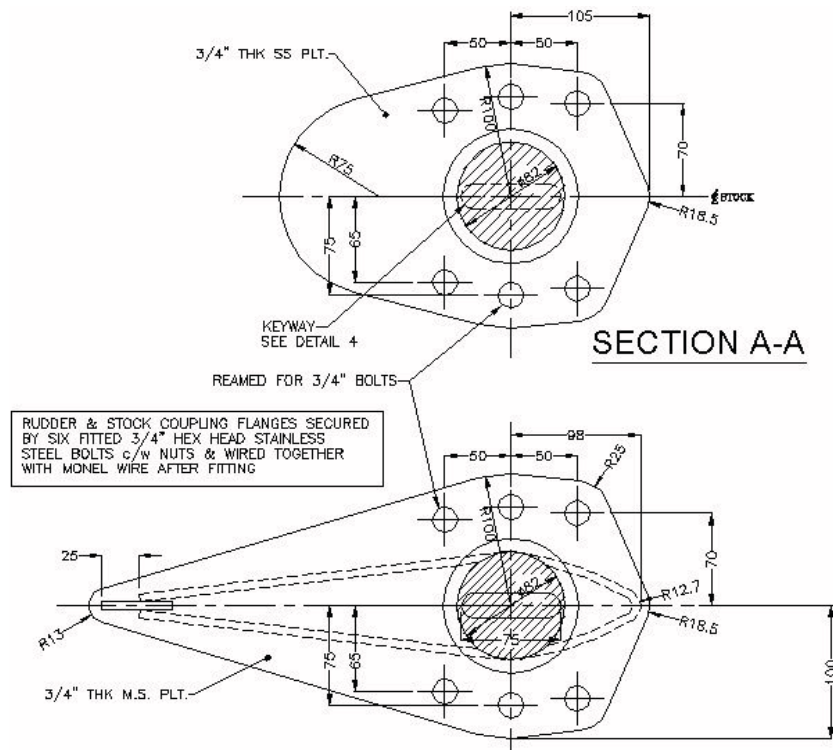


Figure HD-06-Fig. 7 - Rudder connection drawing

## HD-07 PROPULSION SHAFTS

- HD-07-1 Both propulsion shafts will be removed and replaced with new shafts provided by CCG. See Appendix A4 for Shaft Manufacturing Certificates, Appendix A5 for Shafting Arrangement.
- HD-07-2 Contractor shall quote on the removal of the two propellers, rope cutters, stern tubes, strut bearings (two per shaft), and packing gland material.
- HD-07-3 Contractor shall quote on machining and installing four new Thordon bearings (CCG Supplied), one per stern tube and one per strut. Contractor shall machine each of the four bearings as per manufacturer's requirements. Contractor may contact Thom Hofmann at Avalon Marine for correct machining measurements. Contractor shall provide the facility and ice required to shrink fit the bearings after machining. Contractor shall verify all measurements prior to machining and installing the new bearings. Completion of work shall be to the satisfaction of TCMSB. All measurements shall be recorded and a copy given to the CGTA.
- HD-07-4 Contractor shall install the two new shafts, stern tubes, and strut bearings. The original rope cutters shall be installed to the new shaft, pending approval of CGTA. Any additional work or parts required shall be adjusted through PWGSC 1379 action.
- HD-07-5 The shafts will be reconnected to the original drive saver couplings upon completion of the specified work and after TCMSB approval.
- HD-07-6 CGTA shall inspect the removed propellers. Pending approval, contractor is to fit each propeller to the new shafts. Contractor's bid is to allow for three (3) fits. Additional work required in this item shall be performed via PWGSC 1379 action.
- HD-07-7 Contractor shall supply and install new Garlock impregnated packing gland materials for both shafts and adjust as per normal operating procedure. Contractor shall verify the actual size and length required prior to ordering. Contractor shall quote a price for supplying and installing 12 feet of ½ inch Chesterton 329 stern-Lon packing material. Actual quantity and size used shall be adjusted through PWGSC 1379 action.
- HD-07-8 Acceptance shall be based on no visible or physical vibration through all RPM ranges from start to maximum load and both packing glands not leaking seawater into the vessel greater than what is acceptable to the Vessel Engineer. Acceptance shall also be to the satisfaction of the CGTA.
- HD-07-9 Contractor to measure length of shafts and size and dimensions of nuts and length of thread size and supply written report to CGTA
- HD-07-10 Contractor is responsible for disposal of old shafts.

Comment [TS1]: Per taper, 12 in total

#### **HD-08 TRIM TABS**

- HD-08-1 Contractor shall functionally test the port and starboard trim tabs prior to drydocking in the presence of the Owner's Representative.
- HD-08-2 Contractor shall visually inspect the exterior areas of the port and starboard trim tabs for other mechanical wear (linkages, pins, indicator cables, etc.) when the vessel is drydocked, in the presence of the Owner's Representative.
- HD-08-3 Contractor shall prepare a typewritten report of their finding including all necessary repairs and associated costs. A copy shall be given to the Owner's Representative and the PWGSC Contracting Office. Repairs not addressed in this specification item shall be done through 1379 action.
- HD-08-4 Acceptance shall be based on the system functioning as per manufacturer's specification and to the satisfaction of the Owner's Representative.
- HD-08-5 Contractor shall remove all hydraulic fluid AW32 from the trim tab system, including the holding tank, lines hoses and valve blocks in the steering flat. The complete system shall be flushed with CFM hydraulic flush fluid and cleaned where accessible. Contractor to wipe clean the holding tank with lint free cloth. Note when full the system contains eight (8) litres Contractor to bid on replacing the 8 litres.



Figure HD-08-Fig. 1 Trim tab starboard side

#### **HD-09 PROTECTION AGAINST SEA & LOAD LINES**

HD-09-1 The following items are to be removed, and laid out for inspection by a TCMS surveyor:

- Port Forward 3" M/E Sea Water Outboard
- Port Forward Camlock Inspection Cover
- Starboard Forward 3" M/E Sea Water Outboard
- Starboard Forward Camlock Inspection Cover
- Port Aft 2.5" Fire Pump Inboard

HD-09-2 The following valves are to be replaced with class approved equivalent:

- Port Forward 1.5" Recirculation Valve Forward
- Port Forward 0.5" Vent Line, Top
- Starboard Forward 1.5" Recirculation Valve Forward
- Starboard Forward 0.5" Vent Line, Top
- Port Aft 1" Vent Line Outboard

HD-09-3 Any additional work raised by unsatisfactory inspection results is to be completed via PWGSC 1379 action. Any valves to be replaced shall be class approved.

HD-09-4 After TCMS approval has been obtained, all removed items related to HD-09 are to be reinstalled and functionally tested.

## **L-01 ALTERNATOR OVERHAUL**

- L-01-1 The port and starboard alternators are to be disconnected and removed for service.
- L-01-2 Prior to removal, insulation testing is to be completed. A typewritten report of readings is to be submitted to CGTA.
- L-01-3 The alternators are to be cleaned, painted, and brushes/bearings are to be replaced.
- L-01-4 The alternators are to be reinstalled, with new belts (Belt specs: Caterpillar 4N-8218-DF X 2 per engine), and tested as per L-01-2.
- L-01-5 Acceptance shall be based on a type written report, including test results from before and after servicing. In addition, a successful function test shall be performed, demonstrating the generators operation without restriction and to the satisfaction of the vessel engineer.



## **L-02 MAIN ENGINE STARTER**

- L-02-1 The Stbd. Main Engine Starter is to be disconnected and removed for service.
- L-02-2 Prior to removal, peak cranking current, and insulation testing is to be completed. A typewritten report of readings is to be submitted to CCG VMM.
- L-02-3 The starters are to be cleaned, painted, and brushes/bearings are to be replaced. Any defects found during servicing will be considered unscheduled work and be covered by way of PWGSC 1379 action.
- L-02-4 The starters are to be reinstalled. Testing is to be completed as per L-02-2.
- L-02-5 Acceptance shall be based on a type written report including test results from before and after servicing. In addition, a successful function test demonstrating the starters operation without restriction shall be performed to the satisfaction of the vessel engineer.

### **L-03 INTERIOR LIGHTING**

- L-03-1 Contractor is to remove a total of twelve (12) existing lighting fixtures from the engine room the fwd & aft survivors space, and the engine room, to be returned to CCG onsite representative.
- L-03-2 Contractor is to install replacement CG supplied LED lamps in the location of each of the removed lights. See Appendix A6 for manufacturer's installation data.
- L-03-3 Of the twelve fixtures, the five (5) located in the survivors spaces require a 12" diameter round white plastic (or similar) backing plate to cover the outline of the previous fixtures. These backing plates are to be fabricated and installed by the contractor.
- L-03-4 The seven (7) lamps located in the engine room spaces will require a mounting bracket be fabricated to secure them to the vessel.
- L-03-5 All lamps shall be installed such that they may be rotated by 90 degrees if needed.
- L-03-6 Any additional work required shall be adjusted through PWGSC 1379 action.
- L-03-7 Acceptance shall be based on the satisfaction of the CGTA.

## **Appendix A**

### **1 – Division 3 Report, June 21, 2013**



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### **2 – Docking Plan**



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### **3 – Tank Capacities Plan**



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### **4 – Shaft Manufacturing Certificates**



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### **5 – Shafting Arrangement**



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### **6 – Hella Dura 36 LED Rectangular Engine Room Lamps**



Acrobat Document



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 **E.Y.E. MARINE  
CONSULTANTS**  
Dartmouth, N.S.  
90 John's Nfld.

Client: MIKE METAL PRODUCTS

Title
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#### AND BUOYANCY MATERIAL LAYOUT

Score	N.T.S.

C.C.G. Approval

Drawn	
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Checked  
T. THOMPSON

<p>             1. <i>Author's name</i>              2. <i>Author's address</i>              3. <i>Author's phone number</i>              4. <i>Author's fax number</i>              5. <i>Author's e-mail address</i>              6. <i>Author's affiliation</i>              7. <i>Author's position</i>              8. <i>Author's department</i>              9. <i>Author's university</i>              10. <i>Author's country</i>              11. <i>Author's city</i>              12. <i>Author's state</i>              13. <i>Author's zip code</i>              14. <i>Author's country</i>              15. <i>Author's city</i>              16. <i>Author's state</i>              17. <i>Author's zip code</i>              18. <i>Author's country</i>              19. <i>Author's city</i>              20. <i>Author's state</i>              21. <i>Author's zip code</i>              22. <i>Author's country</i>              23. <i>Author's city</i>              24. <i>Author's state</i>              25. 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<i>Author's zip code</i>              174. <i>Author's country</i>              175. <i>Author's city</i>              176. <i>Author's state</i>              177. <i>Author's zip code</i>              178. <i>Author's country</i>              179. <i>Author's city</i>              180. <i>Author's state</i>              181. <i>Author's zip code</i>              182. <i>Author's country</i>              183. <i>Author's city</i>              184. <i>Author's state</i>              185. <i>Author's zip code</i>              186. <i>Author's country</i>              187. <i>Author's city</i>              188. <i>Author's state</i>              189. <i>Author's zip code</i>              190. <i>Author's country</i>              191. <i>Author's city</i>              192. <i>Author's state</i>              193. <i>Author's zip code</i>              194. <i>Author's country</i>              195. <i>Author's city</i>              196. <i>Author's state</i>              197. <i>Author's zip 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     222. <i>Author's country</i>              223. <i>Author's city</i>              224. <i>Author's state</i>              225. <i>Author's zip code</i>              226. <i>Author's country</i>              227. <i>Author's city</i>              228. <i>Author's state</i>              229. <i>Author's zip code</i>              230. </p>
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