

New Build Vessel Specification

18 metre Passenger Vessel

For Street Art Ink Limited

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Compiled by



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1.0 GENERAL

1.1 PARTICULARS

1.1.1 Vessel Description

This Specification describes the requirement for a new build 18 metre passenger vessel to be operated by Street Art Ink Limited. The vessel is to be a P2 passenger boat under licence from the MSO. The vessel after completion is intended to ply the River Suir and the inland water ways of Ireland.

1.1.2 Dimensions

Length overall	18.00 metres
Waterline Length	18.00 metres
Beam	4.00 metres
Depth	2.22 metres

1.1.3 Tank Capacities

Fuel oil	N/A
Fresh water 3 x 335	1.005 tonnes
Sewage holding tank (Across 2 tanks)	0.670 tonnes

1.1.4 Weights and Loading

Light Ship (approximate)	24 tonnes
Maximum Deadweight	2.5 tonnes
Crew	2
Passengers	12

1.1.5 Performance - (not a specification requirement)

Free running speed, ahead	6 knots
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1.2 DEFINITIONS

1.2.1 Parties

1.2.1.1 Owner / Operators

Street Art Ink Limited
7 Leamy St, Browley West,
Waterford,
X91 EC5E,
Ireland.

1.2.1.2 Shipyard, Shipbuilders and/or Suppliers

To be confirmed....

1.2.1.4 Owner's Representative: An individual or Company appointed by the owner to act on their behalf in relation to the build of the vessel or project.

1.2.1.5 Surveyor: A representative of the flag state of Ireland or of a classification society.

1.2.1.6 Classification Society (Class): not to be appointed

1.2.2 Equivalents:

- "Equivalent" Materials or Equipment:
- May be considered by the owners provided that the substituted material or equipment meets the requirements of Flag and/or Class and is of benefit to the project / vessel in terms of overall cost, performance or service life expectancy
- Proposed alternatives, to be approved by the Owners Representative, Flag and/or Class in writing, before any alternatives / equivalents can be approved.
- Materials or equipment are to be considered equivalent to the specified materials or equipment in terms of:
- Efficiency and performance
- Service life and availability of spare parts and service
- Size and weight

- Contractor and suppliers shall present evidence to support their claims that Materials or Equipment qualifies as "Equivalent" to any Materials or Equipment indicated in the Specification. The Owner and/or the Owner's Representative will make the final decision on all "Equivalent" Materials or Equipment to be fitted.

1.2.3 Approved and/or to Approve

- Materials or Equipment, acceptable for installation in the vessel for which written confirmation of same has been received from the Owner's Representative, Flag State.
- Drawings and Calculation, which are produced by this office, signed off by this office and are stamped by the Flag State.

1.2.4 Normal Shipbuilding Practice

"Normal Shipbuilding Practice" refers to methods and procedures proven to be successful in long-term service of similar vessels operating in similar plying limits and/or operations. Notwithstanding the requirements of the Flag State and/or Class.

1.2.5 Supply

"Supply" means purchase and/or manufacture components and equipment in accordance with normal shipbuilding practice.

1.2.6 Install / Installed

"Install" means to fit components and equipment in accordance with normal shipbuilding practice and/or the requirements of the Flag State and/or Class. Components and equipment will be considered "installed" when ready for use, and tested to the approval of the Owner's Representative, Flag State and/or Class.

1.3 FLAG STATE, CLASSIFICATION REQUIREMENTS AND STANDARDS

1.3.1 Flag State

After construction the vessel shall meet the requirements of Merchant shipping (Passenger boat) Rules for a P2 passenger boats as laid down by S.I. No. 273/2002 - Merchant Shipping (Passenger Boat) Regulations 2002 as amended by S.I. No. 648/2003 - Merchant Shipping (Passenger Boat) (amended) Regulations 2003 as interpreted by the Irish Marine Survey Office.

1.3.2 International Maritime Organisation

After construction the vessel shall comply with the current edition (as amended) of the below listed publications as applicable:

- COLREG, Convention on the International Regulations for the Prevention of Collisions at Sea

1.3.3 Classification Society

Not applicable for this project.

1.3.4 Certification

Not applicable for this project.

1.3.5 Fees

Not applicable for this project.

1.3.4 Extra Standards

SSPC - Society for Protective Coatings

No.47 Shipbuilding and Repair Quality Standard

1.4 REGISTRY AND CERTIFICATION

1.4.1 Registry

Vessel is to be registered in Ireland.

1.4.2 Load Line

Not applicable for this project.

1.4.3 Markings

The vessel shall be marked with vessel name, port of registration, IMO and/or official registration number.

The vessel's gross (GRT) and net (NRT) tonnage shall be calculated and marked in accordance with International Tonnage Measurement

1.4.4 Certification

On delivery of the vessel, three copies of the following certificates (as applicable) are to be supplied to the Owner's Representative:

Certification of compliance with Flag State requirements.

1.4.5 Certificates (Other)

On delivery of the vessel, three copies of the following certificates (as applicable) are to be supplied to the Owner's Representative:

- Certificates of fire-fighting equipment and lifesaving equipment
- Certificates of navigation lights

The Owner will be responsible for providing the following certificates:

National registry
Passenger ship licence
Radio Station License
Minimum Safe Manning

1.4.6 Manuals

The builder will be responsible for providing the following approved manuals and/or documents. Some will require assistance from the owner's representative and/or designer.

- Technical files equipment supplied by them.

1.5 CONTRACT DOCUMENTS

1.5.1 Intent of Specification

- This Specification and accompanying Drawings will form part of a Contract between the Owner and Shipbuilder.
- Notwithstanding the requirements set out in this specification, or indicated on design drawings, it is to be understood that the Shipyard (Shipbuilders and/or Suppliers) is responsible for completing the vessel, for the contract amount, in a manner reflecting normal shipbuilding and good marine engineering practices.
- In any differences between the contract and specification the contract shall be deemed correct.
- In any differences between the drawings and specification, the specification shall be deemed correct.
- In any differences between the drawings and/or specification and flag state and/or classification requirements the latter shall be adopted, if the requirements are of a higher standard.
- Matters not covered by the specification are to be on the basis of what is accepted as a normal shipbuilding and good marine engineering practices suitable for the vessel's intended purpose.
- This Specification defines the operating conditions, requirements, and intended capability of each system or device within or on the vessel. The Shipyard is responsible for ascertaining and ensuring that any components, materials, equipment, or parts selected for incorporation into the vessel are suitable for the service as defined by this specification.
- If any equipment, components, materials, equipment, or parts required for the successful operation of any systems are not specifically mentioned in the specification or drawings, the requirement for such components are to be brought to the attention of the owner's representative prior to entering into the contract.
- After the contract is drawn up, non-specified items, which are required for operation of any systems will then be considered as included in the contract amount. The cost of installing and supplying such items will be included in the contract amount.
- Items required for the general installation of shipboard systems such as general hardware, fittings, clips, fasteners, couplings, light steel works etc. are deemed to be included in the definition of the associated systems, whether specifically mentioned or not.

1.5.2 Shipyard's Responsibility

- The shipyard is responsible for the integration of all systems and equipment onboard the vessel and to ensure the vessel meets the requirements as detailed in this specification and is in accordance with flag state.
- The shipyard is responsible for coordinating the supply and delivery of all equipment and materials, including any works carried out by sub-contractors, in a timely manner.
- The shipyard is to notify the owners representative, flag state in writing not less than 10 working days before the vessel is ready for acceptance trials.
- The shipyard shall be responsible for completing successful dockside trials of all main and auxiliary machinery. Such dockside trials are to be completed successfully before any sea trials are undertaken.

- After any defects arising from the dockside trial have been made good, the shipyard shall carry out sea trials on the vessel, of not less than four hours duration. During this trial all systems will be tested. Speed will be tested over a measured mile with a minimum of 3 double runs. In addition, the usual steering tests, astern and stop tests will be carried out.
- The shipyard is to supply all necessary crew, fuel, oil, pilot, compass adjuster, technicians and provisions required for the trials.
- The shipyard is responsible for any corrective action required as a result of both dock side and sea trials, this shall include but is not limited to machinery and vessel systems, local vibration of members, panels, items of outfit, piping systems etc.
- The vessel is to be delivered at a berth at the shipyard's port in a clean and working condition, free from all debts and claims.
- A set of photographs is to be supplied to the Owners.
- When the vessel is finally fitted out as per the agreed items and per specification, all recorded defects are made good, satisfactory trials are completed and the vessel is delivered with all the appropriate certifications, acceptance of the vessel will be made.

1.5.4 Insurance

- The vessel along with all materials, equipment, machinery and appliances shall be, insured by the shipyard until the vessel is accepted. Shipyard Risks shall include all trial, personal employed directly by the yard and any subcontracted aboard the vessel during the contract period.
- The premium for this insurance is to be to the shipyard's account
- The insurance shall include the full value of any and all equipment and materials that are owner supplied and under the care of the shipyard.
- This insurance policy shall be in the joint names of the owner and the shipyard and to cover the full contract value at all times.
- The owner's representative is to receive copy of shipyard's insurance policy for approval prior to contract commencement.
- The shipyard is responsible for making all claims or proof of claims for satisfaction of any loss suffered by the owner, shipyard or any subcontractor.
- The shipyard shall be liable for any and all claims for death or injury to persons and damage to property arising out of construction and final delivery of the vessel to the owners.
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1.5.5 Changes to Drawings or Specification

- The Shipyard shall obtain approval before deviating from the design drawings or specification, from the Owner's Representative and Flag State.
- The Owner has the right to make reasonable changes and alterations to the design as work progresses. These changes shall be permitted without extra charges, provided that works on that part of the project have not commenced, or where works have already commenced an extra cost for labour or material may be involved, a reasonable extra charge may be permitted. These extra charges must be agreed upon between the Owner's Representative and Shipyard before works commence.

- Any and all substitutions by shipyard including the use of alternate scantlings, equipment, or materials can be considered in order to utilise available stock, however these changes must be approved by the Owners Representative and Flag State before any of the related works commence.
- Changes to conform to Shipyard's own practices and/or improvements suggested by the Shipyard, must be approved by the Owners Representative and Flag State before any of the related works commence.
- In the event that changes shall affect the contracted delivery date the new proposed delivery date shall be agreed in writing.

1.5.6 Procedures for Changes or Extras

- Changes or additions to the drawings or specification by the Owner, will be proposed in writing by the Owner's Representative to Shipyard for agreement or quotation.
- On receipt of written reply, the Owner's Representative shall advise the Shipyard of acceptance of agreement or quotation for additional works.
- Changes or additions to the drawings or specification by the Shipyard will be proposed in writing to the Owner's Representative for agreement, along with a detailed quotation for additional labour and/or materials. The Owner's Representative shall advise, in writing of acceptance of proposal.
- Requests from the Owner's Representative to the Shipyard for written quotation of extra charges will be dealt with promptly, to avoid unnecessary delay.
- No extra charge will be due unless written confirmation from the Owner's Representative has been received.

1.6 DOCUMENTS

1.6.1 Designer Supplied Drawings

For the purposes of project costing, the following drawings will be provided:

- General Arrangement
- Typical Structural Section
- General Structural Arrangement
- Lines Plan
- Fire and Safety Plan
- Steel weight Estimate

For construction the following drawings will be provided:

- General Arrangement Drawing.
- Lines Plan.
- Fire and Safety Plan.
- Mooring arrangement details
- Tank Arrangement.
- Bilge Arrangement (Schematic).
- Basic Structural Cal (LRSSC).
- Structural Arrangement (Overview, Deck, Type Frame and BH).
- Weight estimate.
- Full lofting / CNC cutting files (arranged @ shipyards account)
- Assembly book (arranged @ shipyards account)

1.7 CONSTRUCTION

1.7.1 Build Schedule

The Shipyard shall meet with the designers, owners and owner's representatives as soon as practicable possible after acceptance of the contract. A work plan or a construction schedule shall be agreed.

The construction schedule is to be reviewed at 20 working day intervals at which time the shipyard should issue progress reports to the designers and the owner's representative. This progress reports to include photographic records detailing the work in progress.

The designers, owners, owner's representatives, the flag state surveyors are to be given free access to the builder's premises during construction, in order to oversee construction works.

1.7.2 Quality Control

It is the responsibility of the Shipbuilder to ensure that all work meets or exceeds the requirements of the designers, owners, owner's representatives, the flag state surveyors, any workmanship to be found unsatisfactory is to be corrected at the Builders' expense.

Any faults found up to one year after the completion of the trials, due to faulty workmanship and/or improper installation are to be made good by the shipyard at the owner's home port.

1.7.3 Weight Control

It is the shipyards responsibility to monitor and control weights of materials used on the vessel, deviation from the designers' predicated weights shall be reported in all areas not defined by Specification or Drawings. Final weight estimate will be available for the designers before construction will commence.

1.7.4 Cleanliness

The construction area is to be kept clear of all hazards, in good shipyard practice, and the vessel is to be regularly cleared of all surplus materials and tools. In addition to cleaning of steel surfaces, etc the Shipbuilder is responsible for maintenance of a clean and tidy condition during construction and outfitting and is responsible for cleaning bilges, tanks, voids and any spaces which may be rendered inaccessible after the construction. Particular attention should be paid to the protection of machinery components, such as engines, pumps, and compressors.

1.7.5 Tank Cleaning

- Fresh water tank shall be washed down with a mild detergent prior to final close up.

1.7.6 Installation of Equipment and Machinery

- The shipyard is required to install items of machinery and equipment as per the manufacturer's instructions. In the event that the shipyard does not consider the manufactures instructions applicable or reasonable the Shipyard shall contact the Designer and the Owner's Representative in writing.
- Machinery and equipment shall be installed in such a manner that it can be regularly cleaned and maintained without effecting heavy equipment such as piping or pumps.
- Instrumentation shall be located so that it can be easily read when the vessel is in operation.

1.8 INSPECTION AND SURVEYORS

- All parts of the construction and the installation shall be subject to inspection/survey by owner's representative and Flag State. The Shipyard shall provide reasonable assistance to all such personnel for all such inspections.

1.9 TESTS AND TRIALS

1.9.1 Inclining Experiment

- On completion of the vessel the shipyard will organise an Inclining Experiment to be witnessed by the Designers, Owner's Representative and Flag State and/or Class.
- The inclining experiment will follow a format prescribed by the designers and approved by the Flag State and/or Class.
- The shipyard under instruction from the designer will perform the inclining experiment.
- The shipyard shall supply all necessary weights, cranes, manpower and small craft to perform the experiment.

1.9.2 Dock and Sea Trials

- The Shipyard is to notify the Designers, Owner's Representative and Flag State and/or Class in writing not less than 10 working days before the vessel is ready for acceptance trials.
- Dock trial of all main and auxiliary machinery to be completed before any sea trials are organised.
- After any defects arising from the dockside trial have been made good, the vessel shall carry out sea trials of not less than four hours duration. During this acceptance trial all systems will be operated and a speed run over a measured mile with 3 double runs minimum to ascertain vessel's speed. In addition, the usual steering, astern and other tests will be carried out.

2.0 STRUCTURAL MODIFICATIONS

2.1 CONSTRUCTION

2.1.1 Lofting

- Superstructure and structural alterations are to be measured up and/or lofted by the builder before works commence any discrepancies are to be reported immediately to the Designers. In the event that the shipyard chooses to use Prolines cutting files and assembly information the designer will attend the delivery of the cut/kit and inspect on behalf of the shipyard.

2.1.2 Standards and Tolerances

- All welding procedures should be carefully followed to give a fair hull on completion and any unfairness between frames will be corrected at the builder's expense. Tolerances are to be in accordance with IACS standards for Shipbuilding and Repair Quality Standard No. 47.
- Fairness of hull, bulkhead and superstructure plating shall be to satisfaction of Owner's Representative.
- Propeller shafts shall be aligned to engine beds within a tolerance of 0.12 mm over width of shaft coupling.

2.1.4 General Work Practises

- No holes or openings are to cut into structural members for any purpose unless consulting the designers or the Owner's Representative
- Plate edges and holes burned in the structure shall have regular outline.
- Openings burnt in shell, deck or structural members to have rounded corners and edges ground smooth.
- All sharp or jagged edges on exposed structural members to be ground smooth.
- All construction lugs, brackets etc. are to be burnt off and buffed down inside and out
- Where necessary 50mm limber holes are to be cut at the lowest point of compartment or tank for drainage.

2.1.5 Welding

- Plate edges properly prepared in line with welding schedule before welding works are commenced.
- Where stress concentrations may arise at corners and terminals, continuous welds are to be run around the joint for a distance of at least 50 mm
- Continuously all-round welds to be used on all brackets.
- Continuously weld ends of stiffeners on both sides for twice the stiffener depth.
- No intermittent welding of stiffeners on the exterior plating.
- Plate reinforcements are to be insert plates only, doublers not to be used. Insert plates to be tapered at a ratio of 3 to 1 down to the thickness of the surrounding plate. Corners to have large radius
- All welds are to be to the satisfaction of the Designers, Owner's Representative and Flag State and/or Class surveyors.

2.1.5.1 Weld Schedule

- All welding should be in accordance with the classification rules.
- A full welding schedule, including preparations of plate edges, sequence and tapers if necessary are to be presented to the Designers, Owner's Representative and Flag State and/or Class for approval before this works are commenced.
- Shipbuilder shall determine the most suitable welding sequence to eliminate as far as practicable any "locked in" stresses or distortion in the structure.

2.1.5.2 Testing and Inspection

- The owner's Representative and Flag State and/or Class will carry out visual inspection on all butt and fillet welds.

- The Flag State and/or Class surveyors may require DPI, Vax Box and/or X-ray testing some/part of the welds. This will be to the shipyards account and should be agreed while the welding schedule is being approved.
- If welds are determined by Owner's Representative and Flag State and/or Class to be defective the extent of defect shall be removed and renewed at the shipyards expense.

2.1.5.3 Welding Consumables

- All welding consumables are to be compatible with the materials and of approved type.

2.1.5.4 Welders

- All welders are to be coded for the appropriated welding they are undertaking. All welder certifications shall be presented to the designers, Owner's Representative and Flag State and/or Class for approval before works commence.

2.2. CONSTRUCTION MATERIALS

2.2.1 General

- The vessel is to be of steel construction

2.2 Steel

- The steel use is to be of shipbuilding quality structural steel LR Grade "A", or equivalent. Cert to be available for inspection.
- Steel is to be free from laminations, other defects, and rust.

2.3 Timber

- Timbers provided and used for lining, trim, control stations, bars and other purposes are all to be well seasoned, good quality and free of knots and shakes and suitable for marine environment.
- Timber furniture is to be of substantial construction in good modern design with approved facings and hardwood trimmings
- All exposed plywood is to be finished with a veneer, which matches its surrounding
- Hidden woodwork is to be of red cedar, coated with a protective coating
- All plywood must be of marine grade approved by the class rules.

2.3 HULL CONSTRUCTION

2.3.1 General

The structure scantlings are based on the Lloyd register rules for “Special Service Craft”. Scantlings sizes, plate thickness and arrangements as per 3000-00 (General Structural Arrangement).

2.3.2 Black Water Tank

The vessel with two black water tanks. The Shipyard/contractor will be expected to fit the black water tanks to the following requirements. The tanks are to be integrated into the WC piping system and positioned as detailed in the General arrangement drawings and this specification.

- The Black Water Tanks shall be a stand-alone with an approximate capacity of 335 litres each.
- They should be tested and securely installed in the forward and aft accommodation as shown on designer supplied drawings.
- The tanks to be constructed plastic and be CE marked.
- The tanks shall be fitted with an inspection cover and contents gauges or level indicators.
- The air and pumping out pipes are to be of suitable hard wall piping (as per supplier recommendation).
- Air pipes are to be fitted and are to be brought outboard and run up to the top of the coach roof as per design drawings. N.B. dissimilar materials are to be isolated.
- The Air pipes are to have portable spark-proof wire gauze covers; the size being dictated by the area of holes in the wire mesh.
- The Pumping out pipe connected to be decided by the Owner's Representative.
- The tank shall be fitted with a drain plug.

2.3.2 Fresh Water Tank

The vessel is to be fitted with freshwater tanks approximately volume to be 1 cubic meter. The tanks are to be integrated into the WC and Galley piping system and positioned in the engine room as detailed in the General arrangement drawings.

- The Fresh Water Tank shall be a stand-alone with an approximate capacity of 1005 litres over 3 tanks.
- The tanks should be tested and securely installed in the accommodation space forward of the engine room and the Forward Cabin as shown on designer supplied drawings.
- The tanks to be constructed plastic and be CE marked.
- The tanks shall be fitted with an inspection cover and contents gauges or level indicators.
- The air and pumping out pipes are to be of suitable hard wall piping (as per supplier recommendation).
- Air pipes are to be brought outboard and run up to the top of the coach roof as per design drawings. N.B. dissimilar materials are to be isolated.
- Filler pipes are to be brought outboard and run up to the main deck as per design drawings. N.B. dissimilar materials are to be isolated.
- The filler pipe connection type to be decided by the Owner's Representative.
- The tank shall be fitted with a drain plug

2.3.3 Fuel Tanks

The vessel fuel tanks are not required in the vessel.

2.3.4 Bulwarks and rails

The vessels bulwarks and railings are to consist of steel bulwarks as per design drawings and railing system assemble with stanchions and wires. Wires to be stainless steel with effective bottle screws at terminals. When made taught the rails should not deflect more than 3 cm when a 5 kg load is suspended as midspan.

2.3.5 Main Deck

The vessel main decks are to be of steel construction 6mm plate typically stiffened by L 75x50x6. Finished decks to fair with intercostal stiffeners added as required to straighten panels and prevent water from pooling.

2.3.6 Engine Room Ventilation

The vessels engine room vents are to be located at the aft end of the accommodation block. They are to have the following features:

- Steel construction.
- Have effective insulation / separation from the surrounding structure of dissimilar materials.
- A60 fire protection.
- Louver vent with effective flap type closure.

2.3.7 Navigation Mast

- The main mast is to be of a steel construction and is to be a hinged self-supporting structure.
- It shall provide a platform for navigation lights, whistle, radio and GPS antennae
- All wiring to be run neatly
- Mast base to be arranged with hinging system for easy lowering to reduce the air draught of the vessel.
- Arrange navigational lights at minimum spacing and in locations as defined in COLREGS and to the approval of the Flag state.

2.3.8 Seating and Foundations

Propulsion Machinery Foundations

- Accurately fabricate and install main engine girders. All welding on girders to be continuous.
- Plate cuts in girder or brackets to be smooth and fair and grind any roughness smooth. This holds also for lightening holes and limbers

Auxiliary Machinery Foundations

- Mount items of auxiliary machinery on well designed, rigid, and efficient seatings of skids, with drip trays, all to satisfaction of Owner's Representative
- Attachment to ship's structure will be to approval of Owner's Representative, with no struts, braces, or hangers attached directly onto plate panels

• JOINERY AND AREA FINISHES

3.1 GENERAL

- All joiner work shall be of solid construction, neat and attractive appearance. Produced using skilled craftsmanship.
- All painted interior surfaces to be coated with a suitable primer and a minimum of 5 coats overall.
- The colour to be decided by the owner.
- All wood is to be well-seasoned, good quality and free of knots and shakes.
- Wooden furniture is to be of substantial construction in good modern design with approved facings and hardwood trimmings. Surfaces must be highly durable, easily cleaned by wiping or washing with mild detergent. Surfaces to be free of inaccessible corners, or open joints which collect dirt
- All screws must be stainless steel with all visible screw heads countersunk and capped with a material, which matches it's surrounding.
- All exposed plywood to be finished with a veneer, which matches its surroundings.
- Hidden woodwork to be of red cedar, coated with a protective coating.
- All plywood must be class approved marine grade.
- All fittings to be decided by the owner and the interior designer.
- Deck head and ceiling must be in 5mm plywood. Colour scheme to be decided by the Owner's Representative

3.2 WHEELHOUSE

- Flooring to be high quality carpeting, colour to be decided by the Owner's Representative.
- All carpet to be bonded to the floor and protected at edges.
- All plywood in this area to be coated with a minimum of 5 coats of paint or varnish where appropriate.
- All removable panels to be fitted with bronze handles.

- All drawers, which open athwart ships, are to have approved anti-rolling arrangements.
- At least 2 keys are to be provided for every lock.

3.3 GALLEY / SALLON AREA

- Sharp edges should be avoided
- Galley floors and wall to be heat resistant.
- A chromium handrail, 20mm diameter will run around the edge of the work surfaces.
- All food preparation surfaces shall be stainless steel.
- Flooring will be non-slip vinyl and fully washable.
- Work surfaces will be positioned 900mm above the sole.
- Cupboards will be fitted with latches and drawers and will be of the lift and remove type.
- Cupboard shelves will be adjustable and removable.

3.4 PASSENGER AREAS

- Seat/cushions and backs are to be of good quality fire resistant foam covered with approved Ambla or equal.
- Timber furniture is to be of substantial construction in good modern design with approved facings and hardwood trimmings.
- The sole in the passenger areas must be of marine grade plywood, with a 10 mm layer of chestnut wood glued with epoxy and protected by a minimum of 5 coats of satin wood saturator.

3.5 TOILETS

- Toilet cubical to be arranged as per design drawings.
- Flooring to be non-slip vinyl.
- Walls to be tiled.
- Each cubical to have a mirror, washbasin, paper holder, coat hook and paper towel dispenser.
- Each cubical is to have hot and cold running water.
- Each cubical to be fitted with an electrically powered ventilation system.
- Fit isolating valves for each cubical.

3.6 DOORS

3.6.1 Type 1 External Doors

- Provide 2 x external type doors on port and starboard side of the wheelhouse as per the design drawings.
- Doors are to be weather tight to Flag requirements.
- Doors are to be of timber construction fitted into aluminium frames.
- Each door shall have a window of approximately 400 x 400mm, fitted with approved toughened or tempered glass.
- Fixed with a single acting, two-dog locking mechanism actuated by lever from both sides.
- Doors are to have suitable shock absorbers to prevent the doors from slamming shut in high winds.

3.6.2 Type 2 Interior Doors

- Provide 4 x Interior Doors as access for the WC's, shower and forward accommodation.
- Doors are to be to Flag and Class requirements.
- Doors are to be of timber construction fitted into timber frames.
- Doors are to have suitable shock absorbers to prevent the doors from slamming shut.
- Fixed with a single acting, locking mechanism actuated by lever from both sides.

3.6.3 Hardware

- Door hardware to be of stainless steel and class approved.
- Door operation to be lever-type operators on all interior doors.
- Holdback hooks and rubber bumpers to be fitted on every door.
- Nylon or rubber anti-rattle buttons to be fitted on door frames.
- All door sills to be protected with kick strip.

3.6.4 Keys and Locks

- Locks to be fitted on all doors.
- One master key for all locks.
- Key cabinet to be fitted in bar area on lower deck.
- All keys to be marked and supplied in duplicate.

3.7 HATCHES, HATCH COVERS AND INSPECTION HATCHES

3.7.1 Type 1 Hatched in Main Deck

- Provide 2 x external type 1 hatches for access to the forward and aft peaks as per the design drawings.
- Hatches are to be weather tight to Flag requirements.
- Hatches are to be of steel construction fitted into steel frames.
- Each hatch shall have a minimum opening of 510 x 510 mm
- Fixed with a single acting, two-dog locking mechanism actuated by lever from both sides.

3.7.2 Type 2 Hatched on Coach Roof

- Provide 2 x external type 2 hatches to be used for ventilation and emergency escape from the forward and aft accommodation areas.
- Hatches are to be to Flag and Class requirements.
- Hatches are to be of clear plastic construction fitted into aluminium frames and CE marked.
- Hatches are to have suitable shock absorbers to prevent the lids from slamming shut.
- Fixed with a single acting, locking mechanism actuated by lever from both sides.

3.7.3 Type 3 Hatched on Wheelhouse Floor

- Provide 2 x external type 3 hatches to be used for access and emergency escape from the engine room.
- Hatches are to be to Flag and Class requirements.
- Hatches are to be of Hercules type or similar.
- Hatches are to have or have fitted suitable A60 fire protection.
- Fixed with a single acting, locking mechanism actuated by lever from both sides.

3.8 WINDOWS AND GLASS

3.8.1 Windows on wheelhouse

- In all cases the position, dimensions and construction of windows and window frames shall meet the requirements of flag and class.
- Windows to fixed or hinged as indicated on design drawings.
- Ensure all windows are weather tight, secure in lined aluminium alloy extrusions, secured to frame, and bolted to plating.
- Windows glazing to be type approved with the following thickness: 8 mm tempered on forward facing panels and on 8mm safety glass on sides.
- Forward facing windows to be fitted with straight line wiper with variable speed controls, arranged to allow the wiper to sweep maximum window area with each blade.

3.8.2 Windows on the Super Structure.

- In all cases the position, dimensions and construction of windows and window frames shall meet the requirements of flag and class.
- Windows to fixed or hinged as indicated on design drawings.
- Ensure all windows are weather tight, secure in lined aluminium alloy extrusions, secured to frame, and bolted to plating.
- Window glazing to be type approved with the following thickness: 8 mm tempered on forward facing panels and on 8mm safety glass on sides.

3.9 STAIRS, STAIRWAYS, LADDERS AND HAND RAILINGS

3.9.1 Internal Ladders

- In all cases the position, dimensions and construction of internal ladders shall meet the requirements of flag and class.
- Internal ladders to be fitted for access to all void spaces as indicated on design drawings.
- Ladders to be constructed of mild steel with an inside stringer width of 300mm.
- Stringers and rungs to be of welded robust construction.
- Rungs to flat footing and to have effective non-slip finish.
- Ladders to bolted top and bottom using stainless steel fittings.

3.9.2 Stairways

- In all cases the position, dimensions and construction of stairways shall meet the requirements of flag.
- Stairways to be fitted as indicated on design drawings.
- Slope of stairways in accommodation spaces not to exceed 45° from horizontal.
- Stairways to be constructed of mild steel with an inside stringer width of 700mm.
- Stringers and rungs to be of welded robust construction.
- Stairways to bolted top and bottom using stainless steel fittings.
- Stairway treads to be covered in timber and fitted with in effective non-slip material.

3.9.3 Stairway Hand Railings in Accommodation Spaces.

- In all cases the position, dimensions and construction of stairways handrails shall meet the requirements of flag.
- All stairways to be provided with handrails at 1000mm above the steps.
- Handrails to be fixed to internal bulkheads.
- The construction material is to be timber.

3.9.4 Guard Rails on main deck.

- In all cases the position, dimensions and construction of Guardrails shall meet the requirements of flag.
- Guardrails of 1000mm to be fitted in way of all open decks.
- Guardrail construction material is to be steel.
- Railings are to consist of steel bulwarks as per design drawings and railing system assemble with stanchions and wires.
- Wires to be stainless steel with effective bottle screws at terminals. When made taught the rails should not deflect more than 3 cm when a 5 kg load is suspended as midspan.
- Stanchion bases to be welded to the surrounding structure, ensure all welds are well finished, grind where necessary, and remove all weld splatter.

3.10 LININGS AND PARTITIONS

3.10.1 Linings

- The accommodation spaces and wheelhouse of this vessel are to be lined throughout.
- The lining is to appear attractive with final colours and materials chosen by the designers and the owner's representative.
- Supplementary thermal and fire insulation to be fitted to meet flag and class requirements.
- All materials are to be durable and easy to clean.
- Steel and aluminium work are to be cleaned, painted and properly insulated from each other to flag, class and owner's representative standards before linings are installed.

3.10.2 Joinery and Bulkhead System

- An integrated plywood with plastic laminate system is to be used to form all non-structural partitions such as WC cubical.
- Non-structural partitions are to be 50mm thick and be fitted with suitable lining, doors and doorframes.
- Linings to be 12mm thick with joints between panels concealed by mouldings. Final type to be chosen by the designers and owners' representative.
- All joinery to be fastened with stainless steel screws to conceal fastenings or hidden joints.
- Top and bottom of panels to be trimmed with decorative mouldings.
- Builders to ensure that the decks are not penetrated when securing partition mounting channels.

3.11 INSULATION

- Where Flame resistant insulation material for thermal and acoustic transmission is to be fitted between the engine room space and the accommodation and the accommodation space and the wheelhouse.
- Before application of insulation steel works are to be cleaned and painted to flag, class and owner's representative standards.

3.11.2 Air Vents and Engine Room

- A60 standard Rock wool insulation is to be fitted as a heat barrier on the interior of air vents and casings when passing adjacent to accommodation spaces.
- Rock wool insulation may be fitted using pin and fabric sheeting method.

3.11.3 Air Vents

- Air vents to the void spaces and forward and aft are to be lead above the main deck. **Vents**

3.11.4 Galley, Bar and Accommodation Spaces

- Insulate steel surfaces in deck head with A60 rock wool insulation between stiffeners where fire or thermal insulation is required.

3.12 FURNISHINGS

- All furniture to be of modern design, attractive, comfortable and constructed of fire-resistant materials.
- Fabric coverings should be washable where possible and designed so that they are easily cleaned to ensure sanitary conditions on the vessel.
- Construction material should be strong and durable however attention should be paid to overall weight, light alloys and materials of suitable scantlings and design should be used where practicable.
- All items should have suitable marine mountings and fastenings however the steel decks shall not be penetrated when securing furniture.
- Furniture dimensions not given should be selected to suit available space.
- Colours to be agreed with the designers and owner's representative.

3.12.1 Seating and Tables in Main Saloons

- Seating and tables shall be arranged similar to what is shown on the design drawings. In all cases there shall be an allowance for 12 passengers in the main accommodation space.
- Seats shall be so arranged to ensure every passenger has 0.5 metres of seating.
- Tables to be plywood laminate plastic with double reinforced edge.

3.12.2 Upholstery

- Upholstery and coverings of best quality workmanship, strong, serviceable and washable.
- Materials used shall be fire-retardant.
- Cushions shall be of approved latex foam rubber covered in fabric.
- Cushions are to be fixed to seats so that they can be easily removed for cleaning.

3.12.3 Pilot Seats in Wheelhouse.

- A single pilot seats shall be fitted in the wheelhouse as per the design drawings.
- Pilot seats shall be of the highest quality construction with effective fixing to the wheelhouse floor by means of pedestal bases incorporating footrest.
- Special attention shall be drawn to the necessity to ensure that maximum 360degree visibility is achieved from the pilot seat positions.

3.13 CABINETS, SHELVING, AND STORAGE

3.13.1 Medicine Cabinet

- A small medical cabinet for basic first aid equipment to be located in bar area on the lower deck.
- One larger medical cabinet to be located in the wheelhouse.
- Cabinets are to be of plastic laminate plywood construction, with lockable doors and shelving.
- Locks to be heavy duty, suitable for securing supplies.
- Cabinet to be white in colour with a red cross symbol marked on the door.

3.13.2 Storage Cabinet and Drawers in accommodation and wheelhouse

- Storage cabinets and drawers are to be hardwearing and of modern attractive design.
- Storage cabinets are to be of plastic laminate plywood construction with hardwood trim. Fitted with adjustable shelving and lockable doors.
- Drawer cabinets are to be of plastic laminate plywood construction with hardwood trim.
- Drawers to have nylon wear guides with effective concealed latches.
- All materials are to be submitted to owner's representative and designers for approval before commencing work.

3.14 GALLEY OUTFITTING

- The galley in the main accommodation shall be primarily outfitted for the preparation of snacks and sandwiches, however facilities shall be installed for final preparation of larger prepared meals.
- All appliances fitted are to be stainless steel finished of good quality, known brands and suitable for use in the marine environment with the correct CE markings.
- Attention is to be paid to ease of operations within galley, allowing for sensibly sized workspaces which are easy to clean.
- The final arrangement shall be to the satisfaction of the designers and the owner's representative.
- All materials are to be submitted to owner's representative and designers for approval before commencing work.

3.14.1 Refrigeration **Fridge**

- The galley shall have a refrigerator with the following requirements.
 - Volume (l): 65L
 - Freeze Compartment: 4L
 - Freezer Temperature: -6C
 - Dimensions H x W x D (mm): 527 x 448 x 480
 - Power consumption (W/24h): 290
- Units shall be to the satisfaction of the designers and the owner's representative.

3.14.2 Food Preparation Appliances

- A cooker shall be fitted in the galley area. The cooker shall be twin hob with suitable gimbal arrangements and separated ovens.
- The ovens shall have main oven and grilling compartment with effective internal lighting and glass doors.
- A counter-top microwave oven is to be supplied in bar. The oven is to have a minimum power of 800 watts with rotation plate, internal light and easy clean ceramic interior.

3.14.3 Cooking Utensils

- Storage is to be fitted for pots, pans and other cooking utensils. This storage shall be large enough to house 15 sets of delph and cutlery.
- Owners will supply all utensils.

3.14.4 Rubbish Bins

- The galley and the wheelhouse shall be fitted with holders for 60-liter bin bags.
- The galley shall also be fitted with additional 2 x 15 holders for 15-liter bin bags.
- The bin bag holders shall have effective covers and cleanable drip trays.

3.14.5 Sink Unit

- Sink Unit shall be of stainless-steel construction.
- Be a dual bowl arrangement.
- Single lever combination taps and flexible spray nozzle.

3.15 WHEELHOUSE OUTFITTING

- The wheelhouse shall be to the highest standards utilizing materials and fittings used elsewhere in the ship.
- Electronic communications and navigation equipment shall be fitted as described in section 9 of this specification.
- The dashboard, controls and seating position should be mocked up for flag, class and owner's representative approval before installation begins.
- Miscellaneous items to be mounted on the side bulkheads are to include a clock and barometer set as described in section 9, Six coat hooks and certificate frames
- Pilot steering station to be fitted as per section 9 of this specification.
- A small chart table shall be located on the port side at the aft end of the wheelhouse and is to be constructed of plywood covered Leatherette Vinyl trimmed with hardwood.
- The table is to have 2 storage lockers, 4 chart drawers and a rack for pencils, dividers, parallel rulers, compasses, etc.
- The chart table shall be fitted with twin power sockets and a dimming reading lamp with white and red lights.
- Stowage lockers to be fitted as per 3.14.
- Pilot seat to be fitted as per 3.12.3

3.17 FIRE SAFETY SYSTEMS

3.17.1 Fire Alarm System

- The vessels is to be fitted with a fire alarm / foe detection system.
- The system is to be type approved and the meet MSO requirements.
- An alarm panel and controls shall be mounted in the wheelhouse with final position to the satisfaction designers and the owner's representative.

3.17.2 Fixed Fire Fighting Systems

- The machinery space is to be fitted with a fixed firefighting system of approved type.
- The system is activated from the wheelhouse.
- Before discharge a warning alarm is to be activated, and all engine room fans shall shut down automatically.
- All vents to the engine space have effective manual closure however the modification will require modification of the vent routes and will therefore require new closures.
- In all cases the fixed firefighting system shall meet the requirements of flag.

3.17.3 Portable Fire Fighting Systems

- Type approved portable fire extinguisher to fitted with effective quick realise brackets in the engine room, wheelhouse, accommodation space. The number, type and position of fire extinguisher to meet flag requirements. See SA-2002-XX Fire and Safety Plan.

3.17.4 Fire Pumps

- The vessel is to be fitted with two independently powered fire pumps and associated piping and fire hydrants as per SA-2002-XX Fire and Safety Plan.
- Fire hoses are to be 50mm diameter, 15 meters in length and stored on racks close to the fire pumps.
- Fire hose nozzles are to be twist type with three settings: off, spray and jet.
- The fire hoses shall be arranged that they can supply a water jet to every part of the vessel.

3.17.4 Other Fire-Fighting Equipment

- One approved fire blanket shall be fitted in the Galley area.

3.17.5 Structural Fire Protection

- Engine room space is to be fitted with A60 structural protection.
- In all cases the structural fire protection shall meet the requirements of flag.

3.18 LIFESAVING APPLIANCES

3.18.1 Life Jackets (Owner Supplied)

- Provision for the storage of adult lifejackets to be made available in boxes under the seating in the main saloons.
- Provision for the storage of child lifejackets to be made in the LSA storage cabinets in the aft end of the wheelhouse.

3.18.2 Inflatable Life rafts (Owner Supplied)

- Supply and fit one open reversible SOLAS approved life rafts with suitable cradles and hydrostatic releases located on the transom.
- Attention to be paid to the cradle material to ensure that they are compatible with the deck and/or are appropriately insulated.
- Final position, type and sizes to be to the approval of flag.

3.18.3 Lifebuoys

- Provide SOLAS Lifebuoys fitted on suitable racks as per SA-2002-XX Fire and Safety Plan.
- Lifebuoys are to be positioned so they float free with at least two having smoke and light.
- Final position and numbers to be to the approval of flag.

3.19 PAINTING AND PROTECTION

3.19.1 General

Detailed below are the standards required for the exterior and interior painting and tank coating, including surface treatment and application.

- International paint systems are to be used throughout the vessel with strict adhere to the paint manufacturer's recommendations with regards to storage, environmental conditions, surface preparation, mixing and curing times.
- Care is to be taken that recommended thickness and adequate drying times are observed between coats with a minimum of four topcoats used on all exterior metal works.
- Where machinery or equipment may be subjected to paint spatter or over-spray care should be taking to correctly mask off surfaces. Factory finished machinery and electrical components shall be repainted should it be deemed necessary by owner's representative
- Where areas are damaged or spoiled the paintwork shall be touched up to the satisfaction of the owner's representative.
- In places where painting is damaged by welding, abrasion, or any other means, it is to be restored to its former standard by mechanical cleaning to and touched up with a suitable primer before application or subsequent coats. Welded butts and seams after mechanical wire brushing, or equal, are to be given a similar touch up of primer.
- Surfaces and woods and behind bulkheads and deck heads lining in any accommodation areas are to be painted with approved low flame spreading paint, finishes and coating to be inspected by Flag and the owner's representative before lining is fixed.
- All steel is to be shot blasted with 2.0 to 2.5 mils grit and immediately primed with an agreed primer before fabrication If profile is particularly jagged, grind to remove "spikes," providing a more uniform surface.
- Metal surfaces should be thoroughly cleaned with dry compressed air or vacuum to remove all blast/grind/sanding residue and any dust or dirt. Use a brush or broom if necessary. Do not use rags to clean this surface as fibres can act as wicks for moisture or other contamination to enter the paint film

3.19.2 Priming

Apply pre-construction primer to all steel prior to fabrication. Ensure the primer product conforms with paint systems supplier's recommendations.

3.19.3 Surface Preparation

Where pre-weld primer is damaged by welding, abrasion, or other means, to the extent that the protection has broken down it is to be restored to its former standard by mechanical cleaning and touched up with a suitable primer. In all cases the owner's representative is to be informed and his approval obtained when restoration is completed. Where special preservative coatings are to be applied, such floor coverings, wood, and other materials, ensure that the metal works are primed in accordance with the paint manufacturer's recommendations and the approval of the owner's representative.

Surfaces to be prepared to the following standards:

3.19.3.1 Underwater Hull

- Spot blast all welds and damaged areas to SSPC-SP10.
- Sweep blast all other areas.
- Remove all grease and dirt prior to application of paint system.

3.19.3.2 Topsides

- Spot blast all welds and damaged areas to SSPC-SP10.
- Sweep blast all other areas.
- Remove all grease and dirt prior to application of paint system.

3.19.3.3 Other areas

Other areas to include, Decks, Storage areas, Areas behind Linings, Engine Room, Floors, Bilges, Ballast Tanks, Water Tanks, Chain Locker, Cofferdams and Deck Fittings.

- Clean all welds and damaged areas by power tools SSPC-SP3.
- Clean all inaccessible areas by hand tools to SSPC-SP2.
- Remove all grease and dirt prior to application of paint system.

3.19.4 Quality Control

- The paint manufacturer/distributor are to undertake inspection and give application and preparation guidance, the cost for which will be at the builder's expense. The inspections are to be carried out periodically during the build process with the paint inspector expected to collaborate with the owner's representative to ensure the highest standards are maintained.
- Inspections to include:
 - Final produced selection.
 - Application methods
 - Inspection of surface preparation
 - Inspection of application procedure
 - Inspection of all base coats before topcoats are applied to include thickness and coverage.
 - Interim and final reports to the owner representative, flag as required.
 - Submission of interim and final painting reports to owner's representative.
- Painting reports to record, time and date of application, ambient conditions, quantities and type of paint used, coat thickness and a statement with regard to satisfaction of coating applied. In the event that the inspector is unsatisfied with the results of an inspection the owner's representative is to be informed in writing at the soonest reasonable time.
- Deficiencies highlighted by the paint inspector's reports are to be made good and at the builder's expense.

3.19.5 Application Procedures

- Where possible all paint coats are applied to the required thickness using airless spray. Corners and surfaces that are obstructed: may be coated by roller and brush to ensure complete coverage is achieved.
 - Coats to be applied evenly and uniformly ensuring no runs, roller or brush marks are visible.
 - Defective areas are to be touched-up and repainted as directed by the owner's representative or paint inspector.
 - Areas to be repainted and or touched-up are to be prepared and cleaned as per the paint inspector's recommendations.
 - Care must be taken to ensure that surfaces are not damaged during construction.
 - Ensure that all primers and undercoats have been made good with special attention to welding burns etc before topcoats are applied.
 - Ensure that all surfaces are clean and degreased prior to the application of subsequent coats, if recommended by the paint inspector the surfaces should be lightly sanded to ensure the upper coats achieves a good hold.
 - Take care to ensure that limber holes, screens, dogs and toggles etc and not clogged with paint.
- Ensure the following are correctly masked off and are not painted:

- Rudder and propeller shaft bearings
- Rudder and propeller shaft
- Stainless steel dogs and toggles
- Stainless steel door handles
- Door hinge pins
- Door seals
- Machinery
- Machinery gearing
- Electrical fittings
- Electrical control panels
- Electrical wiring and trays
- Engine room and storage area floor plates
- Window glass
- Aluminium window frames
- Anodes

3.19.6 Final Painting and Cleaning

- Final top painting to be applied to the exterior, topsides, deck houses etc to be completed in favourable weather as close as practically possible to the sea trials and delivery date.
- Final painting of interior to be applied as close as practically possible to the sea trials and delivery date to ensure the vessel is delivered in as clean a condition as possible.
- Prior to sea trials and delivery date all protective coatings and/or coverings are to be removed, and all interior spaces are to be cleaned and polished.

3.19.7 Paint Schedule

The final paint schedule shall be agreed after discussion with International paint systems; however, it will have a minimum of standard as shown in the table below.

Item	No of coats	Product	Colour
Underwater hull	1	Epoxy	Red
	1	Epoxy	Grey
	1	Ablative A/F	Red
	1	Ablative A/F	Blue
Sides and superstructure	1	Epoxy	TBC
	1	Epoxy Enamel colour	
	1	coat	

Decks	1 1 1 1	Zinc rich epoxy Epoxy Epoxy Enamel colour coat	TBC
Engine room, storage rooms and bilges	1 1	Epoxy Epoxy topcoat	Topcoat white above deck plates and red below deck plated
Void tanks	1	Fluid film A	Red
Fuel tanks		N/A	
Ballast tanks	2	N/A	
Item	No of coats	Product	Colour
Potable water tanks	2	N/A	N/A
Behind linings in accommodation and wheelhouse	1	Epoxy	Red
Chain locker	2	Epoxy	Red
Deck fittings	2	Epoxy	White
Interior woodwork	2	Varnish finish in satin	Light Stain
Mast	2	Epoxy	White
Exhaust shack		N/A	N/A

3.20 CATHODIC PROTECTION

Special note the main engine is to be an electric engine supplied by E Motor THIS MAY REQUIRE ADDITIONAL PROTECTION AND ARRANGEMENTS please ensure all engine suppliers recommendations are followed.

3.20.1 Hull Protection

- Fit aluminium anodes to provide minimum 24-month hull protection.
- Anodes to be bolt on type.
- Determine distribution of anodes in consultation with supplier and owner's representative.
- Ensure the suppliers are aware that the vessel will be working in river estuaries and therefore encountering both brackish and fresh waters.

3.20.2 Piping Systems Protection

- Fit aluminium anodes to provide minimum 24-month hull protection.
- Anodes to be bolt on type.
- Fit one anode in the chest.
- Determine distribution of anodes in consultation with supplier and owner's representative.
- Ensure the suppliers are aware that the vessel will be working in river estuaries and therefore encountering both seawater and brackish to fresh waters.

3.21 SIGNS AND MARKINGS

3.21.1 Ship's Name and Port of Registration

- Vessel name to be fitted on the port and starboard sides of the bow and centre line of the transom.
- Lettering to be plasma cut from 6 mm steel plate so that all edges fair and smooth.
- Lettering to be 100 mm in height.
- All lettering to be attached with neat, continuous weld, no larger than 2 mm

3.21.2 Vessel Registered Number

- The vessels registration/official number and tonnage is to be permanently marked by means of bead welding into a deck beam in the storage area forward on the engine room.

3.21.3 Draught and Load Line Marks

- Draught marks are to be in metric units
- Numbering and Load Line marks to plasma cut from 6 mm steel plate so that all edges fair and smooth.
- Lettering to be 100 mm in height, load line mark to be 300mm long x 25mm high.
- All marks to be attached with neat, continuous weld, no larger than 2 mm
- Draught marks are to be painted so that they differ from the background hull colour.

3.21.4 Notices

- All notices and labels are to be written in English.

3.21.5 Lifebuoys and Life rafts

- Lifebuoys and life rafts are to be marked using vinyl labelling with the ship's name and port of registry

3.21.6 Filler and Discharging Connections

- Stencilled letters of 50mm in height on deck or bulkhead for show the position of:
 - Fresh water filler pipe.
 - Fresh water breather pipe.
 - Back water discharge pipe.
 - Back water breather pipe.

3.21.7 Bilge system and other valves

- Mark all Seacocks; discharge valves and the fuel oil and bilge transfer systems with engraved Perspex shelf adhesive labels.
- Labels to be in English and should denote the open and closed position and the system they are associated with.

3.21.8 Interior Signs and Notices

- The following notices are to be posted:
 - Muster lists.
 - Muster Stations.
 - Instructions for donning lifejackets.
 - Compass deviation card.
 - Passenger boat certification.
 - Fire and safety plan.

- The following signage to be posted to show the position of the following:
 - First aid kit.
 - Emergency escapes hatches.
 - Emergency escapes routes.
 - Notices for the cover emergency escapes hatches.
 - Muster points.
 - Firefighting appliances.
 - Fire suppression covers.
 - Life Jackets.
 - Life rafts.
 - WC with extra marking for reduced mobility.
 - Flares
 - Emergency VHF
 - GMDS
 - Call Sign
 - MARPOLs (No Dumping at Sea)

All signage shall be graphic symbols to IMO 4500 standards glow in the dark

3.21.9 Warning and Directions Signs

Warning and direction signs to be effectively laminated and mounted to meet flag requirements shall at minimum include:

- Operation instructions and warning signs for the static firefighting system.
- Electrical panels that are served by more than one electrical supply.
- Emergency overboard valves that should only be opened in an emergency.

4.0 - ANCHORING AND MOORING ARRANGEMENTS

4.1 GENERAL

- Ensure all equipment meets the requirements of Class and flag requirements.
- Decks is reinforced in way of the anchor windless and mooring bollards; the new bollards shall have similar structural reinforcement.
- Fittings as are to be located as per the General Arrangement Drawings however their final position will be subject to final acceptance by owner's representative.

4.2 ANCHORING SYSTEM

- It is anticipated that anchoring arrangements shall be windless motor with Chane and warp stored in locker forward.
-

4.3 MOORING EQUIPMENT

4.3.1 Mooring Fittings

The vessel is to be fitted with a mooring system consisting of 8 mooring points, one port and starboard on the transom, one port and starboard on the bow, one port and starboard amidships and one on centre line bow and stern. See design drawing show arrangement with the requirements as follows:

- Supply and fit four Samson post type mooring cleats as per the General arrangement Drawings, with effective stiffening.
- Mooring cleats to be in brushed stainless steel finished smooth and with well rounded corners.
- Fair leads on fore deck to be brushed Stainless Steel matching in material and style to the mooring cleats.
- Fair leads on aft deck to through bulwark type capped with brushed stainless-steel rounds.

4.4. FENDERING SYSTEM

- Vessel is to be fitted with a 75mm diameter half round as per design drawing.

5.0 - MACHINERY AND PROPULSION

5.1 GENERAL

- It is anticipated that engine shall be a 40 kWatt E Propulsion I-Series Inboard Motors is to be supplied an owner's representative.

5.1 GENERAL

- The builder shall install the supplied E Propulsion unit to manufactures recommendation.
- It will be the yards responsibility to ensure that the engines integrate correctly shafting, couplings, propeller.
- All equipment shall be installed and arranged to meet standard class requirements and to meet the approval of flag and the owner's representative.
- Installation inspections are to be carried out during the installation process with the machinery suppliers / manufacturers engineer expected to collaborate with the owner's representative to ensure the highest standards and maintained.
- The builder shall ensure that all installations meet with suppliers / manufacturers specifications.

5.2 MAIN ENGINE

5.2.1 General

- The builder shall install the electric motor, its battery system and control systems.
- Power to be approximately 60 Kwatts.

5.2.2 Main Engine Specification

- | | |
|-------------------|-------------------------------------|
| • Make | - E Propulsion |
| • Model | - I-Series Inboard Motor |
| • Description | - Electric motor |
| • Rated power | - 40 kWatt |
| • Fuel type | - Electric Power Cells 80 kWatt Hrs |
| • Quantity | - 1 |
| • Rotation | - As per unit supplied. |
| • Starting system | - Electronic |
| • Control system | - Electronic |
| • Cooling system | - Air cooled |
| • Exhaust system | - N/A |

- Mounting system - Solid or Flexible TBA with engine manufacturer
- Power take offs - 12 volt charging system / possible 220 V source TBA
- Instrumentation - manufacturers standard
- Alarm system - manufacturers standard
- Language - English

5.2.3 Controls and Instrumentation

- Main Engine Instrument and Control Panels to be fitted in the wheelhouse, shipbuilder / suppliers should ensure following controls and alarms are present after completion:
 - Start and stop buttons
 - Emergency stop button
 - Engine temperature

5.3 GEAR BOXES

- Not required.

5.4 PROPELLER SHAFT

5.4.1 General

- Complete shafting system, to be approved shipyard and to be fully integrated into the main engine.
- Propeller shafts are anticipated to be 40 to 50mm diameter stainless steel.

5.4.2 Shaft Couplings

- Fit solid shaft couplings secured to the shafting on a taper with a key to Owner approval.

5.4.3 Line Cutter

- Supply line / weed cutter suitable of river use in Irish waterways.

5.4.4 Shaft Bearings

- Install self-aligning shaft bearings in strict accordance with the manufacturer's instructions, as required to provide minimum possible levels of shaft vibration
- Mount bearings on rigid foundations, per shafting supplier's recommendations
- Shaft is to be supported by two (2) cutlass bearings
- Bearing to be properly aligned. Contractor to prepare an alignment procedure and provide to Owner's Representative for approval
- Bearings to be installed in accordance with manufacturer's instructions
- Provide flushing/cooling water in accordance with the bearing manufacturer requirements

525.8 Shaft Seals

- Provide a ZWBH seal at the inboard end of the stern tube.

5.5 MACHINERY INSTALLATION

5.5.1 Installation and Alignment Method

- Installation and Alignment Method to be drafted by Builder for approval by the flag and the owner's representative.
- Ensure the bearings accurately align are not subjected to lateral or twisting moments.
- Dial indicator and feeler gauge measurement are to be carried out during the alignment procedure.
- Alignment is to be demonstrated afloat as part of the dock trials prior to the sea trials, demonstration is to be to the satisfaction of flag and the owner's representative.
- Alignment is to be retested after sea trials, to the satisfaction of flag and the owner's representative. If alignment has moved outside acceptable tolerances, bearings are to be re-check as necessary.

5.5.2 Machinery Beds and Engine Bearings.

- As per design drawings.

5.5.3 Jacking bolts and Chocks.

- Main engine mountings and shaft bearings are to be mounted to on solid steel structure.
- Jacking bolts to be fitted to the on main engine mountings and shaft bearings to allow for vertical, lateral, and longitudinal adjustment.

5.5.4 Initial testing and first time start up.

- The owner's representative is to be made aware of the start-up date of all main engines and generator.
- The builder is to ensure that written confirmation has be received from the machinery suppliers / manufacturers inspector before initial start-up.

5.6 STEERING

- The vessel is fitted with single rudder
- Steering is to be hydraulically operated.
- An effective bypass system with an emergency tiller arrangement is to be supplied, this system is to be proposed by the builder and agreed by flag and the owner's representative.

6.0 - ELECTRICS AND ELECTRICAL SYSTEM

The vessels electrical system shall be dictated by the novel propulsion system and the large accumulator batteries fitted in the engine room. The shipyard will be expected to work with the engine suppliers to ensure that the house and driver electrics work together with causes interference.

6.1 GENERAL REQUIREMENTS

- Install, supply, design and wire an electrical system to suit the vessels accommodation and wheelhouse requirements to the satisfaction of flag and the owner's representative, and the (IEE) Regulations for the Electrical and Electronic Equipment of Ships with Recommended Practice for their Implementation, 6th Edition 1990 and Supplement 1994.
- The builder is to supply and fit a 40kWatt main engine and accumulator batters positioned within the engine room space.
- Builder is to supply, fit, design and arrange all electrical equipment, cable, hardware, fixtures and fittings necessary to furnish a completely integrated, fully operational electrical generation and distribution plant suitable for operations in cool temperate oceanic climate.
- Only suitable qualified fitters and electricians to be allowed work on electrical installation, relevant qualification to be made available to flag and owner's representative
- Only electrical equipment and materials specifically designed for the marine environment shall be used.
- All wiring and cables are to be run on effecting trays and fixed with stainless steel clips at a minimum of one metre intervals with plastic cable ties at 300mm intervals. Extra clips and ties to be fitted in areas of vibration or small radii. In all cases the wiring fixings shall be to the satisfaction of flag and the owner's representative.
- The builder shall design and fit the electrical system in such a way as to provide ready access to parts requiring inspection and so that the system is reliable and simple to operate without the need of specialist electrical knowledge.
- Supply and install equipment that is EMI/RFI compatible. Should an EMI problem arise, investigate the cause and eliminate any EMI problem.

6.2 VOLTAGES

- 24 volts DC - for alarms, controls, radio, navigation equipment, navigation lights, main engine controls, general lighting and hotel services.
- The AC system is to be fitted for large accumulator batteries charging with a voltage and frequency regulation system to maintain under steady state and transient conditions, within the following tolerances:
 1. Steady state no load/full load -2.5% to +2.5%
 2. Transient -15% to +20%

6.3 SYSTEM CONFIGURATION

- The vessels propulsion engine shall be powered by large accumulator batteries supplied by E Propulsion anticipated to be 4 in number.
- The vessel hotel power shall be supplied by a 48v battery bank.
- A shore power connection is to be incorporated into the 240 V AC system for charging both set of batteries (i.e. Propulsion and Hotel).
- Permanently connect all equipment rated above 15 Amps.
- 24-Volt DC power for all emergency and other services as detailed in part 6.2

6.4 DOCUMENTATION

6.4.1 Drawings

- The builder shall produce as fitted circuit drawings for the new AC and DC systems fitted to the vessel.
- The drawing shall be circuit diagrams of the complete electrical installation showing, service supplied, loadings, cable type and colour and protection rating.
- Drawing to show compliance with general flag requirements.

6.4.2 Nameplates and Instructions

- All nameplates and instructions are to be clearly marked in English.
- Nameplate to be engraved Perspex shelf adhesive labels.
- Complex instructions to be effectively laminated and mounted as per flag requirements.

6.4.3 Testing

- All systems to be “Megger” tested as per IEE guidelines and to the satisfaction of Flag.
- The builders shall produce as report on all circuits for Flag and owner’s representative approval.

6.6 EARTHING AND EARTH FAULT INDICATION.

- These requirements apply to electrical ship system.
- All electrical enclosures and exposed non-current carrying metal parts of electrical equipment are to be securely bonded to the hull of the vessel.
- Equipment enclosures mounted in direct contact with, and securely bolted to the metallic parts of the hull will be considered adequately bonded provided that the contact surfaces are clean and free from rust, paint, or scale.
- When enclosures cannot be bonded directly to the hull separate copper-bonding strap of suitable size may be used. Provided the bonding strap is clearly visible.
- All AC circuits shall be fitted with low resistance indicators or earth leak detectors including current systems if not currently fitted.

6.7 EMERGENCY POWER

- The current emergency power system shall stand provided the follow requirements are meet however the emergency batteries will require re location.
- In the event of failure of the accumulator batteries failing the vessel shall be fitted with the emergency battery capacity must be able to supply the emergency lights, one GPS and one VHF for at least one hour.
- The emergency power batteries are to be independent to the vessel standard DC system.
- The emergency batteries shall be stored high in the vessel above the vessels load line deck and preferably close to the wheelhouse.

6.8 DC POWER SUPPLY/BATTERY CHARGERS

The vessel is to be fitted with a battery charger for charging the 24-volt system. The charging system shall have the following characteristic:

- Operating characteristics (Be advised this unit will be E propulsion supplied)
 1. Input voltage 540-volt via the E propulsion supplied accumulator batteries.
 2. Output voltage - 24-volt DC

- Controls, protection, indication, and metering:
 3. AC on/off switch with AC "ON" indication
 4. AC and DC voltage surge protection
 5. AC and DC over-current protection
 6. Automatic reset on restoration of supply
 7. Float/equalize voltage indication
 8. Output Ampere meter

Confirm ratings following completion of the DC Load Analysis and provide chargers which are rated to supply the load demand under normal conditions and charge fully depleted batteries within ten (10) hours

6.9 BATTERIES

- Large batteries storage to be located in main engine room.
- Install E propulsion supplied units.
- Small 24 V batteries are to be rated for a 20% service margin operating within plus or minus 10% of 24 volts
- Emergency batteries are to be rated to service the one GPS, one VHF and the emergency lighting for one hour.

6.10 DISTRIBUTION PANELS AND SWITCH BOARDS.

The wheelhouse will require AC and DC circuits are to be supplies and installed so that they are completely independent of each other. At no point shall an AC and DC circuit share a distribution panel or switchboard. Be advised that AC to be from shore power only.

6.10.1 DC Distribution Panels

24-volt DC circuits shall have distribution panels with the follow features:

1. Miniature circuit breakers with short-circuit current rating for the application on the circuit.
2. Each circuit labelled as per 6.5.2 with circuit name, circuit number and load.
3. A voltmeter
4. To have a least 2 spare breakers per panel.

6.10.2 AC Distribution Panels

- AC distribution panels shall have the follow features:
 1. Sheet metal enclosures with metal covers and or CE / RCD approved alternative system.
 2. They shall be flush mounted in accommodation space.

3. They shall be surface mounded in all other spaces.
4. They shall be finished with the manufacturer's standard paint finish.
5. They shall be labelled as per 6.5.2 detailing circuit name, number and voltage type.
6. They shall have case 1, 2 or 3 pole circuit breakers with the following:
 - Identification labels fitted adjacent to each feeder circuit breaker to indicate circuit number, circuit breaker size, and load information.
 - Rated as required for the application.
 - Have a minimum two (2) spare breakers in each panel

6.11 SWITCHBOARDS

6.11.1 General

Supply and fit metal enclosed marine use switchboard as an integral assembly with the required distribution selection and monitoring the safe operation of the vessels electrical system.

6.11.1 Main Switchboard

- The main switchboard is to be installed in the engine room with an effective rubber insulating mat on the deck in front and over its full length.
- The switchboard is to be designed and installed so as to receive power from either the main propulsion batteries or the shore power connection.

6.11.2 Construction

- Switchboards are to be constructed and arranged as below:
 1. Bolted Sheet metal enclosures with metal covers with hinged lockable front access doors capable of being secured in an open position.
 2. Surface mounded and attached directly to the hull of the vessel.
 3. Splash proof / drip proof
- Connections and external circuits are to be arranged as below:
 1. Generator and shore power supply cables entry from the bottom.
 2. Distribution cables exit from the bottom or sides.

- Switchboard assemblies and components shall be rated for the full short-circuit current available when generators are connected.
- Install circuit breakers which:
 1. Open all phases on operation of any or all-tripping elements.
 2. Have tripping characteristics coordinated with the over current characteristics of the generator, shore supply, and ship's distribution system circuit breakers
 3. Fitted with indicating devices for circuit breaker open/tripped/closed condition
 4. Are continuously rated for the circuit requirements.
 5. Meet the requirements of flag and are on an approved type suitable for marine use.

6.11.3 Earthing (Grounding) and Bonding

Notwithstanding the requirements as laid out in section 6.6 the switchboards are to be bonded and grounded as follows:

1. Provide fully insulated electrical devices on doors and panels or bond devices to the door through the instrument body or fixing points.
2. Cover connections to all equipment, which may be live when the door is opened with suitable insulated covers.
3. Fit a complete and continuous copper bus throughout the assembly.
4. Provide facilities to bond the bus to the ship's hull.
5. Permanently fix the bus to the switchboard structure and use it to bond to the switchboard components to the earth.
6. Follow E Propulsions guidance on their installation requirements.

6.12 CABLES AND CABLE TRAYS

6.12.1 Cables

- Use only marine grade polyethylene insulated cable of approved type with IEE recommendations and approved by Flag except where special cables as specified by the equipment manufacturers for all antennae leads and navigation systems.

6.12.2 Cable Trays and Hangers

- Install all cables on trays where possible.
- On small runs used for minor cable studs/flat bars may be used at the discretion of Flag and the owner's representative.
- Install cable tray support system which is:

1. Manufactured from steel or aluminium depending on local ship structure material, which is to be welded or bolted to ship's structure.
 2. Strong enough to withstanding the ship's dynamic and vibratory forces
 3. Positioned above the ceiling support system in accommodation spaces.
 4. Supported at least every 1.5 meters
- Secure the cables using:
 1. Adequately sized stainless steel clips steel at a minimum of one-meter intervals
 2. Fire-resistant nylon plastic cable ties at 300mm intervals

6.12.3 Through Bulkhead Fittings

As part of the vessel-licensing requirement the vessel is expected to achieve single compartment damage criteria, as a result all through bulkhead fittings are to be watertight and shall meet with the approval of Flag. Through bulkhead fittings shall be:

1. Threaded couplings via watertight strain relief devices at all watertight and fire-retardant bulkheads.
2. Deck tubes or metal conduit may be used or for cables penetrating non-watertight decks and or bulkheads above the freeboard deck.
3. Deck tubes for used in the load deck shall be manufactured using stainless steel and fitted with bronze glands.
4. The material for the through hull fittings shall be compatible with the surrounding ships structure.

6.12.4 Cable Passing Through Structure

Where cabling approved by Class and Flag, is to pass through beams and girders, reinforcing collars are to be fitted with smooth edges to reduce chaffing.

6.12.5 Cable Installation

- All cables shall be installed inside the vessel unless outside installation is necessary for specific exterior mounted equipment.
- External cable runs are to be kept to a minimum where it is not possible the keep runs short mechanical protection shall be put in place.

- Fit heat-shrink sleeves and raps on all external cables terminating on weather decks.
- Cables route are to be as directly as possible, running forward and aft on wire trays with the following principles in mind:
 1. Trays to be appropriately sized to allow 25% expansion of cables.
 2. Trays running Port & Starboard shall be at right angles to the main runs.
 3. All cables are to be continuous runs with no splicing permitted. Joins may only be achieved using connection and junction boxes and only when supplying equipment such as plugs, sockets and light fixtures.
 4. Install cables to eliminate adverse effects of EMI. Separate cables with different types of signals and operating at different power levels.
 5. All cabling to be concealed in the accommodation areas.
 6. Avoidance of areas exposed to high temperature, flammable materials, chaffing, or other potential damage.
 7. Avoidance of areas of high fire hazard or areas likely to incur collision or mechanical damage.
 8. Where two suppliers are providing the same service, they shall where possible be sent along separate routes.
 9. Cabling is to be fitted into the bottom of equipment, as far as possible using watertight entry glands especially when top and side entries are required or where watertight proof equipment is being installed.
 10. Do not install cables below engine room floors—where absolutely necessary to install below floor plates, provide mechanical protection and protection from bilge water.
 11. Do not install with bend radii less than those recommended by the IEE.
 12. Terminate all cables inside equipment enclosures in accordance with equipment manufacturer's instructions with crimped compression type cable lugs where possible. Using equipment supplier connectors where applicable.
 13. Support cables and provide cable strain relief at the terminal connections.
 14. Identify all cables at both ends and at appropriate inspection positions with suitable labels or transfers.

6.13 LIGHTING

The vessel's new structure is to be illuminated using a combination fluorescent and incandescent and LED marine lighting fixture.

Lighting fixtures on two systems:

1. Ship's normal DC battery lights and hotel requirements supplied
2. DC battery operated emergency lights supplied

7.0 SHIP SERVICES

7.1. PIPING SYSTEM

The section relates to the accommodation fitout and to the bilge and firefighting systems. These systems will need the installed as specified.

- Manual firefighting pumps to be located in the forward and aft compartments.
- Fire hydrants relocated on forward and aft decks.
- 2 x Bilge pumps required in each compartment, one to be electric and one to be hand operated
- Fresh water (hot and cold) systems.
- Grey water overboard.
- Black water storage and pumping out arrangements.

7.1.1 System Design

- Design and install a piping Design, supply, install, and fit a complete piping system to suit the vessel's requirements, and to the satisfaction of flag and the owner's representative.
- The system is to be so delighted and fitted that it meets the requirements of a P2 passenger vessel requirement.
- Provide all piping, valves, fittings, and associated equipment suitable for the working pressure to which they may be subjected in service.
- In the presence of Owner's Representative and Flag static pressure test all pipe work to 1.5 times working pressure, unless otherwise specified
- Conduct testing before painting and correction system as necessary before retesting the system owner's representative and Flag approval.
- Provide all pumps or equipment with shut-off valves on suction and delivery side to isolate them for maintenance.
- Use only ISO standard fittings throughout.
- CE / RCD approved piping and tanks shall be used for fresh water, grey water and black water systems.

7.1.2 Piping Materials and Fabrication

All material to be class approved materials and or CE / RCD approved for hotel systems.

All welding to be completed by certified welders using approved welding materials appropriated to the piping material.

Certification for the materials, consumables and fitting personal to be made available to Class, Flag and the owner's representative upon request.

7.1.3 Pipe Fittings Flanges and Flange Connectors

All material to be class or CE / RCD approved for hotel systems.

Use only ISO standard Fittings Flanges and Flange Connectors. Use flanges on all systems.

7.1.4 Flexible Connectors

- Water connections may be heavy-duty rubber hoses secured by flanges or dual stainless-steel clamps to both sides of a 90-deg. elbow. Provide hose clamps of all-stainless steel, T-bolt type. Do not use screw type hose clamps. Fit all hose clamps over approved hose nipples. Provide free hose length of minimum three (3) diameters

7.1.5 Bulkhead Penetrations

As part of the vessel-licensing requirement the vessel is expected to achieve single compartment damage criteria, as a result all through bulkhead fittings are to be watertight and shall meet with the approval of Flag.

Through bulkhead fittings shall be:

- Shall not be fitted out board of 1/5 of the waterline beam measured from the out-board side.
- Maintain the bulkheads rating.
- Be of an approved type and meet with the approval of Flag or CE / RCD approved for hotel systems.

7.1.6 Hangers, Mounts, and Clamps

- Piping runs shall be correctly supported to reduce vibration and chafe.
- Vibration that may become evident during sea trials to be put right by the fitting of additional Mounts, and Clamps.
- Hangers and clamps are to be fitted with plastic bushings where there is a risk of chafing.
- Hose clamps are to be stainless steel T-bolt type

7.1.7 Valves

- All valves comply with ISO Standards for marine use and to approval of Flag and the owner's representative.
- Mark all valves as described in 3.24.8 with addition arrow-mark on hand wheels and direct marks on piping.
- Under-floor valves to identified valve and on access plates.

7.2 PIPING INSULATION AND LAGGING

- Insulate piping systems as necessary to conserve heat, protect personnel, or to avoid condensation.
- Insulate hot freshwater supply piping.
- Insulation to be effective at reducing heat losses and lowering surface temperatures.
- Insulate valves and fittings with insulation material of similar thickness to adjacent piping.
- Piping to be insulated is to be cleaned back to bare metal before painting as specified.
- Insulation is to be a class approved material to the satisfaction of flag.

7.3 INSTALLATION

- Piping systems are to be installed with orderly arrangement of runs.
- Conflict between systems shall be avoided.
- Where practicable the piping shall be installed under the floor plates
- The piping shall be arranged in vertically stacked tiers to maintain clear access to bilges, particularly in way of bilge suctions
- External surfaces of galvanized piping damaged by welding etc are to be coated with inorganic zinc.
- Ensure that all pipe ends are clean, fair and smooth after cutting.

7.3.1 Cleaning and Flushing

- Clean and flush the installed tanks before installing equipment in accordance with the supplier / manufacturers requirements.
- All clean and flushing to be to the satisfaction of the machinery supplier / manufacturers requirements with details noted in the installation inspection report.

7.4 FILLING, VENTILATION AND SOUNDING PIPES

- Supply and install freshwater and black water tanks and with filling, ventilation, and sounding pipes as detailed below.

-

7.4.1 Filling Connections

- Fresh Water filling via flush deck fitting with screwed bronze cap.
- Black water emptying to be via flush deck fitting with screwed bronze cap, pipe diameter TBA, connector to be owner advised.

7.4.2 Ventilation Pipes

- Ventilation pipes are to be arranged and constructed to be per rules to the satisfaction of Flag and the owner's representative.
- Ventilation pipes to exit on the main decks forward and aft provided they are 600mm above the deck edge and the arrangement to the satisfaction of Flag and the owner's representative.
- Only the forward and aft compartment require ventilation pipe.

7.4.3 Contents Gauges

- Water and black water tanks are to be fitted with tank level sensors which, are to send level information to gauges at the pilot position in the wheelhouse.

7.6 BILGE SYSTEM

2 x Bilge pumps required in each compartment, one to be electric and one to be hand operated.

7.6.1 Bilge Suction

The vessel is to be arranged with two bilge suctions in each compartment. Longer compartments to have the one suction at each end. The hand powered bilge pipes to have suitable strainers.

7.6.2 Bilge Pump

- Hand pumps to be double action Whale type.
- Powered pumps to be Rule 3700 or equivalent.

7.7 FIRE AND DECK WASH SYSTEM

- The vessel is to be fitted with two hand powered fire pumps and associated piping and fire hydrants as per SA-2002-XX Fire and Safety Plan.
- Hand pumps to be double action Whale type of sufficient size so that a water jet can be delivered to any part of the vessel.

7.8 HYDRAULIC SYSTEM

These systems to limited to the steering system. System to meet to the satisfaction of flag and the owner's representative.

8.0 - DOMESTIC SERVICES

8.1 HEATING SYSTEM

Supply, design and install an electrically powered heating system to deliver heat though out the vessels accommodation and wheelhouse area by means of air blower heater. A system is to be proposed by the builder for approval by the designers and owner's representative.

8.2 VENTILATION ACCOMODATION

8.2.1 Supply Air System

Provide air ducts for accommodations air handling unit and complete with:

- Flow rate adjustment.
- Water traps and drains.
- Weather tight closures.

8.2.2 Exhaust Air System

Fit the following exhaust fans.

- WCs
- Galleys

Each fan is to be vented through a 100mm pipe with gooseneck.

8.3 VENTILATION ENGINE ROOM

It is anticipated that the engine rooms ventilation will be achieved via trucking passing through the wheelhouse exiting on the top of the wheelhouse roof see design drawings. The system should have the following features:

- Fit automated stop of ventilation fans when fire suppression system is operated.

8.4 FRESH WATER SYSTEM

- Supply and install a pressurized freshwater system for use in the WC's and Galley area with a system pressure of 1.6 bar at all fixtures.
- Piping with isolated copper pipe and valves or CE / RCD approved plastic pipe systems.
- After construction the entire system is to be treated with chlorine, drain, and then fill with fresh water. The water quality is to be tested compliance with health standards. Cost of test will be for Owner's account. If the system does not pass, then additional tests will be for Builders account.

8.5.1 Storage Tanks

Description	- 4 x Standalone Fresh Water Tank
Capacity	- 4 x 335 litres
Construction Materials	- Plastic
Instrumentation	- remote contents gauging- gauge at the pilot position in the wheelhouse
Paint	- N/A

8.5.2 Service Pumps

Quantity	- one (1) per ever 2 tanks
Type	- electric motor driven
Power supply	- 24 volts
Pressure	- 1.6 bar
Construction materials	- Plastic casing
Controls	- pressure switch on/off
Mounting-	- fit motor and pump on top of tank

8.5.3 Hot Water Tank

Provide a hot water tank to be positioned in the main accommodation:

Quantity	- two (2)
Description	- electrically heated, dual element type, hot water storage tank
Performance	- 45 litres capacity, 1 x 1500-Watt elements
Construction	- Domestic standards
Accessories	- Relief valve - Isolating valves - Temperature switch - Pressure gauge - Isolating valves

8.5.4 Fixtures

Supply and install fixtures in quantities described in Section 3 or as shown on design drawing.

8.5.5 Washbasins

Description	- Rectangular basin with rear overflow
Capacity	- 6-litre liquid capacity measured at 10cm below the rim of the basin
Construction/materials:	- Ceramic
Accessories	- Drain plug plunger - Hot and cold taps

8.5.6 Galley Sinks

Description	- Stainless steel dual bowl with integrated draining board
Capacity	- 20 litres large bowl and 5 litres small bowl.
Construction/materials	- Stainless steel
Accessories	- strainer / drain plug - Single lever combination tap and flexible spray nozzle

8.6 BLACK WATER SYSTEM

8.6.1 General

Supply and install and complete system to the approval of Flag incorporating the following:

- A gravity flushing system from the WC direct to the black water tank holding tank
- Sea water flushing
- A pump to discharge from the holding tank via deck fitting for pumping ashore
- Piping fixtures to holding tank and to discharge pipe to be Steel

8.6.2 Black Water Tank

Description: Stand-alone steel tank on centreline in store forward of engine room.

Description	- 2 x Standalone Black Water Tank
Capacity	- 2 x 335 litres
Construction Materials	- Plastic
Instrumentation	- remote contents gauging- gauge at the pilot position in the wheelhouse
Paint	- N/A

8.6.3 Discharge Facilities

Provide 2 x ashore discharge system located on the forward and aft decks of the vessel, connectors for ship to shore to be owner supplied.

8.6.4 Fixtures and Fittings

WC	- Two of
Description	- Hand operated toilet
Performance	- Efficient low flow
Construction/materials:	- Ceramic bowl and plastic seat and cover
Controls	- Manual flush valve with full and half flush

8.7 GREY WATER SYSTEM

Drain grey water directly to overboard discharge

8.7.1 Sink Traps

Description	– S trap with clean out
Construction materials	- PVC

8.7.2 Deck Drains

Description	- deck drain without trap
Construction/materials	- body; galvanized steel
	- Screen; cast bronze

9.0 CONTROLS, CONSOLE, INSTRUMENTATION, NAVIGATION, AND COMMUNICATION

9.1 CONTROL GENERAL

Supply and fit a control system so that the vessel can be controlled entirely from wheelhouse by one person. The wheelhouse controls shall include the following:

1. Main engines, including engine starting and stopping
2. Steering control

9.1.1 Steering

- Rudder angle indicators to be installed in the wheelhouse.
- Emergency steering to be operated from the main deck aft with effective instructions for transferring rudder controls displaced in the steering compartment, communication to the emergency steering line of site.

9.1.2 Propulsion and Propulsion Engines

- Reinstall complete control system for remote control operation of the propulsion plant from single position in the wheelhouse
- Fit local controls and instrumentation on or immediately adjacent to the propulsion plant being controlled.

9.1.2.1 General Engine Starting/stopping

- fit wheelhouse engine starting and stopping
- fit wheelhouse emergency stop for engine.

9.1.2.2 Speed Controls

- fit engine speed controls in the wheelhouse.

9.1.3 Electrical System

Fit and install controls for electrical system at generator sets and switchboard as detailed in Part 6.

9.2 CONSOLES

- Design, supply and install ergonomically designed console for mounting of control, communication, and monitoring equipment in the wheelhouse as indicated on the General Arrangement drawings. The system is to be mocked up before construction allowing the Owners Representative to make final discussions regarding control and instrument position.
- Logically group components according to function and operational priorities.
- Consoles to have the following items:
 - Main engine controls
 - Steering controls
 - Fire-fighting alarm system
 - Bilge alarm
 - Depth sounder
 - VHF communications
 - GPS
 - Magnetic compass
- Where possible match instruments of same function in size and detail.
- Provide instruments similar in trim and colour
- Identify all gauges and instrument by nameplates with units of measurement identified on gauge dials.
- Provide dimming control for all illuminated instruments in wheelhouse

9.2.2 Construction

- Construct consoles of laminate woods in keeping with the wheelhouse and accommodation materials.
- Arrange console components in panel mounted for "drop-in" installation.
- Panels to be secured by stainless steel screw fasteners

9.3 INSTRUMENTATION, MONITORING AND ALARM SYSTEMS.

9.3.1 System Requirements

Supply all necessary instruments and alarms as required by Flag are to be approved by the Owner's Representative.

9.3.2 Independent Instruments

Fit and install independent instruments where specified, local to equipment, or provided by equipment manufacturer:

1. All instruments are to have metric units
2. Suitable for a marine environment
3. Accurate and readable when subjected to vibrations
4. Easy to read and understand
5. Oriented with dials in the same direction with needles travelling from left to right
6. Fitted with illumination and dimmer control

9.3.3 General Alarm

Supply and install an automatic alarm system in the wheelhouse to monitor fire and bilge water levels. Switch off for fire and high bilge alarm at relevant zones only.

Fire Alarms

- Smoke alarms to be located throughout accommodation spaces, Engine room and Wheelhouse areas.
- High temperature and rate-of-rise sensors and bilge alarms to be fitted in all compartments.
- Supply and fit low and high-level bilge water alarms engine room.
- Alarms to be arranged as to give false positive in the event of sensor failure.

9.4 NAVIGATION AIDS

Refit the comprehensive navigation and telecommunications system that the vessel already has for navigation on small coastal, estuaries and river journeys.

1. Depth sounder
2. VHF
3. GPS
4. Magnetic compass (with deviation card)

9.5 NAVIGATION LIGHTS

The vessel is fitted with navigation lights however these will need rearranging with the following features.

- Navigation lights to be fitted in accordance with International Regulations for Preventing Collisions at Sea 1972 (Colregs).
- Navigation light control panel to indicate lights on and off on a graphic representation of the vessel.
- Indication lights are to be arranged so that they do not light when the navigation light is blown or the circuit is not completed.