Technical Specifications For Boats for OTDC & WL

I. SPECIFICATIONS FOR FISHERIES PATROL VESSEL (FPV) FOR WILDLIFE WING

1. **Description:** A stable high speed sea going vessel for patrolling against intrusion by fishing boats into the territorial waters along the coast of Orissa. The vessel should take 7 persons besides the crew, with cabin facilities with an endurance of 7 days. The vessel should have a maximum speed of 35 knots with normal running speed of 25 knots.

2. **Approximate main particulars of the FPV**

   - **Length:** 25.00 m
   - **Breadth:** 6.00 m
   - **Draught:** 1.30 m
   - **Crew:** 5
   - **Passengers:** 7
   - **Endurance:** 7 days
   - **Speed:** max 35 knots, cruising speed 25 knots

3. **Material of Construction:** Hull and superstructure material to be proposed by the bidder. There is a range of choice between Steel, Aluminium or Marine Grade Fibre Reinforced Plastic with certification from the classification society.

4. **Sea worthiness:**

   The vessel shall be capable of maintaining speed without impairing the comfort of crew and people onboard or vessel performance in sea conditions up to sea state 5.

5. **General Remarks:**

   - Should be capable of operating in tropical conditions.
   - Have an expected life of 15 years. Excellent sea-keeping quality and dynamic stability particularly at high speeds essential.
   - Should have high operational availability and system redundancy.
   - Should be capable of mission periods of 50 hours or more.
   - All machinery and equipment should have ease of operation and low maintenance requirements with low life cycle cost.
   - Should have minimum Noise, Radar, and IR signature.
   - The vessel should have very high maneuverability
   - General alarm system, fire and flood alarm system confirming to class requirement should be provided.
• One life boat for 13 persons with OBM.

6. Rules & Regulations:

Following rules and regulations shall be met as applicable:-

• Stability standards and Regulations for construction of Vessels as per DNV Class Rules.
• International tonnage 1969
• SOLAS 1992

7. Life Saving & Firefighting Equipment/Appliances: These are to be provided as per SOLAS requirement. Vessel shall carry a Rigid Hull Inflatable Boat with 5 to 6 persons capacity with OBM and which can be lowered from the vessel for easy launch/recovery at sea, particularly in rough weather. Portable firefighting appliances as per SOLAS Regulations shall be provided. Fire pump/hydrant, automatic emergency lighting, automatic fire fighting arrangements in engine-room and magazine as per Class requirement.

8. Main Propulsion System. Following propulsion options are to be considered: -

• Twin marine diesel engines driving water jet for high maneuverability and low draught.
• Electronic control and monitoring system for engine, gear box and jets.
• Remote starting/stopping of main engines from the wheel house, fly bridge and locally from engine.

• Integrated Bridge Control for total propulsion plant management.

9. Power: AC & DC Generation capacity as required shall be provided. There shall be 100% Standby power generator. Battery system of adequate capacity with independently charging facility also to be provided for starting of main engines/Generator sets and meeting emergency power. The power should be adequate for all auxiliary systems, heating, ventilation and air conditioning, lighting and kitchen loads.

10. Ventilation & Air-conditioning: Air-conditioning system is to be provided for living spaces and operational compartments, Adequate ventilation system for non AC compartment shall be provided.

11. Bilge and De-flooding System are to be provided as per Class.

12. Fresh Water & Fuel Oil: Fresh water of suitable capacity and adequate fuel for the endurance requirements should be provided onboard the vessel.
13. **Galley**: Adequate galley facility should be provided for the total number of persons on board with dining room, cold storage, deep freezer facilities for the endurance period.

14. **Radar & Nav Aids.**
   - Quick settling gyro compass with analog repeaters each in bridge, and bridge top
   - Navigational Radar
   - Magnetic Compass.
   - Echo Sounder
   - DGPS.
   - Navigational lights
   - Siren/horn (Air and Electrical).
   - Search lights for 360° coverage of 1200 W with Xenon lamp (Min 3 NM range).
   - Anemometer
   - Wet and dry bulb thermometer
   - Barometer
   - Wind and directional equipment (portable).
   - Chart table & locker and all requirements for Electronic Navigation System.
   - Bridge Window Wiper/Clear View screen

15. **Communication equipment**: State of the art communication system viz., Broadband terminal with Standard IP, radio communication system, Mobile satellite system, integral GPS with data recorder, etc.

16. **Accommodation**
   - Two individual cabins with toilet facility shall be provided
   - Three double occupancy cabins
   - Two cabin each meant for 02 officers shall be provided
   - One dormitory for Ship crew
   - A dining space for 6 at a time.
   - Two toilet/bath facility for officials and one toilet/bath facility for the crew shall be provided

17. **Weapon**: The vessel should have suitable weapon with automatic ammunition reloading.

18. **Tow hook**: The vessel should have a tow hook for towing the confiscated fishing vessel.
II. TECHNICAL SPECIFICATIONS FOR 40 PASSENGER OUTBOARD MOTOR POWERED SHORT TRIP DAY CRUISER OUTBOARD MOTOR POWERED SHORT TRIP CRUISER

1. DESCRIPTION

The requirement is for a mono hull passenger boat of 40 persons capacity for short one to two hours cruises in the different locations at the Chilika lake. The boat will be fitted with a four stroke engine outboard motor of approximately 60 HP and with forward remote control drive. The vessel should be capable of cruising in the backwaters at a speed of 8 knots. It shall be of round bilge hull construction and fitted with bilge keel for passive roll stabilization. The boat dimension shall be 11m x 3.85m x 0.6m draft and will be all fibre glass hull construction as well as the frame work and roof top. All passengers will be seated in the main deck with single seat fibre glass chairs and comfortable spacing. The uniqueness of the construction is avoidance of all metallic parts so that there is no corrosion of any part of the boat. As the boat is intended for operation in backwater area charged with marine environment, the superstructure and seats are to be made of FRP to avoid the possible corrosion and decay of the structure, seating and fittings. The boat will have an attractive look- more like a water bus. The side openings shall be large so that passengers have a good view around and the seats are suitably recessed from the edges so that there is protection from the harsh direct sun. The boat shall comply with the rules of construction as applicable under DNV. Being a short trip boat, there is no need for toilet or pantry in this boat. The hull should have two compartment standard of sub-division and it is necessary to verify this by suitable calculation checks or simulations. The subdivided compartments are to be made accessible for inspection by means of hatch openings above all the compartments. The deck is to be maintained water tight. The boat is to be provided with a well deck and adequate freeing ports at the deck level on the bulwark so that there is no accumulation of flood water on the main deck. There shall be provision to use a manual pump to pump out flood water from the bilge compartments. The boat is intended for normal fair weather operation.

2. MAIN PARTICULARS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>11.0 m</td>
</tr>
<tr>
<td>Breadth</td>
<td>3.85m (excluding fenders)</td>
</tr>
<tr>
<td>Depth</td>
<td>1.35m</td>
</tr>
<tr>
<td>Draught</td>
<td>0.7m</td>
</tr>
<tr>
<td>Displacement</td>
<td>about 12 t</td>
</tr>
<tr>
<td>Total persons on board</td>
<td>40 passengers + 2 crew/ 20 passengers + 3 crew.</td>
</tr>
<tr>
<td>Hull material</td>
<td>Fibre glass</td>
</tr>
<tr>
<td>Layout</td>
<td>Single deck seating</td>
</tr>
<tr>
<td>Speed</td>
<td>8.0 knots</td>
</tr>
<tr>
<td>Cruise duration</td>
<td>2 hours</td>
</tr>
<tr>
<td>Endurance</td>
<td>6 hrs.</td>
</tr>
</tbody>
</table>

3. GENERAL FEATURES

- The vessel shall be built as inland vessel to DNV class and should comply with all applicable statutory rule requirements.
- The boat should be of a proven hull form and construction should be with approval from DNV.
• Passenger seating should be made up of individual fibre glass moulded seats fully non-metallic, designed ergonomically with aesthetic looks, secured by bolts to the main deck and laid out for maximum passenger seating and viewing comfort.

• The main deck is to be of marine grade plywood of at least 15mm thickness supported on the underside with a system of transverse timber beams of typically 500mm spacing, and suitable centerline and side longitudinal timber girders. Central vertical support pillars may be given as required. The upper deck is to be sheathed with one layer of fiberglass.

• The transverse sub-division bulkheads are to be of marine plywood with suitable stiffeners and fibre glass laminate layers.

• The fender is to be provided all around with timber backing and externally finished fiberglass lamination, the fender size is to be not less than 100 mm width x 80 mm depth.

• Fuel tank of adequate capacity (200 litres of diesel) is to be provided.

• The roof support structure should be of fibre glass hat section beam supports with or without timber inserts and the roofing should be with double side finish fibre glass panels curving down to the sides for protection against harsh direct sun or rain.

• Neat roof edge gutters should be provided so that rain water is led to the aft and forward ends of the roof along the length of the boat.

• The windows on the sides should be open, large, providing lighting and ventilation to the passengers and for viewing comfort.

• Wired remote engine and steering control are to be provided from an optimally located Driver’s cabin at the forward end of the boat. The driver’s position should have clear all around view.

• Anchor and mooring arrangements shall be provided as per Class requirements.

• The entire hull construction and equipments on board including safety regulations, standards of all outfit items, provision of freeing ports as applicable, should be in conformation with the rules and regulations of the Det Norske Veritas.

• Life saving appliances should be in conformation with the Indian Merchant Shipping rules.

4. COMPLEMENT

Crew: 2/3
Passengers: 40/20

5. EQUIPMENTS

Main engine: 60 HP Outboard motor of reputed make with remote steering and throttle control
Manually operated bilge pumps and flexible hose pipes

6. CAPACITIES

Diesel fuel for main engine: 200 litres
Fresh water in portable tank/cans with dispenser: 100 litres
7. CLASSIFICATION AND REGULATION

The vessel shall be type approved by DNV and the boat must be certified at the end of construction by DNV with periodic inspections as applicable. Final certificate must be obtained from DNV, after conduct of inclining test and preparation of trim and stability book, as well as conduct of trials.

8. APPROVAL OF DRAWINGS AND SPECIFICATIONS

The vendor should submit prior to construction, all the drawings and specifications after approval by Classification Society, to the Owner for scrutiny and acceptance.

Before handing over the ship for acceptance, “AS FITTED” drawings and “AS BUILT” specifications should be submitted to the Owner. The drawings should show the final General Arrangement, Lines Plan, and as built specifications should show the hydrostatic calculations, trim and stability booklet, tank capacities.

9. CERTIFICATES

The following certificates and documents as applicable shall be obtained by the vendor and forwarded to the Owner at the time of delivery of the vessel

- Classification certificate issued by DNV
- Builder’s certificate issued by the builder
- Inclining experiment data and stability book containing intact and damaged stability

10. SUPERVISION DURING CONSTRUCTION

Under mutual agreement, there shall be periodic inspection by the Owner’s representative of the vessel during construction at critical stages such as plug inspection, hull lay-up, outfit and tests and trials.

11. TESTS AND TRIALS

The following tests and trials shall be conducted prior to acceptance

- Inclining experiment when the vessel is completed in all respects
- Speed trials and engine performance trials for endurance
- Turning trials, stopping ahead and astern trials.
- Hull vibration, noise control check

12. ON BOARD SPARES AND TOOLS

On board spares and tools should be provided as per the equipment manufacturer’s recommendations for daily and routine maintenance
13. BASE SPARES

The vendor should arrange for supply of spares as recommended by the manufacturer of the equipments for maintenance for a period of 3 years.

14. TRAINING AND GUARANTEE

The vendor shall guarantee that the vessel is maintained to be free from manufacturing and workmanship defects of the hull, installations, equipments, fittings and all other items. All such defects that occur during this period are to be rectified free of cost to the Owner, the cost of spares etc. are also to be borne by the vendor.

15. PLACE OF DELIVERY AND PERIOD

The vessel is to be delivered at different locations in the Chilika Lake, Orissa. The delivery period for this vessel is estimated to be 4 months from the date of placement of order. If the vendor estimates that the period of delivery is different then this should be indicated in the offer.

III. TECHNICAL SPECIFICATIONS FOR 20 PASSENGER CATAMARAN SHORT CRUISER IN FRP FOR INLAND WATERS FITTED WITH 25HP OUTBOARD MOTOR POWER

1. DESCRIPTION

The requirement is for a wide deck catamaran type passenger boat of 20 persons capacity for short one to two hours cruises in the different locations at the Chilika lake. The boat will be fitted with a four stroke engine outboard motor of approximately 25 HP and with forward remote control drive. The vessel should be capable of cruising in the backwaters at a leisurely speed of 6 knots. It shall be of catamaran chine type slender hull construction. The approximate dimensions are 8m x 3m x 0.8m demi hull breadth x 0.8m height. The boat shall be all fibre glass hull construction with fibre glass awning roof and frame work. All passengers will be seated in the main deck with single seat fibre glass chairs and comfortable spacing. The uniqueness of the construction is avoidance of all metallic parts so that there is no corrosion of any part of the boat. As the boat is intended for operation in backwater area charged with marine environment, the superstructure and seats are to be made of FRP to avoid the possible corrosion and decay of the structure, seating and fittings. The boat will have an attractive look. All round side railings from pultruded non-metallic material shall be provided, the roofing shall be attractive, light and strong. The seats are suitably recessed from the edges so that there is protection from the harsh direct sun. The boat shall comply with the rules of construction as applicable under DNV. Being a short trip boat, there is no need for toilet or pantry in this boat. The hull should have two compartment standard of sub-division and it is necessary to verify this by suitable calculation checks or simulations. The subdivided compartments are to be made accessible for inspection by means of hatch openings above all the compartments. The deck is to be maintained water tight. The boat is to be provided with a well deck and adequate freeing ports at the deck level on the bulwark so that there is no accumulation of flood water on the main deck. There shall be provision to use a manual pump to pump out flood water from the bilge compartments. The boat is intended for normal fair weather operation.
2. MAIN PARTICULARS

<table>
<thead>
<tr>
<th>PARTICULAR</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>8.0 m</td>
</tr>
<tr>
<td>Extreme Breadth</td>
<td>3.0m (excluding fenders)</td>
</tr>
<tr>
<td>Demi hull breadth</td>
<td>0.8m</td>
</tr>
<tr>
<td>Depth</td>
<td>0.8m</td>
</tr>
<tr>
<td>Draught</td>
<td>0.5m</td>
</tr>
<tr>
<td>Total persons on board</td>
<td>20 passengers + 2 crew</td>
</tr>
<tr>
<td>Hull material</td>
<td>Fibre glass</td>
</tr>
<tr>
<td>Layout</td>
<td>Single deck seating</td>
</tr>
<tr>
<td>Speed</td>
<td>6.0 knots</td>
</tr>
<tr>
<td>Cruise duration</td>
<td>2 hours</td>
</tr>
<tr>
<td>Endurance</td>
<td>6 hrs.</td>
</tr>
<tr>
<td>Type</td>
<td>catamaran</td>
</tr>
</tbody>
</table>

3. GENERAL FEATURES

- The vessel shall be built as inland vessel to DNV class and should comply with all applicable statutory rule requirements.
- The boat should be of a proven hull form and construction should be with approval from DNV.
- Passenger seating should be made up of individual fibre glass moulded seats fully non-metallic, designed ergonomically with aesthetic looks, secured by bolts to the main deck and laid out for maximum passenger seating and viewing comfort.
- The main deck is to be of marine grade plywood of at least 15mm thickness supported on the underside with a system of transverse timber beams of typically 500mm spacing, and suitable centerline and side longitudinal timber girders. Central vertical support pillars may be given as required. The upper deck is to be sheathed with one layer of fiberglass.

- The transverse sub-division bulkheads are to be of marine plywood with suitable stiffeners and fibre glass laminate layers.

- The fender is to be provided all around with timber backing and externally finished fibreglass lamination, the fender size is to be not less than 100 mm width x 80 mm depth.

- Fuel tank of adequate capacity (100 litres of diesel) is to be provided.

- The roof support structure should be of fibre glass hat section beam supports with or without timber inserts and the roofing should be with double side finish fibre glass panels curving down to the sides for protection against harsh direct sun or rain.

- Neat roof edge gutters should be provided so that rain water is led to the aft and forward ends of the roof along the length of the boat.

- Wired remote engine and steering control are to be provided from an optimally located Driver’s cabin at the forward end of the boat. The driver’s position should have clear all around view.

- Anchor and mooring arrangements shall be provided as per Class requirements.

- The entire hull construction and equipments on board including safety regulations, standards of all outfit items, provision of freeing ports as applicable, should be in conformation with the rules and regulations of the Det Norske Veritas.

- Life saving appliances should be in conformation with the Indian Merchant Shipping rules.
4. COMPLEMENT

Crew: 2
Passengers: 20

5. EQUIPMENTS

Main engine: 25 HP Outboard motor of reputed make with remote steering and throttle control
Manually operated bilge pumps and flexible hose pipes

6. CAPACITIES

Diesel fuel for main engine: 100 litres
Fresh water in portable tank/cans with dispenser: 100 litres

7. CLASSIFICATION AND REGULATION

The vessel shall be type approved by DNV and the boat must be certified at the end of construction by DNV with periodic inspections as applicable. Final certificate must be obtained from DNV, after conduct of inclining test and preparation of trim and stability book, as well as conduct of trials.

8. APPROVAL OF DRAWINGS AND SPECIFICATIONS

The vendor should submit prior to construction, all the drawings and specifications after approval by Classification Society, to the Owner for scrutiny and acceptance.

Before handing over the ship for acceptance, “AS FITTED” drawings and “AS BUILT” specifications should be submitted to the Owner. The drawings should show the final General Arrangement, Lines Plan, and as built specifications should show the hydrostatic calculations, trim and stability booklet, tank capacities.

9. CERTIFICATES

The following certificates and documents as applicable shall be obtained by the vendor and forwarded to the Owner at the time of delivery of the vessel

- Classification certificate issued by DNV
- Builder’s certificate issued by the builder
- Inclining experiment data and stability book containing intact and damaged stability

10. SUPERVISION DURING CONSTRUCTION

Under mutual agreement, there shall be periodic inspection by the Owner’s representative of the vessel during construction at critical stages such as plug inspection, hull lay-up, outfit and tests and trials.
11. TESTS AND TRIALS

The following tests and trials shall be conducted prior to acceptance

- Inclining experiment when the vessel is completed in all respects
- Speed trials and engine performance trials for endurance
- Turning trials, stopping ahead and astern trials.
- Hull vibration, noise control check

12. ON BOARD SPARES AND TOOLS

On board spares and tools should be provided as per the equipment manufacturer’s recommendations for daily and routine maintenance

13. BASE SPARES

The vendor should arrange for supply of spares as recommended by the manufacturer of the equipments for maintenance for a period of 3 years.

14. TRAINING AND GUARANTEE

The vendor shall guarantee that the vessel is maintained to be free from manufacturing and workmanship defects of the hull, installations, equipments, fittings and all other items. All such defects that occur during this period are to be rectified free of cost to the Owner, the cost of spares etc. are also to be borne by the vendor.

15. PLACE OF DELIVERY AND PERIOD

The vessel is to be delivered at different locations in the Chilika Lake, Orissa. The delivery period for this vessel is estimated to be 4 months from the date of placement of order. If the vendor estimates that the period of delivery is different then this should be indicated in the offer.

IV. RIGID HULL INFLATABLE BOAT (RIB) FOR ALL WEATHER RESCUE OPERATION IN THE LAKES

1. DESCRIPTION

The Rigid Hull Inflatable Boat (RIB) is an all weather robust, stable, unsinkable platform capable of high planing speed. The main function of this boat is to be able to transit distances in quick time and perform rescue and help operations. The boat will also serve as a patrol boat, and to transport men and material in times of need. At other times, the boat can also be used as a high speed passenger boat. One each may be stationed in each of the three locations of tourist operations. The boat is of approximate 8m length, beam 3m, draft of 0.6m and displacement approximately 4t. The passenger capacity is 10 with a crew of 2. The RIB vessel has an inflated (internally partitioned) collar of 0.45m diameter (material hypalon), grab ropes at the sides, foam filled hull so as to give maximum stability
and unsinkability. The boat should have a maximum speed in excess of 20 knots. The vessel should be built to class requirements.

2. MAIN PARTICULARS

Length (overall) : 8m  
Breadth (overall inflated tube beam) : ≤ 3.0 m  
Displacement (full load) : ≤ 4t  
Draught (full load) : ≤ .60 m  
Inflatable collar diameter : 450mm approx., may be also foam filled, 7 compartments  
Speed (full load) : >20 Knots  
Endurance (full load) : 8hrs. @ NLT 12kt speed  
Fuel Oil Capacity : To meet the specified endurance with 25% reserve  
Reserve of buoyancy : As per Class requirements  
Operating sea state : Sea state 5  
Crew : 2 persons  
Propulsion : 90 hp Outboard motor with remote steering and throttle control

3. GENERAL FEATURES

- The hull form should be of a proven type with good acceptable running trim at the steady planing speed and favourable resistance characteristics. If the hull form is not proven, it is mandatory to have towing tank test verification of the planing performance.
- The vessel shall be built to DNV class and should comply with all statutory rules.
- The boat should be designed to be operational and maneuvered safely and effectively with full complement. The boat shall offer good maneuverability and throttle response throughout its speed range.
- The deck is to be built of marine plywood with suitable sheer, and the deck should be resin sealed and GRP encapsulated. Surface should be of non-skid type.
- The inflatable collar should be of approximately 450mm diameter with 7 internal partitions and these segments are provided with air filling and relief valves. The collar may also be foam filled in lieu of air filling.
- Twelve moulded grab rope attachments are to be bonded to the outboard side of the collar.
- Hand holds are to be provided on the upper surface of the collar.
- The control console should be constructed to seat the helmsman, and to contain engine instruments, electrical control box and switches, throttle and gear control. Locker space shall be provided under the control with weather proof inspection hatches to access the batteries and for general stowage such as foot operated air pump, loose gear stowage etc. Instrumentation panel shall be mounted in front of the helmsman position. All instruments on the panel should be weather proof. Tachometer, fuel level gauge, speed and engine trim indicator should be provided. All buttons should be rubber sealed.
- Seating in the form of moulded seats should be provided for all the passengers.
- Collapsible canopy supported by collapsible aluminium truss work is to be provided to give weather protection to all the passengers.
- Wired remote engine and steering control are to be provided with optimal location and routing.
• Anchor and mooring arrangements shall be provided as per Class requirements.
• The entire hull construction and equipments on board including safety regulations, standards of all outfit items, should be in conformation with the rules and regulations of the Det Norske Veritas.
• Limber holes should be provided to facilitate flow of bilge water to accumulate in an aft end sump. The water should be bailed out or pumped out.
• One search light (100 W) and electric horn are to be provided. The power is provided by a set of 2 batteries (12 V x 100AH), to be charged from an alternator from the outboard motor. Batteries should be maintenance free.
• One navigational compass should be provided.
• Life saving appliances should be in conformation with the Indian Merchant Shipping rules.

4. APPROVAL OF DRAWINGS

The vendor should submit the general arrangement drawing to the Owner prior to construction for the purpose of scrutiny and acceptance.

5. TESTS AND TRIALS

The following tests and trials shall be conducted prior to acceptance

• Inclining experiment when the vessel is completed in all respects
• Speed trials and engine performance trials for endurance
• Turning trials, stopping ahead and astern trials.
• Hull vibration, noise control check

6. SEA WORTHINESS

The vessel shall be capable of maintaining maximum speed without impairing the comfort of crew or vessel performance in sea conditions up to sea state 5. and shall have survivability up to sea state 6.

7. CERTIFICATES

The following certificates and documents as applicable shall be obtained by the vendor and forwarded to the Owner at the time of delivery of the vessel

• Classification certificate issued by DNV
• Builder’s certificate issued by the builder
• Inclining experiment data and stability book
• Swamp test report with photographs

8. MATERIAL OF CONSTRUCTION

Hull of the boat shall be constructed of Glass Reinforced Plastic (GRP) with fire retardant vinyl ester resin or any suitable materials already under use in marine with certification from classification society.
9. SUPERVISION DURING CONSTRUCTION

Under mutual agreement, there shall be periodic inspection by the Owner’s representative of the vessel during construction at different stages such as plug inspection, hull lay-up, outfit and tests and trials.

10. TRAINING AND GUARANTEE

The vendor shall train the operational staff in the running and maintenance of the boat. The vendor shall also undertake the maintenance of the outboard motor and remote control system for a period of one year. The vendor shall also guarantee that the vessel is free from manufacturing and workmanship defects of the hull, installations, equipments, fittings and all other items. All such defects that occur during this period are to be rectified free of cost to the Owner, the cost of spares etc. are also to be borne by the vendor.

11. PLACE OF DELIVERY AND PERIOD

The RIB vessels are to be delivered at the different lake locations at the Chilika Lake, Orissa, as indicated by the Owner. The delivery period for this vessel is estimated to be 6 months from the date of placement of order. If the vendor estimates that the period of delivery is different then this should be indicated in the offer.

V. TECHNICAL SPECIFICATIONS FOR TWIN - CABIN HOUSE BOAT

1. DESCRIPTION

The concept is inspired by the success of the Kerala type House Boats which ply in their hundreds in the backwater lagoons of Kerala, primarily in the Alappuzha, Kollam region in the adjoining connected lakes of Vembanad, Ashtamudi and Kayamkulam. The house boats there are adapted from the early rice boats that were common in the region, primarily for transporting traditional cargo items. The unique boat hull shape, and the parabolic thatched roof render them particularly attractive with an ethnic look, and the graceful movement of these boats in placid waters give the tourists a memorable experience. Hence it is important to retain the ethnic characteristics of these boats in the evolution of a similar or modified design for the Chilika lake. The boats are primarily intended for calm waters. If there are wave conditions in the Chilika lake, then consideration may have to be given for appropriate structural strength. Primarily the house boats are not intended for open sea or coastal sea conditions. The house boats are therefore considered to be operable in select calm water or near calm water regions. The hull form is symmetric about fore and aft. The typical dimension of a house boat is 24m x 4.5m x 1.5m depth and draft of 0.6m. The typical layout consists of a short forward deck, a front ‘verandah’ deck with roof for protection against the weather, two self sufficient air conditioned cabins with attached toilets and a galley (kitchen). The engine room is situated aft below deck and the boat is powered with typically 100 HP inboard diesel engine, driving a screw propeller. Additional auxiliary generator is used to power the vessel for lighting and air-conditioning purpose, miscellaneous pumps, etc. The total displacement...
(weight) of the boat is approximately 8 tonnes. These specifications may be varied to control the cost and sophistication of the boat.

It is also worthwhile to consider a catamaran hull form which would give a broad beam, large stability and ample floor space for the cabins and with the possibility of say 4 cabins in place of 2. However, the traditional house boat appearance, especially of the roof structure, may be altered by choosing the catamaran hull in lieu of the mono hull form.

Some changes are necessary from the ethnic classical house boats. They are traditional wooden and the roof is thatched from natural bamboo and bamboo woven mats. However these are prone to deterioration and annual maintenance is both cumbersome and costly. The alternative material for the hull is fibre glass (weight comparable to the wooden hulls and lighter compared to steel). The upper roof structure too should be of light durable material like fibre glass suitably sheathed to have pleasing look. The deck must have water tight integrity and the hull must be sub-divided for safety in the event of damage and flooding. From environmental considerations, all the boats must be fitted with eco-toilets.

2. MAIN PARTICULARS of a typical mono hull house boat

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>24.0 m</td>
</tr>
<tr>
<td>Breadth</td>
<td>4.5m</td>
</tr>
<tr>
<td>Depth</td>
<td>1.5m</td>
</tr>
<tr>
<td>Draught</td>
<td>0.6m</td>
</tr>
<tr>
<td>Displacement</td>
<td>about 8 t</td>
</tr>
<tr>
<td>Total persons on board</td>
<td>4 to 8 passengers + 3 crew</td>
</tr>
<tr>
<td>Hull material</td>
<td>Fibre glass</td>
</tr>
<tr>
<td>Roofing</td>
<td>Parabolic with fibre glass and sheathed for ethnic look</td>
</tr>
<tr>
<td>Layout</td>
<td>Cabins with attached toilets, verandah deck, galley</td>
</tr>
<tr>
<td>Speed</td>
<td>6.0 knots</td>
</tr>
<tr>
<td>Cruise duration</td>
<td>4 hours (with possibility of overnight anchoring near shore)</td>
</tr>
<tr>
<td>Endurance</td>
<td>8 hrs.</td>
</tr>
</tbody>
</table>

3. GENERAL FEATURES

- The vessel shall be built as inland vessel to DNV class and should comply with all applicable statutory rule requirements.
- The boat should be of a proven hull form and construction should be with approval from DNV.
- The main deck is to be of marine grade plywood of at least 15mm thickness supported on the underside with a system of transverse timber beams of typically 500mm spacing, and suitable centerline and side longitudinal timber girders. Central vertical support pillars may be given as required. The upper deck is to be sheathed with one layer of fiberglass.
- The transverse sub-division bulkheads are to be of marine plywood with suitable stiffeners and fibre glass laminate layers.
- The fender is to be provided all around with timber backing and externally finished fiberglass lamination, the fender size is to be not less than 150 mm width x 100 mm depth.
- Fuel tank of adequate capacity (200 litres of diesel) is to be provided.
- The roof structure should be of parabolic shaped fibre glass shell with suitable hat section arched supports and the panels may be corrugated with good aesthetics.
- Neat roof edge gutters should be provided so that rain water is led to the aft and forward ends of the roof along the length of the boat.
- The well deck should have adequate freeing ports as per rule requirements.
- The windows on the sides should be open, large, providing lighting and ventilation to the passengers and for viewing comfort.
- Wired remote engine and steering control are to be provided from an optimally located Driver’s cabin at the forward end of the boat. The driver’s position should have clear all around view. A classic large helms-wheel should be provided with suitable transmission to the engine and rudder.
- Anchor and mooring arrangements shall be provided as per Class requirements.
- The entire hull construction and equipments on board including safety regulations, standards of all outfit items, provision of freeing ports as applicable, should be in conformation with the rules and regulations of the Det Norske Veritas.
- Life saving appliances should be in conformation with the Indian Merchant Shipping rules.

4. COMPLEMENT

Crew: 3
Passengers: 4 to 8

5. EQUIPMENTS

Main engine: 100 HP inboard diesel engine with suitable gear box and propeller.
Bilge pumps and piping system.
Auxiliary generator set with adequate power for air-conditioning, lighting and ventilation systems.
Galley equipments

6. CAPACITIES

Diesel fuel for main engine: 200 litres
Fresh water in portable tank/cans with dispenser: 100 litres

7. CLASSIFICATION AND REGULATION

The vessel shall be type approved by DNV and the boat must be certified at the end of construction by DNV with periodic inspections as applicable. Final certificate must be obtained from DNV, after conduct of inclining test and preparation of trim and stability book, as well as conduct of trials.
8. APPROVAL OF DRAWINGS AND SPECIFICATIONS

The vendor should submit the general arrangement drawing showing profile, midship section and plan view to the owner for approval prior to construction. All other main drawings and specifications after approval by Classification Society, should also be shown to the Owner for scrutiny and acceptance. Any suggestions for changes are to be frozen on the basis of mutual agreement.

Before handing over the ship for acceptance, “AS FITTED” drawings and “AS BUILT” specifications should be submitted to the Owner. The drawings should show the final General Arrangement, Lines Plan, and as built specifications should show the hydrostatic calculations, trim and stability booklet, tank capacities.

9. CERTIFICATES

The following certificates and documents as applicable shall be obtained by the vendor and forwarded to the Owner at the time of delivery of the vessel

- Classification certificate issued by DNV
- Builder’s certificate issued by the builder
- Inclining experiment data and stability book containing intact and damaged stability

10. SUPERVISION DURING CONSTRUCTION

Under mutual agreement, there shall be periodic inspection by the Owner’s representative of the vessel during construction at critical stages such as plug inspection, hull lay-up, outfit and tests and trials.

11. TESTS AND TRIALS

The following tests and trials shall be conducted prior to acceptance

- Inclining experiment when the vessel is completed in all respects
- Speed trials and engine performance trials for endurance
- Turning trials, stopping ahead and astern trials.
- Hull vibration, noise control check

12. ON BOARD SPARES AND TOOLS

On board spares and tools should be provided as per the equipment manufacturer’s recommendations for daily and routine maintenance

13. BASE SPARES

The vendor should arrange for supply of spares as recommended by the manufacturer of the equipments for maintenance for a period of 3 years.
14. TRAINING AND GUARANTEE

The vendor shall guarantee that the vessel is maintained to be free from manufacturing and workmanship defects of the hull, installations, equipments, fittings and all other items. All such defects that occur during this period are to be rectified free of cost to the Owner, the cost of spares etc. are also to be borne by the vendor.

15. PLACE OF DELIVERY AND PERIOD

The vessel is to be delivered at different locations in the Chilika Lake, Orissa. The delivery period for this vessel is estimated to be 8 months from the date of placement of order. If the vendor estimates that the period of delivery is different then this should be indicated in the offer.

VI. TECHNICAL SPECIFICATIONS FOR 4 PASSENGER FRP HIGH SPEED BOAT WITH 60 HP OUT BOARD MOTOR

The boat is an open type, 4 passenger capacity, lightweight, planing type powered with 60 HP Yamaha outboard motor. Planing should be achieved with a fair but not excessive trim. It should be easily manoeuvrable and capable of taking sharp turns without losing stability. The boat dimensions are length 4.5m, beam 1.6m, depth 0.8m. The boat is to have forward cockpit remote steering, throttle and gear control, and is to be provided with electric starter.

The following drawings/details must be supplied along with the offer from the bidder.

1. General Arrangement drawing with seating plan, location of steering, upper and bow deck plan, fender, battery, fuel tank, OBM well, mooring leads, bollards etc.

2. Structural plan indicating the spacing of longitudinal and transverse stiffeners and the hat section details of the stiffeners. Indicate the bottom, side shell and deck layer thicknesses as well as material of construction. Also indicate the positioning of buoyancy chambers for guaranteeing unsinkability of the vessel. No bottom foam filling is allowed. Indicate the quantity and location of foam filling to guarantee that the vessel will stay afloat upright in the event of capsize.

3. The fender should be internally timber reinforced and externally made integral with the hull in fibre glass with dimensions 100 width x 60 depth.

4. Fittings such as bollards and mooring leads should be of stainless steel. They should be provided both fore and aft.

5. The name and emblem of the Owner should be fixed on the two sides with suitable lettering height for visibility with high quality adhesive bonded plastic film.
VII. TECHNICAL SPECIFICATIONS FOR SOLAR POWERED ELECTRIC BOATS WITH 20/6 PASSENGER CAPACITIES FOR INLAND WATERS AND LAKE

The boat hull is a wide deck (catamaran type) of optimum dimensions to facilitate placement of solar panels on the roof and other available space. The boat is to be built under DNV class. It is to be fitted with electric thrusters which take power from the batteries, which are in turn to be charged by the solar panels. The feasibility of the design must be demonstrated with adequate checks. The placement of solar cell panels, the maximum power derived from these on the basis of their efficiency, and the balance between the power required by the electric propulsors and the power available from the solar cell panels should be worked out. There should be adequate reserve power in the event of low charging of the batteries by the solar panels. All intermediate conversions such as charging current to the batteries, conversion of output battery power by Inverters, DC to DC conversion before power can be given to the electric thrusters must be submitted along with the design. For any deficiency of power supply from the solar cell panels, there must be adequate provision to charge the batteries from the main grid power source on shore such as during day halts or during off working periods. The boat speed is moderate and the key objective is the demonstration of sustainable, silent, eco friendly green energy based tourism. The boat is to operate in calm water conditions at Chilka and Tampara lakes. The feasibility of the design should be adequately demonstrated in the offer. Any need for alternate engine powered thruster should be clearly brought out and provided in the technical offer. A General arrangement drawing should be provided to show the profile, plan and end view of the boat, seating plan and location of principal elements in the power and propulsion system.

VIII. TECHNICAL SPECIFICATIONS FOR 2 Seater FRP Pedal Boat/ 4 Seater FRP Pedal Boat

1. The 2 seater boat dimensions are approximately 2.5m x 1.6m x 0.45m. The 4 seater boat dimensions are approximately 3.00m x 1.80m x 0.45m.

2. Bucket seats must be provided for the riders. The design of the boat offered, should be free of avoidable pockets where water tends to accumulate during service, during rains etc. Adequate drain holes with plug must be provided to free trapped water between inner and outer hulls. The pedal boat should be fitted with wood backed fibre glass fender only. The fender should be of minimum 80 x 50mm dimension. Special care must be taken to design the forward deck corners for impact resistance due to accidental knocks and the corners rounded. This is of utmost importance since the forward in all pedal boats are prone to early damage due to knocks.

3. The pedal boat should be fitted with a manually operated plate rudder with smooth surface and it should have a smoothly rotating efficient pivot and lever with handle. The rudder should be tucked within the overall dimensions of the boat. Rudder stoppers must be provided to limit turning angle to +/- 30 degrees. Teflon bushes must be provided for the rudder shaft.

4. The pedaling mechanism must be designed to smooth, trouble free operation for two years without maintenance and the bearing elements must be guaranteed to be trouble free without change. This is an important requirement. Teflon bushes are highly recommended. The paddle vanes may be Aluminium or galvanized steel plating.

5. The name and emblem of the Owner must be exhibited on both sides of the hull with computer printed stickers.
IX. TECHNICAL SPECIFICATIONS FOR WATER SCOOTER

1 (one) seater water jet powered, petrol engine/diesel engine powered, high speed, safe and robust water scooter design is to be offered for purchase. The engine power, speed and safety features, time for delivery must be clearly specified in the offer. The offer should include maintenance for a period of two years. All manufacturer recommended spares must be included as part of the offer.

X. TECHNICAL SPECIFICATIONS FOR 10 SEATER SPEED OUT BOARD MOTOR BOAT

The catamaran decker should have awning (soft top in steel frame). It should be provided with remote steering and speed control at the forward location, thereby ensuring clear view and driving comfort for the helmsman. The awning should have an attractive visual appeal and ample deck space for the tourists (8 or 10 numbers) to sit comfortably on deck chairs. The deck will give clear view all around and will have protective low railing all around. The boat will have a low power outboard motor. The boat is designed so that tourist groups can comfortably relax, have light snacks on the deck and enjoy the scenic ambience of the lake. The catamaran hull form with its feature of unsinkability and large initial stability will give a safe, stable platform for the tourists to enjoy their water ride.

1. The overall dimensions of the catamaran decker shall be approximately 6 m x 3m x 0.8m x 0.8m with extreme breadth of 3m. The hull is to be of single chine type. The general arrangement drawing should be submitted showing the overall plan of the boat in deck plan, profile, end view, seating arrangement, location of the outboard motor well, fuel tanks, manhole openings for access to the two catamaran hulls, support frame for the fiber glass awning. The all round railing in non-metallic pultruded fiberglass materials should be indicated in the General arrangement drawing. The location of buoyancy foam fillings and quantity of foam filling should be shown. Foam filling of approximately 40kg will be required. The cross deck construction details must be indicated. The location of the steering and remote control should be shown in the forward area of the deck. The boat should be designed with consideration of high aesthetic and functional features for the comfort of passengers. Fender of dimension 100mm x 80mm in fiber glass with timber backing inside should be provided. Rubber fender is not permitted because of low life. Stainless steel/ brass bollards should be provided at all corners. The design features should incorporate stability and unsinkability in the event of swamping. Swamping test will be conducted before acceptance.

The name and emblem of the Owner should be provided by computer printed adhesive film on both sides of the boat.