Dockyard & Engineering Works Ltd.

Bangladesh Navy

Sonakanda, Bandar, Narayanganj-1413, Bangladesh

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EXPRESSION OF INTEREST (EOI)

1. Dockyard & Engineering Works Ltd, Bangladesh Navy, Sonakanda, Bandar, Narayanganj-1413, intends to procure design/drawing and material package for the construction and supply of 01(One) in number 20" Cutter Suction Dredger from a reputed dredger maker/ dredger design house. Short description of the work is as follows:

a. **Project Description.** Construction and supply of 01(One) in number 20" Cutter Suction Dredger.

b. **Quantity.** 01 (One) in number.

c. **Design.** Country of origin of dredger designer shall be EU Countries/ UK/ USA/ Australia/ Canada/ Japan. Submit a list of dredgers so far built on the proven hull design (based on which the offered dredger shall be built) with names of owners and their present address.

d. **Classification Society.** The dredger shall be designed and constructed under the applicable classification society standard. The dredger including its hull, Main and auxiliary engines, other equipment and machinery shall be designed and built for coastal water under the supervision of reputed international classification society of LR/ ABS/ NKK/ DNV/ BV being a member of IACS. The appropriate class notations for fully classed hull and machinery to be mentioned in the offer.

e. **Basic Technical Specification of the Dredger:**

(1)	Length overall including ladder	: Min 33 m to 40 m
(2)	Length over pontoons	: Min 25 m to 26 m
(3)	Width/ Beam	: Min 7.5 m
(4)	Depth	: Not less than 1.7 m
(5)	Draught Loaded	: From 1.05 m to 1.5 m
(6)	Displacement	: From 175 Ton to 350 Ton
(7)	Main Pontoon Length Breadth Depth	 : Minimum 15 m : Minimum 3.5 m : To be mentioned
(8)	Side Pontoons (PS/SB) Length Breadth Depth	 : Not less than 10 m : To be mentioned : To be mentioned
(9)	Forward Side Pontoons (PS/SB) Length Breadth Depth	 : Not less than 15 m : To be mentioned : To be mentioned
(10)	Dredging Installation Diameter of suction pipe Diameter of discharge pipe Dredging depth Discharge distance Dredging width at max. dredging depth	 : 550 mm : 500 mm : Min 12.5 m - 15 m (at ladder angle 45^0 to 50^0). : Min 1,500 m : 33 m to 39 m (at 2x 35^0 to 40^0 swing angle)

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(11)	Pump production capacity	: Minimum 500 m3/ hour mud and silt at a discharge distance of minimum 1,500m at 12.5m dredging depth with 45^0 ladder angles. Calculation of production in terms of mud and silt as well as performance curve in terms of mixture production of the pump shall be provided.
(12)	Country of origin of major machinery	: EU Countries/ UK/ USA/ Australia/ Canada/ Japan

2. **Bidder Qualification**:

a. Local supplier shall have minimum 05 (Five) years of experience in the supply of similar goods. Foreign reputed dredger builder of EU Countries/ UK/ USA/ Australia/ Canada/ Japan shall have 10 (Ten) years of experience in building and supplying either of 20" or higher capacity CSD. Foreign dredger builder shall also have experience of building and supplying dredger of at least 01 (One) unit of 20" or higher within last 03 (Three) years. Necessary documents in this regard have to be submitted with offer.

b. Attested copy of Valid Trade License or equivalent license.
c. Updated TIN/ equivalent certificate and Tax Payment Certificate.
d. VAT/ Business Registration Certificate.
e. Bank Solvency Certificate.

3. Interested dredger maker/ dredger design house is hereby requested to contact/ email the following person of Planning & Design (P&D) department of this yard:

Md. Tyebul Islam
Deputy Chief Engineer
Planning & Design Department
Dockyard & Engineering Works Ltd.
Bangladesh Navy
Sonakanda, Bandar, Narayanganj-1413.
Cell: +880 1769 719818
Email: dewltd.tender@gmail.com

4. Interested dredger maker/ dredger design house shall have to submit entire offer along with Technical & Financial by **08th February 2026** as per detailed instruction on attached Technical Specification.

5. Offer validity period shall be 180 (One hundred & Eighty) days.

6. DEW reserves the right to reject all or any part of this EOI prior to acceptance without showing any reason.

KHALIDUL ISLAM
Commander BN
For Managing Director

Enclosure:

1. Technical Specification - 01 (One) Set.

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CUTTER SUCTION DREDGER (CSD) এর কারিগরি বিবরণ (ডিপি-৫)

1. **Name of the Item**. Cutter Suction Dredger (CSD).

2. **Quantity**. 01 (one) in number.

3. **Purpose**. To be used for dredging mud and silt of Pekua basin area, approach area to basin and support jetty at Kutubdia channel.

4. **Name and Address of the Shipbuilder/Builder of Dredger**. Name and full address, email and website of the manufacturer to be mentioned.

5. **Country of Origin of Dredger Designer**. EU Countries/ UK/ USA/ Australia/ Canada/ Japan.

6. **Year of Manufacture**. 2025 or later.

7. **Qualification/ Eligibility of Bidder**. Interested bidder should provide documents indicating that they have the required qualifications and relevant experience to perform the task. The bidder shall have the following qualification:

   a. The bidder shall be a well reputed and established local shipbuilder having own shipyard/dockyard. The bidder shall have experience of building of Dredger/similar crafts for Bangladesh Navy/ Bangladesh Coast Guard within last 10 years.

   b. Experience of docking/undocking including repair and maintenance of various ships and warships of Bangladesh Navy/ Bangladesh Coast Guard for at least last 10 years.

   c. Relevant documents shall be submitted from appropriate authority that the bidder is not currently defaulted in payment of bank loans; and bidder is not bankrupt or known to be on the verge of being insolvent and/or bankrupt.

   d. Financial solvency shall be proven by submitting relevant documents.

   e. Staffing and logistics of the bidder's firm shall support technical specialty in warship building and submit relevant documents in support of the claim.

   f. Item wise price list of first moving spars of at least 02 years routine maintenance.

   g. Bidder shall submit certified copies of the following documents:

      (1) Income Tax certificate- for last three financial years.

      (2) VAT registration certificate.

      (3) e-TIN certificate.

8. **Responsibilities of the Parties Involved**.

a. **Bangladesh Navy (BN)**. The responsibilities of BN is to be as follows:

(1) To approve appropriate offer proposed by the Shipbuilder/Supplier.

(2) To form a Project Implementation Team (PIT) to supervise the construction on behalf of BN.

(3) To approve all basic drawing such as: General Arrangement (GA) drawing, compartment arrangements (layouts), tank arrangements etc.

(4) To overview, support and assist test and trial of machinery/ equipment of the dredger conducted by the Shipbuilder/Supplier.

(5) To accept the dredger as per contract.

(6) To arrange signing "Test and trial completion certificate" is to be jointly signed by BN nominated personnel and the nominated personnel from shipbuilder.

b. **Bidder/Shipbuilder**. The shipbuilder shall be responsible for the following:

(1) To provide all drawings related to the dredger.

(2) To construct hull and structure of the dredger as per the approved drawing under assistance/ supervision of the classification society (member IACS).

(3) To purchase and install all machinery, equipment as per approved drawings and specification.

(4) To conduct tests/ trials and commissioning of all machinery, equipment, fittings, sensors and systems as necessary with the assistance of the OEM.

(5) To provide any item/interface/arrangement required for the standard operation of the dredger, equipment/system, whether the same is mentioned or not.

(6) To arrange operation and maintenance training for the dredger's crew in Bangladesh for at least 15 working days. The training shall cover all aspects of operation and maintenance of the dredger, all machinery, equipment, sensors and systems onboard. Detail of training shall be furnished by the OEM or its authorized Agent (if there is any) with their offer.

(7) To take the responsibilities for all supplies and timely completion of the tasks.

(8) To arrange signing "Test and trial completion certificate" jointly by shipbuilder, OEM (or OEMS approved agent)/ agent (if there is any) and BN.

(9) **Warranty**. To provide warranty as follows:

(a) Warranty for trouble free operation shall be provided by the shipbuilder for the dredger and all the supplied items for a period of at least 12 months from the date of acceptance by BN.

(b) The warranty shall cover all parts and labour (including service engineer's cost throughout the warranty period).

9. **Ambient Condition**. The dredger shall be designed to operate efficiently and safely under a variety of climate conditions, ensuring its reliability and performance in different environment. The specific climate condition for its operation shall be high saline /salty water, coastal turbid water, height of tide of about 3-4 meter etc.

10. **Scope of Supply**. The scope of supply includes the following goods and services:

a. 01x Cutter Suction Dredger as per the specification mentioned herein.

b. Transportation of the dredger in the designated location as per the directive of BN.

c. Training and test/ trails.

d. Spares.

11. **Capability of the Dredger**.

a. Able to operate in tropical Climate and coastal waters.

b. Capable of dredging (both suction and cutting) of mud, sand and silt.

c. Have a designed life of not less than 25 years.

d. Living and working condition (accommodation design, noise, vibration, indoor climate and lighting) of dredger should be suitable for optimum crew performance.

e. Local representative of OEM of main machinery and equipment such as Main Engine, Auxiliary Engine, Mud Pump and Generator shall be available in Bangladesh to provide quick maintenance support.

12. **Main Description of Dredger**.

a. **Main Characteristics**.

(1) This specification describes a Cutter Suction Dredger of a very robust construction, suitable for heavy duty and durable operations.

(2) The sizes and weights of the various dismountable modules shall permit transportation by road, rail or ship. All the parts to be lifted are to be equipped with steel lifting lugs and above machinery and pumps hoisting eyes are fitted. The complete dredger consists of a main pontoon and side pontoons. These side pontoons are to be mounted to the main pontoon using heavy steel claws and pins at hull bottom with bolt connection at deck level.

(3) The dredger shall be operated from the control cabin.

(4) The dredger shall be constructed in accordance with the General Arrangement Plan.

b. **Main Dimensions**.

(1) Length overall including ladder: 33 m-40 m.

(2) Length over pontoons : 25 m to 26 m.

(3) Width/ Beam : Min 7.5 m.

(4) Depth : Not less than 1.7 m.

(5) Draught Loaded : From 1.05 m to 1.5 m.

(6) Displacement : From 175 Ton to 350 Ton.

c. **Dredging Installation**.

(1) Diameter of suction pipe : 550 mm.

(2) Diameter of discharge pipe: 500 mm.

(3) Dredging depth : Min 12.5 m-15 m (at ladder angle 45^0 to 50^0).

(4) Discharge distance : Min 1,500 m.

(5) Dredging width at max. dredging depth: 33 m to 39 m (at 2x 35^0 to 40^0 swing angle).

d. **Tank Capacities**.

(1) Fuel oil tank capacity : To be mentioned.

(2) Hydraulic oil tank capacity : To be mentioned.

(3) Fresh Water tank Capacity: To be mentioned.

(4) Ballast tanks : To be mentioned.

e. **Workmanship**.

(1) All these materials and equipment supplied shall be new and of latest design. All the equipment shall be designed for marine use.

(2) Steel materials used for the dredger shall be open-hearth or electric furnace processed mild steel of a good and uniform quality certified by Classification Society.

(3) All workmanship in respect of the construction of the dredger shall be in accordance with the standard of classification society.

f. **Classification Society**. The dredger shall be designed and constructed under the applicable classification society standard. The dredger including its hull, Main and auxiliary engines, other equipment and machinery shall be designed and built for coastal water under the supervision of reputed international classification society of LR/ ABS/ NKK/ DNV/ BV being a member of IACS. The appropriate class notations for fully classed hull and machinery to be mentioned in the offer.

13. **Pontoons**.

a. **General**.

(1) The main pontoon shall provide space for the Main Engine, dredge pump installation, auxiliary engine, hydraulic and electric installation. The pontoons shall be welded steel constructions with heavy frames, beams and longitudinal girders made from shipbuilding bulb-angle steel and steel plate frames. Extra reinforcements shall be placed where necessary to withstand all forces while dredging.

(2) On deck level, the pontoons shall be provided with steel lifting lugs, in addition to the bolt plates for the inter-connection of the pontoons. All steel material shall be Grade-A or equivalent for construction of the dredger.

b. **Main Pontoon**.

(1) Length : Minimum 15 m.

(2) Breadth : Minimum 3.5 m.

(3) Depth : To be mentioned.

(4) Scantling of hull member: As per classification society standard.

c. **Foundations/ Reinforcements**. The engine room in the main pontoon shall be provided with suitable foundations, top plates and necessary reinforcements for the mounting and/or installation of all machinery. Strong supports, located on deck, shall be supplied for the installation of the winches, cylinders, gantry etc.

d. **Side Pontoons (PS and SB)**.

(1) Length : Not less than 10 m

(2) Breadth : To be mentioned.

(3) Depth : To be mentioned.

(4) Scantling of hull member: As per classification society.

e. **Forward Side Pontoons (PS and SB)**.

(1) Length : Not less than 15 m

(2) Breadth : To be mentioned.

(3) Depth : To be mentioned.

(4) Scantling of hull member: As per classification society.

f. **Bunkers and Tanks**. The side pontoons shall be provided with fuel bunkers integrated in the steel construction. Furthermore, the side pontoons shall provide void spaces, fore and aft. The bunkers shall be constructed with stiffeners, manholes and entry steps. The fuel bunkers shall be equipped with filler pipes, measuring scale, ventilation pipes with flame arrestors and drain plugs.

g. **Stores**. One part of the void space in side pontoon shall be used for general storage.

h. **Floor Plates**. Removable aluminium floor plating with anti-skid profile shall be provided in the main pontoon.

14. **Scantling**.

a. The scantlings of the structural members are to be as per the requirement of the as per classification society's requirements.

b. The minimum scantlings/ thickness of the following plates are to be mentioned in the quotation:

(1) Side plating : Min 8 mm (To be mentioned).

(2) Bottom plating : Min 8 mm (To be mentioned).

(3) Deck plating : Min 6 mm (To be mentioned).

(4) Bulkhead plating : Min 6 mm (To be mentioned).

(5)	Side longitudinal	: Min 8 mm (To be mentioned).
(6)	Deck longitudinal	: Min 6 mm (To be mentioned).
(7)	Web frames	: Min 8 mm (To be mentioned).
(8)	Deck girders	: Min 8 mm (To be mentioned).
(9)	Keel bar	: Min 8 mm (To be mentioned).
(10)	Superstructure	: Min 4 mm (To be mentioned).

15. **Frames**. The frames are to be of one piece from keel to main deck except in the way of tanks. All beams, girders, stringers etc. are to be provided as per scantling shown in respective drawing.

16. **Side Longitudinal**. The side longitudinal is to be of one piece as far as possible. All beams, girders, stringers etc. are to be provided as per scantling shown as per classification society's requirements.

17. **Deck Longitudinal**. The deck longitudinal is to be of one piece as far as possible. All beams, girders, stringers, etc. are to be provided as per classification society's requirements.

18. **Bulkheads.** Sufficient numbers of watertight bulkheads are to be provided as per classification society's requirements.

19. **Main and Auxiliary Machinery Seating**. These are to be as per the requirement of maker of the concerned machinery/ equipment and as per classification society's requirements.

20. **Sea Chests**. Required numbers of sea chests (in main and auxiliary machinery spaces) are to be integrated in the hull bottom construction. Each chest is to be provided with a dismountable galvanized grating flush attached with the bottom and a vent hole at the top as well as a drain hole at the bottom. High pressure air/water cleaning arrangement of the sea chests to be provided.

21. **Construction of Tanks**. The fuel oil, lube oil, freshwater, dirty lube oil, sewage tank, ballast tank etc. is to be integral part of the hull as far as possible and is to be constructed according to shipbuilding standard and as per classification society's requirements.

22. **Superstructure**.

a. **General**. The upper part of the main pontoon above the machine installation shall be in the form of superstructure and shall be provided with necessary stiffeners and beams.

b. **Operating Cabin**. A spacious control cabin shall be located at the main deck and mounted on shock absorbers. The cabin shall be designed ergonomically with Air-conditioning. The cabin shall provide sitting arrangement for at least three persons. The cabin shall be accessed through two entrance doors and windows all around. Optimal view shall be made available for winch operation. The windows shall be grey tinted and double-glazing. The cabin roof and windows shall be designed to reduce sun reflection.

c. **Insulation**. The operating cabin shall have an optimal acoustic and thermal insulation. The walls below the windows shall be insulated with appropriate material and thickness and covered with plastic coated plywood. The ceiling shall be insulated with appropriate material and thickness wool. Besides, appropriate insulation shall be added as extra acoustic insulation material.

d. **Furniture**. A dredge master chair shall be placed in the cabin and a seat for at least three persons shall be provided. Necessary lockers and table shall be provided.

23. **Dredging Suction and Discharge System**.

a. **General**. The cutter ladder consists of two main parts. The lower part with cutter and cutter drive makes the "cutter unit". The upper part to be hinged to the main pontoon, the "ladder".

b. **Cutter**.

(1) The cutter unit shall be constructed of heavy steel plates with necessary braces and reinforcement to form a rigid frame with assembled cutter shaft bearing.

(2) The cutter shaft shall be made of High Strength Forged steel (Grade 42CrMo4 or equivalent) material. It shall be supported by radial and axial roller bearings that rotates in an oil filled heavy gauge steel pipe casing. A small header tank shall be placed above water level ensures a positive oil pressure in the casing.

(3) The cutter shall be mounted on the cutter shaft by means of screw thread. A steel hawser and flame-cutting ring shall be mounted between cutter hub and bearing housing for easy removal of cutter. The cutter shall be driven by a hydraulic motor. The hydraulic motor shall be directly mounted to the cutter shaft bearing housing.

(4) The front end of the cutter unit shall be provided with a front plate and a dismountable special shaped suction mouth with a nominal surface area of approx. 125% of suction pipe surface. The wall thickness of the suction mouth shall be approx. 15 mm, and is provided with a stone grid.

(5) The specifications of Cutter shall be as follows:

(a) Maker : To be mentioned.

(b) Model : To be mentioned.

(c) Power : To be mentioned (Min 180 kW).

(d) Type : Crown type interchangeable teeth or equivalent

(e) Cutter Teeth : Knives (Narrow chisels) replaceable.

(f) Rotational Speed: Not less than 0-30 RPM.

(g) Country of Origin: EU Countries/ UK/ USA/ Australia/ Canada/ Japan.

c. **Cutter Ladder**.

(1) The cutter ladder shall be made of heavy gauge steel pipe construction with necessary reinforcements for maximum bending and torsion strength to stabilize cutting action. The ladder shall be raised and lowered by a winch mounted on the main deck using the ladder gantry. The upper part of the ladder shall be equipped with hinge arms made of heavy steel plate assembly. The ladder hinge shall be made of steel with dismountable bronze bushes with grease nipples.

(2) Ladder pins shall be made of mild steel Grade A material. All grease points on the cutter ladder shall be reached from the walking grid on the cutter ladder. At the end on the top of the ladder a hoisting unit consisting of steel plates with shaft of X17CrNi16-2 and wire sheaves shall be placed. At each side of the end of the cutter ladder a balanced hinged side wire block shall be mounted.

d. **Dredging Pipe on Ladder**.

(1) The suction pipe shall be dismountable with following specifications:

(a) Nominal diameter : 550 mm.

(b) Material : Mild Steel Grade A.

(c) Wall thickness : Min 12 mm.

(2) A de-aeration valve shall be placed in the suction pipe for priming the dredging pump.

e. **Suction Hose**. The hose shall be equipped with back-vulcanised steel flanges. A rubber suction hose with following specification shall be mounted between the ladder suction pipe and suction pipe:

(1) Nominal diameter hose : 550 mm.

(2) Length of the hose approx. : 1,500 - 1,800 mm.

(3) Wear resistant layer : Min 16 mm.

f. **Suction Pipe Inboard**. The suction pipe in the dredger shall be equipped with necessary bends and supports. It shall be dismountable with following specifications:

(1) Nominal diameter : 550 mm.

(2) Material : Mild Steel Grade A.

(3) Wall thickness : Min 12 mm.

g. **Inspection Piece**. An inspection piece, fitted with a toggle secured cover, shall be placed for inspection. Inspection piece shall have one loose flange with O-ring for axial movement and easy removal.

h. **Dredging Pump**.

(1) The dredger shall be equipped with high efficiency proven model (having proven records of 10 years) with wear resistant material construction of its wearing parts as to suit best performance in dredging. Dredging pump shall have proven efficiency of more than 85 percent. Material hardness for pump casing, suction nozzle liner, suction and shaft cover wearing plates and impeller shall be of BHN 500 or equivalent. The key specifications of the pump are as follows:

(a) Maker : To be mentioned.

(b) Model : To be mentioned.

(c) **Pump production capacity**. Minimum 500 m3/hour mud and silt at a discharge distance of minimum 1,500m at 12.5m dredging depth with 45° ladder angle. Calculation of production in terms of mud and silt as well as performance curve in terms of mixture production of the pump shall be provided with the tender documents.

(d) Material : Heavy-duty and wear resistant cast iron.

(e) Pressure head : Min 8 bar.

(f) Suction Diameter : 500 mm.

(g) Discharge Diameter : 450 mm.

(h) Country of Origin and Manufacture: EU Countries/UK/ USA/ Australia/ Canada/ Japan.

(2) The impeller shall be of closed type, high efficiency with double curved vanes. It shall be secured on the impeller shaft by screw thread. Mounting and dismounting facility shall be available through a 3-piece ring construction.

(3) The impeller shaft made of forged steel 42CrMo4 or equivalent material shall be fitted with 2 radial and 1 axial oil bath spherical roller bearing. The oil of the pump shaft bearing shall be cooled by means of a cooler. The shaft shall be sealed by a mechanical seal.

(4) The impeller shaft shall be provided with a hand operated turning device. All pump parts shall be replaceable. A hoisting tool for easy and safe changing of wearing parts shall be delivered with the dredging pump.

(5) 01 in no volumetric flow meter shall be provided.

j. **Discharge Expansion Piece**. Discharge expansion piece shall be placed on the discharge of the dredge pump to reduce vibrations. The expansion piece shall be equipped with back-vulcanized steel flanges having following characteristic:

(1) Nominal diameter pump side : 450 mm.

(2) Nominal diameter discharge pipe side : 500 mm.

(3) Length of the discharge expansion piece: Min 250 mm.

(4) Wear resistant layer : Min 15 mm.

k. **Discharge Pipe Onboard**. The discharge pipe shall run over the superstructure to the stern and shall be supported by steel supports. The discharge pipe shall be coupled with flanges and is dismountable with following specifications:

(1) Nominal diameter : 500 mm.

(2) Material : Mild Steel Grade A.

(3) Wall thickness : Min 12 mm.

24. **Maneuvering/ Hoisting**.

a. **General**. A ladder winch shall be installed for hoisting and lowering the cutter. Two anchors shall be connected to the side winches. These winches shall control the position of the dredger. In addition, spud hoisting equipment shall be installed for lowering and hoisting of the spud poles.

b. **Cutter Ladder Gantry**. A dismountable cutter ladder gantry of A-frame construction made of welded steel pipe shall be fitted at the fore end deck of both the fore side pontoons. It shall be secured by means of pins. Two heavy steel wire rope stays shall be used to hold the gantry at appropriate position. The gantry shall be provided with wire sheaves, connection points for safety cables and lifting lugs.

c. **Ladder Winch**. A hydraulically driven winch shall be mounted in front of the operating cabin on main deck for hoisting and lowering the cutter ladder. The ladder winch shall be equipped with a hydraulically controlled brake. In addition, the ladder winch shall be provided with a hand operated locking pin and shall have following specification:

(1)	Maker	: To be mentioned.
(2)	Model	: To be mentioned.
(3)	Wire Pull Force	: To be mentioned.
(4)	Hauling Speed	: 0-15 m/min (controllable).
(5)	Drive	: By a hydraulic motor.
(6)	Gearbox	: Planetary type.
(7)	Drum capacity	: Sufficient to lower the ladder to the given depth.
(8)	Country of Origin	: EU Countries/UK/ USA/ Australia/ Canada/ Japan.

d. **Side Wire Winches**. Two hydraulically driven side wire winches shall be mounted in front of the operating cabin on main deck for swinging the dredger. The side wires shall be guided over the guiding sheaves on top of the ladder, through the balanced wire blocks near the cutter unit to the anchors. The two side wire winches shall be equipped with an adjustable hydraulic brake valve enabling the run-out wire to be kept tight, making cutter operation possible with one winch controller. The side wire winches shall be provided with a hand operated locking pin. The side wire winches shall have following specifications:

(1)	Maker	: To be mentioned.
(2)	Model	: To be mentioned.
(3)	Wire Pull Force	: To be mentioned.
(4)	Hauling Speed	: 0-20 m/min (controllable).
(5)	Drive	: By a hydraulic motor.
(6)	Gearbox	: Planetary type.
(7)	Drum capacity	: 130 m to 150 m.
(8)	Country of Origin	: EU Countries/UK/USA /Australia/ Canada/ Japan.

e. **Anchor Winches**. Two hydraulically driven anchor wire winches shall be mounted in front of the operating cabin on main deck for swinging the dredger. The two anchor wire winches shall be equipped with an adjustable hydraulic brake valve enabling the run-out wire to be kept tight, making cutter operation possible with one winch controller. The anchor wire winches shall be provided with a hand operated locking pin. The anchor wire winches shall have following specifications:

(1)	Maker	: To be mentioned.
(2)	Model	: To be mentioned.
(3)	Wire Pull Force	: To be mentioned.
(4)	Hauling Speed	: 0-20 m/min (controllable).
(5)	Drive	: By a hydraulic motor.
(6)	Gearbox	: Planetary type.
(7)	Drum capacity	: Min 100 m.
(8)	Country of Origin	: EU Countries/UK/ USA /Australia/ Canada/ Japan.

f. **Boom Winches**. Two hydraulically driven boom wire winches shall be mounted in front of the operating cabin on main deck for operating boom. The two boom wire winches shall be equipped with an adjustable hydraulic brake valve enabling the run-out wire to be kept tight. The boom wire winches shall be provided with a hand operated locking pin. The boom wire winches shall have following specifications:

(1)	Maker	: To be mentioned.
(2)	Model	: To be mentioned.
(3)	Wire Pull Force	: To be mentioned.
(4)	Hauling Speed	: 0-20 m/min (controllable).
(5)	Drive	: By a hydraulic motor.
(6)	Gearbox	: Planetary type.
(7)	Drum capacity	: Min 50 m.
(8)	Country of Origin	:EU Countries/ UK/ USA/ Australia/ Canada/ Japan.

g. **Spuds**. The spuds shall be made of heavy gauge pipe made of higher-grade steel (AH36 or equivalent). The spuds shall have heavy points at the lower-end and holes at approx. 2.25 m intervals for the locking pin. The total length of each spud shall be minimum 18.5 meters (Approx. diameter 600mm to 630mm and wall thickness varies from 20 mm to 32 mm). Lateral distance between two spuds shall be kept maximum.

h. **Spud Keepers**. Spud keepers shall be mounted at the stern of the main pontoon, for vertical positioning of the spuds. Spud keepers shall to be made of heavy plate assembly. The spud keepers shall be designed to lift the spud pole till bottom level. The spud keepers shall have hinged doors, by means of removable steel pins, for easy removing of the spuds.

j. **Spud Hoisting Equipment**. The spuds shall be lifted by steel wires and single acting hydraulic cylinders. These cylinders shall be hinged/mounted on a base at the aft deck. The top of each cylinder shall be equipped with a wire sheave and guide. The cylinders shall be equipped with free-falling valves and slow fall operation, both controlled from the operating cabin. Manual lowering shall also be possible near the spud poles.

k. **Anchors**. The dredger shall be equipped with two High Holding Dredging anchors, each weighing approximately 1000Kg. Each anchor shall be delivered with pick-up buoy, hoisting wire and shackles. Both anchors shall be secured in anchors securing structures.

j. **Anchor Boom**. Suitable two anchor boom including boom securing pillars, boom supporting bars and boom holding steel wires as required shall be provided.

k. **Pipe Line Mooring Anchors with Wire.** The dredger shall be equipped with at least four mooring anchors (each not less than 500 kg) for pipe line mooring. Each anchor shall be delivered with pick-up buoy, wire and shackles.

l. **Wires**. The dredger shall be equipped with the following wires, ropes and wire sheaves:

(1) **For all Steel Wires**.

(a) Type of wire: 6x36 WS + steel core - galvanised.

(b) Tensile strength >1,960 N/mm2.

(2) **The Ladder Winch Wires**.

(a) Steel wire : Min dia 26 mm.

(b) Length : Sufficient to lower to the given dredging depth.

(3) **The Two Side Winch Wires**.

(a) Steel wire : Min dia 26mm.

(b) Length : Min 150m for each winch.

(4) **Gantry Wires**. The cutter ladder gantry shall be equipped with:

(a) 2 in no steel stay wires.

(b) 2 in no ladder safety wires.

(5) **Two Anchor Winch Wires**.

(a) Steel wire : Min dia. 20 mm.

(b) Length : Min 100m for each winch.

(6) **Two Boom Winch Wires**.

(a) Steel wire : Min dia. 12 mm.

(b) Length : Min 50m for each winch.

(7) **Spud Slings**. Each spud shall be lifted by means of a spud sling equipped with special shackle and split cable eyes.

(8) **Spud Hoisting Wires**. Each spud shall have a steel wire equipped with cable eyes.

(9) **Mooring Ropes**. The dredger shall be equipped with 4 mooring ropes as following specifications:

(a) Material : Polypropylene.

(b) Diameter : Min 40 mm.

(c) Length : Min 2 in no 50m and 2 in no 60m.

m. **Wire Sheaves**. Wire sheaves shall be made of Bainitic Nodular cast iron. Sheave diameter shall be minimum 20x wire diameter. The sheaves in top of the gantry shall be with maintenance free roller bearings. All sheaves under water shall be with bronze bearing bushes on stainless steel shafts. All sheaves above the waterline shall be with maintenance free synthetic bearing bushes on stainless steel shafts (with exception of the sheaves in the gantry). Following wire sheaves shall be provided:

(1) 02 in no Spud hoisting.

(2) 02 in no Balanced side wire blocks.

(3) 02 in no Guiding sheaves on top of ladder.

(4) 04 in no Ladder hoisting.

25. **Loading and Discharging System**. The dredger shall be equipped with loading and discharging appliances. A sniffer valve shall be placed in the discharge pipe for air deaeration at the aft part of the dredger.

26. **Drives and Auxiliaries**.

a. **General**. The dredge pump unit shall be placed in the main pontoon. It contains a dredge pump coupled with a gearbox through clutch. The gearbox shall be coupled with a flexible coupling to the dredge pump. The gearbox and the diesels engine are placed on shock absorber and mounting pad enabling alignment as necessary. A hoisting beam shall be placed above the gearbox and dredge pump for lifting during maintenance.

b. **Main Engine for Dredging Pump**. The dredging pump shall be driven by a diesel engine. The engine shall have the provision for starting and stopping, speed control from both engine room and operating cabin. Necessary control panel, display and alarm shall be installed in engine room and operating cabin as appropriate. The main characteristics of the diesel engine are as follows:

(1) Type : Marine type.

(2) Model : To be mentioned.

(3) Maker : To be mentioned.

(4) Rated Power : From 940 kW to 1250 kW to produce dredge pump solid output of 500 cubic meter/hour at a discharge distance of minimum 1,500m at 12.5m dredging depth with 45° ladder angle.

(5) Cycle : 4-Stroke.

(6) Maximum RPM : To be mentioned.

(7) Engine Duty/ Rating: Continuous Duty. The engine shall have the capability to run continuously at rated speed up to 100% of time. Details of such calculation shall be provided with the tender documents.

(8) Regulation : To be mentioned.

(9) Engine Duty : Continuous Duty.

(10) Cooling system : Fresh water cooled.

(11) Starting system : Battery start.

(12) Certificate : IACS approved.

(13) Country of Origin, Manufacture, Assembly and Shipment: EU Countries/UK/ USA/ Australia/ Canada/ Japan.

c. **Couplings**. A gear coupling shall be fitted between the reduction gearbox and the dredging pump. A flexible coupling shall be fitted between the reduction gearbox and the engine. A flexible coupling shall be fitted between the auxiliary engine and the hydraulic pumps.

d. **Gearbox**. The dredging pump shall be driven by a reduction gearbox with a built-in hydraulically operated friction clutch. The clutch shall be remotely controlled from both engine room and operating cabin. The specification of gearbox shall be as follows:

(1) Maker : To be mentioned.

(2) Model : To be mentioned.

(3) Gear Ratio : To be mentioned.

(4) Certificate : IACS approved.

(5) Country of Origin and Manufacture: EU Countries/UK/ USA/ Australia/ Canada/Japan.

e. **Engine for Auxiliaries**. The hydraulic, electric and auxiliary equipment shall be driven by a diesel engine. The engine shall have the provision for starting and stopping, speed control from both engine room and operating cabin. Necessary control panel, display and alarm shall be installed in engine room and operating cabin as appropriate. The main characteristics of the diesel engine are as follows:

(1) Type : Marine type.

(2) Model : To be mentioned.

(3) Maker : To be mentioned.

(4) Rated Power : From 340KW to 400 kW.

(5) Cycle : 4-Stroke.

(6) Maximum RPM : To be mentioned.

(7) Regulation : To be mentioned.

(8) Engine Duty/ Rating: Continuous Duty. The engine shall have the capability to run continuously at rated speed up to 100% of time. Details of such calculation shall be provided with the tender documents.

(9) Cooling system : Fresh water cooled.

(10) Starting system : Battery start.

(11) Certificate : IACS approved.

(12) Country of Origin, Manufacture, Assembly and Shipment: EU Countries/UK/ USA/ Australia/ Canada/ Japan.

27. **Piping System**.

a. **General**.

(1) The dredger shall be fitted with the following piping systems:

(a) Dredge piping system.

(b) Fuel oil piping system

(c) Cooling system (Water cooling).

(d) Filling, sounding and de-aeration of tanks.

(e) Exhaust system.

(f) Forced and natural Air intake system.

(g) Above piping systems (except Forced and natural Air intake system) shall be made of steel pipes. Piping diameters and wall thickness shall be in accordance with classification standard. Diameters of suction lines shall be of appropriate size to avoid too high vacuum.

(2) The quality of pipe and flange shall be in accordance with ISO-standards. All systems shall be mounted stress free and adequately supported to prevent excessive vibrations during normal operations. Each system shall be provided with the necessary valves, non-return valves, expansion pieces, flexible joints, hoses, filters, as appropriate.

(3) Valves in water pipelines shall be made of Cast steel below water line and other valves made of cast iron or bronze.

(4) All pipes shall be marked with appropriate colour code.

b. **Filling- Sounding and De-Aerating System**. All tanks shall be provided with filling, sounding and (closable) de-aerating pipes and appendages. The ventilation pipes of the fuel bunkers shall be equipped with flame arrestors.

c. **Fuel System**.

(1) The fuel system shall be designed to conform basic operation. From the tanks the fuel oil shall led to the engines as well as return pipes to the tank. Filter shall be placed in fuel suction line of engine. Necessary arrangement for de-fuelling shall be provided.

(2) Fuel piping shall be made of steel as follows:

(a) Couplings up to 25 mm pipe diameter : Cut ring coupling.

(b) Couplings over 25 mm pipe diameter : Flanges.

d. **Grease and Lubrication**. Ladder hinges shall be provided with grease points that can be accessed from deck level. A small header tank shall be placed in front of control cabin allowing enough head for bearing of cutter drive. One oil pump with sufficient capacity shall be provided for oil circulation of dredge pump bearing.

e. **Cooling System**.

(1) Necessary provision for dedicated fresh water cooling for dredge pump engine, gearbox and auxiliary engine shall be kept. The fresh water pumps shall be driven by engines. The expansion tanks shall be installed as appropriate. Furthermore, provision for sea water cooling shall be arranged as necessary.

(2) The hydraulic installation and dredge pump bearing assembly shall be cooled by a sea water pump and cooler. Required sea water inlet with valves and filter unit shall be made in the dredger's hull.

(3) The specification of the sea water pumps shall be as follows:

(a) Capacity : Minimum 20 m3/h.

(b) Total head : Minimum 25 mwc.

f. **Ballast, Bilge, Fire Fighting and Deck Wash System.**

(1) 01 in no submersible pump shall be provided to drain bilges and fill/empty void tanks. It shall also be used for deck wash. The pump shall be equipped with required length of electric cable and discharge hose.

(2) The specification of submersible pump shall be as follows:

(a) Drive : Electric.

(b) Capacity : Not less than 30 m3/h.

(c) Total head : Not less than 25 m.

(3) There shall be at least 04 in no fire hydrants of appropriate size to be installed on main deck for fire-fighting and deck wash. Water shall be supplied by the water pump.

(4) 01 in no GS pump shall be provided as per following specification:

(a) Drive : Electric.

(b) Capacity : Not less than 30 m3/h.

(c) Total head : Not less than 25 m.

(5) 01 in no Bilge pump shall be provided as per following specification:

(a) Drive : Electric.

(b) Capacity : Not less than 20 m3/h.

(c) Total head : Not less than 25 m.

g. **Exhaust System**. A stainless-steel expansion piece shall be fitted. The exhaust piping between expansion piece and silencer shall be made of steel and provided with thermal insulation as appropriate. Exhaust funnel shall be of proven design. Necessary heat insulation shall be provided.

h. **Air Intake System**. Necessary air intake for engines shall be routed through a closable hood and flexible hoses.

28. **Hydraulic System.**

a. **General**. The hydraulic system shall be comprised of main and emergency pump. Particulars of all required equipment related to hydraulic operation shall be provided with the tender document. The system shall conform with classification standards as appropriate. The system shall be used for Cutter drive, Winch drives, Anchor boom, Spud manipulation and other necessary equipment.

b. **Hydraulic Pumps**. Hydraulic pumps shall be driven auxiliary engine. It shall be of following specification:

(1) **Main hydraulic Pump**

(a) Maker : To be mentioned.

(b) Type : Variable axial closed loop piston pump.

(c) Displacement : To be mentioned.

(d) Rated Pressure : Not less than 20 MPa.

(2) **Emergency hydraulic Pump.**

(a) Maker : To be mentioned.

(b) Type : Variable axial closed loop piston pump.

(c) Displacement : To be mentioned.

(d) Rated Pressure : Not less than 20 MPa.

(3) Country of Origin: EU Countries/UK/USA/ Australia/ Canada/ Japan.

c. **Hydraulic Motors.**

(1) The cutter shall be direct driven by a slow running motor with following specifications.

(a) Maker : To be mentioned.

(b) Type : Radial piston motor.

(2) The ladder and side wire winches are to be each driven by a hydraulic motor of adequate capacity.

(a) Maker : To be mentioned.

(b) Type : Radial piston motor.

(3) Country of Origin: EU Countries/UK/USA/ Australia/ Canada/ Japan.

d. **Hydraulic Cylinders.** The two spuds are to be lifted through steel wires, by hydraulic spud cylinders of following specifications.

(1) Type : To be mentioned.

(2) Mounting : To be mentioned.

(3) Stroke : Not less than 1,500 mm.

(4) Rod : To be mentioned.

(5) Rod Protection : 25 tm chromium layer.

e. **Hydraulic Control System.**

(1) The hydraulic control system shall comprise following equipment:

(a) Variable speed regulator of cutter drive.

(b) Speed controller for winches and proportional valves.

(c) Control valve for spud lifting and lowering.

(d) Any other components as necessary.

(2) The winch controls shall be of proportional type with integrated automatic pilot operated pressure relief valves that are open when not in service. A potential meter shall be mounted in the control panel for tension control of the running-outside wires.

(3) Each spud hoisting cylinder shall be provided with a 24 V DC solenoid-controlled cartridge valve on a manifold for free-fall. The spuds shall also be lowered slowly by hand-operated valves, located near the cylinders.

f. **Hydraulic Tank**. One stainless steel hydraulic oil tank shall be provided with necessary fitting, alarms and gauges.

g. **Hydraulic Piping**. All hydraulic piping shall be supported by oil resistant synthetic supports to prevent sound and vibration. The system shall be comprised of all required safety valves, coolers, filters, gauges etc. All flexible connections of the system shall have the capability to withstand high pressure. The system shall be made of suitable seamless steel pipe with following characteristics:

(1) Couplings up to 38 mm pipe diameter : Cut ring type.

(2) Couplings over 38 mm pipe diameter : SAE flanges.

29. **Electrical Installation**.

a. **General**. The design and lay-out of the electrical installation shall comply with marine standards. The complete installation shall be 230 / 400 V AC – 50 Hz and 24 V DC.

b. **Power Source**.

(1) 01in no AC generator shall be supplied and fitted on the dredger operation. The general specification of the generator as follows:

(a) Maker : To be mentioned.

(b) Model : To be mentioned.

(c) Power output : Not less than 50 kW.

(d) Voltage : 400 V, 50 Hz, 4 wires.

(e) RPM : To be mentioned.

(f) Power Factor : 0.80.

(g) Insulation class : H.

(h) Cooling : Marine type.

(j) Starting system : Battery start.

(k) Country of Origin, Manufacture, Assemble and Shipment: EU Countries/ UK/USA/ Australia / Canada/ Japan.

(2) 01 in no AC generator shall be supplied and fitted for domestic use. The general specification of the generator as follows:

(a) Maker : To be mentioned.

(b) Model : To be mentioned.

(c) Power output : Not less than 15 kW (To be finalized after load calculation).

(d) Voltage : 400 V, 50 Hz, 4 wires.

(e) RPM : To be mentioned.

(f) Power Factor : 0.80.

(g) Insulation class : H.

(h) Cooling : Marine type.

(j) Starting system : Battery start.

(k) Country of Origin, Manufacture, Assemble and Shipment: EU Countries/ UK/USA/ Australia / Canada/ Japan.

(3) 01 in no AC portable generator shall be supplied for pipe line repair and limited domestic use. The general specification of the generator as follows:

(a) Maker : To be mentioned.

(b) Model : To be mentioned.

(c) Power output : Not less than 5 kW.

(d) Voltage : 220 V, 50 Hz, 1 ph.

(e) RPM : To be mentioned.

(f) Power Factor : 0.80.

(g) Insulation class : H.

(h) Cooling : Air cooled.

(j) Starting system : Battery start.

(k) Country of Origin, Manufacture, Assemble and Shipment: EU Countries/ UK/USA/ Australia / Canada/ Japan.

(4) A 24 V DC alternator shall be used for starting and charging battery set of the dredge pump engine. Provision for alternative starting shall be kept by as necessary. The battery sets are to be placed in synthetic boxes.

(5) A 24 V DC alternator shall be used for starting and charging battery set of the auxiliary engine. Provision for alternative starting shall be kept by as necessary. The battery sets are to be placed in synthetic boxes.

c. **Users**. The electrical installation shall be used but not limited to following items/equipment:

(1) 01 in no 24 V DC window wiper on the front window of the cabin.

(2) 01 in no 24 V DC window wiper on the aft window of the cabin.

(3) 01 in no 400 V AC portable submersible pump.

(4) 01 in no 230 V AC air-conditioning unit in operating cabin and accommodation.

(5) 02 in no 400 V AC engine room ventilators.

(6) 01 in no 400 V AC oil circulating pump for the dredge pump bearing.

d. **Switchboards**. Switchboards shall be installed in engine room. A distribution board shall be made of steel plating and fed by generator and batteries. It shall distribute necessary power to the users as required. Start/stop/instruments and alarm of main engine, Auxiliary engine and hydraulic system etc shall be connected to control panel by PLC.

e. **Cabling and Wiring**. All electric cables for power, lighting, alarm systems, etc. shall be of marine type. Cables shall be supported by cableways (trays, steel strips), welded or fixed against the steel structures. Watertight cable passages shall be made by means of cable glands.

f. A shore supply cable with connection box (Capacity: 100Amps, 04 wire, Length 150m) shall be supplied.

g. **Lighting**. The interior and exterior lighting consists of armature types to designer's standards. 230 V AC/ 24 DC lighting installation with switches, sockets and fittings shall be fitted as required.

h. **Emergency Source of Power**. In case of shut-down or failure of the 230 / 400 V AC installations, the emergency source of power shall be provided as per classification standard.

j. **Navigational Equipment**. Following navigational equipment shall be installed:

(1)	Echo Sounder	: 01 in no.
(2)	GPS	: 01 in no.
(3)	Magnetic Compass	: 01 in no.
(4)	Navigation lights	: As required.
(5)	CCTV with monitor	: At least 4 cameras for all-round view.

k. **Communication Equipment**. Following communication equipment shall be installed:

(1) 01 in no VHF (Shall be provided by BN).

(2) 01 in no PA System including Power Amplifier, 2 in no Microphone and 2 in no Loud Speaker.

(3) 01 in no Broadcast system.

(4) 01 in no Electrical Horn.

(5) 04 in no walkie talkie.

(6) 01 in no megaphone.

30. **Ventilation**.

a. **General**. All tanks and the stores shall be provided with natural ventilation.

b. **Engine Room Ventilation**. The engine room shall be provided with fresh air from outside the engine room by two axial fans. These fans shall be placed in a closable ventilation chest at the rear of the main pontoon. Air shall pass naturally out of the engine room through a closable chest.

c. **Air Conditioning**. The operating cabin and accommodation space shall be equipped with split air-conditioning units with sufficient capacity.

31. **Instruments**.

a. **General**. The dredger shall be operated from operating cabin. Necessary control panels and displays shall be placed as suitable.

b. **Instruments and Controls**. The following control panel and fittings shall be arranged in operating cabin:

(1) Speed control dredge pump engine.
(2) Control friction clutch reduction gear.
(3) Speed dredge pump engine.
(4) Pressure lubricating oil dredge pump engine.
(5) Temperature cooling water dredge pump engine.
(6) Emergency shutdown dredge pump engine.
(7) Alarm lights dredge pump engine.
(8) Start / stop dredge pump engine.
(9) General alarm light auxiliary engine.
(10) Stop auxiliary engine.
(11) Temperature alarm dredge pump bearing.
(12) Pressure hydraulic system cutter, winches, cylinders.
(13) Pressure and vacuum dredge pump.
(14) Pressure hydraulic system cutter drive.
(15) Level / temperature hydraulic oil in tank.
(16) Control cutter speed.
(17) Control winches.
(18) Control spud cylinders.
(19) Switches for lighting and window wiper.
(20) Switches for dredge lights.
(21) Emergency stop hydraulic system.
(22) Emergency "Deadship" stop.
(23) Stereo radio /CD player.

c. **Ladder Position Indicator**. A ladder position indicator, indicating the dredging depth and of mechanical type shall be clearly visible from the operating cabin.

d. **Pressure Measurement**. Two electronic panel indicators for vacuum and pressure of dredge pump shall be installed in the control panel. The electronic transmitters shall be placed in front and rear of the dredge pump.

32. **Material protection**.

a. **Surface Preparation**. Steel plates and sections shall be cleaned by sand blasting and coated with a primer before fabrication. The paint coats shall be compatible with welding work and subsequent coating.

b. **Painting**.

(1) Painting shall be marine grade/class (Epoxy/ Conventional) as standardized in BN (Sigma/Hempel/Jotun or IP for under-water and Berger/Elite/Navana for above-water).

(2) The paint scheme (For 03 Yrs) and dry film thickness as follows:

Underwater Epoxy Paint.

(a)	Primer	: 100 micron - 1 coat.
(b)	Anti-corrosive	: 100 micron - 1 coat.
(c)	Anti-corrosive (Tie coat)	: 100 micron - 1 coat.
(d)	Anti-fouling	: (125+125) micron - 2 coat.

Pontoons Side and Deck Plate (Epoxy Paint).

(a)	Primer - 100 micron	: 1 coat.
(b)	Mid coat (Light grey, RAL-7001)	: 100 micron - 1 coat.
(c)	Top coat (Light grey, RAL-7001)	: 100 micron - 1 coat.

Superstructure. Three (03) coats of paint shall be applied including Bright Red Orange top coat.

(3) Painting work such as thinning ratio, atmospheric temperature, humidity, re-coating interval and drying time etc. shall be as per manufacturer's specification.

(4) Paint damaged for hot works and abrasion (if any) shall be repaired by the supplier.

c. **Cathodic Protection**. Sufficient number of Aluminum/ Zinc anodes shall be suitably placed on the pontoons and cutter ladder to provide Cathodic protection against corrosion and enhancing the overall lifespan of the dredger. These anodes shall be designed to last for a period of at least 03 years in both fresh and saltwater environments, ensuring the longevity and durability of the dredge's structure.

33. **Deck Equipment and Accessories**.

a. **Deck Crane**. 01 in no electric deck crane of at least 3.5 tons shall be provided for maintenance of dredge pump and other components with electric chain tackle, trolley and slewing mechanism etc.

b. **Hatches**. Sufficient number of hatches shall be installed at suitable locations on the main deck for access and exit. All hatches shall be watertight. Size of hatches shall be suitably designed.

c. **Manholes**. Each closed compartment shall be equipped with a circular / oval type removable manhole. The manhole shall be designed with appropriate seal and flange to prevent water. The inner diameter of the manholes shall be suitable for personnel entry.

d. **Guard Rail**. Guard rail shall be provided for safety and convenience of the personnel for movement on upper deck. The pipes of the guard rail shall be bolted to deck, facilitating transportation and maintenance. In certain areas, sufficient steel chain shall be provided for temporary access.

e. **Ladders and Climbing Steps**. Access to engine room, storage areas and tanks shall be facilitated by stairs and/ or ladders. All stairs and ladders shall be constructed from welded steel and equipped with side bars for climbing.

f. **Machinery Space Walkway**. Rremovable and anti-skid floor shall be provided around main engine, dredge pump and auxiliary engine to facilitate walking, inspection and maintenance.

g. **Bollards**. Each side of the dredger shall be provided with 03 in no double steel bollards shall be provided.

h. **Mast**. 01 in no mast, made of steel plate, shall be mounted on top of operating cabin. The mast shall be of folded back facility for maintenance.

j. **Draft Marks**. Draft mark shall be placed fore and aft and on both sides of the dredger.

k. **Dredger's Name**. The dredger's name/ number/distinguishing marks shall be provided both Bangla and English.

l. **Locks, Keys and Tags**. All doors, hatches shall be provided with locking arrangement (padlocks or rim-locks) along with key rings and identification tags.

m. **Mooring/ Berthing Hawsers**. Following berthing hawsers shall be provided:

(1) 04 in no Berthing hawsers (Rope, Polyamide Multiplaited, Cir-4 Inch, Dia – 32 mm, Length 50 m each).

(2) 04 in no heaving lines.

(3) 04 in no rat guard.

n. **Office Equipment.** 01 in desktop, 01 in no printer, 01 in no UPS and a suitable desk shall be provided.

p. **Living Arrangement**. The living arrangement shall be provided for at least 04 personnel:

(1) 04 in bunks with foam mattress.

(2) Required no of BHD type oscillating fans.

(3) 04 in no utility locker under bunk.

q. **Cooking arrangement**: Limited cooking facility with necessary mess utensils, crockeries including 02 in no portable domestic fridge shall be provided.

r. **Washroom Facilities**. 01 in no washroom with wash basin, shower closet, commode, light with Shade and exhaust fan shall be provided.

s. **STP**. 01 in no appropriate STP shall be provided.

t. Adequate ventilation and split-case air conditioning unit shall be provided of required capacity shall be provided considering high temperature and humidity in Bangladesh. Necessary doors and windows are to be fitted.

34. **Safety Systems**. Following safety equipment shall be provided:

a. **Firefighting and Damage Control Equipment**.

(1) 06 in no 6L Foam type extinguisher.
(2) 04 in no 6 kg ABC Powder type fire extinguisher.
(3) 08 in no 2 kg CO2 type extinguisher.
(4) 04 in no fear naught suit.
(5) 04 in no EDBA.
(6) 04 in no Fire Hoses and Nozzles.
(7) 02 in no 45kg AFFF foam trolley.
(8) 01 in no Portable diesel pump (Capacity minimum 30 tons per hour).
(9) Standard First-Aid and Limited medical support facilities.
(10) DCFF gear and fire extinguisher store facilities.

b. **Life-Saving Equipment**.

(1) 14 in no Life jacket.
(2) 04 in no Life buoy ring with mounting and life line.

c. **Protective Gear**.

(1) 08 in no helmets.
(2) 20 Pair hand gloves.
(3) 04 in no Goggles.
(4) 02 in Pair rubber hand gloves.
(5) 02 in no Safety harness.

d. **Safety Signage**. Following safety signage shall be marked:

(1) Emergency Exit Signs and escape routes.
(2) Safety Instructions for equipment and emergency procedures.

35. **Dredger Pipes**.

a. **MS Pipe**.

(1)	Nominal diameter	: 500 mm.
(2)	Pipe Material	: MS Steel, Grade A (Thickness 8 mm).
(3)	Pipe Length	: To be mentioned.
(4)	Flange Material	: MS Steel, Grade A (Thickness 20 mm).
(5)	Accessories	: 20 set Nut-Bolt, 1 gasket, washer etc. for each joint.
(6)	Total length	: 1,500 meters.
(7)	Country of Origin	: To be mentioned.

b. **Foam Type Floaters**.

(1) Inner Diameter (ID) : To be mentioned.
(2) Outer Diameter (OD): To be mentioned.
(3) Length : To be mentioned.
(4) Buoyancy : To be mentioned.
(5) Material : PE (Poly Ethylene).
(6) Quantity : Proportion to pipe length.
(7) Country of Origin : To be mentioned.

c. **Flexible Rubber Hose**.

(1) Nominal diameter : To be mentioned.
(2) Material : Flexible rubber.
(3) Pressure rating : 8 bar.
(4) Hose Length : To be mentioned.
(5) Accessories : Proportion to pipe length.
(6) Quantity : To be mentioned.
(7) Country of Origin : To be mentioned.

36. **Spare Parts**. Following Spares, tools and test equipment shall be supplied during delivery of the dredger:

a. **Recommended Spare Parts**.

(1) **Main Engine**. Following spare parts of main engine shall be provided:

(a) Injector : 06 in no.
(b) Cylinder Head Gasket : 12 in no.
(c) Push Rod : 06 in no.
(d) Rocker Arms Spring : 06 in no.
(e) Inlet Valve : 06 in no.
(f) Exhaust Valve : 06 in no.
(g) Valve Guide : 06 in no.
(h) Compression Ring : 06 in no.
(j) Oil Ring : 06 in no.
(k) Fuel Filter : 06 in no.
(l) Lub Oil Filter : 06 in no.
(m) Air Filter : 08 in no.
(n) Impeller F/W pump : 02 in no.
(p) Mechanical Seal for F/W pump : 02 sets.
(q) Shaft for F/W pump : 01 in no.

(2) **Auxiliary Engine**. Following spare parts of Auxiliary engine shall be provided:

(a)	Injector	: 06 in no.
(b)	Cylinder Head Gasket	: 12 in no.
(c)	Push Rod	: 06 in no.
(d)	Rocker Arms Spring	: 06 in no.
(e)	Inlet Valve	: 06 in no.
(f)	Exhaust Valve	: 06 in no.
(g)	Valve Guide	: 06 in no.
(h)	Compression Ring	: 06 in no.
(j)	Oil Ring	: 06 in no.
(k)	Fuel Filter	: 06 in no.
(l)	Lub Oil Filter	: 06 in no.
(m)	Air Filter	: 08 in no.
(n)	Impeller F/W pump	: 02 in no.
(p)	Mechanical Seal for F/W pump	: 02 sets.
(q)	Shaft for F/W pump	: 01 in no.

(3) **Electrical Items**. Following electrical items/spare parts shall be provided:

(a) 01 in no DG circuit breaker.
(b) 01 Set Various Sensor.
(c) 01 in no Portable Battery charger.
(d) 02 in no Lead acid Sealed type Battery.
(e) 02 in no Grinding Machine.
(f) 01 in no Dirll Machine.
(g) 02 in no Pedestal fan.

(4) **Hydraulic System**. Solenoid direction valves and hydraulic flexible pipes of hydraulic system shall be provided.

(5) **Cutter Teeth**. 01 set of dredger cutter teeth shall be provided.

b. **Special Tool**. Following special tools shall be supplied with dredger during delivery of the dredger.

(1) 02 in no Grease gun with nipples.
(2) 01 in no sets Socket spanner (Range to be mentioned).
(3) 01 in no sets Ring spanner (Range to be mentioned).
(4) 01 in no sets Open-end spanners (Range to be mentioned).
(5) 01 in no set Combination pliers.

(6) 03 in no Adjustable spanner (6" 8" 12").

(7) 03 in no Pipe wrench (6" 8" 12").

(8) 01 in no set Screw driver (Range to be mentioned).

(9) 01 in no set Star screw driver (Range to be mentioned).

(10) 02 in no sets of Allen keys with ball point (Range to be mentioned).

(11) 02 in no Hand operated chain block (1 ton, 3 ton).

(12) 01 in no Sounding tape (10 m, 13 mm stainless steel).

(13) 02 in no Roller tape measure 3 m.

(14) 02 in no Vernier calipers.

(15) 02 in no Micrometres.

(16) 01 in no set tools box with standard tools (Mallet, Hammer, Chisel.

(17) Hand Saw, Right angle, Surface machine, etc).

(18) 01 in no set Toll kit sets for electrical system.

(19) 01 in no Torque wrench 1/2" 40-200 Nm.

(20) 01 in no Socket for torque wrench 55 mm.

c. **Test Equipment**. Following test equipment shall be provided:

(1) 01 in no Digital Multimeter.

(2) 01 in no Weber Tester.

(3) 01 in no Tachometer.

(4) 01 in no Clamp Tester.

(5) 01 in no Digital Thermometer.

(6) 01 in no Wee meger.

d. **Fast Moving Spares**. Fast moving spares for day to day defect rectification and periodic maintenance of at least two years shall be provided. Item wise price list of the first moving spars shall be submitted with tender documents.

Inspection and Test/ Trial

37. **General**. Prior to keel laying, the General Arrangement (GA) drawing has to be approved by BN. During construction of each work, inspection is to be done jointly by BN and builder. Test and trials of individual equipment and machinery at various level i.e. STW (Setting to Work/Installation), HAT, SAT/River trial etc. as applicable are to be done jointly by the BN representative and the builder. Shipbuilder shall submit test protocol to BN 4(four) weeks prior to conduct Test/ Trial. Before conducting trial, BN shall approve test protocol as per standard procedure. All test/ trial shall be complied at Normal standard loading condition.

38. **Standard Load Condition**. The standard load condition for the dredger would mean the summation of Light weight displacement of the dredger, total crew on board and 50% of Fresh water, POL and deck load as stated in subsequent clauses.

39. **Inclining Experiment**. The inclining experiment is to be carried out upon the substantial completion of Dredger but before the sea trial and results are to be recorded for the calculation of the dredger's trim, stability, light weight and dead weight.

40. **Inspection, Test Trial and Acceptance**. Test and trials including individual equipment and machinery shall be done jointly by the BN's representative and the Bidder. Test/trial procedure shall be submitted to the NHQ well in advance for necessary approval. It shall be conducted at manufacturer yard's adjacent river.

a. All tanks and compartments shall be watertight and their water tightness shall be hose tested. Similarly, all longitudinal and transverse bulkheads, deckhouses, coamings, doors, hatches, windows, portholes, access covers etc. shall be hose tested for ensuring water tightness. All tests shall be carried out before fitting any floor covering, pipes and fittings in positions as far as practicable. Defects (if any) shall have to be made good and re-tested.

b. On completion of building of the Dredger a preliminary trial run shall be carried out in builder's area in accordance with the specifications and to the satisfaction of the purchaser during which the purchaser's representatives shall be present. The dredge pump and all other machinery, equipment and fittings shall be tested at various operating conditions. Onsite Final Test, Trial and Acceptance at Pekua' shall be carried out to assess functionality and capacity of the Dredger.

c. The dredger shall be fully tested at the building yard in accordance with designer's standards. Following tests shall be done, while dredger is in the water:

(1) Functioning tests of all installed equipment, such as winches, cutter and spud poles.

(2) Dredge pump test, while pumping water only.

(3) Endurance test according to FAT protocol of designer's standard.

(4) For testing on-site, a test flange shall be delivered with the dredger.

d. **Acceptance Certificate**. After completion of satisfactory onsite test and trial, a 'Final Acceptance Certificate' shall be signed jointly by the representative of supplier and the representative of Bangladesh Navy (BN Acceptance Committee).

e. **Instruction Books and Documents**. The following documents in English language shall be supplied and handed over to BN:

(1) Operation and maintenance Manual of dredger.

(2) Manuals and instruction books of all installed equipment.

(3) Test/ trial protocols.

(4) Trial/ trial and inspection reports.

(5) Builder's certificates.

(6) Warranty Certificates.

41. **Approval of Plans and Drawings**.

a. For approval, the Bidder shall need to submit to BN 3 (three) copies of following plans and drawings before construction:

(1) General Arrangement Drawing.

(2) Lines Plan.

(3) Machinery Layout Plan.

b. Above mentioned drawings need to be submitted with CAD soft copy for approval. Before submission to BN, the drawings are to be duly checked for conformity with the design standard and endorsed by approved Classification Society when necessary. Once approved by BN, the drawings may however be subjected to only minor modification with approval of BN. All drawings supplied by the Bidder are to be endorsed by the Classification Society.

42. **Drawing Package**. 03 (three) copies of each drawing as well as electronic copy shall be supplied. The list of drawings given below shall act as a guideline only. Any other drawings, diagrams and manuals required shall also to be supplied by the shipbuilder:

a. General Arrangement.
b. Lines Plan.
c. Hydrostatic data and Curves.
d. Preliminary trim and Stability Calculation booklet.
e. Inclining experiment report.
f. Final Trim and Stability booklet.
g. Midship section drawing.
h. Drawing of frames.
j. Aft profile and decks.
k. Forward profiles and decks.
l. Aft sections and bulkheads.
m. Forward sections and bulkheads.
n. Shell expansion.
p. Engine girders/ foundations.
q. Bulwark construction.
r. Welding plan/scheme.
s. Deckhouse and superstructure construction.
t. Hatch covers and hatch coaming.
u. Details of rudder construction.
v. Anchoring and Mooring arrangements.
w. Anchoring and Mooring arrangements.
x. Bollard and fairlead details.
y. Ladders, guardrails and stanchion.
z. Hatches and Manholes.
aa. Ventilation arrangement.
ab. Engine room layout.
ac. Accommodation arrangement.
ad. Docking plan.

ae. Watertight door arrangement.

af. Draught mark.

ag. Bilge piping diagram.

ah. Firefighting system diagram.

aj. Fresh water and sea water system diagram.

ak. Engine cooling sea water and fresh water diagram.

al. Fuel oil pipe line diagram.

am. Lub oil pipe line diagram.

an. Main Engine and Generator exhaust piping diagram.

ap. Lub oil filling pipe diagram.

aq. Air vent pipe diagram.

ar. Sounding pipe diagram.

as. Electric lighting circuit diagram.

at. Main switch board drawing.

au. Electrical load calculation.

43. **Warranty Period/ Services.** The Shipbuilder shall undertake the full responsibility to rectify, any defect in of the dredger which is due to defective material, construction, miscalculation and/ or improper workmanship on part of the bidder and/ or its subcontractors, or to replace any such defective item, equipment and machinery, provided that the defects are revealed/ discovered during the period of 12 (twelve) months after delivery of the Dredger at builders' expense as mentioned below:

a. Warranty for trouble free operation shall be provided by the shipbuilder for the dredger and all the supplied items for a period of at least 12 months from the date of acceptance by BN.

b. The warranty should cover all parts and labour (including service engineer's cost throughout the warranty period).

c. Inspection/routine maintenance of all main machinery (such as main engines, generators, hydraulic pump & system, all types of pump, cutter head, pipe line and winches etc.) for trouble free operation shall be provided by the shipbuilder for the dredger, and the supplied items for a period of at least 24 months from the date of acceptance by BN.

44. **Delayed Delivery**.

a. Delay in delivery of any item/equipment/system of the Dredger shall mean partial delay in delivery and shall be dealt individually. If BN is satisfied that the failure to deliver Dredger within the scheduled delivery period has been for reasons within the control of the bidder, and/ or if the Government has suffered loss for reasons of belated delivery, liquidate damages (LD), shall be recovered at the rate of 1% to 2% of the total contract price of the Dredger per month or fraction there of the period exceeding the original delivery period, subject to the provision that the total liquidated damages thus leviable shall not exceed 10% of the contract value.

b. Delay in the delivery of the dredger up to 21 days shall be regarded as "Grace Period" available to the bidder and the delivery date (ending as of 12 o'clock midnight Bangladesh time on delivery date as mentioned in the contract shall be considered to have been automatically extended up to that limit without issuance of any formal amendment and payment of any liquidated damages. For delays beyond 21 days, formal amendment to delivery period shall be calculated from the original delivery date given in the contract.

c. As soon as it is apparent that, the dates of delivery cannot be adhered to, the bidder shall send an application for extension of delivery period to BN. If failure to deliver within scheduled time as aforesaid shall have arisen from any cause which BN may admit as a reasonable ground for the extension of delivery period, BN may allow such additional time as he considers to be justified without imposing liquidated damages. If the delay is considered by BN due to reasons within the bidder's control, the extension may be granted with liquidated damages. The decision of BN on the issue shall be considered as final.

d. But if the delay in delivery of the dredger continues for a period of more than three hundred and sixty (360) days beyond the date upon which the delivery is due from the bidder under the terms of this contract, then, in such event, and after such period has expired, BN may, at its opinion, cancel this contract by serving upon the bidder a notice of cancellation directed to the bidder's address given in this contract.

e. For the purpose of this Article, the delivery of the Dredger shall be deemed to be delayed when and if the Dredger, after taking into account extension of the Delivery Date or permissible delays as provided in the contract, is delivered beyond the date upon which delivery would then be due under the terms of the contract.

f. During delivery if number of item/ items remains short supplied which shall not affect/ hamper operational capability of the Dredger, delivery of the Dredger may be accepted by BN, under mutual agreement between BN and bidder.

45. **Force Majeure**.

a. Notwithstanding the provision of the previous clauses, the bidder shall not be liable for forfeiture of its performance security, liquidated damages or termination for default if and to the extent that it's delays in performance or other failure to perform its obligations under the contract is the result of an event of force majeure.

b. For purposes of this clause, force majeure means an event beyond control of the Bidder and not involving the Bidders fault or negligence and not foreseeable. Such events may include, but are not restricted to, acts of the purchaser either in its sovereign or contractual capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions and freight and freight embargoes.

c. If a force majeure situation arises, bidder shall promptly notify the purchaser in writing of such condition and the cause thereof. Unless otherwise directed by BN in writing the Bidder shall continue to perform its obligations under the contract as far as is reasonably practical, shall seek all reasonable alternative means for performance not prevented by the force majeure event.

46. **Omission**. In case the bidder fails to supply/ provide any of the items (i.e., machinery, equipment, etc) within the scope of supply of the contract for construction of Dredger, the contract price shall be adjusted by deducting the quoted price of the item along with 25% penalty based on the quoted price of the item. If the price of the item is not quoted in the original offer, BN shall have the right to determine the price of the item based on procurement price of similar item by the BN through DGDP/ NSSD, Dhaka or any other means.

47. **Arbitration**. All legal dispute of whatever kind arising out of the contract concluded between the parties including disputes regarding validity of contract shall be settled wherever possible amicably with the exclusion of ordinary Court of Law. Should this not be possible the dispute can / shall be settled with the strict application of the law of the land under the rules of arbitration of the Bangladesh Chamber of Commerce/ International Chamber of Commerce by arbitration appointed in accordance with the rules. The said Court of Arbitration having jurisdiction is explicitly competent to decide overall legal dispute arising from or concerning the Contract. The Court of Arbitration shall have the right to determine its own rules of the procedure in its absolute discretion. It shall, however, grant both the parties opportunity to present their case and their proofs in writing and by words of mouth in the course of the proceedings.

48. **Compliance Statement**. All equipment and spares to be provided must be of brand-new condition. A compliance statement fulfilling all the requirement of this tender specification along with original OEM certificates /authorized certificates from OEM is to be submitted for evaluation of the quotation.

49. **Guarantee**.

a. The manufacturer shall mention the number of years of guarantee for which the offered model of Dredger with engine shall remain in production.

b. Guarantee by the manufacturer to supply spares for at least 10 years with reasonable price. Yearly increment of price of spares should not be more than 5%. A certificate in this connection is required with the offer.

50. **VAT/ IT**. VAT and IT calculated as per existing Government Rules.

51. **Special Conditions**. This is to be noted for compliance that the Project is procurement for deliverables which shall in general be considered 'Defence Stores' in Bangladesh. These Defense stores shall be used only by the Defence Forces of Bangladesh and hence are exempted from payment of custom duties and sales taxes in Bangladesh as per the Government of the People's Republic of Bangladesh, Ministry of Commerce, National Bureau of Revenue (NBR) Memo No 9 (41) NBR/Cus-IV/72/246 dated 10 Apr 1981.

52. **Delivery**. The Dredger shall be delivered at Pekua as per directive of NHQ not more than 12 (Twelve) months from the date of signing the contract. After completion builder shall arrange at its own responsibility and cost for transportation of the Dredger. The builder (2nd party) shall give the owner (1st party) 4 (four) weeks' notice for taking delivery of the Dredger after completion of construction and launching.

52(a). **Guarantee for Warranty**. SUPPLIER shall furnish to DGDP a guarantee for warranty after satisfactory handing over of Dredger for an amount equivalent to 5% (five percent) of the TCP from any scheduled bank situated in Bangladesh in favour of Senior Finance Controller (Navy), Lalasarai, Sailors Colony Mirpur-14, Dhaka-1206, Bangladesh. This guarantee for warranty shall remain valid until expiry date of the warranty period.

Price and Payment Schedule

53. **Total Contract Price**. The price is to be quoted in Bangladeshi Taka and broken down into the following components, from where BN shall have the option to choose the whole or part of any component:

Ser	Description	Price in BDT
1.	Price of design package including all design, drawings etc.	To be quoted
2.	Price of construction material package	To be quoted
3.	Price of all major machinery and equipment	Price of each item to be quoted separately
4.	Price of electrical and electronic equipment	To be quoted
5.	Price of all auxiliary machinery and equipment	To be quoted
6.	Price of all deck machinery	To be quoted
7.	Cost of FAT and PSI in accordance with Article-	To be quoted
8.	Cost of construction including labour charges, services of machinery installation experts, etc related to construction	To be quoted
9.	Price of mandatory spare parts, special tools and test equipment	To be quoted
10.	Cost of Project Implementation Team (PIT) in	To be quoted
11.	Cost HAT and SAT	To be quoted
12.	Any Other charges	To be quoted
	Total =	To be quoted

54. **Payment terms**. All payment shall be made in local currency (Bangladeshi Taka). Payment schedule shall be under following terms and conditions.

54(a). **Performance Guarantee (PG)**. SUPPLIER shall furnish to DGDP a PG before signing the contract for an amount equivalent to 10% (Ten percent) of the TCP from any scheduled bank situated in Bangladesh in favour of Senior Finance Controller (Navy), Lalasarai, Sailors Colony Mirpur-14, Dhaka-1206, Bangladesh. This PG shall be valid till satisfactory test, trial and acceptance of Dredger to BN and accepted by the PURCHASER.

55. **Terms of Payment**. Total 100% Payment shall be made in local currency by purchaser against bills/ documents submitted by the supplier/ builder. Payment Schedule shall be under following Terms and Conditions:

a. **1st Installment.** 10% of the total contract price (TCP) is to be paid on signing of the contract and submission of the followings:

(1) SUPPLIER shall furnish to DGDP a BG upon signing the for an amount equivalent to 10% (Ten percent) of the TCP from any scheduled bank situated in Bangladesh. This BG shall remain valid till on receipt of 2nd installment.

(2) General Arrangement (GA) drawing duly approved by BN.

b. **2nd Installment.** 20% of the total contract price (TCP) is to be paid on submission of the followings:

(1) 20% Bank Guarantee (BG) for equivalent amount from any scheduled Bank in Bangladesh. This BG shall remain valid till on receipt of 3rd installment.

(2) Keel laying of the dredger.

(3) Availability of hull material in the Yard.

c. **3rd Installment**. 30% of TCP shall be paid after completion of Main Hull and Superstructure construction work of the Dredger and submission of purchase order of major machinery/equipment.

d. **4th Installment**. 20% of TCP shall be paid upon launching of the Dredger

e. **5th Installment**. 20% of TCP shall be paid upon satisfactory test, trial and final acceptance of the Dredger by BN.

56. **Price Readjustment**. BN shall not consider readjustment of the total contract price due to escalation of price of machinery, equipment or materials over the period of construction of the dredger and also due to fluctuation of foreign currency exchange rates over the period of construction of the dredger.

57. **Mandatory Provisions to be Incorporated in the Contract**. The following are intended to be entered as an integral and mandatory part of the Contract to be signed following a successful offer:

a. **With Respect to Dredging Depth**. In case the Dredging depth is less than 12.50 m at 45° ladder angle at minimum 500 cubic meter/hour of solid output at discharge distance of 1500m, the supplier shall pay liquidated damages to the purchaser at 1 % for 10 centimeter up to a maximum limit of 10% of contract price of 20-inch cutter suction dredger.

b. **With Respect to Production Capacity**. In the case of Production capacity is less than 500 cubic meter/hour of solid output at discharge distance of 1500 m at 12.50 m dredging depth at 45° ladder angle, the supplier shall pay liquidated damages to the purchaser at 1 % for 15 cubic meter/hour up to a maximum limit of 10% of contract price of 20-inch cutter suction dredger.

c. **With Respect to Discharge Distance**. In case of discharge distance is less than 1500 meter at minimum 500 cubic meter/hour of solid output at 12.50 m dredging depth at 45° ladder angle, the supplier shall pay liquidated damages to the purchaser at 1 % for 10 meter up to a maximum limit of 10% of contract price of 20-inch cutter suction dredger.

58. **Validity of Offer**. The offer shall remain valid until 180 days.

59. **Factory Acceptance Test (FAT)/ Pre-Shipment Inspection (PSI)**. FAT of Main Engine, Auxiliary Engine and Dredge Pump shall be carried out by 03 (three) BN representatives for a duration of 05 (five) days excluding journey period at the manufacturer factory premises. PSI on all dredging equipment including cutter, winches, spud, gearbox and hydraulic system shall be carried out by 03 (three) BN representatives for a duration of 05 (five) days excluding journey period at the manufacturer factory premises. The bidder should inform BN about FAT/ PSI schedule and FAT/ PSI procedure at least 08 (eight) weeks prior to the date of commencement of the said FAT and PSI. The FAT/ PSI procedure is subject to BN's approval. At the end of the FAT/ PSI, a joint inspection report shall be prepared and signed by both the bidder and BN's representatives. The BN shall bear all expenses regarding international travel, hotel and meals for the FAT team. All expenses related to internal travel within the manufacturer's country, reception and arrangement for entry into the country/ concerned area for FAT & PSI shall be borne by the supplier. The FAT/ PSI can be arranged in same place together upon availability of the machinery and equipment in the same time.

60. **Training**. The supplier shall provide Manufacturer's training and On Job Training (OJT) in Shipyard or delivery site for all crew of Dredger for 15 working days at Pekua. Supplier shall also arrange orientation training on operation and maintenance of machinery, equipment and systems for crew on board the dredger. Training shall be carried out by the supplier on board the dredger. The supplier shall provide 30 (Thirty) days prior notice to BN about the date of commencement of training.

61. **General Remarks**. It is to be understood that anything not mentioned in this document but shall be necessary for proper functioning of the dredger and their machinery, equipment, etc. must be included by the Builder/Bidder.

62. **Compliance Statement**. A compliance statement (in a tabular format) fulfilling all the requirement of the tender is to be submitted for evaluation of the quotations. Stating mere 'yes' or 'no' shall not suffice and detailed description/information as required is to be given. An incomplete compliance statement may attribute to cancellation of the offer. If any clause of this specification does not commensurate with offer, the deviation has to be spelt out clearly.

63. **Submission of the Offer**. The offer/Quotation must include the following:

a. Complete technical specification of the dredger.

b. Preliminary General Arrangement (GA) and Midship section drawing of the offered dredger as well as of the proven design.

c. List of dredgers so far built on the proven hull design (based on which the offered dredger shall be built) with names of owners and their present address.

d. Project work schedule (from the date of signing of contract) from the keel laying or steel cutting to final delivery of the dredger and arrival of major machinery and equipment e. g. main engine, dredge pump, generators etc at the shipyard.

e. A set of design, calculations and drawings to be submitted which should include the following:

(1) Preliminarily layout plan of tanks (POL, freshwater, ballast, etc) capacity.

(2) Preliminary trim and stability information.

(3) Preliminary endurance and Sustainability Calculations.

(4) Preliminary Electrical Load Analysis.

(5) Pump Curves/ Production curves including total Head (m) vs flow rate (m3/hr), Shaft power (Kw) vs flow rate, Efficiency vs flow rate and NPSH vs Flow Rate.

(6) Calculation of production in terms of mud and silt as well as performance curve in terms of mixture production of the pump.

(7) Performance curve and calculation of Main engine and Auxiliary Engine Duty/ ratings.

(8) Certifications on after sale service and guarantee for availability of spares.

64. **BN Project Implementation Team and Crew at Construction Site**. A Project Implementation Team (PIT) shall consist of minimum 1 X BN Officer, 1 X CERA/ERA-I/ LME(S) and 1X CEA/EA-I/ LEN. PIT shall remain at the constructions it throughout the period of ship construction. BIDDER shall provide following facilities to BN personnel during their stay at building shipyard:

a. Office room at or in the immediate vicinity of the shipyard with necessary office materials including fax, computer, internet facilities, printer, etc.

b. Local transportation facility for the team from and to the accommodation area and shipyard.

c. Food and accommodation facilities (Dining and living facilities).

65. **Legal and Financial Issues**. All legal and financial issues mentioned in this specification to be fully complied/ agreed by the Shipbuilder. BN shall have the option to cancel the offer in case any such compliance is not agreed upon by the shipbuilder during the process of evaluation and negotiation to finalize the contract specification. Besides, all legal issues are to be governed by DP-35.