Project Management Unit
Capacity Augmentation of the National Waterway – 1 Project (Jal Marg Vikas)
INLAND WATERWAYS AUTHORITY OF INDIA
(Ministry of Ports, Shipping and Waterways, Government of India)
Head Office: A-13, Sector – 1, Noida - 201301

Phone: 0120-2544004; Fax: 0120-2543976; website: www.iwai.nic.in; email: vc.iwai@nic.in

Expression of Interest

1. Inland Waterways Authority of India (IWAI), Ministry of Ports, Shipping and Waterways, Government of India has applied for financing from the World Bank towards the cost of the Project "**Capacity Augmentation of the National Waterway – 1 (Jal Marg Vikas Project)"**, and intends to apply part of the proceeds for consulting services.

2. The consulting services ("the Services") include **Comprehensive Consultancy Services for preparation of Detailed Project Report (DPR) for IWT sector development for enhancement of socio-economic activities in and around Ganga-Bhagirathi-Hooghly river system (NW-1).**

   The detailed ToR is enclosed as Annex-I. The broad scope of the study includes:

   a) Detailed engineering studies, designs & cost estimates (work in nature) including survey investigations
   b) Fairway development requirement including morphological study and siltation pattern for the proposed / existing floating/ community jetty locations
   c) Traffic potential (ODs) and possible locations for new community jetties
   d) Rapid E&SIA studies for new community jetties/ Ro-Ro terminals to be developed

3. The Project Director, Project Management Unit, IWAI, invites eligible consulting firms ("Consultants") to submit their interest to provide Consultancy services for "**Comprehensive Consultancy Services for preparation of Detailed Project Report (DPR) for IWT sector development for enhancement of socio-economic activities in and around Ganga-Bhagirathi-Hooghly river system (NW-1)."** Consultants interested in providing the Service should provide information demonstrating that they have the required qualifications and relevant experience to perform the Services. Consultants may associate with other firms in the form of a joint venture or a sub-consultancy to enhance their qualifications. It should be noted that CVs shall not be evaluated at REoI stage and therefore need not to be submitted with REoI. The short listing criteria are:

   a) Consultant should be engaged in conducting similar activities for the past 5 years – copy of Certificate of Incorporation to be submitted along with the EOI.

   b) Consultant should have a minimum financial turnover of INR 1.52 Crore during any of the last 5 years – CA certified declaration for last 5 years to be submitted along with the EOI.

c) Consultant should have completed 3 such studies of similar / related work during the last 5 years – List of scope of work, date of commencement, date of completion, client's details, work order, Certificate issued by client declaring the work as completed to be submitted.

d) Consultant should be having a minimum of 16 employees on their payroll – declaration to be submitted.

e) Power of Attorney of the signatory/ies signing the EoI and/or associating to submit the EoI - to be submitted.

f) In case of EoI submission as an association of consultants, then nature of association whether Joint Venture or as Sub-Consultant and name of the lead consultant needs to be mentioned.

5. The EoI can be submitted by the interested consultants in hard copy / email / through e-procurement portal by 26th February, 2021 by 15:00 hours (IST) and shall be opened at 15:30 hours (IST) on 26th February, 2021. It shall be clearly marked "Expression of interest for Consultancy services for **"Comprehensive Consultancy Services for preparation of Detailed Project Report (DPR) for IWT sector development for enhancement of socio-economic activities in and around Ganga-Bhagirathi-Hooghly river system (NW-1)"**

6. The attention of interested Consultants is drawn to paragraph 1.9 of the World Bank's *Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits & Grants by World Bank Borrowers* dated January, 2011 ("Consultant Guidelines"), setting forth the World Bank's policy on conflict of interest.

7. A Firm or an individual Debarred by the World Bank in accordance with the anticorruption guidelines shall be ineligible for this Assignment in any form or way. A list of debarred firms and individuals is available at the Banks external website: www.worldbank.org/debarr.

8. A Consultant will be selected in accordance with the Quality and Cost Based Selection method set out in the Consultant Guidelines.

9. Further information can be obtained at the address mentioned above during office hours.

Instructions for submission of Expression of Interest:

1. Accomplished Expression of Interest (Application) must be submitted together with a Letter of Intent not later than 15:00 hours (IST) on 26th February, 2021. Documents in support of all qualification information shall be submitted with application. Proposal of EOI with qualification information shall be furnished on / before the due date of submission at the address mentioned above.

2. The Application shall be basis of drawing up a shortlist of eligible Consultants who will be invited to submit proposal for services required.

3. All Applications shall be submitted in English.

5. A Consultant shall submit only one proposal. If a Consultant submits or participates in more than one proposal, all such proposals shall be disqualified. This does not, however, preclude a consulting firm to participate as a sub-consultant, or an individual to participate as a team member, in more than one proposal when circumstances justify and if permitted by the Request for Proposals.

6. The Application and all related correspondence and documents should be written in the English language. Supporting documents and printed literature furnished by Applicant with the Application may be in any other language provided that they are accompanied with translations in the English language. Supporting materials, which are not translated into English, may not be considered. For the purpose of interpretation and evaluation of the Application, the English language translation shall prevail.

7. IWAI reserves the right to reject any Applications, without assigning any reasons thereof.

8. The Applicant shall provide all the information sought under this Qualification Document. PMU, IWAI would evaluate only those Applications that are received within the specified time and complete in all respects. Incomplete and/or conditional Applications shall be liable to rejection.

Guidelines for preparation of Expression of Interest

Following information shall be submitted:

1. Complete name of firm(s), date of establishment and type of organization whether individual, proprietorship, partnership, private limited company, public limited company etc.

2. Exact and complete corporate/registered/home office address, business address, telephone numbers, fax numbers, E-mail and cable address. For Consultant of foreign registry, indicate if there is any branch office(s) established in India with details in aforesaid manner.

3. If present firm(s) is the successor to or outgrowth of one or more predecessor firms, fresh name(s) of former entity (ties) and year(s) of their original establishment with details in aforesaid manner.

4. Present a brief narrative description of the firm(s). Kindly avoid submission of company brochures for the purpose description of the firm.

5. List of not more than two (2) principals who may be contacted by this Office.

6. Listed principals must be empowered to speak for him or for the firm on policy and contractual matters.

7. Indicate financial figures from consultancy business for past 5 (five) financial years.

8. Organizational strength of Consultant shall be given.

9. Application Form : Annexure-II

(Project Director)

Annexure - I

Terms of Reference (ToR)

Comprehensive Consultancy Services for preparation of Detailed Project Report (DPR) for IWT sector development for enhancement of socio-economic activities in and around Ganga-Bhagirathi-Hooghly river system (NW-1)

1. Background & Introduction

1.1 Inland Waterways Authority of India (IWAI) (hereinafter referred to as "the **Client**") is a statutory body of the Ministry of Ports, Shipping and Waterways (MoPSW), Government of India (GoI). The Client was set up in 1986 and is primarily responsible for the regulation and development of inland waterways for purposes of shipping and navigation for Inland Water Transport (IWT). With five (5) National Waterways (NWs) up to 2016 and today, with the enactment of NWs Act, 2016, there are a total of one-hundred eleven (111) waterways that have been declared as NWs.

1.2 The Allahabad-Haldia/Sagar stretch (1620km) of Ganga-Bhagirathi-Hooghly river system was declared as NW-1 in the year 1986 and is a waterway of national significance passing through four (4) states of West Bengal, Jharkhand, Bihar and Uttar Pradesh. It links the gateway ports of Haldia and Kolkata to Bhagalpur, Patna, Ghazipur, Varanasi and Allahabad, their industrial hinterland, and several other industrial hubs located along the Ganga basin.

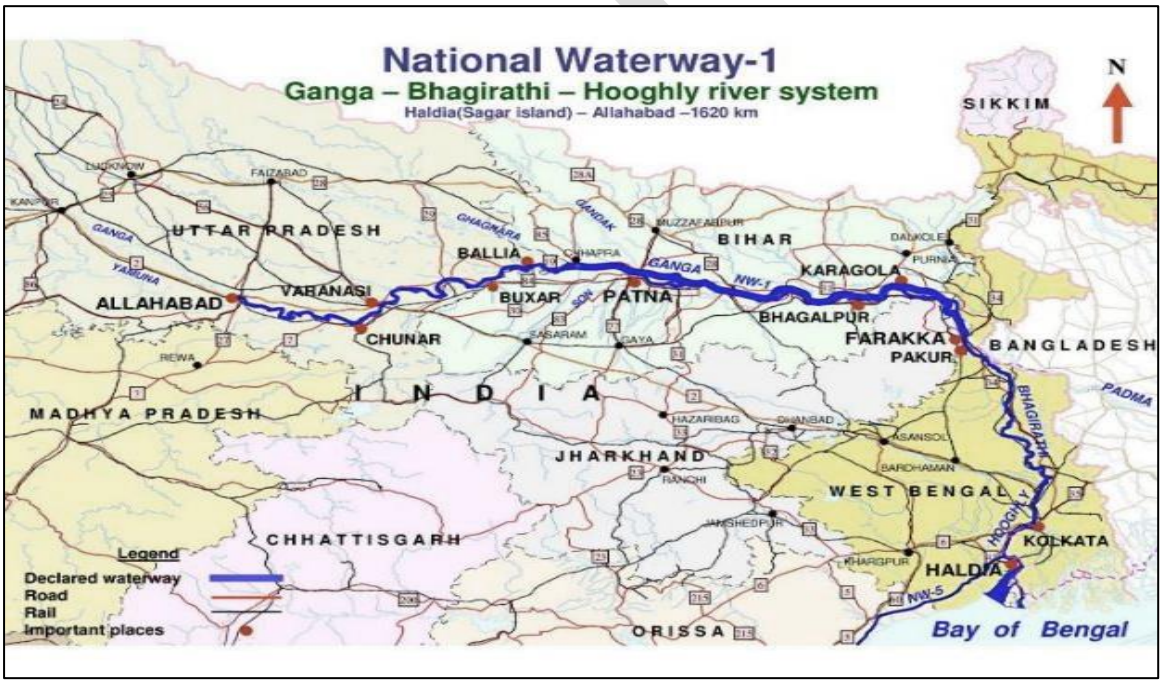

Figure 1: Index Map of NW-1

1.3 The entire length of NW-1 has been divided into ten (10) stretches namely (i) Haldia – Tribeni(158km); (ii) Tribeni - Farakka (351km); (iii) Farakka – Kahalgaon (146km); (iv) Kahalgaon – Sultanganj(56km); (v) Sultanganj – Mahendrapur (74km); (vi) Mahendrapur – Barh (71km); (vii) Barh - Digha (69km); (viii) Digha – Majhaua (98km); (ix) Majhaua – Ghazipur (120km); and (x) Ghazipur -Varanasi (133km).

1.4 IWT on NW-1 has the potential to provide a cost efficient, economic, reliable, safe and environment friendly mode of transport. When developed for use by modern inland vessels

operating on dependable fairway, it can reduce congestion and investment needs in rail & road infrastructure, promote greater complementarities in the riparian states, enhance intra-regional trade and through increased economies of scale, significantly reduce overall logistics costs for the benefit of the entire economy and India's global trade competitiveness.

1.5 Considering the strong potential for transportation of multiple cargoes such as coal, fly ash, cement and clinker, stone chips, edible oils, petroleum products, foods grains and over dimensional cargo, the Client is implementing "*Jal Marg Vikas Project (JMVP)*" for capacity augmentation of NW-1 with the technical and financial assistance of the "*World Bank*" (hereinafter referred to as "**Bank**") to improve the navigability of NW-1 through: (i) fairway development by providing an assured depth of 2.2m to 3.0m throughout the corridor for atleast three hundred thirty (330) days in a year to make it navigable for comparatively larger vessels of 1,500-3,000 DWT; and (ii) civil structures, logistics and communications interventions required that includes multimodal terminals, jetties, navigational locks, barrages, channel marking systems etc.

1.6 With regard to the terminals, the Client has developed floating jetties at twenty (20) locations (list enclosed at **Annex A**) and four (4) Reinforced Cement Concrete (R.C.C)jetties / permanent terminals at GR Jetty-2 (Kolkata), Gaighat (Patna), Multi-modal terminals(MMTs) at Varanasi (Uttar Pradesh) and Sahibganj (Jharkhand) for handling / berthing of cargo vessels, cruise vessels and others inland vessels. Also, one (1) MMT at Haldia, one (1) Inter-modal terminal (IMT) at Kalughat (West Bengal) and a new navigational lock at Farakka(West Bengal) have also been taken up under JMVP.

1.7 Assured depth dredging contracts have also been taken up under JMVP to achieve targeted Least Available Depth (LAD) of 3.0m between Haldia &Barh, 2.5m depth between Barh& Ghazipur and 2.2m between Ghazipur & Varanasi with minimum channel width of 45m.In order to provide safe navigation for various cargo vessels, tourist vessels and other IWT vessels by IWT operators and mechanized country boats moving in NW-1, day navigation marks with bamboos i.e. (left hand/right hand/snag/channel closing marks) are being provided in entire stretch of NW-1 all-round the year. In order to provide twenty-four (24) hours safe navigation, night navigational aids comprising of solar powered lights fixed on country boats/ bamboo structures/ MS Poles/Trestle beacon towers have also been provided from Tribeni to Varanasi stretch.

In addition to the above, a state-of-the-art River Information System (RIS) that includes vessel tracking and the dissemination of important navigation information to mariners is also being implemented.Further, the Client has also developed Differential Global Positioning System (DGPS) stations at Varanasi, Patna, Bhagalpur and Swaroopganj.

2. Studies on NW-1 undertaken in the past / being undertaken that are relevant to the Services

The following important studies have been undertaken in the past / are being undertaken in respect of NW-1 which in the opinion of the Client are important for understanding the ground realities and objectives of the Client for the current study:

2.1 **IWT Sector Development Strategy and Business Development Study for Capacity Augmentation of NW-1 from Haldia to Allahabad:** The principal objective of this study was to provide a comprehensive IWT development strategy. The strategy was based on the assessment of existing transport & freight supply/demand situation in NW-1and identification of all infrastructure, institutional, regulatory, environmental, safety and commercial challenges

hindering IWT competitiveness. The strategy set out a framework that addresses IWT development challenges and dealt proactively with short-, medium- and long-term issues. The aim was to guide all IWT investment decisions and build on the competitive strength of IWT to reduce the cost of transport for the wider Indian economy. The study was undertaken by *M/s HPC Hamburg Port Consulting GmbH &Uniconsult Universal Transport Consulting GmbH*and was completed in June 2016 as part of JMVP.

2.2 **Detailed Feasibility Study and Engineering Study for capacity augmentation of NW-1:** The principal objective of this study was to undertake a detailed techno-economic feasibility study that sets out options to improve the short & long term capacity of NW-1 to deliver increased freight movement at lower transport cost. The study was divided into two (2) parts: (a) techno-economic feasibility study for improving the navigability for larger deeper draft vessels for the entire stretch of NW-1 from Haldia to Allahabad; and (b) detailed engineering for providing and/or improving facilities for common user terminals and other navigational aids in the Haldia to Varanasi stretch. The study is being undertaken by *M/s Howe Engineering Projects (India) Pvt. Ltd., PMC Projects Pvt. Ltd. and Wallingford Ltd.*as part of JMVP.

2.3 **Study on potential ferry locations:** The principal objective of this study was to undertake a detailed strategic planning, design and techno-economic feasibility that sets out a broad planning framework for a proposed ferry network and improved mobility in six (6) major cities i.e. Varanasi (Uttar Pradesh), Patna (Bihar), Munger (Bihar), Bhagalpur (Bihar), Kolkata (West Bengal) and Haldia / Sagar (West Bengal). The study is aimed to provide sustainable and cost-effective transport for over twenty-five (25) million citizens. The study is being undertaken by *M/s Massachusetts Institute of technology /TDG Group (USA)* as part of JMVP.

***Note**: Soft copies of the above-mentioned studies shall be provided by the Client to the Consultant on written request. It may, however, be noted that these study reports are to be used only as a reference and that these study reports do not purport to contain all the information that the Consultant may require. The Consultant should conduct its own investigations, due diligence and check the accuracy, reliability and completeness of the information provided in these study reports and obtain independent advice from appropriate sources. It may also be noted that the Consultant is required to fill up the missing gaps in the relevant data during the course of the Services.*

3. Objective of the Services

3.1 *Arth Ganga and its alignment with JMVP's objective:* India, with a huge network of rivers and interconnecting canals is ideal for an efficient inland waterways system which has multifarious advantages and is the cheapest mode of transportation. However, this potential could not be tapped to its full extent as development of inland waterways as a means for passenger & cargo transportation, had not been a focus area till recently.

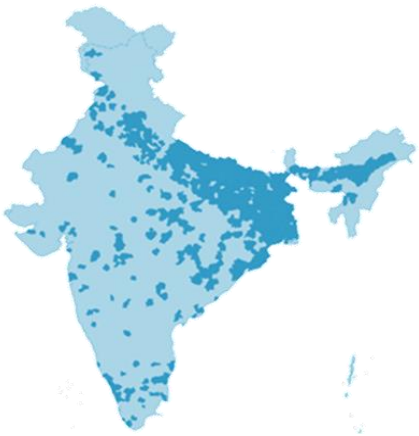

Figure 2: India's population split in half

3.2 In India, almost half the population lives around the Ganges river belt. In terms of trade, 1/5th of all India's freight originates, and 1/3rd terminates in the states around the Ganges belt. Due to the congestion faced by the cities and space constraints, there is hardly any scope for land-based development in the region. Hence, river Ganga can play a pivotal role in generating growth prospects for sustainable economic development of the regions.

3.3 The conceptualization of Arth Ganga program was finalized to energize economic activities which will impact the overall ecosystem along the riverbank. Inland waterways is one of the most important pillars of Arth Ganga program, that can lead to inclusive growth and play a key role in improving the livelihoods of the populations.

3.4 Arth Ganga program of JMVP is being developed on an approach based on principles of sustainable development model that focus on economic activities in & around the hinterland of NW-1 by providing opportunity to local communities to transport their goods and passenger (including tourist) movements through waterways as well as skill development and public / private sector capability developments to support the following:

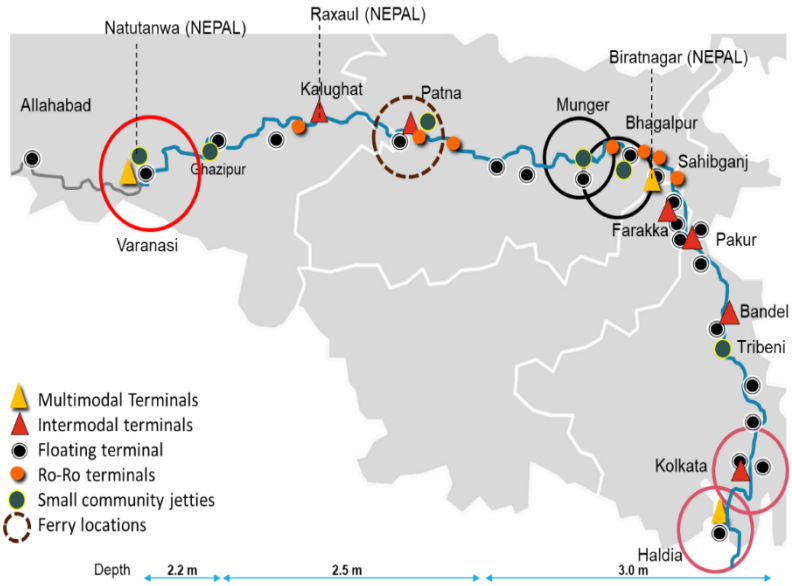

Figure 3: Master Plan of Arth Ganga

(a) Economic benefits to the farmers, traders and public living around the Ganga belt;

(b) Growth of small-scale industries;

(c) Employment opportunities;

(d) Easy, cost-effective and environment friendly transportation of cargo;

(e) Improved logistics through small jetties; and

(f) Wider choice of logistics mode for cargo movement

Since, efficient logistics and transport systems are a critical enabler for sustaining as well as accelerating the economic growth along river Ganga, in this regard, JMVP has the potential to greatly channelize economic activities along river Ganga, thus also aligning to the objective of Arth Ganga program.

3.5 The "*development works under Arth Ganga program*" (hereinafter referred to as "**Project(s)**") will be implemented as part of JMVP through the technical assistance & investment support of the Bank. The major components that have been envisaged under Arth Ganga program are: (a) fairway development through dredging including bandalling and navigational aids; (b) channel stabilisation works; (c) construction of Ro-Ro terminals; (d) construction of new community jetties (tentative list of locations identified is enclosed at **Annex A**); (e) modernization / rehabilitation of existing jetties; (f) modernization / rehabilitation of existing navigational lock at Farakka; (g) RIS and DGPS; (h) Hydrographic equipment, HDP Software, Automatic Gauge Stations etc.; and (i) IWT promotional activities.

3.6 With the aforesaid vision for Arth Ganga program, the Client intends to engage a Consultant to prepare its Detailed Project Report (DPR) to include (a) proposed IWT development strategy for Arth Ganga program with an aim to enhance socio-economic activities in & around the hinterland of NW-1 by providing opportunity to local communities to transport their goods and passenger movements through waterways; (b) suggested infrastructure interventions in terms

of fairway, navigation aids, jetties etc.; and (c) suggested policy interventions, in sufficient details to achieve the said aim.

3.7 The DPR shall inter-alia be based on feasibility assessment of the existing traffic supply and demand situation, along with assessment of all infrastructure, fiscal, institutional, regulatory, environmental, safety and commercial challenges hindering IWT competitiveness in the Project Influence Area (PIA) and recommend (a) additional community jetties; (b) modification/ upgradations in existing floating jetties (except navigational lock at Farakka for which a separate study shall be undertaken); (c) fairway earmarking for interconnectivity of these jetties with approximately 1.5m to 2.0m Least Available Depth (LAD) along with maintenance interventions viz. dredging, navigation aids, hydrographic surveys, vessel repair facilities etc.; and (d) institutional, regulatory, legal, environmental, commercial and safety measures for making Arth Ganga program viable. The feasibility assessment and strategy as part of DPR shall be sufficiently forward looking and deal proactively with short, medium & long-term measures.

3.8 Basis the feasibility assessment, the DPR shall include Front End Engineering Designs (FEEDs) of all the proposed infrastructural interventions to fill all infrastructural gaps. The FEEDs shall be detailed enough to implement proposed infrastructural projects/ sub-projects in Engineering Procurement & Construction (EPC) and / or Item Rate mode. Necessary topographic & hydrographic surveys and geo-technical investigations for preparing layouts and FEEDs to be carried out by the Consultant will be limited to the scope defined under clause 4.6 respectively.

4. Detailed Scope of Work for the Services

Unless explicitly restricted, the Scope of Work of this RFP shall include but shall not be limited to following:

4.1 *Collection and Review of available Reports, Studies and Data*

The Consultant shall collect and review:

(i) all data on road, rail, inland waterways modes of transport serving the NW-1 hinterland & PIA w.r.t transportation of goods and passenger movements;

(ii) all relevant data relating to tidal, topographic surveys, hydrographic surveys (thalweg survey & detail surveys), flow and discharge conditions, water level variations, soil (suspended sediment, bed and bank) conditions, geological, geomorphologic and all other conditions on the Ganga Bhagirathi Hooghly river system available from: Client, Central Water Commission (CWC), Central Water and Power Research Station (CWPRS) Pune, concerned State Departments, the National Remote Sensing Agency, Survey of India, National Water Development Authority, Central Ground Water Board, National Disaster Management Authority, Farakka Barrage project, Irrigation Department/Flood Control Departments, Ministry of Water Resources (MoWR), the Ganga Water Development Authority (GWDA), the Ganga Flood Control Commission, the Commissioner Ganga etc.; and

(iii) all relevant documents and studies made on system tributaries, distributaries and other rivers connected with NW-1

4.2 *Reconnaissance Survey*

(i) Soon after the kick-off meeting, a team of the Consultant comprising of their various domain experts shall conduct a reconnaissance survey of NW-1& its PIA and hold preliminary meetings with Client's field offices, IWT Directorates, State Government departments, District

Administration, CWC & other statutory bodies to understand the ground realities and chalk out detailed action plan and way forward to carry out the task of preparation of a quality DPR as per the spirit of the Contract.

(ii) During this reconnaissance survey, the Consultant shall also study and map all the existing passenger handling facilities (including private and public) on the entire length of NW-1.

(iii) The Consultant shall also study, map & analyse the following:

(a) all existing, man-made structures on the river system (bridges, HT/ LT lines, underwater pipes, power cables, pontoon bridges across the river, river re-direction or river resistive or bank-protection works). The Consultant will also undertake survey to verify the vertical and horizontal clearance available for navigation on all these structures;

(b) carryout a detailed condition survey of the existing floating jetties (enlisted at **Annex A**) belonging to the Client. The condition survey shall determine physical condition, layout, size, road & rail connectivity (if any) and current utilization of each floating terminal etc.;

(c) historic and existing water & river reference levels, low & flood levels, flow characteristics, discharge velocity and other hydrological conditions;

(d) various ferry services / Ro-Ro services operated by State Government departments / Client etc.;

(e) cadastral conditions on riverbanks and in flood areas; and

(f) changes to river courses {based on satellite images for the past ten (10) years or more, collected by the Consultant from various agencies. The Client shall provide the available satellite imageries free of cost to the Consultant however, any missing / additional data shall be arranged by the Consultant at his own cost}

4.3 *Traffic Assessment*

The Traffic Assessment shall comprise of Traffic Survey, Traffic Analysis and potential IWT Traffic Projections. The Consultant shall:

(i) determine/ suggest PIA along with its rationale in the context of increased utilization of NW-1 for IWT under Arth Ganga program of JMVP;

(ii) identify existing goods and passenger movement belonging to the PIA by different modes of transport (also taking into account new clusters such as mandis, trading centres, tourist spots etc. coming up in the next five (5) to ten (10) years). For this, primary traffic surveys will be carried out through solicitation of public input and stakeholder opinions from concerned local authorities i.e. Gram Panchayat, sub-division administration, district level etc. The details for goods movement such as goods type / category, quantity, shipment size, seasonality, mode of transport used and origin-destination (O-D) pairs etc., and for passenger movement such as type / category (local commuters / tourists), number, seasonality, mode of transport used and O-D pairs etc. shall also be presented in the Report. Methodology and planning for this traffic survey will be presented in the **Inception Report** in sufficient details;

(iii) examine current costs of transportation for movement of goods and passengers by different modes;

(iv) conduct a survey of user preferences towards choice of transportation mode based on key attributes such as: (a) price; (b) time; (c) reliability; (d) security; (e) frequency; (f) safety; and (g) capacity etc. Further, the Consultant shall also identify current bottlenecks / limitations / disadvantages faced by users in different modes of transportation (including IWT mode);

(v) identify improvements required in existing IWT services used by the users; and

(vi) prepare database of all stakeholders including existing and potential users of IWT such as shippers, regulators, vessel operators, transporters, freight forwarders, manufacturers, etc.

(Note: *The data shall be compiled from primary surveys of nodal points as well as secondary sources (state level statistics, state government departments, district administration departments, local communities (including farmers, passengers, women etc.), inquiries with trade & commerce, enquiries at ghats, enquiries with vessel operators, manufacturers, shippers, transporters etc.) and documents to substantiate such surveys/ enquiries shall be included in the* ***Traffic Assessment Report****)*

(vii) conduct an analysis on the information gathered in the traffic survey including user preferences identified in clause 4.3 (iv) above to identify O-D pairs(specifically jetty-wise for locations enlisted in **Annex A**)which are addressable by IWT mode and corresponding traffic volume;

(viii) assess and compare the transportation cost currently involved/ expected in IWT mode (including cost involved in first mile, last mile, handling and any other activity required for movement)and other available modes of transportation for the O-D pairs identified above;

(ix) identify O-D wise traffic which can be diverted to IWT mode;

(x) assess the potential tariff level for the divertible traffic for different IWT services; and

(xi) provide traffic demand projection for IWT mode; (a) with the available infrastructure; and (b) after implementation of the Project(s), policies and measures suggested in the DPR. The demand projections shall be provided for a thirty (30) year horizon period keeping FY 2021-22 as the base year. This projection shall also be given for time periods of 5, 10, 15, 20, 25 and 30 years counted from the base year and also for pessimistic, most likely and optimistic scenarios with necessary justification and details.

The above traffic projection shall also be broken into main commodities, O-D pairs and incoming/ terminating & outgoing/ originating quantities.

4.4 *Waterway Infrastructure Analysis*

(i) There are three (3) basic IWT infrastructure facilities necessary for making a waterway navigable for transportation of goods and passengers. These are; (a) fairway or navigation channel with targeted width and depth for plying of a reasonable size of vessel; (b) navigation aids to facilitate fast, reliable and safe navigation; and (c) jetties for loading and unloading of goods (including accessibility to passengers) and last mile connectivity through road or rail (if any); and

(ii) After studying and analyzing traffic demand for IWT mode and making traffic projections for thirty (30) years horizon, as per clause 4.3 above, the Consultant shall critically examine the sufficiency (or otherwise) of all the above three (3) mentioned infrastructure facilities already existing and being maintained by the Client on NW-1. This analysis should be presented in the DPR in sufficient details with specific recommendation including on increasing jetty handling capacity and operational efficiency.

(iii) **Fairway Development and Maintenance:**

Based on the above analysis, the Consultant shall recommend the following details in respect of fairway development and maintenance for the O-D pairs/ optimal ferry routes identified in clause 4.3 above:

(a) Sub-projects for development and maintenance of fairway i.e. jetty approach channel from the main navigational channel with optimum width and LAD for at least 330 days in a year, preferably 45m bottom width &between 1.5m to 2.0m LAD for the O-D pairs.

[Note: These dimensions of fairway are only indicative. Based on the hydro-morphological studies, channel identification &routing, siltation study etc., the Consultant will suggest optimum dimensions of the fairway with necessary justification]

(b) For this purpose, the analysis shall include, but not be limited to dredging, river conversancy works (channelization, bandalling and other flow directive works), channel stabilization works (bank protection and other erosion control works)or any other possible ways;

(c) Segments where the lean season flow is not enough or there is too much braiding (where shoals are formed every year)due to which it has not been possible to maintain LAD between 1.5m to 2.0m during lean season between the O-D pairs / optimal ferry routes, the Consultant will suggest ways to improve LAD for round the year navigation viz. dredging or river conversancy etc.;

(d) Since open river navigation techniques namely dredging and bandalling have been extensively used on Indian alluvial rivers for maintaining fairways all along, the Consultant shall critically examine strengths and limitations of these activities and suggest ways to improve them based on ground realities, the most important being the alluvial nature of NW-1 resulting in formation of shoals every year post monsoon. The Consultant shall make recommendations for preferred options for fairway development and maintenance projects on short-, medium- and long-term basis;

(e) As far as dredging is concerned, the Consultant shall provide clear recommendations with regard to initial and maintenance dredging, type of dredger to be employed and assessment of the quantity of maintenance dredging to be carried out for maintaining the fairway;

(f) In case of dredgers, a specific write up on owning vs hiring of dredgers for development and maintenance of fairway on the identified O-D pairs shall also be included in the DPR; and

(g) The Consultant, if asked to do so by the EIC, shall carry out mathematical modelling studies through a reputed expert agency to verify design parameters. As a minimum, this shall include a numerical model to produce detailed pictures of flow in the river system under current & future flow conditions and also the required flow/ discharge to maintain LAD throughout the year with or without interventions in a specific stretch of the river which experience frequent shoaling or where the proposed jetty is extending into the river obstructing flow of the river. Detailed proposal for such mathematical modelling shall be submitted by the Consultant along with methodology and cost with justification to enable the Client to reimburse the cost of mathematical modelling to the Consultant. In this regard, the necessary hydrographic data shall be provided by the Client.

(iv) **Navigation Aids:**

(a) Navigation Aids include but are not limited to day navigation marks, twenty-four (24) hours navigation marks, snag marks, channel closing marks, danger ahead marks, DGPS connectivity, RIS, pilotage etc. All of these have already been developed by the Client on NW-1 and are being used extensively by IWT operators since long;

(b) The Client has been erecting and maintaining various types of day and night navigation marks on NW-1 since its declaration as a NW. The Client also provides pilotage service to cargo vessels and passenger vessels on NW-1. These need to be studied by the Consultant and critically examined for their strengths, weaknesses and efficacy. Thereafter, these are to be compared with best practices being employed in similar waterways of USA, Europe, China etc. and specific projects to be recommended by the Consultant for improvement to the extent possible. The Consultant shall hold consultations and take feedback from the Client's field units and from existing users of NW-1;

(c) As already brought out at clause 1.7 above, the Client has developed DGPS stations at Varanasi, Patna, Bhagalpur and Swaroopganj. These need to be studied and analysed by the Consultant and their gaps need to be listed out along with suggested mitigation measures in respect of their functioning, status, utility and allied facilities for operating staff, round the clock operation facility, availability of land for future expansion etc.;

(d) After (b) & (c) above, the Consultant shall provide detailed recommendations along with justification for developing/ improving and maintaining different types of navigation aids for the identified O-D pairs on NW-1 in a productive and effective manner to provide value addition in this respect;

(e) The DPR shall include preliminary design & drawings, BoQ and technical specifications for the works/ processes proposed to improve the navigation aids (including its integration with DGPS & RIS stations) for the identified O-D pairs on NW-1 including 24 hours day & night navigation facilities such as buoys with lights, lights on masts on banks, DGPS stations, buoy laying vessels, rescue vessels etc. along with their dimensions/ drawings and numbers with justification, Vessel Traffic Management System (VTMS), RIS, channel marking methods and semi-permanent & permanent river training works at critical locations etc.;

(f) The Consultant shall also suggest internationally accepted and feasible navigation aids maintenance mechanism for such types of alluvial rivers for smooth and safe movement of waterway traffic. Further, the Consultant shall indicate if vertical channel marks on latest electronic route chart can be developed and provided to the operators as a replacement of physical channel marks. In this regard, the Consultant shall submit its cost, technical specifications including its integration with RIS, DGPS & Electronic Navigation Charts (ENC) etc.; and

(g) The Consultant shall also identify any software features and main operating systems for RIS, identification of communication requirement of voice and data firming detailed specifications for revamping/upgradation of existing communication network, details of networking equipment/IT equipment along with operating system, application software, data base, cyber security protection including firewall/antivirus which is compatible with current system as well as having potential for future growth.

(v) **Terminals:**

Based on reconnaissance survey, potential IWT traffic projections for identified O-D pairs, and stakeholders' consultations, the Consultant shall:

(a) study and analyse all existing floating jetties (enlisted at **Annex A**) developed and being maintained by the Client at various locations on NW-1 and list out infrastructural gaps therein, along with suggested mitigation measures (in terms of projects/ sub-projects) in respect of berthing of vessels during daytime and nights, loading & unloading facilities,

status of material handling equipment, handling capacity, traffic circulation for incoming and outgoing cargo, covered and open storage facilities, facilities for passenger/tourist traffic (sensitive to the needs of women, children, old and infirm) with basic amenities including embarkment & disembarkment and waiting etc. facilities, connectivity with national and state highways, rail connectivity (if any), POL bunkering facility, drinking water storage & facility for vessels, administrative block, round the clock operation facility, fire safety, general safety security, availability of land for current capacity and future expansion etc.

(b) suggest and recommend with proper justification locations for new permanent and/or floating jetties / small community jetties including (but not limited to) all the necessary facilities listed out in (a) above. This shall include site selection, detailed layout, sections, traffic circulation plan, cost of construction, first mile /last mile connectivity and maintenance etc. Wherever necessary, alternative sites for location of such new jetties shall also be considered and proper justification shall be given for choosing the selected site. Each new proposed jetty shall be proposed in terms of projects/ sub-projects.

(c) The jetties with the above infrastructural facilities at the respective locations shall be designed in such a way that total cost of each jetty will not exceed to INR 2.00 cr. Similarly in the case of the modernisation of the existing jetties (being maintained by the Client) the total development cost will not exceed to INR 1.50 cr.

(d) suggest with proper justification, sites/ location of new Ro-Ro / Ro-Pax terminals (over and above the ten (10) locations finalized by the Client) in consultation with the State Government including (but not limited to) all the necessary facilities listed out in (a) & (b) above.

Notes:

(1) The site(s) for new jetties proposed to be developed shall be selected considering socio-economic development of the community /stakeholders along NW-1, capacity &type of principal commodities to be handled, connectivity to other modes of transport, availability of depth along the jetty throughout the year especially during lean season, stable river channel with sufficient draft, adequate turning radius for vessels, favourable hydraulic conditions for berthing and navigational safety, exhaustive consultation with community at local level / panchayat level on identification of jetty locations etc.; and

(2) Ownership details of the land for all the alternative new sites shall be collected from State Revenue Departments and presented in the report. This will include all the details with adequate supporting documents for indicating Government or Private land, revenue/ cadastral maps, plot numbers/ khasra/ khata numbers, areas of each plot, details of district/ town/ tehsil/ village etc., circle rates, details of on-going litigation/ legal case for the plots, if any, etc. duly authenticated from the concerned authority of State Government. Further, this will include land not only required for the main jetty but also the land required for road connectivity as well as rail connectivity (if feasible).

(e) In case of development of proposed new jetties, following shall be included/ considered in the DPR with due justifications:

1. based on the traffic assessment, suggest capacity, size and type of jetty for handling of goods and passenger through local level consultation;

2. based on LWL and HFL, ascertain the appropriate level(s) of the jetty;
3. fix the location and type of berthing jetty to ensure safe berthing of loaded as well as empty vessels during highest and lowest water levels;
4. examine the adequacy of the existing road linkages between the jetty and nearest National Highway / State Highway, propose improvements required to facilitate smooth two-way flow of trucks and trailers;
5. requirement of land acquisition / leasing (if any) for the jetty and other allied facilities as well as for widening of road/ improvement of bends shall also be studied and taken into account; and
6. examine the feasibility of providing rail connectivity and give sufficient details along with various activities involved in this regard

(vi) **Vessels Sizes & Types:**

Based on the optimum fairway dimensions for the identified O-D pairs, current velocity, radius of curvature at bends, type and quantity of potential traffic assessed, the Consultant shall:

(a) recommend with proper details and justification, various types of vessels to meet the potential demand.; and

(b) also suggest number and types of vessels such as, dredgers, tugs/ work boats, survey vessels, inspection vessels, rescue vessels, pontoons etc. required for fairway maintenance, inspection and management to effectively develop, maintain and manage NW-1 in a holistic and climate friendly manner for a period up to thirty (30) years.

The Consultant shall submit size & dimensions (overall length, beam width, light and loaded draft etc.) and broad technical specifications of these vessels as part of DPR.

[Note: It may be noted that detailed design of vessels mentioned *in (a) and (b) above is not in the scope of this Services]*

(vii) **Vessel Repair Facility**

Based on the fleet requirement as per clause 4.4. (vi) (a) & (b) above, the Consultant shall analyze possible new location and size of dry-docking as well as running floating repair maintenance facilities required for the proposed fleet. Necessity of land acquisition for executing projects/ sub-projects for this activity shall also be studied and all necessary details presented in the DPR.

In addition to the above, the Consultant shall also map the existing vessel repair facilities along NW-1, workout their modernization and suggest the training required to the local entrepreneurs, engaged in the field of vessel repair, at National Institute of Navigation Institute (NINI) so as to develop confidence in operators.

(viii) **Others:**

Based on reconnaissance survey and other information collected, the Consultant shall:

(a) prepare a list of all the cross structures over NW-1 (road & rail bridges, electric power lines, intake wells, floating pontoons stations for water supply schemes etc.) and give their all the relevant information including (but not limited to) chainage, horizontal clearance between piers, vertical clearances above high flood level;

(b) also suggest measures to modification thereof if any to permit uninterrupted and safe navigation in the waterway round the year during both day and night; and

(c) prepare a list of all major tributaries of NW-1 joining it both from north and south sides.

(ix) **Hydrographic Surveys**

(a) The Client is conducting regular longitudinal thalweg surveys in the entire stretch of NW-1 every fortnight and issues river notices to disseminate navigational information to the users and other stakeholders of the waterway. The Client also carries out detailed pre & post hydrographic surveys at bandals and dredging sites as and when required. Further, the Client also carries out hydrographic surveys in front of various jetties from time to time. Soft or hard copies (as available) of all these hydrographic survey details shall be provided by the Client to the Consultant on demand on written request with justification, free of cost, provided the EIC is convinced that these are indeed required for carrying out any part of the scope of work of this Contract; and

(b) Any additional hydrographic survey required for preparation of this DPR with regard to morphological study, channel identification & routing, siltation pattern study etc. shall be conducted the Consultant duly engaging professional survey agency subject to the requirement (if at all it is necessary) , and at the discretion of EIC.

(x) **Topographic Surveys**

(a) The Consultant shall undertake fresh topographic surveys of the new jetty locations and / or proposed expansion of existing floating jetty sites etc. for preparation of lay-outs, General Arrangement (GA) drawings, sections and elevations etc. These surveys shall be carried out up to the water line during the survey period as per standard norms and practices. Topographic survey of proposed new connectivity with road and rail (if feasible) shall also be undertaken;

(b) Apart from the main jetty area, the Topographic Survey will also be carried out in approximately 1km downstream and 1km upstream areas between the HFL line and the water line during the survey period;

(c) The Consultant shall also carry out Topographic Survey required for preparation of lay-outs, GA drawings, sections and elevations etc. in respect of all other facilities/projects/ sub-projects (e.g. proposed sites for bank protection sites etc.) proposed in the DPR as per the requirement; and

(d) The Topographic Survey charts shall be prepared in the scale of 1:1000 and these will include spot levels in a grid of 25 m as well as other physical features (such as structures / houses, trees, natural drains etc.) and contours. Both hard and soft copies of survey charts as well as raw data shall be submitted to the EIC as per normal practice.

4.5 *Geo-technical Investigation of the finally selected new terminal land*

(i) The Consultant shall carry out geo-technical investigation (boreholes) on the finally selected new terminal land above HFL [at minimum two (2) locations] as well as between highest & lowest waterline[at minimum two (2) locations] at each terminal site for the purpose of design of structures [i.e. total four (4) bore holes per site]. The locations of the boreholes shall be clearly marked on the topographic survey charts;

(ii) The geo-technical investigation shall be carried out as per relevant IS codes & manuals and structures being proposed; and

(iii) The geo-technical report will include but not limited to the following:

(a) Methodology;

(b) Laboratory Tests including Bulk Density and Moisture content, Sieve analysis, Hydrometer analysis, Liquid limits & Plastic limits, Specific gravity, Shear test on undisturbed & remoulded saturated disturbed soil samples and determination of void ratio etc.;

(c) Detailed Bore logs for each Borehole; and

(d) Foundation Design Calculations including Scour Depth, Bearing Capacity and Recommendations

[Note: Since the extent of geo-technical investigations (number of sites and number of boreholes) which may be finally carried out by the Consultant cannot be fixed before-hand and the same will be known only during the course of this Services, for the sake of transparency and evaluation of the Bids on equal footing, it may be noted that:

(1) the Consultant need not include the cost/ rate for carrying out geo-technical investigations in his Bid;

(2) the actual cost of carrying out such geo-technical investigations shall be reimbursed to the Consultant provided, (a) the cost has been arrived at after obtaining competing Bids by the Consultant; (b) prior approval for the scope of work and the rates thereof have been taken by the Consultant from the Client / EIC; and

(3) the claim for reimbursement is accompanied with the proper invoice from the agency which carried out the geo-technical investigations]

4.6 *FEED / Preliminary Engineering Designs for new projects/ sub-projects*

(i) The Consultant shall provide FEED/ preliminary designs, component / sub-component wise including, layouts, basic drawings (plans, sections & elevations etc.) and specifications for each of the project/ sub-project proposed in the DPR;

(ii) The whole set of proposed projects shall be divided into separate logic-based packages so that their execution can be carried out in a systematic and efficient manner;

(iii) The preliminary engineering designs shall include appropriate designs & drawings and construction standards, which are safe, economical, relevant to traffic projections, local site conditions, environmental requirements, social needs and have considerable design life & economic rate of return;

(iv) It may be noted that preliminary engineering design & drawings and other details of every component/ sub-component covered in this DPR shall be detailed enough to enable preparation of bid document(s) for carrying out all the projects and sub-projects of the DPR on EPC and / or Item rate mode;

(v) The preliminary engineering designs shall cover but not be limited to the following:

(a) detail jetty master plan/ detailed layout plan (including future expansion), land development plan, preliminary designs & drawings, BoQ and technical specifications for all structures like berthing jetty, internal roads, covered & open storage along with all allied structures / buildings / facilities like parking of vehicles, waiting room, toilets, refreshment / pantry provision, security office, bunkering of fuel, utilities including water supply, drainage, water treatment plant, fire-fighting, horticulture as well as external roads connectivity with nearest National / State Highway & electrical facilities including compound lighting, requirement of power and transformer / generator, etc., all complete to handle all goods and passengers;

(b) if berthing jetty is being proposed as a steel / HDPE pontoon setup along with steel / HDPE gangway, the preliminary design & drawings, GADs, BoQ, technical specifications sufficient for construction of the same shall also be covered in the report;

(c) detailed layout plan along with preliminary design & drawings, BoQ and technical specifications for the shore protection works required to prevent any erosion;

(d) detailed layout plan along with preliminary design & drawings, BoQ and technical specifications for internal roads, traffic circulation plan, drainage, boundary wall gate, other utilities and rail connectivity (if feasible); and

(e) Handling equipment required at the jetty including preliminary drawings, BoQ and technical specifications etc., considering the type and quantity of goods to be handled as per prevailing norms for operation

(vi) **Proof Checking**

(a) The Consultant shall submit detailed design basis reports of all components of the Project(s) after their review and vetting by an IIT/ NIT or any other reputed Engineering Institute which shall be approved by the Client. The fee for such proof checking shall be borne by the Consultant itself; and

(b) The Consultant shall facilitate coordination among with the proof consultant and other advisors/ consultants/ professionals appointed by the Client for monitoring of preparation of this DPR. In this process, the Consultant shall attend meetings and provide all necessary information drawings and details sufficient enough for systematic review/ vetting of the design proposals before and after submission to the Client.

4.7 *Environment Impact Assessment (EIA)*

The Consultant shall:

(i) analyse and assess advantages of IWT mode vis-a-vis road and rail modes in respect of externalities such as energy saving, reduction in pollution, reduction in congestion, reduction in accidents, reduction in maintenance cost, significant less requirement of land etc.;

(ii) assess the environmental impacts due to development works/ projects/ sub-projects proposed in the DPR and suggest suitable Environment Management Plan (EMP) to mitigate the adverse impacts, if any, including its cost. Only rapid EIA / EMP study is envisaged for which one season data shall be sufficient;

(iii) analyse and assess disturbances to riverbed and river banks (mainly erosion & disturbance to the habitats). In the analyses, riverbed samples need to be collected for at least 1m below the maximum depth of dredging;

(iv) analysis of alternatives (all feasible technical options) must be considered in the EIA / EMP study before finalizing the option that provides for the least amount of disturbance to riverbeds & bank erosion; and

(v) assess and bring out in sufficient details along with supporting documents, the need of obtaining environmental clearances for construction of proposed new jetties and any other allied infrastructure projects/ sub-projects based on prevailing rules and regulations of Central & State Governments. If environmental clearance is not required, in that case, the list of statutory and regulatory clearances required for the Project(s) along with the timeline and concerned Government Agency needs to be given in the EIA / EMP study. The Consultant shall be required to submit the application of these statutory and regulatory clearances to the concerned

Government Agency on behalf of the Client & also follow up and guide the Client for the same. Further, the Consultant shall also follow the environment operational policies of the Bank while carrying out EIA and preparation of EIA / EMP study thereof.

4.8 Social Impact Assessment (SIA)

The Consultant shall carry out social screening and SIA consequent to proposed projects/ sub-projects in the DPR. This SIA shall also include consultations with affected communities & people. The SIA chapter shall inter-alia contain the magnitude and other details of land acquisition, resettlement issues, impacts on gender & livelihoods and the mitigation of impacts thereof. The SIA Report shall also include the baseline socio-economic characteristics of the Project Affected Families (PAFs) & Project Affected Person (PAPs), the R&R policy provisions & entitlements, outcome of the consultations held with the communities, implementation and monitoring mechanisms. It shall also contain the budget for implementing the R&R and other provisions related to SIA. The Consultant shall follow the social safeguard policies of the Bank regarding carrying out the SIA and preparation of SIA report thereof.

4.9 *Socio-Economic Assessment*

The Consultant shall have proper co-ordination & consultation with the NGOs/ Social Agencies engaged for community outreach at field level with regard to project interventions and devise the infrastructure in complete satisfaction of the local communities.

Accordingly, the Consultant shall assess the following:

(i) potential economic development and increase in employment opportunities in the region/ hinterland of NW-1 due to development of IWT sector. The economic potential of the region along NW-1 shall be assessed. Economic Performance Index (EPI) of the districts along NW-1 shall be assessed and provided along with effect of IWT growth on EPI; and

(ii) potential social effect including consideration of health, demographic, employment and generated wealth on account of the potential traffic;

4.10 *Cost Estimates*

The Consultant is required to submit both the Capital as well as O&M expenses (CAPEX & OPEX) for the Project(s) in sufficient details. The component / sub-component wise cost estimates shall be based on the Schedule of Rates (SoR) and / or Delhi Schedule of Rates (DSR). Market Rates can be adopted for those items for which SoR is not available. Transportation of men & material to the construction sites taking into account the ground realities of geographical region will be suitably considered in the rates/ cost of various components / sub-components. The basis/ supporting documents/ SoRs considered for various rates used for preparing the cost estimate shall be given in the DPR.

4.11 *Economic & Financial Analysis*

The Consultant shall provide Cost benefit analysis (CBA), Financial Internal Rate of Return (FIRR) and Economic Internal Rate of Return (EIRR) for judicially chosen sets of projects/ activities with detailed back up calculations, basis, assumption, justification etc. along with their source of information.

4.12 *Organizational Structure*

The Consultant shall suggest:

(i) institutional mechanism for execution of the Project(s) including supervision of construction works without time and cost overrun; and

(ii) organization structure for operation & maintenance/ management of the Project(s) after their commissioning.

4.13 *Time Schedule for Project(s) execution for individual component / sub-components*

The Consultant shall prepare:

(i) detailed & realistic construction time schedule indicating the sequence of activities duly considering the river characteristics in different seasons and priority of works;

(ii) suggestion shall also be given for executing the Project(s) in different phases with split up of the works (if required) and the costs thereto; and

(iii) year wise physical and financial target statement for the first three (3) years

4.14 *Preparation of tender document(s) for execution of Project(s)*

The Consultant shall

(i) prepare and recommend a detailed procurement strategy for the consideration of the Client which shall inter-alia include structuring of Bid packages, type & mode of contracts, interface requirements and planning among various project components / sub-components, procurement schedule etc. The structuring of the Bid packages shall take into account the state-wise clustering approach as shown below in the table in clause 6 (ii).; and

(ii) prepare tender document(s) for execution of various works proposed in the DPR on EPC and / or Item rate mode, as per the Bank's Standard Procurement Guidelines, which will inter-alia include all necessary detailed technical specifications, BoQ, Price Schedule and Special Conditions of Contract. Accordingly, the preliminary designs and cost estimates of every component and sub-component of the DPR will have all such details, authenticity and backup/ supporting documents which are required for preparing and processing the tender document(s) for execution of the Project(s) on EPC and / or Item rate mode as per prevailing norms and practices.

4.15 *Regulatory, Fiscal, Procedural issues and Public Private Partnership (PPP)*

Based on information collected during the course of preparation of this DPR and the proposed projects/ sub-projects, the Consultant shall:

(i) identify institutional, financial, regulatory, taxation issues and procedural bottlenecks including concerns (safety, security) that hinder growth of the IWT sector and propose solutions required for effective and optimum development of the sector; and

(ii) clarify and formulate the expected role of the private sector in the development of Project(s) with regard to dredging, bandalling, jetty construction & management, shipyard and repair facility etc.

4.16 *Stakeholders Consultation*

At the time of submission of **Draft DPR**, the Consultant shall also submit list all the possible stakeholders for approval of the Client. Subsequently, the Consultant shall assist the Client in conducting a stakeholders meeting at Patna/ Kolkata / Varanasi or any other place chosen by the Client. In this stakeholders meeting, the Consultant shall make detailed presentation on the DPR, seek views of local stakeholders, and incorporate those in the DPR by making suitable modifications in consultation with the Client. The cost for arranging the venue and

other allied activities for making the presentation shall be borne by the Client however, the Consultant shall provide all the necessary assistance in conducting the stakeholders meeting.

5. Methodology, Standards and Assumptions

(i) The Consultant, shall, be responsible for evolving an appropriate methodology in accordance with relevant industry standards, undertake all fieldwork and ensure that all data is quality assured & corrected wherever appropriate. The Consultant shall keep a record of all information collected and present this in a manner that allows making statistical comparisons. Qualitative or Quantitative assessments must be backed up by case studies and relevant industry examples.

(ii) The methodology shall ensure that every proposed intervention align with broader long-term vision of the Client for Arth Ganga program. In particular, the methodology shall take into consideration medium to long-term need to reduce maintenance dredging and other works.

(iii) The Consultant, shall, for the purposes of this study, take into account all recognized standards, guidelines and codes of practice as required in accordance with Indian law and as recognized internationally.

(iv) All consultancy works which are included in the scope of work shall be carried out by the Consultant and the Consultant cannot transfer any responsibility for completion of DPR to the Client.

(v) To facilitate the Consultant to obtain data from various Government and other agencies, the Client will only provide necessary assistance through letters authorizing the Consultant to obtain the data for the purpose of the study. All follow up etc. in this regard will have to be done only by the Consultant.

6. Time Schedule & Key Deliverables

(i) The total duration of the Consultancy services shall be **eight (8) months** from the Effective Date, including twenty-one (21) days' time assumed to be taken by the Client in conveying its comments on the Reports at each stage of the Key Deliverables.

(ii) The Consultant shall submit the following Key Deliverables (minimum two (2) copies) within the time schedule as summarized below:

S. No.	Reports to be delivered(Key Deliverables)	No. of Copies	Time Schedule from Effective Date
(i)	**Inception Report** shall be submitted after Kick-off meeting and Reconnaissance Survey by the Consultant (as per clause 4.2 above) and it will cover important observations, preliminary data/ reports collected (as per clause 4.1 above), stakeholders to be consulted, data requirement & availability, questionnaires, proposed benchmarks for comparison & reasons for their selection and detailed methodology, timelines and way forward, the Consultant intends to fulfil the entire Scope of Work as stipulated	2	Within 2 months

(ii)	**Draft Traffic Assessment Report** covering the aspects as mentioned in clause 4.3 above	2	Within 4 months
(iii)	**Final Traffic Assessment Report** (after seeking views of the Stakeholders and incorporating them in the report) covering the aspects as mentioned in clause 4.3 above	2	Within 5 months
(iv)	**Waterway Infrastructure Analysis & Planning Report:** After undertaking all the surveys as enlisted in clause 4.2, 4.3, 4.4 (ix) & (x) above, the Consultant shall undertake waterways infrastructure analysis in terms of clause 4.4 above and accordingly submit Waterway infrastructure Analysis & Planning Reports (refer Note below) ***Note:*** *The Consultant shall submit a separate state wise Report (Uttar Pradesh, Bihar, Jharkhand &W.B.), covering all the above mentioned aspects in sufficient details, having the following components:* *(a) Fairway Development including Navigation Aids;* *(b) Modernization of existing jetties;* *(c) Development of proposed new jetties; and* *(c) others project details envisaged in clause 4.4*	2 for each state	Within 6 months
(v)	**Draft DPR:** This will cover the aspects of: (i) Geo-technical Investigation (as per clause 4.5 above), (ii) FEED/ Preliminary Engineering Designs duly proof checked from reputed Institute as approved by the Client, (iii) Environmental & Social Impact Assessment with mitigation plan, (iv) Cost Estimates, (v) Economic & Financial Analysis, (vi) Organization Structure, vii) Time Schedule for Project(s) execution, viii)Preparation of tender document(s) for execution of Project(s), ix)Regulatory, Fiscal& Procedural issues including Stakeholder Consultation, complete in all respect as detailed in this Section ***Note:*** *The Consultant shall submit a separate state wise Report (Uttar Pradesh, Bihar, Jharkhand &W.B.), covering all the above mentioned aspects in sufficient details, having the following components:*	2 for each state	Within 7 months

	(a) Fairway Development and Maintenance including Navigation Aids; *(b) Modernization of existing jetties;* *(c) Development of proposed new jetties;* *(d) Others project details envisaged in clause 4.4and* *(d) Other aspects as mentioned in the 1st paragraph above*		
(vi)	**Final DPR:** Final DPR shall be submitted after addressing all the comments/ observations on the Draft DPR made by the Client including stakeholder consultations and will cover all the scope of work complete in all respect as detailed in this Section ***Note:*** *The Consultant shall submit a separate state wise Report (Uttar Pradesh, Bihar, Jharkhand & West Bengal), covering all the above mentioned aspects in sufficient details, having the following components:* *(a) Fairway Development including Navigation Aids;* *(b) Modernization of existing jetties;* *(c) Development of proposed new jetties;* *(d) Others project details envisaged in clause 4.4and* *(d) Other aspects as mentioned in S. No. (v) (Draft DPR) above*	2 for each state	Within 8 months

Notes:

(a) The Consultant will have to conduct three (3) to five (5) presentations at the head office of the Client in Noida / Regional Offices at Patna / Varanasi / Kolkata as & when required by the Client at his own cost;

(b) The report submission shall be signed by the relevant Key Experts for related chapters and final cover page shall be signed by the Team Leader. Moreover, all the correspondences shall be done mainly with the Team Leader; and

(c) During the presentations and meetings, the Client may ask for presence of all the Key Experts to be present personally for necessary discussions and clarifications with respect to inputs

7. Man-months estimated for the consultancy service would be 47 man-months

8. Manpower Requirement & Eligibility Criteria

The Consultant shall from a multi-disciplinary team (the "Consultancy Team") for undertaking this assignment. The following Key Experts whose minimum & desired qualification and experience are briefly described herein would be considered for evaluation of the Technical Proposal.

S. No.	Key Personnel	Numbers	Educational Qualification	Relevant Experience
1.	Team Leader	1	*Minimum Qualification* Master's Degree / Post Graduate Diploma (PGD) in any field *Preferred Qualification* NA	Minimum experience of fifteen (15) years out of which minimum seven (7) years of experience in the Ports / IWT sector
2.	Dy. Team Leader / Terminal Planner	1	*Minimum Qualification* B. Tech / B.E. in Civil Engineering *Preferred Qualification* Post Graduation (Master's Degree / PGD) in relevant field	Minimum experience of ten (10) years out of which minimum seven (7) years of experience in Port & Harbor/ IWT Terminal Planning, Port & Harbor/ IWT infrastructure planning and development of physical activities for operations
3.	Traffic Expert	1	*Minimum Qualification* Graduate in any field / CA *Preferred Qualification* Post Graduation (Master's Degree / PGD) in relevant field	Minimum overall experience of seven (7) years out of which minimum five (5) years of experience in traffic studies in the transport infrastructure sector
4.	Procurement Expert	1	*Minimum Qualification* Graduate in any field *Preferred Qualification* Master's Degree in Law or any other related field	Minimum experience of seven (7) years out of which minimum five (5) years of experience in managing procurement of various goods / consultancy / works contracts in the infrastructure sector. Should also have relevant experience of working on working on multilateral funded (World Bank, ADB, JICA etc.) projects
5.	Transport Economist	1	*Minimum Qualification* Graduate in any field / CA *Preferred Qualification*	Minimum experience of seven (7) years out of which minimum five (5)years of experience having understanding of regional economics especially with reference to transport and

S. No.	Key Personnel	Numbers	Educational Qualification	Relevant Experience
			Post Graduation (Master's Degree / PGD) in relevant field	logistics. He / She should have experience of estimating transport investments and implementing transport programs
6.	Business and Financial Analyst	1	*Minimum Qualification* Graduate in any field / CA *Preferred Qualification* Post Graduation (Master's Degree / PGD) in relevant field	Minimum experience of seven (7) years out of which minimum five (5) years of experience in financial & economic analysis / financial structuring (PPP & Non-PPP) / appraisal of transportation infrastructure projects
7.	Structural Engineer	1	*Minimum Qualification* B. Tech / B.E. in Civil Engineering *Preferred Qualification* Master's Degree in Structural Engineering / Marine Engineering	Minimum experience of ten (10) years out of which minimum seven (7) years of experience in Port / IWT structure related designs
8.	Geotechnical Engineer	1	*Minimum Qualification* B. Tech / B.E. in Civil Engineering *Preferred Qualification* Master's Degree in Geotechnical Engineering	Minimum experience of seven (7) years out of which minimum five (5) years of experience in soil investigation, reclamation work, soil improvement and foundation design etc.
9.	Hydrographic Expert	1	*Minimum Qualification* ITI in Survey / Cat "B" International Hydrographic Course qualifier / Diploma in Civil Engineering or equivalent *Preferred Qualification* Higher Qualification / Certification course in Hydrography Survey	Minimum experience of seven (7) years out of which minimum five (5) years of experience in conducting hydrographic surveys, investigations & measurements, bathymetric surveys

S. No.	Key Personnel	Numbers	Educational Qualification	Relevant Experience
10.	Naval Architect	1	*Minimum Qualification* Graduation in Marine Engineering/ Naval Architecture *Preferred Qualification* Post Graduation (Master's Degree / PGD) in relevant field	Minimum experience of seven (7) years out of which minimum five (5) years of experience in construction / designing of inland vessels / coastal vessels
11.	Environment Expert	1	*Minimum Qualification* Graduate in Environmental Engineering / Master's in Environmental Science *Preferred Qualification* Post Graduation(Master's Degree / PGD)in relevant field	Minimum experience of ten (10) years out of which minimum seven (7) years of experience in environment impact assessment involving transportation infrastructure projects
12.	Social Expert	1	*Minimum Qualification* Graduate in Sociology *Preferred Qualification* Post Graduation (Master's Degree / PGD)in relevant field	Minimum experience of seven (7) years out of which minimum five (5) years of experience in Indian Subcontinent environment, with particular reference to resettlement and other social impacts of transportation infrastructure projects
13.	Survey Engineer	1	*Minimum Qualification* B. Tech / B.E. in Civil Engineering *Preferred Qualification* Post Graduation (Master's Degree / PGD)in relevant field	Minimum experience of five (5) years out of which minimum three (3) years of experience in survey works / topography surveys

Annex A

S#	Location	Latitude	Longitude	District
West Bengal				
Existing				
1.	Haldia	22°2'20.08"N	88°6'34.40"E	PurbaMedinipur
2.	Botaniacal Garden	22°33'8.89"N	22°18'2.17"E	Howrah
3.	BTPS Bandel	22°59'39.71"N	88°24'19.83"E	Hooghly
4.	Tribeni	22°59'33.55"N	88°24'18.06"E	Hooghly
5.	Shantipur	23°12'39.80"N	88°25'13.97"E	Nadia
6.	Swaroopganj	23'24'51.36"N	88°23'14.59"E	Nadia
7.	Katwa	23'38'56.71"N	88°8'19.73"E	PurbaBardhaman
8.	Hazarduari	24'10'57.41"N	88°16'5.11"E	Murshidabad
9.	D/s Farakka	24°48'40.71"N	87°54'21.23"E	Murshidabad
10.	U/s Farakka	24°49'9.78"N	87°54'20.30"E	Murshidabad
Proposed				
11.	Manikchak	25°3'48.93"N	87°52'51.17"E	Malda
12.	Berhampore	24°6'12.45"N	88°14'43.39"E	Murshidabad
13.	Narkelbari	23°50'17.61"N	88°12'55.61"E	Murshidabad
14.	Maganpara	23°50'10.17"N	88°13'55.65"E	Murshidabad
15.	Palasi	23°47'18.50"N	88°14'3.92"E	Nadia
16.	Ramnagar	23°47'22.66"N	88°13'58.40"E	PurbaMedinipur
17.	Ballavpara	23°39'8.73"N	88°8'18.83"E	Nadia
18.	Matlari	23°37'31.50"N	88°11'3.05"E	Nadia
19.	Dainhat	23°37'20.78"N	88°10'58.25"E	PurbaBardhaman
20.	Nabadweep	23°23'14.35"N	88°21'54.99"E	Nadia

S#	Location	Latitude	Longitude	District
21.	Kalna	23°12'43.28"N	88°24'23.90"E	PurbaBardhaman
22.	PrincepGhat	22°33'21.66"N	88°19'50.01"E	Kolkata
23.	Diomond Harbour	22°11'3.22"N	88°11'22.90"E	South 24 Parganas
Jharkhand				
Existing				
24.	Manglaghat (Rajmahal)	25°4'16.54"N	87°47'7.58"E	Sahibganj
25.	Samdaghat (Sahibganj)	25°15'0.35"N	87°47'57.73"E	Sahibganj
Proposed				
26.	Singhidalan (Rajmahal)	25°3'23.21"N	87°50'1.01"E	Sahibganj
Bihar				
Existing				
27.	Bateshwarsthan	25°19'45.54"N	87°15'36.43"E	Bhagalpur
28.	Barari (Bhagalpur)	25°15'47.20"N	87°2'13.97"E	Bhagalpur
29.	Munger	25°22'35.77"N	86°27'45.01"E	Munger
30.	Simariya	25°22'44.76"N	86°0'8.06"E	Begusarai
31.	Buxar	25°35'18.47"N	83°59'21.37"E	Buxar
Proposed				
32.	Manihari	25°20'5.30"N	87°37'2.14"E	Katihar
33.	Karagola	25°28'14.18"N	87°23'20.78"E	Katihar
34.	kahalgaon	25°16'4.95"N	87°13'42.47"E	Bhagalpur
35.	Tintanga	25°17'51.06"N	87°11'23.76"E	Bhagalpur
36.	Sultanganj	25°15'17.91"N	86°44'24.35"E	Bhagalpur
37.	Aguani (Shahabad)	25°17'46.21"N	86°46'56.18"E	Khagaria
38.	Hathidah	25°22'18.02"N	85°59'40.67"E	Patna
39.	Barh	25°30'1.89"N	85°43'14.61"E	Patna

S#	Location	Latitude	Longitude	District
40.	Athmal Gola (Bakhtiyarpur)	25°28'57.13"N	85°37'43.76"E	Patna
41.	Hasanpur	25°35'3.44"N	85°31'28.95"E	Samastipur
42.	Kachi Dargah/ Fatuha	25°32'48.88"N	85°16'48.32	Patna
43.	Kalughat(Saran)	25°44'22.46"N	85°7'11.78"E	Saran
44.	Digha/Danapur	25°39'7.39"N	85°5'2.96"E	Patna
45.	Doriganj	25°43'41.81"N	84°50'2.47"E	Saran
46.	Revelganj/JaiprakashNagar	25°44'25.88"N	84°37'50.20"E	Saran
47.	Maujampur (Ara)	25°41'38.24"N	84°35'43.22"E	Bhojpur
Uttar Pradesh				
Existing				
48.	Rajghat (Varanasi)	25°29'29.04"N	83°2'8.37"E	Varanasi
49.	AssiGhat (Varanasi)	25°17'14.40"N	83°0'27.94"E	Varanasi
50.	Ramnagar (Varanasi)	25°15'16.32"N	83°1'46.74"E	Varanasi
Proposed				
51.	Bharauli (Ballia)	25°35'37.11"N	83°59'3.28"E	Ballia
52.	Majhoua (Ballia)	25°46'32.21"N	84°22'58.22"E	Ballia
53.	Kanspur (Ballia)	25°43'49.78"N	84°9'56.13"E	Ballia
54.	Sarai Kota (Ballia)	25°33'58.99"N	83°56'43.46"E	Ballia
55.	Dungurpur	25°37'22.68"N	83°40'8.06"E	Ghazipur
56.	Ghazipur	25°35'20.48"N	83°36'23.33"E	Ghazipur
57.	Zamania	25°25'8.26"N	83°33'8.57"E	Ghazipur
58.	Chochakpur	25°29'15.40"N	83°24'47.37"E	Ghazipur
59.	Saidpur	25°32'0.88"N	83°13'15.38"E	Ghazipur
60.	Kaithy	25°29'8.21"N	83°9'10.59"E	Varanasi

S#	Location	Latitude	Longitude	District
61.	BaluaGhat	25°25'20.52"N	83°11'4.27"E	Varanasi
62.	Samneghat (Varanasi)	25°16'21.47"N	83°1'21.28"E	Varanasi

Annexure - II

[DOCUMENT TITLE]

Reference :- Date:-

To,
Project Director
IWAI – Jal Marg Vikas
(Ministry of Ports, Shipping and Waterways, GOI)
A – 13, Sector – 1, Noida -201301

Subject :- Comprehensive Consultancy Services for preparation of Detailed Project Report (DPR) for IWT sector development for enhancement of socio-economic activities in and around Ganga-Bhagirathi-Hooghly river system (NW-1)

IWAI Reference :-

Dear Sir,

Refer your Expression of Interest ……

We are pleased to enclose our credentials for the subject cited assignment as per your requirements listed at Para 3 (a through d).

SL.NO	Description of Documents	Documents required to be furnished	Yes / No	Reference
1	Name of the Organization	*Copy of Certificate of Incorporation.*		
	Date of Establishment			
	Date of Commencement of Business			
	Type of Organization – Legal Status			
	Nature of Business			
	PAN No			
	GST No			
	Exact & Complete Address			
	Telephone / Fax numbers.			
	E-mail and cable address.			
	Present a brief profile - narrative description of the firm(s).	*Kindly avoid submission of company brochures for the purpose description of the firm*		
	Organizational strength of Consultant			
	Key persons: 2 principals with contact details to be Contacted by IWAI.			
1.1	EOI Submitted as Sole Applicant or Joint Venture	*If yes, details of JV Partner similar to 1 above*		
	Details of Joint Venture Partner			
2	For Consultant of **Foreign registry,** indicate if there is any branch office(s) established in India with details in aforesaid manner	*If yes, details similar to 1 above*		

3	Qualification Requirements		*Details of relevant Engagement,*		
3b	Consultant should have a minimum average annual turnover of INR 1.52 Crore in the last 5 financial years		*CA certified declaration for last 5 years.*		
		2019-20			
		2018-19			
		2017-18			
		2016-17			
		2015-16			
3c	Consultant should have completed 3 studies pertaining to providing such studies of similar / related work during last 05 years. The Consultant should submit Work Order Copies, Date of commencement, Date of completion, Completion Certificate from the Client and brief synopsis of the assignment under taken.		*Kindly Provide following details toward completed works.* • *Client's details* • *Scope of work* • *Date of commencement,* • *Date of completion,* • *Synopsis of the Projects (relevant certificates of Commencement & completions should be enclosed)*		
3d	Consultant should have a minimum of 16 employees on its payroll – Declaration to be submitted		*Declaration to be made by company HR*		

Hope you will find the same in line with your requirements.

Signature & Name of the Consultant
Date & Seal

Certificate

This is to confirm & certify that the information furnished with this Expression of Interest (EOI) are true & Correct and are not debarred by the World Bank.

Signature & Name of the Consultant
Date & Seal

Enclosure :-

As listed here under:-