Equip, Operate and Transfer Agreement

Between

INLAND WATERWAYS AUTHORITY OF INDIA
(as "Authority")

And

[_____]
(as "Concessionaire")

For

Equip, Operate and Transfer of Multimodal Terminal at Varanasi, Uttar Pradesh, India

Dated: [_____]

Contents

CONCESSION AGREEMENT

THIS CONCESSION AGREEMENT is made at_____on the_____day of _____

BETWEEN:

Members of the Inland Waterways Authority of India, a body corporate constituted and incorporated under the provision of the Inland Waterways Authority of India Act, 1985 of the Government of India, and having its Administrative Office at A-13, Sector – 1, Noida – 201301, Uttar Pradesh, hereinafter referred to as **"the Concessioning Authority"** (which expression shall, unless repugnant to the context or meaning thereof, include its successors and permitted assigns);

AND

_____, a Special Purpose Vehicle (SPV) incorporated under the Companies Act, 2013, and having its registered office at _____

_____

hereinafter referred to as **"the Concessionaire"** (which expression shall, unless repugnant to the context or meaning thereof, include its successors and permitted assigns).

WHEREAS:

(A) The Concessioning Authority is desirous of implementing an equip, operate and transfer Project of multimodal terminal at Varanasi, Uttar Pradesh through private sector participation;

(B) About equip, operate and transfer project of multimodal terminal at Varanasi, the Concessioning Authority invited bids from the interested parties in accordance with the Request for Proposal (as defined hereinafter) dated DD MMMM YYYY, to shortlist competent parties bid from whom shall be subsequently considered for identifying selected bidder for the Project;

(C) In response to the Request for Proposal, the Concessioning Authority received proposals from bidders including the one submitted by the Bidder/Consortium;

(D) The Concessioning Authority, after evaluating all the proposals received by it from qualified bidders, accepted the proposal referred to in recital "(C)" above submitted by the Bidder/Consortium and communicated its acceptance to the Bidder/Consortium vide Letter of Intent for Award of Concession dated DD MMMM YYYY.

(E) The Bidder/Consortium has/have incorporated the Concessionaire as a special purpose company in India, under the Companies Act, 2013 to implement the Project;

(F) Following the issue of the Letter of Intent for Award of Concession, the Concessioning Authority has agreed to grant the Concession to the Concessionaire to implement the Project on the terms, conditions and covenants hereinafter set forth in this Agreement.

NOW, THIS AGREEMENT WITNESSETH AS FOLLOWS:

ARTICLE 1

1. Definitions and Interpretations

1.1. Definitions

In this Agreement, unless the context otherwise requires the following terms shall have the following meanings assigned/ascribed thereto:

"**Additional Cost**" means the additional capital expenditure which the Concessionaire has or would be required to incur and which has arisen as a result of Change in Law.

"**Additional Auditor**" means another firm of chartered accountants duly licensed to practice in India empanelled by CAG, to conduct special audit of the quantity MT of cargo/ TEUs handled and the financial statements, documents and supporting evidences thereto as may be mandated by the Concessioning Authority.

"**Agreement**" means this agreement as of date hereof, including Annexures I through XIX as may be amended, supplemented or modified in accordance with the provisions hereof.

"**Annexure**" means the schedules, supplements or documents, annexed to this Agreement.

"**Applicable Laws**" means all laws, brought into force and effect by GOI or any of the state governments, including rules, regulations and notifications made thereunder, and judgements, decrees, injunctions, writs and orders of any court of record, applicable to this Agreement and the exercise, performance and discharge of the respective rights and obligations of the Parties hereunder, as may be in force and effect during the subsistence of this Agreement;

"**Applicable Permits**" means any and all permissions, clearances, licenses, authorizations, consents, no-objections, approvals and exemptions under or pursuant to any of the Applicable Laws or from any Government Authority required in connection with the Project and for undertaking, performing or discharging the obligations contemplated by this Agreement or any other Transaction Document.

"**Bidder**" means [●][1].

"**Appointed Date**" means the date of signing of this Agreement

"**Associate**" means, with respect to any Party and/or with respect to the Bidder and/or with respect to any member of Consortium, any other Person directly or indirectly controlling, controlled by or under common control with such Party, Bidder and/or member of

[1] Name and address of the bidder to be added here

Consortium. For the purposes of this definition, the term "control" (including with correlative meaning, the terms "controlled by" and "under common control with") as applied to any Party or Bidder or a member of Consortium, means the possession, directly or indirectly, of the power to direct or cause the direction of the management of that Party or Bidder or a member of Consortium whether through ownership of more than 50% (fifty percent) of the voting securities, by contract, or otherwise.

"**Bid**" means the proposal and the entire set of documents submitted by the Bidder and/or the Consortium in response to the RFP.

"**Bid Security**" means the bank guarantee [●] dated [●] furnished by the Bidder/Consortium along with its Bid.

"**Book value"** means the aggregate written down value as on the date of issue of the Termination Notice in the books of the Concessionaire of (i) the tangible assets (including capital works in progress) forming part of, fixed or attached to the ground, created, installed or provided by the Concessionaire and comprised in Project Facilities and Services, and (ii) the moveable assets including cargo handling equipment belonging to the Concessionaire, in accordance with Indian Accounting Standards using depreciation rates as set forth in the (Indian) Companies Act, 1956, as applicable from time to time.

"**Cargo throughput**" means the volume of cargo handled at the Terminal in the period of one financial year.

"**Change in Law**" shall have the meaning set out under Article 13.1 of this Agreement.

"**Change of Scope**" means requisition by the Concessioning Authority for the provision of additional works and services which are not included in the scope of the Project as per this Agreement.

"**Change of Scope Notice**" means a notice issued by Concessioning Authority specifying in reasonable detail the works and services contemplated thereunder, if the Concessioning Authority determines that Change of Scope is necessary.

"**Completion Certificate**" means a certificate obtained from the Concessioning Authority as to completion of development of Project Facilities and Services in accordance with the provisions of this Agreement not later than 24 months from the date of commencement of the Terminal Equipment Phase of the terminal in the Concession Period.

"**Concessionaire DPR**" means the designs and drawings, and other technical information submitted by the Concessionaire from time to time and reviewed by the Concessioning Authority in accordance with the provisions of this Agreement.

"**Concessionaire Event of Default**" shall have the meaning as set out under Article 15.1.1.

"**Concessioning Authority Event of Default**" shall have the meaning as set out under Article 15.2.

"**Concession Period**" means the period of the EOT specified in Article 2.2 of this Agreement.

"**Conditions Precedent**" shall mean conditions prescribed in Article 3 of this Agreement.

"**Consortium**" (if applicable) means the consortium consisting of (i) XXXX, (ii) YYYY, and (iii) ZZZZ formed, to implement the Project.

"**Consultation Notice**" has the meaning ascribed to it in Article 15.3.

"**Contractor**" means a Person with whom the Concessionaire has entered into/may enter into a contract relating to the execution of any works and /or operation and maintenance of the Project Facilities and Services, including the Management Contractor.

"**Commercial Operation Date (COD)**" means the date when the Conditions Precedent have either been satisfied and/or waived by the Party other than the Party responsible for satisfying the same.

"**Day**" means the 24 (twenty four) hour period beginning and ending at 12:00 midnight Indian Standard Time.

"**Debt Due**" means the aggregate of the following sums representing the amounts advanced by the Senior Lenders towards Total Project Cost, expressed in Indian rupees as may be outstanding and payable to the Senior Lenders under the Financing Documents on the Transfer Date:

(a) the principal amount of the debt including any Subordinated Debt provided by the Senior Lenders under the Financing Documents for financing the Project ("Principal") but excluding (i) working capital loans; (ii) any part of the principal that had fallen due for repayment two years prior to the Transfer Date, if the Transfer Date is related to expiry of the Concession Period or any part of the Principal that had fallen due before the Termination Notice, if the Transfer Date is related to termination prior to the expiry of the Concession Period; and (iii) any debt that has been rescheduled or refinanced, unless such repayment had been rescheduled or refinancing made with the prior consent of Concessioning Authority; and

(b) all accrued interest, financing fees and charges payable on or in respect of the debt referred to in sub-article (a) above upto the Transfer Date but excluding (i) any interest, fees or charges that had fallen due one year prior to the Transfer Date, and (ii) penal interest or charges, payable under the Financing Documents to any Senior Lender.

provided that if all or any part of the Debt Due is convertible into Equity at the option of Senior Lenders and/or the Concessionaire, it shall for the purposes of this Agreement be deemed to be Debt Due even after such conversion and the principal thereof shall be dealt with as if such conversion had not been undertaken;

"**Development/Equipment Phase**" means the period from the Date of start of the Development/Equipment Works of the Concession agreement to the Date of start of commercial operations for the Development/Equipment Works as specified under Article 6.3.1.

"**Development/Equipment Works**" means all works including equipment and things necessary to complete the Project and provide the Project Facilities and Services in accordance with this Agreement.

"**DPR**" means Detailed Project Report given in Annexure XVI of this Agreement.

"**DTR**" means Detailed Technical Report given in Article 6.1 of this Agreement.

"**Encumbrance**" means any encumbrance such as mortgage, charge, pledge, lien, hypothecation, security interest, assignment, privilege or priority of any kind having the effect of security or other such obligations and shall include without limitation any designation of loss payees or beneficiaries or any similar arrangement under any insurance policy pertaining to the Project, physical encumbrances and encroachments on the Project Site/Terminal's Assets/Project Facilities and Services.

"**EOT**" means the Equip, Operate and Transfer agreement granted by the Concessioning Authority to the Concessionaire in accordance with the provisions of Article 2.1 of this Agreement for implementing the Project and providing Project Facilities and Services.

"**EPC Contract**" means the contract entered into by the Concessionaire with one or more Contractors inter-alia for the purpose of design, engineering, procurement of equipment and materials (including by import thereof) and construction of the Project in accordance with the provisions of this Agreement.

"**Environmental Law**" means any statute, rule, regulation, ordinance, code, guideline or policy having the force of law, in each case, applicable to the Project now or hereafter in effect and any applicable judicial or administrative interpretation, pronouncement, order, decree or judgment, relating to the environment, health and safety.

"**Equity**" means the paid-up share capital of the Concessionaire representing the equity component of the Total Project Cost, as capitalized in the books of the Concessionaire and duly certified by the Statutory Auditors.

"**Equity Documents**" means collectively the documents evidencing subscription to Equity to the extent of equity component of cost of the Project.

"**Equity IRR**" means the internal rate of return on equity investment of the project based on projected/actual cash flows during the Concession Period.

"**Escrow Account**" means the account used for withdrawals and appropriations during the Concession Period as mentioned under Article 9.3.

"**Escrow Agreement**" means the agreement to be executed inter alia between the Concessionaire, the Concessioning Authority and the Senior Lenders/Senior Lenders representative substantially in the format set out in Annexure VI hereto.

"**Event of Default**" shall have the meaning assigned under Article 15.1.

"Exclusivity Period" shall have the meaning ascribed to it in Article 12.2.2

"**Expert**" means any person, body or organization of repute with recognized technical/ professional expertise in respect of any field, matter or subject relevant, including the relevant subject-matter expert(s), financial expert(s), industry expert(s) and technical expert(s), for the purpose of this Agreement.

"Expert Committee" means the committee set up for dispute resolution in accordance with Annexure VII hereto.

"**Financial Assistance**" means all funded and non-funded credit assistance including but not limited to loans, advances, lease assistance and guarantees required for the Project.

"**Financial Close**" means the date on which the Financing Documents providing for Financial Assistance by the Senior Lenders, Equity Documents and the documents in respect of debt, if any, committed by the Bidder/Consortium have become effective and the Concessionaire has access to such Financial Assistance.

"**Financial Year**" means twelve month period commencing from 1st April and ending 31st March

"**Financing Documents**" means, collectively, the documents executed in favour of or entered into with the Senior Lenders, by the Concessionaire in respect of the Financial Assistance relating to the financing (including any re-financing) of the Total Project Cost and includes any document providing security for the Financial Assistance.

"**Financing Plan**" means the base case financial model adopted by Concessionaire with the approval of the Senior Lenders and approved by the Concessioning Authority in accordance with Article 3.1.2(a), setting forth the capital and operating cost of the Project and revenues therefrom on the basis of which financial viability of the Project has been determined by the Senior lenders, and includes a detailed description of the assumptions and parameters used for making calculation and projections therein including inter alia the Total Project Cost, and Royalty payable to the Concessioning Authority annual estimated revenue, equity contribution, cargo handling projections estimated by Concessionaire, discounted net

present value of the cash flows, Equity IRR, debt equity ratio and debt service coverage ratio

"**Force Majeure Event**" shall have the meaning ascribed to it in Article 14.1 of this Agreement.

"**GoI**" means the Government of India.

"**Good Industry Practice**" means the exercise of that degree of skill, diligence and prudence and those practices, methods, specifications and standards of equipment, safety and performance, as may change from time to time and which would reasonably and ordinarily be expected to be used by a skilled and experienced operator engaged in construction, operation and maintenance of facilities, equipment or systems of the type and size similar to the Project Facilities and Services.

"**Government Authority**" means GoI, any state government or any governmental department, commission, board, body, bureau, agency, authority, instrumentality, administrative body, at central, state, or local level, having jurisdiction over the Concessionaire, the Terminal's Assets, the Project Facilities and Services or any portion thereof, but shall not include the Concessioning Authority.

"**Independent Engineer**" means a person appointed in accordance with Article 5 for supervising and monitoring of compliance by the Concessionaire as per Scope of Work , more particularly to undertake, perform, carry out the duties, responsibilities, services and activities set forth in Annexure V.

"**Indian Accounting Standards**" means the Indian accounting standards issued by the Institute of Chartered Accountants of India.

"**Insurance Cover**" shall have the meaning ascribed to it in Article 12.1.3(b).

"**IWAI Act**" means The Inland Waterways Authority of India Act, 1985 as amended, supplemented, re-enacted or replaced from time to time.

"**LAD**" means Least Available Depth.

"**Management Control**" means the possession, directly or indirectly of the power to direct or cause the direction of the management and policies of the Concessionaire, whether through the ownership of voting securities, by contract or otherwise or the power to elect or appoint more than 50% (fifty percent) of the directors, managers, partners or other individuals exercising similar authority with respect to the Concessionaire.

"**Material Adverse Effect**" means material adverse effect of any act or event on the ability of either Party to exercise any of its rights or perform any of its duties under and in accordance with the provisions of this Agreement and which act or event causes a material financial burden or loss to either Party.

"**Minimum Guaranteed Cargo**" shall have the meaning ascribed to it in Article 7.1.12.

"**Month**" means the calendar Month as per the Gregorian calendar.

"**Notional Royalty**" means Royalty calculated as product of actual waterfront volume for the respective quarter and Royalty (per MT) agreed upon in this contract. This will be applicable to calculate penalties during a period of first 4 (four) years after COD.

"**Non-riverine cargo**" means cargo other than Riverine Cargo. Quantity of such cargo will be ascertained as per Goods Receipt document.

"**Operations Phase**" means the period from the Commercial Operation Date to the expiry/termination of the Concession Period.

"**Operations and Maintenance Standards**" means the minimum standards of operations and maintenance set out in the Annexure VIII with regards the Project Facilities and Services.

"**Party**" means either the Concessioning Authority or the Concessionaire as the context may require or admit and "Parties" means both Concessioning Authority and Concessionaire.

"**Performance Standards**" means the minimum standards of performance set out in Annexure IV with regards the Project Facilities and Services.

"**Performance Guarantee**" shall mean the bank guarantee procured by the Concessionaire for the benefit of the Concessioning Authority guaranteeing the performance of the obligations of the Concessionaire hereunder in the manner specified in Article 4.

"**Person**" means any individual, company, corporation, partnership, joint venture, trust, unincorporated organization, government or governmental authority or agency or any other legal entity.

"**Political Event**" means the Force Majeure Events set out in Article 14.3.

"**Project**" means the design, finance, construction, operation, maintenance, and marketing and providing of the Project Facilities and Services at Multimodal Terminal at Varanasi, Uttar Pradesh, India; in accordance with the provisions of this Agreement.

"**Project Capacity**" means the capacity of the Project Facilities and Services to handle 1.26 mmtpa.

"**Project Contracts**" means collectively this Agreement, the EPC Contract, O&M Contract and any other material contract (other than the Financing Documents, the Escrow Agreement, the Substitution Agreement or any commercial agreement with the users)

entered into or may hereafter be entered into by the Concessionaire in connection with the Project and Project Facilities and Services.

"**Project Facilities and Services**" means the facilities and services as set out under the Scope of Work, to be provided by the Concessionaire during the Concession Period, in accordance with this Agreement.

"**Project Site**" means the area demarcated in Annexure I including the waterfront (which shall include adjacent channel stretch of 750 meters on both sides of terminal from center point as defined in Article 12.2.2), existing berth, land together with buildings, structures if any and easement rights thereto that may be given to the Concessionaire and all other assets comprised therein on which the Concessionaire is authorized to develop and operate the Project Facilities and Services as set forth in this Agreement.

"**Provisional Certificate**" shall have the meaning assigned to it under Article 6.7.4.

"**Punch List**" shall have the meaning assigned to it under Article 6.7.4.

"**Quarter**" means a period of 3 (three) months.

"Remedial Period" has the meaning ascribed to it in Article 15.4.

"**Request for Proposal**" or "**RFP**" means the Request for Proposal dated [●] issued by the Concessioning Authority to the bidders and includes any addendum / clarification issued in respect thereof by the Concessioning Authority.

"Requisition" has the meaning ascribed to it in Article 16.3.

"**Riverine cargo"** means cargo transported to and/or from the Terminal through waterways. For the avoidance of doubt, it is clarified that in the event cargo imported into the Terminal has been processed and exported, such cargo shall be treated as Riverine Cargo in the event either the import or export is through waterways.

"**Royalty**" means the share payable by the Concessionaire to the Concessioning Authority, pursuant to Article 9.2.1 hereof.

"**Safety Standards**" means the minimum standards of safety set out in the Annexure VIII with regards the Project/Project Facilities and Services.

"**Scope of Work**" means the minimum requirements as to the operation, management and development of the Project and provision of Project Facilities and Services set out in Annexure III.

"**Selectee**" has the meaning ascribed to it in Article 15.4.2.

"**Senior lenders**" means the financial institutions, multilateral lending agencies, trusts, banks, funds and agents of trustees of debentures, including their successors and assignees, who have agreed to guarantee or provide finance to the Concessionaire under any of the Financing Agreements for meeting all or any part of the Total Project Cost and who hold *pari passu* charge on the assets, rights, title and interests of the Concessionaire.

"**Special Audit**" means an audit of the quantity of cargo handled as MT and the financial statements, documents and supporting evidences thereto as may be mandated by the Concessioning Authority and report to the Concessioning Authority such information as may be desired by the Concessioning Authority for any period.

"**Standards**" means the standards set out in Annexure VIII.

"**Statutory Auditors**" means a firm of chartered accountants appointed in terms of Section 139 of the Companies Act, 2013 and acting as the statutory auditors of the Concessionaire. Appointment of Statutory Auditors shall be as per Annexure XIX.

"**Stressed Project**" means the PPP reaching a situation in which either Party is unable to perform/discharge its obligations under this Agreement due to reasons beyond its control or due to certain unanticipated conditions.

"**Substitution Agreement**" means the agreement substantially in the form set out at Annexure IX, to be entered into between the Concessioning Authority, the Concessionaire and the Senior Lenders.

"**Subordinated Debt**" means the aggregate of the following sums expressed in Indian Rupees as the case may be, outstanding as on the Transfer Date:

(a) the principal amount of debt provided by Senior Lenders for meeting the Total Project Cost and subordinated to the financial assistance provided by the Senior Lenders; and

(b) all accrued interest on the debt referred to in Sub-clause (a) above but restricted to the lesser of actual interest rate and a rate equal to 5% (five per cent) above the Bank Rate in case of loans expressed in Indian Rupees and lesser of the actual interest rate and six-month LIBOR (London Inter Bank Offer Rate) plus 2% (two per cent) in case of loans expressed in foreign currency, but does not include any interest that had fallen due one year prior to the Transfer Date;

"**Tariff**" means the applicable rate's that may be charged by the Concessionaire for and in respect of providing the Project Facilities and Services.

"**Ten Year G Sec**" means the 10 Year G Sec rate published by Reserve Bank of India prevailing as on the date of a payment due from which the computation of interest is required to be made under the Agreement.

"**Terminal's Assets**" means the assets set out in Annexure II, developed and/or provided by the Concessioning Authority.

"**Termination Notice**" means a notice for termination of this Agreement issued pursuant to Article 16.1.1 hereof.

"**Termination Period**" shall have the meaning as set out under Article 16.1 hereof.

"**Tests**" shall have the meaning assigned to it under Article 6.7.1 hereof.

"**Terminal**" means multimodal terminal at Varanasi

"**Total Project Cost**" means the lowest of -

(a) The capital cost of the Project for Concessionaire as set forth in the Financial Package including capital cost incurred by Concessionaire for development/equipment of Terminal infrastructure

(b) The actual capital cost of the Project for Concessionaire upon completion including capital cost incurred by Concessionaire for development/equipment of Terminal infrastructure

(c) A sum of INR 22.5 crore (INR Twenty-two crore and fifty lakh only)

"**Transfer**" means to transfer, sell, assign, pledge, hypothecate, create a security interest in or other encumbrance on, place in trust (voting or otherwise), transfer by operation of law or in any other way dispose of, whether or not voluntarily, the legal or beneficial interest in the equity shares of the Concessionaire.

"**Transfer Date**" means the date of expiry or termination as the case may be, of the Concession Period in accordance with the terms of this Agreement.

"**Transaction Documents**" means collectively the Project Contracts and the Financing Documents.

1.2. Other References

In this Agreement:

"**BIS**" means Bureau of Indian Standards.

"**BS**" means British Standard.

"**CISF**" means Central Industrial Security Force.

"**CPI (IW)**" means Consumer Price Index (Industrial Workers)

"**DIN**" means German Industrial Standard.

"**FEM**" means Federation of Equipment Manufacturers.

"**IWT**" means Inland Waterways Transportation

"**IS**" means Indian Standard.

"**ISO**" means International Standards Organization.

"**IEC**" means International Electro Technical Commission.

"**km**" means kilometre, the unit of length.

"**kWh**" means Kilowatt-hour, the unit of electrical energy.

"**KVA**" means Kilovolt- Ampere, the unit of power.

"**m**" means Metre, the unit of length.

"**mm**" means Millimetre, the unit of length.

"**mt**" means Metric Tonne, the unit of weight.

"**mmtpa**" means million metric tonnes per annum

"**MVA**" means Mega Volt Ampere, the unit of power.

"**MSIHC**" means Manufacture Storage and Input of Hazardous Chemicals.

"**OISD**" means Oil Industry Safety Directorate.

"**WPI**" means annual Wholesale Price Index published by Reserve Bank of India

1.3. Interpretations

This Agreement constitutes the entire understanding between the Parties regarding the Project and supersedes all previous written and/or oral representations and/or arrangements regarding the Project. If there is any aspect of the Project not covered by any of the provisions of this Agreement, then and only in that event, reference may be made by the Parties to the bid documents, inter alia including the RFP document, issued by the Concessioning Authority and also including addendums, clarifications given in writing in the pre-bid meetings and the submissions of the Concessionaire and the bid submitted by the Concessionaire but not otherwise. In case of any contradictions in the terms of this

Agreement and any such other bid documents as referred to above, the terms of this Agreement shall prevail.

In this Agreement unless the context otherwise requires:

1.3.1. any reference to a statutory provision shall include such provision as is from time to time modified or re-enacted or consolidated so far as such modification or re-enactment or consolidation applies or is capable of applying to any transactions entered into hereunder;

1.3.2. the words importing singular shall include plural and vice versa, and words denoting natural persons shall include partnerships, firms, companies, corporations, joint ventures, trusts, associations, organisations or other entities (whether or not having a separate legal entity);

1.3.3. the table of contents and any headings in this Agreement are for ease of reference only and shall not affect its construction or interpretation;

1.3.4. the words "include" and "including" are to be construed without limitation;

1.3.5. references to "development/equipment" include investigation, design, engineering, procurement, delivery, transportation, installation, processing, fabrication, testing, commissioning and other activities incidental to the development/ equipment;

1.3.6. any reference to any period of time shall mean a reference to Indian Standard Time;

1.3.7. any reference to Day shall mean a reference to a calendar Day; any reference to month shall mean a reference to a calendar month;

1.3.8. "Recital", "Articles" and "Annexures" shall refer, except where the context otherwise requires, to Articles of and any Annexure to this Agreement. The Annexures to this Agreement shall form an integral part and parcel of this Agreement and will be in full force and effect as though they were expressly set out in the body of this Agreement;

1.3.9. any reference at any time to any agreement, deed, instrument, license or document of any description shall be construed as reference to that agreement, deed, instrument, license or other document as amended, varied, supplemented, modified or novated at the time of such reference;

1.3.10. any agreement, consent, approval, authorization, notice, communication, information or report required under or pursuant to this Agreement from or by any Party or the Independent Engineer and/or a Statutory Auditor shall be valid and effectual only if it is in writing under the hands of duly authorized representative of such Party or the Independent Engineer and/or Statutory Auditor, as the case may be, in this behalf and not otherwise;

1.3.11. unless otherwise stated, any reference to any period commencing "from" a specified Day or date and "till" or "until" a specified Day or date shall include both such days or dates;

1.3.12. unless otherwise specified, any interest to be calculated and payable under this Agreement shall accrue on a monthly basis and from the respective due dates as provided for in this Agreement; and

1.3.13. any word or expression used in this Agreement, unless defined or construed in this Agreement, shall be construed as per the definition given in General Clauses Act, 1897 failing which it shall bear the ordinary English meaning.

1.4. Measurements and Arithmetic Conventions

All measurements and calculations shall be in metric system and calculations done to 2 (two) decimal places, with the third digit of 5 (five) or above being rounded up and below 5 (five) being rounded down.

1.5. Ambiguities and Discrepancies

In case of ambiguities or discrepancies within this Agreement, the following shall apply:

1.5.1. between two Article of this Agreement, the provisions of specific Articles relevant to the issue under consideration shall prevail over those in other Articles;

1.5.2. between any value written in numerals and that in words, the latter shall prevail; and

1.5.3. between the provisions of this Agreement and any other documents forming part of it, the former shall prevail.

ARTICLE 2

2. Concession Agreement and Terminal Assets

2.1. Concession Agreement

2.1.1. In consideration of the Concessionaire agreeing to pay to the Concessioning Authority (a) License Fee and (b) Royalty along with performing its obligations as set out in this Agreement, the Concessioning Authority hereby grants to the Concessionaire, an exclusive license to Equip, Operate and Transfer ("**EOT**") the Project Facilities and Services as per Scope of Work defined in Annexure III subject to the provisions of this Agreement.

2.2. Concession Period

2.2.1. The Concession hereby granted is for a period of 10 (ten) years commencing from the COD during which the Concessionaire is authorized and obliged to implement the Project and to provide Project Facilities and Services as per Scope of Work in accordance with the provisions hereof.

Provided that:

(a) in the event of the Concession being extended by the Concessioning Authority beyond the said period of 10 (ten) years in accordance with the provisions of this Agreement, the Concession Period shall include the period by which the Concession is so extended, and

(b) In the event of an early termination of this Agreement by either Party in accordance with the provisions hereof, the Concession Period shall mean and be limited to the period commencing from the COD and ending with the date of termination of this Agreement.

2.2.2. The Concessionaire shall, at any time not earlier than 7th (seventh) anniversary of the COD and no later than 8th (eighth) anniversary of the COD, intimate the Authority about its interest and request for extending the term of this Agreement by a period of 2 (two) years. The Authority may accept the request for extending the term of this Agreement subject to the following condition:

Actual riverine cargo throughput at the Terminal was greater than the slab for minimum annual riverine cargo throughput in corresponding year as given in Article 7.1.12 in any 2 (two) years between the 5th (fifth) and 8th (eighth) year of Operations Phase.

For avoidance of doubt it is clarified that actual terminal utilization for riverine cargo shall mean the actual volume of riverine cargo handled at the Terminal in the corresponding year. It is further clarified that measurement and monitoring of cargo throughput shall be according to the provisions of this Agreement.

2.3. Acceptance of the Concession

2.3.1. The Concessionaire hereby accepts the Concession and agrees to undertake and implement the Project and to provide Project Facilities and Services in accordance with the provisions of this Agreement. Subject to and in accordance with the provisions of this Agreement and Applicable Laws and Applicable Permits, the Concessionaire shall at its costs, charges, expenses and risk including but not limited to foreign exchange variation risk if any, equip, operate, maintain and repair the Project/ Project Facilities and Services.

2.4. Terminal's Assets

2.4.1. In consideration of the Concessionaire agreeing to perform and discharge its obligations as set forth in this Agreement, the Concessioning Authority hereby grants to the Concessionaire, the exclusive right to enter upon, occupy and use the Project Site and Terminal's Assets for the purpose of implementing the Project and provision of Project Facilities and Services pursuant thereto in accordance with this Agreement.

2.4.2. The Concessionaire shall at its costs, charges and expenses make such development and improvements in the Project Site and Terminal's Assets as may be necessary or appropriate for implementing the Project and providing Project Facilities and Services in accordance with the Agreement, Applicable Laws and Applicable Permits.

2.5. Use of Terminal's Assets

2.5.1. The Concessionaire shall not without the prior written consent or approval of the Concessioning Authority use the Project Site and the Terminal's Assets for any purpose other than those of the Project/the Project Facilities and Services and those incidental thereto as permitted under this Agreement or as may otherwise be approved by the Concessioning Authority.

2.6. Information about Project Site and Terminal's Assets

2.6.1. The information about the Project Site and Terminal's Assets as set out in Annexures I and II respectively is provided by the Concessioning Authority in good faith and with due regard to the matters for which such information is required by the Concessionaire. The Concessioning Authority agrees to provide to the Concessionaire, upon a reasonable request, any further information relating to the Project Site and Terminal's Assets, which the Concessioning Authority may now possess or may hereafter come to possess, as may be relevant to the implementation of the Project. Subject to this, the Concessioning Authority makes no representation and gives no warranty to the Concessionaire in respect of the condition of the Project Site and Terminal's Assets.

2.7. Acceptance of the Project Site and Terminal's Assets

2.7.1. The Concessionaire accepts possession of the Project Site and Terminal's Assets on 'as is where is' basis and confirms having:

(a) inspected the Project Site and Terminal's Assets, including the berths and all structures there and its surroundings;

(b) satisfied itself as to the nature of the climatic, hydrological and general physical conditions of the Project Site and Terminal's Assets, the nature of the ground and subsoil, the form and nature of the Project Site and Terminal's Assets, and the nature of the design, work and materials necessary for the performance of its obligations under this Agreement; and

(c) obtained for itself all necessary information as to the risks, contingencies and all other circumstances which may influence or affect the Concessionaire and its rights and obligations under or pursuant to this Agreement.

2.8. Peaceful Occupation

2.8.1. Handing over physical possession of the Project Site and Terminal's Assets, free from all encumbrances, after receipt of performance guarantee from the Concessionaire is a Condition Precedent for Concessioning Authority. The Concessioning Authority warrants that the Concessionaire shall, subject to complying with the terms and conditions of this Agreement, remain in occupation of the Project Site and Terminal's Assets during the Concession Period. In the event the Concessionaire is obstructed by any Person claiming any right, title or interest in or over the Project Site and Terminal's Assets or any part thereof or in the event of any enforcement action including any attachment, distraint, appointment of receiver or liquidator being initiated by any Person claiming to have charge on the Project Site and Terminal's Assets or any part thereof pursuant to the IWAI Act, the Concessioning Authority shall, if called upon by the Concessionaire, defend such claims and proceedings. The Concessioning Authority represents that the Concessionaire shall be kept indemnified and harmless against any adverse court order or direction.

ARTICLE 3

3. Conditions Precedent

3.1. Conditions Precedent to be satisfied by the Concessionaire

3.1.1. The Concession shall be subject to satisfaction or waiver of the following conditions precedent (the **"Conditions Precedent"**)

(a) Furnishing of the Performance Guarantee as stipulated in Article 4 hereof;

(b) Furnishing of copies (certified as true copies by a director of the Concessionaire) of the constituent documents of the Concessionaire;

(c) Furnishing of all resolutions adopted by the Board of Directors of the Concessionaire (certified as true copies by a director of the Concessionaire) authorizing the execution, delivery and performance by the Concessionaire, of each of the Bidding Documents;

(d) Opening the Escrow Account and executing the Escrow Agreement;

(e) Signing of substitution agreement as per Annexure IX;

(f) Furnishing a certificate from its principal officer/director on the shareholding pattern of the Concessionaire;

(g) Procuring and furnishing the following confirmations, in original, (from the Bidder/all members in case of a Consortium) that the Concessionaire:

(i) shall at all times comply with the provisions of Article 11.2 in respect of its shareholding:

(ii) has the financial standing and resources to fund /raise finances for undertaking and implementing the Project in accordance with this Agreement;

(iii) is duly organized and validly existing under the laws of jurisdiction of its incorporation, and has requested the Concessioning Authority to enter into this Agreement with the Concessionaire and has agreed to and unconditionally accepted the terms and conditions set forth in this Agreement;

(h) Furnishing to the Concessioning Authority a legal opinion from the legal counsel of the Concessionaire with respect to the Concessioning Authority of

the Concessionaire to enter into this Agreement and the enforceability hereof.

(i) Insurance requirement: The Concessionaire shall, at its cost and expense, purchase and maintain insurances as are prudent, including but not limited to the following:

(i) builder's all risk insurance;

(ii) loss, damage or destruction of Project Facilities and Services, at replacement value;

(iii) comprehensive third-party liability insurance including injury or death to personnel of the Concessioning Authority and others who may enter the Project Site or the Terminal's Assets;

(iv) workmen's compensation insurance;

(v) marine cum storage cum erection insurance; and

(vi) any other insurance necessary to protect the Concessionaire, its employees and its assets and the Concessioning Authority, its employees and agents engaged in or connected to the Project and the Project Site and Terminal's Assets, against loss, damage or destruction at replacement value, including all Force Majeure Events that are insurable and not otherwise covered in items (i) to (v).

3.1.2. The Concessionaire shall satisfy the following conditions precedent no later than 60 days prior to the start of development/equipment works for the Terminal Equipment Phase.

(a) Submission to Concessioning Authority of its Financing Plan and Financing Documents for the Project and demonstrating Financial Close for verification that there is no violation of the terms and conditions of this Agreement. Concessioning Authority, within 30 days, shall notify Concessionaire of violations if any, which shall be promptly addressed by the Concessionaire.

(b) Obtaining "Applicable Permits" as may be required for commencement of Terminal Equipment Phase as set out in Annexure XIII.

3.2. Conditions Precedent to be satisfied by the Concessioning Authority:

3.2.1. Share the clearances required for the Project, as set out in Annexure XIII;

3.2.2. Handing over physical possession of the Project Site and Terminal's Assets, free from all encumbrances, after receipt of performance guarantee from the Concessionaire

with the provision that license fee and applicable taxes shall be paid by concessionaire from the date of taking the physical possession.

3.2.3. Notification of tariff schedule for charges to be collected and retained by the Concessionaire. Proposed tariff schedule is given in Annexure XIV of this Agreement.

3.3. Other Requirements

3.3.1. The aforesaid Conditions Precedent shall be complied within 90 (Ninety) days of the Appointed Date. For the purpose of compliance of Financial Close obligation, operator shall not be considered at default if the conditions pending for achieving Financial Close are only those which are required to be fulfilled by the Concessioning Authority under Article 3.2.

3.3.2. Any of the Conditions Precedent set forth in Article 3.1 may be waived fully or partially by the Concessioning Authority at any time in its sole discretion or the Concessioning Authority may grant additional time for compliance with these conditions. The Concessionaire shall ensure compliance within such additional time as may be specified by the Concessioning Authority. Any of the Conditions Precedent set forth in Articles 3.2 may be waived fully or partially by the Concessionaire at any time in its sole discretion.

3.3.3. If the Concessionaire has fulfilled all the Conditions Precedent under Article 3.1 including the furnishing of the Bank Guarantee and has not waived or extended the time under Article 3.3.2 above, and if the Concessioning Authority has failed to fulfill the Conditions Precedent to be fulfilled by it under Article 3.2 (and which are within the power of the Concessioning Authority), and the Concessionaire has not waived or extended the time under Article 3.3.2 above, the Concessioning Authority shall be liable to pay liquidated damages in a sum calculated at the rate of 0.1% (zero point one percent) of the Performance Guarantee for each Day's delay until fulfilment of the Conditions Precedent subject to a maximum of 5% (five percent) of the figure mentioned in the Performance Guarantee furnished by the Concessionaire. In such event, having regard to the quantum of damages, the time for the performance shall be deemed to have been extended by the number of days for which the liquidated damages is paid and if, after the extended period the Concessioning Authority is still not in a position to comply with the Conditions Precedent, then the agreement shall be liable to be terminated as provided for in Article 3.3.5 below.

3.3.4. If the Concessioning Authority has fulfilled all the Conditions Precedent under Article 3.2 and has not waived or extended the time under Article 3.3.2 above, and if the Concessionaire has failed to fulfil the Conditions Precedent under Article 3.1 (and which are within the power of the Concessionaire), the Concessionaire shall be liable to pay liquidated damages in a sum calculated at the rate of 0.1% (zero point one percent) of the Performance Guarantee for each Day's delay until fulfillment of the Conditions Precedent subject to a maximum of 5% (five percent) of the figure mentioned in the Performance Guarantee furnished by the Concessionaire. In such event, having regard to

the quantum of damages, the time for the performance shall be deemed to have been extended by the number of days for which the liquidated damages is paid and if, after the extended period the Concessionaire is still not in a position to comply with the Conditions Precedent, then the agreement shall be liable to be terminated as provided for in Article 3.3.5 below.

3.3.5. In the event that the Conditions Precedents are not complied within the time (including the extended time, if any) in terms of the aforesaid Article 3, this Agreement shall be liable to be terminated. If such termination is on account of failure of the Concessionaire to comply with Conditions Precedent, the Bid Security shall stand forfeited. If such termination is on account of failure of the Concessioning Authority, the Concessioning Authority shall be obliged to return the Bid Security/Performance Guarantee. It is clarified that except for the payment as stipulated in the foregoing Article 3.3.3 and 3.3.4 and forfeiture in this Article 3.3.5, each party hereto shall have no claims against the other for costs, damages, compensation or otherwise.

ARTICLE 4

4. Performance Guarantee

4.1. The Concessionaire shall for due performance of its obligations towards the Project as given in this Agreement provide to Concessioning Authority an unconditional and irrevocable bank guarantee, within 15 (fifteen) days of execution of this Agreement, in favour of the Concessioning Authority, encashable and enforceable at Noida, Uttar Pradesh, substantially in the form set forth in Annexure XI (the "**Performance Guarantee**"). The Performance Guarantee shall be for a sum of INR 2.3 crore (INR Two crore and thirty lakh only) effective from COD till the end of the Concession Period.

4.2. Till such time the Concessionaire provides to Concessioning Authority the Performance Guarantee pursuant hereto, the Bid Security shall remain in full force and effect. The Performance Guarantee, if in the form of a bank guarantee shall be valid for an initial period of 1 (one) year and shall be renewed no later than 30 (thirty) Days prior to expiry of each year, for an additional term of 1 (one) year.

4.3. The Concessionaire shall be liable to restore the Performance Guarantee to the full amount in case of part encashment of the same by the Concessioning Authority. This shall be done within 30 (thirty) Days of any such part encashment.

4.4. Failure of the Concessionaire to provide and maintain a valid Performance Guarantee and in accordance with this Article shall entitle the Concessioning Authority to terminate this Agreement forthwith and also if relevant, to forfeit the Bid Security.

ARTICLE 5

5. Independent Engineer and Independent Surveyor

5 . 1 The Independent Engineer and Independent Surveyor shall be selected out of the panel prepared for the purpose by the Concessioning Authority. The Concessioning Authority shall in the procurement documents published by it, set out in reasonable detail the scope of work as indicated in this document and shortlist Persons based on their technical capability. The Concessioning Authority shall within 30 (thirty) Days of the date of this Agreement forward to the Concessionaire a list of shortlisted Persons and their profiles.

5.2 Any objection raised by the Concessionaire shall be considered by the Concessioning Authority and Persons against whom such objections are raised will at the discretion of the Concessioning Authority, which discretion shall be used with the highest degree of prudence and fairness, be disqualified prior to seeking a financial bid.

5.3 If within 15 (fifteen) Days of forwarding the list, the Concessioning Authority does not receive any objection from the Concessionaire with reasons therefor, the Concessioning Authority shall call for financial bids from the shortlisted Persons and select the Independent Engineer and Independent Surveyor ordinarily based on the lowest fee quote for respective position.

5.4 The Independent Engineer and Independent Surveyor selected pursuant to the aforesaid process shall be appointed within 90 (Ninety) Days of the date of this Agreement. The Independent Engineer and Independent Surveyor shall discharge its duties and functions substantially in accordance with the terms of reference set forth in Annexure - V. The Independent Engineer and Independent Surveyor shall submit regular periodic reports (at least once every month) to the Concessioning Authority in respect of its duties and functions set forth in Annexure -V.

5.5 The scope of work of Independent Engineer shall *inter-alia* include work of certification of Performance Parameters as stipulated in this Concession Agreement

5.6 The scope of work of Independent Surveyor shall inter-alia include work of validating insufficient LAD and validating penalty payable for insufficient LAD as stipulated in this Concession Agreement. Validating occasions of unsuccessful vessel passage due to insufficient LAD. The Independent engineer shall validate/ certify that unsuccessful passage is not due to Concessionaire default subject to the following conditions:

(a) Concessionaire has taken an informed decision about the size of the vessel and volume of cargo that can pass through the waterway by checking the LAD information updated weekly by the Authority on their website or any other source of information used in the future.
(b) Concessionaire has adhered to the waterway channel as declared by the

Authority in their navigational charts updated periodically.

Independent Surveyor shall also validate penalty payable by Concessioning Authority in case of occasions of insufficient LAD

5.7 The costs and expenses of the Independent Engineer and Independent Surveyor for their services shall be borne by the Concessioning Authority and Concessionaire, equally.

5.8 If the Concessioning Authority either on its own or on a report of the Concessionaire has reason to believe that the Independent Engineer and Independent Surveyor is not discharging its duties in a fair, appropriate and diligent manner, the Concessioning Authority may after giving the Independent Engineer and Independent Surveyor due opportunity of being heard, terminate the appointment of the Independent Engineer/ Independent Surveyor and appoint another firm in its place in accordance with the preceding Article 5.1 above.

5.9 If either Party disputes any advice, instruction or decision of the Independent Engineer/ Independent Surveyor, the dispute shall be resolved in accordance with the dispute resolution procedure set out in Article 19.

5.10 The Concessioning Authority shall require the Independent Engineer and Independent Surveyor to designate and notify to the Concessioning Authority and the Concessionaire up to 2 (two) persons employed in its firm to sign for and on behalf of the Independent Engineer and Independent Surveyor, and any communication or document required to be signed by the Independent Engineer and Independent Surveyor shall be valid and effective only if signed by any of the designated persons; provided that the Independent Engineer and Independent Surveyor may, by notice in writing, substitute any of the designated persons by any of its employees.

ARTICLE 6

6. Project Implementation for the Terminal Equipment Phase

6.1. Preparation of DTR

6.1.1. The Concessionaire shall at its cost, charges and expenses, prepare the detailed technical report (the "**DTR**") including traffic study and operational design for Development/Equipment Works in conformity with the Scope of Work for the Terminal Equipment Phase.

6.2. Review of DTR

6.2.1. The Concessionaire shall submit the DTR for review of the Independent Engineer.

6.2.2. The Independent Engineer shall review the DTR submitted by the Concessionaire and provide its observations and suggestions on the same including the observations of the Concessioning Authority in respect thereof within 60 (sixty) Days from the date of the receipt of such DTR.

6.2.3. In the event that the Independent Engineer and/or Concessioning Authority has observed that the DTR is not in conformity with the Scope of Work, the Concessionaire shall promptly and without any undue delay revise and resubmit the DTR or satisfy the Independent Engineer and/or Concessioning Authority with regards its compliance within 45 (forty five) Days of receiving observations and suggestions from the Independent Engineer.

6.2.4. Concessioning Authority shall provide a No-Objection Certificate ("NOC") for Terminal Equipment Phase development on basis of DTR submitted by the Concessionaire. If the Independent Engineer and/or Concessioning Authority does not make any observations with respect to the DTR submitted to it by the Concessionaire within 60 (sixty) days of the submission, it shall be deemed that the Independent Engineer/ Concessioning Authority has no objections to the DTR and the Concessionaire is permitted to proceed with the Project according to the DTR.

6.2.5. The Concessionaire shall not be entitled to any extension of time for completing development or any other relief on account of delay caused due to providing any clarification or in resubmitting the DTR. Provided, however, that the Concessioning Authority at its sole discretion may suitably extend the Terminal Equipment Phase or provide other relief to compensate for any such delay not attributable to the Concessionaire.

6.2.6. The Concessionaire shall not change approved DTR under this Agreement, without submitting such revised DTR for the review of the Independent Engineer/Concessioning Authority.

6.2.7. Notwithstanding the review by the Independent Engineer, the Concessionaire shall be responsible for any defect and/or deficiency in the DTR relating to the Project or any part thereof, and accordingly, the Concessionaire shall at all times remain responsible for its obligations under this Agreement.

6.3. Terminal Equipment Phase

6.3.1. The Concessionaire shall promptly commence and complete the works, including installation of equipment in accordance with the conditions of the Terminal Equipment Phase and shall also obtain from the Independent Engineer a certificate as to completion of development/equipment of Project Facilities and Services in accordance with provisions of this Agreement ("**Completion Certificate**") not later than 24 months from the date of commencement of the Terminal Equipment Phase.

6.4. Obligations of the Concessionaire

Without prejudice to the generality of Article 6.3 and in addition to any of its other obligations under this Agreement, during the Terminal Equipment Phase, the Concessionaire shall:

6.4.1. arrange for, in a timely manner all necessary financial and other resources required for development, equipment and installation of the Project Facilities and Services.

6.4.2. engage professionally competent Persons for project management and development/equipment and ensure that all works are carried out in compliance with the Standards given in this Agreement;

6.4.3. give written notice to the Concessioning Authority within 7 (seven) Days of any material modification to any of the Financing Documents and/or any Equity Documents and shall simultaneously therewith also furnish copies of such modified documents to the Concessioning Authority. Provided no such modification will be made if it in any manner whatsoever has the effect of imposing an additional financial obligation or increasing the financial obligation of the Concessioning Authority in addition to that contemplated under the Financing Documents provided on Financial Close, without the prior written consent of the Concessioning Authority. For avoidance of doubt any such modifications made without the prior written consent of the Concessioning Authority will not be enforceable against the Concessioning Authority;

6.4.4. obtain Applicable Permits, comply with Applicable Laws and Applicable Permits and give priority to safety in its development/equipment and planning activities in order to protect life, health, property and environment;

6.4.5. provide to the representatives of the Concessioning Authority, at reasonable times and upon prior intimation, access to the Project Site to review progress in development/equipment and to ascertain compliance with any of the requirements of this

Agreement. Provided that non- inspection by the Concessioning Authority of any works shall not, in relation to such works,

(a) amount to any consent or approval by the Concessioning Authority nor shall the same be deemed to be waiver of any of the rights of the Concessioning Authority under this Agreement; and

(b) release or discharge the Concessionaire from its obligations or liabilities under this Agreement in respect of such work;

6.4.6. provide monthly reports on the progress of Development/Equipment Works or such other relevant information as may be required by the Independent Engineer;

6.4.7. promptly carry out at its cost such further works as may be necessary to remove any defects or deficiencies observed by the Independent Engineer and ensure timely completion of development/equipment of Project Facilities and Services in all respects; and

6.4.8. to ensure safe and timely development/equipment and completion of Project Facilities and Services, the Concessionaire may, at its cost, interrupt and divert the water or the road traffic or Terminal traffic, adjacent to the Project Site if such interruption and diversion is imperative for efficient progress of Development/Equipment Works and conforms to Good Industry Practice. Such interruption and diversion shall be undertaken by the Concessionaire only with prior written approval of the Independent Engineer which approval shall not be unreasonably withheld. For avoidance of doubt, it is agreed that the Concessionaire shall, at all times, be responsible for ensuring safe operation of Development/Equipment Works and shall remove interruption or diversion within the period specified by the Independent Engineer.

6.5. Obligations of the Concessioning Authority

In addition to any of its other obligations under this Agreement, the Concessioning Authority shall:

6.5.1. in matters falling within its authority, grant, Applicable Permits, approvals and consents as may be required by the Concessionaire and, on a best efforts basis, assist the Concessionaire in obtaining all other Applicable Permits as may be required by the Concessionaire;

6.5.2. make available all records of sub-soil investigations carried out on its behalf in the Terminal's Assets, if requested by the Concessionaire. It is clarified that the Concessionaire shall be solely responsible for determining the adequacy or otherwise of such investigations and will not in reliance of such records, be entitled to claim any relief under this Agreement.

6.6. Suspension of Works

6.6.1. Upon recommendation of the Independent Engineer to this effect, the Concessioning Authority may by notice require the Concessionaire to suspend forthwith whole or any part of Development/Equipment Works if, in the reasonable opinion of the Concessioning Authority, such work is not in accordance with Standards given in this Agreement.

6.6.2. The Concessionaire shall, pursuant to the notice under foregoing provision suspend Development/Equipment Works or any part thereof for such time and in such manner as may be specified by the Concessioning Authority and thereupon represent to the Concessioning Authority / Independent Engineer, measures to remedy defects notified. The Concessionaire may by notice require the Independent Engineer to inspect such remedial measures forthwith and make a report to the Concessioning Authority recommending whether or not the suspension hereunder may be revoked. Any dispute as regards suspension of works or remedial measures proposed, if not resolved within 30 (thirty) Days of the suspension or proposal of the remedial measures respectively, shall be submitted for dispute resolution in accordance with Article 21 hereof.

6.7. Issue of Completion Certificate

6.7.1. At least 60 (sixty) Days prior to the likely completion of Terminal Equipment Phase, the Concessionaire shall notify the Independent Engineer of the date when it intends to commence commercial operations. The Independent Engineer shall then proceed to inspect Development/Equipment Works with the intention of issuing Completion Certificate and determine and notify to the Concessionaire schedule and manner of tests as are specified in Annexure V that it shall carry out to ensure that the Project meets with the Standards ("**Tests**"). The date and time of each of the Tests shall be determined by the Independent Engineer in consultation with the Concessionaire, and notified to the Concessioning Authority who may designate its representative to witness the Tests. The Concessionaire shall provide such assistance as the Independent Engineer may reasonably require for conducting the Tests. In the event of the Concessionaire and the Independent Engineer failing to mutually agree on the dates for conducting the Tests, the Concessionaire shall fix the dates by not less than 10 (ten) Days' notice to the Independent Engineer;

6.7.2. Upon completion of each Test, the Independent Engineer shall provide to the Concessionaire and the Concessioning Authority copies of all Test data including detailed Test results;

6.7.3. Upon completion of Development/Equipment Works and the Independent Engineer determining all the Tests to be successful, it shall forthwith issue to the Concessionaire and the Concessioning Authority a Completion Certificate substantially in the form set forth in Annexure XI;

6.7.4. The Independent Engineer may, at request of the Concessionaire, issue a provisional certificate of completion substantially in the form set forth in Annexure XI

("**Provisional Certificate**") if the Tests are successful and the Project can be safely and reliably placed in commercial operation though certain works or things forming part thereof are outstanding and not yet complete. The Provisional Certificate shall have appended thereto a list of outstanding items signed jointly by the Independent Engineer and the Concessionaire ("**Punch List**") to be completed by the Concessionaire within a stipulated time. All items in the Punch List shall be completed by the Concessionaire within 90 (ninety) Days of date of issue of the Provisional Certificate or such other extended period that the Concessioning Authority may in its sole discretion determine, failing which the Provisional Certificate shall lose its validity and the Concessioning Authority shall be entitled to terminate this Agreement;

6.7.5. Without prejudice to the foregoing, if the Concessionaire fails to complete any Development/Equipment Works on account of Force Majeure or for reasons solely attributable to the Concessioning Authority, the Concessioning Authority may, in its discretion, reduce the scope of Project and require the Concessionaire to pay 80% (eighty percent) of the sum saved due to such reduction of scope. Upon such payment to the Concessioning Authority, obligations of the Concessionaire in respect of such works shall be deemed to have been fulfilled.

6.8. Change of Scope

6.8.1. The Concessioning Authority may, notwithstanding anything to the contrary contained in this Agreement, require the provision of additional works and services which are not included in the scope of the Project as contemplated by this Agreement ("**Change of Scope**"). Provided no such Change of Scope shall be made in the Terminal Equipment Phase if it is in the reasonable judgment of the parties hereto likely to delay the Scheduled Project Completion Date. Provided further, cost of implementing a single Change of Scope shall not exceed a sum corresponding to INR 1.1 crore (INR One crore and ten lakh only) and during the Concession Period the cumulative cost of implementing orders pertaining to Change of Scope shall not exceed a sum corresponding to INR 4.5 crore (INR Four crore and fifty lakh only). The Change of Scope shall be considered only for development of multimodal transportation projects;

6.8.2. If the Concessioning Authority determines that a Change of Scope is necessary, it shall issue to the Concessionaire a notice specifying in reasonable detail the works and services contemplated thereunder ("**Change of Scope Notice**");

6.8.3. Upon receipt of a Change of Scope Notice, the Concessionaire shall, provide to the Concessioning Authority, the following:

(a) adverse impact, if any, which the Change of Scope is likely to have on the Project; and

(b) cost to be incurred by the Concessionaire for and in respect of such Change of Scope;

6.8.4. Upon receipt of the foregoing information, the Concessioning Authority shall, if it decides to proceed with the Change of Scope, convey its agreement or otherwise of the assessment of the Concessionaire. If the Concessionaire does not notify any adverse impact of a Change of Scope notified under the Change of Scope Notice within 30 (thirty) Days of the date thereof and/or the Concessioning Authority does not disagree with the cost assessment of the Concessionaire, the Concessioning Authority shall issue an order requiring the Concessionaire to proceed with the implementation of such Change of Scope. If an adverse impact is notified by the Concessionaire and/or the Concessioning Authority disagrees with the cost assessment, the Parties shall in good faith modify the Change of Scope envisaged so as to remove the adverse impact/agree to the cost implication for carrying out the Change of Scope within a period of 30 (thirty) Days of notification of the adverse impact/cost. In the event that the Parties are unable to mutually agree to a Change of Scope and/or the cost of implementing the same, they may seek intervention of an Independent Engineer to resolve the differences and upon the final determination of the desired Change of Scope and its cost implication, the Concessioning Authority may issue an order to implement the Change of Scope;

6.8.5. The provisions of this Agreement, insofar as they relate to Development/Equipment Works and Tests, shall apply mutatis mutandis to the works undertaken by the Concessionaire in respect of a Change of Scope;

6.8.6. Within 7 (seven) days of an order for Change of Scope being issued, the Concessioning Authority shall make an advance payment to the Concessionaire of a sum equal to 20% (twenty per cent) of the cost of Change of Scope as agreed hereunder. The Concessionaire shall, after commencement of work, present to the Concessioning Authority bills for payment in respect of the works in progress or completed works, as the case may be, supported by such documentation as is reasonably sufficient for the Concessioning Authority to determine the accuracy thereof. Within 30 (thirty) days of receipt of such bills, the Concessioning Authority shall disburse to the Concessionaire after deducting Pro-rata advance payment, such amounts as are certified by the Statutory Auditors as being expended by the Concessionaire for and in respect of implementing Development/Equipment Works or procuring equipment following an order for a Change of Scope;

6.8.7. Notwithstanding anything to the contrary contained in this Article 6.8, the Concessioning Authority may, after giving the Change of Scope Notice to the Concessionaire and considering its reply thereto, decide to seek competitive bids for carrying out the works envisaged in a Change of Scope; provided that the Concessionaire shall have the option of matching the first ranked bid in terms of selection criteria, subject to payment of 2% (two per cent) of bid amount to the Concessioning Authority, and thereupon securing the award of such works or services. For the avoidance of doubt, it is agreed that the Concessionaire shall be entitled to exercise such option only if it has participated in the bidding process and its bid does not exceed the first ranked bid by more than 10% (ten percent) thereof; and

6.8.8. If during the pendency of the Agreement, the Concessionaire determines at any

time that a Change of Scope is necessary for providing safer and improved Project Facilities and Services, it shall by notice in writing request the Concessioning Authority to consider such Change of Scope. The Concessionaire may implement the Project and provide Project Facilities and Services in accordance with the Change of Scope as may be approved in writing by the Concessioning Authority and all provisions of this Article 6 for Project Implementation shall mutatis mutandis apply. Provided, it is clarified that the provisions contained in Article 6.8.6 and 6.8.7 shall not apply to a Change of Scope required by the Concessionaire.

6.9. Liquidated Damages

6.9.1. Subject to any of the provisions of this Agreement providing for extension of time for performance or excuse from performance, as the case may be, of any of the obligations of the Concessionaire under this Agreement, apart from performance standards and damages as mentioned in Annexure IV, the Concessionaire shall pay to the Concessioning Authority liquidated damages at the rate of 0.1% (zero point one percent) of the Performance Guarantee for every day of delay in fulfilling specified obligations on or before a Milestone Date including a delay in obtaining the Completion Certificate or the Provisional Certificate on or before the Scheduled Project Completion Date. Provided such liquidated damages shall not in aggregate exceed INR 2.3 crore (INR Two crore and thirty lakh only) and unless the delay is in obtaining of the Completion Certificate or the Provisional Certificate, shall not be payable for less than 15 (fifteen) days of delay from a Milestone Date, in fulfilling a specified obligation. The Parties agree that liquidated damages as provided are a genuine pre-estimate of the damages the Concessioning Authority is likely to suffer and are not by way of a penalty. In case the aggregate delay exceeds 180 (one hundred and eighty) days or the aggregate liquidated damages paid and/or payable under this provision exceeds specified limit of INR 2.3 crore (INR Two crore and thirty lakh only), the Concessioning Authority shall be entitled to terminate this Agreement and consequences of termination as laid down in Article 15 shall follow. The Concessioning Authority may, at its discretion recover any amounts with respect to liquidated damages from the Performance Guarantee.

ARTICLE 7

7. Operations and Maintenance

7.1. Obligations of the Concessionaire

In addition to any of its other obligations under this Agreement, the Concessionaire shall manage, operate, maintain and repair the Project Facilities and Services, entirely at its cost, charges, expenses and risk in accordance with the provisions of this Agreement. The Concessionaire's obligations under this Article shall include, but not be limited to the following:

7.1.1. Berth and Terminal Operations

The Concessionaire shall:

(a) Promptly commence Project operations after the COD;

(b) Make efforts to maximize cargo handled so as to achieve optimal utilization of the Project Facilities and Services;

(c) Ensure compliance of Scope of Work

(d) Be free to deploy higher capacity equipment/facilities/ technology, etc. and induct new technology and carry out value engineering for improved productivity and/or improved utilization and/or cost saving of Project assets during the concession period;

(e) Ensure that the Project Facilities and Services shall adhere to the Operations and Maintenance Standards and Safety Standards and there is safe, smooth and uninterrupted flow of traffic under normal operating conditions;

(f) Minimize disruption to traffic in the event of accidents or other incidents affecting the safety and use of the Project Facilities and Services by providing a rapid and effective response and maintaining liaison with emergency services of the Concessioning Authority or other agencies;

(g) Make available all necessary financial, technical, technological, managerial and other resources for operation, maintenance and repair of and procurement and installation of equipment for the Project Facilities and Services in a timely manner;

(h) Ensure maintenance of proper and accurate record/data/accounts relating to operations of the Project Facilities and Services and revenue earned therefrom;

(i) Obtain, maintain and comply with Applicable Permits and comply with the Applicable Laws including those relating but not limited to Terminal side safety,

health, environment and labour;

(j) Subject to the provisions of this Agreement, perform, undertake or provide, in connection with the Project, all services which the Concessioning Authority is authorized to perform, undertake or provide under provisions of the IWAI Act; and

(k) Prevent, with assistance of concerned law enforcement agencies, any encroachment or unauthorized use of the Project Facilities and Services.

7.1.2. Marine and Terminal Services

(a) Scheduling the entry, berthing and sailing of vessels, pilotage and towage on a non-discriminatory basis subject to priority berthing norms and the sailing schedule

(b) Concessionaire share provide pilotage and towage services at the waterfront on the Project Site

(c) Provide for/put in place arrangements for provision of supporting Project Infrastructure other than those covered under the Concession Agreement

(d) Provide office space of 700 sq. ft. for the Concessioning Authority within the Terminal Administrative Building

7.1.3. Repairs and Maintenance

The Concessionaire shall at its own cost:

(a) Repair as necessary and maintain Project Facilities and Services or any part thereof in accordance with Scope of Work and for this purpose carry out routine preventive measures and maintenance of Project Facilities and Services

(b) Maintain the Project Facilities and Services in accordance with the provisions of this Agreement and Good Industry Practice with the objective of providing adequate service standards and ensuring that Project Facilities and Services to be transferred to the Concessioning Authority upon expiry of the Concession Period are in good condition, except for normal and reasonable wear and tear.

(c) Ensure that maintenance Performance Standards as specified in Annexure IV are met.

7.1.4. Repairs or Restoration

The Concessionaire shall at its own costs, promptly and diligently, repair or restore any of Project Facilities and Services or part thereof which may be lost, damaged, or destroyed for any reason whatsoever.

7.1.5. Removal and/or Replacement of Assets

Except as provided/authorized under this Agreement, the Concessionaire shall not, without prior written notice to the Concessioning Authority, remove or replace any assets forming part of Project Facilities and Services. Such notice shall contain the exact details of assets that the Concessionaire intends to remove and/or replace, its reasons for doing so and the likely period for replacement.

7.1.6. Payments to the Concessioning Authority

The Concessionaire shall ensure payments to the Concessioning Authority as per Article 9.

7.1.7. Access for Inspection

The Concessioning Authority, Authority's Personnel and their respective agents will at all times have access to the Terminals, technical documents, materials, records and accounts relating to such operations for the purpose of inspection and review, consistent with relevant safety procedures. The Concessionaire shall be obliged to extend all co-operation to subject matter Experts appointed by the Concessioning Authority for purposes of verifying that Project Facilities and Services are operated and maintained in compliance with Performance Standards and adhere to Operations and Maintenance Standards and Safety Standards. Such verification shall be made annually. Additionally, the Concessionaire shall upon prior intimation by the Concessioning Authority provide authorized representatives of the Concessioning Authority access to Project Facilities and Services for inspection and review of assets and operations and also to ascertain compliance with the requirements under this Agreement. Without prejudice to generality of this provision, it is agreed that the Concessionaire shall in particular extend all co-operation and information required by subject matter Experts appointed by the Concessioning Authority for conducting a safety audit and verifying that Project Facilities and Services are in strict compliance with Safety Standards.

7.1.8. Reports

The Concessionaire shall provide to the Concessioning Authority, Monthly reports on cargo traffic, unit gross output/ discharge rates at berth, Tariff billed and collected in respect of Project Facilities and Services. The Monthly Report shall be submitted within 15 (fifteen) days following the end of each month along with any other information relating to Project Facilities and Services which the Concessioning Authority may require from time to time. The Concessionaire shall provide reports in prescribed formats and in such electronic form so as to provide online access to the Concessioning Authority and its representatives.

7.1.9. Computer System and Network

The Concessionaire shall install, operate and maintain such computer system and network (such as Electronic Data Interchange and Terminal Community System) and follow such protocol as

the Concessioning Authority may specify from time to time. In addition, the Concessionaire shall install, operate and maintain an automated Gate Management System to ensure transparent and accurate reporting of total cargo throughput at the entry and exit gate of the terminal. The Concessionaire shall ensure live access of Gate Management System to the Concessioning Authority. The system shall report the entry time, exit time, type of cargo and quantity of cargo carried by the vehicle exiting the terminal;

7.1.10. Security Arrangements

The Concessionaire may make his own arrangements for security of Project Site and Terminal Assets. The Concessionaire shall abide by the security regulations and procedures prescribed by the Concessioning Authority or a competent Government Concessioning Authority from time to time.

7.1.11. Employment of personnel and manpower training

(a) The Concessionaire shall employ qualified and skilled personnel required to operate the Project Facilities and Services. The terms of employment may be as deemed fit by the Concessionaire and the Concessionaire shall comply with all Applicable Laws and bear all costs in this regard. Without prejudice to the generality of this provision, all requisite approvals for employment of personnel of foreign origin or nationality shall be obtained by the Concessionaire prior to engaging such personnel. Failure to obtain approval will not amount to a Force Majeure Event. All employees shall always remain the Concessionaire's responsibility.

(b) The Concessionaire shall adhere to all labour law compliances. The Concessionaire shall also ensure that adequate training is provided to the employees for skill development relevant to industry that would benefit the Terminal and enable knowledge transfer.

7.1.12. Minimum Guaranteed Cargo

(a) The Concessionaire shall endeavor to achieve a minimum annual riverine cargo throughput as per below schedule starting from the 4th (fourth) anniversary of COD.

S No	Year	Minimum Annual Riverine Cargo (mmtpa)
1	5 and 6	0.26
2	7 and 8	0.35
3	9 and 10	0.44
4	11 onwards (if applicable)	0.44

(b) Achievement of minimum annual riverine cargo throughput shall be monitored as per slabs in Article 7.1.12 (a) as given in Article 2.2.2 in case the Concessionaire requests for an extension of the Concession Period.

(c) In the event that the Concession Period is extended as given in Article 2.2.2, the Concessionaire shall unconditionally guarantee a minimum annual riverine cargo throughput as per slabs in Article 7.1.12 (a)

For avoidance of doubt it is clarified that in the event that Concession Period is extended and minimum annual riverine cargo throughput is not met in any year 11th year onwards, the Concessionaire shall pay Royalty commensurate with minimum annual riverine cargo as per slabs in Article 7.1.12 (a).

7.1.13. Indemnity against claims for loss of goods

Notwithstanding anything contained in the IWAI Act or any other law for the time being in force, the Concessionaire shall be responsible for addressing any claim, action, suit or proceeding ("**Action**") by any third party alleging loss, destruction or deterioration of goods of which charge has been taken by the Concessionaire and indemnify, save and hold harmless the Concessioning Authority, its officers, employees, agents and representatives (**"Indemnified Persons"**) against all claims, which may be asserted against or suffered and legal fees and costs incurred and which relate to any such goods, provided that notice of the action received by the Indemnified Persons shall be forwarded to the Concessionaire expeditiously and in any case within 30 (thirty) Days of receipt thereof by any of the Indemnified Persons.

Provided further that the Indemnitees shall have the right but not the obligation, to contest, defend and litigate any Action by any third party alleged or asserted against any of such Indemnitees in respect of, resulting from, related to or arising out of any matter for which it is to be indemnified hereunder, and reasonable costs and expenses thereof shall be indemnified by the Concessionaire.

If the Concessionaire acknowledges in writing its obligation to indemnify the Indemnitees in respect of loss to the full extent, the Concessionaire shall be entitled, at its option, to assume and control the defence of such Action at its expense and through the counsel of its choice; provided it gives prompt notice of its intention to do so to the Indemnitees and reimburses to them for reasonable cost and expenses incurred by them prior to assumption of such defence by the Concessionaire.

In such case the Indemnitees shall not be entitled to settle or compromise any Action without prior written consent of the Concessionaire, which consent shall not be unreasonably withheld or delayed. This indemnity shall survive the termination of this Agreement.

7.1.14. Maintenance of Complaint Portal

The Concessionaire shall maintain a "**Complaint Portal**" on its website which shall be available to all users of the Project Facilities and Services who shall be duly informed about availability of provision for lodging of complaints. The Complaint Portal will also be linked to the Concessioning Authority website with an alert system for real time access to the complaints.

Concessionaire shall take action for just and fair redressal of the complaint and submit a reply to the complainant within 30 (thirty) days of the date of receipt of the complaint with a copy to

Concessioning Authority and maintain a proof of reply.

If concessionaire fails to address the complaint and the complainant makes a reference to the Concessioning Authority, the Concessioning Authority may issue directions that shall be binding on the Concessionaire. The Concessioning Authority shall be just and fair in issuing such directions.

7.1.15. Operation and maintenance of Utilities

The operation and maintenance of Project utilities and related services shall be the responsibility of the Concessionaire.

7.1.16. Cargo visibility

The Concessionaire shall provide end-to-end visibility of cargo to all users by use of adequate technologies.

7.1.17. Reporting of Performance Standards

The Concessionaire shall report the Performance Standards to the Concessioning Authority on a quarterly basis.

7.1.18. Compliance with the Environment Management Plan

The Concessionaire shall fully comply with the Environment Management Plan ("**EMP**") provided by the Concessioning Authority during all times. Detailed provisions of the EMP are given in Annexure XV of this document.

7.1.19. Operation and maintenance of Waste Reception & Treatment Facility

The Concessionaire shall take over operation and maintenance of the Waste Reception & Treatment Facility infrastructure at the Terminal from the Concessioning Authority on COD to provide waste reception services to vessels as per Schedule IV of Ministry of Shipping Notification dated 13 July 2016.

7.2. Rights of Concessionaire

7.2.1. Preferential and priority berthing

The Concessionaire shall manage and operate Project Facilities and Services on a 'first come - first serve', common-user basis, open to any and all barge operators, importers, exporters, shippers, consignees and receivers; and refrain from indulging in any unfair or discriminatory practice against any user or potential user thereof. However, if there is a requirement to offer preferential or priority berthing to any one or more barge operators or vessel owners/operators to optimize the use of Project Facilities and Services, it shall be done based on volume commitments from the Concessionaire's client.

7.2.2. Liability for shortfall in draft maintenance along NW-1

In the event the Concessionaire observes that draft along NW-1 fall short of the mentioned draft as per Article 7.3.3, the Concessionaire shall calculate the amount of liquidated damages payable by the Concessionaire in accordance with Annexure IV of this Agreement and demand the Concessioning Authority by a notice in writing to pay the same within 90 (ninety) days. On receipt of demand, the Concessioning Authority may make a written representation to the Concessionaire which shall be considered by the Concessionaire on merits. The Concessionaire may waive liquidated damages in part or full, if it is satisfied that the Concessioning Authority has been carrying out its obligations diligently and efficiently and the shortfall to be waived was on account of reasons beyond the control of the Concessioning Authority.

7.2.3. Refinancing of debts

The Concessionaire in accordance with the provisions of this document and the provisions of the Draft Tripartite Agreement (Annexure XVIII may issue bonds to refinance the debts raised and utilized by it from Senior Lenders for financing the project for which Concessioning Authority shall enter into Tripartite Agreement as per the Draft Tripartite Agreement given in Annexure XVIII.

7.3. Obligations of the Concessioning Authority

In addition to any of its other obligations in this Agreement, the Concessioning Authority shall arrange for, or provide the following:

7.3.1. Approvals

The Concessioning Authority shall promptly grant approvals sought by the Concessionaire as required under this Agreement subject to the Concessionaire having complied with all Applicable Laws and requirements.

7.3.2. Additional land, utilities and facilities

In the event that land, utilities and facilities are found to be insufficient by the Concessionaire for providing services as per the scope of work, at any time during the Concession Period, the Concessionaire may approach the Concessioning Authority for providing additional land, utilities and facilities. The Concessioning Authority on being approached by Concessionaire shall consider the same, subject to reasonableness and availability. The Concessioning Authority may provide additional land, utilities and facilities if considered necessary. If the Authority is not in a position to provide the same, the Concessionaire shall not be entitled to any relaxation on the grounds that its request for additional land, utilities and services was not accepted by the Concessioning Authority.

7.3.3. Maintenance of Least Available Depth

The Concessioning Authority shall endeavour to provide the Least Available Depth (**"LAD"**) along NW-1 as follows:

Section	LAD (m)
Haldia – Barh	3.0

Barh - Ghazipur	2.5
Ghazipur –Varanasi	2.2

The Concessioning Authority may arrange for dredging operations, as may be required to ensure the LAD as per this Agreement, with minimum inconvenience to or dislocation of the Project Facilities and Services;

7.3.4. Terminal Community System

The Terminal Community System would be developed by the Concessioning Authority.

7.4. Rights of Concessioning Authority

7.4.1. If in the reasonable opinion of the Concessioning Authority, the Concessionaire is in material breach of its obligations under this Agreement for handling of cargo at the berth, the Concessioning Authority may, without prejudice to any of its rights under this Agreement including Termination thereof, by notice require the Concessionaire to take reasonable measures for the handling of cargo.

7.4.2. In the event that the Concessionaire, upon receipt of notice above, fails to handle cargo at the berth within a reasonable period, the Concessioning Authority may take over performance of any or all obligations of the Concessionaire to the extent deemed necessary by it for handling of cargo at the berth; provided that such taking over by the Concessioning Authority shall be of no greater scope and of no longer duration than is reasonably required.

7.5. Utilities and services

7.5.1. The Concessioning Authority shall, during the Concession Period, provide access to the Concessionaire for all infrastructure facilities and utilities including water, electricity and telecommunication facilities necessary for the implementation, operations and management of the Project Facilities and Services in accordance with this Agreement, at rates and on terms no less favourable to the Concessionaire than those generally available to commercial customers availing substantially equivalent facilities and utilities. Provided that, unless otherwise agreed to by the Concessioning Authority:

(a) power made available shall be as received by the Concessioning Authority from Purvanchal Vidyut Vitaran Nigam Limited. The take off point for electricity shall be from the sub station;

(b) The Concessionaire shall, at its cost, and to satisfaction of the Concessioning Authority, install meters to measure consumption of power and water. The Concessioning Authority does not warranty reliability, quality and quantity of water and power and shall not be liable in any manner for shortage in or non-supply of these utilities;

(c) The Concessionaire may, at its cost, make alternate arrangements for power including but not limited to installation of generators, subject to obtaining

Applicable Permits, if any.

7.6. Liability for shortfall in performance

7.6.1. In the event the Concessioning Authority, whether from the review of reports submitted by the Concessionaire or otherwise, observes that Project Facilities and Services fall short of the Performance Standards, the Concessioning Authority shall issue a demand notice to the Concessionaire seeking liquidated damages. The liquidated damages shall be calculated in accordance with Annexure IV of this Agreement. The liquidated damages shall be payable within 30 (thirty) days of the date of issue of notice. On failure of the Concessionaire to pay the same, Concessioning Authority shall recover the amount from the Performance Bank Guarantee provided by the Concessionaire.

7.6.2. Provided that, within 15 (fifteen) days of receipt of demand notice, the Concessionaire may make a written representation to the Concessioning Authority which shall be considered by the Concessioning Authority on merits. The Concessioning Authority may waive the liquidated damages in part or full, if it is satisfied that the Concessionaire has been carrying out its obligations diligently and efficiently and that the performance shortfall to be waived was on account of reasons beyond the control of the Concessionaire.

7.6.3. It is clarified that this provision does not prejudice the rights of the Concessioning Authority upon a Concessionaire Event of Default as set out in Article 15 including the Concessioning Authority's right to terminate this Agreement which shall remain unaffected.

ARTICLE 8

8. Tariff

8.1. Levy and Recovery of Tariff

8.1.1. The Concessionaire shall levy and recover Tariff from the users of the Project Facilities and Services as per Annexure XIV. The tariff document as per Annexure XIV prescribes the maximum tariff that can be levied by the Concessionaire ("Ceiling Tariff").

8.1.2. The Ceiling Tariff shall be revised every year based on a variation in the Wholesale Price Index ("WPI"). Such revision shall be based on indexation against 60% (sixty percent) of the variation in the WPI for a relevant year beginning 1st January and ending 31st December.

8.1.3. The revised Ceiling Tariff shall be regulated as per Section 17 of the Inland Waterways Authority Act, 1985. Such revised Ceiling tariff will become applicable after the same has been notified by the Concessioning Authority.

ARTICLE 9

9. Payments to the Concessioning Authority

9.1. License fee

9.1.1. The Concessionaire shall, as consideration for the use, in its capacity as a bare licensee of the Project Site and the equipment comprised in the Terminal's Assets, made available in accordance with Article 2.4, pay to the Concessioning Authority the sum of Re 1 (Rupee 1 Only) (the "License Fee"). Such amount shall be paid by the Concessionaire in yearly installments.

9.1.2. Any delay in payment of the amount in the preceding Article 9.1.1 shall entail payment of interest @ 10 Year GSec plus 6% (Six percent) per annum on the amount outstanding.

9.2. Payments of Royalty

9.2.1. The Concessionaire shall make payments to the Concessioning Authority a Royalty equal to INR _____ per MT on Riverine cargo handled during the previous month ("**Royalty**"). Such payments shall commence from 2nd (second) month (pertaining to previous month) after 4th (fourth) anniversary of COD until Termination. The Concessionaire shall make payments to the Concessioning Authority an amount equivalent to the quoted Royalty plus a premium of 20% (twenty percent) on quoted Royalty for Non-Riverine cargo handled during the previous month. Such payments shall commence from 2nd (second) month (pertaining to previous month) after COD until Termination. All such payments shall be exclusive of applicable taxes which the Concessionaire will pay over and above Royalty payments.

9.2.2. Royalty per MT of cargo will be indexed as per the variations in the Wholesale Price Index (WPI) annually. Such revision shall be based on indexation against 60% (sixty percent) of the variation in the WPI for a relevant year beginning 1st January and ending 31st December.

9.2.3. Royalty for each month shall be paid on or before the 7th (seventh) day of the following month.

9.2.4. Royalty amounts remaining unpaid on respective due dates would carry interest @ 10 year GSec plus 6% (Six percent) per annum from the due date till the date of payment.

9.2.5. The Concessionaire shall submit a Monthly Report to the Concessioning Authority showing, among other things, calculation of total cargo throughput in metric tons, for all types of cargo including dry-bulk, break-bulk, liquid-bulk, containers, bagged etc., measured through bill of lading or cargo manifest. For the purpose of Royalty calculation, cargo measurement mechanism as given below may be used:

S No	Cargo type	Cargo measurement
1	Container	Gross weight in MT as per bill of lading/cargo manifest
2	Dry bulk	As per bill of lading/cargo manifest in MT

3	Liquid bulk	As per bill of lading/cargo manifest in MT
4	Break bulk	As per bill of lading/cargo manifest in MT
5	Bagged cargo	As per bill of lading/cargo manifest in MT
6	Any other cargo	As per bill of lading/cargo manifest in MT

The decision of the Additional Auditor shall be final in this matter as given in Article 9.3.3.

9.3. Certified accounts

9.3.1. During the subsistence of this Agreement, the Concessionaire shall maintain all documents and supporting evidences for its financial statements including agreements and documents with respect to all capital and debt raised by the Concessionaire, capital expenditure and operational expenses towards the Project; user-wise, vessel-wise information; cargo throughput by category; tariffs charged and the amount of money received. The Concessionaire shall submit to the Concessioning Authority a financial statement including quantity (MT) of cargo handled for every 6 (six) monthly period ending 30th September and 31st March every year, duly certified by its Statutory Auditors. The certificate must be furnished within 30 (thirty) Days of the end of each such period**.**

9.3.2. The Concessioning Authority may, at its own cost, appoint a firm of chartered accountants duly licensed to practice in India and empaneled by CAG (**"Additional Auditor"**) to conduct a special audit of the cargo throughput and the financial statements, documents and supporting evidences thereto as may be mandated by the Concessioning Authority (**"Special Audit"**).

9.3.3. In the event that the cargo throughput reported by the Additional Auditor is higher than that reported by the Statutory Auditor, the auditors shall meet to resolve such differences and if they are unable to resolve the same, the Concessionaire shall pay Royalty on the cargo throughput reported by the Additional Auditor. The Concessionaire shall also pay interest @ 10 year GSec plus 6% - (Six percent) on the difference in Royalty as per the cargo throughput reported by the Statutory Auditor and the Additional Auditor. Further, the Concessionaire shall reimburse all costs, charges and expenses related to Special Audit. Without prejudice to the aforesaid, if difference between cargo throughput reported by the Additional Auditor and the Statutory Auditor is higher than 5% (five percent), the Concessioning Authority shall have the right to require a Special Audit for the entire outstanding tenure of the Concession.

9.4. Escrow account

9.4.1. Withdrawals and appropriations during the Concession Period, at any relevant time, from the Escrow Account shall be in the following order of priority:

(a) for all taxes due and payable by the Concessionaire;

(b) towards payment of license fees;

(c) all development/equipment expenses relating to Project Facilities and Services, subject to limits if any set out under Financing Documents;

(d) all expenses relating to operation and maintenance of Project Facilities and Services, subject to limits if any set out under Financing Documents;

(e) towards payment of Royalty and other sums payable to the Concessioning Authority and liquidated damages, if any;

(f) towards Concessionaire's debt service obligations under Financing documents;

(g) towards any reserve requirements in accordance with Financing Documents; and the Concessionaire shall be at liberty to withdraw any sums outstanding in Escrow Account after all the aforesaid payments due in any Quarter have been made and/or adequate reserves have been created in respect thereof for that Quarter. Provided, upon issuance of Termination Notice and/or suspension of the Concessionaire in accordance with provisions of this Agreement, withdrawal from the Escrow Account shall be made only in accordance with written instructions of the Concessioning Authority and the Senior Lenders.

9.4.2. All amounts standing to the credit of Escrow Account at the end of the Concession Period including amounts credited to the Escrow Account towards compensation payable in accordance with Article 16 shall be appropriated in following order of priority:

(a) towards taxes and statutory dues payable by the Concessionaire;

(b) compensation to Senior Lenders in terms of Financing Documents towards discharge of the Concessionaire's liability under such Financing Documents;

(c) all amounts due to the Concessioning Authority and amounts payable towards transfer of Project Facilities and Services by the Concessionaire in accordance with this Agreement;

The Concessionaire shall be at liberty to withdraw any sums outstanding in Escrow Account after all the aforesaid payments due have been made and/or adequate reserves have been created in respect thereof to the satisfaction of the Senior Lenders and the Concessioning Authority.

9.4.3. The Concessionaire agrees and undertakes that it shall deposit into and/or credit the Escrow Account with:

(a) all monies received in relation to the Project from any source, including the Senior Lenders;

(b) all funds received by the Concessionaire from its share-holders, in any manner or

form;

(c) all Fee levied and collected by the Concessionaire;

(d) any other revenues from or in respect of the Project/Project Facilities and Services accruing to the Concessionaire including termination payments; and

(e) all proceeds received pursuant to any insurance claims.

For avoidance of doubt, all amounts received by the Concessionaire in respect of the Project/Project Facilities and Services excepting any amounts in respect of cesses and duties collected by it from the users on behalf of the Concessioning Authority or such other Concessioning Authority in accordance with the Concession Agreement or pursuant to any other instructions in respect thereof shall be deposited in the Escrow Account.

ARTICLE 10

10. Assets: Ownership and Permitted Charge

10.1. Ownership of Assets

10.1.1. Land and Water Area

The ownership of the Project Site and Terminal's Assets shall always remain vested with the Concessioning Authority. The rights of the Concessionaire in the Project Site and Terminal's Assets shall only be that of a bare licensee of such assets and the Concessionaire shall neither assign, transfer, sublet, create any charge or Encumbrance, nor shall the Concessionaire create or permit creation of any third party rights whatsoever, on whole or any part of the Terminal's Assets or Project Site. Further, any such rights of the Concessionaire shall always be subject to existing rights of way. It is expressly agreed that the Concessionaire's rights in Project Site and/or Terminal's Assets shall cease without the need for any action to be taken by the Concessioning Authority upon termination of this Agreement for any reason whatsoever.

10.1.2. Assets created or provided by the Concessionaire

The ownership of all infrastructure assets, buildings, structures, berths, wharfs, equipment and other immovable and movable assets constructed, installed, located, created or provided by the Concessionaire at Project Site and/or in Terminal's Assets pursuant to this Agreement shall, until expiry of or termination of this Agreement, be with the Concessionaire. However, such ownership of buildings etc. erected by the Concessionaire at Project Site shall not be construed as and shall not confer any rights in Project Site or other Terminal's Assets upon the Concessionaire, save as that of a bare licensee.

10.2. Permitted Charge

The Concessionaire shall be entitled to create a charge on its rights, title and interest in the assets referred to in Article 10.1.2 in favour of Senior Lenders for securing the Financial Assistance provided or agreed to be provided by them under the Financing Documents. Provided, any such charge shall not be effective before Financial Close and shall not continue for a period exceeding the Concession Period.

Provided further, that such charge shall not be for the Project Site nor encumber the Project Site.

Provided further, in the event of termination of this Agreement, the said charge shall stand extinguished upon payment of compensation by the Concessioning Authority to the Senior Lenders, to the extent they are entitled to receive the same in accordance with the provisions of this Agreement.

ARTICLE 11

11. Shareholding

11.1. Ownership Structure

11.1.1. The Bidder/Consortium has caused the Concessionaire to be incorporated as a Special Purpose Vehicle ("**SPV**") to equip, operate and transfer Project/Project Facilities and Services in accordance with this Agreement. The shareholding pattern of the SPV is as follows: [●].

11.2. Shareholding

The Concessionaire shall ensure that the Bidder/ members of the Consortium maintain Management Control at least until expiry of 4 (four) years after COD and also maintain their equity holding in the Concessionaire such that[2]:

11.2.1. Lead Consortium Member hold not less than 51% (fifty one percent) of its issued and paid up equity and that no member of Consortium whose technical and financial capacity was evaluated in response to Request for Proposal shall hold less than 26% (twenty six percent) of such equity until expiry of 4 (four) years after COD. At any time, after expiry of the aforesaid equity lock-in period, the lead member can seek Concessioning Authority's approval for change in the SPV's shareholding structure. The Concessioning Authority may, at its sole discretion, consider and approve it subject to the condition that the SPV, after the proposed change in shareholding structure, would not violate the eligibility criteria as prescribed in RFP for the Project; and

11.2.2. M/s [●] ("Lead Member") of the Consortium (original or new as the case may be) legally and beneficially holds at any time at least 51% (fifty one percent) of the Consortium's holding in paid up equity capital of the Concessionaire.

11.2.3. Any Transfer of shareholding in the Concessionaire and/or direct or indirect change in the Management Control of the Concessionaire, including by way of a restructuring or amalgamation, shall only be with the prior written approval of the Concessioning Authority which consent shall not be withheld except:

(i) for reasons of national security; or

(ii) if the Person proposed for assuming such Management Control would by virtue of the restrictions imposed under the Applicable Law or the conditions of bidding (including restrictions to avoid anti-competitive and monopolistic practice) and/or public policy be disqualified from undertaking the Project.

(iii) if in the reasonable view of the Concessioning Authority such change is likely to

[2] This provision would be edited depending on whether the bidder is a single bidder or a Consortium. Article 11.2.2 will be omitted in case the bidder is a single Bidder.

cause material adverse impact on the Concessionaire and/ or the Project.

11.2.4. Provided, nothing contained in this Article shall preclude or prevent pledge of shares in the Concessionaire in favour of Senior Lenders as security for the Financial Assistance subject to enforcement and consequent Transfer thereof only with prior written consent of the Concessioning Authority as stated hereinbefore and in accordance with the Financing Documents.

11.3. Constituent documents

11.3.1. The Concessionaire shall ensure that its articles of Association adequately reflect aforesaid and relevant commitments, obligations and responsibilities of the Concessionaire.

11.3.2. In particular, the articles of Association and Memorandum of Association of the Concessionaire shall be amended within 3 (three) months of the Appointed Date to include terms and conditions regarding composition and changes of shareholding structure and management stipulated in this Agreement;

11.3.3. The Concessionaire shall submit amended Articles of Association and Memorandum of Association to the Concessioning Authority within 30 (thirty) days of the Appointed Date.

11.3.4. Any subsequent change in the Articles of Association or Memorandum of Association shall require prior approval of the Concessioning Authority and the Articles of Association and Memorandum of Association shall include a specific provision to this effect.

ARTICLE 12

12. General Rights, Duties and Obligations

12.1. Of the Concessionaire

12.1.1. Applicable Permits

The Concessionaire shall at all times during the Concession Period maintain and comply with the Applicable Permits.

12.1.2. Taxes & duties

The Concessionaire shall during the Concession Period pay in a timely manner all taxes, duties, levies and charges including but not limited to income tax and goods and services tax that may be levied, claimed or demanded from time to time by any Government Authority including any increase therein effected from time to time from any Government Authority, in respect of Project/ Project Facilities and Services.

12.1.3. Insurance

(i) Insurance Requirement: The Concessionaire shall, at its cost and expense, purchase and maintain insurances as are prudent, including but not limited to the following:

(a) Concessionaire's all risk insurance;

(b) loss, damage or destruction of the Project Facilities and Services, at replacement value;

(c) comprehensive third party liability insurance including injury or death to personnel of the Concessioning Authority and others who may enter Project Site or Terminal's Assets;

(d) workmen's compensation insurance;

(e) marine cum storage cum erection insurance; and

(f) any other insurance that may be necessary to protect the Concessionaire, its employees and its assets and the Concessioning Authority, its employees and agents engaged in or connected to the Project and Project Site and Terminal Assets (against loss, damage or destruction at replacement value including all Force Majeure Events that are insurable and not otherwise covered in items (i) to (v).

(ii) Insurance Cover & Insurance Companies: The Concessionaire shall insure all insurable Terminal's Assets and Project Facilities and Services and all insurable risks associated with Project to the extent advisable in accordance with Good Industry Practice ("Insurance Cover"). Insurance of IWAI assets to be taken with zero deductible franchise to ensure maximum proceeds.

(iii) Evidence of Insurance Cover: The Concessionaire shall, from time to time, provide to the Concessioning Authority copies of all insurance policies (or appropriate endorsements, certifications or other satisfactory evidence of insurance) obtained by the Concessionaire in accordance with this Agreement.

(iv) Application of Insurance Proceeds: Subject to provisions of the Financing Documents, all moneys received under insurance policies shall be promptly applied by the Concessionaire towards repair or renovation or restoration or substitution of Terminal's Assets and Project Facilities and Services or any part thereof which may have been damaged or destroyed and in respect of which the claim is lodged. The Concessionaire may designate Senior Lenders as loss payees under the insurance policies or assign the insurance policies in their favour as security for the Financial Assistance. The Concessionaire shall carry out such repair or renovation or restoration or substitution to the extent possible in such manner that the Project Facilities and Services or any part thereof, shall, after such repair or renovation or restoration or substitution be as far as possible in equal or better condition as they were before such damage or destruction, normal wear and tear excepted.

(v) Validity of Insurance Cover: The Concessionaire shall pay premium payable on such insurance policies so as to keep the policies in force and valid throughout the Concession Period and furnish copies of the same to the Concessioning Authority. Each insurance policy shall provide that the same shall not be cancelled or terminated unless 10 (ten) Days' clear notice of cancellation is provided to Concessioning Authority in writing. If at any time the Concessionaire fails to purchase and maintain in full force and effect any and all insurances required under this Agreement, the Concessioning Authority may at its option purchase and maintain such insurance and all sums incurred by the Concessioning Authority therefor shall be reimbursed with interest @ 10 year GSec plus 6% - (six percent) per annum by the Concessionaire forthwith on demand, failing which the same shall be recovered by the Concessioning Authority by exercising right of set off or otherwise.

(vi) Waiver of Subrogation: All insurance policies procured in terms of provisions hereof shall include a waiver of any right of subrogation of insurers thereunder against, inter alia, the Concessioning Authority and its assigns and successors and their respective subsidiaries, Associates, employees and of any right of the insurers of any set-off or counterclaim or any other deduction, whether by attachment or otherwise, in respect of any liability of any such person insured under any such policy or in any way connected with any loss, liability or obligation covered by such policies of insurance.

12.1.4. Indemnification

The Concessionaire shall, during pendency of this Concession Agreement and thereafter, until all claims and demands in respect to acts and omissions during the Concession Period as described hereunder are duly settled, indemnify and keep indemnified and otherwise save harmless, the Concessioning Authority, its agents and employees, from and against all claims, demands made against and/or loss caused and/or damages suffered and/or cost, charges/expenses incurred to and/or penalty levied and/or any claim due to injury to or death of any person and/or loss or damage caused or suffered to property owned or belonging to the Concessioning Authority, its agents and employees or third party as a result of any acts, deeds or thing done or omitted to be done by the Concessionaire or as a result of failure on part of the Concessionaire to perform any of its obligations under this Concession Agreement or on the Concessionaire committing breach of any terms and conditions of this Concession Agreement or on the failure of the Concessionaire to perform any of its duties and/or obligations including statutory duties or as a consequence of any notice, action, suit or proceedings, given, initiated, filed or commenced by consignee or owner of goods or vessel owner/agent or its employees or any third party or Government Authority or as a result of any failure or negligence or default of the Concessionaire or its Contractor(s), sub-contractor(s), or employees, servants, agents of such Contractor(s) and/or sub-contractor(s) and/or invitees as the case may be, in connection with or arising out of this Agreement and/or arising out of or, in connection with the Concessionaire's use and occupation of the Project Site or Terminal's Assets and/or development/equipment, operation, management and maintenance of Project Facilities and Services.

12.1.5. Assignability

Except as otherwise provided in this Agreement, the Concessionaire shall not assign its rights, title or interest in this Agreement in favour of any Person without prior written consent of the Concessioning Authority.

Provided the Concessionaire may assign its rights, interests and benefits under this Agreement to Senior Lenders as security for Financial Assistance. Provided further nothing contained in this Article shall:

(i) absolve the Concessionaire from its responsibilities to perform/discharge any of its obligations under and in accordance with the provisions of this Agreement; and

(ii) authorize or be deemed to authorize the Senior Lenders to operate the Project Facilities and Services themselves and any such assignment to operate shall be in terms of the Substitution Agreement.

12.1.6. Engagement of Contractors

The Concessionaire shall engage the Management Contractor and execute the Management Contract, thereby entrusting the Management Contractor with the responsibilities of operating and managing the Project Facilities and Services in the manner envisaged under

the Request for Proposal. A copy of the Management Contract shall be provided to the Concessioning Authority and the same shall not be amended, substituted or revoked without prior written consent of the Concessioning Authority.

The Concessionaire may engage any Person possessing requisite skill, expertise and capability of designing, engineering, procurement and development of civil/ mechanical/electrical engineering structures/equipment, and/or operation and maintenance of Project Facilities and Services.

Provided that:

(i) the Concessionaire shall at all times be solely responsible for all its obligations under this Agreement notwithstanding any such engagement and anything contained in any Project Contracts or any other agreement, and no default under any Project Contract or agreement shall excuse the Concessionaire from its obligations or liability hereunder and the Concessionaire shall at all times be solely responsible for non-performance or for any defect, deficiency or delay in development and erection and/or installation of structures/equipment or any part thereof and for the operation and maintenance of Project/Project Facilities and Services in accordance with provisions of this Agreement;

(ii) the Concessionaire should have obtained, if required, security clearance for the Contractor the Concessionaire intends to engage;

(iii) the Concessionaire shall ensure that Project Contracts contain provisions that entitle the Concessioning Authority to step into such contract in its sole discretion in substitution of the Concessionaire in the event of termination or suspension of this Agreement; and

(iv) any contract that it enters with an Associate in respect of the Project shall be on arms-length basis and shall require a written approval from the Concessioning Authority.

12.1.7. Condition Survey

The Concessionaire agrees that at least 6 (six) Months prior to expiry by efflux of time of the Concession Period, it shall, cause to be conducted at its cost by an industry Expert appointed by Parties by mutual consent, a condition survey and an inventory of entire Project Facilities and Services. If, as a result of such survey, the industry Expert shall observe that the Terminal's Assets and/or Project Facilities and Services or any part thereof have/has not been operated and maintained in accordance with requirements therefor under this Agreement (normal wear and tear excepted) the Concessionaire shall, at its cost and expenses, take all necessary steps to put the same in good working condition well before the Transfer Date. In the event the Concessionaire fails to comply with this provision, the Concessioning Authority may itself cause the condition survey and inventory of the Terminal's Assets and Project Facilities and Services to be conducted and remove any defect or deficiency. The Concessioning Authority shall be promptly reimbursed by the

Concessionaire for costs incurred in conducting such survey and preparation of inventory as also in putting Project Facilities and Services in a good working condition.

The Concessionaire shall as security for performance of its obligation in preceding sub-Article (a), submit to the Concessioning Authority a guarantee issued by a scheduled bank in India for a sum of INR 2.3 crore (INR Two crore and thirty lakh only), 2 (two) years prior to the expiry of the Concession Period. In the event of Concessionaire's failure to provide such guarantee, the same shall be deemed to be a Concessionaire Event of Default and the Concessioning Authority shall accordingly be entitled to terminate this Agreement in accordance with Article 15. This shall be over and above the Performance Guarantee submitted in accordance with Article 4.

12.2. Of the Concessioning Authority

12.2.1. Assistance in obtaining approvals, permits and licenses

The Concessioning Authority shall, at the written request of the Concessionaire, but without guarantees and/or without assuming any responsibility in that behalf, issue recommendatory letters and make best efforts to assist the Concessionaire in obtaining all the Applicable Permits including renewals thereof. Provided that, nothing contained in this Article shall relieve the Concessionaire of its obligations under this Agreement to obtain the Applicable Permits and to keep them in force and effect throughout the Concession Period.

12.2.2. Competing facilities

The Concessioning Authority shall not operationalize any additional terminal to handle riverine cargo at riverfront within a radial distance of 50 km from the Terminal reference point for the duration of the Concession Period as mentioned in Article 2.2. The terminal reference point shall be the center point with co-ordinates 25°15'06.1"N 83°01'50.1"E. Equipment phase of the Project shall not be considered as a competing facility.

For avoidance of doubt, it is clarified that floating jetties and Ro-Ro jetties shall not be considered as competing facilities for the Terminal.

12.2.3. General rights of inspection and verification

The Concessioning Authority may during pendency of the Agreement itself or by appointment of a subject matter Experts verify performance of obligations of the Concessionaire as set out in this Agreement.

12.3. Of the Concessioning Authority and the Concessionaire

12.3.1. Monitoring Arrangement

The parties shall furnish to each other periodical status reports relating to key milestones and obligations as per Annexure X "Monitoring Arrangement"

12.3.2. Compliance with Laws and Regulations

The Parties shall perform their respective obligations under this Agreement in accordance with Applicable Laws and Applicable Permits.

12.3.3. Rights to Documents

(i) Concessioning Authority's Documents: Documents and computer programs or copies thereof, if any, provided by the Concessioning Authority to the Concessionaire, shall always remain property of the Concessioning Authority. Such documents, computer programs and/or copies shall not be used by the Concessionaire for purposes other than for the Project. Such documents, computer programs and/or copies thereof shall, unless otherwise agreed upon by the Concessioning Authority, be returned by the Concessionaire to the Concessioning Authority on Transfer Date.

(ii) Concessionaire's Documents: Documents and computer programs provided by the Concessionaire, or which are developed (and owned by the Concessionaire) for operation and/or management of Project /Project Facilities and Services shall be handed over by the Concessionaire to the Concessioning Authority free of cost on the Transfer Date.

(iii) Confidentiality: All confidential information and documents (whether financial, technical or otherwise provided by either Party to the other shall not, unless compelled by law or the process of a Government Authority, be disclosed to any Person without the consent of the other Party with the exception of providing such information to legal advisors/auditors of the concerned party on a need-to-know basis. This covenant shall survive the Concession Period.

(iv) Obligation to Cooperate: The Parties shall mutually cooperate with each other in order to achieve the objectives of this Agreement.

(v) Substitution Agreement: The Substitution Agreement envisaged in this document, may be executed within 30 (thirty) Days' of notice by the Concessionaire to the Concessioning Authority of Senior Lenders' readiness to execute the same.

12.4. Assistance of Expert

12.4.1. The Parties, may, in circumstances mentioned in this Concession Agreement and other appropriate circumstances seek help of an Expert on case to case basis. The Parties shall ensure that the Expert proposed to be appointed is independent and has no conflict of interest and possesses the skill and experience to resolve the issue at hand. The cost of the service of the Expert shall be shared equally.

12.4.2. The Concessioning Authority shall propose the name of three Experts proposed to be appointed and the Concessionaire shall be required to choose one of them no later than

30 (thirty) days from date of proposal by Concessioning Authority to act as Expert for the issue at hand.

12.4.3. The Expert shall be expected to resolve the issues referred to him expeditiously and the Parties shall ensure that all necessary and reasonable assistance is provided to the Expert.

ARTICLE 13

13. Change in Law

13.1. Change in law

"Change in Law" means any of the following events which has a Material Adverse Effect:

13.1.1. adoption, promulgation, modification, reinterpretation or repeal after the date of this Agreement by any Government Authority of any statute, rule, ordinance, regulation or order, treaty, convention, directive, guideline, policy having force of law; or

13.1.2. the imposition by any Government Authority of any material condition (other than a condition which has been imposed as a consequence of a violation by the Concessionaire of any Applicable Permit) in connection with the issuance, renewal or modification of any Applicable Permits after the date of this Agreement which renders the performance by the Concessionaire of any of the terms of this Agreement impossible or unviable; or

13.1.3. Any Applicable Permit previously granted, ceasing to remain in full force and effect for reasons other than breach/violation by or the negligence of the Concessionaire or if granted for a limited period, being renewed on terms different from those previously stipulated.

13.1.4. Any imposition of new Taxes except a new Direct Tax (both State and Central), duties, cess and the like and/or the increase in Taxes except in Direct Taxes (both State and Central), duties, cess and the like effected from time to time by any Government Authority, and/or imposition of standards and conditions of operations, maintenance and safety arising out of a new or revised Environmental Law; and/or imposition of standards and terms of employment and working conditions of Labourers and Workmen; and/or any rules or regulations stipulated by IWAI Act or other regulatory authority having jurisdiction over the Project in respect of standards of service. A change in the interpretation or application of any Indian Law by the judgement of a court of record which has become final and binding in place of such interpretation or application of law by a count of record prior to the bid due date

13.2. The Concessionaire's Remedy

13.2.1. In the event of Change in Law the Concessionaire may propose to the Concessioning Authority modifications to the relevant terms of this Agreement which are reasonable and intended to mitigate the effect of the Change in Law. Thereupon, the Parties shall, in good faith, negotiate and agree upon suitable changes in the terms of this Agreement including extension of the Concession Period, so as to place the Concessionaire in substantially the same legal and financial position as it were prior to such Change in Law. i.e Protecting Project IRR as per Financing Plan. Provided however, that if the resultant Material Adverse Effect is such that this Agreement is frustrated or is rendered illegal or impossible of performance, the Change in Law shall be deemed to be a Political Event, whereupon the provisions with respect thereto shall apply.

13.2.2. In the alternative to the aforesaid, subject to the Concessionaire taking necessary measures to mitigate the impact or the likely impact of Change in Law on the Project, if as a direct consequence of a Change in Law, the Concessionaire is obliged to incur Additional Cost in any accounting year, any such Additional Cost above a sum of INR 1.1 crore (INR One crore and ten lakh only) may at the option of the Concessioning Authority be borne by the Concessioning Authority. It is clarified that Additional Cost upto INR 1.1 crore (INR One crore and ten lakh only) in any accounting year shall be borne by the Concessionaire;

13.2.3. Upon occurrence of a Change in Law, the Concessionaire shall notify the Concessioning Authority, of the following:

(a) the particulars, nature and the impact of Change in Law on the Project;

(b) in sufficient detail, the estimate of the Additional Cost likely to be incurred by the Concessionaire on account of the Change in Law; and

(c) the measures, which the Concessionaire has taken or proposes to take to mitigate the impact of Change in Law, including in particular, minimising the Additional Cost.

13.2.4. Upon receipt of the notice of Change in Law issued by the Concessionaire pursuant to the preceding sub-article 13.2.3, the Concessioning Authority and the Concessionaire shall hold discussions and take all such steps as may be necessary including determination/certification by a financial Expert, appointed by the Parties by mutual consent, of the Additional Cost and to determine the quantum of the Additional Cost to be incurred.

13.2.5. If it is determined that the only material impact of a Change in Law is Additional Cost and the Concessioning Authority opts to compensate the same in accordance with the preceding sub-article 13.2.4, the Concessionaire shall not be entitled to any other remedy nor shall seek any alterations to the Agreement and the Concessioning Authority shall, within 30 (thirty) Days from the date of determination of quantum of Additional Cost to be borne by the Concessioning Authority in accordance with sub-article (b) above, compensate the Concessionaire in either of the following ways:

(a) by lump-sum reimbursement of such Additional Cost to the Concessionaire;

(b) reimbursement of the such Additional Cost to the Concessionaire, in not exceeding four half yearly installments, subject to payment of interest at 10 Year GSEC + 6% - (Six percent) on the amount the payment of which is deferred.

13.2.6. Notwithstanding the aforesaid, if in terms of Good Industry Practice, the event constituting a Change in Law could be insured, the Concessionaire shall not be entitled to any remedy under this Article 13.2;

13.2.7. If as a result of Change in Law, the Concessionaire incurs a reduction in costs or other financial gain or benefit in connection with its development or operation of the Project, the aggregate financial effect of which exceeds INR 1.1 crore (INR One crore and ten lakh only) in any Financial Year, the Concessionaire shall notify the Concessioning Authority and pay to the Concessioning Authority an amount that would put the Concessionaire in the same financial position it would have occupied had there been no such Change in Law resulting in such cost reduction, increase in return or other financial gain or benefit as aforesaid. Without prejudice to the aforesaid, the Concessioning Authority may, by notice in writing require the Concessionaire to pay an amount that would put the Concessionaire in the same financial position it would have occupied had there been no such Change in Law resulting in such cost reduction, increase in return or other gain or benefit.

13.2.8. The Concessionaire shall make payment of such compensation within sixty (60) Days of the said financial benefit. If the Concessionaire shall dispute the quantum of such compensation claim of the Concessioning Authority, the same shall be finally settled in accordance with the dispute resolution mechanism contained in Article 19 herein.

ARTICLE 14

14. Force Majeure

14.1. Force Majeure Event

14.1.1. As used in this Agreement, Force Majeure Event means the occurrence of any of the Non- Political Events, the Political Events or the Other Events in India, set out in Articles 14.2, 14.3 and 14.4 respectively including the impact/consequence thereof which:

(a) is beyond the control of the Party claiming to be affected thereby (the **"Affected Party"**);

(b) prevents the Affected Party from performing or discharging its obligations under this Agreement; and

(c) the Affected Party has been unable to overcome or prevent despite exercise of due care and diligence.

14.2. Non-Political Events

14.2.1. Any of the following events which prevent the Affected Party from performing any of its obligations for a continuous period of not less than 7 (seven) Days from the date of its occurrence, shall constitute a Non-Political Event:

(a) act of God, epidemic, extremely adverse weather conditions, lightning, earthquake, cyclone, flood, volcanic eruption, chemical or radioactive contamination or ionizing radiation, fire or explosion (to the extent of contamination or radiation or fire or explosion originating from a source external to the Project Site and by reasons not attributable to the Concessionaire or the Contractor or any of the employees or agents of the Concessionaire or the Contractor);

(b) strikes or boycotts (other than those involving the Concessionaire, Contractors or their respective employees/representatives, or attributable to any act or omission of any of them), and not being an Other Event set forth in Article 14.4, labour disruptions or any other industrial disturbances not arising on account of the acts or omissions of the Concessionaire or the Contractor;

(c) any failure or delay of a Contractor caused by any of the Non-Political Events, for which no offsetting compensation is payable to the Concessionaire or on behalf of the Contractor;

(d) the discovery of geological conditions, toxic contamination or archeological

remains on the Project Site that could not reasonably have been expected to be discovered through a site inspection; or

(e) any event or circumstance of a nature analogous to any of the foregoing.

14.3. Political Events

14.3.1. Any of the following events shall constitute Political Event:

(a) Change in Law for which no relief is provided under the provisions of Article 1 3 , resulting in Material Adverse Effect;

(b) action of a Government Authority having Material Adverse Effect including but not limited to:

(i) acts of expropriation, compulsory acquisition or takeover by any Government Authority of the Project/Project Facilities and Services or any part thereof or of the Concessionaire's or the Contractor's rights under any of the Project Contracts, and

(ii) any unlawful, unauthorized or without jurisdiction refusal to issue or to renew or the revocation of any Applicable Permits, in each case, for reasons other than the Concessionaire's or the Contractor's breach or failure in complying with the Scope of Work, Applicable Laws, Applicable Permits, any judgment or order of a Governmental Agency of any contract by which the Concessionaire or the Contractor as the case may be is bound;

(iii) early termination of this Agreement by the Concessioning Authority for reasons of national emergency, national security or the public interest;

(iv) any failure or delay of the Contractor caused by any of the aforementioned Political Events, for which no offsetting compensation is payable to the Concessionaire by or on behalf of the Contractor; or

(v) any event or circumstance of a nature analogous to any of the foregoing.

14.4. Other Events

14.4.1. Any of the following events which prevents the Affected Party from performing any of its obligations under this Agreement for a continuous period of not less than 7 (seven) Days from the date of its occurrence, shall constitute the Other Event:

(a) an act of war (whether declared or undeclared), invasion, armed conflict or act of foreign enemy, blockade, embargo, riot, insurrection, terrorist or military action, civil commotion or politically motivated sabotage;

(b) industry wide or State wide strikes or industrial action;

(c) any civil commotion, boycott or political agitation which prevents collection of Fee by the Concessionaire;

(d) any judgment or order of a court of competent jurisdiction or statutory authority in India made against the Concessionaire or the Contractor in any proceedings which is non-collusive and duly prosecuted by the Concessionaire; and any judgment or order of a court of competent jurisdiction or statutory authority in India made against the Concessionaire or the Contractor in any proceedings which is non-collusive and duly prosecuted by the Concessionaire other than relating to proceedings

(i) pursuant to failure of the Concessionaire to comply with any Applicable Law or Applicable Permit, or
(ii) on account of breach of any Applicable Law or Applicable Permit or of any contract, or
(iii) enforcement of this Agreement or
(iv) with respect to exercise of any of its rights under this Agreement by the Concessioning Authority; or

(e) any event or circumstance of a nature analogous to any of the foregoing.

(f) Insufficient LAD on NW-1 for a period of 7 (seven) Days or more as communicated by the Authority through a public notification.

14.5. Notice of Force Majeure Event

14.5.1. The Affected Party shall give written notice to the other Party in writing of the occurrence of any of the Force Majeure Event (the **"Notice"**) as soon as the same arises or as soon as reasonably practicable and in any event within 7 (seven) Days after the Affected Party knew, or ought reasonably to have known, of its occurrence and the adverse effect it has or is likely to have on the performance of its obligations under this Agreement.

14.5.2. The Notice shall inter-alia include full particulars of:

(a) the nature, time of occurrence and extent of the Force Majeure Event with evidence in respect thereof;

(b) the duration or estimated duration and the effect or probable effect which such Force Majeure Event has or will have on the Affected Party's ability to perform its obligations or any of them under this Agreement;

(c) the measures which the Affected Party has taken or proposes to take, to

alleviate the impact of the Force Majeure Event or to mitigate the damage; and

(d) any other relevant information.

14.5.3. So long as the Affected Party continues to claim to be affected by a Force Majeure Event, it shall provide the other Party with periodic (fortnightly/monthly) written reports containing the information called for by Article 14.5.2 and such other information as the other Party may reasonably request.

14.6. Period of Force Majeure

14.6.1. Period of Force Majeure shall mean the period from the time of occurrence specified in the Notice given by the Affected Party in respect of the Force Majeure Event until the earlier of:

(a) expiry of the period during which the Affected Party is excused from performance of its obligations in accordance with Article 14.8; or

(b) termination of this Agreement pursuant to Article 14.10 hereof.

14.7. Resumption of Performance

14.7.1. During the period of Force Majeure, the Affected Party shall in consultation with the other Party, make all reasonable efforts to limit or mitigate the effects of the Force Majeure Event on the performance of its obligations under this Agreement. The Affected Party shall also make efforts to resume performance of its obligations under this Agreement as soon as possible and upon resumption shall notify the other Party of the same in writing. The other Party shall afford all reasonable assistance to the Affected Party in this regard.

14.8. Performance Excused

14.8.1. The Affected Party, to the extent rendered unable to perform its obligations or part thereof under this Agreement as a consequence of the Force Majeure Event shall be excused from performance of the obligations. Provided that, the excuse from performance shall be of no greater scope and of no longer duration than is reasonably warranted by the Force Majeure Event. Provided further, nothing contained herein shall absolve the Affected Party from any payment obligations accrued prior to the occurrence of the underlying Force Majeure Event.

14.9. Costs, Revised Timetable

14.9.1. Costs

Each Party shall bear its costs, if any, incurred as a consequence of the Force Majeure Event.

14.9.2. Extension of time/period

The Affected Party shall be granted by the other Party, extension of time specified in this Agreement for the performance of any obligation by such period not exceeding the period during which the relative performance was affected by the Force Majeure Event. Such extension may include extension of the Concession Period by the Concessioning Authority in appropriate cases if permissible under Applicable Law.

14.10. Termination due to Force Majeure Event

14.10.1. If the period of Force Majeure continues or is in the reasonable judgment of the Parties likely to continue beyond a period of 120 (one hundred and twenty) Days, the Parties may mutually decide to terminate this Agreement or continue this Agreement on mutually agreed revised terms. If the Parties are unable to reach an agreement in this regard, the Affected Party shall after the expiry of the said period of 120 (one hundred and twenty) Days be entitled to terminate the Agreement in which event, the provisions of Articles 16 and 17 shall, to the extent expressly made applicable, apply.

ARTICLE 15

15. Events of Default

15.1. Events of Default

Event of Default means the Concessionaire Event of Default or the Concessioning Authority Event of Default or both as the context may admit or require.

15.1.1. The Concessionaire Event of Default

Concessionaire Event of Default means any of the following events unless such an event has occurred as a consequence of the Concessioning Authority Event of Default or a Force Majeure Event:

(i) Concessionaire's failure to perform or discharge any of its obligations in accordance with the provisions of this Agreement;

(ii) Development/Equipment at the Project Site is abandoned for a more than 90 (ninety) Days during the Terminal Equipment Phase;

(iii) Delay of more than 180 (one hundred and eighty) Days from any Milestone Date in achieving any of the performance obligations set forth for the relevant Milestone Date or the Date of Commercial Operations is delayed for more than 180 (one hundred and eighty) Days from the Scheduled Project Completion Date;

(iv) Delay in payment of Royalty for 2 (two) consecutive Months or more than (5) (five) times in the aggregate during the Concession Period;

(v) Concessionaire's failure to perform or discharge any of its obligations under any other Project Contract, which has or is likely to affect the Project/the Project Facilities and Services, materially;

(vi) Any representation made or warranties given by the Concessionaire under this Agreement is found to be false or misleading;

(vii) The Concessionaire passing a resolution for voluntary winding up;

(viii) Appointment of a provisional liquidator, administrator, trustee or receiver of the whole or substantially whole of the undertaking of the Concessionaire by a court of competent jurisdiction in proceedings for winding up or any other legal proceedings;

(ix) Occurrence of default under the Financing Documents pursuant to which the

Senior Lenders exercise their rights to substitute the Concessionaire in accordance with the provisions of the Substitution Agreement;

(x) Levy of an execution or destraint on the Concessionaire's assets which has or is likely to have Material Adverse Effect and/or affect the Project/Project Facilities and Services, materially and such execution or destraint remaining in force for a period exceeding 90 (ninety) Days;

(xi) The Performance Guarantee is not maintained in terms of the provisions hereof;

(xii) The Concessionaire abandons or expresses its intention to revoke/terminate this Agreement without being entitled to do so as is expressly provided in the Agreement;

(xiii) A change in shareholding such that the beneficial interest of the Bidder/Consortium in the Concessionaire reduces below the limits set in Article 11.2 and/or Management Control of the Concessionaire has occurred in contravention of the provisions of Article 11 hereof;

(xiv) Amalgamation of the Concessionaire with any other company or reconstruction or transfer of the whole or part of the Concessionaire's undertaking [other than transfer of assets in the ordinary course of business] in contravention with the provisions of Article 11 hereof; and

(xv) The Concessionaire engaging or knowingly allowing any of its employees, agents, Contractor or representative to engage in any activity prohibited under this Agreement and/or by law or which constitutes a breach of the Agreement or breach of or an offence under any law, in the course of any activity undertaken pursuant to this Agreement.

15.1.2. The Concessioning Authority Event of Default

(i) The Concessioning Authority's failure to perform or discharge its obligations in accordance with the provisions of this Agreement unless such failure has occurred as a consequence of any Concessionaire Event of Default or a Force Majeure Event.

(ii) Any representation made or warranties given by the Concessioning Authority under this Agreement is found to be false or misleading.

(iii) Appointment of a provisional liquidator, administrator or receiver of the whole or part of the Terminal's Assets in any legal proceedings initiated against the Concessioning Authority (unless such proceedings are initiated as a consequence of any Concessionaire Event of Default).

(iv) Levy of an execution or destraint on the Terminal's Assets in any proceedings

against the Concessioning Authority (unless such proceedings are initiated as a consequence of any Concessionaire Event of Default) which has or is likely to have Material Adverse Effect and such execution or destraint remaining in force for a period exceeding 90 (ninety) Days.

15.2. Parties Rights

15.2.1. Upon the occurrence of a Concessionaire Event of Default, the Concessioning Authority shall without prejudice to any other rights and remedies available to it under this Agreement be entitled to terminate this Concession Agreement.

15.2.2. Upon the occurrence of a Concessioning Authority Event of Default, the Concessionaire shall without prejudice to any other rights and remedies available to it under this Agreement be entitled to terminate this Concession Agreement.

Provided that before proceeding to terminate this Concession Agreement, the Party entitled to do so shall give due consideration and shall have due regard to the nature of the underlying Event of Default, its implication on the performance of the respective obligations of Parties under this Agreement and the circumstances in which the same has occurred.

15.3. Consultation Notice

15.3.1. Either Party exercising its right under Article 15.2, shall issue to the other Party a notice in writing specifying in reasonable detail the underlying Event of Default(s) and proposing consultation amongst the Parties and the Senior Lenders to consider possible measures of curing or otherwise dealing with the underlying Event of Default (**"Consultation Notice"**).

15.4. Remedial Process

Following the issue of Consultation Notice by either Party, within a period not exceeding 90 (ninety) Days or such extended period as the Parties may agree (**"Remedial Period"**) the Parties shall, in consultation with the Senior Lenders, endeavour to arrive at an agreement as to the manner of rectifying or remedying the underlying Event of Default. Without prejudice to this, if the underlying event is a Concessionaire Event of Default, the Concessioning Authority shall in consultation with the Senior Lenders endeavour to arrive at an agreement as to one or more of the following measures and/or such other measures as may be considered appropriate by them in the attendant circumstances:

15.4.1. the change of management or control/ownership of the Concessionaire;

15.4.2. the replacement of the Concessionaire by a new operator (**"Selectee"**) proposed by the Senior Lenders (in terms of the Substitution Agreement), and the specific terms and conditions of such replacement which shall include :

(a) the criteria for selection of the Selectee;

(b) the transfer of rights and obligations of the Concessionaire surviving under this Agreement to the Selectee;

(c) handing over/ transfer of the Project Site, the Terminal's Assets and the Project Facilities and Services to the Selectee;

(d) acceptance by the Selectee of the outstanding obligations of the Concessionaire under the Financing Documents and preserving Senior Lenders' charge on the Concessionaire's assets;

(e) acceptance by the Selectee of any amounts due to the Concessioning Authority from the Concessionaire under this Agreement; and

(f) payment of consideration for the Concessionaire's assets comprised in the Project Facilities and Services and the manner of appropriation thereof.

15.5. Obligations during Remedial Period

15.5.1. During the Remedial Period, the Parties shall continue to perform their respective obligations under this Agreement which can be performed, failing which the Party in breach shall compensate the other Party for any loss or damage occasioned or suffered on account of the underlying failure/breach.

15.6. Revocation of Consultation Notice

15.6.1. If during the Remedial Period the underlying Event of Default is cured or waived or the Parties and the Senior Lenders agree upon any of the measures set out in Article 15.4, the Consultation Notice shall be withdrawn in writing by the Party who has issued the same.

15.7. Termination due to Events of Default

15.7.1. If before the expiry of the Remedial Period, the underlying Event of Default is neither cured nor waived nor the Parties and the Senior Lenders have agreed upon any of the measures in accordance with Article 15.4, the Party who has issued the Consultation Notice shall have the right to terminate this Agreement, in which event, the provisions of Article 16 and 17 shall, to the extent expressly made applicable, apply.

15.8. Concessioning Authority's Rights of Step-in

15.8.1. Upon a Termination Notice being issued due to a Concessionaire Event of Default, the Concessioning Authority may, at its discretion:

(a) re-enter upon and take possession and control of Project Site/Project Facilities and Services forthwith;

(b) prohibit the Concessionaire and any Person claiming through or under the Concessionaire from entering upon/dealing with the Project Facilities and Services;

(c) step in and succeed upon election by Concessioning Authority without the necessity of any further action by the Concessionaire, to the interests of the Concessionaire under such of the Project Contracts as the Concessioning Authority may in its discretion deem appropriate with effect from the date of communication of such election to the counter party to the relative Project Contracts.

15.8.2. Provided, that in such circumstances, the Concessioning Authority shall assume the obligations of the Concessionaire with respect to the Senior Lenders during such Remedial Period out of the current revenues. Provided further, the Concessionaire acknowledges that any payments made by the Concessioning Authority during the Remedial Period shall be adjusted against compensation payable by the Concessioning Authority to the Concessionaire in terms of the provisions of this Agreement.

ARTICLE 16

16. Termination of Concession Agreement

16.1. Termination Procedure

16.1.1. The Party entitled to terminate this Concession Agreement either on account of a Force Majeure Event or on account of an Event of Default having Material Adverse Effect shall do so by issue of a notice in writing (**"Termination Notice"**) to the other Party and simultaneously deliver a copy thereof to the Senior Lenders. The Termination Notice shall be of not less than 90 (ninety) Days and not ordinarily be more than 180 (one hundred and eighty) Days, (**"Termination Period"**) and at the expiry of the Termination Period, this Agreement shall stand terminated without any further notice.

16.2. Obligations during Termination Period

16.2.1. During Termination Period, the Parties shall, subject where applicable to the provisions of this Article 16, continue to perform such of their respective obligations under this Agreement which are capable of being performed with the object, as far as possible, of ensuring continued availability of the Project Facilities and Services to the users, failing which the Party in breach shall compensate the other Party for any loss or damage occasioned or suffered on account of the underlying failure/breach.

16.3. Requisition

16.3.1. Except where the Termination Notice is issued prior to Financial Close being achieved by the Concessionaire, when the Concession Agreement has not come into effect the Concessionaire has no right hereunder and no compensation is payable by the Concessioning Authority, upon issue or receipt as the case may be of Termination Notice, either as a consequence of a Force Majeure Event or as a consequence of an Event of Default, or otherwise 6 (six) months prior to the expiry of the Concession Period, the Concessioning Authority shall by a notice in writing (**"Requisition"**) call upon the Concessionaire to furnish the following information to enable the Concessioning Authority to estimate the likely compensation payable by the Concessioning Authority to the Concessionaire and/or to finalise the items of Concessionaire's assets comprised in the Project Facilities and Services to be handed over to/taken over by the Concessioning Authority:

(a) except in cases where no Financial Close has been achieved, the particulars of Debt Due supported by Senior Lenders' certificate;

(b) data or records including test certificates, survey reports, inspection reports, records of maintenance, statutory certificates issued for operation and establishment of the project facilities and services and regarding the operation and maintenance of the Project Facilities and Services;

(c) specifications regarding the Concessionaire's assets comprised in the Project

Facilities and Services; and

(d) any other information or records [to be specified by Concessioning Authority at its discretion] regarding Concessionaire, its business, the Project/Project Facilities and Services, assets and liabilities.

16.3.2. The Concessionaire shall within a period of 30 (thirty) Days of receipt of Requisition furnish the particulars called for by the Concessioning Authority.

16.4. Condition Survey

16.4.1. The Concessionaire agrees that on the service of a Termination Notice or at least 6 (six) months prior to the expiry of the Concession Period, as the case may be, it shall conduct or cause to be conducted under the Concessioning Authority's supervision, a condition survey of the Project Facilities and Services including the Project Site and/or the Terminal's Assets to ascertain the condition thereof, verifying compliance with the Concessionaire's obligations under this Concession Agreement and to prepare an inventory of the assets comprised in the Project Facilities and Services. During this period, the designated key personnel of the Concessioning Authority shall be associated with the operations of the Project Facilities and Services (except when the same is impossible due to a Force Majeure Event) in order to facilitate smooth takeover of the same by the Concessioning Authority on the Transfer Date.

16.4.2. If, as a result of the condition survey, the Concessioning Authority shall observe/notice that the Project Site and/or the Terminal's Assets and/or the Project Facilities and Services or any part thereof have/has not been operated and maintained in accordance with the requirements therefor under this Concession Agreement (normal wear and tear excepted) the Concessionaire shall, at its cost and expenses, take all necessary steps to put the same in good working conditions well before the Transfer Date.

16.4.3. In the event the Concessionaire fails to comply with the provisions of this Concession Agreement, the Concessioning Authority may itself cause the condition survey and inventory of Terminal's Assets and the Project Facilities and Services to be conducted. The Concessioning Authority shall be compensated by the Concessionaire for any costs incurred in conducting such survey and preparation of inventory as also in putting the Project Facilities and Services in good working condition.

16.5. Consequences of Termination

16.5.1. Without prejudice to any other consequences or requirements under this Concession Agreement or under any law:

(a) the Concessionaire shall transfer all the assets and rights upon expiry of the Concession Period by efflux of time or termination of the Agreement due to a Force Majeure Event or on account of an Event of Default in accordance with Article 18;

(b) the Concessioning Authority shall be entitled to encash any subsisting bank guarantee(s) provided by the Concessionaire against any amounts owing to the Concessioning Authority by the Concessionaire.

16.5.2. Notwithstanding anything contained in this Concession Agreement, except for ensuring the deposit of the compensation payable to the Concessionaire in accordance with Article 17 in the Escrow Account, the Concessioning Authority shall not, as a consequence of termination or otherwise, have any obligation whatsoever to any third party including but not limited to obligations as to compensation for loss of employment, continuance or regularization of employment, absorption or re-employment on any ground, in relation to any person in the employment of or engaged by the Concessionaire in connection with the Project, and the handback of the Project Site/Terminal Assets/Project Facilities & Services by the Concessionaire to the Concessioning Authority shall be free from any such obligation.

ARTICLE 17

17. Compensation

17.1. Compensation

17.1.1. Termination due to Force Majeure Event

(i) If the termination is due to a Non Political Event, compensation payable to the Concessionaire shall be the lower of the Book Value or the Debt Due LESS any amount due to the Concessioning Authority by the Concessionaire under this Agreement LESS all insurance claims received or admitted.

(ii) If the termination is due to an Other Event compensation payable to the Concessionaire shall be the higher of the Book Value or the Debt Due LESS any amount due to the Concessioning Authority by the Concessionaire under this Agreement LESS all insurance claims received or admitted. Provided, the Book Value or the Debt Due, as the case may be shall not exceed the Total Project Cost.

(iii) If termination is due to a Political Event, compensation payable to the Concessionaire shall be the same as that stipulated for termination due to a Concessioning Authority Event of Default under Article 15.

(iv) Provided, no compensation shall be payable to the Concessionaire if the Concessionaire fails to maintain Insurance Cover as contemplated under Article 12 of this Concession Agreement.

17.1.2. Termination due to Concessionaire Event of Default

If the termination is after the Date of Commercial Operation, due to a Concessionaire Event of Default, the compensation payable by the Concessioning Authority to the Concessionaire shall be the lowest of:

(i) the Book Value;

(ii) 90% (ninety percent) of Debt Due;

(iii) the Total Project Cost;

Provided, no compensation shall be payable to the Concessionaire if the Concessionaire fails to maintain Insurance Cover as contemplated under Article 12 of this Concession Agreement.

17.1.3. Termination due to Concessioning Authority Event of Default

If the termination is due to a Concessioning Authority Event of Default, the compensation payable by the Concessioning Authority shall be equal to the aggregate of:

(i) Debt Due plus
(ii) 150% (one hundred and fifty percent) Equity

17.2. No Compensation on Expiry of Concession Period

17.2.1. In the event of expiry of Concession Agreement by efflux of time (the Concession Agreement having run its full course), the Concessionaire shall hand over/ transfer peaceful possession of the Project Site including land, Terminal's Assets and the Project Facilities and Services free of cost and Encumbrance.

17.3. Transfer Fee and Charges

17.3.1. Transfer costs, stamp duties, notary fees and taxes, if applicable, for the transfer of the Project Facilities and Services consequent to the expiry or termination of this Concession Agreement shall be borne by:

(a) the Concessionaire in the event of expiry of Concession Period or termination due to a Concessionaire Event of Default;

(b) the Concessioning Authority in the event of termination due to an Concessioning Authority Event of Default or Political Event; and

(c) by both parties equally in case of termination due to Change in Law or Non Political Event or Other Event.

17.4. Payment of Compensation to Senior Lenders

17.4.1. The Concessionaire hereby irrevocably authorises the Concessioning Authority to pay to the Senior Lenders or at their instruction to any designated bank account in India the compensation payable to the Concessionaire. The Concessionaire confirms that upon such payment being made, the Concessioning Authority shall stand duly discharged of its obligations regarding payment of compensation under this Concession Agreement and the charge created by the Concessionaire in favour of the Senior Lenders on any of its assets taken over by the Concessioning Authority shall stand satisfied and all such assets shall on and from the Transfer Date be free from such charge. The Concessionaire further confirms that payment of compensation by Concessioning Authority in accordance with

this Article 17.4 shall be a valid discharge to the Concessioning Authority in respect of Concessioning Authority's obligation regarding payment of compensation to the Concessionaire under this Concession Agreement.

17.4.2. Provided notwithstanding anything inconsistent contained in this Concession Agreement, the Concessionaire/the Senior Lenders as the case may be shall be entitled to remove at its/ their cost all such moveables which are not taken over by the Concessioning Authority and to deal with the same in accordance with their respective rights under law.

17.4.3. Provided further, if there are no amounts outstanding under the Financing Documents and a certificate to that effect issued by the Senior Lenders is furnished by the Concessionaire to the Concessioning Authority, the compensation shall be paid by the Concessioning Authority to the Concessionaire directly.

17.5. Delayed Payment of Compensation

17.5.1. If for any reasons, other than those attributable to the Concessionaire, the Concessioning Authority fails to pay the compensation on the Transfer Date, the Concessioning Authority shall be liable to pay interest @ 10 year GSEC plus 6% (six percent) per annum thereon from the Transfer Date till payment thereof. Provided, nothing contained in this Article shall be deemed to authorise any delay in payment of compensation in accordance with this Concession Agreement.

17.6. Delayed Transfer of Assets

17.6.1. If for any reasons other than those attributable to the Concessioning Authority the Concessionaire fails to transfer assets, rights and contracts on the Transfer Date in accordance with Article 16.5 read with Article 18, there shall be no suspension of the operation and maintenance of the Project Facilities and Services and the Concessionaire shall, as a trustee of the Concessioning Authority,

(a) continue to operate and maintain the Project Facilities and Services or such of them, as directed by Concessioning Authority until completion of the relative transfer formalities and

(b) account for and pay to the Concessioning Authority the Project Revenue minus operating costs and statutory dues, from such operations. In the event of failure to do so, the Concessionaire shall be liable to pay to the Concessioning Authority, for every Day of delay, liquidated damages computed at the rate of the average daily profits earned during the 3 (three) years immediately preceding the Transfer Date. Parties confirm that this is a true and correct estimate of damages and not in the nature of a penalty. Provided nothing contained in this Article 17.6 shall be deemed or construed to authorise delay in completion of formalities of transfer of assets, rights and contracts by the Concessionaire to the Concessioning Authority in accordance with the requirements thereof under this Concession Agreement.

17.6.2. In case the transfer of assets by the Concessionaire to the Concessioning Authority is delayed for reasons attributable to the Concessioning Authority, the Concessionaire shall nonetheless continue to operate the Project Facilities and Services but as agent of the Concessioning Authority. Provided however, the Concessionaire shall be liable to pay Royalty in accordance with Article 9.2.1.

17.7. Remedies Cumulative

17.7.1. The exercise of right by either Party to terminate this Agreement, as provided herein, shall not preclude, such Party from availing any other rights or remedies that may be available to it under law. All remedies available to the Parties shall be cumulative and the exercise or failure thereof of one or more remedies by any Party shall not limit or preclude the exercise of or constitute a waiver of any other remedies by such Party.

ARTICLE 18

18. Transfer on expiry of Concession Period

18.1. General Scope of Transfer/Payment

18.1.1. The Parties shall perform/discharge their respective obligations to be performed or discharged under the provisions of this Concession Agreement on the Transfer Date in entirety. Without prejudice to the generality of this provision and the provisions of Article 16, the transactions to be consummated and the formalities to be completed by the Parties on the Transfer Date shall be as set out in Articles 18.2 and 18.3.

18.2. Concessionaire's Obligations

The Concessionaire shall;

18.2.1. hand over peaceful possession of the Project Site, Terminal's Assets, the Project and the Project Facilities and Services free of Encumbrance;

18.2.2. transfer all its rights, titles and interests in the assets comprised in the Project Facilities and Services which are required to be transferred to the Concessioning Authority in accordance with this Concession Agreement and execute such deeds and documents as may be necessary for the purpose and complete all legal or other formalities required in this regard;

18.2.3. hand over to the Concessioning Authority all documents including as built drawings, manuals and records relating to operation and maintenance of the Project Facilities and Services;

18.2.4. transfer technology and up-to-date know-how relating to operation and maintenance of the Terminal's Assets and/or the Project Facilities and Services;

18.2.5. transfer or cause to be transferred to the Concessioning Authority any Project Contracts which are:

(a) valid and subsisting;

(b) capable of being transferred to the Concessioning Authority; and

(c) those the Concessioning Authority has chosen to take over, and cancel or cause to be cancelled such Project Contracts not transferred to the Concessioning Authority. For this purpose, the Concessionaire shall ensure that all Project Contracts are assignable in favor of the Concessioning Authority without any further action on part of the respective counterparties. The Concessionaire shall entirely at its cost, terminate all such Project Contracts which are not transferred/assigned and/or are not required to be transferred/assigned to the Concessioning Authority;

18.2.6. at its cost, transfer to the Concessioning Authority all such Applicable Permits which the Concessioning Authority may require and which can be legally transferred. Provided if the termination is on account of Concessioning Authority Event of Default the cost of such transfer shall be borne/ reimbursed by the Concessioning Authority;

18.2.7. be permitted to remove moveable assets procured by the Concessionaire without any consideration or payment provided that the Agreement has not been terminated owing to any Event of Default.

For avoidance of doubt it is clarified that moveable assets shall refer to those moveable assets procured by the Concessionaire as given in Annexure II of this Agreement;

18.2.8. at its cost, remove within 90 (ninety) days from expiry of the Concession Period, from the Project Site/Terminal's Assets, any moveable assets that are not taken over by or not to be transferred to the Concessioning Authority in terms of the provisions of this Concession Agreement.

18.3. Concessioning Authority's Obligations

18.3.1. Except in the event of expiry of the Concession Agreement by efflux of time, the Concessioning Authority shall pay compensation payable to the Concessionaire in accordance with Article 17.1 of this Concession Agreement, to the Senior Lenders, or deposit the same in the Escrow Account or on the written instructions of the Senior Lenders to any designated bank account in India, or to the Concessionaire, as the case may be. The Concessionaire confirms that upon such payment being made, the Concessioning Authority shall stand duly discharged of its obligations regarding payment of compensation under this Concession Agreement and the charge created by the Concessionaire in favour of the Senior Lenders on any of the assets shall stand satisfied and all such assets shall on and from the Transfer Date be free from such charge.

18.3.2. The Concessionaire further confirms that payment of compensation by Concessioning Authority in accordance with this Article 18.3 shall be a valid discharge to the Concessioning Authority in respect of Concessioning Authority's obligation regarding payment of compensation to the Concessionaire under this Concession Agreement.

18.4. Risk

18.4.1. Until transfer in accordance with this Article 18, the Terminal's Assets and the Project Facilities and Services shall remain at the sole risk of the Concessionaire except for any loss or damage caused to or suffered by the Concessionaire due to any act or omission or negligence on the part of the Concessioning Authority under this Concession Agreement.

ARTICLE 19

19. Dispute resolution

19.1. Amicable settlement

19.1.1. If any dispute or difference or claims of any kind arises between the Concessioning Authority and the Concessionaire in connection with interpretation or application of any terms and conditions or any matter or thing in any way connected with or in connection with or arising out of this Agreement, whether before or after the termination of this Agreement, then the Parties shall meet together promptly, at the request of any Party, in an effort to resolve such dispute, difference or claim by discussion between them.

19.2. Assistance of Expert

19.2.1. The parties, may, in appropriate cases agree to refer the matter to a legal Expert appointed by them with mutual consent. The cost of obtaining the service of the legal Expert shall be shared equally.

19.3. Arbitration

19.3.1. Arbitration

Failing amicable settlement and/or settlement with the assistance of legal expert appointed by the parties by mutual consent, the dispute or differences or claims as the case may be, shall be finally settled by binding arbitration under the Arbitration and Conciliation Act, 1996. Unless the parties mutually agree otherwise, within 30 (thirty) days of invocation of the arbitration as mentioned below, the rules of arbitration prescribed by the International Centre for Alternative Dispute Resolution, New Delhi shall apply to the arbitration. The arbitration shall be by a panel of three arbitrators, one to be appointed by each party and the third, who shall act as presiding arbitrator, to be appointed by the two arbitrators appointed by the parties. The arbitration shall be invoked by one party issuing to the other a notice in writing invoking the arbitration and appointing an arbitrator. Upon receipt of the notice, the other party shall appoint the second arbitrator. The two arbitrators so appointed shall appoint the third arbitrator who shall act as the 'Presiding Arbitrator'. If the other Party fails to appoint a second arbitrator within 30 (thirty) days from the receipt of the request to do so, then the arbitrator so appointed by the first party shall adjudicate the disputes as 'Sole Arbitrator'.

19.3.2. Place of arbitration

The place of arbitration shall be the headquarters of the Concessioning Authority in India.

19.3.3. English language

The request for arbitration, the answer to the request, the terms of reference, any written submissions, any orders and rulings shall be in English and, if oral hearings take place, English shall be the language to be used in the hearings.

19.3.4. Procedure

The procedure to be followed within the arbitration, including appointment of arbitrator/arbitral tribunal, the rules of evidence which are to apply shall be in accordance with the Arbitration and Conciliation Act, 1996.

19.3.5. Enforcement of award

Any decision or award resulting from arbitration shall be final and binding upon the parties. The parties hereto agree that the arbitral award may be enforced against the parties to the arbitration proceeding or their assets wherever they may be found and that a judgment upon the arbitral award may be entered in any court having jurisdiction thereof.

19.3.6. Fees and expenses

The fees and expenses of the arbitrators and all other expenses of the arbitration shall be initially borne and paid equally by respective parties subject to determination by the arbitrators. The arbitrators may provide in the arbitral award for the reimbursement to the successful party of its costs and expenses in bringing or defending the arbitration claim, including legal fees and expenses incurred by the party. The fee of arbitration shall be determined according to the Arbitration and Conciliation Act, 1996.

19.3.7. Performance during arbitration

Pending the submission of and/or decision on a dispute, difference or claim or until the arbitral award is published, the Parties shall continue to perform all of their obligations under this Agreement without prejudice to a final adjustment in accordance with such award.

ARTICLE 20

20. Representations and warranties

20.1. Representations and warranties of the Concessionaire

The Concessionaire represents and warrants to the Concessioning Authority that:

20.1.1. it is duly organised, validly existing and in good standing under the laws of India and hereby expressly and irrevocably waives any immunity in any jurisdiction in respect of this Agreement or matters arising thereunder including any obligation, liability or responsibility hereunder;

20.1.2. it has full power and authority to execute, deliver and perform its obligations under this Agreement;

20.1.3. it has taken all necessary action to authorise the execution, delivery and performance of this Agreement;

20.1.4. this Agreement constitutes the legal, valid and binding obligation of the Concessionaire, enforceable against it in accordance with the terms hereof;

20.1.5. there are no actions, suits or proceedings pending or to its best knowledge, threatened against or affecting it before any court, administrative body or arbitral tribunal which might materially and adversely affect its ability to meet or perform any of its obligations under this Agreement;

20.1.6. it has the financial standing and capacity to undertake the Project in accordance with the terms of this Agreement;

20.1.7. the execution, delivery and performance of this Agreement will not conflict with, result in the breach of, constitute a default under, or accelerate performance required by any of the terms of its memorandum of association and articles of association or any Applicable Laws or any covenant, contract, agreement, arrangement, understanding, decree or order to which it is a party or by which it or any of its properties or assets is bound or affected;

20.1.8. it has no knowledge of any violation or default with respect to any order, writ, injunction or decree of any court or any legally binding order of any Government Authority which may result in any Material Adverse Effect on its ability to perform its obligations under this Agreement and no fact or circumstance exists which may give rise to such proceedings that would adversely affect the performance of its obligations under this Agreement;

20.1.9. it has complied with Applicable Laws in all material respects and has not been subject to any fines, penalties, injunctive relief or any other civil or criminal liabilities which in the aggregate have or may have a Material Adverse Effect on its ability to perform its obligations under this Agreement;

20.1.10. all its rights and interests in the Project/Project Facilities and Services shall pass to and vest in the Concessioning Authority on the Transfer Date free and clear of all liens, claims and Encumbrances, without any further act or deed on its part or that of the Concessioning Authority, and that none of the Project Terminal Assets shall be acquired by it, subject to any agreement under which a security interest or other lien or Encumbrance is retained by any person, save and except as expressly provided in this Agreement;

20.1.11. no representation or warranty by it contained herein or in any other document furnished by it to the Concessioning Authority including the Bid or to any Government Authority in relation to Applicable Permits contains or will contain any untrue or misleading statement of material fact or omits or will omit to state a material fact necessary to make such representation or warranty not misleading;

20.1.12. no sums, in cash or kind, have been paid or will be paid, by it or on its behalf, to any person by way of fees, commission or otherwise for securing the Concession or entering into this Agreement or for influencing or attempting to influence any officer or employee of the Concessioning Authority in connection therewith;

20.1.13. agrees that the execution, delivery and performance by it of this Agreement and all other agreements, contracts, documents and writings relating to this Agreement constitute private and commercial acts and not public or governmental acts; and

20.1.14. consents generally in respect of the enforcement of any judgement against it in any proceedings in any jurisdiction to the giving of any relief or the issue of any process in connection with such proceedings.

20.2. Representations and warranties of the Concessioning Authority

The Concessioning Authority represents and warrants to the Concessionaire that:

20.2.1. it is duly organised, validly existing and in good standing under the laws of India;

20.2.2. it has full power and authority to execute, deliver and perform its obligations under this Agreement;

20.2.3. it has taken all necessary action to authorise the execution, delivery and performance of this Agreement;

20.2.4. this Agreement constitutes the legal, valid and binding obligation of the Concessioning Authority, enforceable against it in accordance with the terms hereof; and

20.2.5. there are no actions, suits or proceedings pending or to its best knowledge, threatened against or affecting it before any court, administrative body or arbitral tribunal which might materially and adversely affect its ability to meet or perform any of its obligations under this Agreement.

20.3. Disclosure

20.3.1. In the event that any occurrence or circumstance comes to the attention of either Party that renders any of its aforesaid representations or warranties untrue or incorrect, such Party shall immediately notify the other Party of the same. Such notification shall not have the effect of remedying any breach of the representation or warranty that has been found to be untrue or incorrect nor shall it adversely affect or waive any obligation of either Party under this Agreement.

ARTICLE 21

21. Miscellaneous provisions

21.1. Amendments

21.1.1. No amendment or waiver of any provision of this Agreement, nor consent to any departure by any of the parties therefrom, shall in any event be effective unless the same shall be in writing and signed by the parties hereto and then such waiver or consent shall be effective only in the specific instance and for the specified purpose for which given.

21.2. Agreement to override other Agreements

21.2.1. This Agreement supersedes all previous agreements or arrangements between parties, including any memoranda of understanding entered into in respect of the contents hereof and represents the entire understanding between the parties in relation thereto.

21.3. Survival of Obligations

21.3.1. Any cause of action which may have occurred in favour of either Party or any right which is vested in either Party under any of the provisions of this Agreement during the Concession Period as the case may be as a result of any act, omission, deed, matter or thing done or omitted to be done by either Party before the expiry of the Concession Period by efflux of time or otherwise in accordance with the provisions of this Agreement shall survive the expiry of the Concession Period/ termination of this Agreement.

21.4. Articles to survive Termination

21.4.1. The provisions of Articles 16 to 21 shall, to the fullest extent necessary to give effect thereto, survive the Concession Period/the termination of this Agreement and the obligations of Parties to be performed/discharged following the termination/early determination of this Agreement shall accordingly be performed/discharged by the Parties.

21.5. Joint Responsibility

21.5.1. In the event that any damage is caused partly due to the negligence or default or omission on the part of the Concessioning Authority and partly due to the negligence or default or omission on the part of the Concessionaire, each Party shall be liable to the other Party only in the proportion to its respective degree of negligence or default or omission, as the case may be.

21.6. Several Obligations

21.6.1. Nothing contained in this Agreement shall be construed to create an association, trust, partnership, agency or joint venture among the Parties and Parties shall be liable to perform their respective duties and discharge their respective liabilities or obligations in accordance with the provisions of this Agreement.

21.7. Severability

21.7.1. If for any reason whatsoever any provision or any part(s) of this Agreement is held or shall be declared to be void or illegal or invalid under present or future laws or regulations effective and applicable during the Concession Period, by any competent arbitral tribunal or court, and if such provisions shall be fully separable and this Concession shall be constructed as if such provision or such part(s) of this Agreement never comprised part of this Agreement and the remaining provisions of this Agreement shall remain in full force and effect and shall not be affected by such void or illegal or invalid provision or by its severance from this Agreement.

21.8. Waiver; remedies

21.8.1. No failure on the part of any party to exercise, and no delay in exercising any right, power or privilege hereunder shall operate as a waiver thereof or a consent thereto; nor shall any single or partial exercise of any such right, power or privilege preclude any other or further exercise thereof or the exercise of any other right, power or privilege. The remedies herein provided are the cumulative and not exclusive of any remedies provided by applicable law.

21.9. Severance of terms

21.9.1. If any provisions of this Agreement are declared to be invalid, unenforceable or illegal, by any competent arbitral tribunal or court, such invalidity, un-enforceability or illegality shall not prejudice or affect the remaining provisions of this Agreement which shall continue in full force and effect and shall not be affected by such void.

21.10. Language

21.10.1. All notices, certificates, correspondence or other communications under or in connection with this Agreement, and Project contracts, if any, or the Project shall be in English.

21.11. Confidentiality

21.11.1. No Party shall, without the prior written consent of the other Parties, at any time divulge or disclose or suffer or permit its servants or agents to divulge or disclose to any person or use for any purpose unconnected with the Project any information which is, by its nature or it marked "proprietary material", concerning the other (including any information concerning the contents of this Agreement) except to their respective officers, directors, employers, agents, representatives and professional

advisors or as may be required by any law, rule, regulation or any judicial process for period of five years after the transfer date; provided, however, that any Party, with the written consent of the other Parties, may issue press releases containing non-sensitive information in relation to the progress of the Project. This article shall not apply to information:

(a) Already in the public domain, otherwise than by breach of this Agreement.

(b) Already in the possession of the receiving party before it was received from any other party in connection with this Agreement and which was not obtained under any obligation of confidentiality; or

(c) Obtained from a third party who is free to divulge the same and which was not obtained under any obligation of confidentiality.

(d) Disclosure to lenders under terms of confidentiality.

21.12. Notices

Any notice to be given thereunder shall be in writing and shall either be delivered personally or sent by registered post, telex, facsimile transmission, electronic mail or other means of telecommunication in permanent written form. The addresses and numbers for service of notice shall be given to the Parties at their respective addresses set forth below:

The Concessioning Authority:

CHAIRMAN
_____
_____
_____
Fax No: Email:

_____
_____

The Concessionaire:

The MANAGING DIRECTOR
——————————————————Ltd
_____
_____

Fax No. Email:

or such other address, telex number, or facsimile number as may be notified by that party to the other Party from time to time, and shall be deemed to have been made or delivered (i) in the case of any communication made by letter, when delivered by hand, or by mail (registered, return receipt requested) at that address and (ii) in the case of any communication made by telex or facsimile, when transmitted properly addressed to such telex number or facsimile number.

21.13. Waiver

21.13.1. No waiver of any term or condition or of the breach thereof by any Party shall be valid unless expressed in writing and signed by such Party and communicated by such Party to the other Party in accordance with the provisions of Article 21.8 of this Agreement. A waiver by any Party of any term or condition or breach thereof in a given case shall not be deemed or construed as a general waiver of such term or condition or the breach in the future or waiver of any other terms or conditions or breach of this Agreement.

21.14. Amendments, Modifications or Alterations.

21.14.1. No amendments, modifications or alterations of or any additions to the terms and conditions of this Agreement shall be valid unless the same be in writing and agreed to by the Parties.

21.15. Governing Law

21.15.1. This Agreement shall be governed by and construed in accordance with the laws of the Republic of India and courts having territorial jurisdiction over the Project shall have jurisdiction over all matters relating to or arising out of this Agreement.

21.16. Entire Agreement

This Agreement and the Annexures together constitute a complete and exclusive statement of the terms of the agreement between the Parties. All prior written or oral understandings, offers or other communications of every kind pertaining to this Agreement unless specifically retained in this Agreement and the Annexures, by reference or otherwise, are abrogated and withdrawn.

IN WITNESS WHEREOF, the Parties, intending to be legally bound, have caused this Agreement on the dates indicated next to their signatures below:

Common Seal of the Concessioning Authority is affixed pursuant to its resolution dated _____ of the Board in the presence of Mr. _____who has signed this Agreement in token thereof.

Signed and Delivered by the Concessionaire by the hand of its authorized representative Mr. _____ pursuant to
Resolution dated _____ of its
Board of Directors.

22. Annexures

23. Annexure I: Project site

Please refer to the attached CAD drawing for Project site's details including Terminal and connectivity features.

24. Annexure II: Terminal's assets

The following is the list of Terminal's assets to be handed over to the Concessionaire.

S No	Item Description	Value (INR crore)
1	Jetty Structures	55.91
2	Stone Pitching Works	50.63
3	Buildings (Substation, Toilet and Administrative)	3.69
4	Electrical Works	1.77
5	Mobile Cranes (2 Nos)	44.59
6	Pontoon with Gangway	7.38
7	Roads	4.37
8	Septic Tanks and Associated Works	0.03
9	Water Supply Works	0.07
10	Storm Water Drainage Works	1.29
11	Topography, Geotechnical and Hydrographic Investigations	0.27
12	External road, weigh bridge & control cabin, firefighting system	17.0
13	Duties and Taxes	4.70
	Total	**190**

List of immoveable and essential moveable contracted assets

		Contracted assets	
S No	**Particulars**	**Immovable contracted assets**	**Essential movable contracted assets**
1	Jetty Structures (includes berth of 200 m)	✓	
2	Stone protection piles and stone pitching	✓	
3	Buildings (Substation, Toilet and Administrative)	✓	
4	Electrical Works	✓	
5	Mobile Cranes (2 Nos)		✓
6	Pontoon with Gangway	✓	
7	Internal roads	✓	
8	Septic Tanks and Associated Works	✓	
9	Water Supply Works	✓	
10	Storm Water Drainage Works	✓	
12	External road, weigh bridge & control cabin, firefighting system	✓	
13	Approach road from National Highway 7	✓	

25. Annexure III: Scope of Work

The scope of work (**"Scope of Work"**) shall mean and include the following:

Terminal Equipment Phase

Development/Equipment Works shall mean and include the following:

1. preparation of the DTR for Terminal Equipment Phase

2. the design, planning, procurement, development and installation of equipment at Terminal to ensure design capacity of Terminal to 1.26 mmtpa;

3. to increase design capacity of Terminal to 1.26 mmtpa the Concessionaire shall mandatorily complete procurement, development and installation of equipment not later than 4th anniversary of COD:

4. As per DPR shared in Annexure XVI with this Agreement, design capacity of Terminal can be increased to at least 1.26 mmtpa by introducing the following:

S No	Description
1	Land and site development
2	Development of stockyard
3	Utilities and others

However, the Concessionaire may adopt any alternate approach to ensure design capacity of Terminal of at least 1.26 mmtpa. The calculations for calculating the design capacity of Terminal has to be included in DTR which has to be approved for Terminal Equipment Phase by Independent Engineer.

For avoidance of doubt, it may be clarified that any equipment on lease shall be considered out of scope of Terminal Equipment Phase as given in this Agreement.

Operation and Maintenance

1. Operation and maintenance of the terminal's assets as mentioned in Annexure II handed over to the Concessionaire by the Concessioning Authority in accordance with the provisions of this Agreement, applicable laws and applicable permits.

2. Operation and maintenance of the proposed passenger pontoon jetty in accordance with the provisions of this Agreement, applicable laws and applicable permits.

3. Performance and fulfilment of all other obligations of the Concessionaire and matters incidental thereto or necessary for the performance of any or all of the obligations of the Concessionaire under this Agreement, in accordance with the provisions of this Agreement, applicable laws and applicable permits.

26. Annexure IV: Performance Standards and damages

The following are the performance standards for the Concession agreement for the Terminal

S No	Key Performance Indicator	Threshold	Measurement
1	Equipment reliability (maintenance)	Greater than 95%	• Frequency: Quarterly • Actual Equipment reliability = (1 – [Downtime hours / Total deployed hours]) X 100 Wherein: Downtime hours is the actual number of hours during which the equipment was not running due to failure of the equipment Total deployed hours is the total number of hours for which an equipment is given to the operations team
2	Equipment availability (maintenance)	Greater than 90%	• Frequency: Quarterly • Actual equipment availability = (1 – ((Planned maintenance hours + downtime hours)/total deployed hours)) X 100 Wherein: Planned maintenance hours is the actual number of preventive maintenance hours during which the equipment was not running Downtime hours is the actual number of hours during which the equipment was not running due to failure of the equipment Total deployed hours is the total number of hours for which an equipment is given to the operations team
3	Average container	Greater than 10 containers per hour	• Frequency: Quarterly • Relevant for Cranes only

<table>
<tr><th>S No</th><th>Key Performance Indicator</th><th>Threshold</th><th>Measurement</th></tr>
<tr><td></td><td>moves (operational)</td><td></td><td>• Actual average container moves = Number of container moves/effective crane working hours

Wherein:

Container moves means the total number of container moves made by the crane

Effective crane working hours means the time for which the crane was deployed measured by the HMR (Hour meter reading) device on the crane</td></tr>
<tr><td>4</td><td>Average handling rate (operational)</td><td>Thresholds as given below:<table><tr><th>S No</th><th>Commodity</th><th>Minimum handling rate (MT/Hour)</th></tr><tr><td>1</td><td>Construction material</td><td>150</td></tr><tr><td>2</td><td>Consumer goods</td><td>150</td></tr><tr><td>3</td><td>Foodstuff</td><td>150</td></tr></table></td><td>• Frequency: Quarterly
• Actual average handling rate = Cargo handled /effective crane working hours

Wherein:

Cargo handled means the total amount of bulk, break-bulk and liquid cargo in metric tonnes handled by the crane

Effective crane working hours means the time for which the crane was deployed measured by the HMR (hour meter reading) device on the crane</td></tr>
<tr><td>5</td><td>Average turnaround time of trucks (operational)</td><td>Less than 120 minutes</td><td>• Frequency: Quarterly
• Actual average turnaround of trucks = Σ(Gate out time – Gate in time) / total number of trucks

Wherein:

Gate-in time means time at which the driver enters terminal gate

Gate-out time means time of reception of documentation which would allow the truck to exit the terminal</td></tr>
</table>

Performance evaluation and calculation of liquidated damages

Performance evaluation shall be made on a quarterly review of the reports furnished by the Concessionaire and/or the records of the Concessionaire and/or by an enquiry by the Concessioning Authority.

The Concessionaire shall be liable to pay liquidated damages determined as per the following:

(i) at the rate of 5% (five per cent) of the Royalty of the respective quarter for shortfall upto 10% (ten per cent) in the average performance

(ii) at the rate of 12.5% (twelve point five per cent) of the Royalty of the respective quarter for shortfall between 10% (ten per cent) and 20% (twenty per cent) in the average performance

(iii) at the rate of 22.5% (twenty two point five per cent) of the Royalty of the respective quarter for shortfall between 20% (twenty per cent) and 30% (thirty per cent) in the average performance

(iv) at the rate of 35% (thirty five per cent) of the Royalty of the respective quarter for shortfall between 30% (thirty per cent) and 40% (forty per cent) in the average performance

(v) at the rate of 50% (fifty per cent) of the Royalty of the respective quarter for shortfall between 40% (forty per cent) and 50% (fifty per cent) in the average performance which shall be assessed in the manner as described below.

Each Performance Standard is calculated as an average in the manner indicated above. The actual average performance vis-à-vis a standard will be evaluated against the prescribed standard. The shortfall will be computed as a percentage of the prescribed standard. The shortfall in respect of each performance standard will have a weightage assigned to it.

The overall shortfall in average performance shall be assessed as the aggregate of the weighted shortfalls in respect of each of the Performance Standards. The following weights would be applied:

KPI	**Equipment reliability (v)**	**Equipment availability (w)**	**Truck turnaround time (x)**	**Average container moves (y)**	**Average handling rate (z)**
Weight	20%	20%	10%	25%	25%

Based on the above table, the overall shortfall in average performance will be (0.2v + 0.2w + 0.1x + 0.25y + 0.25z) %.

The maximum Royalty charged as damages would be limited to 50% (fifty per cent) in the respective quarter.

No liquidated damages shall be paid before 1st anniversary of COD. After 1st anniversary and before 4th anniversary of the COD, liquidated damages shall be calculated on basis on Notional Royalty of the respective quarter.

If Performance Standards for KPIs are not met by operator for 4 (four) consecutive quarters, the Concessioning Authority will initiate a performance assessment to identify improvement areas. The Concessionaire shall be allowed a time period of 2 (two) consecutive quarters to improve areas of performance shortfall, during which no action will be taken by Concessioning Authority. If Performance Standards for KPIs are not met even at the end of 6 (six) consecutive quarters, it may be considered as case of contract termination by the Concessioning Authority.

Calculation of penalty in case of shortfall in LAD maintenance

The Concessioning Authority shall be liable for penalty to the Concessionaire at a specific location/stretch in event of LAD shortfall discovered by unsuccessful passage of vessel through waterway as certified/ validated by the Independent Surveyor. The Concessioning Authority shall be liable for such penalty only in stretches upstream of Tribeni which is located at a chainage distance of 193 km on National Waterway-1. For avoidance of doubt, it is stated that the Concessioning Authority shall not be liable for such penalty in stretches downstream of Tribeni. The Concessioning Authority shall also be liable for such penalty in the 7 km long connecting channel between the Terminal and National Waterway-1.

Independent Surveyor shall validate/ certify that unsuccessful passage is not due to Concessionaire default subject to the following conditions:

i. Concessionaire has taken an informed decision about the size and draft of the vessel and volume of cargo that can pass through National Waterway-1 by duly checking the LAD information updated periodically by the Authority on their website or any other source of information used in the future.
ii. Concessionaire has adhered to the National Waterway-1 channel as declared by the Authority in their navigational charts updated periodically.

Concessionaire will immediately communicate such instance to the Concessioning Authority. The Concessioning Authority will then have 48 (forty eight) hours to rectify the shortfall in LAD to ensure passage of vessel. Liability for penalty will arise only if there is LAD shortfall for a period greater than an initial duration of 48 hours from the exact time of receiving written validation from Independent Surveyor that unsuccessful vessel passage was due to LAD shortfall on National Waterway-1. Liability for penalty shall arise only if period of unsuccessful vessel passage due to LAD shortfall exceeds 48 hours and not for the initial duration of 48 hours.

Penalty component shall be assessed by the Independent Surveyor. Penalty component by the Concessioning Authority shall be adjusted from the Royalty payments due from the Concessionaire and the Concessionaire shall make reduced Royalty payment to the Concessioning Authority with specific relation to the volume of cargo being carried in the particular vessel.

Penalty component shall be capped at 50% of Royalty for the vessel unable to pass due to shortfall in LAD which shall be calculated on the basis of Royalty per MT to be paid by Concessionaire and volume of cargo carried by the vessel which was delayed due to LAD shortfall.

The Concessioning Authority shall be liable for penalty commensurate to loss of productivity induced for the particular vessel which was delayed due to LAD shortfall. Penalty payable will be calculated on basis of performance shortfall induced in operational KPIs for the Concessionaire. The induced performance shortfall for the Concessionaire will be used to calculate a notional penalty which would have been paid by the Concessionaire if there was equal operational performance shortfall only for the duration when LAD was not available beyond 48 hours.

The notional penalty amount arrived at as stated above will be the liability for penalty by Concessioning Authority to the Concessionaire as compensation for LAD shortfall for a period exceeding 48 hours. The same has been illustrated with an example below.

If a 1,500 MT vessel carrying bulk cargo is unable to pass through waterway due to LAD shortfall for a duration of 72 hours, the Concessioning Authority will pay penalty for loss of operational performance for the period of 24 hours, which is the period exceeding initial duration of 48 hours. If the quoted royalty is INR 100 per MT, the total Royalty payable by Concessionaire shall amount to INR 1,50,000 only (100 per MT x 1500 MT).

As also given above regarding Performance Standards for Concessionaire, liability for penalty shall be capped at 50% of Royalty payable by Concessionaire for cargo carried by vessel which was unable to pass due to LAD shortfall.

For avoidance of doubt, it may be stated that the maximum liability for penalty as calculated above shall be the upper cap of Royalty that the Concessioning Authority shall forgo.

Amount of liability for penalty shall be calculated based on performance shortfall induced by unsuccessful vessel passage due to insufficient LAD as validated by Independent Surveyor. An illustration of the same is given below.

Calculation of induced performance shortfall
Assuming that the vessel has bulk cargo for which threshold average handling rate has been defined as 150 MT per hour for the Concessionaire. Accordingly it would have taken 10 (ten) hours to unload cargo. Due to vessel delay the time for unloading cargo will increase by 24 (twenty four) hours and total actual time for unloading cargo will be 34 hours.
Therefore, actual average handling rate for the vessel = 1500 / 34 = 44.12 MT per hour
Induced performance shortfall for average handling rate = (150 - 44.12)/150 = 70.59%
Assuming other KPIs remain unaffected, average induced performance shortfall = 0.25 X 70.59 = 17.65%

Calculation of notional penalty corresponding to induced performance shortfall
Notional penalty for average induced performance shortfall of 17.65% = 12.5% of royalty as per bands stipulated in case of non-adherence to KPIs by Concessionaire.
Therefore, notional penalty = 12.5% of 1,50,000 = 18,750

Notional penalty of average induced performance shortfall of 17.65% = 18,750
As per above example used only for illustrative purpose, the Concessioning Authority will be liable for penalty of INR 18,750 to the Concessionaire for a 24 hour period of delay in vessel passage due to LAD shortfall.

This amount shall be adjusted in the royalty payments by the Concessionaire to the Concesssioning Authority.

No penalty will be payable every year between March 11 and May 10, during which, according to the Indo-Bangladesh Ganges Water Sharing Treaty of 1996, both India and Bangladesh shall receive guaranteed 35,000 cusecs of water in alternate three 10-day periods.

Before 4th anniversary of the COD, the Concessioning Authority shall not be liable to pay any penalty for shortfall in LAD.

27. Annexure V: Terms of Reference for Independent Engineer and Independent Surveyor

1. Role and functions of the Independent Engineer

The Independent Engineer is expected to play a positive and independent role in discharging its functions, thereby facilitating the smooth implementation of the project. The role and functions of the Independent Engineer shall include the following:

(i) review of DTR;

(ii) review, inspection and monitoring of Development/Equipment Works;

(iii) conducting tests on completion of development/equipment and issuing Completion/ Provisional Certificate;

(iv) determining, as required under the Agreement, the costs of any works or services and/or their reasonableness;

(v) determining, as required under the Agreement, the period or any extension thereof, for performing any duty or obligation;

(vi) assisting the parties in resolution of disputes as regards the designs & drawings; and

(vii) undertaking all other duties and functions as envisaged under the Agreement.

2. Review of DTR

(i) The Independent Engineer shall undertake a detailed review of the DTR to be furnished by the Concessionaire along with supporting data. The Independent Engineer shall complete such review and send its comments in accordance with the Agreement. In particular, such comments shall specify the conformity or otherwise of such DTR with the Scope of Work and Standards.

(ii) The Independent Engineer shall review the detailed design, development methodology, quality assurance procedures and the procurement, engineering and development time schedule sent to it by the Concessionaire and furnish its comments. The Independent Engineer shall take into account comments and suggestions of the Concessioning Authority, if any while furnishing the comments.

(iii) The Independent Engineer shall review the monthly progress reports as regards the Construction Works.

(iv) The Independent Engineer shall inspect the Development/Equipment Works once every Month, preferably after receipt of the monthly progress report from the Concessionaire, but before the 20th (twentieth) Day of each month in any case, and make out a report of such inspection (**"Inspection Report"**) setting forth an overview of the

status, progress, quality and safety of construction, including the work methodology adopted, the materials used and their sources, and conformity of Development/Equipment Works with the Standards. In a separate section of the Inspection Report, the Independent Engineer shall describe in reasonable detail the lapses, defects or deficiencies observed by it in the Development/Equipment Works.

(v) The Independent Engineer may inspect the Development/Equipment Works more than once in a month if any lapses, defects or deficiencies require such inspections

(vi) For determining that the Development/Equipment Works conform to Standards, the Independent Engineer shall require the Concessionaire to carry out, or cause to be carried out, tests on a sample basis, to be specified by the Independent Engineer in accordance with Good Industry Practice for quality assurance. The Independent Engineer shall issue necessary directions to the Concessionaire for ensuring that the tests are conducted in a fair and efficient manner, and shall monitor and review the results thereof.

(vii) The tests shall be undertaken on a random sample basis and shall be in addition to, and independent of, the tests that may be carried out by the Concessionaire for its own quality assurance in accordance with Good Industry Practice.

(viii) In the event that the Concessionaire carries out any remedial works for removal or rectification of any defects or deficiencies, the Independent Engineer shall require the Concessionaire to carry out, or cause to be carried out, tests to determine that such remedial works have brought the Construction Works into conformity with the Standards.

(ix) In the event that the Concessionaire fails to adhere to the Project Schedule and complete the Development/Equipment Works on the specified Milestone Dates, the Independent Engineer shall undertake a review of the progress of development/equipment works and identify potential delays, if any. If the Independent Engineer shall determine that completion of the Project is not feasible within the time specified in the Agreement, it shall require the Concessionaire to indicate within 15 (fifteen) days the steps proposed to be taken to expedite progress, and the period within which the Project shall be completed. Upon receipt of a report from the Concessionaire, the Independent Engineer shall review the same and send its comments to the Concessioning Authority and the Concessionaire forthwith.

(x) If at any time during the Terminal Equipment Phase, the Independent Engineer determines that it is not safe to carry on Development/Equipment Works for any reason whatsoever including if the Concessionaire has not made adequate arrangements for the safety of workers or other third parties or that any work is being carried out in a manner that threatens such safety, it shall make a recommendation to the Concessioning Authority forthwith, identifying the whole or part of the Development/Equipment Works that should be suspended for ensuring safety in respect thereof.

(xi) Upon remedial measures being taken by the Concessionaire for securing the safety of suspended works, the Independent Engineer shall inspect the safety measures for adequacy and recommend whether or not such suspension may be revoked by the Concessioning Authority.

(xii) If suspension of Development/Equipment Works is for reasons not attributable to the Concessionaire, the Independent Engineer shall determine the extension of time for completion, to which the Concessionaire is reasonably entitled, and shall notify the Concessioning Authority and the Concessionaire of the same.

(xiii) The Independent Engineer shall carry out, or cause to be carried out, all the Tests specified in the Annexure hereto and issue a Completion Certificate or Provisional Certificate, as the case may be, in accordance with the provisions of the Agreement.

3. Role and functions of the Independent Surveyor

The Independent Surveyor is expected to play a positive and independent role in discharging its functions, thereby facilitating the smooth implementation of the project. The role and functions of the Independent Surveyor shall include the following:

3.1 Validating occasions of unsuccessful vessel passage due to insufficient LAD. The Independent engineer shall validate/ certify that unsuccessful passage is not due to Concessionaire default subject to the following conditions:

1. Concessionaire has taken an informed decision about the size of the vessel and volume of cargo that can pass through the waterway by checking the LAD information updated weekly by the Authority on their website or any other source of information used in the future.
2. Concessionaire has adhered to the waterway channel as declared by the Authority in their navigational charts updated periodically.

3.2. Validating penalty payable by Concessioning Authority in case of occasions of insufficient LAD

28. Annexure VI: ESCROW Agreement

THIS ESCROW AGREEMENT is entered into on this the [●] Day of [●] 20[●].

By and Amongst:

1. [●], a company incorporated under the provisions of the Companies Act, 2013 and having its registered office at [●] (hereinafter referred to as the "Concessionaire" which expression shall, unless repugnant to the context or meaning thereof, include its successors, permitted assigns and substitutes);

2. [● (name and particulars of Senior Lenders' Representative)] and having its registered office at [●] acting for and on behalf of the Senior Lenders as their duly authorised agent with regard to matters arising out of or in relation to this Agreement (hereinafter referred to as the "Senior Lenders' Representative" which expression shall, unless repugnant to the context or meaning thereof, include its successors and substitutes);

3. [● (name and particulars of the Escrow Bank)] and having its registered office at [●] (hereinafter referred to as the "Escrow Bank" which expression shall, unless repugnant to the context or meaning thereof, include its successors and substitutes); and

4. **INLAND WATERWAYS AUTHORITY OF INDIA**, a statutory body established by the Government of India under the provisions of Inland Waterways Authority of India Act, 1985, having its head office at, A-13, Sector -1, Noida – 201 301, Uttar Pradesh, represented by its [Chairman] (hereinafter referred to as the **"Concessioning Authority"**, which expression shall, unless repugnant to the context or meaning thereof, include its successors and assigns).

WHEREAS:

(i) The Concessioning Authority has entered into a Concession Agreement dated [●] with the Concessionaire (the **"Concession Agreement")** for undertaking the Project (as defined in the Concession Agreement) on EOT basis. The Senior Lenders have agreed to finance the Project in accordance with the terms and conditions set forth in the Financing Documents.

(ii) The Concession Agreement requires the Concessionaire to establish an Escrow Account, inter alia, on the terms and conditions stated therein.

NOW IT IS HEREBY AGREED as follows:

1. Definitions and Interpretations

1.1 Definitions

In this Agreement, the following words and expressions shall, unless repugnant to the context or meaning thereof, have the meaning hereinafter respectively assigned to them:

"**Agreement**" means this Escrow Agreement and any amendment thereto made in accordance with the provisions contained herein;

"**Budget**" means the budget for development/implementation expenses relating to the Project/Project Facilities and Services and operation and maintenance Expenses submitted by the Concessionaire in accordance with the provisions contained herein;

"Concession Agreement" means the Agreement dated with the Concessionaire for undertaking the Project on EOT basis Concession Agreement and shall include any amendments made thereto in accordance with the provisions contained in this behalf therein;

"**Escrow Account**" means an escrow account established in terms of and under this Agreement, and shall include any sub accounts thereof;

"Escrow Default" shall have the meaning ascribed thereto in Article 6.1;

"Senior Lenders' Representative" means the person referred to as the Senior Lenders' Representative in the foregoing Recitals;

"Parties" means the parties to this Agreement collectively and **"Party"** shall mean any of the Parties to this Agreement individually;

"**Payment Date**" means, in relation to any payment specified in Article 4.1, the date(s)dates specified for such payment; and

"**Quarter**" means, any three month period from 1st April to 30th June, 1st July to 30th September, 1st October to 31st December or 1st January to 31st March.

1.2 Interpretation

1.2.1 References to Senior Lenders' Representative shall, unless repugnant to the context or meaning thereof, mean references to the Senior Lenders' Representative, acting for and on behalf of Senior Lenders.

1.2.2 The words and expressions beginning with capital letters and defined in this Agreement shall have the meaning ascribed thereto herein, and the words and expressions used in this Agreement and not defined herein but defined in the Concession Agreement shall, unless repugnant to the context, have the meaning ascribed thereto in the Concession Agreement.

1.2.3 References to Articles are, unless stated otherwise, references to Articles of this Agreement.

1.2.4 The rules of interpretation stated in Articles 1.3, 1.4 and 1.5 of the Concession Agreement shall apply, mutatis mutandis, to this Agreement.

2. Escrow Account

2.1 Escrow Bank to act as trustee

2.1.1 The Concessionaire hereby settles in trust with the Escrow Bank a sum of INR 100 (Rupees Hundred Only) appoints the Escrow Bank to act as trustee for the Concessioning Authority, the Senior Lenders, the Senior Lenders' Representative and the Concessionaire in connection herewith and authorises the Escrow Bank to exercise such rights, powers, authorities and discretion as are specifically delegated to the Escrow Bank by the terms hereof together with all such rights, powers, authorities and discretion as are reasonably incidental hereto, and the Escrow Bank accepts such appointment pursuant to the terms hereof.

2.1.2 The Concessionaire hereby declares that all rights, title and interest in and to the Escrow Account shall be vested in the Escrow Bank and held in trust for the Concessioning Authority, the Senior Lenders, the Senior Lenders' Representative and the Concessionaire, and applied in accordance with the terms of this Agreement. No person other than the Concessioning Authority, the Senior Lenders/Senior Lenders' Representative and the Concessionaire shall have any rights hereunder as the beneficiaries of, or as third party beneficiaries under this Agreement.

2.2 Acceptance of Escrow Bank

The Escrow Bank hereby agrees to act as such and to accept all payments and other amounts to be delivered to and held by the Escrow Bank pursuant to the provisions of this Agreement. The Escrow Bank shall hold and safeguard the Escrow Account during the term of this Agreement and shall treat the amount in the Escrow Account as monies deposited by the Concessionaire, Senior Lenders or the Concessioning Authority with the Escrow Bank. In performing its functions and duties under this Agreement, the Escrow Bank shall act in trust for the benefit of, and as agent for, the Concessioning Authority, the Senior Lenders' Representative and the Concessionaire or their nominees, successors or assigns, in accordance with the provisions of this Agreement.

2.3 Establishment and operation of Escrow Account

2.3.1 Within 30 (thirty) Days from the date of this Agreement, and in any case prior to the Date of Award of Concession, the Concessionaire shall open and establish the Escrow Account with the [(name of Branch)] Branch of the Escrow Bank. The Escrow Account shall be denominated in Rupees.

2.3.2 The Escrow Bank shall maintain the Escrow Account in accordance with the terms of this Agreement and its usual practices and applicable regulations, and pay the maximum rate of interest payable to similar customers on the balance in the said account from time to time.

2.3.3 The Concessionaire shall submit to the Escrow Bank a Budget within 7 (seven) Days of the commencement of each Financial Year. Till the pendency of the financing Documents, such Budget shall be approved by the Senior Lenders/Senior Lenders Representative and thereafter by the Concessioning Authority.

2.3.4 The Escrow Bank and the Concessionaire shall, after consultation with the Senior Lenders' Representative, agree on the detailed mandates, terms and conditions, and operating procedures for the Escrow Account, but in the event of any conflict or inconsistency between this Agreement and such mandates, terms and conditions, or procedures, this Agreement shall prevail.

2.4 Escrow Bank's fee

The Escrow Bank shall be entitled to receive its fee and expenses in an amount, and at such times, as may be agreed between the Escrow Bank and the Concessionaire. For the avoidance of doubt, such fee and expenses shall form part of the operating and maintaining expenses and shall be appropriated from the Escrow Account in accordance with Article 4.1.1 (c).

2.5 Rights of the parties

The rights of the Concessioning Authority, the Senior Lenders (through the Senior Lenders' Representative) and the Concessionaire in the monies held in the Escrow Account are set forth in their entirety in this Agreement and the Concessioning Authority, the Senior Lenders' and the Concessionaire shall have no other rights against or to the monies in the Escrow Account.

2.6 Substitution of the Concessionaire

The Parties hereto acknowledge and agree that upon substitution of the Concessionaire with the Selectee, pursuant to the Substitution Agreement, it shall be deemed for the purposes of this Agreement that the Selectee is a Party hereto and the Selectee shall accordingly be deemed to have succeeded to the rights and obligations of the Concessionaire under this Agreement on and with effect from the date of substitution of the Concessionaire with the Selectee.

3. Deposits into Escrow Account

3.1 Deposits by the Concessionaire

3.1.1 The Concessionaire agrees and undertakes that it shall deposit into and/or credit the Escrow Account with:

(a) all monies received in relation to the Project from any source, including the Senior Lenders;

(b) all funds received by the Concessionaire from its share-holders, in any manner or form;

(c) all Fee levied and collected by the Concessionaire;

(d) any other revenues from or in respect of the Project/Project Facilities and Services accruing to the Concessionaire including termination payments; and

(e) all proceeds received pursuant to any insurance claims.

For avoidance of doubt, all amounts received by the Concessionaire in respect of the Project/Project Facilities and Services excepting any amounts in respect of cesses and duties collected by it from the users on behalf of the Concessioning Authority or such other Concessioning Authority in accordance with the Concession Agreement or pursuant to any other instructions in respect thereof shall be deposited in the Escrow Account.

4. Withdrawals from Escrow Account

4.1 Withdrawals during Concession Period

4.1.1 At the beginning of every month, or at such shorter intervals as the Senior Lenders' Representative and the Concessionaire may by written instructions determine, the Escrow Bank shall withdraw amounts from the Escrow Account and appropriate them in the following order by depositing such amounts in the relevant Sub-Accounts for making due payments in a month:

(a) all taxes due and payable by the Concessionaire;

(b) towards License Fee;

(c) towards Royalty and other sums payable to the Concessioning Authority and liquidated damages, if any;

(d) towards its debt service obligations under the Financing Documents;

(e) all development/implementation expenses relating to the Project/Project Facilities and Services, in accordance with the Budget and subject to limits if any set out under the Financing Documents;

(f) all expenses relating to operations and management of the Project/Project Facilities and Services, in accordance with the Budget and subject to limits if any set out under the Financing Documents;

(g) towards any reserve requirements in accordance with the Financing Documents;

and the Concessionaire shall be at liberty to withdraw any sums outstanding in the escrow account after all the aforesaid payments due in any Quarter have been made and/or adequate reserves have been created in respect thereof for that Quarter.

4.1.2 Not later than 60 (sixty) Days prior to the commencement of each Accounting Year, the Concessionaire shall provide to the Escrow Bank, with prior written approval of the Senior Lenders' Representative, details of the amounts likely to be required for each of the payment obligations set forth in this Article 4.1; provided that such amounts may be subsequently modified, with prior written approval of the Senior Lenders' Representative, if fresh information received during the course of the year makes such modification necessary.

4.2 Withdrawals upon end of Concession Period

4.2.1 All amounts standing to the credit of the Escrow Account at the end of the Concession Period including amounts credited to the Escrow Account towards compensation payable in accordance with Article 16 of the Concession Agreement shall be appropriated in the following order of priority:

(a) towards taxes and statutory dues payable by the Concessionaire;

(b) compensation to Senior Lenders in terms of the Financing Documents towards discharge of the Concessionaire's liability under such Financing Documents;

(c) all amounts due to the Concessioning Authority and amounts payable towards transfer of the Project Facilities and Services by the Concessionaire in accordance with this Agreement;

and the Concessionaire shall be at liberty to withdraw any sums outstanding in the Escrow Account after all the aforesaid payments due have been made and/or adequate reserves have been created in respect thereof to the satisfaction of the Senior Lenders and the Concessioning Authority and the Escrow Agent has received a confirmation of final settlement by the Senior Lenders and/or Concessioning Authority.

4.3 Application of insurance proceeds

Notwithstanding anything in this Agreement, the proceeds from all insurance claims, except life and injury, shall be deposited into and/or credited to the Escrow Account and utilised for any necessary repair, reconstruction, reinstatement, improvement, delivery or installation of the Project/Project facilities and Services, and the balance remaining, if any, shall be applied in accordance with the provisions contained in this behalf in the Financing Documents.

4.4 Withdrawals during Suspension

Notwithstanding anything to the contrary contained in this Agreement, in case the Escrow Bank receives a notice in writing from the Concessioning Authority that the rights of the Concessionaire are suspended in accordance with the Concession Agreement or a Termination Notice is issued, the Escrow Bank shall until such notice is withdrawn, act only on the instructions of the Concessioning Authority.

5. Obligations of the Escrow Bank

5.1 Segregation of funds

Monies and other property received by the Escrow Bank under this Agreement shall, until used or applied in accordance with this Agreement, be held by the Escrow Bank in trust for the purposes for which they were received, and shall be segregated from other funds and property of the Escrow Bank.

5.2 Notification of balances

7 (seven) business Days prior to each Payment Date (and for this purpose the Escrow Bank shall be entitled to rely on an affirmation by the Concessionaire and/or the Senior Lenders' Representative as to the relevant Payment Dates), the Escrow Bank shall notify the Senior Lenders' Representative of the balances in the Escrow Account as at the close of business on the immediately preceding business Day.

5.3 Communications and notices

5.3.1 In discharge of its duties and obligations hereunder, the Escrow Bank:

(a) may, in the absence of bad faith or gross negligence on its part, rely as to any matters of fact which might reasonably be expected to be within the knowledge of the Concessionaire upon a certificate signed by or on behalf of the Concessionaire;

(b) may, in the absence of bad faith or gross negligence on its part, rely upon the authenticity of any communication or document believed by it to be authentic;

(c) shall, within 5 (five) business Days after receipt, deliver a copy to the Senior Lenders' Representative of any notice or document received by it in its capacity as the Escrow Bank from the Concessionaire or any other person hereunder or in connection herewith; and

(d) shall, within 5 (five) business Days after receipt, deliver a copy to the Concessionaire of any notice or document received by it from the Senior Lenders' Representative in connection herewith.

5.4 No set off

The Escrow Bank agrees not to claim or exercise any right of set off, banker's lien or other right or remedy with respect to amounts standing to the credit of the Escrow Account. For the avoidance of doubt, it is hereby acknowledged and agreed by the Escrow Bank that the monies and properties held by the Escrow Bank in the Escrow Account shall not be considered as part of the assets of the Escrow Bank and being trust property, shall in the case of bankruptcy or liquidation of the Escrow Bank, be wholly excluded from the assets of the Escrow Bank in such bankruptcy or liquidation.

5.5 Regulatory approvals

The Escrow Bank shall use its best efforts to procure, and thereafter maintain and comply with, all regulatory approvals required for it to establish and operate the Escrow Account. The Escrow Bank represents and warrants that it is not aware of any reason why such regulatory approvals will not ordinarily be granted to the Escrow Bank.

6 Escrow Default

6.1 Escrow Default

6.1.1 Following events shall constitute an event of default by the Concessionaire (an **"Escrow Default"**) unless such event of default has occurred as a result of Force Majeure or any act or omission of the Concessioning Authority or the Senior Lenders' Representative:

(a) the Concessionaire commits breach of this Agreement by failing to deposit /cause the deposit of any receipts into the Escrow Account;

(b) the Concessionaire causes the Escrow Bank to transfer funds to any account of the Concessionaire in breach of the terms of this Agreement; or

(c) the Concessionaire commits or causes any other breach of the provisions of this Agreement.

6.1.2 Upon occurrence of an Escrow Default, the consequences thereof shall be dealt with under and in accordance with the provisions of the Concession Agreement.

7. Termination of Escrow Agreement

7.1 Duration of the Escrow Agreement

This Agreement shall remain in full force and effect so long as any sum remains to be advanced or is outstanding from the Concessionaire in respect of the debt, guarantee or financial assistance received by it from the Senior Lenders, or any of its obligations to the Concessioning Authority remain to be discharged, unless terminated earlier by consent of all the Parties or otherwise in accordance with the provisions of this Agreement.

7.2 Substitution of Escrow Bank

The Concessionaire may, by not less than 45 (forty five) Days prior notice to the Escrow Bank, the Concessioning Authority and the Senior Lenders' Representative, terminate this Agreement and appoint a new Escrow Bank, provided that the new Escrow Bank is acceptable to the Senior Lenders' Representative and arrangements are made satisfactory to the Senior Lenders' Representative for transfer of amounts deposited in the Escrow Account to a new Escrow Account established with the successor Escrow Bank. The termination of this Agreement shall take effect only upon coming into force of an Escrow Agreement with the substitute Escrow Bank.

7.3 Closure of Escrow Account

The Escrow Bank shall, at the request of the Concessionaire and the Senior Lenders' Representative made on or after the payment by the Concessionaire of all outstanding amounts under the Concession Agreement and the Financing Documents including the payments specified in Article 4.2, and upon confirmation' of receipt of such payments, close the Escrow Account and pay any amount standing to the credit thereof to the Concessionaire. Upon closure of the Escrow Account hereunder, the Escrow Agreement shall be deemed to be terminated.

8. Supplementary Escrow Agreement

8.1 Supplementary escrow agreement

The Senior Lenders' Representative and the Concessionaire shall be entitled to enter into a supplementary escrow agreement with the Escrow Bank providing, inter alia, for detailed procedures and documentation for withdrawals from Escrow Account, creation of sub-accounts pursuant to Article 4.1.1 and for matters not covered under this Agreement such as the rights and obligations of Senior Lenders, investment of surplus funds, restrictions on withdrawals by the Concessionaire in the event of breach of Financing Documents, procedures relating to operation of the Escrow Account and withdrawal therefrom, reporting requirements and any matters incidental thereto; provided that such supplementary escrow agreement shall not contain any provision which is inconsistent with this Agreement and in the event of any conflict or inconsistency between provisions of this Agreement and such supplementary escrow agreement, the provisions of this Agreement shall prevail.

9. Indemnity

9.1 General indemnity

9.1.1 The Concessionaire will indemnify, defend and hold the Concessioning Authority, Escrow Bank and the Senior Lenders, acting through the Senior Lenders' Representative, harmless against any and all proceedings, actions and third party claims for any loss, damage, cost and expense arising out of any breach by the Concessionaire of any of its obligations under this Agreement or on account of failure of the Concessionaire to comply with Applicable Laws and Applicable Permits.

9.1.2 The Concessioning Authority will indemnify, defend and hold the, Concessionaire harmless against any and all proceedings, actions and third party claims for any loss, damage, cost and expense arising out of failure of the Concessioning Authority to fulfill any of its obligations under this Agreement materially and adversely affecting the performance of the Concessionaire's obligations under the Concession Agreement or this Agreement other than any loss, damage, cost and expense arising out of acts done in discharge of their lawful functions by the Concessioning Authority, its officers, servants and agents.

9.1.3 The Escrow Bank will indemnify, defend and hold the Concessionaire harmless against any and all proceedings, actions and third party claims for any loss, damage, cost and expense arising out of failure of the Escrow Bank to fulfill its obligations under this Agreement materially and adversely affecting the performance of the Concessionaire's obligations under the Concession Agreement other than any loss, damage, cost and expense, arising out of acts done in discharge of their lawful functions by the Escrow Bank, its officers, servants and agents.

9.2 Notice and contest of claims

In the event that any Party hereto receives a claim from a third party in respect of which it is entitled to the benefit of an indemnity under Article 9.1 or in respect of which it is entitled to reimbursement (the **"**Indemnified Party"), it shall notify the other Party responsible for indemnifying such claim hereunder (the "Indemnifying Party") within 15 (fifteen) Days of receipt of the claim and shall not settle or pay the claim without the prior approval of the Indemnifying Party, which approval shall not be unreasonably withheld or delayed. In the event that the Indemnifying Party wishes to contest or dispute the claim, it may conduct the proceedings in the name of the Indemnified Party and shall bear all costs involved in contesting the same. The Indemnified Party shall provide all cooperation and assistance in contesting any claim and shall sign all such writings and documents as the Indemnifying Party may reasonably require.

10. Miscellaneous Provisions

10.1 Governing law and jurisdiction

This Agreement shall be construed and interpreted in accordance with and governed by the laws of India, and the Courts at [●] shall have jurisdiction over all matters arising out of or relating to this Agreement.

10.2 Waiver of sovereign immunity

10.2.1 The Concessioning Authority unconditionally and irrevocably:

(a) agrees that the execution, delivery and performance by it of this Agreement constitute commercial acts done and performed for commercial purpose;

(b) agrees that, should any proceedings be brought against it or its assets, property or revenues in any jurisdiction in relation to this Agreement or any

transaction contemplated by this Agreement, no immunity (whether by reason of sovereignty or otherwise) from such proceedings shall be claimed by or on behalf of the Concessioning Authority with respect to its assets;

(c) waives any right of immunity which it or its assets, property or revenues now has, may acquire in the future or which may be attributed to it in any jurisdiction; and

(d) consents generally in respect of the enforcement of any judgement or award against it in any such proceedings to the giving of any relief or the issue of any process in any jurisdiction in connection with such proceedings (including the making, enforcement or execution against it or in respect of any assets, property or revenues whatsoever irrespective of their use or intended use of any order or judgement that may be made or given in connection therewith).

10.3 Priority of agreements

In the event of any conflict between the Concession Agreement and this Agreement, the provisions contained in the Concession Agreement shall prevail over this Agreement.

10.4 Alteration of terms

All additions, amendments, modifications and variations to this Agreement shall be effectual and binding only if in writing and signed by the duly authorised representatives of the Parties.

10.5 Waiver

10.5.1 Waiver by any Party of a default by another Party in the observance and performance of any provision of or obligations under this Agreement:

(a) shall not operate or be construed as a waiver of any other or subsequent default hereof

(b) or of other provisions of or obligations under this Agreement shall not be effective unless it is in writing and executed by a duly authorised representative of the Party; and

(c) shall not affect the validity or enforceability of this Agreement in any manner.

10.5.2 Neither the failure by any Party to insist on any occasion upon the performance of the terms, conditions and provisions of this Agreement or any obligation thereunder nor time or other indulgence granted by any Party to another Party shall be treated or deemed as waiver of such breach or acceptance of any variation or the relinquishment of any such right hereunder.

10.6 No third party beneficiaries

This Agreement is solely for the benefit of the Parties and no other person or entity shall have any rights hereunder.

10.7 Survival

10.7.1 Termination of this Agreement:

(a) shall not relieve the Parties of any obligations hereunder which expressly or by implication survive termination hereof; and

(b) except as otherwise provided in any provision of this Agreement expressly limiting the liability of either Party, shall not relieve either Party of any obligations or liabilities for loss· or damage to the other Party arising out of, or caused by, acts or omissions of such Party prior to the effectiveness of such termination or arising out of such termination.

10.7.2 All obligations surviving the cancellation, expiration or termination of this Agreement shall only survive for a period of 3 (three) years following the date of such termination or expiry of this Agreement.

10.8 Severability

If for any reason whatever any provision of this Agreement is or becomes invalid, illegal or unenforceable or is declared by any court of competent jurisdiction or any other instrumentality to be invalid, illegal or unenforceable, the validity, legality or enforceability of the remaining provisions shall not be affected in any manner, and the Parties will negotiate in good faith with a view to agreeing to one or more provisions which may be substituted for such invalid, unenforceable or illegal provisions, as nearly as is practicable to such invalid, illegal or unenforceable provision. Failure to agree upon any such provisions shall not be subject to dispute resolution under Article 10.1 of this Agreement or otherwise.

10.9 Successors and assigns

This Agreement shall be binding on and shall inure to the benefit of the Parties and their respective successors and permitted assigns.

10.10 Notices

Unless otherwise stated, notices to be given under this Agreement including but not limited to a notice of waiver of any term or related or breach of any term of this Agreement shall be in writing and shall be given by hand delivery, recognized international courier, mail, telex or facsimile transmission and delivered or transmitted to the Parties at their respective addresses set forth below:

The Concessioning Authority:

CHAIRMAN
_____
_____
_____

Fax No:
Email:

The Concessionaire:

The MANAGING DIRECTOR
_____Ltd
_____
_____

Fax No. Email:

The Senior Lenders/Senior Lenders representative:
_____Ltd
_____
_____

Fax No:
Email:

The Escrow Bank:
_____Ltd
_____
_____

Fax No:
Email:

or such other address, telex number, or facsimile number as may be duly notified by the respective Parties from time to time, and shall be deemed to have been made or delivered (i) in the case of any communication made by letter, when delivered by hand, by recognized international courier or by mail (registered, return receipt requested) at that address and (ii) in the case of any communication made by telex or facsimile, when transmitted properly addressed to such telex number or facsimile number.

10.11 Language

All notices, certificates, correspondence and proceedings under or in connection with this Agreement shall be in English.

10.12 Authorised representatives

Each of the Parties shall, by notice in writing, designate their respective authorised representatives through whom only all communications shall be made. A Party hereto shall be entitled to remove and/or substitute or make fresh appointment of such authorised representative by similar notice.

10.13 Original Document

This Agreement may be executed in four counterparts, each of which when executed and delivered shall constitute an original of this Agreement.

IN WITNESS WHEREOF THE PARTIES HAVE EXECUTED AND DELIVERED THIS AGREEMENT AS OF THE DATE FIRST ABOVE WRITTEN.

SIGNED, SEALED AND DELIVERED

For and on behalf of CONCESSIONAIRE by: (Signature)
(Name)
(Designation)
(Address) (Fax No.)
SIGNED, SEALED AND DELIVERED
For and on behalf of SENIOR LENDERS by the Senior Lenders' Representative: (Signature)
(Name) (Designation)
(Address) (Fax No.)

SIGNED, SEALED AND DELIVERED For and on behalf of ESCROW BANK by: (Signature)
(Name)

(Designation)
(Address) (Fax No.)

SIGNED, SEALED AND DELIVERED
For and on behalf of Concessioning Authority by: (Signature) (Name)
(Designation) (Address) (Fax No.) In the presence of:

1.

2.

29. Annexure VII: Expert Committee

Dispute resolution through the Expert Committee can be resorted to if either of the parties exercises its right for dispute resolution through the Expert Committee as provided for explicitly in this Agreement

(i) In the event a party issues a notice (Expert Committee Notice) to refer the dispute to the Expert Committee, the parties may finalise a choice of an independent expert in the field of port and harbour engineering and/or financial and cost accounting as the case warrants within one week of such notice, failing which, each party shall appoint such an independent expert within two weeks of the Expert Committee Notice.

(ii) Such independent experts shall have adequate experience in the design, construction, operation and maintenance of Terminal facilities and/or finances, accounting, costing and valuation practices as the case warrants.

(iii) The two experts will jointly appoint a third expert with similar experience within one week of their appointment.

(iv) The party issuing the Expert Committee Notice will provide the Experts with written submission of the nature of the dispute and the claim of the other party along with supporting documents within 1 (one) week of the constitution of the Expert Committee. Within one week of the furnishing of such submission, the other party may choose to provide written submissions defending its position.

(v) The Expert Committee may call on either party to furnish additional information as deemed necessary to solve the dispute.

(vi) The Expert Committee shall give the majority decision to both parties within three weeks of the receipt of written submission from the contracting parties.

(vii) The decision of the Expert Committee shall be final and binding on the contracting parties unless either of the parties issues an Arbitration Notice.

(viii) The costs of the engagement of the Expert Committees shall be shared equally by the parties.

30. Annexure VIII: Standards

1. Construction Standards

Concessionaire shall ensure compliance with the civil construction standards set out in the DPR given in Annexure XVI.

2. Operations and Maintenance Standards

2.1 Repairs and Maintenance

The Concessionaire at its own cost promptly and diligently maintain or restore any of the project facilities or part thereof which may be lost, damaged, destroyed or worn out.

While carrying out the repairing and maintaining the project facilities, the Concessionaire acknowledges and accepts that it is holding and maintaining the EOT or assets, project facilities in trust for eventual transfer to the Concessioning Authority on termination of the agreement and therefore, will not do any act as a result of which the value of Terminal's Assets and Project Facilities and Services is diminished.

The Concessionaire shall, at all times during the Concession Period, at its own risk, cost, charges and expenses, performance and pay for maintenance repairs, and renewals of various type of assets and equipment in the Concessionaire premises and /or the project or any parts thereof, whether due to use and operations or due to deterioration of materials and /or parts, so that on the expiry or termination of Concession Period, the same shall except normal wear and tear be in good working condition as it were at the time of commencement of the Concession Period.

While carrying out the repair and maintenance of the project facilities, the Concessionaire shall carry out the work in accordance with the manufacturer's recommendations and the relevant latest Indian Standards or in its absence ISO/OISD Standards. In the event that the Concessionaire, by necessity or otherwise need to follow any other country standard and it shall be equal or superior to the standard specified above.

The repairs and maintenance shall generally conform to the following specifications.

S No	Standards	Description
1	**Maintenance**	
1.1	ISO 4308-1-2003	Maintenance of lifting appliances
1.2	ISO 4309-2004	Cranes wire rope care, maintenance and discard
1.3	IS 13367: Part 1 : 1992	Safe use of cranes – Code of Practice Part 1: General
1.4	BS 7121-2-2003	Code of Practice for safe use of cranes, inspection, testing & examination
1.5	BS 7121-4-1997	Code of Practice for safe use of cranes (Lorry Loaders)
1.6	BS 7121-5-2006	Code of Practice for safe use of cranes (Tower Cranes)
2	**Painting**	
2.1	IS 144 : 1950	Ready mixed paint, brushing, petrol resisting, air-drying, for interior painting of tanks and container, red oxide (colour unspecified)
2.2	IS 145 : 1950	Ready mixed paint, slushing, petrol resisting, air-drying for interior painting of tanks and containers, red oxide (colour unspecified)

2.3	IS 146 : 1950	Specification for ready mixed paint, brushing, petrol resisting, stoving, for interior painting of tanks and containers, red oxide (colour unspecified)
2.4	IS 147 : 1950	Specification for ready mixed paint, brushing, petrol resisting, stoving, for interior painting of tanks and containers, red oxide (colour unspecified)
2.5	IS 164 : 1981	Specification for Ready mixed paint for road marking (first revision)
2.6	IS 1419 : 1989	Antifouling paint, brushing for ship's bottom and hulls-Specification (second revision)
2.7	IS 6714 : 1989	Ready mixed paint, finishing, non-slip, deck – Specification (first revision)
2.8	IS 6948 : 1973	Specification for Ready mixed paint, undercoat, synthetic for ships
2.9	IS 6951 : 1973	Specification for Ready mixed paint, finishing, exterior for ships
2.10	IS 1477 : Part I : 1971	Code of Practice for Painting of Ferrous Metals in Buildings - Part I : Pretreatment
2.11	IS 1477 : Part 2 : 1971	Code of practice for painting of ferrous metals in buildings: Part2 Painting
2.12	IS 9954 : 1981	Pictorial Surface Preparation Standards for Painting of Steel Surfaces

3. Safety Standards

The Concessionaire shall ensure compliance with the safety standards set out under Applicable Law/international conventions, as relevant, from time to time including those required under the following:

3.1. Dock Workers (Safety, Health and Welfare) Act, 1986 & Regulations framed thereunder of 1990.

3.2. The Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989.

3.3. The Petroleum Act, 1934 along with the Petroleum Rules, 2002.

3.4. The Explosives Act, 1884 along with The Explosive Substance Act, 1983 & The Explosive Rules, 1983

3.5. Guidelines by Fire Advisor, CCE & DG FASLI, Government of India

3.6. National Fire Codes (National Fire Protection Association – USA)

3.7. Drill Manual for the Fire Services of India.

3.8. International Safety Guide for Oil Tankers & Terminals.

4. Safety Guidelines

4.1 Safe movement

In the design, construction and operation of the facility, particular care shall be taken to ensure safety of Users. This shall include facilities for safe and efficient evacuation in case of emergency.

4.2 System integrity

In the design of power supply, lighting, signalling, communication and security equipment, particular care shall be taken to minimise the likely incidence of failure.

4.3 Restoration of services

The facility shall be designed such that in the event a fault occurs, a limited service can be provided within a few minutes by isolation of the affected area or equipment, to the extent possible.

4.4 Contingency and safety management

4.4.1 The Concessionaire shall procure and ensure that appropriate contingency arrangements are in place at the Terminal to deal with the following events in accordance with applicable guidelines of IWAI:

(a) removal of disabled vessel from channel;

(b) bomb threat to the Terminal, or any acts of terrorism;

(c) vessel accidents in and around the vicinity of the Terminal;

(d) non-scheduled vessel forced to berth at the terminal;

(e) fires at the Terminal;

(f) natural calamities and disasters;

(g) strikes at the Terminal;

(h) unlawful interference with IWAI; and

(i) any other emergency at the Terminal.

4.4.2 The Concessionaire shall procure and ensure that the emergency alarm bells are installed and operated to link the terminal control Facility to the Terminal in charge and to all emergency services located at the Terminal, including but not limited to fire services, medical services, the Security Agency etc.

4.4.3 A safety statement shall be prepared by the Concessionaire once every quarter to bring out clearly the system of management of checks and maintenance tolerances for various assets, and the compliance thereof. The statement shall also bring out the nature and extent of staff training and awareness in dealing with such checks and tolerances. During the Terminal Equipment Period, two copies of the statement shall be sent to the Independent Engineer within 15 (fifteen) days of the close of every quarter.

4.5 Safety equipment

The following safety equipment shall be provided at the Terminal:

(a) Fire extinguishers and fire alarms at appropriate locations on the Terminal;

(b) Adequate number of stretchers and standard first aid boxes; and

(c) Such other equipment as may be required in conformity with relevant IWAI guidelines and Good Industry Practice.

4.6 Emergency

A set of emergency procedures shall be formulated to deal with different emergency situations and the operations staff shall be trained to respond appropriately during such emergency through periodic simulated exercises, as laid down in a manual for management of disasters ("**Disaster Management Manual**"), to be prepared and published by the Concessionaire prior to COD. The Concessionaire shall provide 5 (five) copies each of the Disaster Management Manual to the Authority no later than 30 (thirty) days prior to COD.

4.7 Fire safety

4.7.1 The Concessionaire shall conform to the standards specified under safety standard in Annexure VIII.

4.7.2 Emergency exit should be accessible without any obstructions and the exit doors should be kept locked in the ordinary course. The exit doors shall be easy to open from inside the Terminal Building in case of emergency.

4.7.3 Escape routes shall be clearly marked by arrows in the correct direction and no cryptic symbols shall be used. In complying with the provisions of this Clause, the possibility of poor visibility due to smoke shall be duly taken into account. All notices and signages shall be uniform and standardised.

4.7.4 Appropriate categories of rescue and fire-fighting services shall be made available and maintained in accordance with safety standards in Annexure VIII.

31. Annexure IX: Substitution Agreement

THIS SUBSTITUTION AGREEMENT is entered into on this the --------- Day of ------- ------ (Month) ---- (Year) at ----------.

AMONGST,

INLAND WATERWAYS AUTHORITY OF INDIA, a statutory body established by the Government of India under the provisions of Inland Waterways Authority at the time of Financial Close.

Note: Such format of the Financing Plan shall also identify the respective threshold limit of the above parameters and the basis of further projections and the detailed requirements that would need to be stratified with respect to each line item.

NOW, THEREFORE, THIS AGREEMENT WITNESSETH AS FOLLOWS:

1. Definitions and Interpretations

1.1 Definitions

In this Agreement the following words and expressions shall, unless repugnant to the context or meaning thereof, have the meaning hereafter respectively assigned to them.

"**Agreement**" means this agreement and includes any amendment or modification made to this agreement in accordance with the provisions hereof.

"**Financial Assistance**" means the financial assistance set forth in Schedule A hereto, agreed to be provided by the Senior Lenders to the Concessionaire for financing the Project.

"**Financial Default**" means occurrence of a material breach of the terms and conditions of the Financing Documents or a continuous default in servicing debt there under by the Concessionaire for a minimum period of 3 (three) months.

"**Senior Lenders**" means the financial institutions/banks whose names and addresses are set out in Schedule A hereto and shall include the financial institutions/banks who may replace the same by way of a refinance/subrogation, as may be notified by the Senior Lenders' Representative to the Concessionaire, from time to time.

"**Residual Concession Period**" means the period which shall be the remainder of the Concession Period computed from the date of issuance of Termination Notice in terms of Article 15.3.5. of the Concession Agreement.

"**Selectee**" means a Person proposed by the Senior Lender/Senior Lender's Representative pursuant to this Agreement and approved by the Concessioning Authority for substituting the Concessionaire for the residual Concession Period, in accordance with the provisions of this Agreement.

"**Suspension Period**" means the Termination Notice period as defined in Article 15.3.7. of the Concession Agreement at the end of which all formalities connected with substitution of the Concessionaire by the Selectee including handing over of Project Site/Project Facilities and

Services, in accordance with this Agreement are completed and the substitution has become effective.

1.2 Capitalized terms used in this Agreement but not defined shall have the meaning assigned to them respectively in the Concession Agreement.

2. Assignment

2.1 Assignment of rights and title

The Concessionaire hereby agrees to assign its rights, title and interest in the EOT to, and in favour of, the Senior Lenders pursuant to and in accordance with the provisions of this Agreement and the Concession Agreement by way of security in respect of financing by the Senior Lenders under the Financing Documents.

3. Substitution of the Concessionaire

3.1 Rights of substitution

3.1.1 Pursuant to the rights, title and interest assigned under Article 2.1, the Senior Lenders shall be entitled to substitute the Concessionaire by a Selectee under and in accordance with the provisions of this Agreement and the Concession Agreement.

3.1.2 The Concessioning Authority hereby agrees to substitute the Concessionaire by endorsement on the Concession Agreement in favour of the Selectee selected by the Senior Lenders in accordance with this Agreement (For the avoidance of doubt, the Senior Lenders shall not be entitled to operate and maintain the Project/Project Facilities and Services).

3.2 Substitution upon occurrence of Financial Default

3.2.1 Upon occurrence of a Financial Default, the Senior Lenders/Senior Lenders' Representative may issue a notice to the Concessionaire (the "Notice of Financial Default") along with particulars thereof, and send a copy to the Concessioning Authority for its information and record. A Notice of Financial Default under this Article 3 shall be conclusive evidence of such Financial Default and it shall be final and binding upon the Concessionaire for the purposes of this Agreement.

3.2.2 Upon issue of a Notice of Financial Default hereunder, the Senior Lenders/Senior Lenders' Representative may, without prejudice to any of its rights or remedies under this Agreement or the Financing Documents, substitute the Concessionaire by a Selectee in accordance with the provisions of this Agreement.

3.2.3 At any time after the Senior Lenders/Senior Lenders' Representative has issued a Notice of Financial Default, it may by notice require the Concessioning Authority to suspend all the rights of the Concessionaire and undertake the operation and maintenance of the Project/Project Facilities and Services, and upon receipt of such notice, the Concessioning Authority shall suspend the rights of the Concessionaire. Provided, such suspension shall be revoked upon substitution of the Concessionaire by a Selectee, and in the event such substitution is not completed within 180 (one hundred and eighty) days from the date of such suspension, the Concessioning Authority may terminate the Concession Agreement forthwith by issuing a Termination Notice in accordance with the provisions of the Concession Agreement; provided that upon written request from the Senior Lenders/Senior Lenders' Representative and the Concessionaire, the Concessioning Authority may

extend the aforesaid period of 180 (one hundred and eighty) days by a period not exceeding 90 (ninety) days.

3.3 Substitution upon occurrence of Concessionaire Default

3.3.1 Upon occurrence of a Concessionaire Default, the Concessioning Authority shall by a notice inform the Senior Lenders/Senior Lenders' Representative of its intention to issue a Termination Notice and grant 15 (fifteen) days' time to the Senior Lenders/Senior Lenders' Representative to make a representation, stating the intention to substitute the Concessionaire by a Selectee.

3.3.2 In the event that the Senior Lenders/ Senior Lenders' Representative makes a representation to the Concessioning Authority within the period of 15 (fifteen) days specified in Article 3.3.1, stating that it intends to substitute the Concessionaire by a Selectee, the Senior Lenders/ Senior Lenders' Representative shall be entitled to undertake and complete the substitution of the Concessionaire by a Selectee in accordance with the provisions of this Agreement within a period of 180 (one hundred and eighty) days from the date of such representation, and the Concessioning Authority shall either withhold termination and/or suspend the rights of the Concessionaire for the aforesaid period of 180 (one hundred and eighty) days; provided that upon written request from the Senior Lenders/ Senior Lenders' Representative and the Concessionaire, the Concessioning Authority shall extend the aforesaid period of 180 (one hundred and eighty) days by a period not exceeding 90 (ninety) days.

3.4 Procedure for substitution

3.4.1 The Concessioning Authority and the Concessionaire hereby agree that on or after the date of Notice of Financial Default or the date of representation to the Concessioning Authority under Article 3.2.2, as the case may be, the Senior Lenders/Senior Lenders' Representative may, without prejudice to any of the other rights or remedies of the Senior Lenders, invite, negotiate and procure offers, either by private negotiations or public auction or tenders from potential Selectees for substituting the Concessionaire and taking on the rights and obligations under the Concession Agreement.

3.4.2 To be eligible for substitution in place of the Concessionaire, the Selectee shall be required to fulfil the eligibility criteria that were laid down by the Concessioning Authority for shortlisting the bidders for award of the Concession Agreement; provided that the Senior Lenders/ Senior Lenders' Representative may represent to the Concessioning Authority that all or any of such criteria may be waived in the interest of the Project, and if the Concessioning Authority determines that such waiver shall not have any material adverse effect on the Project, it may waive all or any of such eligibility criteria.

3.4.3 Upon selection of a Selectee, the Senior Lenders/Senior Lenders' Representative shall request the Concessioning Authority to:

(a) accede to transfer to the Selectee the rights and obligations of the Concessionaire under the Concession Agreement; and

(b) novate the Concession Agreement to the Selectee such that the Selectee replaces the Concessionaire and becomes entitled/obligated to all the rights and obligations of the Concessionaire, for the residual Concession Period.

3.4.4 If the Concessioning Authority has any objection to the transfer of the Concession Agreement in favour of the Selectee in accordance with this Agreement, it shall within 7 (seven) days from the date of proposal made by the Senior Lenders/Senior Lenders' Representative, give a reasoned order after hearing the Senior Lenders/Senior Lenders' Representative. If no such objection is raised by the Concessioning Authority, the Selectee shall be deemed to have been accepted. The Concessioning Authority thereupon shall novate the Concession Agreement within 7 (seven) days of its acceptance/deemed acceptance of the Selectee; provided that in the event of such objection by the Concessioning Authority, the Senior Lenders' Representative may propose another Selectee whereupon the procedure set forth in this Article 3.4 shall be followed for substitution of such Selectee in place of the Concessionaire.

3.5 Selection to be binding

The decision of the Senior Lenders/Senior Lenders' Representative and the Concessioning Authority in selection of the Nominated Company shall be final and binding on the Concessionaire. The Concessionaire irrevocably agrees and waives any right to challenge the actions of the Senior Lenders' Representative or the Senior Lenders or the Concessioning Authority taken pursuant to this Agreement including the transfer/novation of the Concession Agreement in favour of the Selectee. The Concessionaire agrees and confirms that it shall not have any right to seek revaluation of assets comprised in the Project or the Concessionaire's shares. It is hereby acknowledged by the Parties that the rights of the Senior Lenders/Senior Lenders' Representative are irrevocable and shall not be contested in any proceedings before any court or Concessioning Authority and the Concessionaire shall have no right or remedy to prevent, obstruct or restrain the Concessioning Authority or the Senior Lenders/Senior Lenders' Representative from effecting or causing the transfer by substitution and endorsement of the EOT as requested by the Senior Lenders/Senior Lenders' Representative.

4. Transaction Documents

4.1 Substitution of Selectee in Transaction Documents

The Concessionaire shall ensure and procure that each Transaction Documents contains provisions that entitle the Selectee to step into such Transaction Documents, in its discretion, in place and substitution of the Concessionaire in the event of such Selectee assumption of the liabilities and obligations of the Concessionaire under the Concession Agreement.

5. Termination of Concession Agreement

5.1 Termination upon occurrence of Financial Default

At any time after issue of a Notice of Financial Default, the Senior Lenders/Senior Lenders' Representative may by a notice in writing require the Concessioning Authority to terminate the Concession Agreement forthwith, and upon receipt of such notice, the Concessioning Authority shall terminate the EOT in accordance with the Concession Agreement.

5.2 Termination when no Selectee is selected

In the event that no Selectee acceptable to the Concessioning Authority is selected and recommended by the Senior Lenders/Senior Lenders' Representative within the period of 180 (one hundred and eighty) days or any extension thereof as set forth in Article 3.3.2, the Concessioning

Authority may terminate the Concession Agreement forthwith in accordance with the provisions thereof.

5.3 Realisation of Debt Due

The Concessioning Authority and the Concessionaire hereby acknowledge and agree that, without prejudice to their any other right or remedy, the Senior Lenders are entitled to receive from the Concessionaire, without any further reference to or consent of the Concessionaire, the Debt Due upon termination of the Concession Agreement.

6. Duration of the Agreement

6.1 Agreement duration

6.1.1 This Agreement shall come into force from the date hereof and shall expire at the earliest to occur of the following events:

(a) Termination of the Agreement; or

(b) no sum remains to be advanced, or is outstanding to the Senior Lenders, under the Financing Documents.

7. Indemnity

7.1 General indemnity

7.1.1 The Concessionaire will indemnify, defend and hold the Concessioning Authority and the Senior Lenders/Senior Lenders' Representative harmless against any and all proceedings, actions and third party claims for any loss, damage, cost and expense of whatever kind and nature arising out of any breach by the Concessionaire of any of its obligations under this Agreement or on account of failure of the Concessionaire to comply with Applicable Laws and Applicable Permits.

7.1.2 The Concessioning Authority will indemnify, defend and hold the Concessionaire harmless against any and all proceedings, actions and third party claims for any loss, damage, cost and expense arising out of failure of the Concessioning Authority to fulfil any of its obligations under this Agreement, materially and adversely affecting the performance of the Concessionaire's obligations under the Concession Agreement or this Agreement, other than any loss, damage, cost and expense, arising out of acts done in discharge of its lawful functions by the Concessioning Authority.

7.1.3 The Senior Lenders/Senior Lenders' Representative will indemnify, defend and hold the Concessionaire harmless against any and all proceedings, actions and third party claims for any loss, damage, cost and expense arising out of failure of the Senior Lenders/Senior Lenders' Representative to fulfil its obligations under this Agreement, materially and adversely affecting the performance of the Concessionaire's obligations under the Concession Agreement, other than any loss, damage, cost and expense, arising out of acts done in discharge of their lawful functions by the Senior Lenders/Senior Lenders' Representative.

7.2 Notice and contest of claims

In the event that any Party hereto receives a claim from a third party in respect of which it is entitled to the benefit of an indemnity under Article 7.1 or in respect of which it is entitled to reimbursement (the "Indemnified Party"), it shall notify the other Party responsible for indemnifying such claim hereunder (the "Indemnifying Party") within 15 (fifteen) days of receipt of the claim and shall not settle or pay the claim without the prior approval of the Indemnifying Party, such approval not to be unreasonably withheld or delayed. In the event that the Indemnifying Party wishes to contest or dispute the claim, it may conduct the proceedings in the name of the Indemnified Party and shall bear all costs involved in contesting the same. The Indemnified Party shall provide all cooperation and assistance in contesting any claim and shall sign all such writings and documents as the Indemnifying Party may reasonably require.

8. General

8.1 General conditions

8.1.1 The Parties hereto expressly represent and warrant that they are duly empowered to sign and execute this Agreement.

8.1.2 Notices under this Agreement shall be sent to the Addresses first hereinabove mentioned. Any change in the address of any Party shall be duly notified by registered post acknowledgement due and delivered to the other parties.

8.1.3 The expressions "Concessioning Authority", the "Concessionaire", the "Senior Lender" and the "Senior Lenders' Representative", "Selectee" herein used shall unless there be anything repugnant to the subject or context include the respective successors and assigns.

8.1.4 This Agreement shall not be affected by reorganisation of any Senior Lender, the Concessionaire or Concessioning Authority, "Selectee" and the successor in interest of the Senior Lender or Concessioning Authority shall have the benefit of this Agreement.

8.1.5 Failing amicable settlement and/or settlement with the assistance of legal Expert, the dispute or differences or claims as the case may be, shall be finally settled by binding arbitration under the Arbitration and Conciliation Act, 1996. The arbitration shall be by a panel of three Arbitrators, one each to be appointed by the Concessioning Authority and the Senior Lenders/Senior Lender's Representative and the third to be appointed by the two arbitrators. If any Party entitled to do so, fails to appoint a second Arbitrator within 30 (thirty) days of from the receipt of the request for such appointment, then the single Arbitrator appointed in accordance with this provision shall adjudicate the disputes as Sole Arbitrator.

8.1.6 This Agreement and rights and obligations of the Parties hereunder shall remain in full force and effect pending the Award in any arbitration proceeding hereunder. The courts having territorial jurisdiction over the Project alone shall have jurisdiction over all matters arising out of or relating to the arbitration agreement contained herein or proceedings arising out of or relating to the arbitration proceedings thereunder.

8.1.7 The consultation, recommendation or approval of the Senior Lenders' Representative under this Agreement shall always be deemed as consultation, recommendation or approval of every concerned Senior Lender and each such Senior Lender shall be bound by the same.

8.1.8 This Agreement shall be in addition to and shall not be in derogation of the terms of the Financing Documents.

8.1.9 The Concessionaire agrees and acknowledges that it shall not be necessary for the Senior Lender(s) or the Senior Lenders' Representative to enforce or exhaust any other remedy available to them before invoking the provisions of this Agreement.

8.1.10 No amendment, variation or modification to this Agreement shall be valid and effectual unless made in writing and executed by the duly authorized representatives of all the Parties hereto.

8.1.11 All stamp duties or other imposts and charges as are applicable on this Agreement or on amendment of the Concession Agreement or execution of fresh Concession Agreement for the purpose of substitution as aforesaid, irrespective of the Senior Lenders making such payment for the time being, shall be borne by and be to the account of the Concessionaire.

8.1.12 The Parties hereby expressly agree that for the purpose of giving full and proper effect to this Agreement, the Concession Agreement and this Agreement shall be read together and construed harmoniously. The terms of this Agreement shall prevail in the event of any inconsistency with the Concession Agreement.

Schedule A

Particulars of Financial Assistance

Name and Address of the Lender Nature and Amount of Financing Assistance

IN WITNESS WHEREOF THE PARTIES HERETO HAVE SET THEIR HANDS HEREUNTO ON THE DAY, MONTH AND YEAR HEREINABOVE MENTIONED.

SIGNED AND DELIVERED ON BEHALF OF
----------LIMITED BY:

Name: Title:

SIGNED AND DELIVERED ON BEHALF OF GOVERNMENT OF INDIA
BY:

Name: Title:
SIGNED AND DELIVERED ON BEHALF OF
---------- ON BEHALF OF THE SENIOR LENDERS SETFORTH IN

SCHEDULE BY:
Name:

32. Annexure X: Monitoring Arrangement

(Name of the Terminal)

Operation Stage Monitoring Report of for the month ended……..

Compliance of Obligations of the Concessionaire

S No.	Obligations of the Concessionaire	Whether any action required (Yes/ No)	If yes, give details of action taken *
1	Prompt commencement of operations after "Ready for Operation" declaration		
2	Operation of Project Facilities as per "Project Requirement"		
3	Achieving Performance Standards		
4	Compliance of O&M and Safety Standards		
5	Rapid & Effective response in the event of accident/ emergency		
6	Repair of project facilities in a timely manner		
7	Manage & Operate Project Facilities on "First Come First Served" basis except for Priority & Preferential berthing as per GOI guidelines		
8	Maintenance of Proper Records relating to Revenue and operation of Project Facilities		
9	Obtaining, Maintenance of Applicable Permits and Compliance of Applicable laws		
10	Prevention of encroachment / unauthorized use of Project Facilities		
11	Repair & Maintain all Project Facilities as per Agreement provisions &Good Industry Practice at all times during the Concession Agreement.		
12	Repair, or Restore the damaged Project Facilities at its own costs.		
13	Obtaining prior written permission of Concessioning Authority for removal of assets		

14	Compliance with Monthly Reporting Requirements		
15	Cooperation to safety experts appointed by concession authority in access for inspection for safety audit once in a year		
16	Cooperation to Terminal representatives for inspection and review of operations also to compliance with requirements of Agreement		
17	Installation & Operation of specified computer system and Network as specified by Concession Authority		
18	Ensuring the prescribed Security Arrangements conforming to ISPS code		
19	Employment of personnel of foreign origin only after requisite approvals from Government of India		
20	Employ qualified and skilled personnel.		
21	Meeting Minimum Guaranteed Cargo requirements		
22	To recover tariff from users of the project facilities as per Tariff Order Notification and deposit all Tariff in Escrow Account		
23	If requested by CA, collect the cess and charges from the users on behalf of Concessioning Authority		
24	Make timely payments to Concessioning Authority viz. Royalty & Licence fees		
25	To operate Escrow Account as per priority of payments		
26	Meeting any claim/ action/ suit etc. alleging loss/ destruction of goods		
27	Inform Concessioning Authority if any Direct or indirect change of management of concessionaire		
28	Payment of all taxes/ duties/ levies etc., to the Government Authorities		
29	Purchasing and Maintaining of Insurance requirements in accordance with the Agreement and Good Industry Practice		

30	Providing copies of insurance policies to the Terminal		
31	Utilisation of money received under insurance policies as per terms of Agreement		
32	Engagement of Management Contractor as envisaged in RFP		
33	Ensuring conduct of Conditional Survey by an industry expert appointed by mutual consent and compliance of remedies thereof before expiry of concession period.		
34	Submit bank guarantee two years prior to expiry of concession period for repairs if any for condition survey		
35	Issue of consultation notice and compliance of remedial process in case of Event of Default on the part of Terminal		

(Name of the Terminal)

Operation Stage Monitoring Report of for the month ended……..

Compliance of Obligations of the Concessioning Authority

S No.	Obligations of the Concessioning Authority	Whether any action required (Yes/ No)	If yes, give details of action taken *
1	To get from the concessionaire copies of "as built" design and drawings (for Terminal Equipment Phase) maintenance schedule of equipments etc. as reviewed by Independent Engineer		
2	Release of Performance Security after 6 months from the date of commercial operation		
3	Maintenance of LAD		
4	Grant approvals/ consents sought by the Concessionaire as required under the agreement		
5	Evolve mutually acceptable mechanism for sharing the common costs by existing and future terminal operators		
6	Provide access to all applicable infrastructure facilities and utilities including water, electricity etc.		
8	Review performance standards from the monthly report submitted by concessionaire and take remedial action including recovery of liquidated damages		
9	To operate escrow account as per priority of payments		
10	Whether shareholding requirements are met by lead member/ members of the Bidder consortium		
11	Assistance to concessionaire by giving recommendation letter for getting applicable permits		
12	Shall not operationalise competing facility		
13	Issue notice of Force Majeure In the event of occurrence of any Force Majeure event		
14	Extension of time for performing obligations due to occurrence of Force majeure		
15	Compliance of provisions of Article 14 in the event of force majeure continuing beyond 120 days		

16	Payment of compensation in the event of termination due to force majeure event Payment of compensation in the event of termination due to concessionaire event of default Payment of compensation in the event of termination due to Concessioning Authority event of default		
17	Authorize the concessionaire to collect cesses and charges including infrastructure cess if required and remit the same to Concessioning Authority if required		
18	Initiate action for amicably resolution of disputes		
19	Any other observation, complaint or suggestion		
20	Payment of Compensation to Senior Lenders		
21	Issue of Consultation Notice and Compliance of remedial process in case of Event of Default on the part of Concessionaire		
22	Informing Senior Lenders of intent of termination by issuing a copy of Termination Notice to them on occurrence of force Majeure/ Event of Default		

Key Performance Indicators (KPI)/Performance Standards

S. No.	Maintenance/ Performance Standards	Indicative norms	Actual during the month	Shortfall, if any	Action taken to remedy shortfall
1	Average container moves				
2	Average handling rate				
3	Average turnaround time of trucks				
4	Equipment reliability				
5	Equipment availability				

(Name of the Terminal)

Operation Stage Monitoring Report of (Name of the Project) for the month ended……..

I. Basic Data of the project

S No.	Project Parameters	Details
1.	Name of the concessionaire	
2.	Percentage of equity holding in case of consortium	
3.	Payment of Royalty	
4.	Date of Issue of Letter of acceptance by the Concessioning Authority to concessionaire	
5.	Date of signing of Concession Agreement	
6.	Time duration for fulfilling the condition precedent as per concession agreement (a) By Concessionaire (b) By Concessioning Authority	
7.	Actual Date of award of concession after fulfilling condition precedent	
8.	Date of starting of commercial operation	
9.	Estimated cost	
10.	Actual Cost	
11.	Capacity	
12.	Project details like length of berth, design vessel size can be handled,	
13.	Present tariff rate	
14.	MGT if any as per concession agreement	
15.	Cargo handled during this month	
16.	Cumulative cargo handled during the financial year	
17.	Any other remarks	

33. Annexure XI: Performance Guarantee

(Proforma of Bank Guarantee)

THIS DEED OF GUARANTEE executed on this the ---- Day of ----- at ------ by --------- ---------- (Name of the Bank) having its Head/Registered office at ------ ---------- herein after referred to as "**Guarantor**" which expression shall unless it be repugnant to the subject or context thereof include its successors and assigns;

In favour of:

INLAND WATERWAYS AUTHORITY OF INDIA, a statutory body established by the Government of India under the provisions of Inland Waterways Authority of India Act, 1985, having its head office at A-13, Sector -1, Noida – 201 301, Uttar Pradesh, represented by its [Chairman] (hereinafter referred to as the "**the Concessioning Authority"**, which expression shall, unless repugnant to the context or meaning thereof, include, its successors and assigns.

WHEREAS:

The Concessioning Authority, vide its Request for Proposal dated [●] ("the RFP") invited bidders to implement a project envisaging (more particularly described in Annexure I and hereinafter referred to as "**Project**");

After evaluation of the bids received in response to the RFP, the Board accepted the bid of the consortium comprising of and ("the Consortium") OR the Board accepted the bid of ("**Bidder**") and issued the Letter of Intent No (**"LOI"**) dated to the Consortium/Bidder requiring, inter alia, the execution of the Concession Agreement, ("the Concession Agreement") the draft whereof was provided in the RFP;

Pursuant to the LOI the Bidder/Consortium has promoted and incorporated a special purpose company ("the Concessionaire"), to enter into the Concession Agreement for undertaking, inter alia, the work with respect to the Project referred to in Recital (a) above and to perform and discharge all its obligations thereunder.

In terms of the LOI and the Concession Agreement, the Concessionaire is required to furnish to the Board, a Performance Guarantee being an unconditional and irrevocable Bank Guarantee from a Scheduled Bank for a sum of Rs. [●] (Rupees [●] only) as security for due and punctual performance/discharge of its obligations under the Concession Agreement during the Terminal Equipment Phase,

At the request of the Concessionaire, and for valid consideration the Guarantor has agreed to provide guarantee, being these presents guaranteeing the due and punctual performance/discharge by the Concessionaire of its obligations under the Concession Agreement during the Terminal Equipment Phase.

NOW THEREFORE THIS DEED WITNESSETH AS FOLLOWS:

1. Capitalized terms used herein but not defined shall have the meaning assigned to them respectively in the Concession Agreement.

2. The Guarantor hereby irrevocably and unconditionally guarantees the due execution and punctual performance by M/s. ("the Concessionaire") of all its obligations under the Concession Agreement during the Terminal Equipment Phase.

3. The Guarantor shall, without demur or protest, pay to the Board sums not exceeding in aggregate Rs. [●] (Rupees [●] only) within five (5) calendar days of receipt of a written demand therefor from the Board stating that the Concessionaire has failed to meet its performance obligations under the Concession Agreement during the Terminal Equipment Phase. The Guarantor shall not go into the veracity of any breach or failure on the part of the Concessionaire or validity of demand so made by the Board and shall pay the amount specified in the demand notwithstanding any direction to the contrary given or any dispute whatsoever raised by the Concessionaire or any other Person before any court, tribunal, expert, arbitrator or similar proceedings. The Guarantor's obligations hereunder shall subsist until all such demands of the Board are duly met and discharged in accordance with the provisions hereof. Any such demand made on the Guarantor by the Board shall be conclusive, absolute and unequivocal as regards the amount due and payable by the Guarantor under this Agreement. The Concessioning Authority shall at all times at its sole discretion have the absolute and unconditional right to call upon the Guarantor to pay the amount under the Guarantee.

4. In order to give effect to this Guarantee, the Board shall be entitled to treat the Guarantor as the principal debtor. The obligations of the Guarantor shall not be affected by any variations in the terms and conditions of the Concession Agreement or other documents or by the extension of time for performance granted by the Board or postponement/non- exercise/ delayed exercise of any of its rights by the Board or any indulgence shown by the Board to the Concessionaire and the Guarantor shall not be relieved from its obligations under this Guarantee on account of any such variation, extension, postponement, non-exercise or delayed exercise by the Board of any of the Board's rights or any indulgence shown by the Board; provided nothing contained herein shall enlarge the Guarantor's obligation hereunder.

5. This Guarantee shall be unconditional and irrevocable and shall remain in full force and effect until Scheduled Project Completion Date and for a period of twelve months thereafter unless discharged/released earlier by the Board in accordance with the provisions of the Concession Agreement. The Guarantor's liability in aggregate shall be limited to a sum of Rs. [●] (Rupees [●] only).

6. This Guarantee shall not be affected by any change in the constitution or winding up, insolvency, bankruptcy, dissolution or liquidation of the Concessionaire/ the Guarantor or any absorption, merger or amalgamation of the Concessionaire/the Guarantor with any other Person.

7. Any payment made hereunder shall be made free and clear of, and without deduction for or on account of taxes, levies, imposts, duties, charges, fees, deductions, or withholding of any nature whatsoever.

8. The Guarantor hereby irrevocably and unconditionally undertakes, agrees and acknowledges that its obligations as a Guarantor hereunder:

(a) shall not be affected by the existence of or release or variation of any other guarantee or security for any of the obligations of the Concessionaire under the Concession Agreement;

(b) shall not be affected by any failure by the Concessioning Authority to perform any of its obligations under the Agreement;

(c) shall not be affected by any failure or delay in payment of any fee or other amount payable to the Guarantor in respect hereof;

(d) shall not be affected by any exercise or non-exercise of any right, remedy, power or privilege of any person under or in respect of any payment obligations of the Concessionaire under the Concession Agreement;

(e) shall not be affected by any failure, omission or delay on the Concessioning Authority's part to enforce, assert or to exercise any right, power or remedy conferred on the Concessioning Authority in this Guarantee;

(f) shall not be affected by any act, omission, matter or thing which, but for this article would reduce, release or prejudice the Guarantor from any of the obligations under this Guarantee or prejudice or diminish the obligations in whole or in part.

9. The obligations, covenants, agreements and duties herein shall not be subject to any counterclaims, cross claims, set offs, deductions, withholdings, diminutions, abatements, recoupments, suspensions, deferments, reductions or defence for any reason whatsoever and the Guarantor, shall have no right to terminate this Guarantee or to be released, relieved or discharged from any of its obligations, covenants, agreements and duties hereunder for any reason whatsoever.

10. The Guarantor has power to issue this guarantee and discharge the obligations contemplated herein, and the undersigned is duly authorized to execute this Guarantee pursuant to the power granted under .

11. This Guarantee shall be governed by and construed in accordance with the laws of India. The Guarantor hereby irrevocably submits to the exclusive jurisdiction of the Court of___ _____for the purposes of any suit, action, or other proceeding arising out of this Guarantee, or the subject matter hereof, brought by the Concessioning Authority or its successors or assigns. To the extent permitted by Applicable Law, the Guarantor or its successors or assigns hereby waive, and shall not assert, by way of motion, as defence, or otherwise, in any such suit, action, or proceeding any claim that such suit, action, or proceedings is brought in an inconvenient forum, or that the value of such suit, action, or proceeding is improper, or that the subject matter hereof may not be enforced in or by such court.

IN WITNESS WHEREOF THE GUARANTOR HAS SET ITS HANDS HEREUNTO ON THE DAY, MONTH AND YEAR FIRST HEREINABOVE WRITTEN.

SIGNED AND DELIVERED by

_____Bank by the hand of Mr._____its

_____and authorized official.

34. Annexure XII: Certificates

Completion Certificate

1. I, [●] (Name of the Independent Engineer), acting as Independent Engineer, under and in accordance with the Agreement dated [●], for the [●] Project on equip, operate and transfer (EOT) basis, through [(Name of Concessionaire)], hereby certify that the Tests specified in Article [●] and Schedule-[●] of the Agreement have been successfully undertaken to determine compliance of the Project with the provisions of the Agreement, and I am satisfied that the Project can be safely and reliably placed in commercial service of the users thereof.

2. It is certified that, in terms of the aforesaid Agreement, all works forming part of the Project have been completed, and the Project is hereby declared fit for entry into commercial operation on this the [●] Day of [●] 20[●].

SIGNED, SEALED AND DELIVERED For and on behalf of the INDEPENDENT ENGINER by:

(Signature) (Name) (Designation) (Address)

Provisional Certificate

1. I, [[●] (Name of the Independent Engineer)], acting as Independent Engineer, under and in accordance with the Agreement dated [●], for the Project on equip, operate and transfer (EOT) basis through [● (Name of Concessionaire)], hereby certify that the Tests specified in Article [●] and Schedule-[●] of the Agreement have been undertaken to determine compliance of the Project with the provisions of the Concession Agreement.

2. Development/Equipment Works that were found to be incomplete and/or deficient have been specified in the Punch List appended to the Provisional Certificate, and the Concessionaire has agreed and accepted that it shall complete and/or rectify all such works in the time and manner set forth in the Agreement. [Some of the incomplete works have been delayed as a result of reasons attributable to the Concessioning Authority or due to Force Majeure and the Provisional Certificate cannot be withheld on this account. Though the remaining incomplete works have been delayed as a result of reasons attributable to the Concessionaire,] I am satisfied that having regard to the nature and extent of such incomplete works, it would not be prudent to withhold commercial operation of the Project, pending completion thereof.

3. In view of the foregoing, I am satisfied that the Project can be safely and reliably placed in commercial service of the users thereof, and in terms of the Concession Agreement, the Project is hereby provisionally declared fit for entry into commercial operation on this the [●] Day of [●] 20[●].

ACCEPTED, SIGNED, SEALED AND DELIVERED For and on behalf of CONCESSIONAIRE by:	SIGNED, SEALED AND DELIVERED For and on behalf of INDEPENDENT ENGINEER by:
(Signature)	(Signature)
(Name and Designation)	(Name and Designation)
(Address)	(Address)

35. Annexure XIII: Applicable Permits

The following are the key applicable permits:

1. Approval under Section 13 of the IWAI Act, for the execution and delivery of this Contract;

2. Environmental Clearance in accordance with the provisions of Environment Impact Assessment Notification, 2006;

3. Approval from Central Empowered Committee constituted by the Supreme Court in respect of the Terminal, in accordance with the provisions of Wildlife Protection Act-1972;

4. Forest Clearance in accordance with the provisions of the Forest (Conservation) Act, 1980;

5. Consent to Establish in accordance with the provisions of the Water (Prevention and Control of Pollution) Act, 1974;

6. Consent to Operate in accordance with the provisions of the Water (Prevention and Control of Pollution) Act, 1974;

7. Consent to Establish in accordance with the provisions of the Air (Prevention and Control of Pollution) Act, 1981;

8. Consent to Operate in accordance with the provisions of the Air (Prevention and Control of Pollution) Act, 1981;

9. No-objection certificate in respect of the building from the Uttar Pradesh Fire Service Directorate;

36. Annexure XIV: Schedule I, II, III, IV and V of Inland Waterways Authority of India Amendment Regulations 2021

(Refer article *8.1.1)*

In exercise of the powers conferred by section 35 read with section 17 of the Inland Waterways Authority of India Act, 1985 (82 of 1985), the Authority, with the previous approval of the Central Government, hereby makes the following regulations further to amend the Inland Waterways Authority of India (Levy and Collection of fees and charges) Regulations, 2011, namely:

1. These regulations may be called the Inland Waterways Authority of India (Levy and Collection of fees and charges) (Third Amendment) Regulations, 2021.

2. They shall come into force on the date of its publication in the Official Gazette.

3. In the Inland Waterways Authority of India (Levy and Collection of fees and charges) Regulations, 2011 (herein after referred to as the said regulations), in regulation 4, in clause (b), for sub-clause (i), the following sub-clauses shall be substituted, namely:

   "(i.) for all terminals, except the terminals at Kolkata [(Garden Reach Jetty-I, Garden Reach Jetty-II and British Indian Steamer Navigation Jetty), Kalughat (District Saran), Multimodal Terminal Haldia (West Bengal) and Multimodal Terminal Varanasi (Uttar Pradesh)] be made as per Schedule II."

4. In the said regulations, in regulation 4, in sub-regulation (b), after clause (ii), the following clauses shall be added, namely:-

   "(iii.) for Multimodal Terminal at Haldia (West Bengal) be made as per Schedule IV. (iv.) for Multimodal Terminal at Varanasi (Uttar Pradesh) be made as per Schedule V."

5. In the said regulations, for Schedules I, II and III, the following Schedules shall be substituted namely:-

Schedule I

[See regulation 4.(a.)]

(For Waterways usage charges, Vessel related charges and Composite charges for all terminals)

(I) Waterway usage charges

Sl. No	Name of the service	Charges (in rupees)
1.	Movement of cargo vessels	NIL
2.	Movement of passenger or cruise vessels	NIL
2 (a).	Movement of Ro-Ro vessels	NIL
3.	Movement of any other vessel not covered in above categories	NIL

(II) Vessel related charges

Sl. No.	Name of the service	Charges (in rupees)
1.	Berthing charges	For all vessels except Ro-Ro vessels: i. 3000/- for Kolkata (Garden Reach Jetty-I, Garden Reach Jetty-II and British Indian Steamer Navigation Jetty) for twenty-four hours or part thereof - 6AM to 6AM (next day). ii. *3000/-* for Haldia Multimodal Terminal for twenty-four hours or part thereof - 6AM to 6AM (next day).* iii. *3000/-** for Sahibganj Multimodal Terminal for twenty-four hours or part thereof - 6AM to 6AM (next day).* iv. *1500/- * for Varanasi Multimodal Terminal for twenty-four hours or part thereof - 6AM to 6AM (next day).* v. 1500/- for all Inland Waterways Authority of India terminals (except those mentioned in paragraph (i.) to (iv.) above for twenty-four hours or part thereof - 6AM to 6AM (next day). vi. 500/- for all Inland Waterways Authority of India temporary pontoons for twenty-four hours or part thereof - 6AM to 6AM (next day). For Ro-Ro vessels: i. 100/- per hour or part thereof for all Inland Waterways Authority of India terminals or 1500/- for 24 hours whichever is lesser.
2.	Towage	On specific request as per actual cost.
3.	Pilotage	750/- per day or part thereof per pilot.

** (1)This shall be applicable and remain valid for ten years or till the end of Equip, Operate and Transfer concession in respect of Haldia Multimodal Terminal and Varanasi Multi Modal Terminal, whichever is earlier; after which there shall be a one-time escalation equal to sixty per cent of average Year-On-Year Wholesale Price Index variation (from notification of tariff to time of escalation).*

(2) The escalated ceiling tariff level shall further be applicable and remain valid for ten years or till the end of Equip, Operate and Transfer (or any other concession/contract for terminal operations) whichever is earlier; after which there shall be another escalation equal to sixty

percent of average Year-On-Year Wholesale Price variation (from previous escalation to

time of escalation in question).

(3) The same tariff revision mechanism shall be followed further.

*** (1) This shall be applicable and remain valid for ten years or till the end of Operation, Management and Development concession for Sahibganj Multimodal Terminal, whichever is earlier; after which there shall be a one-time escalation equal to sixty percent of average Year-On-Year Wholesale Price variation (from notification of*

tariff to time of escalation).

(2) The escalated ceiling tariff level shall further be applicable and remain valid for ten years or till the end of Operation, Management and Development (or any other concession or contract for terminal operations) whichever is earlier; after which there shall be another escalation equal to sixty percent of average Year-On-Year Wholesale Price variation (from previous escalation to time of escalation in question).

(3) The same tariff revision mechanism shall be followed further.

(III) Composite charges

Sl. No	Name of the service	Charges (in Rupees)
1.	Movement of Over Dimensional Cargo	1.50/- per metric ton per kilometer* for use of National Waterways 1, 2, 3, 4 and Indo-Bangladesh Protocol Route within Indian Territory*
*A user paying Over Dimensional Cargo charges would be exempt from payment of waterway charges and vessel related charges.		

Note: Composite charges shall also be applicable on all National Waterways or part thereof which are included in the Indo-Bangladesh Protocol Route.

(IV) **Taxes**

Taxes extra, as applicable

Schedule II

[See regulation 4.(b.)(i.)]

[Fees and charges (other than Waterways usage charges, Vessel related charges and Composite charges) for terminals other than those specifically mentioned in Schedule III, Schedule IV and Schedule V]

(I) Cargo related charges

Sl. No.	Name of the service	Charges (in rupees)
1.	**Terminal Charges**	
(i)	Dry cargo	a) *5/- per metric tonne or part thereof for the Bandel Thermal Power Station jetty located at Tribeni, Hooghly.* b) 1/- per metric tonne or part thereof for all terminals other than (a)
(ii)	Liquid cargo	1/- per metric tonne or part thereof
(iii)	Containerised cargo	50/- per twenty-foot equivalent unit and 75/- per forty-foot equivalent unit
2.	**Transit shed charges**	a) Free for first thirty days b) 5/- per metric tonne per day or part thereof for next fourteen days c) 10/- per metric tonne per day or part thereof for further fourteen days d) 40/- per metric tonne per day or part thereof after fifty-eight days and the cargo shall be caused to be removed without notice and disposed off by the Authority at the risk and cost of the owner to vacate the covered area or transit shed or premises and to recover due payment. Per day – 6AM to 6AM (next day)
3.	**Open storage charges**	
(i)	Hard stand	a) Free for first thirty days

		b) 2/- per metric tonne per day or part thereof for next fourteen days c) 4/- per metric tonne per day or part thereof for further fourteen days d) 16/- per metric tonne per day or part thereof after fifty-eight days and the cargo shall be caused to be removed without notice and disposed off by the Authority at the risk and cost of the owner to vacate the hard stand or premises and to recover due payment. Per day – 6AM to 6AM (next day)
(ii)	On open area	a) Free for first thirty days b) 1/- per metric tonne per day or part thereof for next fourteen days c) 2/- per metric tonne per day or part thereof for further fourteen days d) 8/- per metric tonne per day or part thereof after fifty-eight days and the cargo shall be caused to be removed without notice and disposed off by the Authority at the risk and cost of the owner to vacate the open area or premises and to recover due payment. Per day – 6AM to 6AM (next day)

(II) Miscellaneous charges

Sl. No.	Name of the service	Charges (in rupees)
1.	Crane (including pontoon crane) hire charges	800/- per shift of eight hours for the cranes of the capacity up to five metric tonnes.
		2000/- per shift of eight hours for the cranes of the capacity up to twenty metric tonnes.
		2500/- per shift of eight hours for the cranes of the capacity of more than twenty metric tonnes.
2.	Container crane	1100/- per hour or part thereof
3.	Fork lift	600/- per shift of eight hours for the fork lift of the capacity up to three metric tonnes.
4.	Electric supply to the vessel	As per the actual rates of the Electricity Board or Authority including surcharge.
5.	Bunkering of fuel or petroleum oil lubricants	As per market rate and surcharge, transport etc.
6.	Water supply	300/- per kilolitre
7.	Sewage disposal	100/- per kilolitre
8.	Weighing scale	5/- per metric tonne. Minimum 50/- Issue of weight certificate : rupees twenty-five per vehicle
9.	Pontoon Hire Charges	1000/- per day or part thereof

(III) **Taxes**

Taxes extra, as applicable

Schedule III

[See regulations 4.(b.)(ii.)]

[Fees and charges (other than Waterways usage charges, Vessel related charges and Composite charges) for terminals at Kolkata (Garden Reach Jetty –I, Garden Reach Jetty-II and British Indian Steamer Navigation Jetty) and Kalughat (District Saran)]

(I) Cargo related charges

Sl. No	Name of the service	Charges (in Rupees)
1.	**Terminal Charges**	
(i)	Dry cargo	21/- per tonne or part thereof
(ii)	Liquid cargo	21/- per tonne or part thereof
(iii)	Containerised cargo	420/- per twenty-foot equivalent unit and 800/- per forty-foot equivalent unit
2.	**Handling charges - Break Bulk Cargo (Export and Import)**	
(a)	Bagged Cargo	
(i)	Discharging charges from ship to shore and vice-versa using Garden Reach Jetty crane	160/- per metric tonne or part thereof
(ii)	Movement from jetty to storage yard or warehouse and vice-versa	50/- per metric tonne or part thereof
(b)	Cargo in wooden box or cartons	
(i)	Discharging charges from ship to shore and vice-versa using Garden Reach Jetty crane	250/- per metric tonne or cubic meters, whichever is higher
(ii)	Movement from jetty to storage yard or warehouse and vice-versa	80/- per metric tonne or cubic meters, whichever is higher
(c)	Iron and steel	
(i)	Discharging charges from ship to shore and vice-versa using Garden Reach Jetty crane	300/- per metric tonne or part thereof
(ii)	Movement from jetty to storage yard or warehouse and vice-versa	100/- per metric tonne or part thereof
3.	**Truck loading or unloading charges**	
(i)	Truck loading or unloading	50/- per metric tonne or cubic meter
4.	**Storage**	
(i)	Warehouse	a) Free for first three days b) 15/- per metric tonne or cubic meter or part thereof for next twelve days c) 27/- per metric tonne or cubic meter or part thereof for further fifteen days d) 54/- per metric tonne or cubic meter per day or part thereof after thirty-one days
(ii)	Open Yard	a. Free for first seven days

		b. 12/- per metric tonne or cubic meter per day or part thereof for next twelve days c. 22/- per metric tonne or cubic meter per day or part thereof for further fifteen days d. 44/- per metric tonne or cubic meter per day or part thereof after thirty-one days
	Handling charges for Bulk Cargo (Export and Import)	
(a)	Stone chips	
(i)	Composite charge for loading or unloading on to vessel by mechanical means, movement to yard or truck and loading or unloading on or from Truck	170/- per metric tonne
(b)	Fly Ash	
(i)	Composite charge for loading or unloading on to vessel by pneumatic means, movement to yard or truck and loading or unloading on or from Truck	45/- per metric tonne
6.	**Container - Terminal Service**	
(a)	Loaded container, Loading or Discharging	4500/- per twenty-foot equivalent unit container, 6000/- per forty-foot equivalent unit container and 6800/- per forty-foot equivalent high cube unit container
(b)	Empty container, Loading or Discharging	1800/- per twenty-foot equivalent unit container, 2200/- per forty-foot equivalent unit container and 2500/- per forty-foot equivalent high cube unit container
(c)	Transportation of containers from Garden Reach Jetty to storage yard and stacking or *vice versa*	850/- per twenty-foot equivalent unit container, 1000/- per forty-foot equivalent unit container and 1200/- per forty-foot equivalent high cube unit container
7.	**Container – Export**	
(a)	Pick up of empty container from Garden Reach Jetty storage yard, placement for stuffing, cargo receiving from truck, Customs examinations, stuffing in container and transportation of the loaded container up to Gross Garden Reach Jetty	5500/- per twenty-foot equivalent unit container, 11000/- per forty-foot equivalent unit container and 13000/- per forty-foot equivalent high cube unit container
(b)	Lift-On / Lift-Off*	700/- per twenty-foot equivalent unit container, 1300/- per forty-foot equivalent unit container and 1300/- per forty-foot equivalent high cube unit container
For forty-five feet containers, the fees shall be 1.25 times higher than Fee for forty-foot equivalent unit containers and ground rent shall be twice the rent for forty-foot equivalent unit containers. Reserve Bank of India declared exchange rate for the conversion of currency applicable for the day shall be applied. *for any additional movement if requested by exporters		
	Laden containers	
(c)	Storage for export laden containers	a) Free for first three days b) 6 (US Dollar equivalent in Rupees) per twenty-foot equivalent unit for next six days

		c) 12 (US Dollar equivalent in Rupees) per twenty-foot equivalent unit for next six days d) 24 (US Dollar equivalent in Rupees) per twenty-foot equivalent unit per day for the next six days e) 48 (US Dollar equivalent in Rupees) per twenty-foot equivalent unit per day after twenty-one days
For forty-five feet containers, the fees shall be 1.25 times higher than Fee for forty-foot equivalent unit containers and ground rent shall be twice the rent for forty-foot equivalent unit containers. Reserve Bank of India declared exchange rate for the conversion of currency applicable for the day shall be applied.		
8.	**Container – Import**	
(a)	Removal of laden container from gross Garden Reach Jetty storage yard to un-stuffing yard, Custom examinations, un-stuffing of container and transportation of empty container from un-stuffing yard to Garden Reach Jetty empty yard	5500/- per twenty-foot equivalent unit container, 11000/- per forty-foot equivalent unit container and 13000/- per forty-foot equivalent high cube unit container
(b)	Storage of Import laden containers	a) Free for first three days b) 6 (US Dollar equivalent in Rupees) per twenty-foot equivalent unit for next six days c) 12 (US Dollar equivalent in Rupees) per twenty-foot equivalent unit for next six days d) 24 (US Dollar equivalent per twenty-foot equivalent unit per day for the next six days e) 48 (US Dollar equivalent in Rupees) per twenty-foot equivalent unit per day after twenty-one days
For forty-five feet containers, the fees shall be 1.25 times higher than Fee for forty-foot equivalent unit containers and ground rent shall be twice the rent for forty-foot equivalent unit containers. Reserve Bank of India declared exchange rate for the conversion of currency applicable for the day shall be applied.		
9.	**Container - Empty Container**	
(a)	Lift-On / Lift-Off	350/- per twenty-foot equivalent unit container, 550/- per forty-foot equivalent unit container and 550/- per forty-foot equivalent high cube unit container
(b)	Ground Rent	70/- per twenty-foot equivalent unit container, 140/- per forty-foot equivalent unit container and 140/- per forty-foot equivalent high cube unit container
For forty-five feet containers, the fees shall be 1.25 times higher than Fee for forty-foot equivalent unit containers and ground rent shall be twice the rent for forty-foot equivalent unit containers.		
10.	**Container – Transportation**	
(a)	Laden and empty transportation to and from Garden Reach Jetty to Netaji Subhas Dock or Kolkata Port Trust	1500/- per twenty-foot equivalent unit container, 2500/- per forty-foot equivalent unit container and 2500/- per forty-foot equivalent high cube unit container

For forty-five feet containers, the fees shall be 1.25 times higher than Fee for forty-foot equivalent unit containers and ground rent shall be twice the rent for forty-foot equivalent unit containers.		
11.	**Container - Reefer Container**	
(a)	Container power plug	750/- per twenty-foot equivalent unit container and 1500/- per forty-foot equivalent container for eight hours or part thereof
(b)	Power monitoring	750/- for eight hours or part thereof

(II) Miscellaneous charges

Sl. No	Name of the service	Charges (in Rupees)
1.	Electric supply to the vessel	As per the actual rates of the Electricity Board or Authority including surcharge
2.	Bunkering of fuel/petroleum oil lubricants	As per market rate and surcharge
3.	Water supply	500/- per kilolitre
4.	Weighing scale	15/- per metric tonne. (Minimum 500/-) Issue of weight certificate: 50/-per vehicle
5.	Weighment	400/- per twenty-foot equivalent unit container and 600/- per forty-foot equivalent unit container
6.	Verified gross mass	1000/- per container
7.	Mooring and ancillary functions	4000/- for eight hours or part thereof
8.	Berthing and unberthing assistance services (per Berth/Voyage)	2000/-
9.	Berthing and unberthing assistance services for Ro-Ro (per berth/Voyage)	1500/-
10.	Seal cutting charge/ Seal fixing charge	100/- per container
11.	Loaded Container survey charge	300/- per twenty-foot equivalent unit container and 600/- per forty-foot equivalent unit container
12.	Cargo survey charge	300/- per twenty-foot equivalent unit container and 500/- per forty-foot equivalent unit container
13.	Container entry	150/- per twenty-foot equivalent unit container and 300/- per forty-foot equivalent unit container
14.	Sweeping for spill over cargo	150/- per container
15.	Bagging charge (In pp bags in case of bulk cargo)	13/- per kg
16.	Customs appraisement charges in case of multiple shipping bills	750/- per shipping bill or bill of entry

17.	Internal shifting of loaded container	700/- per twenty-foot equivalent unit container and 1225/- per forty-foot equivalent unit container
18.	Truck entry	50/-
19.	Truck weighment	200/- per truck
20.	Terminal charges Ro-Ro truck	150/- for empty truck 200/- up to 12 tonnes 300/- above 12 tonnes
21.	Truck parking	100/- per hour Truck arriving at terminal via RO-RO vessel will be allowed to move out free of charge.

(III) **Discount**

The operator of a terminal included in this schedule may offer a discount, if any, on prescribed rates. However, the discount has to be from the revenue share of operator only and revenue share of Authority shall not get affected due to such discounts.

(IV) **Taxes**

Taxes extra, as applicable

5. In the said regulations, after Schedule III, the following Schedules shall be inserted, namely:-

Schedule IV
[See regulations 4. (b.)(iii.)]

[Fees and charges (other than Waterways usage charges and Composite charges) for Multi Modal Terminal at Haldia, West Bengal]

(I) Cargo related charges

Sl. No	Name of the service	Charges (in Rupees)
1.	**Terminal Charges**	
(i)	Dry cargo	46/- per metric tonne or part thereof
(ii)	Liquid cargo	46/- per metric tonne or part thereof
(iii)	Containerized cargo	525/- per twenty-foot equivalent unit and 1000/- per forty-foot equivalent unit
2.	**Handling charges - Break Bulk Cargo**	
(a)	Over Dimensional Cargo *	
(i)	Terminal access charges	45/- per metric tonne or cubic meter (whichever is higher)
(ii)	Heavy lift charges	12000/- per day
*Charges mentioned in this tariff schedule shall be applicable over cargo as mentioned in para 3 of Schedule I.		
(b)	Bagged Cargo	

(i)	Discharging from ship to shore and vice-versa using Multimodal Terminal crane	350/- per metric tonne or part thereof
(ii)	Movement from jetty to storage yard / warehouse and vice-versa	110/- per metric tonne or part thereof
(c)	Cargo in wooden box or cartons	
(i)	Discharging from ship to shore and vice-versa using Multimodal Terminal crane	350/- per metric tonne or cubic meter, whichever is higher
(ii)	Movement from jetty to storage yard / warehouse and vice-versa	(a.) 130/- per metric tonne or cubic meter, whichever is higher or (b.) 25/- per package (of maximum 50 kg) whichever applicable
(d)	Iron and steel	
(i)	Discharging from ship to shore and *vice-versa* using Multi Modal Terminal crane	400/- per metric tonne or part thereof
(ii)	Movement from jetty to storage yard or warehouse and vice-versa	130/- per metric tonne or part thereof
(e)	Any other not specified break bulk cargo	
(i)	Discharging from ship to shore and vice-versa using Multimodal Terminal crane	200/- per Metric Tonne or part thereof
(ii)	Movement from jetty to storage yard or warehouse and vice-versa	75/- per Metric Tonne or part thereof
3.	**Truck loading or unloading charges**	
(i)	Truck loading/unloading	(a) 70/- per metric tonne or cubic meter whichever is higher or (b) 8/- per package (of maximum 50kg) whichever is applicable
4.	**Storage, bulk or break-bulk cargo**	
(i)	Warehouse	a) Free for first three days b) 33/- per metric tonne or cubic meter or part thereof for next twelve days c) 35/- per metric tonne or cubic meter or part thereof for

		further fifteen days d) 70/- per metric tonne or cubic meter per day or part thereof after thirty days
(ii)	Open Yard	a) Free for first three days b) 20/- per metric tonne or cubic meter per day or part thereof for next twelve day c) 30/- per metric tonne or cubic meter per day or part thereof for further fifteen days d) 55/- per metric tonne or cubic meter per day or part thereof after thirty days
5.	**Storage- Fly ash**	
(i)	Silo	a) Free for first two days b) 33/- per metric tonne or part thereof for next thirteen days c) 45/- per metric tonne or part thereof for further fifteen days d) 70/- per metric tonne or part thereof after thirty days
6.	**Handling charges for Bulk Cargo**	
(a)	Stone chips	
(i)	Composite charge for loading or unloading on to vessel by mechanical means, movement to yard or truck and loading or unloading on/from Truck	275/- per metric tonne
(b)	Fly Ash or other free flowing cargo like cement etc.	
(b.1)	Bulker to barge	
(i)	Composite charge for loading or unloading on to vessel by pneumatic means, movement to yard or truck and loading or unloading on from Truck	170/- per metric tonne
(b.2)	Bulker to silo to barge	
(i)	Composite charge for loading or unloading on to vessel by pneumatic means, movement to yard or truck and loading or unloading on or from Truck	170/- per metric tonne
(c)	Coal	
(i)	Composite charge for loading or unloading on to vessel by mechanical means, movement to yard or truck and loading or	275/- per metric tonne

	unloading on or from Truck	
(d)	Others	
(i)	Composite charge for loading/unloading on to vessel by mechanical means, movement to yard or truck and loading/unloading on/from Truck	275/- per metric tonne
(e)	Coal and Other Dry Bulk Cargo including all Minerals Ores Fertilizers etc	
(i)	Screening services	30/- per metric tonne or part thereof
(ii)	Water sprinkling	30/- per metric tonne or part thereof
7.	**Handling charges- bulk liquid cargo**	
(a)	Loading or unloading charges through pipeline onto shore tanks or barge vice versa	5/- per metric tonne or cubic meter whichever is higher
(b)	Delivery charges via barge	10/- per metric tonne or cubic meter whichever is higher
(c)	Delivery charges via road tanker	15/- per metric tonne or cubic meter whichever is higher
(d)	Storage charges- shore tank charge (monthly)	300/- per ton (1:1 ratio) on the shell capacity of the tank
8.	**Container - Handling Charges**	
(a)	Truck loading or unloading charge for laden container	450/- per twenty-foot equivalent unit container, 750/- per forty-foot equivalent unit container and 850/- per forty-foot equivalent unit high cube unit container
(b)	Truck loading/ unloading charge for empty container	200/- per twenty-foot equivalent unit container, 350/- per forty-foot equivalent unit container and 400/- per forty-foot equivalent unit high cube unit container
(c)	Laden container- Discharging from ship to shore and vice-versa using crane	4800/- per twenty-foot equivalent unit container, 6800/- per forty-foot equivalent unit container and 7000/- per forty-foot equivalent high cube unit container
(d)	Laden container-Transportation of containers from Jetty to Multi Modal Terminal storage yard and stacking or *vice versa*	1200/- per twenty-foot equivalent unit container, 1800/- per forty-foot equivalent unit container and 1800/- per forty-foot equivalent high cube unit container
9.	**Container – Export**	
(a)	Pick up of empty container from Multi Modal Terminal storage yard, placement for stuffing, cargo receiving from truck, Customs examinations, stuffing in container and transportation of the loaded container up to Multi Modal Terminal jetty	6500/- per twenty-foot equivalent unit container, 14000/- per forty-foot equivalent unit container and 14000/- per forty-foot equivalent high cube unit container

(b)	Lift-On / Lift-Off*	1400/- per twenty-foot equivalent unit container, 2000/- per forty-foot equivalent unit container and 2000/- per forty-foot equivalent high cube unit container
*for any additional movement if requested by exporters		
	Laden containers	
(c)	Storage for export laden containers	a) Free for first three days b) 7 (US Dollar equivalent in Rupees) per twenty-foot equivalent unit for next six days c) 14 (US Dollar equivalent in Rupees) per twenty-foot equivalent unit for next six days d) 25 (US Dollar equivalent in Rupees) per twenty-foot equivalent unit per day for the next six days e) 48 (US Dollar equivalent in Rupees) per twenty-foot equivalent unit per day after twenty one days
Storage for laden forty-foot equivalent units shall be charged at two times that of twenty-foot equivalent units. For forty-five feet containers, the fees shall be 1.25 times higher than Fee for forty-foot equivalent unit containers. Reserve Bank of India declared exchange rate for the conversion of currency applicable for the day shall be applied.		
10.	**Container – Import**	
(a)	Removal of laden container from Multimodal Terminal storage yard to un-stuffing yard, Custom examinations, un-stuffing of container and transportation of empty container from un-stuffing yard to Multimodal Terminal empty yard	6500/- per twenty-foot equivalent unit container, 14000/- per forty-foot equivalent unit container and 14000/- per forty-foot equivalent high cube unit container
(b)	Lift-on/ Lift-off*	1400/- per twenty-foot equivalent unit container, 2000/- per forty-foot equivalent unit container and 2000/- per forty-foot equivalent high cube unit container
(c)	Storage of Import laden containers	a) Free for first three days b) 7 (US Dollar equivalent in Rupees) per twenty-foot equivalent unit for next six days c) 14 (US Dollar equivalent in Rupees) per twenty-foot equivalent unit for next six days d) 25 (US Dollar equivalent per twenty-foot equivalent unit per day for the next six days e) 48 (US Dollar equivalent in Rupees) per twenty-foot equivalent unit per day after twenty one days

Storage for laden forty-foot equivalent units shall be charged at two times that of twenty-foot equivalent units. For forty five feet containers, the fees shall be 1.25 times higher than Fee for forty-foot equivalent unit containers. Reserve Bank of India declared exchange rate for the conversion of currency applicable for the day shall be applied.

*for any additional movement if requested by user

11.	**Container - Empty Container**	
(a)	Empty container- discharging from ship to shore and vice-versa using Multi Modal Terminal crane	2400/- per twenty-foot equivalent unit container, 3100/- per forty-foot equivalent unit container and 3500/- per forty-foot equivalent high cube unit container
(b)	Transportation of empty containers from Jetty to Multi Modal Terminal storage yard and stacking or vice versa	350/- per twenty-foot equivalent unit container, 500/- per forty-foot equivalent unit container and 500/- per forty-foot equivalent high cube unit container
(c)	Pick up of empty container from Multi Modal Terminal storage yard, placement for stuffing, cargo receiving from truck, stuffing in container and transportation of the loaded container up to Multi Modal Terminal jetty	5000/- per twenty-foot equivalent unit container, 10000/- per forty-foot equivalent unit container and 10000/- per forty-foot equivalent high cube unit container
(c)	Lift-On / Lift-Off*	750/- per twenty-foot equivalent unit container, 1500/- per forty-foot equivalent unit container and 1500/- per forty-foot equivalent high cube unit container
(d)	Ground Rent	100/- per day per twenty-foot equivalent unit container, 160/- per day per forty-foot equivalent unit container and 200/- per day per forty-foot equivalent high cube unit container

For forty five feet containers, the fees shall be 1.25 times higher than Fee for forty-foot equivalent unit containers and ground rent shall be twice the rent for forty-foot equivalent unit containers.

*for any additional movement if requested by user

12.	**Container- Domestic**	
(a)	Lift-On / Lift-Off*	700/- per twenty-foot equivalent unit container, 1300/- per forty-foot equivalent unit container and 1300/- per forty-foot equivalent high cube unit container
(b)	Storage for laden containers	a) Free for first three days b) 525/- per twenty-foot equivalent unit container for next six days c) 1051/- per twenty-foot equivalent unit container for next six days d) 1877/- per twenty-foot equivalent unit container for next six days e) 3603/- per twenty-foot equivalent unit container after twenty one days

Storage for laden forty-foot equivalent units shall be charged at two times that of twenty-foot equivalent units. For forty five feet containers, the fees shall be 1.25 times higher than Fee for forty-foot equivalent unit containers. Reserve Bank of India declared exchange rate for the conversion of currency applicable for the day shall be applied.

*for any additional movement if requested by user

13.	**Container – Transportation**	
(a)	Laden container transportation to and from Multi Modal Terminal to Haldia Dock Complex and Nearby Container Freight Station in 5 Kilometre Radius	3000/- per twenty-foot equivalent unit container, 6000/- per forty-foot equivalent unit container and 7000/- per forty-foot equivalent high cube unit container
(b)	Empty container transportation to and from Multimodal Terminal to Haldia Dock Complex and Nearby Container Freight Station in 5 Kilometre radius	2200/- per twenty-foot equivalent unit container, 3400/- per forty-foot equivalent unit container and 3500/- per forty-foot equivalent high cube unit container
For forty five feet containers, the fees shall be 1.25 times higher than Fee for forty-foot equivalent unit containers and ground rent shall be twice the rent for forty-foot equivalent unit containers.		
14.	**Container - Reefer Container**	
(a)	Container power plug	900/- per twenty-foot equivalent unit container and 1800/- per forty-foot equivalent container for 8 hours or part thereof
(b)	Power monitoring	900/- for 8 hours or part thereof
15.	**Railway rake terminal access and handling charges**	
(a)	Terminal access charges	75000/- per rake
(b)	Container loading or unloading and shifting to yard and vice versa	5500/- per twenty-foot equivalent unit container, 11500/- per forty-foot equivalent unit container and 13500/- per forty-foot equivalent unit high cube unit container
(c)	Cargo loading or unloading from Wagon and intercart to storage yard and unloading or loading at storage yard	
(i)	Dry bulk cargo	205/- per metric tonne or part thereof
(ii)	Steel cargo	380/- per metric tonne or part thereof
(iii)	Bagged cargo	22/- per kilogram (weighing upto 50 kilogram)
(d)	Track cleaning and yard management	40/- per metric tonne or part thereof

(II) Miscellaneous charges

Sl. No	Name of the service	Charges (in Rupees)
1.	Electric supply to the vessel	As per the actual rates of the Electricity Board or Authority including surcharge
2.	Arranging of electric supply to vessel	2500/- per vessel for 24 hours or part thereof from 6AM to 6AM (next day)
3.	Bunkering of fuel or petroleum oil lubricants	As per market rate and surcharge

4.	Bunkering of fuel or petroleum oil lubricants (Safety Fee)	1000/- per vessel
5.	Entry of Fuel Tanker at terminal	600/- per tanker for 24 hour period or part thereof from 6AM to 6AM (next day) per 1000 Ltr or part thereof
6.	Water supply	500/- per kiloliter
7.	Weighing scale	15/- per metric tonne . (Minimum 500/-) Issue of weight certificate: 100/-per vehicle
8.	Weighment	500/- per twenty-foot equivalent unit container and 700/- per forty-foot equivalent unit container and 700/- per forty-foot equivalent unit high cube unit container
9.	Verified gross mass	1200/- per container
10.	Mooring and ancillary functions	4000/- for eight hours or part thereof
11.	Berthing and unberthing assistance services (per Berth or Voyage)	a) 2000/- for 24 hours or part thereof for vessels upto 1400 Dead Weight Tonnage b) 4000/- for 24 hours or part thereof for vessels from 1400 Dead Weight Tonnage to 2100 Dead Weight Tonnage c) 5500/- for 24 hours or part thereof for vessels above 2100 Dead Weight Tonnage
12.	Berthing and unberthing assistance services for Ro-Ro (per berth or Voyage)	2000/-
13.	Seal cutting charge or Seal fixing charge	100/- per container
14.	Loaded Container survey charge	350/- per twenty-foot equivalent unit container, 700/- per forty-foot equivalent unit container and 700/- per forty-foot equivalent unit high cube unit container
15.	Cargo survey charge	350/- per twenty-foot equivalent unit container, 700/- per forty-foot equivalent unit container and 700/- per forty-foot equivalent unit high cube unit container
16.	Stuffing or destuffing survey charge (empty)	150/- per twenty-foot equivalent unit container, 250/- per forty-foot equivalent unit container and 250/- per forty-foot equivalent unit high cube unit container
17.	Stuffing or destuffing survey charge (laden)	400/- per twenty-foot equivalent unit container, 800/- per forty-foot equivalent unit container and 800/- per forty-foot equivalent unit high cube unit container
18.	Container entry	150/- per twenty-foot equivalent unit container, 300/- per forty-foot equivalent unit container and 300/- per forty-foot equivalent unit high cube unit container
19.	Sweeping for spill over cargo	150/- per twenty-foot equivalent unit container, 300/- per forty-foot equivalent unit container and 300/- per forty-foot equivalent unit high cube unit container

20.	Bagging charge (In pp bags in case of bulk cargo)	14/- per kg
21.	Customs appraisement charges in case of multiple shipping bills	800/- per shipping bill/ bill of entry
22.	Internal shifting of loaded container	a) 1000/- per twenty-foot equivalent unit container b) 1750/- per forty-foot equivalent unit container c) 1750/- per forty-foot equivalent unit high cube unit container
23	Internal shifting of empty container	300/- per twenty-foot equivalent unit container
24.	Truck entry	100/- per truck
25.	Truck weighment	250/- per truck
26.	Terminal charges Ro-Ro truck	a) 150/- for empty truck b) 200/- up to 12 metric tonnes c) 300/- above 12 metric tonnes
27.	Truck parking	a) 100/- per hour b) Truck arriving at terminal via RORO vessel will be allowed to move out free of charge.
28.	Container repairs and cleaning (per container) manhour rate	US Dollar 1.6 per hour per twenty-foot equivalent unit US Dollar 3.2 per hour per forty-foot equivalent unit
29.	Less than Container Load delivery charges	1250/- per shipment
30.	Facilitation of examination of Less than Container Load cargo	750/- per shipment
31	Towage	4000/- per hour
32	Pilotage	5/- per gross registered tonnage

(IV) Discount

The operator of terminals included in this schedule may offer a discount, if any, on prescribed rates.

(V) Revision

i the above tariffs shall be revised every year based on a variation in the Wholesale Price Index.

ii Wholesale Price Index shall be as published by Reserve Bank of India.

iii such revision shall be based on indexation against sixty per. cent of the variation in the Wholesale Price Index for a relevant year beginning from the 1st January and ending on the 31st December.

iv such revised Ceiling tariff will become applicable after the same has been notified by the concessioning Authority.

(VI) Taxes

Taxes extra, as applicable

Proposed Schedule V

[see regulation 4. (b.)(iv.)]

[Fees (other than Waterways usage charges and Composite charges) for Multi Modal Terminal at Varanasi, Uttar Pradesh] (as published in The Gazette of India on 17 May 2021)

(I) Cargo related charges

Sl. No	Name of the service	Charges (in Rupees)
1.	**Terminal Charges**	
(i)	Dry cargo	21/- per metric tonne or part thereof
(ii)	Liquid cargo	21/- per metric tonne or part thereof
(iii)	Containerised cargo	420/- per twenty-foot equivalent unit and 800/- per forty-foot equivalent unit
2.	**Handling charges - Break Bulk Cargo (Export and Import)**	
(a)	Bagged Cargo	
(i)	Discharging from ship to shore and vice-versa using crane	160/- per metric tonne or part thereof
(ii)	Movement from jetty to storage yard / warehouse and vice-versa	50/- per metric tonne or part thereof
(b)	Cargo in wooden box or cartons	
(i)	Discharging from ship to shore and vice-versa using Multimodal Terminal crane	250/- per metric tonne or cubic meters , whichever is higher
(ii)	Movement from jetty to storage yard / warehouse and vice-versa	80/- per metric tonne or cubic meters, whichever is higher
(c)	Iron and steel	
(i)	Discharging from ship to shore and vice-versa using Multimodal Terminal crane	300/- per metric tonne or part thereof
(ii)	Movement from jetty to storage yard / warehouse and vice-versa	100/- per metric tonne or part thereof
3.	**Truck loading or unloading charges**	
(i)	Truck loading/unloading	50/- per metric tonne or cubic meter
4.	**Storage**	
(i)	Warehouse	a) Free for first three days b) 15/- per metric tonne or cubic meter or part thereof for next twelve days c) 27/- per metric tonne or cubic meter or part thereof for

		further fifteen days d) 54/- per metric tonne or cubic meter per day or part thereof after thirty days
(ii)	Open Yard	a) Free for first three days b) 12/- per metric tonne or cubic meter per day or part thereof for next twelve days c) 22/- per metric tonne or cubic meter per day or part thereof for further fifteen days d) 44/- per metric tonne or cubic meter per day or part thereof after thirty days
5.	**Handling charges for Bulk Cargo (Export and Import)**	
(a)	Stone chips	
(i)	Composite charge for loading or unloading on to vessel by mechanical means, movement to yard or truck and loading or unloading on/from Truck	170/- per metric tonne
(b)	Fly Ash	
(i)	Composite charge for loading or unloading on to vessel by pneumatic means, movement to yard or truck and loading or unloading on or from Truck	170/- per metric tonne
6.	**Container - Terminal Service**	
(a)	Loaded container, Loading or Discharging	4500/- per twenty-foot equivalent unit container, 6000/- per forty-foot equivalent unit container and 6800/- per forty-foot equivalent high cube unit container
(b)	Empty container, Loading or Discharging	1800/- per twenty-foot equivalent unit container, 2200/- per forty-foot equivalent unit container and 2500/- per forty-foot equivalent high cube unit container
(c)	Transportation of containers from Jetty to storage yard and stacking or vice versa	850/- per twenty-foot equivalent unit container, 1000/- per forty-foot equivalent unit container and 1200/- per forty-foot equivalent high cube unit container
7.	**Container – Export**	
(a)	Pick up of empty container from storage yard, placement for stuffing, cargo receiving from truck, Customs examinations, stuffing in container and transportation of the loaded container up to jetty	5500/- per twenty-foot equivalent unit container, 11000/- per forty-foot equivalent unit container and 13000/- per forty-foot equivalent high cube unit container
(b)	Lift-On / Lift-Off*	700/- per twenty-foot equivalent unit container, 1300/- per forty-foot equivalent unit container and 1300/- per forty-foot equivalent high cube unit container

For forty-five feet containers, the fees shall be 1.25 times higher than Fee for forty-foot equivalent unit containers and ground rent shall be twice the rent for forty-foot equivalent unit containers. Reserve Bank of India declared exchange rate for the conversion of currency applicable for the day shall be applied. *for any additional movement if requested by exporters		
	Laden containers	
(c)	Storage for export laden containers	a) Free for first three days b) 6 (US Dollar equivalent in Rupees) per twenty-foot equivalent unit for next six days c) 12 (US Dollar equivalent in Rupees) per twenty-foot equivalent unit for next six days d) 24 (US Dollar equivalent in Rupees) per twenty-foot equivalent unit per day for the next six days e) 48 (US Dollar equivalent in Rupees) per twenty-foot equivalent unit per day after twenty-one days
For forty-five feet containers, the fees shall be 1.25 times higher than Fee for forty-foot equivalent unit containers and ground rent shall be twice the rent for forty-foot equivalent unit containers. Reserve Bank of India declared exchange rate for the conversion of currency applicable for the day shall be applied.		
8.	**Container – Import**	
(a)	Removal of laden container from storage yard to un-stuffing yard, Custom examinations, un-stuffing of container and transportation of empty container from un-stuffing yard to empty yard	5500/- per twenty-foot equivalent unit container, 11000/- per forty-foot equivalent unit container and 13000/- per forty-foot equivalent high cube unit container
(b)	Storage of Import laden containers	a) Free for first three days b) 6 (US Dollar equivalent in Rupees) per twenty-foot equivalent unit for next six days c) 12 (US Dollar equivalent in Rupees) per twenty-foot equivalent unit for next six days d) 24 (US Dollar equivalent per twenty-foot equivalent unit per day for the next six days e) 48 (US Dollar equivalent in Rupees) per twenty-foot equivalent unit per day after twenty one days
For forty-five feet containers, the fees shall be 1.25 times higher than Fee for forty-foot equivalent unit containers and ground rent shall be twice the rent for forty-foot equivalent unit containers. Reserve Bank of India declared exchange rate for the conversion of currency applicable for the day shall be applied.		
9.	**Container - Empty Container**	
(a)	Lift-On or Lift-Off	350/- per twenty-foot equivalent unit container, 550/- per forty-foot equivalent unit container and 550/- per forty-foot equivalent high cube unit container
(b)	Ground Rent	70/- per twenty-foot equivalent unit container, 140/- per forty-foot equivalent unit container and 140/- per forty-foot equivalent high cube unit container
For forty-five feet containers, the fees shall be 1.25 times higher than Fee for forty-foot equivalent unit containers and ground rent shall be twice the rent for forty-foot equivalent unit containers.		

10.	**Container – Transportation**	
(a)	Laden and empty transportation to and from Multi Modal terminal yard to other nearby yard	1500/- per twenty-foot equivalent unit container, 2500/- per forty-foot equivalent unit container and 2500/- per forty-foot equivalent high cube unit container
For forty-five feet containers, the fees shall be 1.25 times higher than Fee for forty-foot equivalent unit containers and ground rent shall be twice the rent for forty-foot equivalent unit containers.		

11.	**Container - Reefer Container**	
(a)	Container power plug	750/- per twenty-foot equivalent unit container and 1500/- per forty-foot equivalent container for 8 hours or part thereof
(b)	Power monitoring	750/- for eight hours or part thereof

(II) Miscellaneous charges

Sl. No	Name of the service	Charges (in Rupees)
1.	Electric supply to the vessel	As per the actual rates of the Electricity Board or Authority including surcharge
2.	Bunkering of fuel/petroleum oil lubricants	As per market rate and surcharge
3.	Water supply	500/- per kiloliter
4.	Weighing scale	15/- per metric tonne. (Minimum 500/-) Issue of weight certificate: 50/-per vehicle
5.	Weighment	400/- per twenty-foot equivalent unit container and 600/- per forty-foot equivalent unit container and 600/- per forty-foot equivalent unit high cube unit container
6.	Verified gross mass	1000/- per container
7.	Mooring and ancillary functions	4000/- for eight hours or part thereof
8.	Berthing and unberthing assistance services (per Berth or Voyage)	2000/- for twenty-four hours or part thereof
9.	Berthing and unberthing assistance services for Ro-Ro (per berth or Voyage)	1500/-
10.	Seal cutting charge or Seal fixing charge	100/- per container
11.	Loaded Container survey charge	300/- per twenty-foot equivalent unit container and 600/- per forty-foot equivalent unit container
12.	Cargo survey charge	300/- per twenty-foot equivalent unit container and 500/- per forty-foot equivalent unit container
13.	Container entry	150/- per twenty-foot equivalent unit container and 300/- per forty-foot equivalent unit container
14.	Sweeping for spill over cargo	150/- per container
15.	Bagging charge (In pp bags in case of bulk cargo)	13/- per kilogram
16.	Customs appraisement charges in case of multiple shipping bills	750/- per shipping bill or bill of entry

17.	Internal shifting of loaded container	700/- per twenty-foot equivalent unit container and 1225/- per forty-foot equivalent unit container
18.	Truck entry	50/-
19.	Truck weighment	200/- per truck
20.	Terminal charges Ro-Ro truck	150/- for empty truck 200/- up to 12 metric tonnes 300/- above 12 metric tonnes
21.	Truck parking	100/- per hour Truck arriving at terminal via RORO vessel will be allowed to move out free of charge.
22.	Towage	4000/- per hour
23.	Pilotage	5/- per gross registered tonnage

(IV) Discount

The operator of terminals included in this schedule may offer a discount, if any, on prescribed rates

(V) Revision

i the above tariffs shall be revised every year based on a variation in the Wholesale Price Index;

ii Wholesale Price Index shall be as published by Reserve Bank of India;

iii such revision shall be based on indexation against sixty per cent of the variation in the Wholesale Price Index for a relevant year beginning from the 1st January and ending on the 31st December;

iv such revised Ceiling tariff will become applicable after the same has been notified by the concessioning Authority.

(VI) Taxes

Taxes extra, as applicable

Col. MANISH PATHAK, Secy.

[ADVT. III/4/Exty./85/2021-22]

Foot Note : The principal regulations were published in Gazette of India on dated the 16th July, 2011vide No. IWAI/Cargo/184/2009 and subsequently amended vide no. IWAI/PR-17/IFC/(INTG) /2015 Vol. IV dated the 20th September, 2018 and IWAI/Cargo/184/2009 Nol-II dated 29th July, 2020.

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37. Annexure XV: Environment Management Plan

INLAND WATERWAYS AUTHORITY OF INDIA

Ministry of Shipping, Government of India

"CAPACITY AUGMENTATION OF NATIONAL WATERWAY.1"

(Jal Marg Vikas Project)

ENVIRONMENTAL IMPACT ASSESSMENT REPORTS

VOLUME - 4:
Environmental Management Plan (EMP) for Varanasi Terminal

May 2016

(Revised September 2016)

Eqms® Since 1998

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Chapter 1. EMP FOR VARANASI TERMINAL

1.1. Introduction

Inland waterways Authority of India (IWAI) has proposed to augment the navigation capacity of waterway NW-1 (Haldia to Allahabad) and continue to maintain the entire stretch. Under this project, IWAI has proposed to develop the infrastructure facility like Multimodal terminals, Navigation aids for day & night navigation, River information system with all hardware and software, Ro-Ro jetties, Bank & slope protection, River training works, Equipment like tow barges, inland vessels, survey vessels including rescue boats & survey equipment and Dredging of the navigation channel, to augment the navigation capacity of the waterway.

A Multimodal inland water terminal at Varanasi is proposed under this project to enhance the navigation facility of the NW-1. Proposed terminal site abuts River Ganga and is located near village Ralhupur, Ramnagar, Varanasi, Uttar Pradesh. Location map of the project is given in **Figure 1.1** below.

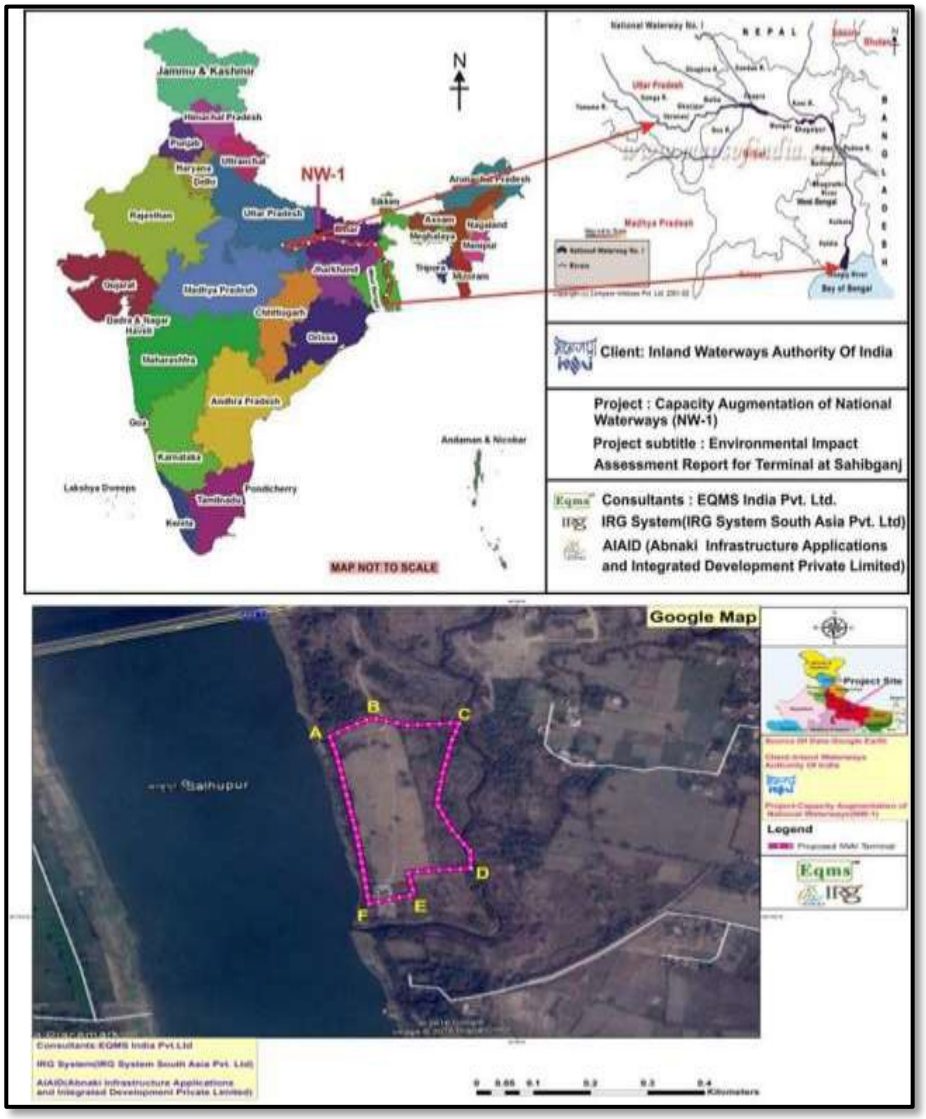

Figure 1.1 : Location Map

1.2. Brief on Varanasi Terminal

The Varanasi terminal is proposed to be developed as a multimodal terminal facility. The terminal site is agricultural land at present with land cover comprising of crops, mango orchards and few settlements. Site is flat land with elevation variation from RL +74-77m. Finished level of site achieved after cut & fill will be RL +75 which is more than the highest flood level, i.e. RL +74

As per planning this terminal will be connected to rest of the city vide roads and railways both. At present site is connected by a village road. Approach road of 1 km length will be constructed to connect terminal site to NH-7. Railway siding will be constructed to provide connectivity to terminal site with the EDFC. Internal road of 12 m width will be developed within the terminal to facilitate smooth movement. In the phase 1 the terminal shall handle about 0.54 MTPA (million metric tones per annum) or 1636 TPD. Material to be handled will be coal, cement, stone chips, and fertilizer and food grains etc. Capacity will be enhanced to 1.22 MTPA by 2038. Onshore facilities for phase 1 include unloading/loading areas, internal roads, administration buildings, substation building, toilet block, fuel bunker, security office, weigh bridge building, lighting tower and other allied services sewerage management system, drainage system, fire-fighting facilities, communication system, water supply & power supply (ESS); Boundary wall, Green belt and Approach Road (1 km connecting to NH-7.

Off-shore facilities for phase 1 include construction of berth of 200 m length & 35 m width, Water area & approach channel and Shore protection (117 m upstream of terminal and 35 m downstream of terminal).

1.3. Description of Environment

The baseline environmental data generation has been done for the period of 1st April 2015 to 30th June 2015. The study area within a 10 km radius around the proposed terminal site has been considered as general impact zone and 2 Km radius as influence zone for EIA study. Primary and secondary data has been collected for both the zone however focus of primary data generation has been more for 2 Km radius. Data was generated by following the monitoring plan approved by IWAI and World Bank in line with prescribed TOR by IWAI.

The Salient Environmental Features of Ramnagar Terminal Project within 500m, 2 Km and 10 Km radius is summarised at **Table 1.1**.

Table 1.1 : Salient Environmental Features of Ramnagar Terminal Site

S. No.	Environmental Features	Within 500 m area around Proposed terminal site	Within 2 km area around Proposed terminal site	Within 10 km area around Proposed terminal site
1	**Ecological Environment**			
A	Presence of Wildlife Sanctuary/ National Park/Biosphere Reserves	None	None	Kashi Turtle Sanctuary is located about 2.3 km downstream of the Ganga river
B	Reserved /Protected Forests	None	None	None

S. No.	Environmental Features	Within 500 m area around Proposed terminal site	Within 2 km area around Proposed terminal site	Within 10 km area around Proposed terminal site
C	Wetland of state and national interest	None	None	None
D	Migratory route for wild animals	None	None	None
E	Presence of Schedule-I Terrestrial Fauna	None	None	None
F	Presence of RET Aquatic Fauna	Yes, Turtle species present in Kashi turtle sanctuary	Yes, Turtle species present in Kashi turtle sanctuary	Yes, Turtle species present in Kashi turtle sanctuary
H	Tree cover	12 Khajur tree and 8 nos. of babul shrubs are present	Yes Scattered vegetation is present	Yes Scattered vegetation is present.
2.	**Physical Environment**			
I	Critically Polluted Area	None	None	None
J	Road connectivity	Site is connected with NH-7 and NH-2 through village road	NH-7 and NH-2	NH-7 and NH-2.
K	Rail connectivity	None	Jeonathpur about 4.0 km in SE	Maruadih 9.0 km and Varanasi 9.3 Railway station.
L	Topography	Mainly flat with elevation ranges between 74-77 m	Flat terrain. Elevation ranges between 60 to 85 m	Flat terrain. Elevation ranges between 55 to 95 m
M	Seismicity	Falls in Zone-III (Moderate damage risk zone)	Falls in Zone-III (Moderate damage risk zone)	Falls in Zone-III (Moderate damage risk zone)
N	Surface Water Resources (Rivers)	Ganga River (along western boundary of site)	Ganga River	Ganga River
O	Groundwater	Falls in Safe Zone as per Central Ground Water Board	Falls in Safe Zone as per Central Ground Water Board	Falls in Safe Zone as per Central Ground Water Board
P	Soil and Land-use	Clay loam Fallow agricultural land	Clay loam and sandy loam Land use in 2 km area of site is primarily is under agricultural, water fallow land, and Settlements.	Clay loam and sandy loam Land use in 10 km of site: About 57.87% of the land is under cultivation, 29.85% of the land is under settlement, 6.2% land is under water bodies and rest is under other uses.

S. No.	Environmental Features	Within 500 m area around Proposed terminal site	Within 2 km area around Proposed terminal site	Within 10 km area around Proposed terminal site
Q	State Boundary	None	None	None
3.	**Social Environment**			
R	Physical Setting	Rural Settings	Rural Settings	Rural/ urban and industrial Settings
S	Physical Sensitive Receptors	None	Yes (Temples, Schools, Health care)	Yes (Temples, Schools, and Hospital etc.)
T	Archaeological Monuments	None	Ramnagar Fort 2.0 km in North	Yes Temples

Meteorology: The predominant wind direction is from Northwest. The average wind speed ranges from 1.8 to 5.0 km/hr. Daily mean temperature varied from 22.1oC to 40.4oC. The relative humidity varied from25% to 51%. The annual average rainfall is1000 mm.

Air Quality: As per air quality monitoring study, the ambient air quality of the study area is meeting the prescribed National Ambient Air Quality Standard at all locations except Ramnagar location, where the RSPM values are high in terms of NAAQS. This is mainly due to the heavy traffic load on SH-7 and other commercial activities in Ramnagar.

Noise Quality: Noise quality has been monitored at eight locations within the study area. The noise levels in the study area were found to be within the national standards for residential area (45 dB(A) during night time and 55 dB(A) during day time,) and commercial area (55 dB(A) during night time and 65 dB(A) during day time.

Water Quality: Eight samples of ground water and three samples of surface water have been collected from the study area. Surface water quality of the Ganga River in upstream and downstream point of project site was found to meet the Best Designated Use – 'D' Criteria of CPCB (fit for fish propagation). Surface water quality of Nala is not meeting any of the category of Best Designated Use Criteria of CPCB. All the parameters in ground water sample were well within the permissible limit prescribed in Indian Standard IS: 10500-2012.

Soil Quality: Soil samples from surrounding agriculture fields were collected for analysis. pH of the soil samples ranges from 6.9 to 7.7 indicating the soils are neutral to slightly alkaline in nature. Texturally, the soils of study area are observed as Sandy Loam, & Clay Loam Soils. Available Nitrogen, potassium and phosphorus content in the surface soils are in moderate range. Overall, the soil of the study area is moderately fertile.

Flora & Fauna: The proposed site is devoid of any major plantation. Some agriculture activities were taken up by nearby villagers within the land in the past but these activities have been discontinued now. Now the land is categorized as fallow land. There are about 12 small trees of Khajur (Phoenix sylvestris) and 8 trees of Babool shrubs (Acacia spp.) are present in the identified land. The access road to connect site crosses through the Ralhupur village. This road is pucca upto the Ralhupur village. About 700 m stretch that connect

terminal site to Rahlupur village need to be some levelling and widening. Trees of Jamun, Peepal, Babul and Sisham etc are present along this road. Houses and shops also exist along the access road. The access road (700 m stretch that have to develop) is almost clear, only one or two trees of Jamun, is present along the road alignment that may require to be removed. One big tree also requires some chopping for clearing the passes. No significant flora or fauna was observed during the site visit except nilgai which was spotted during site visit.

Socio-economic: Administratively the villages and settlements within 10-km area around the proposed site fall in Varanasi, Chandoli and Mirzapur District of Uttar Pradesh. As per the census records of 2011, there are One hundred sixty-one (161) settlements in the study area falling within the study area. Total no. of households was recorded as 255682 in the study area. Total population of the 10-km radial zone / study area is 1614854 comprising 854215 males and 760639 females respectively. Sex ratio was also observed as 890 females per 1000 males in the study area.

1.4. Environmental Management and Monitoring Plan

Effective measures are required to be proposed and implemented during design, preconstruction, construction and operation stage to eliminate or minimize the impact of the project development. **Table 1.2 & 1.3** provides details of mitigation measures with implementation and supervision responsibility.

Since project is likely to have impact on various components of environment, the monitoring requirement covering soil erosion, tree plantation, air quality, water quality noise, river sedimentation has been defined and included under respective head at **Table 1.4.**

It will be essential for contractor to comply with applicable regulations and World Bank safeguard requirements. Contractor will also have to comply with applicable standards with respect to Water, air, Noise, Dredge Material, soil and biodiversity as applicable to this project.

1.5. Environment Health and Safety Cell

It is essential to establish environment health and safety cell for the project by contractor to ensure the health & safety of workers and environmental management of study area through effective implementation of EMP. Highly qualified and experienced persons in the field of Environmental Management of Similar projects shall be considered to man the cell who shall ensure the effective implementation of the environment management plan.

1.6. Reporting Requirements:

It is required that contractor will submit quarterly compliance report to Project Management Consultants (PMC) as well as to PMU (Project Management Unit) of IWAI. PMC will analyse the report and notify the corrective action if any required to contractor under intimation to IWAI.

Table 1.2 : Environment Management Plan Varanasi Terminal During Construction Phase

Environmental Issue/ Component	Remedial Measure	Reference to laws and Contract Documents	Approximate Location	Time Frame	Indicative / Mitigation Cost	Institutional Responsibility	
						Implementation	Supervision
1. Climate							
1. Project is unlikelyto cause negative effect on climate. However, project can contribute positively for climate	• Avoid cutting any tree standing on the proposed terminal site or temporary accesses area of 600-700 m length. • Prior permission shall be taken for cutting any tree. • Compensatorytree plantation shall be carried out for any tree cut (as per state forest policy (minimum 1:2)) • Addition plantation of local variety of tree (200 nos one row of tree on three side of the terminal land) shall be carried out along boundary of the terminal site (Greenbelt development plan All terminal buildings should have energy efficient design. It should follow GRIHA guidelines and aim for highest ratings under GRIHA. **Annexure-1.1**)	Forest Conservation Act, 1980	Access road area and proposed terminal area	During design and Pre-Construction Stage	Compensatory for 200 trees	Contractor	IWAI/SEMU/PMC[1]
2. Natural Hazard							

[1] It is proposed to set up Social and Environmental Management Unit (SEMU) in IWAI to manager social and environmental aspect of NW1 augmentation. PMC (Project Management Consultants) anticipated to be appointed for project management and quality check.

Environmental Issue/ Component	Remedial Measure	Reference to laws and Contract Documents	Approximate Location	Time Frame	Indicative / Mitigation Cost	Institutional Responsibility	
						Implementation	Supervision
2. Earthquake- Seismic Zone III i.e., Moderate damage risk zone[2]	Adoption of Relevant IS codes while designing the civil structures to sustain the earthquake of moderate to high magnitude. **(Annexure 1.2)**	Applicable BIS Standards	Project area	During design and Pre-Construction Stage	Part of Project Costs	Contractor	IWAI/SEMU/PMC
3. Site Preparation: Access road, Construction Camp, Construction Site							
3. Improvement of Access road: pavement of the road, Disposal of accumulated	**Improvement of Access Road:** • Access road route and alignment (for unpaved area) shall be finalized and submitted to PMC and IWAI for their	Municipal Solid Wastes (Management and Handling)	Juncture of Access road and Entrance phase 1A	During design and Pre-Construction	Part of Project Costs	Contractor.	IWAI/SEMU/PMC

[2] *IS:1893 (Part 1): 2002 Indian Standard Criteria for Earthquake Resistant Design of Structures Part 1 General Provisions and Buildings Fifth Revision divides the Indian subcontinent into five seismic zones (II to V) depending on the magnitude and damage intensity of seismic activit*

Environmental Issue/ Component	Remedial Measure	Reference to laws and Contract Documents	Approximate Location	Time Frame	Indicative / Mitigation Cost	Institutional Responsibility	
						Implementation	Supervision
Municipal Solid Waste[3]: Loss of Agricultural land, loss of tree, air and noise pollution	concurrence. • Tree shall not be cut. Alignment shall be suitable adjusted to avoid cutting of the tree. If unavoidable, then tree shall be cut with due permission from concerned district/forests authorities. • Trimming of the large tree standing close to the site shall be done as minimum as possible. • Provision shall be made for dust suppression during its use. • Provision shall be made (safety boards, speed control, traffic guards) to prevent accident. • Survival rate of tree shall be regularly monitored. It is shall be minimum	Rules, 2000, Social Impact Assessment requirements	terminal site	Stage			

[3] Substantial municipal solid waste is disposed at the entrance and around the proposed terminal site requiring proper management of the same.

Environmental Issue/ Component	Remedial Measure	Reference to laws and Contract Documents	Approximate Location	Time Frame	Indicative / Mitigation Cost	Institutional Responsibility	
						Implementation	Supervision
	70%. **Municipal Solid Waste Management** • Arrangement shall be made for identifying the area for disposal of construction debris and notify to IWAI. The site should be minimum 1000 m distance from the river bank, residential area and sensitive areas like hospitals, school and temples. • Arrangement shall be made for segregation of waste generated from construction site into recyclable, compostable and non-compostable waste. • Resalable/recyclable waste shall be sold off to authorized agencies. Compostable waste will be composted in pits at site and non-compostable waste shall be disposed off to designated landfill site. If designated landfill site not available, then debris disposal site shall be identified. **(Annexure-1.3)**						
4. Setting of Labour Camps: Loss of agriculture land, contamination of land and water resources from municipal waste from Camps, worker's health, Pressure on natural resources due to establishment of labour camps	**Location of Camp:** • Agriculture land should not be used for development of construction labour camps. Barren/waste land should be used • Site identified by contractor should be approved by the engineers of PMC/IWAI • Proper closure, stabilization and rehabilitation of the area should be carried out as soon as the activity is	The Building and Other Construction workers (Regulation of Employment and Conditions of Service) Act 1996 and Cess Act of 1996	Labour Camp Locations	During design and Pre-Construction Stage	For sanitation some health facilities.	Contractor.	IWAI/SEMU/PMC

Environmental Issue/ Component	Remedial Measure	Reference to laws and Contract Documents	Approximate Location	Time Frame	Indicative / Mitigation Cost	Institutional Responsibility	
						Implementation	Supervision
	completed • No land should be used for above purpose without consent of land owner. **Sanitation and Worker's Health:** • Camp shall be well ventilated. It should have adequate provision for illumination, kitchen and safe drinking water facility shall be provided at the camp • Adequate bathing and sanitation facilities to be provided at labour camp. Mobile Toilets shall be provided. Soak Pits can be provided only if labour camp is located away from river. • Proper drainage to be maintained around the sites to avoid water logging leading to disease • Preventive medical care to be provided to workers - six monthly medical check-up should be organized • Waste will be collected &segregated within site into recyclable, compostable and inert waste. Recyclable waste will be sold off to authorized dealers. Compostable waste shall be pit composted and inert waste shall be sent for disposal to landfill or site identified for debris disposal. • Provision shall be made for essential material supply like cooking fuel (only LPG gas should be used, open	and The Water (Prevention &Control of Pollution) Act, 1974 and amendments thereof. Municipal Solid Wastes (Management and Handling) Rules, 2000					

Environmental Issue/ Component	Remedial Measure	Reference to laws and Contract Documents	Approximate Location	Time Frame	Indicative / Mitigation Cost	Institutional Responsibility	
						Implementation	Supervision
	burning of fuel should not be allowed) Provision shall be made for day crèche for children						
5. Setting up construction Camp: Concert Mix Plant, Hot Mix Plant, Mechanical Workshop, Fuel storages, Lubricant storages	• All these facilities shall be installed at proposed terminal site itself. In case these are to be set up away from site than these shall be located at minimum distance of 500 m from habitation, water bodies and 1000 m from forest areas. • All maintenance facilities, hot mix plant and concrete missing plant shall be established with prior consent to establish to be obtained from SPCB. • All such equipment/plant shall be fitted with air pollution control system and shall comply with condition of consent to establish. • Periodic monitoring shall be carried as per consent conditions. **(Annexure-1.4)**	Air (Prevention and Control of Water Pollution) Act, 1981 and Water (Prevention and Control of Water Pollution) Act, 1972	Site construction Camp	During design and Pre-Construction and construction Stage	For sanitation some health facilities.	Contractor.	IWAI/SEMU/PMC
4. Site Preparation: Power supply, Water Supply, Drainage and disposal of muck and debris							
6. Power supplyand Energy Conservation: Air Pollution, energy loss	• Power shall be sourced from national/state grid. DG sets shall be used only during power failure. • Back-up power shall be set up with all provisions of containment for fuel leakages, air pollution control (stack height as per regulation), and with acoustic enclosure. • Solar energy shall be used in common lighting area on 1:2 basis. • Buildings designed should have green infrastructure. Measures should be	Energy Conservation Building Code 2007	Construction Sites, Access road, and Labour Camp Locations	During design, Pre-Construction Stage	Part of Project Costs	Contractor.	IWAI/SEMU/PMC

Environmental Issue/ Component	Remedial Measure	Reference to laws and Contract Documents	Approximate Location	Time Frame	Indicative / Mitigation Cost	Institutional Responsibility	
						Implementation	Supervision
	taken to conserve energy as per ECBC norms as applicable.						
7. Water Supply, Drainage and effluent discharge	• The Area is under safe category as per Central Ground Water Board. However, necessarypermission shall be taken from district authorities as applicable before digging the bore well. • Staff and visitors should be made aware about water conservation by displaying posters and signage • Garland storm water temporarydrains shall be developed around the site to prevent any direct discharge of contaminated or soiled water to river. It shall be pass through di-siltation chamber and water collection pit. Collected water shall be used for construction purposes. • All washing and maintenance effluent from the workshop area of vehicle maintenance area should drain to separate collection areas fitted with oil and grease trap and de- siltation chamber. The treated water shall be used for dust suppression and green belt development. This water shall not be discharged to river at all.	Central Ground Water Board, Local regulations.	Construction Sites, and Labour Camp Locations	Pre-Construction and construction Stage	For construction of grease traps and de-siltation chambers	Contractor.	IWAI/SEMU/PMC
8. Disposal of piling earth, muck and debris: uncontrolled disposal maylead to increased sedimentation of the river.	• Provision shall be made for collection and draining of water for the piling earth. It shall be used for embankment protection or road construction depending on its suitability. • Provision shall be made for geo		Terminal area River Bank along the terminal site	Pre-Construction and construction Stage	Part of Project Costs	Contractor.	IWAI/SEMU/PMC

Environmental Issue/ Component	Remedial Measure	Reference to laws and Contract Documents	Approximate Location	Time Frame	Indicative / Mitigation Cost	Institutional Responsibility	
						Implementation	Supervision
	Synthetic Screen for arresting silt flowing down stream.						
5. Embankment Design and Construction, Drainage Pattern and Fishermen's Access to River.							
9. River Bank Erosion Protection: Construction of Embankment and construction of berth: may lead to accumulation of sediments on the up drift side and erosion of the down drift side. Contamination of river water quality and land may happen due to river bed material	• Embankment protection measures (stone pitching) shall be made in both upstream and downstream to the extent that erosion is minimized. • Erosion monitoring shall be carried out periodicallydownstream as well. • River Bed material shall be tested for contaminants before its use or disposal for land fill site. If any level of heavy metal contamination is found than it shall be disposed off in a secure manner.		River Bank along the terminal site	During design, Pre-Construction and construction Stage	Part of Project Costs	Contractor.	IWAI/SEMU/PMC
10. Drainage Pattern	• Natural Drainage pattern of area around shall be maintained. No waste shall be allowed to dumped to industrial effluent Nala flowing adjacent to the terminal site. Its opening to river shall not be obstructed in any manner.		Construction Sites, Access road, and Labour Camp Locations	Pre-Construction Stage and construction stage	Part of Project Costs	Contractor.	IWAI/SEMU/PMC

Environmental Issue/ Component	Remedial Measure	Reference to laws and Contract Documents	Approximate Location	Time Frame	Indicative / Mitigation Cost	Institutional Responsibility	
						Implementation	Supervision
11. Access to river: restricted movement of fisherman[4]	Fishing activities are seen in the river close to site. Arrangement shall be made to provide free access to river and undisturbed safe movement of the fishermen.		Terminal site and area around	Construction Stage	Part of Project Costs	Contractor.	IWAI/SEMU/PMC
6. Construction Material Sourcing							
12. Borrow areas for sourcing earth for filling as required (erosion, loss of productive land, land degradation, air pollution)	• Non-productive lands, barren lands, raised lands; wastelands shall be used for borrowing earth with the necessary permissions/consents. • Agricultural areas not to be used as borrow areas unless requested by the landowner for lowering the land for making it cultivable. • Excavation depth should not exceed 1.5 m bgl • Environmental Clearance from State Environmental Impact Assessment Authority and required permission from District Magistrate shall be obtained prior to excavation. Copy of this permission shall be submitted to IWAI before start of excavation. • Record of location, area,	IRC Guidelines on borrow areas and for quarries. EIA Notification 2006(under Environmental Protection Act and Rules, 1986;)	All Identified Borrow sites	During design and Pre-Construction Stage	Part of Project Costs	Contractor	IWAI/SEMU/PMC

[4] Fishing activities are seen. Local fisherman are seen fishing close to river areas. They access the river from small temporary access around the s

Environmental Issue/ Component	Remedial Measure	Reference to laws and Contract Documents	Approximate Location	Time Frame	Indicative / Mitigation Cost	Institutional Responsibility	
						Implementation	Supervision
	accessibility to the location and photograph of borrow area should be maintained prior to excavation • Site selected for borrow area should be approved by PMC & IWAI expert prior to excavation • Ridges of not less than 8m width will be left at intervals not exceeding 300m. Small drains will be cut through the ridges, if necessary, to facilitate drainage. • The slope of the edges will be maintained not steeper than 1:4 (vertical: Horizontal). • Topsoil to be stockpiled and protected for use at the rehabilitation stage. • Rehabilitation shall be satisfactorily undertaken immediately after the use has ceased and at least three weeks prior to monsoon. • Unpaved surfaces used for the haulage of borrow materials to be maintained. • Transportation of earth materials shall be through covered vehicles.**(Annexure 1.5)**						
13. Quarries for sourcing stone and aggregates (loss of productive land, land degradation, air pollution. Any illegal quarrying may lead to land use change, unstable rock formation)	• Aggregates required for embankment stone pitching and roads shall be procured from licensed quarries. • It shall be ensures that selected quarries are having requisite environment clearance, and comply with Air Pollution Control and Noise level requirements as per the law.	EIA Notification 2006(under Environmental Protection Act and Rules, 1986;)	Quarry Site	During design and Pre-Construction Stage	Part of Project Costs	Contractor	IWAI/SEMU/PMC

Environmental Issue/ Component	Remedial Measure	Reference to laws and Contract Documents	Approximate Location	Time Frame	Indicative / Mitigation Cost	Institutional Responsibility	
						Implementation	Supervision
	• Copy of Environmental Clearance letter and Consent to Operate and shall Be obtained and submitted to IWAI. • Material shall be transported under covered trucks only. • No new quarry shall be opened without due permissions. • Each Quarry shall be visited prior to its selection to ensure its compliance with lease conditions, EC and consent conditions. • Stone crushers, if required, shall be set up only after consent from SPCB and taking adequate measures for air pollution control.						
7. Protection of Flora and Fauna							
14. Protection of Tortoise: Increased sedimentation downstream of construction site	• Tortoise Sanctuary is located at about 2.3 Km from site. Necessary permission shall be obtained from National Board of Wild Life prior to start of construction • No movement of tortoise is reported upward to the site. No harm shall be caused to these tortoises in case any tortoise is sited. Necessary caution notice shall be displaced and conveyed to all construction workers and officers. • Geo-Textile synthetic sheet curtain shall be placed around pilling and construction area to prevent movement of sediments and construction waste.	Wild Life (Protection) Act, 1972	In and Around Project Site	During the design and Construction stage	Part of project costs	SEMU through DFO	IWAI/SEMU/PMC

Environmental Issue/ Component	Remedial Measure	Reference to laws and Contract Documents	Approximate Location	Time Frame	Indicative / Mitigation Cost	Institutional Responsibility	
						Implementation	Supervision
15. Terrestrial Fauna: increase in hunt tendency[5]	• Caution sign shall be placed to prevent hunting of wild animal and birds. • Provision shall be made for strict penalty for hunting these animals. • High noise construction work shall not be made in night.	Wild Life (Protection)Act, 1972	In and Around Project Site	During the design and Construction stage	Part of project costs	Contractor	IWAI/SEMU/PMC
16. Vegetation loss due to site preparation and construction activities	• Tree shall not be cut as much as possible. Any tree cut shall be compensated with compensatory tree plantation as per state forest policy (minimum 1:2). • Tree plantation shall be made as feasible at site and around the site depending on land availability. • Provision of LPG shall be made in construction site camp and labour camp as fuel source to avoid tree cutting. • Proper arrangement of lighting should be made at site and construction labour camp Open burning of fuel for any purpose	Forest Conservation Act, 1980	In and Around ProjectSite and labour camp	During the design and Construction stage	Part of project Costs	Contractor	IWAI/SEMU/PMC

[5]Peacock and Wild Neel Gai are sited next to project site.

Environmental Issue/ Component	Remedial Measure	Reference to laws and Contract Documents	Approximate Location	Time Frame	Indicative / Mitigation Cost	Institutional Responsibility	
						Implementation	Supervision
	should not be allowed at the site						
17. Effect on Aquatic life such as Fish, Plankton[6]	• No breeding ground is noticed around the project site. However, construction activity shall be restricted during spawning period of June to August. • Sedimentation and siltation shall be prevented/ controlled to maintain productivity of aquatic ecosystem and ensure availability of food for aquatic fauna & flora.		Terminal construction site	During the design and Construction stage	Part of project Costs	Contractor	IWAI/SEMU/PMC
8. Air Quality							
18. Fugitive Dust Generation due to construction activities	• Transport of loose and fine materials through covered vehicles. • Loading and unloading of construction materials in covered area. • Approach roads shall be paved and widened. • Water spraying on earthworks, unpaved haulage roads, other dust prone areas and construction yard. Make Provision of PPEs like face mask to workers.	Environmental Protection Act, 1986 and amendments thereof; The Air (Prevention and Control of Pollution) Act, 1981 and amendments thereof	Construction sites, Loading areas, storage areas,	During the Construction stage	Part of project Costs	Contractor	IWAI/SEMU/PMC

[6]The floodplain fisheries are dominated by major and minor carps viz, Labio rohita, Catla catla, Cirrhinus mrigala, L. bata, Puntius sps. and catfishes viz. H. fossilis, Mystus sps, etc. and fishes of family Clupeidae, Notopteridae and a mix of many other families.

Environmental Issue/ Component	Remedial Measure	Reference to laws and Contract Documents	Approximate Location	Time Frame	Indicative / Mitigation Cost	Institutional Responsibility	
						Implementation	Supervision
19. Exhaust gas emissions from machineryand vehicular traffic.	• Regular maintenance shall be carried out of machinery and equipment. • Periodic Ambient air quality monitoring shall be carried out. • DG sets to be fitted with stacks of adequate height and low sulphur diesel to be used in DG sets as well as in machineries. Monitoring of air quality for PM_{10}, $PM_{2.5}$, SO_x, NO_x, and CO shall be carried out quarterly at construction site. Stack monitoring shall be carried out every month at the site.	Environmental Protection Act, 1986 and amendments thereof; The Air (Prevention and Control of Pollution) Act, 1981 and amendments thereof	Construction camps and sites, concrete mixing plant, DG sets locations	During the Construction stage	Part of project Costs	Contractor	IWAI/SEMU/PMC
20. Emissions at access road: avoidance of traffic Jams[7]	• Efforts shall be made to move construction material early morning and late evening period. • Traffic regulators (Guard) shall be posted in habitat area and at key junction areas to avoid congestion	-do-	Access road	During the Construction stage	- Do -	Contractor	IWAI/SEMU/PMC
9. Noise and Vibration							

[7] The roads connecting the proposed sites is narrow and also passes through habitat area. Traffic remains heavy.

Environmental Issue/ Component	Remedial Measure	Reference to laws and Contract Documents	Approximate Location	Time Frame	Indicative / Mitigation Cost	Institutional Responsibility	
						Implementation	Supervision
21. Noise from construction vehicle, equipment and machinery.	• All equipment to be timely serviced and properly maintained to minimize its operational noise. • Construction equipment and machinery to be fitted with silencers and maintained properly. • Provision of temporary noise barrier near habitat areas during construction phase. • Protection devices (ear plugs or ear muffs) will be provided to the workers operating in the vicinity of high noise generating machines. • Speed control shall be enforced in habitat areas. • The ambient noise level as per CPCB standard is 55 dB(A) and 45 db(A). Current noise level at habitat area meets the standard • Noise monitoring day and night at site, labour camp and access road area shall be carried quarterly to ensure the effectiveness of mitigation measures.	Noise Pollution (Regulation and Control) Rules, 2000 and amendments thereof	Construction Site and accesses road.	During the Construction stage	Part of project Costs	Contractor	IWAI/SEMU/PMC
10. Land-use and Landscape							
22. Land use Change and Loss of productive/top soil	• Efforts shall be made to improve the aesthetic of the area. No construction waste or other wastes shall be dumped at unidentified areas. Caution board in local language shall be placed at different locations to prevent dumping of waste generated from construction site in the river and nearby areas • Compensatorytree plantation for loss	Design requirement	Around project site area and borrow area	During construction Stage	For five caution boards	Contractor	IWAI/SEMU/PMC

Environmental Issue/ Component	Remedial Measure	Reference to laws and Contract Documents	Approximate Location	Time Frame	Indicative / Mitigation Cost	Institutional Responsibility	
						Implementation	Supervision
	of trees. • Top soil shall be preserved and laid over either on the embankment slope for growing vegetation to protect soil erosion or spread over in the proposed plantation areas. • Land earmarked for dumping of construction waste shall be free from any social and R&R issue and away from settlements.						
23. Soil erosion due to construction activities, earthwork	• Provision of cross drainage structure shall be made in the access road if required to maintain the natural drainage pattern. • Provision of side drain shall be made in access road if required to prevent water logging. • Measures like building of scouring protection structures, protection by geo-textiles matting etc shall be made, if river bank erosion is found around the terminal area. • Bio-turfing of embankments shall be made enhance the slop stabilization.		Access road and river bank	Construction stage	Part of project costs	Contractor	IWAI/SEMU/PMC
24. Soil erosion at earth stockpiles	• The earth stockpiles to be provided with gentle slopes to prevent soil erosion.		At earth stockpiles	Construction stage	Part of project costs	Contractor	IWAI/SEMU/PMC
25. Compaction and contamination of soil due to movement of vehicles and equipment	• Fuel and lubricants to be stored at the predefined storage location. • Storage area shall be paved with gentle slope to a corner and connected with a chamber to collect any spills of the oils. • Provision of “oil interceptors” at wash-down and re-fuelling areas.		Terminal site	Pre-construction and construction stage.	Part of project costs	Contractor	IWAI/SEMU/PMC

Environmental Issue/ Component	Remedial Measure	Reference to laws and Contract Documents	Approximate Location	Time Frame	Indicative / Mitigation Cost	Institutional Responsibility	
						Implementation	Supervision
	• Oil and grease spill and oil soaked materials are to be collected and stored in labelled containers (Labelled: WASTE OIL; and hazardous sign be displayed) and sold off to SPCB/ MoEF authorized vendors. • Movement of construction vehicles, machinery and equipment shall be restricted to the designated haulage route.						
11. Water Resources							
26. Depletion of Groundwater resources due to unregulated abstraction for construction purpose	• Preference shall be given to source water from rivers wherever feasible in the project area with due permission from authorities. • Augmentation through incorporating water harvesting structures if technically feasible. • Construction of check dams in consultation with community to reduce burden on ground water resources if technically feasible. • Efforts to restrict water intensive activities during summer period (April, May, June)			During Construction stage	Part of project costs	Contractor,	IWAI/SEMU/PMC
27. Increase in water Siltation levels due to construction of terminal and contamination due to disposal of domestic waste	• The piling work shall be undertaken during low flow period. • Restoration of changes in the stream, if any, made during construction to its original level. • Precautions shall be made that no nala or canal is clogged. • Substructure construction should be limited to the dry season and		Terminal Site	During Construction stage	Part of project costs	Contractor	IWAI/SEMU/PMC

Environmental Issue/ Component	Remedial Measure	Reference to laws and Contract Documents	Approximate Location	Time Frame	Indicative / Mitigation Cost	Institutional Responsibility	
						Implementation	Supervision
	cofferdams may be constructed and utilized to lift the spoil directly out of it and carried to the riverbank for land disposal. • Mobile toilets with anaerobic digestion facility shall be fixed at construction site. No domestic waste shall be discharged to river.						
12. Accident and Safety Risks							
28. Accident risk from construction activities	• Contractors to adopt and maintain safe working practices. • Usage of fluorescent signage, in local language at the construction sites • Training shall be provided to workers, especially machinery operators, on safety procedures and precautions. • The contractors to appoint a safety officer mandatory. • At every work place, a readily available first aid unit including an adequate supply of dressing materials, a mode of transport (ambulance), nursing staff, and doctor to be provided. • Required PPE shall be provided to workers. • Half yearly medical check-up shall be carried of the workers and summary report shall be submitted to PMC	Central Motor and Vehicle Act 1988 EP Act 1986 Noise Rules 2002	Construction sites	Construction period	Part of project costs	Contractor	IWAI/SEMU/PMC
13. Shifting of Common Property Resources and other Utilities							
29. Shifting of community properties and utilities	As per assessment, no such shifting is involved. However, if any shifting is involved it shall have done at suitable		Project Area	Pre-Construction	Part of Project Costs	Contractor	IWAI/SEMU/PMC

Environmental Issue/ Component	Remedial Measure	Reference to laws and Contract Documents	Approximate Location	Time Frame	Indicative / Mitigation Cost	Institutional Responsibility	
						Implementation	Supervision
	location with the concurrence from local authorities and community.						

Table 1.3 : Environment Management Plan Varanasi Terminal During Operation Phase

Environmental Issue/ Component	Avoidance/Mitigation/ Compensation Measures	Reference to laws/ guideline	Location	Monitoring indicators (MI)/ Performance Target (PT)	Monitoring Methods	Mitigation Costs	Institutional Responsibility	
							Implementation	Supervision
OPERATION AND MAINTENANCE STAGE								
1. Climate								
1.1 Impact on Climate	• Ensuring survivability of trees planted under greenbelt minimum 70% survival rate and create additional GHG sink by planting additional trees • Adopting all energy efficiency measures e.g the terminal building should have a platinum rated for Green building provisions • Street lighting solar lighting provisions (on 1:3 ratio of minimal needs) along with solar power generation system should also be provided as to meet the other power requirements of the terminal thus reducing dependence on power grid supply.	Kyoto Protocol, National Water Policy, 2012, Forest Conservation Rules &National Forest Policy	Terminal site	Survival rate of trees and monitoring performance of energy conservation equipments	• Observations and inspection	Aftercare & Monitoring of 200 trees	IWAI	IWAI
2. Air Quality								

Environmental Issue/ Component	Avoidance/Mitigation/ Compensation Measures	Reference to laws/ guideline	Location	Monitoring indicators (MI)/ Performance Target (PT)	Monitoring Methods	Mitigation Costs	Institutional Responsibility	
							Implementation	Supervision
2.1 Air pollution due to due to vehicular movement& loading and unloading areas	• Construction raw material and debris shall be transported and stored in covered condition • Transportation vehicle shall be properly serviced and maintain and shall carry PUC certificate • Thick green belt shall be developed and maintained all along the periphery and along the roads. The green belt shall be developed in canopy shape with local species of broad leaf variety. Species selected for development of green belt shall also be tolerant to expected pollutants and shall have the ability to adsorb the pollutants. Suggested species are suitable for different areas are also listed under CPCB guidelines for green Belt development. • Water sprinkling should be carried out during all loading and unloading activities and in storage yards. Further dust suppression measures should be taken at the site like vaccum collectors at dust generation areas. • Mechanical conveying system with provision of dust	Environmental Protection Act, 1986; The Air (Prevention and Control of Pollution) Act, 1981	Throughout the project area	MI: Ambient air quality (PM_{10}, CO, SO_2 NO_x) PT: Levels are equal to or below baseline levels given in the EIA report	• As per CPCB requirements • Site inspection	Included in Operation / Maintenance cost	IWAI	IWAI

Environmental Issue/ Component	Avoidance/Mitigation/ Compensation Measures	Reference to laws/ guideline	Location	Monitoring indicators (MI)/ Performance Target (PT)	Monitoring Methods	Mitigation Costs	Institutional Responsibility	
							Implementation	Supervision
	collection should be provided for barge loading • Green belt planted should be maintained and survival rate of plantation should be maintained to minimum 70% • Monitoring of air quality shall be carried out on monthly basis to check the level of pollutants and effectiveness of proposed EMP • It is recommended to provide mechanical conveying system with provision of dust collection system for loading/unloading material from barges. Pneumatic transfer only should be preferred for flyash transportation • Minimizing free fall of materials to reduce the dust generation • Minimizing dry cargo pile heights and containing piles with perimeter walls • Removing materials from the bottom of piles to minimize dust re-suspension • Regularly sweeping docks and handling areas, truck / rail storage areas, and paved roadway surfaces • Keeping transfer equipment (e.g. cranes, forklifts, and trucks) in good working							

Environmental Issue/ Component	Avoidance/Mitigation/ Compensation Measures	Reference to laws/ guideline	Location	Monitoring indicators (MI)/ Performance Target (PT)	Monitoring Methods	Mitigation Costs	Institutional Responsibility	
							Implementation	Supervision
	condition[8] • Upgrading the land vehicle fleet with less-polluting trucks and vehicles, and using alternative fuels and fuel mixture							
3. Noise Quality								
2.1 Noise due to operation	• Site boundary should be provided which can act as noise barrier • Provision of thick green belt along the boundary and roads which will act as noise buffer • Earplugs should be provided to workers involved in unloading operations • Provision of thick green belt along the boundary and roads which will act as noise buffer • Timely maintenance and servicing of transportation vehicles and the machinery/pumps to be used during operation phase to reduce the noise generation due to friction and abrasion • Honking shall be prohibited at the project site • Hearing test for the workers shall be undertaken before	Noise Rules, 2000	Site and Nearby areas	MI: Noise levels –day & night PT: Levels are equal to or below baseline levels given in the EIA report	Measuring by noise meter 24 hourly	Included in Operation / Maintenance cost	IWAI	IWAI

[8] IFC Environmental, Health & Safety Guidelines-Ports, Harbors and Terminals

Environmental Issue/ Component	Avoidance/Mitigation/ Compensation Measures	Reference to laws/ guideline	Location	Monitoring indicators (MI)/ Performance Target (PT)	Monitoring Methods	Mitigation Costs	Institutional Responsibility	
							Implementation	Supervision
	employing them and thereafter shall be done after every six months • Job rotations should be practiced for people, working in high noise level areas • No noise generating activity shall be carried out between 6:00 AM to 10:00 PM • DG sets shall be provided with acoustic enclosure • Monitoring of Noise levels shall be carried out on monthly basis to check the level of pollutants and effectiveness of proposed EMP							
3. Land and Soil								
3.1 Soil erosion at embankment during heavy rainfall.	• Periodic checking to be carried to monitor the soil erosion along the River Banks at and near terminal area • Necessary maintenance should be undertaken wherever it is required	Project requirement	Along river bank	MI: Existence of soil erosion sites Number of soil erosion sites PT: Zero or minimal occurrences of soil erosion	On site observation	Included in Operation / Maintenance cost	IWAI	IWAI

Environmental Issue/ Component	Avoidance/Mitigation/ Compensation Measures	Reference to laws/ guideline	Location	Monitoring indicators (MI)/ Performance Target (PT)	Monitoring Methods	Mitigation Costs	Institutional Responsibility	
							Implementation	Supervision
3.2 Soil contamination	• Fuel shall be stored in HDPE containers on paved surfaces only to prevent spillage of fuels on the soil and thus soil contamination. • Dustbins shall be provided at all the required locations at the site for collection of recyclable and non-recyclable waste. • Recyclable waste shall be sold to authorized vendors and non-recyclable waste shall be disposed off through authorized agencies and shall not be dumped in open. • Used oil from DG sets and other equipment shall be stored in HDPE containers in isolated location on paved surfaces and shall be disposed through authorized vendors only and shall not be dumped in open. • Room shall be provided for storage of E-waste at site and this waste shall be sold to authorized vendors periodically and shall not be dumped in open. • Municipal waste generated at terminal should either be sent for landfilling through authorized agencies or shall be composted within the	Project requirement	Terminal site, access road and along river bank	MI: Existence of soil erosion sites Number of soil erosion sites PT: Zero or minimal occurrences of soil erosion	On site observation	Included in Operation / Maintenance cost	IWAI	IWAI

Environmental Issue/ Component	Avoidance/Mitigation/ Compensation Measures	Reference to laws/ guideline	Location	Monitoring indicators (MI)/ Performance Target (PT)	Monitoring Methods	Mitigation Costs	Institutional Responsibility	
							Implementation	Supervision
	terminal site and manure should be used for maintaining the green area within the site • Vessel waste reception facility should be available at the terminal site incase maintenance facility is not in place. The waste should be received from the vessel in proper segregated and packed form.. This waste should be treated and disposed within the terminal site only but in case it is not feasible, tieups with Government and authorized private agencies can be made for handling, treatment, storage and disposal of this waste. Also fee can be imposed on the vessel operator for letting them dispose their waste at terminal/maintenance facilities.							
4. Water resources/Flooding and Inundation								

Environmental Issue/ Component	Avoidance/Mitigation/ Compensation Measures	Reference to laws/ guideline	Location	Monitoring indicators (MI)/ Performance Target (PT)	Monitoring Methods	Mitigation Costs	Institutional Responsibility	
							Implementation	Supervision
4.1 Siltation	• Regular checks shall be made for bank protection works so as to check the bank erosion and increased sediment level in the river	Project requirement	Near surface Water bodies	MI: Water quality PT: No turbidity of surface water bodies due to the terminal activity	Site observation	Included in Operation/ Maintenance cost	IWAI	IWAI
4.2 Water logging due to blockage of drains, culverts or streams	• Regular visual checks and cleaning of drains provided at site shall be done to ensure that flow of water is maintained and prevent water logging. Drains and cross drainage structures shall be regularly cleaned and de-silted • Drains shall be regularly cleaned and de-silted • Monitoring of water borne diseases due to stagnant water bodies • Storm water drains provided in parking & road areas shall be provided with oil & grease traps	Project requirement	Near surface Water bodies	MI: Presence/ absence of water logging along the approach road/terminal area PT: No record of overtopping/ Water logging	Site observation	Included in Operation/Maintenance cost	IWAI	IWAI
4.3 Waste Water treatment and conservation	• Provision of storm water harvesting system at site. Roof top rain water should be collected in separate collection pond and should	Project requirement	Project area	MI: proper treatment PT: treated water quality	Treatment parameter, ph, BOD, TDS etc.	Included in Operation/Maintenance	IWAI	IWAI

Environmental Issue/ Component	Avoidance/Mitigation/ Compensation Measures	Reference to laws/ guideline	Location	Monitoring indicators (MI)/ Performance Target (PT)	Monitoring Methods	Mitigation Costs	Institutional Responsibility	
							Implementation	Supervision
	be used for horticulture and cleaning purpose at site. • Toilets to be provided with running water facility to prevent open defecation. • Sewage should be treated in STP • Water conservation fixtures shall be installed in toilets and kitchen area. Some of the water conservation fixtures which can be installed are dual flushing cisterns, sensor taps, low water urinals etc. • No wastewater shall be received from vessels and vessels should not be allowed to discharge their wastewater and solid waste in river • Fuel shall be stored in leak proof containers and containers shall be placed on paved surfaces • Monitoring of surface water quality shall be carried out on monthly basis to check the level of pollutants and effectiveness of proposed EMP • Oil should be stored in leak proof containers and storage area should be provided with facility of collecting the oil in case of spillage. The storage			check		cost		

Environmental Issue/ Component	Avoidance/Mitigation/ Compensation Measures	Reference to laws/ guideline	Location	Monitoring indicators (MI)/ Performance Target (PT)	Monitoring Methods	Mitigation Costs	Institutional Responsibility	
							Implementation	Supervision
	facility should be so designed that spilled oil shall not enter the storm water and sewage drains or storm water storage pits. Oil storage facility should be contained. Oil & grit seperators should be provided in the storm water drains in these areas. • Fueling of vessels is not proposed at terminal facility but in case fueling is carried out then Fuel dispensing equipment should be equipped with "breakaway" hose connections that provide emergency shutdown of flow. Fueling equipment should be inspected daily to ensure all components are in satisfactory condition							
5. Flora& Fauna								
a. Terrestrial Flora & fauna	• Thick green belt will be developed at site by the time operation starts at the project site. This will improve the ecology of the area and will provide the habitat to avifauna. • 70% survival of the plantation shall be maintained. The tree survival audit to be conducted at least once in a	Forest Conservation Act 1980, Wild Life Protection Act, 1972	Project tree plantation sites.	MI: Tree/plants survival rate PT: Minimum rate of 70% tree survival	Records and field observations. Information from Forestry Department	Operation/ Maintenance Cost	IWAI/Forest Department	IWAI

Environmental Issue/ Component	Avoidance/Mitigation/ Compensation Measures	Reference to laws/ guideline	Location	Monitoring indicators (MI)/ Performance Target (PT)	Monitoring Methods	Mitigation Costs	Institutional Responsibility	
							Implementation	Supervision
	year to assess the effectiveness • Dust suppression should be carried out • Water sprinkling should be carried out on internal as well as on approach road to the site • Stack height in DG set shall be provided as per the CPCB norm. • Native plant species should preferably be planted at site • Shed leaves, branches and flowers should be composted and should be used as manure within the site • STP sludge should also be used as manure at the site. No chemical fertilizers, pesticides or insecticides should be used at site as it may wash-off with run-off and may enter the river impacting aquatic ecology • Possibilityof composting the food waste within the site should be explored and composted waste should be used as manure within the site • Instruction should be given to all the workers and visitors that no harm to the plantation at the site or any							

Environmental Issue/ Component	Avoidance/Mitigation/ Compensation Measures	Reference to laws/ guideline	Location	Monitoring indicators (MI)/ Performance Target (PT)	Monitoring Methods	Mitigation Costs	Institutional Responsibility	
							Implementation	Supervision
	animal should be done within the project premises							
b. Impact on Aquatic Flora & Fauna due to vessel movement & discharge of waste c. Impact Due to Oil spillage	• Water sprinkling should be carried out at the storage yards to minimize the dust generation and settling the dust on the River surface • Material loading or unloading from barges should be through mechanical covered conveyor system than through pay loaders/trucks/barge loaders • Moisture should be maintained in coal to reduce coal dust generation during loading/unloading at berth. • The solid wastes, sewage, oily ballast, bilge water and bunker fuel bottoms generated from barge should not be discharged directly and it should be discharged as per the norms. Cargo Operators needs to exercise all caution to avoid any kind of accidental discharge of such wastes. No provision of maintenance and repairing and fuel refilling of barge and vessels is proposed at terminal site hence chances of oil spillage is almost negligible due to	Bio-diversity conservation rules, Wildlife Protection Act, 1972	River stretch along the terminal	MI: Aquatic species PT: Should and similar to baseline	Surveys	For Aquatic Ecology Survey	IWAI	IWAI

Environmental Issue/ Component	Avoidance/Mitigation/ Compensation Measures	Reference to laws/ guideline	Location	Monitoring indicators (MI)/ Performance Target (PT)	Monitoring Methods	Mitigation Costs	Institutional Responsibility	
							Implementation	Supervision
	maintenance activities. • No wastewater or waste should be disposed off in river from terminal site or from vessel into the water. Penalty should be imposed on the vessels reported of disposing waste/wastewater in the river • Surface run-off from site should be collected and re-used at site for dust suppression. Run-off from building should be collected separately and should be used for plantation and cleaning purpose. • STP should be provided at site for treatment of sewage generated. No sewage should be allowed to enter in the river. Treated water from STP should be reused completely at site and should not be discharged into river • Dredged sand (if any) should not be disposed off in river or dumped near the river banks. • Dredging should be avoided during the breeding and spawning seasons • No dredging should be carried out within turtle sanctuary							

Environmental Issue/ Component	Avoidance/Mitigation/ Compensation Measures	Reference to laws/ guideline	Location	Monitoring indicators (MI)/ Performance Target (PT)	Monitoring Methods	Mitigation Costs	Institutional Responsibility	
							Implementation	Supervision
	• Barge speed should be maintained less than 5 kmph • Instruction should be given to all vessels and all employee and staff that no aquatic faunal species should be harmed due to any reason • Waiting time of ships should be reduced at the terminal by providing the adequate loading and unloading equipment and vehicles. • Ships should be instructed for not using sharp lights and sounds as they may disturb aquatic organisms • Propeller guards should be provided for all the vessels to minimize the propeller inflicted injuries and scars to the aquatic organisms. • No developments should be brought up on other bank of river opposite to terminal site so as to provide the ground to aquatic organisms for their activities • Nesting grounds, breeding & spawning grounds shall be identified and project activities shall be minimized in those areas • Time schedule and the quantity of material allowed shall be strictly checked and							

Environmental Issue/ Component	Avoidance/Mitigation/ Compensation Measures	Reference to laws/ guideline	Location	Monitoring indicators (MI)/ Performance Target (PT)	Monitoring Methods	Mitigation Costs	Institutional Responsibility	
							Implementation	Supervision
	monitored for each ship. This will prevent overcrowding of the vessels at terminal site and thus no obstruction will be there on movement of the aquatic organisms due to ships. • Waiting time of ships shall be reduced at the terminal by providing the adequate loading and unloading equipment and vehicles. • Ships shall be instructed for not using sharp lights and sounds as they may disturb aquatic organisms • Crew of the ships carrying the oil should be competent and experienced so as they can prevent the accidents to happen as much as possible • IWAI should carry out the inspections of the vessels which are transporting the material to and fro from the terminal. • Aquatic ecology monitoring should be carried out yearly so as to assess the impact of terminal activities on aquatic life.							
6. Safety								
6.1Accident risks associated with traffic	• Traffic control measures, including speed limits should be forced strictly. • Monitor/ensure that all	IRC: SP:55	Throughout the Project	MI: Number of accidents	Review accident	Included in operatio	IWAI	IWAI

Environmental Issue/ Component	Avoidance/Mitigation/ Compensation Measures	Reference to laws/ guideline	Location	Monitoring indicators (MI)/ Performance Target (PT)	Monitoring Methods	Mitigation Costs	Institutional Responsibility	
							Implementation	Supervision
movement.	safety provisions included in design and construction phase are properly maintained • Movement of traffic shall be restricted to designate hours and routes. • Adequate illumination should be provided at the site during evening • Separation of people from vehicles and making vehicle passageways one-way, to the extent practical. • Existence of spill prevention and control and emergency responsive system at the site. Preparation of spill control and management plan for the terminal facilities & jetties • Locating means of access to ensure suspended loads do not pass overhead, to the extent practical • Constructing the surface of terminal areas to be: of adequate strength to support the heaviest expected loads; level, or with only a slight slope; free from holes, cracks, depressions, unnecessary curbs, or other raised objects; continuous; and skid resistant • Providing safe access		route	Conditions and existence of safety signs, rumble strips etc. on the road PT: Fatal and non-fatal accident rate is reduced after improvement	records Site observations	n /Maintenance cost		

Environmental Issue/ Component	Avoidance/Mitigation/ Compensation Measures	Reference to laws/ guideline	Location	Monitoring indicators (MI)/ Performance Target (PT)	Monitoring Methods	Mitigation Costs	Institutional Responsibility	
							Implementation	Supervision
	arrangements suitable for the sizes and types of vessels calling at their facilities. These access arrangements should include guard rails and / or properly secured safety nets to prevent workers from falling into the water between the vessel side and the adjacent quay. • Inspecting and approving all slings before use • Clearly marking (indicating its own weight) all lifting beams and frames, vacuum lifting, or magnetic lifting device which does not form an integral part of a lifting appliance and every other item of loose gear weighing more than 100 kilograms (kg) • Inspecting disposable pallets and similar disposable devices before use and avoiding re-use of such disposable devices, Equipping lifting appliances with means of emergency escape from the driver's cabin and a safe means for the removal of an injured or ill driver • Risk of free fall of materials should be minimized by							

Environmental Issue/ Component	Avoidance/Mitigation/ Compensation Measures	Reference to laws/ guideline	Location	Monitoring indicators (MI)/ Performance Target (PT)	Monitoring Methods	Mitigation Costs	Institutional Responsibility	
							Implementation	Supervision
	installing telescoping arm loaders and conveyors • Materials handling operations should follow a simple, linear layout to reduce the need for multiple transfer points							
6.2. Transport of Dangerous Goods	• Existence of spill prevention and control and emergency responsive system. • Emergencyplan for vehicles carrying hazardous material should be available at the site and be implemented if required	-	Throughout the project stretch	MI: Status of emergency system – whether operational or not PT: Fully functional emergency system	Review of spill prevention and emergency response plan Spill accident records	Included in operation/Maintenance cost.	IWAI	IWAI
6.4 Accidents Risks Due to Movement of Vessels and other hazards associated with site	• Emergency preparedness plan for natural (flood & earthquake) and other hazards like fires, fall/trip, electric shocks etc shall be prepared and should be implemented during emergency condition. Mock drills should be conducted for workers to handle such emergency situation • Emergency collection area should be designated at the site which is safe. All workers should be directed	-	Throughout the project stretch	MI: Status of emergency system – whether operational or not PT: Fully functional emergency system	Review of spill prevention and emergency response plan Spill accident records	Included in operation/Maintenance cost.	IWAI	IWAI

Environmental Issue/ Component	Avoidance/Mitigation/ Compensation Measures	Reference to laws/ guideline	Location	Monitoring indicators (MI)/ Performance Target (PT)	Monitoring Methods	Mitigation Costs	Institutional Responsibility	
							Implementation	Supervision
	to collect at this area in case of emergency. • Implementation of the environment management plan as proposed to prevent the environmental pollution during operation phase • Ships should comply with safety norms and should maintain the speed so as to prevent the accidents like oil spillage. In case of accidents, ship owner should be responsible for clean-up operations • Employment should preferably be given to local people. Women should be given equal opportunity for work. • Safety norms should be followed for all operational phase activities at terminal • Development activities should be carried out in the nearby areas for development of area • Fishing activity should not be restricted in the river. • Alternate provision for fishermen should be given in case fishing activity is restricted. • Firefighting facility should be provided at site and trained personnel should be							

Environmental Issue/ Component	Avoidance/Mitigation/ Compensation Measures	Reference to laws/ guideline	Location	Monitoring indicators (MI)/ Performance Target (PT)	Monitoring Methods	Mitigation Costs	Institutional Responsibility	
							Implementation	Supervision
	available at site that can operate the fire extinguishers and other fire-fighting equipment.							

Table 1.4 : Environment Monitoring Plan of Varanasi Terminal for Construction & Operation Phase (Phase 1)

S. No.	Aspect	Parameters to be monitored	No of sampling locations & frequency	Standard methods for sampling and analysis	Role & Responsibility	
					Implementation	Supervision
Construction Period						
1.	Air Quality (Ambient & Stack)	PM_{10}, $PM_{2.5}$, SO_2, NO_x, CO	Three Locations including project site, once in two months	• Fine Particulate Samplers for $PM_{2.5}$ • Respirable Dust Sampler fitted PM_{10} • Respirable Dust Sampler fitted with Gaseous sampling arrangements for SO_2 and NO_x, CO analyser; TO-14A, TO-15, USEPA method for sampling	Contractor	IWAI & PMC
2.	Surface Water Quality	Physical, chemical and biological	River Ganga Once a month (upstream &downstream)	Grab sampling and analysis by using standard methods	Contractor	IWAI & PMC
3.	Drinking water Quality	Physical, chemical and biological	Drinking water for labour camps Once a month	Grab sampling and analysis by using standard methods	Contractor	IWAI & PMC
4.	Noise Level	Day time and night time noise level (max, min & Leq levels)	Construction labour camp, construction site and nearest	Noise meter	Contractor	IWAI & PMC

			village Once a month			
5.	Soil Quality & River Bed Sediment	Soil texture, type, Electrical conductivity, pH, infiltration, porosity, etc.,	Construction site, labour camps and debris disposal site Once in 6 months	Collection and analysis of samples as per IS 2720	Contractor	IWAI & PMC
6.	Plantation	Plantation survival rate	Terminal site	Survey, counting, recording & reporting	Contractor	IWAI & PMC
7.	Plantation	Plantation survival rate	Compensatory plantation site (if carried out)- Once in year	Survey, counting, recording & reporting	IWAI	IWAI & PMC
8.	Soil Erosion	---	Upstream & downstream of project site near river bank--Once a month	Survey & observation; Extent and degree of erosion; Structures for controlling soil erosion	Contractor	IWAI & PMC
9.	Aquatic ecology	Phytoplankton, Zooplankton	River Ganga Six monthly	Plankton net of diameter of 0.35 m, No.25 mesh size 63 and analysis by using standard methods.	Contractor	IWAI & PMC
10.	Integrity of embankment	---	Upstream & downstream of terminal site-Once a month	Survey & observation; Extent and degree of erosion; Structures for controlling soil erosion	Contractor	IWAI & PMC
Operation Phase						
1.	Air Quality (Ambient & Stack)	PM_{10}, $PM_{2.5}$, SO_2, NO_2, HC and CO	Three Locations including project site, once in two months - Six monthly	• Fine Particulate Samplers for $PM_{2.5}$ • Respirable Dust Sampler fitted PM_{10} • Respirable Dust Sampler fitted with Gaseous sampling arrangements for SO_2 and NO_x, CO analyser;	NABL accredited Lab to be contracted by IWAI	IWAI

				TO-14A, TO-15, USEPA method for sampling		
2.	Surface Water Quality	Physical, chemical and biological	River Ganga Once in quarter (Upstream & Downstream)	Grab sampling and analysis by using standard methods	NABL accredited Lab to be contracted by IWAI	IWAI
3.	Drinking water Quality	Physical, chemical and biological	Drinking water for staff-Once a quarter	Grab sampling and analysis by using standard methods	NABL accredited Lab to be contracted by IWAI	IWAI
4.	Noise Level	Day time and night time noise level (max, min & Leq levels)	Two locations: Project site & nearest habitation -Once in quarter	Noise meter	NABL accredited Lab to be contracted by IWAI	IWAI
5.	Wastewater Management	Physical, chemical and biological of sewage and STP treated water	Terminal site, testing of sewage and STP treated water Once in quarter	--	NABL accredited Lab to be contracted by IWAI	IWAI
6.	Plantation	Plantation survival rate of 70%	Terminal site and compensatory plantation site- Once In year	Survey, counting, recording & reporting	IWAI	IWAI
7.	Soil Erosion	---	Upstream & downstream of project site near river bank-Monthly	Survey & observation; Extent and degree of erosion; Structures for controlling soil erosion	IWAI	IWAI
8.	Aquatic ecology	Phytoplankton, Zooplankton	River Ganga-Six monthly	Plankton net of diameter of 0.35 m, No.25 mesh size 63 and analysis by using standard methods.	IWAI	IWAI
9.	River Bed Sediments	Physio-Chemical Parameters	Once in Six Month at Terminal Site Area	Depth Sampler	IWAI	IWAI
10.	Integrity of	---	Upstream &	Survey & observation; Extent	IWAI	IWAI

	embankment		downstream of terminal site- Once in six month	and degree of erosion; Structures for controlling soil erosion		

Annexure 1.1: Green Belt Development Plan

1.0 Introduction

Site for terminals/jetty/lock may support vegetation such as trees, shrubs herbs etc. Sahibganj site is the one out of four sites selected for terminals/locks support significant vegetation, i.e. mango orchards and other trees. Remaining sites supports some trees which may be required to cut or can be retained. Other sites which are not finalized may also support the vegetation which will be required to remove. Tree cutting shall be required at such sites and it should be carried out only after obtaining clearance from forest department. Only identified & permitted tree species shall be cut.

As per state forest policy compensatory afforestation should be carried out in ratio of at least at 1:2 ratios. Compensatory afforestation shall be carried out by forest department. It is preferable that compensatory afforestation is carried out in nearby land patch. Survival rate of the afforestation carried out by forest department shall be monitored by IWAI.

Apart from above compensatory plantation as part of environmental management, it is proposed to develop 15-20 m thick green belt all along the site boundary and along the roads within the site. Green belt shall be developed as per the following guidelines

1.1 Selection of Tree Species

The Project involve movement of vehicle for transportation of material Thus emissions like particulate matter, SO_2, NO_x& CO shall be generated at site. Also there is potential of generation of coal dust while unloading the materials at stock piles. Thus the plantation species tolerant to these pollutants and mitigate these from air shall be planted. Species selecting criteria is given below:

1. Tolerant to expected pollutants at site
2. Longer duration of foliage
3. Freely exposed foliage (adequate height of crown, openness of foliage, big leaves, small stomata apertures, stomata well exposed)
4. Leaves supported on firm petioles

1.2 Recommended Plant species

Based on nature of pollutants following tree species are recommended to be planted

S. No.	Plant Species	Common Name	Habit
1.	Termanilia catappal	Jagali Badam	Tree
2.	Anthocephalus cadamba	Kadam	Tree
3.	Ficus bengalensis	Badh	Tree
4.	Magnifera indica	Aam	Tree
5.	Tectona grandis	Teak	Tree
6.	Ficus religiosa	Peepal	Tree
7.	Hibiscus rosa sinensi	Hibiscus	Shrub
8.	Wrightia arboriea	Dudhi	Shrub
9.	Tabernaemontana divaricata	Chandani	Shrub

S. No.	Plant Species	Common Name	Habit
10.	Bougainvillea glavra	Bougainvillea	Shrub
11.	Codium variegates	Cockscomb	Herb
12.	Celosia argentea	Croton	Herb
13.	*Ilex rotunda*	Kurogane holly	Tree
14.	*Cassia surattensis*	Golden Senna	Tree
15.	*Cinnamomum camphora*	Camphor tree	Tree
16.	Lagerstroemia flos-reginae	Lagerstroemia	Tree
17.	Alstonia scholaris	Devil tree	Tree
18.	Cassia fistula	Golden shower	Tree
19.	Delonix regia	Gulmohar	Tree
20.	Pongamia pinnata	Indian beech	Tree
21.	Terminalia arjuna	Arjun	Tree
22.	Terminalia belerica	Baheda	Tree
23.	Butea superb	Tesu	Tree
24.	Cassuarina sp.	Cassuarina	Tree
25.	Bahunia acuminate	White orchid green	Tree
26.	Swetania mohogini	Cuban Mahagony	Tree
27.	Azadiracta indica	Neem	Tree
28.	Artocarpus integrifolia	Jackfruit	Tree
29.	Gmelina arborea	Gamhar	Tree
30.	Putranjiba roxburghii	Putranjiba	Tree

1.3 Plantation Methodology

Components of green belts on roadside fence should be both absorbers of gases as well as of dust particles, including even lead particulates. Thus the choice of plants should include pollution tolerant shrubs of height 1 to 1.5 m and trees of 3 to 5m. The intermixing of trees and shrubs should be such that the foliage area density in vertical is almost uniform. For effective removal of pollutants, it is necessary that (i) plants should grow under conditions of adequate nutrient supply, (ii) absence of water stress and (iii) plants are well exposed to atmospheric conditions (light & breeze).

Multiple rows of green belt shall be developed. Green belt should be pyramidal in shape.

Plantation pattern shall be kept as given below:

- Short trees and tall shrubs shall be planted as first row (from road) followed by tall tree plantation which will be followed by another row of medium and small trees and tall shrubs.
- Planting of trees should be in appropriate encircling rows, each rows alternating the previous one to prevent further fanning and horizontal pollution dispersion;
- Since tree trunks are normally devoid of foliage, it would be appropriate to have small shrubs in front and in between the tree spaces;

- The open areas between the process installations where trees cannot be planted should be covered with lawn grasses for effective trapping and absorptions of air pollutants.
- Fast growing trees with thick canopy and perennial foliage should be selected so that the effective tree height with envisaged objective will be attained in minimum span of time

1.4 Plantation Pattern

A standard horticultural practice involving planting of saplings in pits of substantial dimensions i.e., 1m × 1m × 1m for big trees and along half of these dimensions for smaller trees and shrubs. The pits are then filled with earth, sand, silt and manure in pre-determined proportions. Saplings planted in such pits are watered liberally during dry months.

1.5 Time of Plantation

Plantation of the tree sapling should be done only after the first shower during the rainy season. The best time for plantation is after 15 days from the day of first shower during rainy season.

1.6 Protection of Tree saplings

Circular tree guard should be placed after the plantation of the saplings for the protection of these young plants from the ravages of cattle, sheep and goat and other animals. If tree saplings died or damage occur after placing the circular tree guard, timely replacements of damaged plant and thereafter care is important.

1.7 After Care & Monitoring

The growing plants are cared at least for the first two years under favourable conditions of climate and irrigation. Nutrients in pits are supplemented and the juveniles provided protection.

Thinning shall start after the stand is 3-4 years old and repeated every 4 years until the stand is 15 years old. Between 15-25 years old, thinning should be conducted every 5 years and after 25 years old, thinning shall be done after every 10 years. When the canopy closes, at about 6 years, 30-40% of the stems shall be thinned to selectively remove suppressed, diseased and badly formed trees.

Periodic assessment shall be carried for survivability of the trees. Minimum 70% survival rate shall be achieved.

1.8 Records Keeping & Reporting

The following records shall be maintained:

1. Record of Tree plantation
2. Record of Survivability rate

Inspection shall be carried out at site to know the survival rate of the plantation. The tree plantation and survivability report shall be prepared every six monthly.

1.9 Responsibility

Compensatory plantation shall be carried out by forest department. Survival rate of plantation shall be inspected of the by IWAI. Plantation within the terminal/jetty/lock site shall be carried out by IWAI and shall be monitored by IWAI.

Annexure 1.2: Occupational Health & Safety Management Plan

1.0 Introduction

Many emergencies can occur on any construction site and need to be effectively handled. The environmental and occupational health and safety aspects and related emergency can include incidence such as Collapse / subsidence of soil / Fire / Explosion / Gas Leak, Collapse of Building / Equipment and other Occupational Accidents. On site and off site emergency management plan shall be developed to effectively handle them.

Thus every contractor shall have an approved on-site emergency plan. The contractor should submit a copy of this plan to PIU and Supervision consultant before the start of the work. Contractor shall develop the onsite emergency plan considering the potential environmental, occupational health and safety emergency situation at site and activities involved. This plan shall include a list of these potential emergency situations in the onsite emergency preparedness & response plan. Contractor shall get the plan approved from IWAI/PMC

1.1. Anticipated Emergencies at Construction Site

The potential emergency situations have been defined below for guidance purposes. The contractors can follow these for developing site specific on site emergency preparedness plan.

Emergency conditions / situations	Sources
Collapse / subsidence of soil	▪ Civil structures
Bulk spillage	▪ Hazardous substance / inflammable liquid storage ▪ Vehicular movement on highway
Fire and explosion	▪ Inflammable Storage Areas ▪ Gas Cylinder Storage Areas ▪ Electrical Circuits ▪ Isolated Gas Cylinders (LPG / DA) ▪ Welding / Gas Cutting Activity
Electrical Shock	▪ HT line ▪ LT distribution ▪ Electrically Operated Machines / Equipment / Hand Tools / Electrical Cables
Gaseous Leakage	▪ Gas Cylinder Storage Areas ▪ Gas Cylinder used in Gas Cutting / Welding Purposes

Emergency conditions / situations	Sources
Accidents due to Vehicles	▪ Heavy Earth Moving Machinery ▪ Cranes ▪ Fork Lifts ▪ Trucks ▪ Workman Transport Vehicles (cars / scooters / motor cycles / cycles) ▪ Collapse, toppling or collision of transport equipment
Slips & Falls (Man & Material)	▪ Work at Height (Roof Work, Steel Erection, Scaffold, Repair & Maintenance, Erection of equipment, Excavation etc.) ▪ Slips (Watery surfaces due to rain) ▪ Lifting tools & Tackles (Electric Hoist & Forklifts)
Collision with stationary/ moving objects	▪ Vehicular movement
Other Hazards	▪ Cuts &Wounds ▪ Confined Space (under & inside machinery etc.) ▪ Hot Burns ▪ Pressure Impacts (Plant contains several Pressure Vessels & pipefitting containing CO_2, air, water, product & steam, which can cause accidents & injuries to person around.)

1.2. Design of 'On-Site Emergency Plan'

The 'On-site emergency plan' to be prepared by contractor and shall include minimum the following information:

- Name & Address of Contractor
- Updation sheet
- Project Location
- Name, Designation & Contact Numbers of the organization, nearby hospitals, fire agencies etc. and key personnel including their assigned responsibilities in case of an emergency.
- The roles and responsibilities of executing personnel
- Site Layout Diagram showing location of fire extinguishers, emergency collection area and fire alarm
- Identification of Potential Emergencies Situations/ preventive measures / control & response measures
- Location of Emergency Control Centre (or designated area for emergency control / coordination) with requisite facilities.
- Medical services / first aid
- List of emergency equipment including fire extinguishers, fire suits etc.

1.3. Emergency Control Centre

The emergency control centre shall be equipped with following facilities

- Copy of current on-site emergency plan
- Display of the name of site emergency controller
- Two numbers of artificial respiratory sets
- Two numbers of Stretchers
- Vehicle for 24 hours (for large construction sites)
- Inter personnel/section telephone (2 numbers)
- Site layout diagram with entry and exit routes / Assembly points
- Directory of internal / external emergency phone Numbers
- A set of fire extinguishers (DCP type / Foam Type / CO2)
- List of fire extinguishers installed in the construction site including maintenance record
- A set of personal protective equipment (PPE)
- Two numbers of first-aid boxes with prescribed first-aid medicines
- List of competent first-aiders
- List of fire trained personnel
- Two numbers of blankets
- Drinking water
- Two numbers of rescue ropes
- Two numbers of high beam torches
- Two numbers of gas leak detectors
- Life boat & jackets (if working in or near water course)

1.4. Records

The following records shall be maintained:

1. Record of emergency preparedness plan with emergency contact numbers
2. Mock drill/emergency preparedness exercise records
3. Corrective preventive action record after emergency is occurred

1.5. Reporting

The accident and incident records and emergency preparedness drill reports shall form part of quarterly report to EA

1.6. Responsibility

Contractor shall be responsible to handle emergency condition and shall be liable to compensate the damage against accident, if any occurs at site.

Annexure 1.3: Construction Debris Management Plan

INTRODUCTION

Waste will be generated from the construction site and labour camps during the construction phase. Type of the waste to be generated during construction phase is given below.

Excavated Soil

Site is undulating and thus will require cut & fill for levelling. Finished level of the soil will be 37 m. Top excavated soil of 15 cm shall be stripped and shall be stored separately under covered sheds. This soil shall be used for green belt plantation.

Lower layers of excavated soil shall be re-used within the site for flling purpose, construction of approach & internal roads & railway link. If any extra soil is remained, then that should be disposed of to the approved debris disposal site

Dredged Material

Dredging shall be carried out in the river for construction of off-shore structures like jetty & berths (pilling) and navigation channels. Dredged soil shall not be disposed along the river bank as they are sensitive habitat for various aquatic species and provide as the spawning and breeding grounds also. Dredged material shall be tested for its quality. If non-toxic then should be disposed at disposal site but if toxic & contains heavy metals, then it should be disposed to TSDF site.

Construction Waste

Construction waste will comprise of broken bricks, dry cement, discarded timber, metal piece, cement bag, dry asphalt/bitumen, glass, paint/varnishes box etc. These wastes should be segregated into recyclable and non-recyclable waste. Recyclable waste shall be stored in the covered area and shall be sold to authorized vendors regularly. Non-recyclable waste shall be disposed at approved debris site in covered vehicles.

Municipal Waste

Municipal waste will be generated from labour camp. Dustbins for recyclable and non-recyclable waste shall be provided in labour camp area. Recyclable waste shall be sold to authorized vendors and non-recyclable shall be disposed through authorized agency in area responsible for waste collection and management.

Waste generated requires proper management so as to minimize the negative impacts on environment. Concept of reduce, re-use and recycle shall be followed at site. The rejected waste should be disposed in a secured manner. Thus a site should be identified for disposal of the rejected waste.

1.1 SELECTION OF DISPOSAL SITES:

The locations of Disposal sites have to be selected such that:

- Disposal sites are located at least 1000 m away from sensitive locations like settlements, water body, notified forest areas, wildlife/bird/dolphin sanctuaries or any other sensitive locations.
- Disposal sites shall not contaminate any water sources, rivers etc so the site should be located away from water body and disposal site should be lined properly to prevent infiltration of water.
- Public perception about the location of debris disposal site has to be obtained before finalizing the location.
- Permission from the village/local community is to be obtained for the Disposal site selected.
- Environment Engineer of PMC and Executive Engineer of Contract Management Unit must approve the Plan before commencement of work.

1.2 PRECAUTIONS TO BE ADOPTED DURING DISPOSAL OF DEBRIS / WASTE MATERIAL

The Contractor shall take the following precautions while disposing off the waste material.

- During the site clearance and disposal of debris, the Contractor will take full care to ensure that public or private properties are not affected, there is no dwellings around the dumpsite and that the traffic is not interrupted.
- The Contractor will dispose debris only to the identified places or at other places only with prior permission of Engineer-in-Charge of works.
- In the event of any spoil or debris from the sites being deposited on any adjacent land, the Contractor will immediately remove all such spoil debris and restore the affected area to its original state to the satisfaction of the Engineer-in-Charge of works.
- The Contractor will at all times ensure that the entire existing canal and drains within and adjacent to the site are kept safe and free from any debris.
- Contractor will utilize effective water sprays during the delivery and handling of materials when dust is likely to be created and to dampen stored materials during dry and windy weather.
- Materials having the potential to produce dust will not the loaded to a level higher than the side and tail boards and will be covered with a tarpaulin in good condition.
- Any diversion required for traffic during disposal of debris shall be provided with traffic control signals and barriers after the discussion with local people and with the permission of Engineer-in-Charge of works.
- During the debris disposal, Contractor will take care of surrounding features and avoid any damage to it. The debris should not be disposed along the bridges & culverts and near the water bodies.
- While disposing debris / waste material, the Contractor will take into account the wind direction and location of settlements to ensure against any dust problems.
- Contractor should display the board at disposal site stating the name of project, usage of the site and type of debris being disposed.
- A guard shall be kept at disposal site to prevent any unauthorized disposal of waste at the debris disposal site
- Material should be disposed through covered vehicles only

- No contaminated/hazardous/e-waste shall be disposed at the debris disposal site

1.3 RECORD KEEPING

Site approved by site engineer only can be used as disposal site. Record of all such site should be maintained along with the area of disposal site, type & quantity of material disposed daily and capacity of disposal site.

1.4 GUIDELINES FOR REHABILITATION OF DISPOSAL SITES

The dumpsites filled only up to the ground level could be rehabilitated as per guidelines below and to be decided by the Engineer and the supervision consultant.

- The dumpsites have to be suitably rehabilitated by planting local species of shrubs and other plants. Local species of trees has also to be planted so that the landscape is coherent and is in harmony with its various components.
- In cases where a dumpsite is near to the local village community settlements, it could be converted into a play field by spreading the dump material evenly on the ground. Such playground could be made coherent with the landscape by planting trees all along the periphery of the playground.
- Closure of the disposal site should be upto the satisfactory level of site engineer

1.5 PENALTIES

Stringent action & penalties should be imposed off on contractor for dumping of materials in locations other than the pre-identified locations. Grievance Redressal mechanism should be in place for taking note and action on such complaints.

Annexure 1.4: Construction and Labour Camp Management Plan

1.0 Objective of the Plan

The objective of this plan is to provide guidance to the contractor or other agency involved in setting up of the construction and labour camp for keeping the health & Safety of workers and impacts of setting up such camps on the local community in consideration while developing and establishing such camp. This plan is prepared in reference to the Workers accommodation: processes and standards (A guidance note by IFC and EBRD). The plan aims to promote "safe and healthy working conditions, and to protect and promote the health of workers."

2.0 Selection and layout of construction camp

Labour camps, plant sites and debris disposal site shall not be located close to habitations, schools, hospitals, religious places and other community places. A minimum distance of 500 m shall be maintained from the habitations, sensitive locations like temple, school & hospitals, forest areas and other eco-sensitive zones for setting up such facilities.

3.1 Facilities at workers' camps

During the construction stage of the project, the construction contractor will construct and maintain necessary (temporary) living accommodation, rest area and ancillary facilities for labour. Facilities required are listed and elaborated below.

- Site barricading
- Clean Water Facility
- Clean kitchen area with provision of clean fuel like LPG
- Clean Living Facilities for Workers
- Sanitation Facilities
- Waste Management Facilities
- Rest area for workers at construction site
- Adequate Illumination & ventilation
- Safe access road is required at camps
- Health Care Facilities
- Crèche Facility & Play School
- Fire-fighting Facility
- Emergency Response Area

3.2 Attendance& Working hours

Supervisor of the camp should take the attendance of the employee at each camp twice in a day (morning and evening) and should maintain the record. Further work hours of the workers should be maintained in accordance to the labour law and as mentioned in the labour licence. All workers should be provided with ID card and entry to the site should be through ID card only and should be ensured by security guard.

3.3 Site Barricading

Site should be completely barricaded from all the sides to prevent entry of outsiders and animals into the site. Entry gate should be provided at the site and labour camp which should be guarded by security guard. All workers should be issued ID cards and entry of outsiders shall be maintained in the register at the gate. Board should be displayed at the site and the labour camp, the name of project, capacity of project, authority carrying our projects, restriction of entry without authorization, no smoking zone and associated risks. Plant operation shall be restricted to 6:00 Am to 10:00 PM

3.4 Clean Water Facility

Potable water shall be provided for construction labour for drinking & cooking purpose. Clean water shall be provided for bathing, cleaning and washing purpose. Water quality testing for drinking water provided for workers shall be carried out on monthly basis. Water dispensers should be cleaned on monthly basis. Adequate water per person should be provided at site for drinking, cooking, barhing, cleaning and other use purpose

3.5 Clean Kitchen Area

Provision of clean kitchen area for cooking and storage of eatables shall be provided. Clean fuels like LPG shall be provided for cooking purpose. Burning of firewood, garbage, paper and any other material for cooking or any other purpose shall strictly be prohibited at the site. Separate utensil washing area should be provided with proper drainage system. Kitchen waste should be daily cleaned and disposed off. Water storage facility at kitchen should be covered and cleaned on monthly basis. Kitchen area should be away from washing, toilets and bathing area.

Wall surfaces adjacent to cooking areas are made of fire-resistant materials. Food preparation tables are also equipped with a smooth durable washable surface. Lastly, in order to enable easy cleaning, it is good practice that stoves are not sealed against a wall, benches and fixtures are not built into the floor, and all cupboards and other fixtures and all walls and ceilings have a smooth durable washable surface.

3.6 Clean Living Facility for the Workers

Workers should be provided with proper bedding facility. Single bed should be provided to each workers and each bed should be at least 1 m apart from another. Double deck bedding should be avoided, in case provided, adequate fire-fighting facility should be provided. Bed linen should be washed regularly and should be applied with repellent and disinfectants so as to manage the diseases caused due to pests. Facilities for storage of personal belongings for workers should be provided in form of locker, shelf or cupboard. A separate storage area for the tools, boots, PPE should be provided. Proper ventilation through mechanical systems and lighting system should be ensured in construction camps.

3.7 Sanitation Facilities

Construction camps shall be provided with sanitary latrines and urinals. Toilets provided should have running water availability all the time. Bathing, washing & cleaning areas shall be provided at the site for construction labour. Washing and bathing places shall be kept in clean and drained condition. Adequate nos. of bathing & toilet facility should be provided at site and should not exceed 1 unit per 15 person. Toilets and bathing

facility should be closed to the camps. Workers shall be hired especially for cleaning of the toilets and bathing area. Septic tanks and soak pits shall be provided at site for disposal of the sewage generated. The toilets should be cleaned on daily basis. These tanks should be evacuated through authorized vendors if filled and at the time of closure. Pest management should be carried out at the camps if the area is infected by any pests. Adequate lighting should be ensured in camp area especially during night time. The area should be guarded by security guard to minimize the crime and thefts.

3.8 Waste Management Facilities

Waste generated should be segregated at the site by providing the different colour bins for recyclable and non-recyclable waste. Recyclable waste shall be sold to authorized vendors and non-recyclable shall be handed over to authority responsible in area for waste management. Waste management for construction site shall be as per waste management plan proposed in EMP. Waste management area should be cleaned on regular basis to avoid germination of flies, mosquitoes, rodents and other pests.

3.9 Rest Area for Workers at Site

A rest area/shelter shall be provided at the site for construction workers where they can rest after lunch time and shall not lay down at site anywhere. The height of shelter shall not less than 3m from floor level to lowest part of the roof. Sheds shall be kept clean and the space provided shall be on the basis of at least 1.0 Sq. m per head.

3.10 Adequate Illumination & Ventilation

Construction worker camps shall be electrified and adequately illuminated. Illumination level shall be maintained after 5.30 P.M. at the site to minimum 200 lux. Labour camps shall be adequately ventilated. Fans shall be provided for ventilation purpose.

3.11 Safe Access Road for Labour Camps

Temporary paved surface shall be constructed to approach the labour camp from the site. Movement shall not be hampered during monsoon season due to water logging and muddiness.

3.12 Health care Facilities:

First aid box, first aid room and personnel trained in first aid (certified first-aider) shall be available at labour camp and site all the time (24X7). Equipment in first-aid box shall be maintained as pet State Factory's Law. Ambulance/ 4 wheeler motorized vehicle shall be available at the site for carrying injured to the nearby hospital. Tie-ups should be made with nearby hospital to handle emergency, if any. Nos. of ambulance, doctors and nearby hospital s hall be displayed in first-aid room, site office & labour camps. List of contact nos. of emergency personnel, hospitals, fire brigade and other emergency contact should be displayed at camp site, guard's room and first aid room. Workers shall be made aware about the causes, symptoms and prevention from HIV/AIDS through posters and awareness programs. Workers shall have access to adequate preventive measures such as contraception (condoms in particular) and mosquito nets.

3.13 Crèche Facility & Play School

Crèche facility and play school should be constructed at the site temporarily so as children of construction labour can be kept there. Care takers should be hired for taking care of children. Attendance records of children shall be maintained. Children should not be allowed to enter active work areas.

3.14 Fire-Fighting facilities

Fire-fighting facility such as sand filled buckets and potable fire-extinguishers shall be provided at labour camps and at site. Fire-extinguishers shall be provided as per NBC norms. Personnel trained in handling fire-fighting equipment should be available at the site. Fire evacuation plan should be displayed at the site and should be communicated to all the workers and other staff at camp site.

3.15 Emergency Assembly Area

Area shall be demarcated as emergency collection area near the gate where all the workers shall be guided to collect in case of any emergency like fire, flood and earthquake.

4.1 Activities prohibited at site

Activities which should be strictly prohibited at site shall include

- Open burning of wood, garbage and any other material at sit for cooking or any other purpose
- Disturbance to the local community.
- Adoption of any unfair means or getting indulgence in any criminal activity
- Non-compliance of the safety guidelines as communicated be safety officials and during the trainings
- Adoption and proper usage of PPEs all the time as required
- Operation of the plant and machinery between 10 pm to 6 am unless approved by team leader
- No animal (wild or domestic or bird) shall be harmed by any construction worker in any condition at site and nearby areas
- Cutting of tree without permission of team leader/authorized person
- No indigenous population shall be hurt or teased

5.0 Guidelines for night time working at the site.

No activity generating noise shall be carried out at the site after 10:00 PM. Night working protocol should be followed (if required) as per guidelines prepared by IWAI. Site should be well illuminated to maintain minimum illumination level of 200 lux. Personnel working shall obtain permit to work from the team leader prior carrying out any work in night time and the record of such working shall be maintained in register. Any accidents, if occurs at site during night time working shall be immediately reported and recorded. Penalty shall be imposed on the contractor for the accident. Analysis shall be carried out to find the reason for such accidents for future learning.

6.0 Record keeping & Maintenance

Record of entry/exit of the people in the construction site and labour camp area shall be maintained in register at gate. Record of material coming in and going out from site also shall be maintained.

7.0 Auditing & Inspection

Conditions of labour camp and site shall be inspected and audit report shall be submitted to IWAI on monthly basis.

8.0 Grievance readressal System

CA complaint register and a complaint box should be provided at the site so any person from local community can register their complaint, if any due o the camp, workers and other facilities. The system shall be communicated to local communities through consultations. Open house meetings should be conducted with workers on monthly basis to identify their problems and issues if any related p health, hygiene, safety, comfort and other issues.

9.0 Security System

Site should be barricaded and should be guarded by security guards at all the gates. Security guards should allow only authorized personnel to the campsite. Guards should be available during both morning and night time. Guard should allow entry of workers to the site only be seeing the ID cards. Guard should report if any unusual or unfair practise happening at site and nearby area. Guards should be trained to handle emergency situations like fire-fighting and should be responsible to contact the emergency personnel in case of any emergency.

10.1 Closure of the Construction Site and Construction labour Camps

Construction site and labour camps shall be restored back to the original site conditions. Following measures are required to be taken during closure

1. Septic tanks/soak pits should be dismantled
2. Any temporary/permanent structure constructed shall be dismantled
3. Construction/demolition waste, hazardous waste and municipal waste at site and labour camp site shall be disposed as per waste management plan in EMP
4. The site shall be cleaned properly
5. Tree plantation to be carried out, if any required for stabilizing the area
6. Any pit excavated shall be filled back
7. Closure of the site and labour camp shall be approved by authorized person.

Annexure 1.5: Borrow Area Management Plans

1.1 Introduction

Borrow areas will be finalized as identified by Contractor as agreed by the PMC and IWAI as per the requirements of the contract. Environment clearance under EIA Notification, 2006 from competent authority and NOC from state pollution control board under Air Act, 1981 as applicable shall be obtained by contractor prior excavation. Consent from land owners and DC of the area shall also be taken prior undertaking any excavation. The Contractor in addition to the established practices, rules and regulation will also consider following criteria before finalizing the locations. Contractor should submit borrow area establishment plan along with the locations marked in map and the environmental settings of the planned area to PMC/IWAI for approval of the "Engineer" through RFI.

1) The borrow area should not be located in agriculture field unless unavoidable i.e. barren land is not available.
2) The borrow pits should not be located along the roads, close to project site
3) The loss of productive and agricultural land should be minimum.
4) The loss of vegetation is almost nil or minimum.
5) Sufficient quality of soil is available.
6) The Contractor will ensure the availability of suitable earth.

The Contractor shall obtain representative samples from each of the identified borrow areas and have these tested at the site laboratory following a testing programme as approved by the concerned Engineer. It shall be ensured that the fill material compacted to the required density. The Contractor shall submit the following information to the Engineer for approval at least 7 working days before commencement of compaction.

- The values of maximum dry density and optimum moisture content obtained in accordance with ARE: 2720 (Part 7) or (Part 8), as the case may be, appropriate for each of the fill materials he intends to use.
- A graph of density plotted against content from which, each of the values in (i) above of maximum dry density and optimum moisture content are determined.
  After identification of borrow areas based on guidelines and full filling the following requirements are to be fulfilled
- Quantification of Earth
- Land Agreement
- Clearance from local authorities
- Environmental Clearances from SEIAA should be obtained. All EC conditions are to be followed by contractor and contractor should submit EC to IWAI/PMC/PMU

After receiving the approval Contractor will begin operations keeping in mind following:

- Haulage of material to the areas of fill shall proceed only when sufficient spreading and compaction plants are operating at the place of deposition.
- No excavated acceptable material other than surplus to requirements of the Contract shall be removed from the site. Contractor should be permitted to remove acceptable material from the site to suit his operational procedure, then be shall make good any consequent deficit of material arising there from.
- Where the excavation reveals a combination of acceptable and un-acceptable materials, the Contractor shall, unless otherwise agreed by the Engineer, carryout the excavation in such a manner that the acceptable materials are excavated separately for use in the permanent works without contamination by the un-acceptable materials. The acceptable material shall be stockpiled separately.
- The Contractor shall ensure that he does not adversely affect the stability of excavation or fills by the methods of stockpiling materials, use of plants or siting of temporary buildings or structures.

1.2 Borrow Area Management

Borrow areas located in different land will require different management. Management measures to be taken in different land types are given below.

1.1.1 Borrow Areas located in Agricultural Lands

- The preservation of topsoil will be carried out in stockpile.
- A 15 cm topsoil will be stripped off from the borrow pit and this will be stored in stockpiles in a designated area for height not exceeding 2m and side slopes not steeper than 1:2 (Vertical: Horizontal).
- Borrowing of earth will be carried out up to a depth of 1.5m from the existing ground level.
- Borrowing of earth will not be done continuously throughout the stretch.
- Ridges of not less than 8m widths will be left at intervals not exceeding 300m.
- Small drains will be cut through the ridges, if necessary, to facilitate drainage.
- The slope of the edges will be maintained not steeper then 1:4 (Vertical: Horizontal).

1.1.2 Borrow Areas located in Agriculture Land in un-avoidable Circumstances:

- The preservation of topsoil will be carried out in stockpile.
- A 15 cm topsoil will be stripped off from the borrow pit and this will be stored in stockpiles in a designated area for height not exceeding 2m and side slopes not steeper than 1:2 (Vertical: Horizontal).
- The depth of borrow pits will not be more than 30 cm after stripping the 15 cm topsoil aside.

1.1.3 Borrow Areas located on Elevated Lands

- The preservation of topsoil will be carried out in stockpile

- A 15 cm topsoil will be stripped off from the borrow pit and this will be stored in stockpiles in a designated area for height not exceeding 2m and side slopes not steeper than 1:2 (Vertical: Horizontal).
- At location where private owners desire their fields to be levelled, the borrowing shall be done to a depth of not more than 1.5m or up to the level of surrounding fields.

1.1.4 Borrow Areas near Riverside

- The preservation of topsoil will be carried out in stockpile
- A 15 cm topsoil will be stripped off from the borrow pit and this will be stored in stockpiles in a designated area for height not exceeding 2m and side slopes not steeper than 1:2 (Vertical: Horizontal).
- Borrow area near to any surface water body will be at least at a distance of 15m from the toe of the bank or high flood level, whichever is more.

1.1.5 Borrow Areas near Settlements

- The preservation of topsoil will be carried out in stockpile
- A 15 cm topsoil will be stripped off from the borrow pit and this will be stored in stockpiles in a designated area for height not exceeding 2m and side slopes not steeper than 1:2 (Vertical: Horizontal).
- Borrow pit location will be located at least 0.75 km from villages and settlements. If un-avoidable, the pit will not be dug for more than 30 cm and drains will be cut to facilitate drainage.
- Borrow pits located in such location will be re-developed immediately after borrowing is completed. If spoils are dumped, that will be covered with layers of stockpiled topsoil in accordance with compliance requirements with respect MOEF&CC/CPCB guidelines.

1.1.6 Borrow Pits along the Roads

- The preservation of topsoil will be carried out in stockpile
- A 15 cm topsoil will be stripped off from the borrow pit and this will be stored in stockpiles in a designated area for height not exceeding 2m and side slopes not steeper than 1:2 (Vertical: Horizontal).
- Borrow pits along the road shall be discouraged.
- If permitted by the Engineer; these shall not be dug continuously.
- Ridges of not less than 8m widths should be left at intervals not exceeding 300m.
- Small drains shall be cut through the ridges of facilitate drainage.
- The depth of the pits shall be so regulated that its bottom does not cut an imaginary line having a slope of 1 vertical to 4 horizontal projected from the edge of the final section of bank, the maximum depth of any case being limited to 1.5m.
- Also, no pit shall be dug within the offset width from the toe of the embankment required as per the consideration of stability with a minimum width of 10m.

- Minimum distance from road/ railway should be 50 metres.

1.1.7 Re-development of Borrow Areas

The objective of the rehabilitation programme is to return the borrow pit sites to a safe and secure area, which the general public should be able to safely enter and enjoy. Securing borrow pits in a stable condition is fundamental requirement of the rehabilitation process. This could be achieved by filling the borrow pit approximately to the road level.

Re-development plan will be prepared by the Contractor before the start of work in line with the owner's will and to the satisfaction of owner.

The Borrow Areas will be rehabilitated as follows

- Borrow pits will be backfilled with rejected construction wastes (unserviceable materials) compacted and will be given a turfing or vegetative cover on the surface. If this is not possible, then excavation slope should be smoothened and depression is filled in such a way that it looks more or less like the original ground surface.
- Borrow areas might be used for aquaculture in case landowner wants such development. In that case, such borrow area will be photographed after their post-use restoration and Environment Expert of Supervision Consultant will certify the post-use redevelopment.
- The Contractor will keep record of photographs of various stages i.e. before using materials form the location (pre-project), for the period borrowing activities (Construction Phase) and after rehabilitation (post development), to ascertain the pre and post borrowing status of the area.

38. Annexure XVI: Detailed Project Report

INLAND WATERWAYS AUTHORITY OF INDIA

(Ministry of Shipping, Government of India)

Detailed Feasibility Study for Capacity Augmentation of National Waterway-1 and Detailed Engineering for its Ancillary Works and Processes between Ghazipur to Allahabad (Jal Marg Vikas Project)

Detailed Project Report
Varanasi Multimodal Terminal

January 2018

HOWE ENGINEERING PROJECTS (INDIA) PVT. LTD.
(Successor-in-interest with respect to the Engineering Consultancy Business of Howe (India) Pvt. Ltd.

PMC PROJECTS (INDIA) PRIVATE LIMITED
from vision to reality...

In JV with

HR Wallingford
Working with water

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	INLAND WATERWAYS AUTHORITY OF INDIA (Ministry of Shipping, Government of India)
PROJECT:	Detailed Feasibility Study for Capacity Augmentation of National Waterway-1 and Detailed Engineering for its Ancillary Works and Processes between Ghazipur to Allahabad (Jal Marg Vikas Project)
TITLE:	**Detailed Project Report – Varanasi Terminal**
DOCUMENT NO.:	I-525/2017/DPR-VT/R-0

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EXECUTIVE SUMMARY

1 INTRODUCTION

Inland Waterways Authority of India (IWAI), an autonomous organization under Ministry of Shipping (MoS), Govt. of India was constituted for development and regulation of inland waterways of the country.

IWAI has appointed M/s Howe Engineering Projects (India) Pvt. Ltd. (HOWE) as Consultant for carrying out detailed feasibility study for capacity augmentation of NW-1 and detailed engineering for its ancillary works and processes between Haldia to Allahabad (Jal Marg Vikas Project). The present submission deals with the Detailed Project Report (DPR) of the proposed facilities for Multimodal Terminal (MMT) at Varanasi.

2 PROJECT LOCATION

The Site is located on the eastern side of Ganges at a distance of 9 km up stream of Malviya road cum Railway Bridge connecting Varanasi to Mughalsarai at Latitude 25°15'12.4" North and Longitude 83°01'50.3" East at Varanasi in Uttar Pradesh. Proposed IWT terminal at the bank of Ganga River in Ramnagar Municipal Board of Varanasi district which is south of Viswa Sundari Setu (NH-2) Viaduct is 650 meters from existing National Highway -7 and existing Airport at Babatpur lies at 30 Kms of aerial distance from the proposed site.

Figure 1-1: Location of Site for Varanasi Multimodal IWT Terminal

3 TRAFFIC POTENTIAL

The traffic potential of Varanasi MMT as provided by M/s Hamburg Port Consulting GmBH, the traffic consultant is presented below.

Table 1-1: Varanasi MMT - 2020 to 2045 cargo forecast by cargo type (tons)

Cargo	2020	2025	2035	2045
Bagged	1.40	1.50	3.31	3.37
Container	0.16	0.17	0.19	0.21
Dry Bulk	0.14	0.15	4.25	4.34
General Cargo	0.66	0.69	0.74	0.75
Neo-Bulk	1.13	1.23	1.27	1.29
Ro-Ro	0.05	0.05	0.35	0.36
Liquid Bulk	0.01	0.01	0.01	0.01
Total	3.55	3.82	10.12	10.32

Source: HPC report on Infrastructure requirement of individual terminals along National Waterways 1, 26th April 2016.

4 TARGETED TRAFFIC AND TERMINAL CAPACITY

Considering the restriction in the availability of water front, maximum of five berths can be developed. However, for Phase 1 development two berths are planned. Therefore, alternate layouts have been worked out based on various discussion held with IWAI, the following commodities has been considered as the targeted cargoes and the individual berth capacities for handling the targeted commodities have been worked out as described below:

4.1 Bagged and General Cargo

Bagged and General Cargo like food grains, vegetables, agricultural produce, jute, cloths, cement etc. will come to the terminal by barges and unloaded by MHC cranes into trucks and transported to the covered shed. Then it will be loaded to trucks and transported to the hinterland by trucks or rail.

4.2 Bulk Cargo

Natural aggregates like Sand, Stone Chips, Soil, consumer goods etc. will come to the terminal by barges and unloaded by MHC cranes into trucks hopper / mobile hopper and transported to the storage yard by conveying system / trucks. Then it will be loaded to trucks by pay loader and transported to the hinterland by trucks or rail.

4.3 Container

Containers will come to the terminal by barges and unloaded by MHC cranes into trucks and container yard. Then it will be loaded to trucks by reach stacker and transported to the hinterland by trucks or rail.

4.4 Berth Capacity

Following table shows the berth capacities considered for phase wise development:

Table 1-2: Phase wise Total Traffic

Commodity	Phase 1a		Phase 1b		Final Phase	
	No. of berths	Traffic in MTPA	No. of berths	Traffic in MTPA	No. of berths	Traffic in MTPA
Construction Material Bulk	2	0.21	2	0.31	5	1.53
Construction Material Bagged		0.21		0.31		1.53
Consumer goods Bulk		0.08		0.14		0.17
Containers		0.04		0.06		0.08
Food and food stuff Bagged		0.25		0.36		0.44
Project Cargo		0.06		0.08		0.10
Total	**2**	**0.84**	**2**	**1.26**	**5**	**3.85**

5 DESIGN VESSEL SIZE

The principal dimension of the design vessel considered to be handed at Varanasi multimodal terminal is mentioned below:

Table 1-3 : Design Vessel Size

Vessel Type	Vessel Size (DWT)	LOA (m)	Beam (m)	Loaded Draft (m)
Barge	3000 DWT	95	15	2.5
Barge	2,000 DWT	80	11	2.5
Barge	75 TEU	80	11	2.5

Though a range of vessels are mentioned in the table above can be handled at Varanasi Terminal, at present available maximum draft at the location is only 1.5m, accordingly the design shall be made.

The following water levels have been considered for planning of the terminal at the Site.

High Flood Level (HFL)	RL +73.90 M
Low Water Level (LWL)	RL +58.22 M

6 PHASE -1A LAYOUT OF VARANASI MMT

Figure 1-2: Varanasi MMT - Layout Plan of Terminal Facilities during Phase 1A Development

7 PHASE -1B LAYOUT OF VARANASI MMT

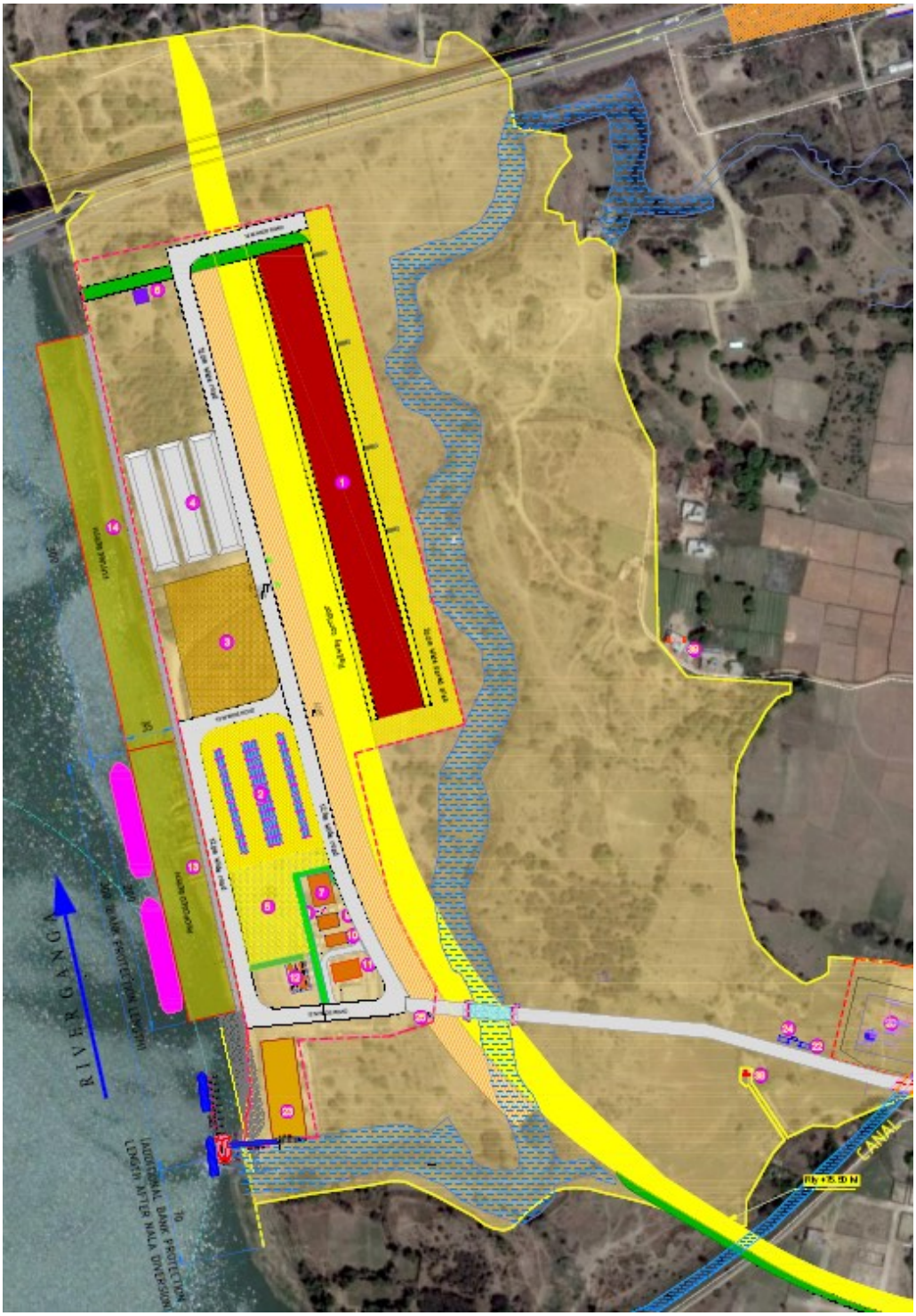

Figure 1-3: Varanasi MMT - Layout Plan of Terminal Facilities during Phase 1B Development

8 MASTER PLAN LAYOUT OF VARANASI MMT

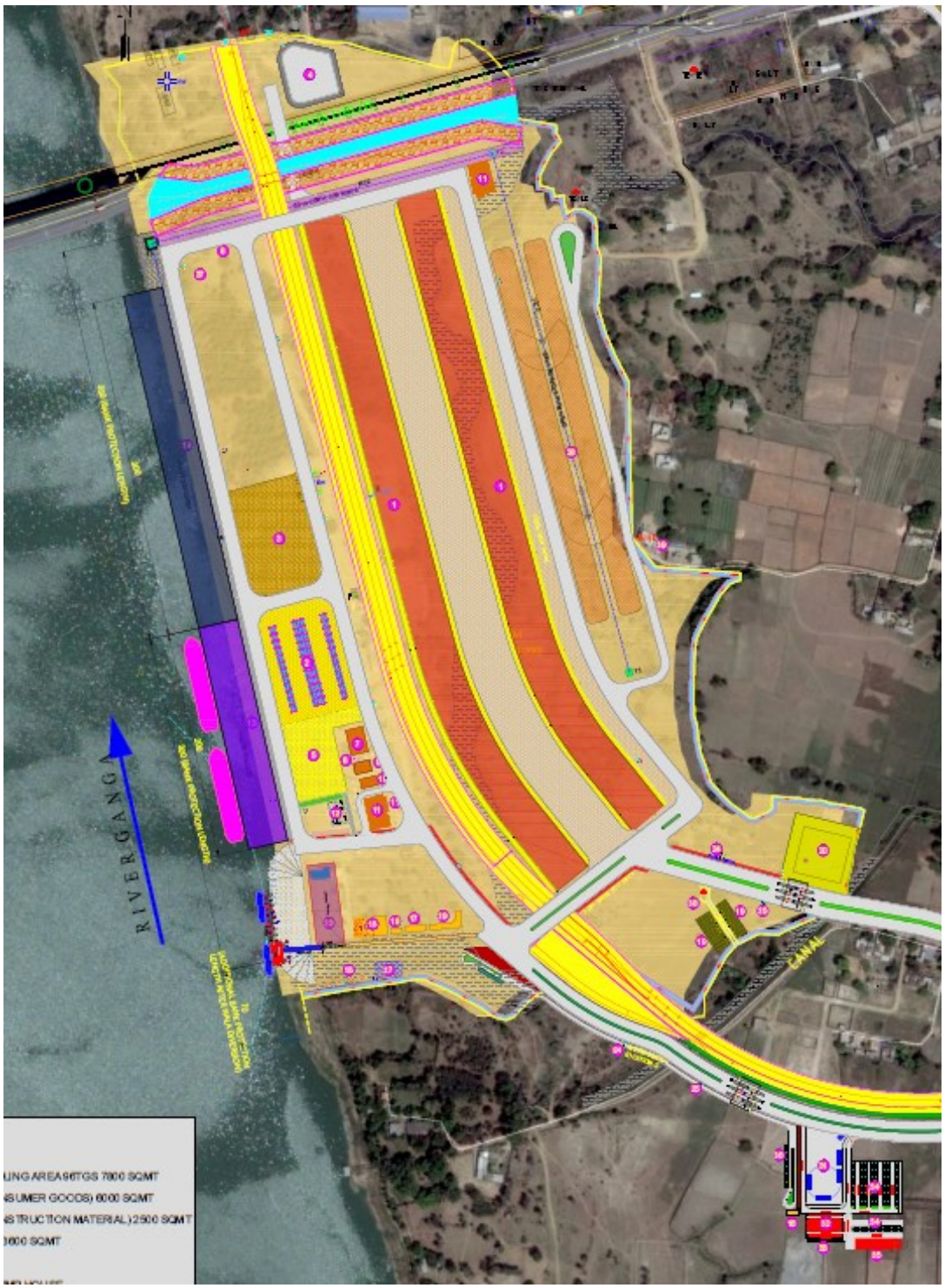

Figure 1-4: Varanasi MMT - Layout Plan of Terminal Facilities during Final Phase Development

9 DEVELOPMENT PLAN – MARINE FACILITIES

Considering IWAI's requirement, it is proposed to take up the proposed development in Phase-1 (1a & 1b) and Final Phase.

9.1 Berths

9.1.1 Phase 1A + 1B

It is proposed to develop berth 1 as multi-cargo berth for handling bagged food, consumer bulk cargo, project cargo and containers. The length of berth-1 is 200m and width is 35 m. The berth will be continuous with backup yard with a slope protection under the berth.

9.1.2 Final Phase

In final phase and additional berth is proposed to cater for the future traffic requirement. The dimension of the proposed additional berth is 300m length and 35m in width.

9.2 Manoeuvring Area & Approach Channel

The manoeuvring area for development of terminal comprises of approach channel, turning circle and berthing area. It is proposed that the barges will move in 45 m wide channel, with 2.2m LAD. To enable continuous operations of the terminal, the approach channel, turning circle and berth pockets will be dredged to 2.5m depth from LWL. The diameter of the turning circle is 190 m.

10 DEVELOPMENT PLAN – ONSHORE FACILITIES

10.1 Storage Areas

10.1.1 Phase 1A + 1B

It is proposed to have one number covered storage shed for storing bagged cargo. For storing the Bulk construction, consumer goods & project cargo open stockyard is proposed. Containers will be stored in open container yard.

10.1.2 Final Phase-(Master Plan)

It is proposed to have second covered storage shed for storing bagged cargo. For storing the Bulk construction, consumer goods & project cargo open stockyard along with Mechanised stockyard is proposed. Containers will be stored in open container yard.

10.2 Buildings

Buildings to be developed in Phase-1A

- Worker's amenity building & Septic tank and sock pit
- Electrical substation building - 1
- Pump Room

Buildings to be developed in Phase-1B

- Terminal administration building
- Security office, boundary wall and fencing
- Godown / storage Shed – 1 (Part-1)
- Water tank & Pump house
- Weigh bridge control room-1 (1 nos)

Buildings to be developed in Master Plan

- Electrical substation building – 2
- Godown / storage Shed – 1 (Part-2)
- Godown / storage Shed – 2
- Gate house (2 nos)
- Jal Yatri Niwas (Guest House)
- Banarasi Haat
- Shops/ Kiosks
- Canteen and Toilet Block
- Weigh bridge control room-1 (1 nos)
- Toilet block -(2 nos)

10.3 Onshore Utilities

Onshore facilities such as roads, drainage, sewerage, water supply, communication system will be developed in phase wise manner as shown in drawing.

10.4 Mechanical Equipment

The mechanical equipment proposed in phases are as follows:

Equipment except Mobile Harbour crane, Weigh Bridge & control cabin, conveying system, rail mounted stacker and Mobile hopper with feeder to be arranged by O&M contractor managing the terminal in working stage.

Table 8 Phase wise additional requirement of Mechanical Equipment

S. No.	Equipment	No. of Equipment	No. of Equipment	No. of Equipment
		Phase 1A	Phase 1B	Final Phase (Master Plan)
1.	Mobile Harbour Crane	2	2(Phase 1a) + 1	3(Phase 1a & 1b) +4
2.	Truck Loading Hopper	2	2(Phase 1a) + 0	-
3.	Front end loaders	1	1(Phase 1a) + 0	1(Phase 1a & 1b) +3
4.	Dumper Trucks	1	1(Phase 1a) + 0	1(Phase 1a & 1b) +0
5.	Reach stacker	2	2(Phase 1a) + 0	2(Phase 1a & 1b) +0
6.	Weigh Bridge & Control cabin	1	1(Phase 1a) + 0	1(Phase 1a & 1b) +1
7.	Flatbed Truck Trailers / Trucks	3	3(Phase 1a) + 2	5(Phase 1a & 1b) +7
8.	Conveying system (1000TPH)	-	-	1 Lot
9.	Mobile hopper with feeder	-	-	2
10.	Rail mounted stacker 1000 TPH (20m boom)	-	-	1

10.5 External Road Connectivity

A two lane road of 650m length is proposed in Phase-1A, which is proposed to be widened to four lane road in Master Plan. An additional four lane road is also proposed in Master Plan on the other side of the Railway track to provide better accessibility to the terminal.

10.6 Rail Connectivity

The terminal has a good connectivity with railway network too. The nearest railway station is Jeonathpur Railway Station, which is about 3.75 Kms by road. Mughal Sarai Junction and Varanasi Junction are about 14 kms and 17 kms by road respectively from the proposed site of the terminal. The site with respect to railway network is shown in below figure.

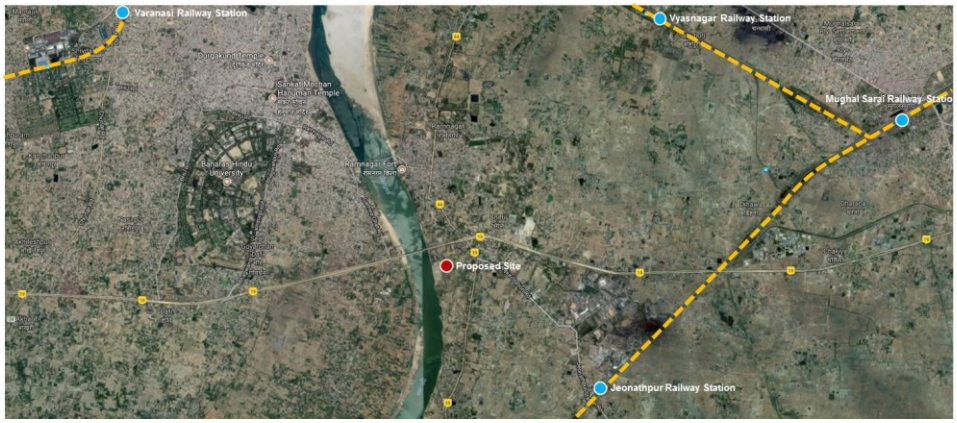

Figure 1-5 Rail connectivity for Varanasi Multimodal IWT Terminal

The layout shall allow the provision of rail line inside the terminal such that rail connectivity to the nearest rail head can be achieved suitably.

In order to transport the large quantities of bulk cargo through rail, it is proposed have rail connectivity with in their IWT premises, taking off from DFC (Eastern) corridor with proposed new Jeonathpur cabin and connectivity to IR at Jeonathpur station, Mughalsarai-Allahabad section in Allahabad division of north central railway. Length of rail connectivity line from take off from DFC near Jeonathpur to IWT terminal is 5.1Km and to R&D yard beyond the takeoff is 2km.

The proposed alignment crosses the through agricultural lands, irrigation canal, village roads some stretch of built up area and NH-7.

The total approximate capital cost for connectivity including civil engineering, signalling & Telecommunication, OHE and general electrical works are around 80.98 Cr. (Ref : Railway DPR).

10.7 Air Connectivity

The nearest airport is Lal Bahadur Shastri International Airport, Babatpur in Varanasi which is about 37 kms by road from the project site.

11 IMPLEMENTATION SCHEDULE

The time frame for implementation of Phase-1A is 24 months.

The time frame for implementation of Phase-1B is 16 months.

12 COST ESTIMATES

12.1 Capital Costs

The capital cost estimates for Phase-1A of the Terminal considering the base year rate is worked out to be Rs. 181 crores , Phase-1B of the Terminal considering the base year rate is worked out to be Rs. 87 crores & Final Phase of the Terminal considering the base year rate is worked out to be Rs. 406 crores. The above cost is excluding the cost paid for land acquisition and cost to be paid to the local authorities for obtaining electrical & water supply connection. The dredging cost for terminal and approach channel along with navigational aids is included in the overall cost of fairway development and therefore not included under this terminal cost.

12.2 Operation and Maintenance Costs

As the entire Operation and maintenance of Terminal will be outsourced to O&M operator, cost of O&M for IWAI will be nil.

13 FINANCIAL AND ECONOMIC ANALYSIS

13.1 Financial Analysis

Based on the capital cost and operating expenditure, the financial analysis has been carried out considering 30 years of operation. The financial IRR is worked out to be negative for (10% revenue share) Phase-1 development.

13.2 Economic Analysis

The economic analysis for Varanasi MMT is carried out considering various economic factors from the projects and the economic IRR is worked out as **23.70%** for Phase-1.

1 INTRODUCTION

1.1 Project Background

Inland Waterways Authority of India (IWAI), an autonomous organization under Ministry of Shipping (MoS), Govt. of India was constituted for development and regulation of inland waterways of the country.

Till an year ago, five waterways namely (i) the Ganga-Bhagirathi-Hugli river system from Haldia to Allahabad (1620 km), (ii) the Brahmaputra from Dhubri to Sadiya (891 km), (iii) West Coast canal from Kottapuram to Kollam along with Champakara and Udyogmandal canals (205 km), (iv) Kakinada-Pondicherry canals integrated with rivers Godavari and Krishna (1095 km) and (v) East Coast canals along with river Brahmani and Mahanadi (621 km), have been declared as National Waterway No. 1, 2, 3, 4 & 5 respectively. During 2016, the government of India have notified 106 more rivers as National Waterways. Thus, now there are 111 waterways.

In this connection, IWAI has appointed M/s Howe Engineering Projects (India) Pvt. Ltd. (HOWE) as Consultant for carrying out detailed feasibility study for capacity augmentation of NW-1 and detailed engineering for its ancillary works and processes between Haldia to Allahabad (Jal Marg Vikas Project).

The present submission deals with the Detailed Project Report (DPR) of the proposed facilities for Multimodal Terminal (MMT) at Varanasi.

1.2 Need of the Project

An efficient transport sector is vital for development of the economy of any country and to stimulate competitive business environment. Indian transport system comprises various modes, viz. Railways, Roadways, Inland Waterways, Coastal Shipping and Airways. The main modes of transport are rail and road which are overburdened and experiencing congestion.

India has large number of inland waterways consisting of rivers, canals, backwaters, creeks, and lakes etc. which have the potential for development of efficient waterways transport network. Inland Water Transport (IWT) is a fuel efficient, environment friendly and cost effective mode of transport having potential to supplement the overburdened rail and congested roads. Hence, it is proposed to develop inland water ways and terminals at certain locations for loading and unloading of cargo.

With the above background the development of a multimodal terminal at Varanasi has been initiated by IWAI.

1.3 Scope of Work

The broad scope of work for the project is to carry out a technical analysis together with Front-end Engineering and Design work, economic and financial analysis, procurement assessment, operation & management and monitoring & evaluation guideline.

The scope for preparation of the Detailed Project Report is as follows:

- Collection and review of the available data / reports.
- Undertake surveys to ensure adequacy and completeness of data and record details after physical verification, wherever necessary.
- Prepare detailed multimodal terminal layout plan, shore side infrastructure plan, bank protection work, land development plan along with design and structural drawings, specifications, cost estimates for all structures like berthing jetty, approach jetty, covered and open storage along with all allied structures / buildings / facilities like Administrative Buildings, Residential Accommodation, security office, customs enclosure, bunkering of fuel, water supply, electricity supply, firefighting including lighting, requirement of power, water supply, emergency and standby power supply, communication system, Drainage & Sewerage system, boundary wall, fencing, gates, internal roads, etc. Layout developed should permit expansion of terminals to cater to projected traffic beyond the assessed value for the projected time frame.
- Every estimate shall be duly supported by the justification of rates adopted / basis of rates adopted like CPWD rates / market rates / lowest offers / rates received etc.
- Preparation of realistic construction schedule for the ancillary structures indicating the sequence of activities duly considering the river characteristics in different seasons and priority and phasing of work along with phasing of expenditure.
- Preparation of specifications, bill of quantities, estimates and tender documents containing General condition of contract, special condition of contract, technical specification and NIT etc. to facilitate implementation of works after the finalization of Detailed Project Report.
- Work out cost benefit analysis, Financial Internal Rate of Return (FIRR) and Economic Internal Rate of Return (EIRR) of the project based on current Indian/International norms including SWOT analysis with detailed back up calculations, basis, assumption, justification etc. along with their source of information.

2 PROJECT SITE ENVIRONMENT

This chapter provides information on location, meteorological, hydrographical parameters, connectivity and existing features to have a complete understanding on the site conditions and to enable proper planning and design of terminal facilities.

2.1 Project Location

The Site is located on the eastern side of Ganges at a distance of 9 km up stream of Malviya road cum Railway Bridge connecting Varanasi to Mughalsarai at Latitude 25°15'12.4" North and Longitude 83°01'50.3" East at Varanasi in Uttar Pradesh. Proposed IWT terminal at the bank of Ganga River in Ramnagar Municipal Board of Varanasi district which is south of Viswa Sundari Setu (NH-2) Viaduct is 650 meters from existing National Highway -7 and existing Airport at Babatpur lies at 30 Kms of aerial distance from the proposed site.

The bye pass bridge is on NH2 which is also a part of the Delhi-Kolkata part of Golden Quadrilateral. The site will have connectivity from NH7 via proposed access road.

Location on Google image of the proposed terminal is shown in the figure below:

Figure 2-1 Location of Site for Varanasi Multimodal IWT Terminal

2.2 Land Availability

The multi-cargo Inland Water Transport (IWT) terminal is proposed in an area of about 81 acres (32 Ha). The land belongs to both govt and private parties and is under acquisition for the project. In the entire 32.0 ha, there are no houses or built structures.

2.3 Infrastructure at the Project Site

The infrastructure near the project site is as follows:

2.3.1 Road Connectivity

The terminal has a good connectivity with national highway network. The nearest national highway from the terminal is NH-7, which runs parallel to the river on the eastern side. Another national highway is NH-2 which connects Allahbad to Aurangabad through Varanasi. The site lies at the intersection of these two national highways. The terminal is about 650 m (proposed access road) from NH-7. Further to the east NH-2 connects the terminal to Buxar, Ballia, Chhapra, Sonepur and Patna. The site location with respect to National Highways is shown in below figure. The by-pass bridge is on NH2 which is also a part of the Delhi-Kolkata part of Golden Quadrilateral.

Figure 2-2 Road connectivity for Varanasi Multimodal IWT Terminal

2.3.2 Rail Connectivity

The terminal has a good connectivity with railway network too. The nearest railway station is Jeonathpur Railway Station, which is about 3.75 Kms by road. Mughal Sarai Junction and Varanasi Junction are about 14 kms and 17 kms by road respectively from the proposed site of the terminal. The site with respect to railway network is shown in below figure.

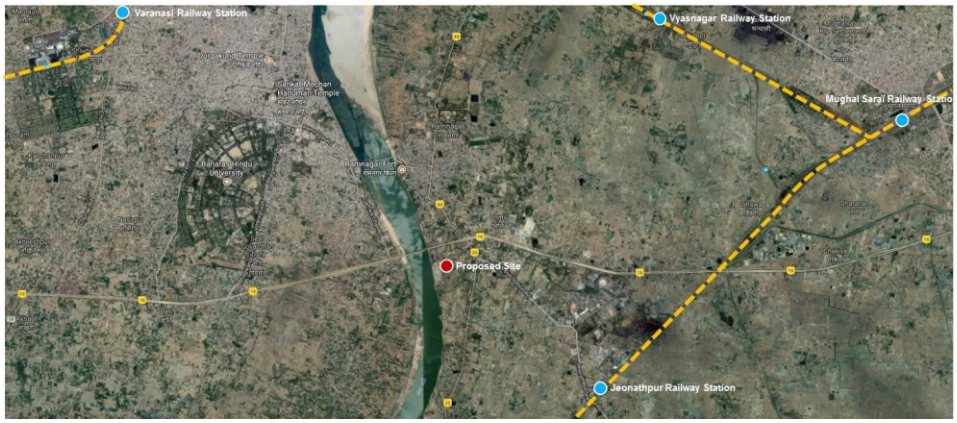

Figure 2-3 Rail connectivity for Varanasi Multimodal IWT Terminal

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The proposed alignment crosses the through agricultural lands, irrigation canal, village roads some stretch of built up area and NH-7.

The total approximate capital cost for connectivity including civil engineering, signalling & Telecommunication, OHE and general electrical works are around 80.98 Cr. (Ref : ARVEE Associate DPR).

2.3.3 Air Connectivity

The nearest airport is Lal Bahadur Shastri International Airport, Babatpur in Varanasi which is about 37 kms by road from the project site.

2.3.4 Nearest Towns

The nearest towns are Ramnagar and Varanasi which are in vicinity of the project site. The nearest village is Bhitti Village.

2.4 Meteorological Parameters

The meteorological data of the project site has been obtained from the Climatological Handbook of India, 1971 to 2000 published by Indian Meteorology Department. The nearest IMD observatory to project site was at the Sanskrit University. Surrounding area is plain with numerous trees in all directions. The river Ganga is to the southeast about 3 kms. away from the observatory and the river Baruna is to the north within 1 km. Wind instruments on wooden platform on the top of the College building.

2.4.1 Temperature

The temperature details at Varanasi are shown in Table below. The table gives the mean of daily maximum, minimum, highest and lowest and extreme highest and lowest temperatures. The month of January is the minimum and May is maximum of mean of daily temperature. Mean of highest temperature recorded in the month of May is 44.3°C and the mean lowest temperature recorded in the month of January is 5.3°C. The extreme highest and lowest temperature recorded 47.2°c and 1.7°C for the month of May and February respectively. The minimum temperature slumped down to 1.7° C.

Table 2-1 Recorded Mean Daily and Extreme Temperatures

Month	Recorded Temperature (°C)				Extreme	
	Mean Daily Maximum	Mean Daily Minimum	Highest Maximum	Lowest Minimum	Highest	Lest
January	23.1	9.6	27.4	5.3	31.1	2.5
February	26.8	12.0	32.0	7.2	36.1	1.7
March	33.1	17.1	38.3	12.1	41.1	6.7
April	38.7	22.8	42.4	18.0	44.4	11.1
May	41.1	26.4	44.3	22.2	47.2	17.3
June	38.7	27.8	43.7	23.7	47.2	20.6
July	33.7	26.2	38.2	23.4	45.0	20.0
August	32.7	25.8	35.9	23.4	40.1	22.1
September	32.8	24.9	35.8	22.5	38.5	17.8
October	32.8	21.1	35.3	16.6	39.4	11.7
November	29.1	14.3	32.5	10.5	36.0	5.0
December	24.5	10.2	28.0	6.4	32.8	2.2

Source: IMD

2.4.2 Wind

The mean wind speed recorded by the observatory nearest to the project site is Varanasi which is found to be in the range of 1.9 m/s to 4.9 m/s. As per IS 875 Part-3, the basic wind speed at Varanasi is 47.0m/s.

2.4.3 Relative Humidity

The humidity is moderate to high throughout the year with the mornings being more humid than evenings. The mean relative humidity for each month of the year measured during mornings and evenings is as tabulated below:

Table 2-2 Mean Relative Humidity

Month	Mean Relative Humidity (%)	
	Morning (0530 hrs)	Evening (1730 hrs)
January	75	51
February	64	39
March	49	28
April	40	24
May	47	27
June	62	47
July	82	72
August	85	78
September	82	73
October	71	57
November	65	50
December	73	53

Source: IMD

2.4.4 Rainfall

The area is dominated by south-west monsoon during June to October rather than north-east monsoon during December to March. The area received almost 90 % of the rainfall during south-west monsoon. The average annual rainfall in the region is about 1003.3 mm. The month-wise distribution of the average rainfall recorded for each month of the year is as follows:

Table 2-3 Annual Rainfall Data

Month	Monthly Total (mm)	Number of Rainy Days	Heaviest Fall in 24 Hours (mm)	Year
January	20.3	1.8	69.6	1984
February	12.5	1.1	67.1	1990
March	10.4	1.0	37.1	1982
April	4.3	0.5	40.0	1993
May	11.5	0.9	31.6	1990
June	85.6	4.5	159.5	1999
July	303.8	12.5	288.3	1990
August	281.3	13.3	321.6	1988

Month	Monthly Total (mm)	Number of Rainy Days	Heaviest Fall in 24 Hours (mm)	Year
September	214.9	9.4	349.5	1987
October	39.8	2.2	138.9	1996
November	15.5	0.3	161.5	1995
December	3.4	0.3	53.1	1995
Total	**1003.3**	**47.8**	**1761.8**	

Source: IMD

2.4.5 Thunders and Dust Storms

The area is located far from the sea coasts and hence is not prone to cyclones. On an average about 13 days in a year the area faces thunders and dust storms. Rest of the year remains calm. It is evident that fog is very less in this region except in the month of January. Thunder rains occur generally only in the month of July and August. In other months thunders and rains are less. So it is quite suitable for navigation at Varanasi.

2.4.6 Visibility

The visibility in the project area is generally good throughout the year, except for a few days during the winter season and during periods of heavy rain. On an average, the visibility is less than 4 km for about 65 days in a year.

2.5 Hydrographical / River Conditions

2.5.1 Water Levels

The following water levels have been considered for planning of the terminal at the Site.

Table 2-4 Water Levels

High Flood Level (HFL)	RL +73.90 M
Low Water Level (LWL)	RL +58.22 M

2.5.2 Current

The currents in the river are significant and vary season to season. It may be as high as 4.0 m/s during high flood and as low as 0.5 m/s during low flow.

2.5.3 Discharge

Average and annual monthly discharge data as available between 1971 and 1989 and also for the year 2000 at Varanasi is shown in Table 2.5.

Table 2-5 Details of discharge at Varanasi in m^3 /sec

Month	Discharge at Varanasi in m^3 /sec									
	Ave 71-82	Ave 84-87	Ave 85-88	1984	1985	1986	1987	1988	1989	2000
Jan	472	-	469.54	-	562.98	514.34	511.48	289.36	481.98	754.3
Feb	464	-	406.37	-	366.46	650.93	326.45	281.63	359.88	580.8
Mar	417	-	333.22	-	261.30	432.21	352.29	287.06	229.76	486.0
April	370	-	274.91	-	214.89	374.00	237.26	273.50	231.03	374.0
May	319	-	220.59	-	164.78	295.20	237.42	184.95	160.80	332.0
June	586	-	217.74	540.70	169.77	318.28	212.05	170.84	404.82	1273.0
July	-	-	-	2643.84	2018.52	10295.96	1192.26	6031.45	1144.7	-
Aug	-	-	-	11097.87	15782.52	18971.47	3035.65	16769.75	4447.0	-
Sep	-	-	-	13706.63	9283.33	5323.57	14921.42	4609.81	6882	-
Oct	-	-	-	1739.03	13825.34	2164.20	2430.52	3285.18	1259	-
Nov	1071	1287.05	-	897.23	2493.41	892.15	829.42	884.55	568.11	-
Dec	625	340.31	-	410.36	811.63	612.41	256.90	486.59	365	-

(Source: CWC, Varanasi)

Table 2.6 shows the maximum flood discharge at Varanasi between 1959 and 1976.

Table 2-6 Data on floods at Varanasi in m3/sec (Source: CWC, Varanasi)

Sl. No.	Year	Gauge	Q Max (Cumecs)
1.	1959	70.71	32,590
2.	1960	70.96	29,401
3.	1961	70.00	21,169
4.	1962	70.78	25,050
5.	1963	69.84	23,451
6.	1964	69.71	24,008
7.	1965	68.85	18,220
8.	1966	69.01	18,062
9.	1967	72.81	30,736
10.	1968	68.98	19,850
11.	1969	71.01	34,702
12.	1970	71.11	34,890
13.	1971	72.69	46,186
14.	1972	64.43	24,700

15.	1973	71.03	30.451
16.	1974	69.441	21,975
17.	1975	69.42	23,662
18.	1976	69.84	20,234
19.	1977	72.16	30,362
20.	1978	67.64	-
21.	1979	-	-

The maximum discharge varied between a minimum of 18,062 m3/sec in 1966 and maximum of 46,186 m3/sec in 1971.

2.5.4 Morphological condition

This site is located on what is presently a deep channel with more than 2.5m of water depth close to the shoreline. The river has no meandering tendency in this reach. The bank has been stable for so many years as can been seen in the past 10 years of imagery. It is to mention here the bridge on river Ganga for NH-2 is acting as a control point to keep the river in position.

2008

2010

2012

2014

2016

2017

2.6 Natural Hazards

2.6.1 Seismicity

The terminal falls under the seismic Zone III as per IS: 1893 – 2000.

3 FIELD SURVEYS AND INVESTIGATIONS

The secondary data on the topography of the terminal site, landside as well as riverside geotechnical data and bathymetric data of the river was not available. These details were collected by carrying out field surveys and investigations.

3.1 Topographic Surveys

The topographic survey of site was carried out during August 2015 by the agency appointed by M/s. HOWE (JV), namely M/s Ocean Science and Surveying Pvt. Ltd.

- The proposed site for the terminal is relatively plain and the existing Ground level varies from around (+) 69 m to (+) 78 m from MSL.

- There exists a Nallah within the proposed land for the terminal. The Nallah is a natural drain which originates around 4.5 Kms from the site. The Nallah comes under Bhitti Gram Panchayat. In the master plan it is proposed to divert this nallah. Average ground level of nallah varies from around (+) 59 m to (+) 65 m from MSL.

The topographic survey data is enclosed as **Drawing I-525-VTR-201**.

3.2 Geotechnical Investigations

A Geotechnical investigation for the proposed site was undertaken by M/s CENGRS Geotechnica Pvt. Ltd. and detailed report was submitted in 2003. Two boreholes on land (BH-2 & BH-4) were drilled up to 20.0m below EGL and two boreholes in river (BH-1 & BH-3) were drilled up to 40.0m below EGL to get the understanding on the subsurface profile. The Geotech report indicates that the average ground level is around RL (+) 76.0m for land side and average bed level is around RL (+) 52.0m for river side.

Land Boreholes (BH-2 & BH-4)

The substrata encountered on the land boreholes are found to be consistent in both the Boreholes. The sub-soil profile is found to be uniform in both the boreholes consists of hard clayey silt with SPT N values greater than 30 up to termination of boreholes.

Average SPT N values are presented in tabular form below

Stratum No.	Stratum Description	Soil Classification	Average Standard Penetration Test (N) Value	Thickness of Stratum
I	Hard Clayey SILT	MI	> 30	20m

River Boreholes (BH-1 & BH-3)

The substrata encountered on the river boreholes are found to be consistent with varying thicknesses. The top soil is observed to be Hard Clayey SILT with traces of gravel followed by very dense Sandy Silt which is then underlain by dense to very dense silty SAND up to termination of boreholes.

Average SPT N values are presented in tabular form below

Stratum No.	Stratum Description	Soil Classification	Average Standard Penetration Test (N) Value	Approximate Thickness of Stratum
I	Hard Clayey SILT with gravel mixture	MI	> 30	27.0m
II	Very Dense Sandy Silty	CL	> 50	3.0m
III	Dense to very dense silty SAND	SM	> 50	10.0m

Based on the review of geotechnical data (Reference: Report on geotechnical investigations at Varanasi terminal– 2003). The existing ground level varies from RL 62.0 and RL 78.0 and finished ground level is proposed to be at approximate RL 75.0m. Thus filling of approximately 6.0 to 10.0 m above Existing ground level and cutting of 2.0m to 3.0m below EGL is expected.

Land Side (BH-2 & BH-4)

1. Shallow foundation is proposed for lightly loaded structure like administration building, substation and other facilities. The net safe bearing capacity shall be considered as 125 kPa for design. The minimum embedment depth for the footing shall be 1.5m below finished ground level.

2. However the net safe bearing capacity shall be considered as 80kPa for the foundations resting on filled up soil. It has been assumed that the filling shall be carried out using well graded soil and % of passing through 0.075mm (i.e. fines) shall not be more than 20%. The filling material shall be placed in layers of uniform thickness; each layer shall not exceed 250 mm compacted thicknesses.

3. The permissible settlement shall be 50mm for isolate footings and 75mm for raft foundations.

4. For Stack Yard locations, the heap may be laid on the finished ground level. No soil replacement is envisaged.

River Side (BH-1 & BH-3)

Berths and Approach trestle proposed for river side will have deep foundations. Bored cast in-situ pile foundation shall be provided to support the super structure loads. The following pile capacities are estimated for different diameters for preliminary design purpose.

Pile Diameter	Pile Termination level	Embedded length of pile below Cut-off level	Vertical Capacity of Pile	Uplift Capacity of Pile
(mm)	(RL m)	(m)	(kN)	(kN)
1000	32	43.0	1410	820
1200	32	43.0	1770	980
1000	30	45.0	1630	960
1200	30	45.0	2060	1160
1000	26	49.0	2060	1260
1200	26	49.0	2630	1530
1000	24	51.0	2280	1430
1200	24	51.0	2900	1740

Pile Cut-off level has been assumed as RL 75m.

Scour level has been assumed as RL 50m.

3.3 Bathymetry Survey

The topographic survey of site was carried out during August 2015 by the agency appointed by M/s. HOWE (JV), namely M/s Ocean Science and Surveying Pvt. Ltd. The existing river bed depth near the proposed terminal varies from (-) 4.0 m to (-) 12.0 m below LWL. The bathymetric survey data is enclosed as **Drawing I-525-VTR-202**.

4 TRAFFIC FORECAST

IWAI has appointed M/s Hamburg Port Consulting, GmBH and M/s Universal Transport Consulting, GmBH as consultants for carrying out market analysis of Multi-modal terminal at Varanasi.

On the basis of the collected origin-destination pairs (O/D-pairs), the Consultants forecasted the traffic for Varanasi (Ramnagar) MMT from base year 2015 until 2045 as mentioned in the below table.

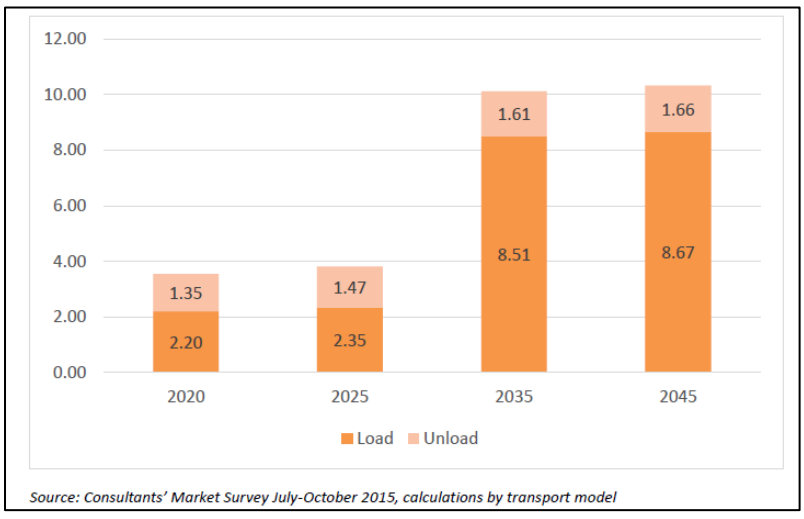
Table 4-1 Varanasi MMT - 2020 to 2045 cargo forecast by cargo type (million tons)

Cargo	2020 (MT)	2025 (MT)	2035 (MT)	2045 (MT)
Bagged	1.40	1.50	3.31	3.37
Container	0.16	0.17	0.19	0.21
Dry Bulk	0.14	0.15	4.25	4.34
General Cargo	0.66	0.69	0.74	0.75
Neo-Bulk	1.13	1.23	1.27	1.29
Ro-Ro	0.05	0.05	0.35	0.36
Liquid Bulk	0.01	0.01	0.01	0.01
Total	3.55	3.82	10.12	10.32

Source: HPC report on Infrastructure requirement of individual terminals along National Waterways 1, 26th April 2016.

Summary of Loaded and Unloaded traffic at the Terminal as forecasted in HPC report is shown in below figure:

Figure 4.1 Loaded versus Unloaded Cargo 2020 to 2045



4.1 Traffic to be handled

Considering the restriction in the availability of water front, maximum of five berths can be developed. Therefore, alternate layouts have been worked out based on various discussion held with IWAI, the following commodities has been considered as the targeted cargoes and the individual berth capacities for handling the targeted commodities have been worked out as described below:

4.1.1 Bagged and General Cargo

Bagged construction material and bagged food /food stuff will come to the terminal by barges and unloaded by MHC cranes into trucks and transported to the covered shed. Then it will be loaded to trucks/rail and transported to the hinterland by trucks or Rail.

4.1.2 Bulk Cargo

Construction material and consumer goods will come to the terminal by barges and unloaded by MHC cranes into loading hopper and transported to the storage yard by conveying system/trucks. Then it will be loaded to trucks/rail by pay loader and transported to the hinterland by trucks/Rail.

4.1.3 Containers

Containers will come to the terminal by barges and unloaded by MHC cranes into trucks and transported to the container yard. Unloading from trucks will by reach stacker. Then it will be loaded to trucks/rail by reach stacker and transported to the hinterland by trucks/rail

Table 4-2 Phase wise Total Traffic

Commodity	Phase 1a		Phase 1b		Final Phase	
	No. of berths	Traffic in MTPA	No. of berths	Traffic in MTPA	No. of berths	Traffic in MTPA
Construction Material Bulk	2	0.21	2	0.31	5	1.53
Construction Material Bagged		0.21		0.31		1.53
Consumer goods Bulk		0.08		0.14		0.17
Containers		0.04		0.06		0.08
Food and food stuff Bagged		0.25		0.36		0.44
Project Cargo		0.06		0.08		0.10
Total	**2**	**0.84**	**2**	**1.26**	**5**	**3.85**

5 VESSEL SIZES

The size of vessels that would call at any terminal will generally be governed by the following aspects:

- The trading route
- Availability of a suitable vessel in the market
- Available facilities mainly navigational channel and manoeuvring areas including the draft
- The available facilities for loading & unloading
- Volume of annual traffic to be handled and the likely parcel size as per the requirements of the user agency.

The following main cargo commodities for proposed terminal at Varanasi have been identified:

- Construction material
- Food and Food stuff
- Consumer Goods
- Project Cargo
- Container

5.1 Vessel Sizes

The size of vessels calling at the proposed IWT terminal at Varanasi is restricted by the availability of draft in the navigation channel of National Waterway-1. Based on the LAD of 2.5 m in the navigational channel, self-propelled barges of sizes presented in table below can ply in the inland waterways.

Table 5-1 Vessels that can Ply in Inland Waterways with LAD of 3.0 m

Tonnage (T)	Length (m)	Beam (m)	Draft (m)
650 - 1000	60 - 80	8.20	2.20
1000 - 1500	80 - 85	9.50	2.20
1500 - 3000	85 - 95	15.00	2.50

5.2 Design Vessel Size

As per the proposed plan, the LAD at Varanasi shall be 2.5m, the design vessel is considered as 3000 DWT but it shall be partially loaded up to maximum of 2000 DWT.

Table 5-2 Design Vessels Size

Vessel Type	Vessel Size (DWT)	LOA (m)	Beam (m)	Loaded Draft (m)
Design vessel size proposed at Varanasi terminal	3,000	95	15.00	2.5

However, IWAI is getting the model vessel designed and details are yet to be made available.

6 FACILITY REQUIREMENT

The marine infrastructure and shore based infrastructure shall be planned and developed to cater to the cargo forecast. Development of the terminal infrastructure shall also be suitably phased in such a way that the initial phases integrate well with subsequent phases.

6.1 Traffic to be handled

As the IWT sector is in a nascent stage, the diversion of traffic to IWT would depend on the government policies and several other factors. Hence on a conservative side, the traffic projection for the base case as arrived at in the traffic report by M/s Hamburg Port Consulting GmBH and M/s Universal Transport Consultancy GmBH has been adopted. This is given in chapter 4. The projected Cargo govern in the HPC report has been reduced due to site constraints which have also been discussed in Chapter 4.

6.2 Marine infrastructure

The marine infrastructure comprises of jetties and manoeuvring areas like approach channels, turning circle, berthing pockets, holding area, etc.

6.2.1 Navigational and Operational requirements

The basic navigational and operational requirements to service the vessels calling at a port / terminal are:

- Sufficient depth in manoeuvring area and at the berths
- Sufficient depth and width in approach channel
- Adequate berthing infrastructure including berth fixtures like fenders
- Mooring system
- Navigational aids

Dimensions of navigable water ways generally comply with guidelines provided in the BIS Code of Practice IS: 4651– 1980 “Code of Practice for Planning and Design of Ports and Harbours - Part V - Layout and Functional Requirements” and as per PIANC guidelines for Design guidelines for Habour approach channels.

6.2.1.1 Design Vessels

The dimensions of manoeuvring areas are dependent on the design vessels arriving at the terminal and details of the same is presented in Table 5.2.

6.2.1.2 Channel Length

Since the depth availability is sufficient at Terminal location, no separate approach channel is required.

6.2.1.3 Channel Depth

The proposed depth of the approach channel is 2.5 m from LWL excluding any siltation allowances.

6.2.1.4 Channel Width

The channel width for a one way channel is arrived based on the following considerations as per PIANC guidelines:

Table 6-1 Considerations for Channel Width

Basic manoeuvring lane	1.5 B
Bank Clearance (both sides sloping)	2 x 0.3 B
Allowance for currents	0.7 B
Allowance for depth	0.1 B
Allowance for channel bottom	0.1 B
Total	**3.0 B**

Based on the above, the channel width in the straight leg of the channel for 3,000 DWT vessel is 45m.

6.2.2 Turning circle dimensions and depth at Berth

6.2.2.1 Turning Circle

The turning circle, required to swing and berth the vessels, is very important and must have proper configuration, dimensions and access. As per IS: 4651 (Part V) – 1980, the minimum diameter of the turning circle should be 1.7 to 2.0 times (1.7 for protected locations and 2.0 for exposed locations) the length of the largest vessel.

Keeping these requirements in view, the dimension of the turning circle would be as 190m. Since the depth & width available is sufficient at Terminal location, no separate turning circle is required.

6.2.2.2 Depth at Berths

Based on table 6.1, the dredge depth at berth location is 2.5m from LWL.

In order to work out the berth requirements to meet the projected traffic, it is necessary to define the following governing parameters:

- Average parcel size
- Cargo handling arrangement
- Cargo handling rates
- Number of operational days per year

- Number of working hours per day
- Effective working hours per day
- Time required for peripheral activities

Each of the above parameters is discussed below.

6.2.2.3 Average Parcel Size

Though the design vessel size is the guiding parameter in arriving at the dimensions of the navigable water ways, in actual practice vessels of various sizes will arrive at the IWT terminal. For ascertaining the requirement of number of berths, it is prudent to consider the average parcel size for each commodity and details of the same are presented below.

Table 6-2 Average Parcel Size

Commodity	Average Parcel Size (T)
Bulk and Bagged Cargo	1000
Containers	75 TEU

6.2.2.4 Cargo Handling Arrangements

For estimating the required number of berths, the handling arrangements assumed for various commodities of the IWT terminal at Varanasi are described below:

6.2.2.4.1 Bagged Cargo

Bagged Cargo like food grains, vegetables, agricultural produce, jute, cloths, cement etc. will come to the terminal by barges and unloaded by MHC cranes into trucks and transported to the covered shed. Then it will be loaded to trucks/rail and transported to the hinterland by trucks/rail.

6.2.2.4.2 Bulk Cargo

Bulk material consumer goods will come to the terminal by barges and unloaded by MHC cranes into trucks and transported to the storage yard. Then it will be loaded to trucks/rail by pay loader and transported to the hinterland by trucks/rail. Bulk material Stone Chips, will come to the terminal by barges and unloaded by MHC cranes into Mobile hopper and transported to the storage yard by conveying system in final phase. Then it will be loaded to trucks/rail by pay loader and transported to the hinterland by trucks / rail.

6.2.2.4.3 Containers

Containers will come to the terminal by barges and unloaded by MHC cranes into trucks and transported to the container yard. Unloading from trucks will by reach stacker. Then it will be loaded to trucks/rail by reach stacker and transported to the hinterland by trucks/rail.

6.2.2.5 Cargo Handling Rates

Based on the above cargo handling arrangements for various commodities, the cargo handling rates assumed are presented in table below:

Table 6-3 Cargo Handling Rates

S. No.	Cargo	Handling Rate (TPD)	Handling Rate (TPD)	Handling Rate (TPD)
		Phase 1A	Phase 1B	Final Phase (Master Plan)
1.	Bulk Construction Material	4615	4615	4615
2.	Bulk Consumer Goods	2609	2609	2609
3.	Bagged Construction Material	2609	2609	2609
4.	Bagged food and food stuff	2609	2609	2609
5.	Containers	277 TEU	290 TEU	340 TEU
6.	Project Cargo	1304	1304	1304

6.2.2.6 Number of Operational Days

It is assumed that Varanasi Terminal will work seven days a week, which brings the effective number of working days to 315 days per year, allowing for 50 non-operational days due to weather and other reasons.

6.2.2.7 Number of Operational Hours

The productive cargo handling hours on an average in a day when the vessels are at berth has been taken as 20 hours to account for shift changes, equipment position changes and for any unplanned stoppages.

6.2.2.8 Time Required for Peripheral Activities

Apart from the actual time for loading / unloading cargo, additional time is required for other activities such as berthing, de-berthing and other incidental activities, for which 1 hour has been considered per barge.

6.2.2.9 Allowable Levels of Berth Occupancy

Berth occupancy is expressed as the ratio of the total number of days per year that a berth is occupied by a vessel (including the time spent in peripheral activities) to the number of terminal operational days in a year. High levels of berth occupancy will result in bunching of vessels resulting in undesirable pre-berthing detention. For limited number of berths and with random arrival of vessels, the berth occupancy levels have to be kept low to reduce this detention. The norms generally followed for planning the number of berths, in ports worldwide and in Indian ports are indicated in the table below:

Table 6-4 Norms for Berth Occupancy

No. of Berths	International Standards	Indian Practice	
		Bulk Cargo	General Cargo
1	40 %	60 %	70 %
2	50 %	70 %	70 %
3	55 %	70 %	70 %
4	60 %	70 %	75 %
5	65 %	70 %	75 %
6 and above	70 %	70 %	75 %

Source: UNCTAD Publication

In the IWT, random arrival of vessels can be reduced by regulation of the vessel movements. The following berth occupancy factors are recommended while planning of Varanasi Terminal:

Table 6-5 Recommended Berth Occupancy Factors for Varanasi Terminal

No. of berths	Recommended Berth Occupancy (%)
1	75
2 or more	75

6.2.2.10 Berth Requirements

Based on the considerations discussed above, the requirements of cargo handling berths for Varanasi Terminal in final Phase have been calculated as shown in tables below.

Table 6-6 Requirement of Berths for Phase-1A

Commodities to be Handled	Import (I) / Export (E)	Handling Rate TPD	Average Parcel Size T	Phase - IA				
				Annual Throughput MTPA	Ship Calls/ Annum	Berth Days Required	Berths Provided	Combined Berth Occupancy
Bulk constru. Material	**I**	4615	1,000	0.21	205	44	**2**	**49%**
Bagged Constru.Material	**I**	2,609	1,000	0.21	205	79		
Bulk Consum. Goods	**I/E**	2,609	1000	0.08	83	32		
Bagged Food/ Food stuff	**I**	2,609	1000	0.25	245	94		
Containers	**I/E**	277 TEU	75TEU	0.04	44	12		
Project Cargo	**I**	1304	500	0.06	120	46		

Table 6-7 Requirement of Berths for Phase-1B

Commodities to be Handled	Import (I) / Export (E)	Handling Rate TPD	Average Parcel Size T	Phase - IB				
				Annual Throughput MTPA	Ship Calls/ Annum	Berth Days Required	Berths Provided	Combined Berth Occupancy
Bulk constru. Material	**I**	4615	1,000	0.306	306	67	**2**	**73%**
Bagged Constru.Material	**I**	2,609	1,000	0.306	306	117		
Bulk Consum. Goods	**I/E**	2,609	1000	0.14	140	54		
Bagged Food/ Food stuff	**I**	2,609	1000	0.364	364	140		
Containers	**I/E**	290 TEU	75TEU	0.06	66	17		
Project Cargo	**I**	1304	500	0.084	168	65		

Table 6-8 Requirement of Berths for Final Phase (Master Plan)

Commodities to be Handled	Import (I) / Export (E)	Handling Rate TPD	Average Parcel Size T	Final Phase – (Master Plan)				
				Annual Throughput MTPA	Ship Calls/ Annum	Berth Days Required	Berths Provided	Combined Berth Occupancy
Bulk constru. Material	**I**	4615	1,000	1.53	1530	332	**5**	**79%**
Bagged Constru.Material	**I**	2,609	1,000	1.53	1530	587		
Bulk Consum. Goods	**I/E**	2,609	1000	0.168	168	65		
Bagged Food/ Food stuff	**I**	2,609	1000	0.44	440	169		
Containers	**I/E**	340 TEU	75TEU	0.08	93	21		
Project Cargo	**I**	1304	500	0.10	200	77		

6.2.2.11 Length of the Berths

The requirement of the berth length for various commodities is estimated below:

Maximum length of the vessel is 95 M, assuming 2 vessels of length 95 and 65 the total length of the jetty is 200m (10+95+20+65+10) in Phase 1A & 1B. Similarly in final phase, the development of Jetty works out to be 300m.

6.3 Shoreside Infrastructure

The shore based infrastructure comprises of cargo storage areas, terminal buildings, road and rail networks, conveyor and pipeline networks, utilities and services such as power and water supply, drainage, nallah diversion, sewerage, etc.

6.3.1 Storage Area Requirements

As per industry practice and UNCTAD guidelines, the storage capacity at terminal for a particular commodity should at least cater to the higher of the following:

- 22 days storage (6% of the annual cargo throughput); or
- 1.5 times the maximum parcel size.

Other factors to be taken into account in determining the size of the terminal storage areas are material densities, angle of repose, average stacking height, etc.

Table 6-9 Storage Area Requirement for Varanasi Terminal

S. No.	Commodity	Storage Area for Phase 1A (in SqM)	Storage Area for Phase 1B (in SqM)	Storage Area for Final Phase (in SqM)
1	Bagged Cargo – Construction Material	~ 4928	~ 7,269	~ 28,463
2	Bulk Cargo – Construction Material	~ 5250	~ 9,000	~ 24,150
3	Container	~2310	~3,360	~4,830
4	Project Cargo	~ 2,145	~ 3,000	~ 3,578
5	Bulk Cargo – Consumer Goods	~ 3000	~ 6,000	~ 6,000
6	Bagged Cargo – Food and food stuff	~ 13300	~ 19,675	~ 18,996
	Total	**30,931**	**48,304**	**86,017**

The above storage areas duly account for the circulation space within the storage area for effective stacking/removal of cargo.

6.3.2 Utilities and Services

6.3.2.1 Buildings

Various buildings envisaged in the terminal are as follows:

Buildings under construction in Phase-1A

- Worker's amenity building & Septic tank and sock pit
- Electrical substation building - 1
- Pump Room

Buildings to be developed in Phase-1B

- Terminal administration building
- Security office, boundary wall and fencing
- Godown / storage Shed – 1 (Part-1)

- Water tank & Pump house
- Weigh bridge control room-1 (1 nos)

Buildings to be developed in Master Plan

- Electrical substation building – 2
- Godown / storage Shed – 1 (Part-2)
- Godown / storage Shed – 2
- Gate house (2 nos)
- Jal Yatri Niwas (Guest House)
- Banarasi Haat
- Shops/ Kiosks
- Canteen and Toilet Block
- Weigh bridge control room-1 (1 nos)
- Toilet block -(2 nos)

6.3.2.2 Bunkering

It is proposed to have fuel bunkering facility at terminal for vessels and vehicles. Required storage space and corridor for the piping from storage to jetty has been provided. Facility and space provision for vehicles to fill the fuel is also given in the master plan.

6.3.2.3 Communications

IWT terminal will be provided with modern telecommunication system consisting of telephone, telefax, e-mail etc.

6.3.2.4 Water Supply

Total water demand is broadly classified in the following categories:

- Potable water for consumption of terminal personnel.
- Potable water for vessels calling at the terminal.
- Water for canteen and truck drivers visiting the terminal.
- Water for truck washing
- Water for fire-fighting.
- Other uses like greenery etc.

Water supply system details are provided in Chapter 9.

6.3.2.5 Power Supply

The power is required at the terminal for the following activities:

- Mechanised cargo handling equipment and other equipment
- Lighting of the terminal area
- Offices and transit sheds
- Miscellaneous

Based on the above requirements the power demand is calculated and presented in Chapter 11. The power is to be drawn from the nearest substation to the terminal and internal electrical distribution system has been planned according to required HT and LT supply.

6.3.2.6 Road Network

As the mode of transport of the commodities to / from the terminal is by road, a well-developed internal and external road network is required. Adequate area is provided for internal road network running throughout the whole terminal. Ref. drawing No.: I-525/VTR-204, I-525/VTR-205 & I-525/VTR-206.

6.3.2.7 Green Belt

Green Areas have been proposed at various locations according to the Master Plan such as along the diverted nallah, between road and rail corridor and buildings.

6.3.2.8 Storm Water Drainage

A network of covered storm water drain will be provided. Run off from the storage areas will be routed through collection pits (Please refer 9.11).

6.3.2.9 Sewerage System

Sewerage from toilets, bathrooms, kitchens etc. will be collected and treated in sewage treatment plant (Please refer 9.14).

6.3.2.10 Nallah Diversion

As mentioned earlier, there exists a natural drain within the identified land for the project. The storm water of the upstream catchment is getting collected and discharged in to the River Ganga. The existing alignment and slope of the Nallah is naturally formed with unprotected sides and non-uniform section through the length.

It is proposed to divert this nallah. Alignment of the proposed diversion is along the Vishwasundari Setu through the project site. The alignment is shown in the master plan.

The energy needs to be dissipated before the water falls in river Ganga, for which the structure at confluence point is proposed and its details are given in Drawing No.: I-525/VTR-230.

Proposed Diversion

Cross Section of the diversion is designed as per the existing cross section of the nallah at the point where nallah enters the project site as shown in the below figures:

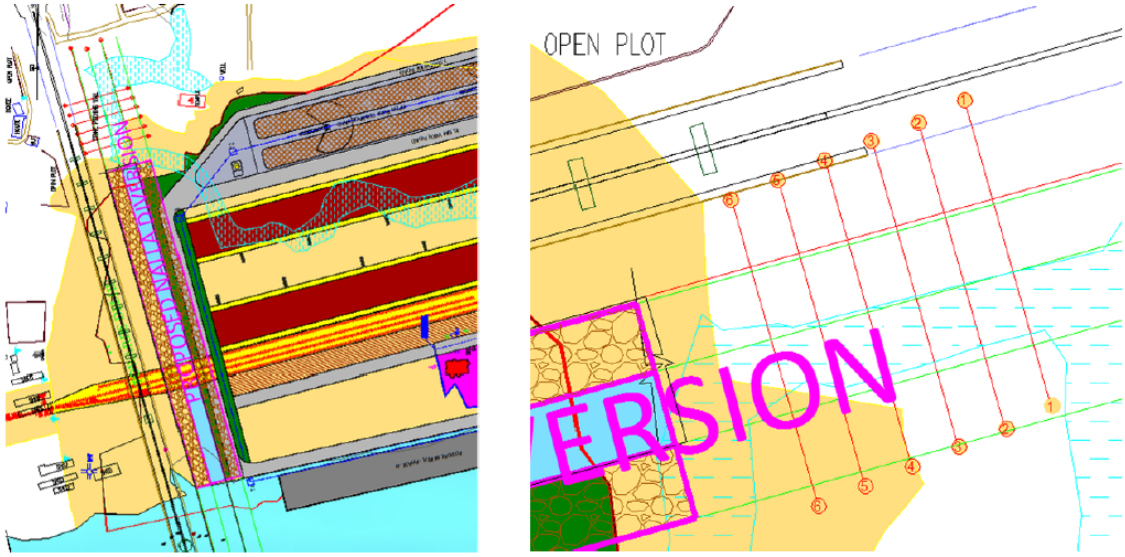


Figure 6-1 Diversion point of the nallah

Based on the existing cross section at diversion point the new cross section as per the FGL is generated which will have higher discharge capacity compare to existing cross section as shown in cross section 1 to cross section 6 (Figure 5 & 6)

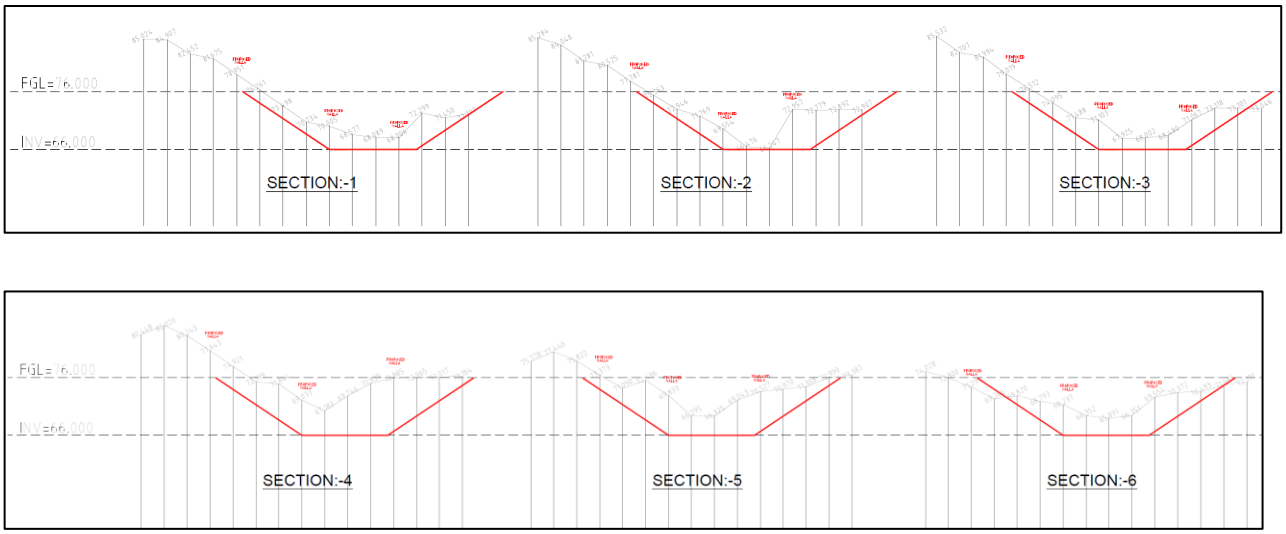


Figure 6-2 Various Cross Sections of the Nallah (Existing and Proposed)

The bed slope of the diversion shall be 1:2000 towards the river. The Proposed Nallah at the mouth of the River shall be of bell mouthed to dissipate the flow energy by providing scouring protection arrangements. Proposed nallah diversion as described will have Trapezoidal cross section with 1V:1.5H side slopes.

As the proposed terminal development is bisecting the natural flow path of storm water towards river, a trapezoidal boundary drain is proposed along the plot boundary to collect the storm water between the catchment area (approx. 33 hectares) of NH-7 and plot boundary, which will further discharge in the proposed nallah diversion. Below google earth image in Figure 5.3 with land profile shows the flow path towards the river.

Figure 6-3 Catchment Area profile for drainage plan.

7 ALTERNATIVES

The proposed layouts of Phase 1A, Phase 1B and Master Plan have evolved based on various discussions with IWAI, traffic projections and site constraints. Hence no other alternatives were prepared.

The layout of various phases of the terminal is presented in **Drawing I-525/VTR/204, I-525/VTR/205 & I-525/VTR/206.**

8 DEVELOPMENT PLAN

This chapter describes the plan for development of the terminal infrastructure in various phases.

8.1 Marine Facilities

8.1.1 Berths

Considering IWAI's requirement, it is proposed to take up the proposed development in two stages Phase-1 (Phase 1a & 1b) and final phase.

8.1.1.1 Phase-1A & 1B

It is proposed to develop two multi-cargo berth for handling containers, natural aggregates, bagged & general cargo. The cumulative length of both the berths is 200 m and width is 35 m. The berth will be directly connected to land.

8.1.1.2 Final Phase

In final phase, additional berth is proposed to cater for the future traffic requirement. The dimension of the proposed additional berth is 300m length and 35m in width.

8.1.2 Manoeuvring Area & Approach Channel

The manoeuvring area for development of terminal comprises of approach channel, turning circle and berthing area. It is proposed that the barges will move in 45 m wide channel, with 2.5 m LAD. To enable continuous operations of the terminal, the approach channel, turning circle and berth pockets will be dredged to 2.5 m from LWL. The diameter of the turning circle is 190 m.

8.2 Onshore Facilities

8.2.1 Storage Areas

It is proposed to have a covered storage shed for storing bagged & cargo. For storing the Bulk Cargo open stockyard is proposed. Storage areas of the terminal are mentioned in Table 6.9.

8.2.2 Fuel Bunkering

Storage space, filling station and pipeline corridor provision for fuel bunkering has been considered at the terminal.

8.2.3 Buildings

The buildings envisaged in the onshore area of the terminal are mentioned in clause 6.3.2.

8.2.4 Onshore Utilities

Onshore facilities such as roads, drainage, sewerage, water supply, communication system will be developed in phase-wise manner.

8.2.1 Mechanical Equipment

The mechanical equipment proposed phase wise are as follows:

Table 8-1 Phase wise additional requirement of Mechanical Equipment

S. No.	Equipment	No. of Equipment	No. of Equipment	No. of Equipment
		Phase 1A	Phase 1B	Final Phase (Master Plan)
1.	Mobile Harbour Crane	2	2(Phase 1a) + 1*	3(Phase 1a & 1b) +4
2.	Truck Loading Hopper	2	2(Phase 1a) + 0	-
3.	Front end loaders	1	1(Phase 1a) + 0	1(Phase 1a & 1b) +3
4.	Dumper Trucks	1	1(Phase 1a) + 0	1(Phase 1a & 1b) +0
5.	Reach stacker	2	2(Phase 1a) + 0	2(Phase 1a & 1b) +0
6.	Weigh Bridge & Control cabin	1	1(Phase 1a) + 0	1(Phase 1a & 1b) +1
7.	Flatbed Truck Trailers / Trucks	3	3(Phase 1a) + 2	5(Phase 1a & 1b) +7
8.	Conveying system (1000TPH)	-	-	1 Lot
9.	Mobile hopper with feeder	-	-	2
10.	Rail mounted stacker 1000 TPH (20m boom)	-	-	1

* Note: The third crane in phase 1B will be procured based on increase in traffic and cargo handling requirment.

8.3 Layout Plan

The layout plan of Phase-1A, Phase-1B and Final Phase is enclosed as **Drawing I-525/VTR/204, I-525/VTR/205 & I-525/VTR/206 respectively**.

9 PRELIMINARY ENGINEERING – CIVIL WORKS

9.1 Berthing Facilities

The design criteria for berthing facilities are provided in the following sections.

9.1.1 Deck Elevation

The deck of the jetty should be high enough so that during normal conditions it would be possible to inspect and repair the structural elements like deck and beams at all water levels.

HFL at the proposed location is 73.9m. It is therefore proposed to keep the deck elevation at RL +75.0 M and back up yard level is kept same as deck level i.e. +75.0M.

9.1.2 Design vessel and required water Level

The maximum design vessel and the minimum required water level for the operation of vessel at the berths are given in table below. However for the design of structure scour at the location to be considered as per IRC-78: 2000.

Table 9-1: Design Vessel Parameters

S.No.	Design Vessel Size (DWT)	Design Vessel Dimensions (m)			LWL (m)	Max. Draft (m)	Desired UKC including swat (m)	Required min water level (m)
		LOA	Beam	Loaded Draft				
1.	3,000	95	15	2.5	+58.22	2.5	0.5	+55.22 M

9.1.3 Geotechnical Criteria for Design of Berths Piles

Geotechnical Design of the marine piles has been carried out in accordance with the recommendations given in IS 2911, IS 14593 and IRC 78. The following safety factors are used to establish the safe geotechnical working load capacities of the piles given in table below:

Table 9-2: Safety Factors

End Bearing	SF = 2.5
Skin Friction on compression piles	SF = 2.5
Skin Friction on tension piles	SF = 3.0
Lateral Load	SF = 2.0

9.1.4 Loads Considered for Design of Jetty

The major loads considered for the design of the various components of the jetty are:

i. Dead Load

ii. Live Load

iii. Berthing Load

iv. Mooring Load

v. Current Load

vi. Wind Load

vii. Temperature Load

viii. Earthquake Load

ix. Wave load

x. Slamming forces (if any)

9.1.4.1 Dead Load

The dead load comprising the self-weight of the structure plus superimposed loads of permanent nature are considered as per IS: 875 (Part-I) 1987. Following unit weights are used to assess the self-weights of the structural elements in design

- Reinforced Concrete : 25.0 kN/m
- Mass Concrete : 24.0 kN/m^3
- Structural Steel : 78.5 kN/m^3

9.1.4.2 Live Load

The live load to be considered on the deck of jetty includes the following loads:

- Uniform distributed Live load of 3.5 T/m2.
- IRC class A/AA /70 R vehicles.
- Loads due to Rail mounted LPS 180 and Tyre mounted LHM 180 with a 320 T lifting capacity at maximum outreach of 22 m from waterside rail

9.1.4.3 Berthing Load

9.1.4.3.1 Berthing Energy

The design vessels are assumed to approach the berths under moderate wind, swell and moderate berthing condition (IS 4651 Part III – Cl 5.2.1.1, Table 2) at an angular approach of 10^o. Based on this criterion the approach velocity perpendicular to the berth has been calculated to arrive at the design berthing energy for various design vessels.

Berthing loads are considered as per IS: 4651 Part III-1989. The Berthing energy calculated for 3,000 DWT vessel using IS: 4651 as per details in table below:

Table 9-3: Berth Load Parameters for 3000 DWT vessel

Dead Weight Tonnage (DWT)	3,000
Displacement Tonnage (DT)	3,990
Overall Length, LOA (m)	95
Beam Width, B (m)	15
Loaded Draft, d (m)	2.5
Berthing Velocity (m/s)	0.45
Approach angle	20^{o}

At present, available draft at the stretch near project location is 1.5m. Accordingly vessels will be brought partial loaded to suite available water depths.

The design berthing energy works out to 59 Tm considering required safety factors.

9.1.4.3.2 Fendering System

Considering the level variation in the water level of 15.7m between high water level and low water levell at the site and also the variation in the sizes of vessels to be handled at the jetty, the fendering system should be designed such that sufficient contact area between the hull of the vessel and the fender face is ensured at all water levels.

It is required to provide a suitable fendering system not only to absorb the design berthing energy of the vessel but also to keep the vessel's hull pressure within the limits as specified in PIANC 2002. For general cargo vessels with DWT less than or equal to 20,000, hull pressure may be limited to 50 T/m^2 and for container vessel it shall be limited to 40 T/m^2.

9.1.4.3.3 3000 DWT vessel

Based on these criteria, arch fenders of AN 800, grade E3.0 of Trellborg make or equivalent are proposed at each fender pile.

9.1.4.4 Mooring Load

Mooring force of 30 T, as per Table-4, IS: 4651- Part III shall be applied at any of the bollard location.

9.1.4.5 Current Load

The current loads on the structure shall be applied on the submerged parts of the structure as per IS: 4651 - Part III.

9.1.4.6 Wind Load

The wind load on structure shall be considered as follows

1. Operating wind speed shall be 18.0m/s
2. Extreme basic wind speed (V_b) shall be 47m/s as per IS: 875-Part III.

9.1.4.7 Temperature Load

- Berth shall be designed for temperature variation of (± 15^0 C)
- Coefficient of thermal expansion for RCC structure is taken as $11.7x10^{-6}$/ °C.
- In temperature analysis, long term elastic modulus of the concrete is taken as half the instantaneous elastic modulus of the concrete.

9.1.4.8 Earthquake Load

Earthquake load shall be considered in design as applicable for the site as per IS 1893-2002. The design horizontal seismic coefficient αh is calculated based on the following parameters:

α_h = Z I (Sa/g) / (2R), where

Z = Zone factor = 0.16

I = Importance factor = 1.5

R = Response reduction factor = 3 for RCC structures

S_a/g = Average response acceleration coefficient, which depends on Time Period of

The Time Period, T of the structure will be evaluated by STAAD Analysis considering Dead Load and 50% Live Load.

9.1.4.9 Wave Load

During the operation and storm condition the design wave height shall be considered as 0.10m and 0.3m respectively.

9.1.4.10 Slamming forces

The wave slamming forces are nothing but the uplift force experienced by the submerged horizontal member due to oscillatory wave action. The same shall be calculated based on the Coastal Engineering Manual.

$F_U = C_U A_Z \gamma_w w^2 / 2g$, where

F_U = Uplift force

C_U = Laboratory derived slamming co-efficient

A_Z = Projected area of solid body in the horizontal plane

γ_w = Density of sea water

w = Vertical component of flow velocity at level of object

9.1.5 Load Combinations

The above loads with appropriate load combinations, as per IS 4651-Part IV have been applied on the different components of the jetty.

9.1.6 Reinforced Concrete Design

9.1.6.1 MATERIAL

- Concrete Grade

Concrete grade M40 will be used for all the structural elements like pile, pile muff, beams, deck slab etc.

- Reinforcement

Low alloy steel reinforcement bars of grade Fe 500 D confirming to IS:1786 will be used for the design of deck slab, beam and piles.

9.1.6.2 PILE DESIGN PARAMETERS

- Pile Diameter

Bored cast-in-situ RC piles are proposed for the marine facilities. The pile configuration including diameter, founding depth and spacing has been arrived based on soil parameters.

- Depth of fixity

Pile fixity depth below scour level has been calculated as per IS-2911 guidelines.

9.1.6.3 MINIMUM COVER

The minimum cover to the steel reinforcing bars of different members (as per Table 16, IS 456:2000) shall be as follows unless stated otherwise:

a) Slabs

- Top : 50 mm
- Bottom : 75 mm

b) Beams

- Top : 75 mm
- Bottom : 75 mm
- Sides : 75 mm

c) Piles muff : 75 mm

d) Piles : 75 mm

9.1.7 Design Life

The permanent works shall be designed and constructed to give the following design lives:

- Jetty and approach trestle - 50 years
- Fenders - 8 years
- Bollards and ladders - 15 years

9.1.8 Materials and Material Grades

The specifications are given below:

Table 9-4 : Material specification

Structural Concrete	M-40
Wearing coat	M-40 grade wearing course of 75 mm average thickness shall be provided on the jetty. and Minimum Reinforcement for the wearing course shall be 25 kg\m^3.
Reinforcement	Low alloy steel reinforcement of grade equivalent to **Fe 500 D <u>in accordance with IS 1786</u>**.
Cement	For plain and reinforced concrete works cement shall be of any of the following types: 1. 43 Grade OPC Ordinary Portland cement conforming to IS 8112 2. Portland slage cement conforming to IS 455 3. Portland Pozzolana Cement (Fly ash based) conforming to IS 1489 (Part -1) 4. Portland Pozzolana Cement (Calcined based) conforming to IS 1489 (Part -2) For marine structures , the above mention types of cement shall also confirm to IS 4651 Part 4.

Chlorides in the concrete

Whenever there is chlorides in concrete there is an increased risk of corrosion of embedded metal. The higher the chloride content or if subsequently exposed to warm moist conditions, the greater the risk of corrosion. All constituents may contain chlorides and concrete may be contaminated by chlorides from the external environment. To minimise the chance of deterioration of concrete from harmful chemical salts, the levels of such harmful salts in concrete materials, that is, cement, aggregates, water and admixtures, as well as by diffusion from the environment should be limited. The total amount of chloride content (as Cl) in the concrete at the time of placing shall be as given below.

Limits of Chloride Content of Concrete

Sl. No	**Type or Use of Concrete**	**Maximum Total Acid soluble Chloride Content Expressed as kg/m3 of Concrete**
1	Concrete containing metal and steam cured at elevated temperature and pre-stressed concrete	0.4
2	Reinforced concrete or plain concrete containing embedded metal	0.6
3	Concrete not containing embedded metal or any material requiring protection form chloride	3.0

The total acid soluble chloride content should be calculated from the mix proportions and the major chloride contents of each of the constituents. Whenever possible the total chloride content of the concrete should be determined as per the approval of the Engineer-in-Charge.

Sulphates in concrete:

Sulphates are present in most cements and in some aggregates; excessive amounts of water –soluble sulphate from these or other mix constituents can cause expansion and disruption of concrete. To prevent this, the total water-soluble sulphate content of the concrete mix, expressed as SO3, should not exceed 4 per cent by mass of the cement in the mix. The sulphate content should be calculated as the total from

	the various constituents of the mix as per the approval of the Engineer-in-Charge. The 4 percent limit does not applied to concrete made with super sulphated cement complying with IS 6909 or as approved by the Engineer-in-Charge.
Corrosion Inhibiting Admixture	Corrosion of reinforcement bars in RCC by sea water, aqueous corrosion, is electrochemical process. Sea water, by virtue of its chloride content, is a most efficient electrolyte. The omni-presence of oxygen in marine atmospheres, sea spray and splash zones at the water-line, and sometimes at much greater depths, increases the aggressiveness of salt attack and in turn reduces the durability of concrete. Chlorides and sulphates do not present a favourable environment to the embedded RCC. Therefore a key consideration in proposing a corrosion prevention strategy is to ensure that the rebars remain protected in a heavily chloride and sulphate saturated environment thus allowing us to maximize the service life of the structure. Leaving aside the strategy of preventing corrosion through better concrete, the solution of choice has been to coat the rebars. Such coatings have ranged from cement slurries to epoxies and zinc. Coatings suffer from the obvious disadvantage that they may be physically damaged or electrochemically penetrated so that the base steel is again vulnerable to the usual corrosion process. Not only are these coatings systems are prohibitively expensive but due to unavoidable damage several disasters have been attributed to failure of such systems all over the world. In comparison polydentate, bipolar, migratory, non-nitrite base concrete penetrating corrosion inhibiting admixture becomes not only effective in performance but also cost effective at about 50% of the cost of such coating systems. No calcium nitrite based admixture shall be used for the project'. **<u>Item Description for corrosion protection of reinforcement bars</u>-** Admix polydentate, bipolar, migratory, non-nitrite base concrete penetrating corrosion inhibiting admixture at a dosage of 3 Kg per cu.m. of concrete. Corrosion Inhibiting admixture should pass JIS Z 1535 (Accelerated corrosion test), ASTM G1 (Immersion test for 720 hrs with results rebar weight loss less than 5 mpy), ASTM G3 (Polarization test by Tafel test Rebar weight loss results in less than 5 mpy), ASTM G-109-2005 (Long term corrosion test with results of a corrosion rate of zero coulombs) IS 9103-2005 (No Adverse effect on Compressive strength of concrete), pH- 10-12, Specific Gravity- 1.01 to 1.04. Manufacturer should submit all the test reports (short term as well as long term) during initial approval stage only. All the test reports submitted by manufacturer should be minimum 6-7years old and product should have a track record of minimum 10 years.
Structural Steel	As per IS:2062 (Grade-A) with minimum thickness of 10 mm
Protective coating to structural steel	Minimum DFT of 240 micron after sand blasting to SA 2.5 grade.

9.1.9 Proposed Structural Arrangement Of Berth

The proposed jetty having two berths of 500m (200m + 300m) for handling multi-cargo is aligned parallel to the river bank. The jetty is connected to yard at the end to have access to the bank for operations and maintenance.

Drawings **I-525/VTR/209** presents the general arrangement and cross section of jetty with bank protection.

The width of the jetty, keeping in view the operational requirement should be about 35 m. The total length of jetty provided is 500m.

In phase-1 initially jetty is proposed with well foundation, subsequently the it is converted to pile jetty. Piled foundation is considered as best option for the structural system.

The proposed structural arrangement consists of six rows of vertical bored cast-in-situ piles of 1.2 m diameter and one row of fender piles of 1.0 m diameter, spaced at 6.5 m c/c in the longitudinal direction.

In the transverse direction, cross beams are provided supported over the piles, which in turn support main beams in the longitudinal direction. A 500 mm thick deck slab will be provided supported over the longitudinal and cross beams.

9.2 Dredging

No dredging is required, as the available natural depths at the project location is more than the required depth of +55.22m.

9.3 Bank Protection Work

The Bank protection works are generally adopted on the river bank against erosive action of river. It is therefore, proposed to provide stone pitching in crates on the slope of river bank. In phase-1A, the length of protection work is 370 m and in phase-2 the length of bank protection work is 350 m. Model Studies shall be carried out by selected contractor to access the quantum of bank protection works and shall also include the effects of overtopping of river discharge and construction of proposed berth and approach trestle on stability of bank.

Typical details of Bank Protection Works are shown in Drawing I-525/VTR/210.

9.4 Storage Areas

9.4.1 Stockyard for Bulk & Project Cargo

In phase-1B, the stockyard shall be provided for stockpiling of bulk cargo such as consumer goods, construction material and project cargo. The stockyard shall be developed by compacting top 2 m soil in layers of 225 mm with road roller; in which the top layer of the

ground is then compacted with stone aggregate of specified sizes in uniform thickness by a vibratory roller to proper grade and camber.

In Master Plan Phase of terminal, the stacker tracks for construction material are proposed to be supported on precast concrete sleepers resting on a flexible foundation made of stone ballast and typical details are shown in the Drawing I-525/VTR/218.

9.4.2 Stockyard for containers (Phase-1B)

In phase 1B, the Stockyard for containers shall be provided to facilitate stockpiling of 4 fully loaded containers plus 1 empty container stacking load.

In Final Phase, the area for container stockyard shall be further increased to cater the additional traffic.

9.5 Paved Area

In phase 1B, the paved area for Railway yard and 20m wide area adjacent to Godown 1 shall be provided to facilitate handling of bagged cargo.

In Final phase, the paved area for bagged cargo shall be further increased to cater the additional traffic.

9.5.1 Storage Sheds

Bagged cargo cannot be stored in open atmosphere and requires covered storage sheds. The sheds shall be mainly built using structural steel for the frames and galvanised sheets for roofing and cladding. Grade slab are provided for maintaining the finished floor level so as to give a plinth height of not less than 1200 mm above Finished Ground level. Retaining wall of adequate height shall be provided around the shed for optimising the storage capacity.

Based on the review of geotechnical data (Reference: Report on geotechnical investigations at IWT terminal at Varanasi – July 2017), it is assessed to have open foundations for the sheds.in phase 1B, Godown 1 (Part-1) having storage size as 345 m x 35 m shall be provided.

In master plan Phase , Godown 1 (Part-2) having storage size as 280 m x 35 m and another Godown of size as 625m x 35 m adjacent to Godown 2 shall be provided.

Details are shown in the Drawing I-525/VTR/217 which is only indicative and may undergo changes based on the design.

9.6 Terminal Buildings

In phase 1B, the following terminal buildings are proposed for the Varanasi terminal:

9.6.1 Terminal Administration Building

It will be 2-storey building housing the following:

- Administration wing of the terminal including documentation
- Terminal operations wing

It is assessed that the terminal administration building will have a total floor area of 640 sqm (320 sqm per floor). Typical Layout and Elevations of Terminal Administration Building are shown in **Drawings I-525/VTR/211**.

9.6.2 Security Office

There shall be a single storey building for security office area of 09 sqm, and shall be provided near the terminal entrance. Details of security office is shown in **Drawing I-525/VTR/214**

9.6.3 Pump Room

There shall be a single storey building for pump room with area of 340 sqm, and shall be provided at the location shown in master plan terminal layout. Details of pump room are shown in **Drawing I-525/VTR/212**.

9.6.4 Underground reservoir

The underground reservoir is of RCC structure catering to the supply of water. The minimum capacity of the underground sumps should be 700 m^3.

The broad design parameters for water supply system are given below:

- Wastage and leakage in system: 15% of total theoretical demand
- Hydraulic design of the pipeline shall be using Hazen-Williams formula
- All pipelines shall be laid 1.2 m below ground

In Master Plan phase, the following terminal buildings are proposed for the Varanasi terminal:

9.6.5 Electrical Sub Station - 2

The electrical sub-station shall be a two storey building with a floor area of 800 sqm. The details of electrical sub-station are shown in **Drawing I-525/VTR/232**.

9.6.6 Banarasi Haat

There shall be a Banarasi haat with built up area of 120 sqm.

9.6.7 Shops/ Kiosks

There shall be a shops / Kiosks with built up area of 110 sqm.

9.6.8 Jal Yatri Niwas (Guest House)

The Jal Yatri Niwas (Guest House) shall be a two storey building with total floor area of 550 sqm (275 sqm per floor). Typical Layout and Elevations of Jal Yatri Niwas (Guest House) are shown in **Drawings I-525/VTR/229**.

9.6.9 Weighbridge control cabin

There shall be a single storey building for weighbridge control cabin with area of 09 sqm. Details of weighbridge control cabin is shown in **Drawing I-525/VTR/215**.

9.6.10 Canteen and Toilet Block

There shall be a single storey building for canteen and toilet block with area of 212 sqm, and shall be provided at the location shown in master plan terminal layout. Details of canteen and toilet block are shown in **Drawing I-525/VTR/216.**

9.6.11 Toilet Block

There shall be a single storey building for toilet block with area of 50 sqm, and shall be provided at the location shown in terminal layout. Details of toilet block are shown in **Drawing I-525/VTR/228**.

9.6.12 Gate house complex,

A Gate House complex shall be provided in the South-East boundary of the terminal, another Gate House shall be provided on alternative access on the other side of railway track as shown in the master plan layout. Typical details and dimensions of gate house complex are shown in **Drawing I-525/VTR/213**.

9.6.13 Design Criteria

All designs of RCC structures other than liquid retaining structures shall be carried out as per IS 456. The buildings shall be provided with adequate arrangements for plumbing, sanitary, electrical fittings, illumination, water distribution etc. The aspects considered for construction of buildings

- Floor to floor height of buildings is arrived considering the bylaws of National Building Code.
- Finished floor level of buildings is considered 500 mm above the finished ground level
- Grade Slab

All ground floors shall be of R.C.C. (M-20) with minimum thickness of 150 mm over 75mm thick P.C.C. (M-10) base. The sub base of 230 mm thick Stone/bolder soling over compacted earth is proposed. The floor finish of 40 mm thick including 13 mm thick metallic hardener topping is proposed for storage shed and substation building. For the remaining buildings i.e. administrative building, Workers amenity building (Toilet Block), Gate complex etc.,

vitrified floor finish is proposed. Floor top is proposed to be laid to slope minimum 1:100 towards floor drain for floor washing.

- A 750 mm wide plinth protection is proposed around each building.
- All external walls shall be of 230 mm thick, all partition walls shall be minimum 115 mm thick with 1:4 cement mortar
- Stair Case
  - Clear width : 1.2 m
  - Tread width : 250 mm
  - Riser : 180 mm
  - Continuous Hand rail is proposed.

9.6.13.1 Foundations

Based on the review of geotechnical data (Reference: Geotechnical Investigation for Intermodal Terminal at Varanasi), it is assessed that open foundations will be proposed for buildings.

9.6.13.2 Loads

9.6.13.2.1 Dead Load

The unit weight of all other materials shall satisfy the requirements of IS: 875.

9.6.13.2.2 Live Load

Live load shall be considered as given below and shall also satisfy the requirements of IS: 875.

Flat Roof	150 kg/m^2 + Dust load of 50 kg/m^2 hanging load for pipe shall be considered as 100 Kg/m^2 and 50 Kg/m^2 for electrical, ventilation & air conditioning (wherever applicable)
Non-accessible roof	75 kg/m^2 + Dust load of 50 kg/m^2
Inclined roof	Roof slope upto 10 Deg.: 75 Kg/m^2 +50 Kg/m^2 Roof slope above 10 Deg.: [(75-(θ-10) x2] + 50 Subjected to a minimum of (40+50) =90 Kg/ m^2 For sloping roofs with slope greater than 10°, members supporting the roof purlins, such as trusses, beams, girders etc. may be designed for two-thirds of live load stated above
MCC Floor	300 kg/m^2 +1.2T/m of Panel

9.6.13.2.3 Seismic Load

- Zone factor : Corresponding to seismic zone-III

- Importance factor : 1.50
- Response reduction factor : 5

9.6.13.2.4 Equipment Load

The Substation building is to be designed to accommodate anticipated static and dynamic loading from electrical equipment. Where the uniform floor live load adequately accounts for the equipment weight, the weight of such equipment as a dead load need not be considered.

9.6.13.2.5 Impact Factor

- For Manual monorail/Hoist design an impact factor of 1.20 shall be considered in design.
- For Electrical monorail/Hoist design an impact factor of 1.25 shall be considered in design.

9.6.13.3 Load Combinations

The load combinations are in accordance with IS: 456, IS: 875 – Part 5, IS 1893 – Part 1 and IS: 800.

9.6.13.4 Minimum Cover

Clear cover to main reinforcement shall be as mentioned hereunder but shall not be less than the diameter of such reinforcement.

Pile (if any):	75 mm
Top, bottom & side of footing:	50 mm
Pedestal / column	
- Below ground	50 mm
- Above ground	40 mm
Beams	25 mm
Slab	20 mm
Face of walls & grade beam	50 mm (in contact with soil)
Face of walls not exposed to soil	25 mm (min.) or dia of main bar
At each end of reinforcing bar	20 mm or twice the dia of bar whichever is greater
Columns of max. dimension 200mm or under and with longitudinal reinforcement diameter not exceeding 12mm	25 mm

9.6.13.5 Serviceability Checks

Crack width of all the structural elements shall be calculated as per IS: 456.

9.6.13.6 Material Specification

The specifications are as given in this volume.

Structural Concrete	Minimum M-30
Levelling Concrete	M-10 of 100 mm thick
Reinforcement	Reinforcement bars shall be low alloy steel reinforcement bars of grade Fe 500 D confirming to IS:1786.
Cement	For plain and reinforced concrete works cement shall be of any of the following types: 1. 43 Grade OPC Ordinary Portland cement conforming to IS 8112 2. Portland slage cement conforming to IS 455 3. Portland Pozzolana Cement (Fly ash based) conforming to IS 1489 (Part -1) 4. Portland Pozzolana Cement (Calcined based) conforming to IS 1489 (Part -2) **Chlorides in the concrete** Whenever there is chlorides in concrete there is an increased risk of corrosion of embedded metal. The higher the chloride content or if subsequently exposed to warm moist conditions, the greater the risk of corrosion. All constituents may contain chlorides and concrete may be contaminated by chlorides from the external environment. To minimise the chance of deterioration of concrete from harmful chemical salts, the levels of such harmful salts in concrete materials, that is, cement, aggregates, water and admixtures, as well as by diffusion from the environment should be limited. The total amount of chloride content (as Cl) in the concrete at the time of placing shall be as given below.

<table>
<tr>
<td></td>
<td>
Limits of Chloride Content of Concrete
<table>
<tr><th>Sl. No</th><th>Type or Use of Concrete</th><th>Maximum Total Acid soluble Chloride Content Expressed as kg/m3 of Concrete</th></tr>
<tr><td>1</td><td>Concrete containing metal and steam cured at elevated temperature and pre-stressed concrete</td><td>0.4</td></tr>
<tr><td>2</td><td>Reinforced concrete or plain concrete containing embedded metal</td><td>0.6</td></tr>
<tr><td>3</td><td>Concrete not containing embedded metal or any material requiring protection form chloride</td><td>3.0</td></tr>
</table>
The total acid soluble chloride content should be calculated from the mix proportions and the major chloride contents of each of the constituents. Whenever possible the total chloride content of the concrete should be determined as per the approval of the Engineer-in-Charge.
Sulphates in concrete:
Sulphates are present in most cements and in some aggregates; excessive amounts of water –soluble sulphate from these or other mix constituents can cause expansion and disruption of concrete. To prevent this, the total water-soluble sulphate content of the concrete mix, expressed as SO3, should not exceed 4 per cent by mass of the cement in the mix. The sulphate content should be calculated as the total from the various constituents of the mix as per the approval of the Engineer-in-Charge.
The 4 percent limit does not applied to concrete made with super sulphated cement complying with IS 6909 or as approved by the Engineer-in-Charge.
</td>
</tr>
<tr><td>Structural Steel</td><td>As per IS:2062 (Grade-A) with minimum thickness of 10 mm</td></tr>
<tr><td>Protective coating to structural steel</td><td>Minimum DFT of 240 micron after sand blasting to SA 2.5 grade.</td></tr>
</table>

9.7 Boundary Wall / Fencing

It is proposed to provide boundary wall of 2.4 m height using brick masonry with barbed wire fencing of 1 m high. The boundary wall shall be provided along the periphery of the terminal area except the water-front side founded on strip footing. Layout of terminal boundary is shown in **Drawing I-525/VTR/207**.

9.8 Roads

Based on the traffic study, it is implicit that both the import and export cargoes will be carried to and from the hinterland through road only. Therefore, providing well-planned internal road network is essential for effective functioning of the terminal. Accordingly, the internal roads were provided with the capacity to cater the traffic of Phase-1B and Final phase.

The cross section for internal and external roads provided in Phase 1A, Phase 1B and Final Phase are shown in Drawing **I-525/VTR/204, 205 & 206 respectively**. The length and width of the internal and external roads are given below:

Table 9-5: Details of roads within boundry Phase-1A

Width of Road	Length
12m	750 m

Table 9-6: Details of roads within boundry Phase-1B

Width of Road	Length
12m	310 m

Table 9-7: Details of roads within boundry Master Plan phase

Width of Road	Length
14 m	705 m
12 m	1190 m
7.5m	545 m

Table 9-8: Detail of roads outside boundry Master Plan phase

Width of Road	Length
10.5 m	235 m
14 m	510 m

9.9 Water Supply

The water requirements for the terminal in different Phases are furnished in Table 9-9 below:

Table 9-9: Water Demand in different phases for Terminal (Litre/per day)

S. No.	Facilities	Water Demand (Litre/per day)	
		Phase 1A+1B	Master Plan Phase
1.	**Water for FFS and other requirement**		
	• Greenery and Miscellaneous	4000	4000
	• For fire fighting	400000	600000
	• Water for Truck wash	6000	9000
	Total Water Requirement (Litre/per day)	**410,000**	**613,000**
2.	**Water for buildings and vessel**		
	• Terminal Personnel, Canteen & Users	15,000	20,000
	• Vessel Supply	5,000	13,000
	Total Water Requirement (Litre/per day)	**20,000**	**33,000**

The scheme for providing raw water and potable water in Master plan phase development of terminal is described below.

The raw & potable water required for firefighting, truckwash, plantation, personnel and vessel supply shall be tapped from borewell. Water shall be tapped from that source and transferred to an underground reservoir of 700 cum capacity located within the project boundary. The raw water shall be pumped from underground sump to overhead tanks located above the buildings for personnel and to bunkering points. As can be seen from above Table , there is not much difference in the water requirement in the Phase 1 and Master Plan Phase, it is therefore proposed to provide Underground storage tank in Phase-1 itself, located near worker's amenity.

The schematic layouts of water supply system in two Phases are shown in Drawing **I-525/VRT/221 to I-525/VRT/222** respectively.

9.10 Sewerage System

The amount of sewage/waste water generated in the terminal are worked out in all the Phases and furnished in Table 9-10 below:

Table 9-10: Details of Sewerage in different Phases of Terminal

S. No.	Phases of the Terminal	Sewerage/Waste water generation in L/day
1.	Phase 1A+1B	13,500
2.	Master Plan Phase	18,000

Based on the number of persons working in the terminal and water requirement mentioned in the above section, the quantity of sewage that is expected to be generated from Varanasi will be around 90% of total water requirement i.e. 18 KLD. Accordingly, it is proposed to provide a sewage treatment plant of capacity 20 KLD which will suffice for the terminal. As can be seen from above Table , there is not much difference in the sewage generation in the Phase 1 and Master Plan Phase, it is therefore proposed to provide a small sewage treatment plant of 20 KLD capacity in Phase-1 itself, located near Container yard. It shall receive sewerage from the terminal buildings and Worker's Amenities Building. The treated sewage shall be used for greenery and in case of any surplus that will be discharged to the drainage network along the access road outside the terminal boundary. The sludge from the treatment plant will be processed and converted into Biomass used as manure. (Refer chapter 13 for STP details).

9.11 Storm Water Drainage

The drainage system for carrying the storm water run-off shall be designed for rainfall intensity of 55 mm/hr at project site location based on iso-pluvial maps of india.

The drainage network for the storage shed will comprise mainly of two longitudinal drains at front and rear end of shed and both sides of road. From the central part, shed pavements will slope at 1:1000 on either side to the drains. These longitudinal drains will discharge the water to the transverse drain/nalah, which disposes the water into the river. The storm water from the buildings will also be connected to the respective storm water drain through small drains and then discharged to the river.

The proposed drainage network in Phase-1 and Master Plan Phase are as shown in Drawing **I-525/VRT/225 to I-525/VRT/227** respectively.

9.12 Navigational Aids

Navigational aids are required to be provided to ensure safe and efficient navigation of vessels while transiting in the navigational channel as well as in the manoeuvring areas near the terminal. Marker buoys will be provided alongside the channel and manoeuvring areas to aid the navigation.

The navigation aids are detailed in below.

There will be a pair of marker buoys at the periphery of the manoeuvring area near terminal. Provision of 3 buoys is kept for marking manoeuvring area. The channel marker buoys will be procured as part of the navigation channel for the entire NW1.

The channel marker buoys will have the following characteristics:

Material	Rotationally moulded in low density uv-stabilised virgin polyethylene
Body diameter	1800 mm
Day Mark	PE Module (as per IALA)
Radar reflector	To be provided
Light Range	3.5 – 4 nautical miles (T=0.74)
PLC Programmer all functions for monitoring of buoy and light	To be provided
Remote Monitoring Unit for buoy position and light	To be provided
Power	Solar plus backup battery for optimum autonomy
Mooring arrangement	250 kg M.S. stockless anchor with 26 mm dia chain

10 PRELIMINARY ENGINEERING - MATERIAL HANDLING SYSTEM/ EQUIPMENTS

As already discussed elseware in this document, cargo commodities are devided broadly into three catagories. i.e. 1. Bulk Cargo, 2. Containers and 3. Bagged cargo.

Dry bulk cargo (Construction Material, consumer goods) will be handled using MHC cranes (Grab operation), unloaded into truck loading hopper/Mobile hopper and transferred to storage area using dumper trucks/conveyor system. Dumper trucks will dump the cargo at storage area and high hipping will be done by front end loaders at storage yard. In final phase, Conveyor will stack the material in stock yard using rail mounted travelling stacker.

Bagged cargo will be handled using MHC cranes (Hook operation with Net), unloaded on flat bed trailers and transferred to warehouse for storage.

Containers will be handled using MHC cranes (Spreder operation), unloaded on flat bed trailers and transferred to container yard for storage. Unloading at container yard will be done by reach stackers.

10.1 Mechanical Equipment

Considering the cargo projections, the summary of mechanical equipment proposed for the terminal are given in Table 8.2.

10.2 Technical Requirements

The terminal parameters shall be adhered to in the bid. Berth layout, crane travel, Barge sizes and dimensions, clearances, water level details, etc., are given in this document against respective chapter. Those required but not given here shall be bidder responsibility to collect and implement.

10.3 Mobile Harbour Crane

MHC cranes shall have following specifications for technical requirement for the project.

MHC shall be equivalent or better than currently conceded in phase-1A LIEBHERR Model LHM180 (4 rope S-version)

OPERATING CONDITIONS
Mobile Harbour Crane shall be of rubber-tyre, self-contained construction and shall be equipped with a diesel engine as a prime mover for crane operation and travelling. The crane shall be of four-rope construction and shall be designed and equipped for multi-purpose operation like general cargo handling, bagged cargos, heavy lift operation as well as containers with semiautomatic Spreader and bulk handling with suitable four rope grab. Being a new terminal and to have edge in the industry market, equipment should have maximum efficiency to perform highest in its class.
Crane will cater to barge up to 2,000 DWT size with the dimension of 80 m x 11 m x 2.5 m.

10.3.1 Main Technical Requirements

The following minimum operating characteristics are required:

10.3.2 Load Capacities

The crane shall have a lifting minimum capacity under four rope grab, up to a radius of 20 m from crane centerline as given in data sheet table 10.1. Maximum Load carrying capacity of crane shall be 64 Ton.

10.3.3 Classification of Crane and Machinery

The crane and its machinery shall be classified according to the FEM 1.001 (Rules for the Design of Hoisting Appliances) and shall have the A7 classification for grab operation.

10.3.4 Operating Speeds

The following speeds shall be provided as a minimum:
Hoisting/ Lowering 0 - 90 m/min
Slewing 0 - 1.6 rpm
Luffing 0 - 83 m/min
Travelling 0 – 5.4 km/hr.

Table 10-1: Data sheet for Mobile harbor crane.

Maximum Load carrying capacity	64 ton
Lifting Capacity under four rope grab at 20m	26 ton
Crane Classification Grab Operation	A7 for 35 ton
Minimum/Maximum out reach	9 m / 35 m
Height of boom pivot above ground	12.5 m
Height of eye level in tower cab	17.6 m
Maximum hoisting height on hook above ground	42 m
Minimum hoisting height on hook below ground	12 m

10.3.5 Main Dimensions

Main dimensions shall be suitable to handle 2000 DWT barge, with hook & slings for bagged and project cargo, four rope grab for bulk cargo and spreader for containers. Main dimensions shall be as per data sheet table 10.1 for MHC as above.

10.3.6 Quay Load Arrangements

Uniformly distributed load 1.36 t/m^2

Max. Load per tyre: 5.2 T

10.3.7 Environmental Conditions

The crane shall be designed to work safely and reliably under the following environmental conditions:

- Daily temperature range variation : ± 15$_0$ C
- Maximum operating wind speed : 24 m/s
- Maximum wind speed for travelling : 24 m/s
- Maximum wind speed out of operation with boom in steepest position: 46 m/s
- Maximum gradient for travelling…
    - In direction of travel : 6 %
    - Perpendicular to direction of travel : 2.5 %

10.3.8 Safety Devices

The crane shall provide the following safety equipment as a minimum:

- Safe load indicator
- Mechanical interlock of chassis and superstructure during travelling
- Stabilizer monitoring
- State-of-the-art electronic limit switching system
- Safety valves at hydraulic cylinders
- Anemometer
- Emergency stop buttons at various locations of the crane
- Video camera at the boom tip
- Appropriate lighting system for night-time operation
- Crane management system (optional)

10.3.9 Grab

4 rope cam shell grab suitable to handle various bulk materials having 8 m3 capacities shall be provided with MHC.

10.3.10 Spreader

Electro-Hydraulic Telescopic fully automatic Spreader with 35t SWL shall be required to handle 20ft & 40ft containers. Each spreader shall be fitted with hydraulically retractable twist lock housings mounted on the main centre section. It shall also have Telescopic design, CG adjustment, flipper guides and twist lock including all supporting accessories.
Figure shows typical details of spreader.

10.3.11 Typical Details of Mobile Harbour Crane

Figure shows Typical Details of Mobile Harbor Crane

10.4 Reach Stackers

Reach stackers shall be required to handle and stack containers in the yard to support import and export cargo movement with flexibility. It shall be used to load and unload 20ft and 40ft containers from flatbed trailers. Table shows the basic requirement of reach stacker specification.

Table 10-2: Specifications of Reach stacker

SL. No.	Description	Data
1	Lifting Capacity at load center about 2m	45000 Kg
2	Lifting Capacity at load center about 4m	27000 Kg
3	Lifting Speed, unloaded – at 70% of rated load	0.42 - 0.25 m/s
4	Lowering Speed, unloaded – at rated load	0.36 m/s
5	Traveling Speed Forward, unloaded - at rated load	21 - 25 Kmph
6	Traveling Speed Backward, unloaded - at rated load	16 - 18 Kmph
7	Engine	Diesel
8	Transmission	Gearbox & clutch
9	Wheels	Pneumatic

10.4.1 Typical Details of Reach Stacker

Figure shows the typical details of reach stacker

10.4.2 Truck Loading Hopper

Tyre mounted truck loading hopper to be loaded with natural aggregates having bulk density 1.6t/m3 using grab operation and further it will load the truck dumpers using hydraulically operated sector gates installed at hopper bottom openings. Following are the minimum technical requirements of the tyre mounted truck loading hopper.

Table 10-3: Specifications of Tyre Mounted Truck Loading Hopper

SPECIFICATION OF TYRE MOUNTED TRUCK LODING HOPPER	
Type	Tyre mounted mobile hopper.
Capacity of Hopper	100 tons of water minimum
Qty	As per equipment Table
Location	On Berth adjacent to Cranes
Material of Construction	Mild Steel (IS: 2062 Grade-B killed Steel), 10mm thick (min).,& Liners of 10thk. SS409
Top opening	Approx. 8 m X 8 m Max.
Overall Height	9.6 m max.
Handrail	Hand rail shall be provided at the top and intermediate platform and along the stairs. It shall be 1m above the floor, a knee rail and a toe guard or by equivalent plain sheeting. There shall be min. clearance of 500mm between appliance and the hand rail. The section of handrail shall be of galvanized pipe of 32mm nominal bore. Grating shall be hot dip galvanised. Hand rail shall be GI Coating with min 610 GSM; Grating shall be with min 910 GSM, painting as per APSEZL corrosion protection specification.
Wheels	630mm Dia. -4 set (8 nos.) with swivelling arrangement & 4 nos. Jacking pads. Wheel shall be of EN 19 Forged material with 300BHN hardness having moulded surface of tyre rubber.
Other ancillaries	2nos Hydraulic operated sector gate and operator cabin.

10.5 Mobile hopper with Feeder

Rail mounted mobile loading hopper to be loaded with natural aggregates having bulk density 1.6t/m3 using grab operation and further it will load the belt conveyor using suitable feeder arrangement. Hopper shall be provided with suitable dust suppression system using water spray nozzle at top hoper opening with piping, pump and water tank, hose reel etc. Following are the minimum technical requirements of the mobile conveyor loading hopper.

Table 10-4: Specifications of rail Mounted mobile Hopper

SPECIFICATION OF RAIL MOUNTED LODING HOPPER	
Type	Rail mounted mobile hopper.
Capacity of Hopper	75 tons of water minimum
Qty	As per equipment Table
Location	On Berth adjacent to Cranes
Material of Construction	Mild Steel (IS: 2062 Grade-B killed Steel), 10mm thick (min).,& Liners of 10thk. SS409
Top opening	Approx. 8 m X 8 m Max.
Overall Height	9.6 m max.
Handrail	Hand rail shall be provided at the top and intermediate platform and along the stairs. It shall be 1m above the floor, a knee rail and a toe guard or by equivalent plain sheeting. There shall be min. clearance of 500mm between appliance and the hand rail. The section of handrail shall be of galvanized pipe of 32mm nominal bore. Grating shall be hot dip galvanised. Hand rail shall be GI Coating with min 610 GSM; Grating shall be with min 910 GSM, painting as per APSEZL corrosion protection specification.
Wheels	630mm Dia. With 4 nos. Jacking pads.
Other ancillaries	Belt feeder / vibrating feeder 600 TPH.

10.6 Truck Dumpers

Multi axel, hydraulically operated 14CBM box body truck dumpers are to be used to transfer material from truck loading hopper to storage yard location. Truck dumpers will dump the

material near to storage yard stock piles and to be moved to jetty for further cargo transfer. Refer equipment table for quantity requirement.

10.7 Front End Loaders

Tyre mounted, hydraulically operated front end loader with 3CBM bucket are to be used to transfer material from dumped stack to stockpile. It can also be used for high hipping of material and maintain the stock piles.

10.8 Flat bed truck trailors

40 ft., 40 tonner flatbed truck trailers are to be used to transfer the bagged cargo from jetty to ware house. Crane will unload the bagged cargo using hook & net operation and further, it will be located on trailer bed. Truck trailers further transfer the cargo to the storage warehouse facility.

10.9 Weighbridge

The assembly shall be Static, pit less, surface mounted electronic load cell based weighbridge having 100 MT capacity and shall be installed with fully functional control cabins with data indication and weighment recording facility for inward and outward cargo.

The weigh bridge shall be of fabricated steel structure with ample safety margin suitably painted with anti-corrosion epoxy based paint.

The specifications for same are as given below:

Table 10-5: Specifications of Road Weigh Bridge

S. No.	Description	Data
1	Type	Pit less, Static
2	Capacity	100T
3	Accuracy	± 0.05% of Full scale
4	Platform size	15 m x 3 m
5	Trucks to be weighed	Heavy duty Trucks / dumpers
6	Operator interface	Menu driven
7	PC & Printer	Required
8	Auto zero & Auto Calibration	Required

9	Anti-skid to plate	Required
10	Stamping by W&M Inspector	Required

10.10 Belt Conveyor

10.10.1 Conveyor:

The conveyor shall have a sturdy, welded, structural steel frame and supports for mounting all the machinery. Frame shall be designed suitably for the belt tension, clearances etc. Frame shall be fabricated from steel conforming to IS: 2062. Antifriction bearings with double labyrinth dust seals and easily accessible pressure gun lubrication fittings shall be provided. It shall be possible to operate the telescopic movement of the spout, within the operating range while the machine is operating at its full capacity. All bearings shall be Spherical roller bearings with plummer blocks lubricated by grease. Belt Conveyors shall be complete in all respects and shall include but not limited to conveyor belting, idler rolls with supports, pulleys, drive units with base frames, head and tail frames, take-up units, skirt boards, scrapers, transfer chutes, stringer frames, short supports, deck plates, gates, etc. and all bolts including anchor bolts.

Belt Conveyor Parameter

Conveyor No.		J1C1	J1C2	J1C3
Aprox. Length	m	250	310	470
Material to be handled		Stone Chips		
Bulk density	kg/m3	1600		
Rated Capacity	TPH	900	900	900
Design Capacity	TPH	1000	1000	1000
Belt Width	mm	1000	1000	1000
Belt Speed	m/sec	2.2	2.2	2.2
Troughing Angle	Degree	35	35	35
3 PC Carrying Idlers	dia(mm)	139.7	139.7	139.7
Carrying Idler Pitch	m	1.2	1.2	1.2
Flat Return Idler	dia (mm)	139.7	139.7	139.7
Return Idler Pitch	m	3.6	3.6	3.6

10.10.2 Belting

The belting for conveyor shall be of suitable EP belt for heavy duty application and shall have adequate number of plies to withstand the tension and support load, adequately; top and bottom cover thickness shall not be less than 5 mm and 3 mm respectively. The ratio of breaking strength to rated allowable working tension shall be minimum nine (9). Belts

supplied shall not blister or separate in the plies or at seams or stretch more than two and half per cent of their original length within one year of installation and normal operation. Belt construction shall be such that in the case of edge damage, ply separation and ingress of moisture shall not take place.

(A) Belting shall conform to latest revision of IS: 1891 (Part I), IS: 11592-2000 and other relevant Indian Standards.

(B) Belts shall have hot vulcanized joints after erection

Nylon-Nylon belting shall be used for all conveyors. Belt ratings are selected in such a way that normal working tension in the belt will not exceed 80 % of the maximum allowable working tension. The belt cover for conveyors shall be of rubber and grade of cover shall be Fire Resistant (FR) grade conforming to Canadian Standard Association CAN / CSA / M-222-M87 Grade-C

10.10.3 Idlers

Carrying idlers shall be of fixed type and provided with three equal rolls with 35° troughing angle. Return idlers shall be of two equal rolls with 10° trough ('V' type). At loading zone impact idlers shall be provided.

Idlers shall be made from ERW steel tube. The rollers shall be mounted on EN 8 or equivalent material shaft by means of heavy-duty ball bearings. The bearings shall be adequately lubricated and sealed for life.

Idler rolls shall be water proof, dust proof and weather proof against a high velocity water jet. All idlers shall be provided with double labyrinth dust seal.

Deep groove ball bearings shall be used. The bearings shall be chosen for life L-10 equal to 50,000 hours minimum. The bearing seals shall have minimum resistance to rotation. Lubrication fittings for the labyrinth seals shall be provided in the case of idlers provided at loading points, for the purpose of occasional greasing to keep the dirt and dust out. Felt seals will not be accepted.

All idlers and assemblies shall conform to latest edition of IS: 8598 or equivalent.

Internal rolling friction resistance of idler rolls shall not exceed 0.015 while testing.

10.10.4 Pulleys :

Pulleys shall be made of welded steel and stress relieved in the furnace before machining. All pulleys shall have ring feeder or tapered lock be keyed to forged steel shafts of EN8 or equivalent material.

Pulley shall be straight faced. Drive and discharge pulleys shall be of same diameter provided with 16 mm thick diamond type grooved rubber lagging. The rubber hardness shall be IRHD 60. All pulleys shall be statically balanced. The balance weight shall not exceed 1% of the total weight of the pulley. The pulleys shall have minimum rim and disc thickness of 12 mm. The face width of pulleys shall be as per relevant IS Standards suitable for belt. The face run-out on diameter shall not be more than 0.5 mm. The run-out tolerance after lagging shall not be greater than 0.5 mm on diameter. Bearings for all pulleys shall be antifriction double row, self-aligning, spherical roller bearings mounted on adapter sleeves.

All Plummer blocks housings shall be of cast steel construction with double / triple labyrinth seals. All pulley bearings shall have life of 50,000 hours.

10.10.5 Belt Weighers

Belt weigher shall be provided in the system at appropriate locations for measurement of cargo handled. The belt scale shall be load cell type and shall be continuous operating. Accuracy shall be 0.25%. Provisions for local and remote measurement of instantaneous throughput and to falling shall be made. Signals for remote indication and overload alarm shall be provided. Local control panel including rate indicator and totalizer shall be provided. The load cells shall be completely sealed, water and dust proof, and maintenance free.

10.10.6 Belt Cleaners

External belt cleaners shall be double bladed, spring loaded modular segmented and replaceable polyurethane scrapper. The modular units shall be easily replaceable. The scraper assembly shall be easily maintainable from outside without any interference with the chute arrangement and assembly.

Internal belt cleaners shall be V plough type made of mild steel flats and hard rubber strips with automatic wear adjustment.

10.10.7 Safety & Control Devices

All conveyors, unless mentioned otherwise, to be equipped, but not limited to the following:

Pull chord type (manually reset type) emergency stop switches shall be located on both sides of belt conveyors along the walk ways for the entire length of conveyors for emergency stopping of conveyors.

Belt sway switches of resetting type shall be provided at periodic intervals on both sides of conveyor to limit belt sway to permissible extent. Zero speed switches shall be non-contact (proximity) type electronic switches and shall be mounted on tail / bend pulleys.

Chute blockage switch: All chutes shall be provided with plugging switches connected to the conveyor interlocking system.

10.10.8 Drive Unit

Drive shall be through reversible Geared Motor/Motor & shaft mounted Gear box, flexible couplings and brake etc. Gear type shall be Bevel Helical of reputed make.

10.10.9 Take-up Arrangement

The conveyors shall be provided with automatic take-up of gravity type. Gravity take up arrangement shall comprise of a structural steel frame sliding up and down on two vertical steel pipe guides, a take up pulley unit mounted on antifriction bearing pillow blocks bolted on to the steel frame and threaded counter weight rods secured to the lower edge of the steel frame each provided with two nuts and washer at their lower end for attaching counter weights.

The take up movement shall not be less than the values specified in Table 1 of IS 4776 (Part I).

Take-up weight shall consist of multi-blocks to facilitate adjustment in weight if required during operation. Weight of single heaviest piece shall be suitable for easy handling

10.10.10 Chute & Hood

Guided transfer chutes suitably designed with a minimum valley angle of 65 shall be provided at all transfer points for transfer of cargo from one conveyor to the next in the direction of belt travel.

Chutes shall be made of structural steel as per IS 2062 and shall have minimum thickness of 10mm.

Chutes shall be provided with replaceable type liner plates. Such liner plates shall be of abrasion resistant type or impact resistant type depending on whether the surface is subjected to friction or impact.

Hoods shall be provided over chutes having provision for fixing dust suppression system as per requirement.

10.10.11 Hoist / Chain pulley blocks

Monorail Hoists with pendant control shall be provided in towers, transfer towers, drive houses, and other areas, as required, where equipment parts heavier than 200 Kg are to be handled for maintenance or lifting height is more than 10m. Elsewhere, monorails shall be provided to facilitate manual chain pulley block operations for lighter parts.

10.10.12 Conveyor Galleries

Conveyor galleries shall be provided with walkways of adequate width on either side to facilitate inspection and maintenance work. Minimum walkway width of 1000mm on each side shall be provided.

Generally conveyor galleries shall be of open type with conveyor hood, however, at jetty hopper travel portion the gallery shall be open type.

Handrails of suitable size and construction shall be provided for safety reasons.

10.10.13 Transfer Towers

All transfer towers shall be provided with GI corrugated sheet cladding as necessary to have an enclosed structure for dust containment. Necessary louver arrangement shall be provided to have natural ventilation.

Sufficient headroom and a minimum space of 1500mm all-round the equipment installed shall be provided in all transfer towers for the purpose of maintenance and safe operation.

All transfer towers shall be provided with electric / manual hoists with monorails for maintenance purpose. The rails shall protrude out of the house by 1500mm or so for enabling lifting and lowering of heavy components / spares.

Table 10-6: Data Sheet for Belt Conveyor System

1.	Belting	Nylon-Nylon
2.	Cover Grade	Fire Resistant (FR) grade conforming to Canadian Standard Association CAN / CSA / M-222-M87 Grade-C
3.	Motor	TEFC Squirrel cage Induction motors
4.	Gear Box	Helical or bevel helical type without fans or cooling coils
5.	High Speed Couplings	Scoop controlled / delayed chamber type
6.	Low Speed Couplings	Geared type
7.	Brakes (as applicable)	Thrustor type
8.	Hold back units	Integral with gear box
9.	Carrying idlers	Fixed type with three equal rolls with 35° troughing angle
10.	Return idlers	Fixed type and provided with two equal rolls with 10° trough ('V' type)
11.	Pulleys	Mild steel construction keyed to forged steel shafts with vulcanized natural rubber lagging
12.	External belt cleaners	Double bladed, spring loaded modular segmented and replaceable polyurethane scrapper
13.	Internal belt cleaners	V plough type made of mild steel flats and hard rubber strips
14.	Take-up	Automatic take-up of gravity type
15.	Belt Protection	Pull chord switches, Belt sway switches, Zero speed switches, Chute blockage switches, etc.
16.	Chutes	Structural steel construction as per IS 2062, 10mm thick Mother Plate with replaceable type liner plates
17.	Flap gates	Linear actuator operated
18.	Belt scale	Load cell type
19.	Magnetic separator	In-line D.C. operated, Electromagnetic suspended type
20.	Metal detector	Electronic Solid State
21.	Maintenance	Monorail Hoists/Cranes

10.11 Rail mounted travelling Stacker

Stacker, as shown in Figure below, is a large machine mounted on a travelling gantry with a boom conveyor. Its function is to stack bulk materials in an orderly and geometric stockpile optimizing the area.

A stacker has three basic movements:

Luffing: This is vertical movement done by luffing (raising and lowering) of its boom by either a winch mechanism with a wire rope, or by hydraulic cylinders. This minimizes the dust generation by reducing the discharge height. The boom is luffed upwards as the height of the stockpile increases.

Travelling: The stacker moves on a rail track (gauge proportionate to the boom of the stacker), enabling it to stack the cargo along the length of the stockyard as required. For this purpose, traction motors powered with gear reducers and multi wheel bogies are provided. All controls are either in a control cabin located at the boom or in the Main Control Room. Stackers can also be controlled remotely.

Slewing: This allows the stacker to form stockpiles on either side of the conveyor by rotation of the stacker boom around its central axis to align where required. This works mostly by a slew pinion that rotates around a slew base with a sun and planet gear arrangement.

Figure : Typical Arrangement of Stacker

11 PRELIMINARY ENGINEERING - ELECTRICAL AND CONTROL SYSTEM

11.1 Electrical Power Requirement

The main power requirement for electrical load in the Construction of IWT Terminal at Varanasi on National Waterway-1 project shall be on account of illumination system, Conveyors, Transfer Towers, Godown, Overhead Water Pump, Sewage Treatment Plant, Weigh Bridge, Belt Scale, flap gates etc. for backup yard and other auxiliary services of Phase-1B and Final Phase. In case of operational power, all the installed loads shall not be required simultaneously. For instance, in case of FFS, Water pump, Dust extraction System etc., all the loads shall not be operating simultaneously. Similarly all the running conveyors shall also not draw maximum power at the same time.

All Electrical and controls equipment shall be designed for an ambient temperature of 45^{o}C.

Taking all such aspects and applying suitable diversity factors, the computation for estimated connected power and demand load are shown in the attached **Annexure-1,** summary of which is given below:

Table 11-1 Summary of Load Calculations

Description	PHASE	Connected Load	Demand Load
Total LT Load	PHASE-1A & 1B	493 kW	365 kW
Total LT Load	FINAL PHASE	1027 kW	760 kW

11.1.1 Source of Power Supply

Power at 11kV shall be made available up to Existing substation in Phase 1a.

11.1.2 System Description

Power at 11kV received at the incomer of HT Switchgear shall be fed at the same voltage to High Power Consuming Equipment (> 160kW) like Motors and other substations as required in future phases as also shown in attached **Power Single Line Diagram I-525/VTR/233**.

11.1.3 Utilization Voltages

The particulars of Power Supply shall be as follows:

Voltage	11kV ± 10% & 415V ± 10%
Phase	11kV (3 Phase 3 Wires) 415V (3 Phase 4 Wires)
Frequency	50 Hz ± 3%
Combined Voltage & Frequency Variation	10%
Fault Level	26.3kA for 3 second at 11kV

	50kA for 1 second at 415V
System Earthing 415 V	Solidly Earthed
Control Circuits	
Circuit Breaker Protection & Tripping	110 V DC, 2 Wire grounded
Control System	
UPS System, Field Hooters	240 V ± 10%, AC, 50 HZ ± 3%, 1 Ph, 2 Wire

11.1.4 Electrical Substation (ESS)

ESS-1 is already under construction for Phase 1A. Further One number substation ESS-2 is proposed to be located and constructed progressively as shown in the **Drawing I-525/VTR/232**. Switchgear room on the Ground Floor shall be housing Metering Panel of UPPCL, Transformers, Diesel Generator set, 11kV HT Switchgear Panel, 415V Power Control Center (PCC) and various distribution Boards etc.

Control room on the First Floor of ESS shall be housing Programming Station, Server Station, Operating Station, CCTV Control Station, PLC Panel, UPS & 64" LED Screen. First Floor shall also have facility of Store Room, Pantry, Conference Room and Toilet.

11.1.5 Power Factor Correction

415V capacitor banks with Automatic Power Correction Panels shall be provided at ESS1 & ESS2 as shown in the attached **Power Single Line Diagram I-525/VTR/233 & I-525/VTR/234** to achieve power factor of 0.95 lag on 415V bus respectively. One number capacitor bank for 415V shall be installed in Phase-1b at ESS1 and in final phase at ESS2.

11.1.6 Distribution Transformer

11kV voltage is further stepped down to 415V through two numbers of distribution transformers, which shall be installed in Phase-1A & Final phase each capable of handling 100% load at a time. Transformer of rating 11kV/433V, 500KVA, at EES1 and 11kV/433V, 1250KVA at ESS2. Transformer shall be indoor Dry type, having off circuit tapping of +/-10%, in steps of 2.5%, winding temperature detectors with scanner for temperature alarm and trip, door safety limit switch and accessories.

11.1.7 Motors

All Motors including and below 160 kW shall be 415V and all motors above 160 kW shall be 11 kV. Motors shall be energy efficient (IE3), squirrel cage induction type.

11.1.8 HT Power Distribution System

11kV HT Switchgear Panels are proposed at ESS1 & ESS2 as shown in the Single Line Diagram **Drawing I-525/VTR/233 & I-525/VTR/234 respectively**. All relays in these HT Switchgear Panels shall have intelligent type Multifunction relays (Numerical relays) and meters shall be of digital type with RS 485 communication port facility both for relays & meters. Lamps shall

be LED type. Busbars shall be high conductivity Aluminium alloy @ 1.0 Amps/mm^2 current density for HT Switchgear panels. One of each type of feeder, shall be provided as spare. The enclosure protection shall be IP54 minimum for indoor installation and IP55 minimum for outdoor installation.

11kV HT Switchgear Panel shall be provided with Vacuum Circuit Breaker (VCB) of suitable breaking capacities but not less than 26.3KA for 3 second.

11.1.9 LT Power Distribution System

One number of 415V Power Control Centre (PCC) is proposed at ESS1 & ESS2 as shown in the SLD **Drawing I-525/VTR/233 & I-525/VTR/234 respectively**. All relays in this LT Switchgear Panel shall have intelligent type Multifunction relays (Numerical relays) and meters shall be of digital type with RS 485 communication port facility both for relays & meters. Lamps shall be LED type. Busbars shall be high conductivity Aluminium alloy @ 1.0 Amps/mm^2 current density for PCC, ACDB & MLDB. Bus bar shall be of high conductivity electrolytic grade Copper @1.25 Amps/mm^2 current density for other distribution boards (like LDB, PDB, CDB etc.). PCC shall feed power at 415V to the various LT Loads such as motors, PDBs, MLDB/LDBs, Distribution Boards (DBs) etc. The enclosure protection shall be IP54 minimum for indoor installation and IP55 minimum for outdoor installation.

PCC shall be provided with Air Circuit Breaker (ACB) and moulded case circuit breaker (MCCB) of suitable breaking capacities but not less than 50KA for 1 second. The rupturing capacity of miniature circuit breaker (MCB) used in DB's/SB's/FP's for further distribution shall not be less than 10 KA.

Industrial power sockets 240V 15A, minimum 2 Nos. shall be installed at each floor of Electrical Substation, Control Room, Terminal Admin. Building, Worker's Amenity Building, Security Office, Weigh Bridge Building, Sewage Treatment Plant, Covered shed, Transfer towers etc. & at a distance of every 30m in case of Conveyors

Welding socket 415V TPN and earth 63A, minimum 2 Nos. shall be installed at each floor of Electrical Substation, Control Room, Terminal Admin. Building, Worker's Amenity Building, Security Office, Weigh Bridge Building, Sewage Treatment Plant, Covered shed, Transfer towers etc. & at a distance of every 30m in case of Conveyors

11.1.10 Standby Power Supply

Silent Diesel generator (DG) set has been envisaged for feeding 100% indoor lighting & 20% High Mast Load requirements. One number 160 KVA & one number 200 kVA DG set is proposed in Phase-1b at ESS1 and final phase at ESS2 respectively.

11.1.11 Illumination

The illumination level in various areas to be maintained at the working plane are mentioned below and for other areas not mentioned below it shall be based on National Electric Code.

Location	Average lux level	Type of Luminaire
Stockpile and Jetty Area	30	350W LED Flood Light, weather proof, Heavy duty High Mast(30 m) light in die cast Aluminium alloy housing
Electrical Substation, Transformer, DG Room, Worker's Amenity Building, Sewage Treatment Plant, Waste Collection Center, Weigh Bridge Building & Security Office	200	General Purpose Industrial compact batten suitable for 2x20 W LED Tube Light fitted with Aluminium heat sink
Terminal Admin. Building & Control Room	300	34Watt LED Panel with ultramodern recess mounting luminaire suitable for armstrong/grid/POP ceiling complete with separate electronic driver & high brightness Surface Mounted Device (SMD) LEDs
Storage shed	100	Open type vertical Medium Bay LED luminaire with high power COB 70W LED as light source
Belt Conveyors walkways, Transfer Towers	50	Vertical/Horizontal surface mounting pressure die-cast aluminium well glass luminaires with high power 40W LED as light source
Electrical Substation, Control Room, Terminal Admin Building, Worker's Amenity Building, Security Office, Weigh Bridge, STP, Covered Shed, Transfer Towers, conveyor galleries, all exit / entry points etc.	10	Battery operated emergency lighting unit consist of aesthetically designed rechargeable 5 Watt LED lantern with dimming and SOS feature. Battery shall be rechargeable Li-ion type & 5V DC Li-ion charger with 1 hour battery backup
Road light	20	70 Watt LED with single / double arm 9 meter hexagonal GI pole with FRP J.B and required accessories.

Wherever required poles of suitable height with fittings shall also be installed for outdoor lighting of the buildings.

One number of MLDB is proposed. MLDB shall receive dual power from respective PCC and DG supply, which in turn shall feed various LDBs of Phase-1B & Final Phase as shown in attached **Power Single Line Diagram Drawing I-525/VTR/233 & I-525/VTR/234 respectively**. 1:1 Lighting trans-formers shall be placed at MLDB to maintain voltage drop within the permissible limits.

11.1.12 Cables

Power distribution at 11 kV shall be done through 11 kV (E), XLPE, stranded aluminium conductor, armoured, overall FRLS PVC sheathed cable laid on cable trays, ducts, directly buried in ground and in trenches, etc. as per site requirement.

LT power distribution to various LT motors and services such as illumination, firefighting, air conditioning, water supply etc. shall be done through 1.1 kV grade XLPE insulated, stranded aluminium conductor, armoured, overall FRLS PVC sheathed power cables. Laying of cables shall be done as per site requirement.

Internal wiring shall be done in recessed PVC conduit or on surface with GI conduit and single core PVC insulated FRLS copper wire.

11.1.13 Cable Trays & Accessories

FRP type cable trays & its accessories shall be considered for the project. Thickness of the various components shall be as per the calculations and these calculations shall be submitted by EPC Contractor for client approval before starting the manufacturing.

11.1.14 Earthing & Lightning Protection

An efficient earthing and lightning protection system shall be designed to ensure protection of men & material in worst of the weather conditions. Suitable Lightning protection system shall be installed as per the guide lines of the IS/IEC-62305:2010 (Superseding IS-2309: 1989).

All equipment of substation and various other services / equipment shall be earthed at two points. There shall be one earth grid formation using 75 x 8 mm GI strip and all equipment earthing shall be connected to this earth grid through Aluminium wire with PVC coating or GI strip as per the requirement. This grid shall be connected with number of pipe electrodes. However, the neutrals of transformers and DG sets shall be earthed separately. Each neutral shall be connected to 2 numbers separate pipe earth electrodes. Specialised Earthing shall be provided to the sensitive equipment by means of dedicated Cu. earthing pits, Cu. earthing conductor and Cu. earth bus bar mounted on the insulators. Earthing system shall be designed in principle as per IS: 3043, however for chemical earthing IEEE: 80-2000 shall also be followed.

For lightning protection separate earth pits shall be provided. Exact number of earth pits shall be worked out after earthing and lightning protection calculation has been carried out measuring the soil resistivity at site.

Earth (chemical) pits shall be based on High Conductivity Technology. In this technology of chemical earthing, a compound of high electrical conductivity shall be filled up in the space around the ground electrode, so that the earth resistance value would decrease appreciably. Minimum Electrode size shall be as per the latest amendments of IS: 3043.

The high Conductive Compound shall be able to perform in any weather and soil Conditions and shall have following properties;

1) It shall have high electrical conductivity, which should remain constant and unaffected by changes in temperature & moisture.

2) It shall permanently remain embedded and should neither dissolve in and swept away by water.

3) It shall have an ability to absorb large amount of water and retain the same over a long periods of time.

4) It shall decreases earth pit resistance with passage of time.

5) Solubility: Shall be partly miscible; so that it does not dissolve fully like common salt and thus increasing the Earth Pit Life.

6) The pH value shall be near neutral so that it does not pollute soil or water and also does not corrode earth electrode.

7) It shall be maintenance free Compound so that there shall be no need of extra water pouring at regular interval as in conventional earthing material, because it should retain the moisture.

8) Chemical Compound shall be thermally conductive, in order to maintain a constant Earth resistance in temperature range of -50 to +60 degree Celsius.

9) The Compound shall have relatively High conductivity so that it can create very low resistance even in rocky areas.

10) It shall have low earth resistance, carries high peak current repeatedly.

11) It shall have a Long and reliable life.

12) It shall be easily installed in any soil conditions.

11.1.15 Ventilation and Air Conditioning (AC) System

Electrical Substation at Ground Floor, metering room, Battery room, control Room, Worker's Amenity Building, STP (Pump room), all toilets & pantries shall be provided with exhaust fans for ventilation to maintain proper temperature inside the panel room and removal of additional heat produced due to various switchgears.

Split AC shall be used for Control Room, Security Office & Weigh Bridge building. The offices in the Terminal Admin. Building shall be Air-conditioned through centralized AC so as to maintain an inside temperature of 27^{o}C.

Tentative layout of the various rooms is shown in the drawings mentioned below:

a) Typical Layout of Terminal Administration Building, **I-525/VTR/211**

b) Substation Equipment Layout, **I-525/VTR/232**

c) Typical Layout & Elevations of Security and Weigh Bridge control room and Canteen with toilet **I-525/VTR/214, I-525/VTR/215 & I-525/VTR/216**

d) Layout Plan (Phase-1A, Phase 1B & Phase-2) of Terminal Facilities, **I-525/VTR/204, I-525/VTR/205 & I-525/VTR/206 respectively.**

11.1.16 Battery and Battery Charger

One number dual Battery and Battery Charger with DC Distribution Board shall be provided for the control, protection, interlocks and indication of switchgear panels.

11.1.17 Closed Circuit TeleVision (CCTV) System

To ensure surveillance of required locations as well as create secured record for post event analysis, CCTV system is proposed. The system shall provide an online display of video images on LED monitors located in Control Room and PTZ (360O) cameras at various locations like Gate Complex, Terminal Administration building & at all berths etc. as per **Drawing I-525/VTR/235**. The core of the surveillance system shall be Network Video recorder (NVR) server. System shall also have operating systems, appropriate software, networking equipment and other essential components.

11.1.18 Control System

The Control system shall be installed to ensure safe and reliable operation of conveyors, dust extraction system and others facilities. PLC system shall read the inputs, perform all system logic, conduct online diagnostics, sequencing control and control the outputs. The processor based central control system is envisaged to control and monitor the material handling operations in the IWT Terminal so as to carry out the operation in an integrated mode from “Control Room”.

The Control Network shall be used for providing automation functions, interlocking, sequence starting, monitoring and supervisory functions with Belt Conveyors.

The Control Network shall also be used for providing monitoring and supervisory functions, interconnection with Equipment/Machines having its own Control Systems like Mobile Harbour Crane, Barge Loaders, Weigh Bridge, Gantry Type Grab Cranes etc.

The core of the system shall consist of an Operating station, Programming Station & Server station (all the computers shall be latest version of the Industrial PCs - IPC as on the date of bidding) with printer and along with centralized real –time redundant PLC system (One online and the other in hot standby excluding I/O modules), sharing a RAID 6 (redundant array of independent disk) data storage system and a data network, with shared high-capacity data backup and off-site data archiving.

The control system would incorporate all safety interlocks to ensure complete safety to operating personnel and to avoid any damage to equipment due to mal- functioning.

The control system shall generally be based on the following principles:

i) To start equipment in either of the two modes i.e. 'Local' or 'Remote'
ii) To trip off minimum equipment in the desired sequence during abnormal operating conditions, leaving all the other equipment running, which may safely be permitted to continue the operations
iii) To annunciate the fault which has tripped equipment along-with the cause for tripping
iv) To prevent restarting of the equipment until safe conditions have been restored
v) To retain maximum flexibility of operation consistent with safety
vi) To prevent mal-operation of equipment on interruptions
vii) To stop all the running equipment simultaneously by pressing Emergency Stop Push Button
viii) To stop running equipment in the reverse order with time lag during normal stop.

Processor would perform all operational and control functions. Processor would collect all the field related data from local field devices like local push button station, pull chord switch, belt sway switch, zero speed switch, local control panels etc. via junction boxes by means of data bus cable.

The control network shall be real-time network, requiring long time continuous operation. During normal operations, the system cannot be shut off and it shall be possible to replace the components without shutting off the power. It shall be feasible to program the system online.

Proper care shall be taken in data transfer so as to achieve quick response while transmitting control and management information. The response time should not be more than one millisecond. The network system shall have fault clearance functions, secure transmission of data through error checking routines on all data transmitted. The networks shall use open systems (universal protocol) technology, support multiple industrial standards, allow a combination of multiple communication agreements, and shall have the capability to join wider networks in future through the server.

The analogue module system shall have provision to accept signals from other subsystems generating 4-20mA analogue signals. Proper conversion to standard units shall be done by control software.

Redundancy (100% hot standby) is provided in the PLC's so that in case of failure of any of the processors, the hot stand by processor shall take over automatically. The changeover shall be smooth. Redundancy shall be provided for complete processor subsystem including CPU, memory, power supply.

Input/output units shall be capable of accepting discrete, analogue and digital input and output devices. If the number of slots for input and output modules in the controller rack is not sufficient, expansion units shall be connectable to the CPU by means of interface modules.

Each Input and Output module shall be electrically isolated from the controllers through opto-couplers or isolation transformers and shall withstand severe voltage transients without damage or adverse effect on the controller. Output modules shall incorporate self-contained damping networks and voltage limiting devices to prevent false triggering of outputs and to suppress line voltage spikes.

PLC power supply units must have self-test facilities for detecting under voltage and also must be able to give alarm and switch over to UPS mode in case the output voltage is + 20% above the normal value.

A SCADA system shall be provided to control and monitor operation of the proposed facility.

11.1.19 Safety Switches

Safety switches for conveyors shall mainly consist of the Zero Speed Switches (ZSS), Belt Sway Switches (BSS), Pull Chord Switches (PCS) and Belt Take-up Switches (BTS).

PCS shall be installed @ 30m on both sides of each pipe/belt conveyor to stop the conveyor instantly when an accident happens. BSS shall be installed @ 50m to stop drive unit for protecting belt from rubbing against the structural parts on both sides of each pipe/belt conveyor. One number ZSS shall be provided to stop the motor when the speed of the equipment drops below a specified value or if normal speed is not reached within a specified time, and to signal starting and stopping of preceding conveyor/ equipment.

PCS and BSS shall be microprocessor based addressable type and shall be connected to the Master Unit for monitoring, which in turn shall communicate with the PLC. This Master unit shall be placed in the Field / Remote I/O panel as shown in the attached Control Architecture.

BTS switches shall be provided and installed so as to be actuated by an extreme movement of the conveyor belt take ups, should the belt tension not be adequate for any reason.

11.1.20 Communication System

Telephone System

EPABX system of 50 lines is proposed for this project.

Public Address (PA) System

No PA system is proposed for this project.

Annexure – 1

LT LOAD CALCULATION – PHASE 1A & 1B							
S.NO.	Equipment	Connected load (KW)	Utilization factor (%)	Maximum Demand (KW)	DG Rating (kVA)	TOTAL CAPACITANCE LOAD	
1	Power Supply to Godown 1	60	0.8	48	0	48	
2	Power supply to Fuel station	15	0.6	9	0	9	
3	Power supply to Banarasi Haat	15	0.6	9	0	9	
4	Power supply to Shops & Kiosk	15	0.6	9	0	9	
5	Power supply to Jal Yatri Nivas	20	0.6	12	0	12	
6	Underground reservoir - Pump	30	1	30	0	30	
7	Sewage Treatment Plant	7.5	1	8	0	8	
8	Electric Hoist (5 X 5.9kW)	29.5	0	0	0	0	
9	Weigh Bridge (including control room) (2x3kW)	6	0.8	5	0	5	
10	MLDB Load Phase 1a	130	1	130	100	130	
11	MLDB Load Phase 1b	100	1	100	50	100	
12	PDB (For Welding Socket Load)	60.0	0	0	0	0	
13	Battery Charger	5.0	1	5	5	5	
	LT Load in kW - PHASE-1	493.0		364.3	155.0	364	
	Load in kW at 90% Diversity factor			**327.9**	**139.5**	**Total Capacitance Load**	364
	Load in kVA at .95 pf			345.1	174.4	Multiplying Factor (0.75 to 0.95)	0.553
	Load at 120% Overload			414.2	209.3	Required Capacitance	201
	TRANSFORMER & DG RATING SELECTED			500 kVA	50 kVA, Phase 1a + 160 KVA Phase 1b	CAPACITOR BANK SELECTED	25 KVAR Phase 1a+ 200 KVAR Phase 1b

LT LOAD CALCULATION - FINAL PHASE							
S.NO.	Equipment	Connected load (KW)	Utilization factor (%)	Maximum Demand (KW)	DG Rating (kVA)	TOTAL CAPACITANCE LOAD	
1	Power Supply to Godown 2	60	0.8	48	24	48	
2	Jetty Conv. 1	90	0.8	72	0	72	
3	Conv. 2	90	0.8	72	0	72	
4	Yard Conv. 3	150	0.8	120	0	120	
5	Mobile Hopper 1	75	0.8	60	0	60	
6	Mobile Hopper 2	75	0.8	60	0	60	
7	Stacker 1	110	0.8	88	0	88	
8	Conv. Accessories - Hoist, Drive coupling, transfer tower illumination etc.	50	0.8	40	0	40	
9	Road Weigh Bridge for MHS (2x3kW)	6	1	6	0	6	
10	Electric Hoist (5 X 5.9kW)	29.5	0.8	24	0	24	
11	Weigh Bridge (including control room) (2x3kW)	6	1	6	6	6	
12	MLDB Load Final Phase	160	1	160	110	160	
13	PDB (For Welding Socket Load)	120.0	0	0	0	0	
14	Battery Charger	5.0	1	5	5	5	
	LT Load in kW - FINAL PHASE	1026.5		760.6	145.0	761	
	Load in kW at 90% Diversity factor			**684.5**	**130.5**	**Total Capacitance Load**	761
	Load in kVA at .95 pf			720.6	163.1	Multiplying Factor (0.75 to 0.95)	0.553
	Load at 120% Overload			864.7	195.8	Required Capacitance	421
	TRANSFORMER & DG RATING SELECTED			1250 kVA	200 kVA	CAPACITOR BANK SELECTED	420 kVAR

12 FIRE FIGHTING

12.1 Fire Fighting Facilities

The firefighting system should be Provided IWT Terminal, Varanasi. The system shall be designed in accordance with NFPA and TAC standards.

It is envisaged to use raw water for fire hydrant system.

12.2 Fire Water Tank & Pump House

PHASE 1B

The Fire water is stored in two compartments having capacity (8.5M X 7.1M X 4M H) 482 M^3 located near the fire water pump house. Two (2) nos. fire water storage tanks each of capacity sufficient to meet fire water requirements of phase 1B.

The 2 Nos. (1W+1S) pumps with capacity 171 M^3 located in fire pump house shall be operated in a semi-automatic mode. The capacity pump is sufficient to meet fire water requirements in phase 1B.

Final Phase

The Fire water is stored in two compartments having capacity 700 M^3 located near the fire water pump house. Two (2) nos. fire water storage tanks each of capacity sufficient to meet fire water requirements envisaged within the plant area.

The 2 Nos. (1W+1S) pumps with capacity 273 M^3 located in fire pump house shall be operated in a semi-automatic mode. I.e. starting of the pumps shall be automatic or manual and stopping shall be manual only. Main pump shall be electric motor driven and the standby pump shall be diesel driven. The jockey pump shall also be provided to keep the firewater main under required pressure.

Isolation valves (butterfly valves) shall be provided at suitable places in each of the ring mains / sub-loops to enable to take up part of any of the ring mains for maintenance.

12.3 Hydrant System

We have considered single headed Fire Hydrant System at Container yard, Bulk Cargo and jetty area only. Spacing of hydrants shall not be more than 45m. We have considered Water cum foam hydrant at Fuel station area.

We have considered internal hydrant at substation & Building.

Hydrant mains shall be G.I. heavy grade pipe with suitable type of fittings made of by same material. Underground pipes shall be treated for anti-corrosive material.

12.4 Fire Extinguisher

Fire extinguishers shall be installed in all the buildings within the plant boundary as per the requirement.

13 SEWAGE TREATMENT PLANT

13.1 General

The quantity of sewage that is expected to be generated from Varanasi MMT will be around 90% of total water requirement i.e. 18 KLD. The sewage treatment plant of 20 KLD (FAB technology) is proposed which should be compact, odour free and shall consume low power.

Plant shall be installed below ground level or at any desirable depth and shall generate minimum amount of excess sludge. Waste water after treatment below shall be suitable for A/C cooling towers irrigation and scrubber make-up.

Standards of the effluent discharge after treatment shall be as follows:

Parameters	Value
pH	6.0 - 8.8
BOD	Less than 20 Mg/L.
Suspended solids	Less than 10 Mg/L.
COD	Less than 180 Mg/L.
Oil & Grease	Less than 10 Mg/L.
Coliform count	< 103 at the CCT outlet

13.2 Special Notes

Cost of pump shall include provision of isolation valves at inlet and outlet, non-return valves at outlet, pressure gauge, and steel channel arrangement at base, power and control cable from and to electrical panel, level controllers and alarm system.

- Providing of air educator system shall be made for following through MS epoxy painted piping, fittings and valves
- Sludge recycle piping from clarifier
- Sludge waste piping from clarifier
- Skimmer return piping from clarifier
- Contractor to note that all submersible pipelines shall be in SS 304.

14 EXTERNAL CONNECTIVITY

14.1 External Road Connectivity

14.1.1 Existing Road Connectivity

During the site visit and as per topography survey, it is observed that there is no pucca road connectivity to the proposed site. There is an existing village road of about 700m which connects the site from NH 7.

14.1.2 Proposed road connectivity

To facilitate the movement of cargo from Varanasi Terminal to the hinterland, it is proposed to provide external road connectivity to the terminal from NH-7. A right of way of 23 m is acquired for the road connectivity. A canal and a nala exists along the alignment of the proposed road. The layout showing details of proposed road is shown in the Drawing I-525/VTR/242.

A two lane road of 650m length is proposed in Phase-1A, which is proposed to be widened to four lane road in Master Plan Phase. An additional four lane road is also proposed in Phase-2 on the other side of the Railway track to provide better accessibility to the terminal.

14.2 External Rail Connectivity

Rail connectivity plan for Varanasi Terminal was prepared considering the proposed jetty (under construction) level, Yard gradient for drainage, NH proposed alignment received from RITES. A RoB is proposed on NH-7 to accommodate rail alignment below proposed RoB. The railway level at the crossing of NH-7 is +77.00m and FRL of RoB is +87.50 m. The road traffic of Varanasi Terminal will be facilitated by U-Turn facility provided below the RoB and use of service road.

15 ENVIRONMENTAL IMPACT ASSESSEMENT (EIA) & ENVIRONMENT MANAGEMENT PLAN (EMP)

16 COST ESTIMATE

In this chapter, an estimate of the capital cost for both the phases viz. Phase-1 and Phase-2 has been prepared for the most optimal layout. The annual operation and maintenance cost of facilities that would be incurred annually for both the above mentioned phases is also provided.

16.1 Basis of Cost Estimates

The quantities for various project components has been arrived based on the preliminary engineering carried out by the consultant. Further, the cost estimate has been arrived on the basis mentioned below.

- The cost estimates for onshore civil works has been prepared on the basis of the rates provided in "Delhi Schedule of Rates – 2016"
- The cost estimates for the offshore civil works has been arrived based on the rates taken from current works of similar nature, updated rates of works of similar nature completed in the recent past and from Consultant's in-house data bank
- The cost estimate for equipment is based on Consultant's in-house data bank and budgetary quotations
- Taxes / Duties as applicable has been included

16.2 Capital Cost Estimates of Phase IA

Table 16-1 Capital Cost Estimate for Varansi Terminal – Phase-1A

S. No.	Item		Quantity	Unit	Rate (Rs.)	Capital Cost (Rs. in Cr.)
1.	**LAND & SITE DEVELOPMENT**					**17.15**
	1.1	Site clearance		LS		
	1.2	Earth Cutting & filling	5,00,000	cum	343	17.15
2.	**SHORE PROTECTION WORK**					**13.75**
	2.1	Shore protection		LS		13.75
3.	**JETTY**					**46.50**
	3.1	Berths		LS		46.50
4.	**STOCKYARD**					
	4.1	Stockyard development works (considered in Ph-1B)	0	Sqm		-
5.	**BUILDINGS & SHED**					**1.22**
	5.1	Ware house (considered in Ph-1B)	0	sqm	-	-
	5.2	Sub station	400	sqm	28,000	1.12

	5.2	Administrative building (considered in Ph-1B)	0	sqm	-	-
	5.3	Water tank and pump house (considered in Ph-1B)	0	sqm	-	-
	5.4	Banarasi hat (considered in Final Phase)	0	sqm	-	-
	5.5	Toilet block	30	sqm	32,000	0.10
	5.6	Shops and kiosk (considered in Final Phase)	0	sqm	-	-
	5.7	Jal Yatri Nivas (considered in Final Phase)	0	Sqm	-	-
	5.8	Weigh bridge cabin (considered in Ph-1B)	0	Sqm	-	-
	5.9	Security cabin (considered in Ph-1B)	0	sqm	-	-
	5.10	Fuel station/Storage area (considered in Final Phase)	0	sqm	-	-
	5.11	Gate Complex with Parking (considered in Final Phase)	0	LS	-	-
6.	**ROADS & PARKING AREA**					**6.91**
	6.1	Approach road (External)	-	LS	-	1.81
	6.2	Internal roads	-	LS	-	5.10
7.	**UTILITIES AND OTHERS**					**1.05**
	7.1	Water supply and distribution (considered in Ph-1B)		LS	-	-
	7.2	Storm water drainage work		LS	-	1.05
	7.3	Sewerage system (considered in Ph-1B)		LS	-	-
	7.4	Electrical distribution system & IT		LS	-	-
	7.5	Firefighting system (considered in Ph-1B)		LS	-	-
	7.6	Boundary wall (considered in Ph-1B)		LS	-	-
8.	**EQUIPMENTS**					**46.26**
	8.1	Mobile Harbour Crane	2	No.	23,13,03,072	46.26
	8.2	Semi-automatic spreader (considered in Ph-1B)	0	No.	-	-
	8.3	Grab 8 cum, 13Mt (considered in Ph-1B)	0	No.	-	-
	8.4	Road weigh bridge with Foundation	0	No.	-	-
	8.5	Dumper truck	0	No.	-	-
	8.6	Front end loader	0	No.	-	-
	8.7	Flat bed trailor	0	No.	-	-
	8.8	Truck Loading Hopper (considered in Ph-1B)	0	No.	-	-
	8.9	Reach stacker	0	No.	-	-
9.	**Pontoon and Gangway**					**10.95**
	9.1	Pontoon and Gangway and stairway	1	LS	-	10.95
10.	**Entry Gate**					**0.80**
	10.1	Entry Gate	1	LS	-	0.80

A	**TOTAL COST (1 TO 10)**	**144.59**
B	**CONTINGENCY (3%)**	**4.34**
C	**TOTAL PROJECT COST (A + B)**	**149.00**
D	**GST**	**31.45**
E	**GRAND TOTAL (C + D)**	**181.00**

16.3 Capital Cost Estimates of Phase IB

The item-wise capital cost estimate of Phase-1B for the development of Varansi terminal is presented in below:

Table 16-2 Capital Cost Estimate for Varansi Terminal – Phase-1B

S. No.	Item		Quantity	Unit	Rate (Rs.)	Capital Cost (Rs. in Cr.)
1.	**LAND & SITE DEVELOPMENT**					**0.85**
	1.1	Site clearance		LS		-
	1.2	Earth Cutting & filling	1,14,000	cum	75	0.85
2.	**SHORE PROTECTION WORK**					**-**
	2.1	Shore protection		LS		-
3.	**JETTY**					**-**
	3.1	Berths		LS		-
4.	**STOCKYARD**					**11.54**
	4.1	Stockyard development works	42,245	Sqm		11.54
5.	**BUILDINGS & SHED**					**17.11**
	5.1	Ware house	12,075	Sqm	11,200	13.52
	5.2	Adimnitrative building	640	Sqm	45,000	2.88
	5.3	Water tank and pump house	300	Sqm	22,059	0.66
	5.4	Banarasi hat	0	Sqm	0	-
	5.5	Toilet block	0	Sqm	0	-
	5.6	Shops and kiosk	0	Sqm	0	-
	5.7	Jal Yatri Nivas	0	Sqm	0	-
	5.8	Weigh bridge cabin	9	Sqm	25,000	0.02
	5.9	Security cabin	9	Sqm	25,000	0.02
	6.0	Fuel station/Storage area	0	Sqm	0	-
	6.1	Gate Complex with Parking	1	LS		
6.	**ROADS & PARKING AREA**					**2.11**
	6.1	Approach road (External)		LS		
	6.2	Internal roads		LS		2.11
7.	**UTILITIES AND OTHERS**					**10.27**
	7.1	Water supply and distribution		LS		0.95
	7.2	Storm water drainage work		LS		2.05
	7.3	Sewerage system		LS		0.28

	7.4	Electrical distribution system & IT communication		LS		3.29
	7.5	Fire fighting system		LS		2.57
	7.6	Boundary wall		LS		1.14
8.	**EQUIPMENTS**					**26.26**
	8.1	Mobile Harbour Crane	1	No.	23,13,03,072	23.13
	8.2	Semi-automatic spreader	1	No.	52,50,000	0.53
	8.3	Grab 8 cum, 13Mt	1	No.	32,00,000	0.32
	8.4	Road weigh bridge with Foundation	1	No.	28,00,000	0.28
	8.5	Dumper truck	0	No.	-	-
	8.6	Front end loader	0	No.	-	-
	8.7	Flatbed trailor	0	No.	-	-
	8.8	Truck Loading Hopper	2	No.	1,00,00,000	2.00
	8.9	Reach stacker	0	No.	-	-
A	**TOTAL COST (1 TO 8)**					**68.13**
B	**CONTINGENCY (3%)**					**2.04**
C	**TOTAL PROJECT COST (A + B)**					**71.00**
D	**GST**					**15.66**
E	**GRAND TOTAL (C + D)**					**87.00**

The following items have not been included in the above cost estimate.

- Land acquisition cost
- Electricity and water connection cost from local electricity board and municipal corporation

16.4 Capital Cost Estimates of Master Plan

The item-wise capital cost estimate for Master Plan for the development of Varansi terminal is presented in below:

Table 16-3 Cost Estimate of Varansi Master Plan

S. No.	Item		Quantity	Unit	Rate (Rs.)	Capital Cost (Rs. in Cr.)
1.	**LAND & SITE DEVELOPMENT**					**24.42**
	1.1	Site clearance		LS		-
	1.2	Earth filling	7,11,500	cum	343	24.42
2.	**SHORE PROTECTION WORK**					**13.00**
	2.1	Shore protection		LS		13.00
3.	**JETTY**					**69.75**
	3.1	Berths		LS		69.75
4.	**STOCKYARD**					**11.42**

	4.1	Stockyard development works	58,920	Sqm		11.42
5.	**BUILDINGS & SHED**					**43.14**
	5.1	Ware house	31,675	sqm	11,200	35.48
	5.2	Sub station	800	sqm	28,000	2.24
	5.3	Banarasi Haat	120	sqm	22,000	0.26
	5.4	Toilet Block	50	sqm	32,000	0.16
	5.5	Shops/ Kiosks	110	sqm	22,000	0.24
	5.6	Jal Yatri Niwas (Guest House)	550	Sqm	45,000	2.48
	5.7	WeightBridge Cabin	9	Sqm	25,000	0.02
	5.8	Security Office (2 Nos)	36	sqm	25,000	0.09
	5.9	Fuel station/Storage area	-	-	-	0.00
	5.10	Gate Complex with Parking		LS		1.37
	5.11	Water tank and pump house (extension)	120	sqm	22059	0.26
	5.12	canteen and toilet block	212	sqm	25000	0.53
6.	**ROADS & PARKING AREA**					**9.75**
	6.1	Approach road (External)		LS		2.99
	6.2	Internal roads		LS		6.76
7.	**UTILITIES AND OTHERS**					**27.17**
	7.1	Water supply and distribution		LS		0.20
	7.2	Storm water drainage work		LS		13.51
	7.3	Sewerage system		LS		0.49
	7.4	Electrical distribution system & IT		LS		9.45
	7.5	Firefighting system		LS		2.04
	7.6	Boundary wall		LS		1.49
8.	**EQUIPMENT**					**125.99**
	8.1	Tyre mounted Mobile Harbour Crane	4	No.	23,13,03,072	92.52
	8.2	Grab 8 cum, 13Mt	4	No.	32,00,000	1.28
	8.3	Road weigh bridge with Foundation	1	No.	28,00,000	0.28
	8.4	Front end loader	0	No.	-	-
	8.5	Flat bed trailor	0	No.	-	-
	8.6	Mobile hopper	2	No.	4,50,00,000	9.00
	8.7	Conveyor system	1,030	Rmt	71,538	7.37
	8.8	Stacker reclamer	1	Nos	15,54,21,335	15.54
A	**TOTAL COST (1 TO 8)**					**324.64**
B	**CONTINGENCY (3%)**					**9.74**
C	**TOTAL PROJECT COST (A + B)**					**335.00**
D	**GST**					**70.55**
E	**GRAND TOTAL (C + D)**					**406.00**

16.5 Operation and maintenance (O&M) costs

Operation and maintenance costs have been calculated as described below:

The following considerations have been taken to the repair and maintenance costs.

a) Civil works – 1 %

b) Mechanical works – 4 %

c) Electrical works – 4 %

d) Utilities – 4 %

The operation costs for manpower, electricity, water and fuel charges is calculated for Phase-1B as mentioned in the table below:

Based on the recent meeting held with IWAI on 5th October 2017, It is decided that entire O&M will be done by Operator and scope of authority will be limited to land lord. Therefore O&M cost for authority will be null as entire operation and maintenance of terminal will be done by operator.

Table 16-4 Annual O&M Cost

S. No.	Item	Annual Costs (Rs. in Cr.)
A.	**REPAIR AND MAINTENANCE COSTS**	**Nil for IWAI as it is outsourced**
B.	**OPERATION COSTS**	
C.	**TOTAL - (A) + (B)**	
D.	Admin, Insurance and Miscellaneous expenses	
E.	**TOTAL ANNUAL OPERATION AND MAINTENANCE COSTS - (C) + (D)**	

17 PROJECT IMPLEMENTATION SCHEDULE

17.1 General

The implementation schedule for the development of Phase-1B for the development of Varansi MMT and its associated facilities are presented in this chapter. The probable time schedule for various activities from onset to completion of the project and commencement of operation are also discussed in this chapter.

Phase IA of the project is likely to be operationalized in year 2018.

17.2 Basic consideration for Implementation

For timely completion of the project, identification of major project components and sequential planning of various modules is very important for any project. The major components of Varansi MMT include both the construction of offshore and onshore facilities, apart from installation of mechanical and electrical equipment.

The offshore facilities like berths are being developed as part of Phase IA. Whereas development of onshore facilities includes site development, stockyard development, construction of buildings, storage shed, development of internal roads, and providing utilities like water supply system, sewerage system, storm water drainage system and firefighting facility.

17.2.1 Development of Phase-1B

The following are the major activities involved for effective completion of Phase-1B, which involves engineering, procurement, construction and commencement of operational activities.

- Detailed Engineering
- Site development including site clearance, and earth filling
- Development of stockyard
- Construction of covered storage shed for handling fertilizer
- Incremental addition of building, internal road, water supply system, storm water drainage system, electrical, firefighting system and other utilities
- Supply, installation and commission of equipment

Implementation schedule indicating timelines for Phase-1A & Phase IB is presented in figure below:

IMPLEMENTATION SCHEDULE - VARANSI TERMINAL PHASE IA

		ITEM	YEAR 1												YEAR 2											
		MONTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
		Zero Date	0																							
Phase - 1	1	Detailed Design																								
		Approval from IWAI																								
	2	Mobilisation, Site grading & Demolition works																								
	3	Shore Protection																								
	4	Jetty & Approach construction																								
	5	Site development																								
	6	Construction of Buildings / Sheds / Parking area																								
	7	Construction of Approach and Internal Roads																								
		Pontoon , Gangway and Stairway																								
	8	Supply and erection of Cranes / Mechanical Equipments																								
	9	Water Supply, Electrical Works, Drainage and Other Utilities																								
	10	Commissioning of Terminal																								

Figure 17-1 Project Implementation Schedule – Phase-1A

Figure 17-2 Project Implementation Schedule – Phase-1B

IMPLEMENTATION SCHEDULE - VARANSI TERMINAL - PHASE 1B

		ITEM	YEAR 1												YEAR 2			
		MONTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		Zero Date	0															
Phase - 1B	1	Detailed Design																
	2	Approval fro IWAI																
	3	Mobilisation, Site grading & Demolition works																
	4	Construction of Buildings / Sheds / Parking area																
	5	Construction of Diversion, Approach and Internal Roads																
	6	Supply and erection of Cranes / Mechanical Equipments																
	7	Water Supply, Electrical Works, Drainage and Other Utilities																
	8	Commissioning of Terminal																

18 FINANCIAL AND ECONOMIC ANALYSIS

18.1 Introduction

Financial feasibility is a key determinant in a business oriented investment decision. For the projects of public/national interest like development of Varanasi Multi-modal Terminal, the viability of the project depends on the economic feasibility which acts as the deciding factor. In this note, economic and financial viability for the development of Varanasi Multimodal terminal has been carried out and presented.

18.2 General Assumptions

Following are the key assumptions considered for carrying out the Financial and Economic Analysis for Capacity Augmentation of National Waterways-1.

The inputs are taken from the technical studies carried out by M/s HOWE Engineering Projects (India) Pvt. Ltd and traffic study carried out by M/s HPC Consultant.

The inflation rate of 5% per annum is considered based on CPI index and as per Indian government's targeted inflation rate.

The cost of diesel is considered as Rs. 60/ litre (June 2017 price) and same has been escalated for the forthcoming years.

As per World bank data, the purchasing power parity (PPP) of India is 0.3, whereas the PPP of France is 1.1 (Source: data.worldbank.org)

The analysis has been carried out for Phase-I development

Even though the inland waterways has various socio-economic benefits, this study is restricted to the economic factors mentioned in the below section.

18.3 Construction Period and Project Life

Phase IA of the terminal has been under construction and likely to be started by year 2018 and project life is considered as 30 years. Terminal-wise implementation schedule considered in the economic model is presented below.

Table 18-1: Phase–IB schedule

Construction period	16 Months
Operation Start (Phase 1B)	1 March - 2020

18.4 Means of Finance

The financial analysis is carried out presuming that the entire capital expenditure will be invested in the form of fund and therefore no debt component is considered.

18.5 Income Tax Calculations

IWAI is registered with the Income Tax Department, Ghaziabad under section 12 A (a) and has got exemption of income tax under section 10(23) (c) (iv) of Income Tax Act. Therefore, income tax is not considered in the Financial Analysis.

18.6 Tariff Analysis

18.6.1 Prevailing IWAI charges

The 'Fee and Charges (Effective from July 16, 2011)' published by Inland Waterways Authority of India (IWAI) are given below.

Table 18-2: Fee and Charges as per IWAI

S. No.	Description	Unit	Amount (in Rs)
1	Waterway Usage Charges	Rs/GRT/km	0.02
2	Vessel Related Charges		
a.	Berthing Charges	Rs/ 24hrs	1000
b.	Pilotage	Rs/ 24hrs	750
3	Cargo Related Charges		
a.	Terminal Charges - Dry Cargo	Rs/ton	1
b.	Transit shed charges:		
	For first seven days	Rs/ton	0
	Next Fourteen days	Rs/ton	5
	Further Fourteen days	Rs/ton	10
	After 35 days	Rs/tons	40
c.	Open storage charges - Hard stand		
	For first seven days	Rs/ton	0
	Next Fourteen days	Rs/ton	2
	Further Fourteen days	Rs/ton	4
	After 35 days	Rs/tons	16

S. No.	Description	Unit	Amount (in Rs)
d.	Open storage charges -open area		
	For first seven days	Rs/ton	0
	Next Fourteen days	Rs/ton	1
	Further Fourteen days	Rs/ton	2
	After 35 days	Rs/tons	8
4	Miscellaneous Charges		
a.	Crane hire charges		
	<= 5t cranes	Rs. / 8 hrs	800.00
	5 to 20t cranes	Rs. / 8 hrs	2,000.00
	> 20t cranes	Rs. / 8 hrs	2,500.00
b.	Forklift Hire Charges	Rs. / 8 hrs	600.00

18.6.2 Tariff considered for augmented NW-1

Vessel Related Charges

To carry out the tariff estimation, the vessel related charges has been considered as per the prevailing IWAI charges.

Cargo Related Charges

At present, IWAI is charging Rs. 1 per ton as the terminal charges. In addition, to carry out the loading/unloading operations, the terminal users can hire the cranes and fork lift.

In case of the proposed Varansi MMT, the cargo handling will be carried out through various mechanised/semi-mechanised systems. Considering this, it may not be feasible to adopt the prevailing IWAI's cargo related charges for the proposed Varansi MMT. Therefore, the scale of rates published by Kolkata Port Trust for Inland Water vessels have been adopted for cargo related charges as mentioned below.

Table 18-3: Tariff Considered for Augumented NW-1

Vessel related charges		
Berthing Charges	Rs/ 24hrs	1000
Pilotage	Rs/ 24hrs	750
Cargo Related Charges		
Stone chips/Lime Stone/Sand		

Handling through other than mechanical system	Wharfage	Rs. / Tonne	18
	shore handling charges	Rs. / Tonne	48.6
	non -mechanized handling charges	Rs. / Tonne	66.6
Handled through Mechanical system	Wharfage	Rs. / Tonne	21.6
	mechanized handling charges	Rs. / Tonne	21.6
Bagged Cargoes (Cement, Food grains, fertilizer, plastic granular & textiles)			
Handling through other than mechanical system	Wharfage	Rs. / Tonne	18
	shore handling charges	Rs. / Tonne	48.6
	Bagged cargoes - non-mechanized handling charges	Rs. / Tonne	66.6
	Transportation of container from quay to container yard or vice versa	Rs. / Tonne	118.8
	Transportation of container from container yard to truck or vice versa	Rs. / Tonne	89.1
	Container handling charges	Rs. / Tonne	297.9
non-mechanized handling charges	Wharfage	Rs. / Tonne	18
	shore handling charges	Rs. / Tonne	40.5

For Revenue : As IWAI intends to invite O&M operator to carry out operation of proposed Multimodal terminal on lines of recent GR jetty and Ghaighat terminal wherein operation and revenue will be handled by O&M operator and IWAI (authority) will receive revenue share. At present, it is difficult to estimate at the value of revenue share which will be offered by O&M operator. However, it is learnt that IWAI has received reasonable market interest in the earlier such contracts of GR jetty and Ghaighat terminal. Therefore we have assumed revenue share of 10% as base case for financial analysis and sensitivity (revenue share) has been carried out.

18.7 Capital Costs

Table 18-4: Capital Cost for Phase-IB Development of Varansi MMT

S. No.	Item	Capital Cost (Rs. in Cr.)
1	LAND & SITE DEVELOPMENT	0.85
2	STOCKYARD	11.54
3	BUILDINGS & SHED	17.11
4	ROADS & PARKING AREA	2.11
5	UTILITIES AND OTHERS	10.27
6	EQUIPMENTS	26.26
A	TOTAL COST (1 TO 6)	68.13
B	CONTINGENCY (3%)	2.04
C	TOTAL PROJECT COST (A + B)	71.00
D	GOODS & SERVICE TAX	15.66
E	GRAND TOTAL (C + D)	87.00

In addition, the service tax component estimated in the costing model is considered only for the financial analysis and not for economic analysis as it is only a transfer payment within the economy.

18.8 Operation and Maintenance Costs

As per the industry norms, the repair and maintenance cost have been calculated under various heads, as described below.

1% of capital cost for Civil Works

4 % of capital cost for Utilities

4 % of capital cost for Mechanical and Electrical Works

In addition, operating expenses would be incurred on day to day basis which includes administrative expenses, salaries, expenses towards electricity, fuel, payment of insurance premium etc.

18.9 Key Results - Financial Analysis

Based on the financial analysis carried out taking into consideration of the above mentioned factors, the financial IRR has be worked out (assuming 10% revenue share) to be negative for Phase-1 development.

Table 18-5 Snapshot of Financial Analysis

			1-Sep-18	1-Apr-19	1-Apr-24	1-Apr-29	1-Apr-34	1-Apr-39	1-Apr-44	1-Apr-45	1-Apr-46
		31ST August 19	31-Mar-19	31-Mar-20	31-Mar-25	31-Mar-30	31-Mar-35	31-Mar-40	31-Mar-45	31-Mar-46	30-Aug-46
Traffic	MMTPA		0.28	0.60	1.16	1.20	1.20	1.20	1.20	1.20	0.50
Capital Cost	Rs. '000		(1,779,142.8)								
Benefit from the project											
Revenue from operation	Rs. '000		3,209	4,212	10,433	13,778	17,585	22,443	28,644	30,076	13,158
Other Revenue	Rs. '000		-	-	-	-	-	-	-	-	-
Economic Benefit	Rs. '000		-	-	-	-	-	-	-	-	-
Total Benefit from the project	Rs. '000		**3,209**	**4,212**	**10,433**	**13,778**	**17,585**	**22,443**	**28,644**	**30,076**	**13,158**
Operation Expenses											
Repair and Maintenance	Rs. '000		-	-	-	-	-	-	-	-	-
Operating Cost (Variable)	Rs. '000		-	-	-	-	-	-	-	-	-
Total OPEX	**Rs. '000**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Net Cash Flow	**Rs. '000**	(1,779,142.8)	**3,209**	**4,212**	**10,433**	**13,778**	**17,585**	**22,443**	**28,644**	**30,076**	**13,158**
Financial IRR			**(-ve)**								

18.10 Economic Analysis

In this section, economic analysis has been carried out for 'Capacity Augmentation of National Waterway – 1 (Jal Marg Vikas)' based on various socio-economic factors as mentioned below.

18.10.1 Approach and Methodology

The economic analysis of the project has been evaluated based on the following scenarios.

'With Project' Scenario and

'Without Project' Scenario

Both 'with project' and 'without project' scenarios have been quantified over the full life of the project. Also the 'incremental situation' or 'Benefit from the project' have been arrived by comparing the 'with project' scenario and 'without project' scenario wherein in the former case, the cargoes will be transported through barges and in later case, cargoes will be transported through road & rail.

18.10.2 Economic Factors considered

Following are the factors that are considered to carry out the economic analysis for this project.

- Energy Consumption
- Air Pollution
- Emission of CO2
- Noise Pollution
- Soil and Water Pollution
- Accidents
- Surface Occupation
- Benefit from exporting flyash
- Energy Consumption

Transport infrastructure plays a key role in the economic development of a country and an efficient transport sector, particularly for transportation of bulk goods is vital for development of any country. As per the World Bank study, Indian logistics cost is one of the highest in the world. As per this study, the logistics cost is 6% to 8% of the total value of goods in developing countries, 10% of the total values of goods in China whereas the cost of logistics in India is 14% of the total value of goods. By using the energy efficient mode of transportation, the logistics cost can be drastically reduced which in turn will boost the economy of the country.

In this section, a comparative study on the energy performance of inland shipping versus that of other land transportation modes has been carried out.

The energy consumption pattern of waterways, roadways and railways is illustrated in the below table, which is based on the 'Eleventh Working Group Report on Shipping and IWT' and 'Working Group Report on Railways'.

Table 18-6: Energy Consumption - Waterways, Road and Rail

Energy Consumption	Waterways		Road		Rail	
	Mj/t km	litre/Tkm	Mj/t km	litre/Tkm	Mj/t km	litre/Tkm
11th Working Group Report on shipping and IWT (Based on EU: Progress Report on short sea shipping 1999)		0.0048		0.0313		0.0089
Report of Working Group on Railways-2012			1.3550	0.0350	0.2550	0.0066
'Energy Consumption' considered for the Study		0.0048		0.0313		0.0089

For the present study, the energy consumption pattern published by `11th Working Group Report on shipping and IWT' has been considered for further analysis.

18.10.3 External Costs

Transport contributes significantly to economic growth. Unfortunately, most forms of transport do not only affect society in a positive way but also give rise to side effects. In contrast to the benefits, the cost of these effects of transport are generally not borne by the transport users and hence not taken into account when they make a transport decision. Therefore these effects are generally labelled as external effects. The various cost associated with the external effects are described below.

18.10.3.1 Air Pollution

Transport related air pollution causes damages to humans, biosphere, soil, water, buildings and materials. The most important pollutants are the following:

- Particulate matters
- Nitrogen oxides
- Sulphur oxide
- Ozone
- Volatile organic compounds

Several studies have been carried out to estimate the level of impact caused due to the air pollution triggered by road, rail and inland shipping. Subsequently, the cost factor was arrived for the air pollution by critically valuating various cost elements like valuation of human life, market prices for crops, valuation of building damages, and valuation of long term risks in biosphere. The external cost of air pollution arrived by various studies are listed below:

Table 18-7: External Costs of Air Pollution - Waterways, Roadways and Railways

Inland Water Transportation	Unit	Cost	Cost (in Rs/tkm)
Total Transportation System Study - Planning Commission Report	Rs / t km	0.0300	0.0300
Union Internationale des Chemins de fer (PIANC)	€/Tkm	0.0040	0.0011
le Groupe d'Economie des Transports de l'ULB (PIANC)	€/ Tkm		
Bundesamt fur Umweltschutz (PIANC)	€/Tkm	0.0014	0.0004
Cost considered for the study			0.0300
Roadway	Unit	Cost	Cost (in Rs/tkm)
Total Transportation System Study - Planning Commission Report	Rs / t km	0.2020	0.2020
Union Internationale des Chemins de fer (PIANC)	€/Tkm	0.0122	0.0033
le Groupe d'Economie des Transports de l'ULB (PIANC)	€/ Tkm	0.0329	0.0090
Bundesamt fur Umweltschutz (PIANC)	€/Tkm	0.0096	0.0026
Cost considered for the study			0.2020
Railway	Unit	Cost	Cost (in Rs/tkm)
Total Transportation System Study - Planning Commission Report	Rs / t km	0.0366	0.0366
Union Internationale des Chemins de fer (PIANC)	€/Tkm	0.0122	0.0033
le Groupe d'Economie des Transports de l'ULB (PIANC)	€/ Tkm	0.0329	0.0090
Bundesamt fur Umweltschutz (PIANC)	€/Tkm	0.0096	0.0026
Cost considered for the Study			0.0366

18.10.3.2 Noise Pollution

Noise costs consist of costs for annoyance and health. The external cost of noise pollution arrived by various studies are listed in the below table. The cost factors for noise pollution

are available only based on European conditions and are mentioned in Euros. Same has been converted to Rupees based on the purchasing power parity as mentioned in the Key Assumptions.

Table 18-8: External Cost of Noise Pollution

Inland Water	Unit	Cost	Cost (in Rs/tkm)
Union Internationale des Chemins de fer (PIANC)	€/Tkm	Nil	Nil
le Groupe d'Economie des Transports de l'ULB (PIANC)	€/ Tkm	Nil	Nil
Bundesamt fur Umweltschutz (PIANC)	€/Tkm	Nil	Nil
Cost considered for the study			
Roadways	Unit	Cost	Cost (in Rs/tkm)
Union Internationale des Chemins de fer (PIANC)	€/Tkm	0.0119	0.0032
le Groupe d'Economie des Transports de l'ULB (PIANC)	€/ Tkm	-	-
Bundesamt fur Umweltschutz (PIANC)	€/Tkm	0.0018	0.0005
Cost considered for the Study			0.0012
Railways	Unit	Cost	Cost (in Rs/tkm)
Union Internationale des Chemins de fer (PIANC)	€/Tkm	0.0044	0.0012
le Groupe d'Economie des Transports de l'ULB (PIANC)	€/ Tkm	0.0010	0.0003
Bundesamt fur Umweltschutz (PIANC)	€/Tkm	0.0035	0.0009
Cost considered for the study			0.0008

18.10.3.3 Soil and Water Pollution

The external cost of soil & water pollution arrived by various studies and it is observed that only roadways tends to produce soil & water pollution as mentioned.

Table 18-9: External Cost of Soil and Water Pollution

Roadways	Unit Rs/t km	Cost	Cost in Rs.
Union Internationale des Chemins de fer (PIANC)	€/Tkm	-	-
le Groupe d'Economie des Transports de l'ULB (PIANC)	€/ Tkm	-	-
Bundesamt fur Umweltschutz (PIANC)	€/Tkm	0.0020	0.0005
Cost considered for the Study			0.0005

18.10.3.4 Reduction in Accidents

The external cost for accident considered for three modes of transportation is mentioned below.

Table 18-10: Accident Cost - Waterways, Roadways and Railways

Accident Cost		Unit	Cost	Cost (in Rs/tkm)
Waterways	Total Transportation System - Planning commission	Rs./Tkm	Nil	Nil
	Union Internationale des Chemins de fer (PIANC)	€/Tkm	Nil	Nil
	le Groupe d'Economie des Transports de l'ULB (PIANC)	€/Tkm	Nil	Nil
	Bundesamt fur Umweltschutz (PIANC)	€/Tkm	Nil	Nil
	Cost considered for the Study		Nil	Nil
Roadways	Total Transportation System - Planning commission	Rs./Tkm	0.0620	0.0620
	Union Internationale des Chemins de fer (PIANC)	€/Tkm	0.0208	0.0057
	le Groupe d'Economie des Transports de l'ULB (PIANC)	€/Tkm	0.0353	0.0096
	Bundesamt fur Umweltschutz (PIANC)	€/Tkm	0.0091	0.0025
	Cost considered for the Study			0.0620
Railways	Total Transportation System - Planning commission	Rs./Tkm	0.0010	0.0010
	Union Internationale des Chemins de fer (PIANC)	€/Tkm	0.0008	0.0002
	le Groupe d'Economie des Transports de l'ULB (PIANC)	€/Tkm	0.0005	0.0001
	Bundesamt fur Umweltschutz (PIANC)	€/Tkm	0.0006	0.0002
	Cost considered for the study			0.0010

18.10.3.5 Emission of Green house gases

Table 18-11 : Emission of Green House Gases

CO2 Emission form various transport modes			
	Freight Transport (gm/tkm)		
	As per '12th Five	Mckinsey 'Transforming the railway's logistics	International Union

	Year Plan'	infrastructure 2010'	of Railways
Road	160	64	84
Rail	29	28	17
Water ways	31	15	

18.10.3.6 Surface Occupation

Table 18-12 : Surface Occupation

Surface Occupation		Unit	Cost	Cost (in Rs/tkm)
Waterways	As per Bundesamt fur Umweltschutz (PIANC)	€/Tkm	-	-
Roadways		€/Tkm	0.0006	0.0002
Railways		€/Tkm	0.0002	0.0001

18.10.3.7 Observation on Key Results – Economic Analysis

Taking in the consideration of the economic benefits from the projects as worked out above, the economic IRR has been worked out to be 24.52 % for Phase-1A & Phase 1B development which indicates that the project is economically viable.

Table 18-13 – Detailed Economic Cost Estimation

		1-Sep-18	1-Apr-19	1-Apr-24	1-Apr-29	1-Apr-34	1-Apr-39	1-Apr-44	1-Apr-45	1-Apr-46
		31-Mar-19	31-Mar-20	31-Mar-25	31-Mar-30	31-Mar-35	31-Mar-40	31-Mar-45	31-Mar-46	30-Aug-46
Energy Consumption										
Without Project Scenario										
Road Transportation										
Road - Energy Consumption	Rs/ Tkm	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41
Road- Total Energy Consumption	in Rs. Mn	202.86	434.71	845.30	874.82	874.82	874.82	874.82	874.82	874.82
Rail Transportation										
Rail Transportation										
Rail - Energy Consumption	Rs/ Tkm	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Rail- Total Energy Consumption	in Rs.	5.21	11.17	21.71	22.47	22.47	22.47	22.47	22.47	22.47
Total	**in Rs. Mn**	**208.07**	**445.87**	**867.01**	**897.29**	**897.29**	**897.29**	**897.29**	**897.29**	**897.29**
With Project Scenario										
Waterways Transportation										
Waterways - Energy Consumption Cost	Rs/ Tkm	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Waterways- Total Energy Consumption Cost	**in Rs. Mn**	**60.27**	**129.14**	**251.15**	**259.93**	**259.93**	**259.93**	**259.93**	**259.93**	**259.93**
Incremental Benefit from the project	**in Rs. Mn**	**147.81**	**316.73**	**615.86**	**637.36**	**637.36**	**637.36**	**637.36**	**637.36**	**637.36**
Air Pollution										
Without Project' Scenario										
Road Transportation										
Unit Cost	Rs/ Tkm	0.21	0.22	0.28	0.36	0.46	0.59	0.75	0.79	0.83
Total cost	in Rs. Mn	30.52	68.67	170.42	225.10	287.29	366.66	467.96	491.36	515.93
Rail Transportation										
Unit Cost	Rs/ Tkm	0.038	0.040	0.051	0.066	0.084	0.107	0.137	0.143	0.151

Total cost	in Rs. Mn	0.50	1.12	2.79	3.68	4.70	6.00	7.66	8.04	8.44
Without Project' Scenario - Total cost	**in Rs. Mn**	**31.02**	**69.79**	**173.21**	**228.78**	**291.99**	**372.66**	**475.62**	**499.40**	**524.37**
With' Project Scenario										
Waterways Transportation										
Unit Cost	Rs/ Tkm	0.032	0.033	0.042	0.054	0.069	0.088	0.112	0.118	0.123
Total cost	**in Rs. Mn**	**8.74**	**19.66**	**48.80**	**64.46**	**82.26**	**104.99**	**134.00**	**140.70**	**147.74**
Incremental Benefit from the project	**in Rs. Mn**	**22.28**	**50.13**	**124.41**	**164.32**	**209.72**	**267.67**	**341.62**	**358.70**	**376.63**
Noise Pollution										
Without Project' Scenario										
Road Transportation										
Unit Cost	Rs/ Tkm	0.001	0.001	0.002	0.002	0.003	0.004	0.005	0.005	0.005
Total cost	in Rs. Mn	0.19	0.42	1.05	1.39	1.77	2.26	2.88	3.03	3.18
Rail Transportation										
Unit Cost	Rs/ Tkm	0.001	0.001	0.001	0.001	0.002	0.002	0.003	0.003	0.003
Total cost	in Rs. Mn	0.01	0.02	0.06	0.08	0.10	0.13	0.17	0.18	0.19
Without Project' Scenario - Total cost	**in Rs. Mn**	**0.20**	**0.45**	**1.11**	**1.47**	**1.87**	**2.39**	**3.05**	**3.20**	**3.37**
With' Project Scenario										
Waterways Transportation										
Unit Cost	Rs/ Tkm	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total cost	**in Rs. Mn**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Incremental Benefit from the project	**in Rs. Mn**	**0.20**	**0.45**	**1.11**	**1.47**	**1.87**	**2.39**	**3.05**	**3.20**	**3.37**
Soil and Water Pollution										
Without Project' Scenario										
Road Transportation										
Unit Cost	Rs/ Tkm	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002
Total cost	in Rs. Mn	0.08	0.19	0.46	0.61	0.78	0.99	1.26	1.33	1.39
Rail Transportation										
Unit Cost	Rs/ Tkm	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total cost	in Rs. Mn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Without Project' Scenario - Total cost	**in Rs. Mn**	**0.08**	**0.19**	**0.46**	**0.61**	**0.78**	**0.99**	**1.26**	**1.33**	**1.39**
With' Project Scenario										
Waterways Transportation										

Unit Cost	Rs/ Tkm	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total cost	**in Rs. Mn**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Incremental Benefit from the project	**in Rs. Mn**	**0.08**	**0.19**	**0.46**	**0.61**	**0.78**	**0.99**	**1.26**	**1.33**	**1.39**
Accidents										
Without Project' Scenario										
Road Transportation										
Unit Cost	Rs/ Tkm	0.065	0.068	0.087	0.111	0.142	0.181	0.231	0.243	0.255
Total cost	in Rs. Mn	9.37	21.08	52.31	69.09	88.18	112.54	143.63	150.81	158.35
Rail Transportation										
Unit Cost	Rs/ Tkm	0.001	0.001	0.001	0.002	0.002	0.003	0.004	0.004	0.004
Total cost	in Rs. Mn	0.01	0.03	0.08	0.10	0.13	0.16	0.21	0.22	0.23
Without Project' Scenario - Total cost	**in Rs. Mn**	**9.38**	**21.11**	**52.38**	**69.19**	**88.31**	**112.70**	**143.84**	**151.03**	**158.58**
With' Project Scenario										
Waterways Transportation										
Unit Cost	Rs/ Tkm	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total cost	**in Rs. Mn**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Incremental Benefit from the project	**in Rs. Mn**	**9.38**	**21.11**	**52.38**	**69.19**	**88.31**	**112.70**	**143.84**	**151.03**	**158.58**
Surface occupation										
Without Project' Scenario										
Road Transportation										
Unit Cost	Rs/ Tkm	0.0002	0.0002	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0007
Total cost	in Rs. Mn	0.0251	0.0566	0.1404	0.1854	0.2366	0.3020	0.3854	0.4047	0.4249
Rail Transportation										
Unit Cost	Rs/ Tkm	0.00006	0.00006	0.00008	0.00010	0.00013	0.00016	0.00020	0.00021	0.00022
Total cost	in Rs. Mn	0.0007	0.0017	0.0042	0.0055	0.0070	0.0089	0.0114	0.0120	0.0126
Without Project' Scenario - Total cost	**in Rs. Mn**	**0.03**	**0.06**	**0.14**	**0.19**	**0.24**	**0.31**	**0.40**	**0.42**	**0.44**
With' Project Scenario										
Waterways Transportation										
Unit Cost	Rs/ Tkm	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total cost	**in Rs. Mn**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Incremental Benefit from the project	**in Rs. Mn**	**0.03**	**0.06**	**0.14**	**0.19**	**0.24**	**0.31**	**0.40**	**0.42**	**0.44**

Overall Incremental Economic Benefit from the project	**in Rs. Mn**	**178**	**382**	**743**	**769**	**769**	**769**	**769**	**769**	**320**

Table 18-14 Snapshot of Economic Analysis

		1-Sep-18	1-Apr-19	1-Apr-24	1-Apr-29	1-Apr-34	1-Apr-39	1-Apr-44	1-Apr-45	1-Apr-46
		31-Mar-19	31-Mar-20	31-Mar-25	31-Mar-30	31-Mar-35	31-Mar-40	31-Mar-45	31-Mar-46	30-Aug-46
Traffic	MMTPA	0.28	0.60	1.16	1.20	1.20	1.20	1.20	1.20	0.50
Capital Cost	Rs. '000									
Benefit from the project										
Revenue from operation	Rs. '000	3,209	4,212	10,433	13,778	17,585	22,443	28,644	30,076	13,158
Other Revenue	Rs. '000	-	-	-	-	-	-	-	-	-
Economical Benefit	Rs. '000	178,254	381,972	742,720	768,656	768,656	768,656	768,656	768,656	320,273
Total Benefit from the project	Rs. '000	**181,463**	**386,184**	**753,154**	**782,435**	**786,241**	**791,100**	**797,300**	**798,733**	**333,432**
Operation Expenses										
Repair and Maintenance	Rs. '000	-	-	-	-	-	-	-	-	-
Operating Cost (Variable)	Rs. '000	-	-	-	-	-	-	-	-	-
Total OPEX	**Rs. '000**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Net Cash Flow	**Rs. '000**	**181,463**	**(483,816)**	**753,154**	**782,435**	**786,241**	**791,100**	**797,300**	**798,733**	**333,432**
Economic IRR			**23.75%**							

18.10.4 Sensitivtty Analysis results summary

Following table shows Sensitivity analysis summary of different revenue share and its impact on Financial IRR & Economic IRR:

Table 18-15 Sensitivity analysis summary

Sr No	Revenue Share	Financial IRR	Economic IRR
1	10%	(-)ve	**23.7%**
2	20%	(-)ve	**24.0%**
3	30%	(-)ve	**24.3%**

39. Annexure XVII: Base Case Financial Model

[Note: The model BCFM would be developed with the appropriate inputs from the financial and technical consultants. However such Financing Plan would need to be customized based on each project and its requirements. Such model Financing Plan would essentially include;

(i) Total Project Cost,

(ii) License Fee and Royalty payable to the Concessioning Authority,

(iii) Annual estimated Project revenue,

(iv) Equity contribution,

(v) Cargo handling projections estimated by Concessionaire,

(vi) Discounted net present value of the cash flows,

(vii) Equity IRR,

(viii) Debt equity ratio, and

(ix) Debt service ratio.

Such Financing Plan would be submitted by the concessionaire and got approved by the Concessioning Authority at the time of Financial Close.]

Note: Such format of the Financing Plan shall also identify the respective threshold limit of the above parameters and the basis of further projections and the detailed requirements that would need to be stratified with respect to each line item.

40. Annexure XVIII: Draft Tripartite Agreement

MODEL TRIPARTITE AGREEMENT

BETWEEN INLAND WATERWAYS AUTHORITY OF INDIA,

CONCESSIONAIRE AND INFRASTRUCTURE DEBT FUND

This Tripartite Agreement is made at ****** on the ***** day of *****, 20** by

and between

(i) **MEMBERS OF INLAND WATERWAYS AUTHORITY OF INDIA**, a body corporate constituted under the provisions of the Inland Waterways Authority of India Act 1985, and having its principal administrative office at A-13, Sector-1, Noida – 201301, Uttar Pradesh,

hereinafter referred to as the "**Concessioning Authority**" which expression shall, unless repugnant to the context or meaning thereof, include its administrators, successors and assigns;

(ii) The [***** Infrastructure Debt Fund], a company registered under the Companies Act, 1956, acting through *****, and having its registered office at ***** (hereinafter referred to as the "**Debt Fund**" which expression shall, unless repugnant to the context or meaning thereof, include its administrators, successors and assigns);

And

[***** Limited], a company registered under the Companies Act, 2013, acting through *****, duly authorised by the resolution passed at the meeting of its Board of Directors held on *****,

and having its registered office at ***** (hereinafter referred to as the "**Concessionaire**" which expression shall, unless repugnant to the context or meaning thereof, include its administrators, successors and assigns)

40.1.1. WHEREAS:

(A) The Concessioning Authority and the Concessionaire had entered into a Concession Agreement (as defined hereinafter), a true copy of which is annexed hereto and marked as Annex-I, for development of ***** (the "**Project**");

(B) The Project entered into commercial operation or any substitute thereof on ***** (the "**Date of Commercial Operation**") in accordance with the provisions of the Concession Agreement;

(C) Following the occurrence of the Date of Commercial Operation, the Concessionaire has been operating the Project in accordance with the terms and conditions of the Concession Agreement;

(D) The Concessionaire had raised debt from the Senior Lenders for financing the Project and had utilised the same for the purposes of the Project under the Concession Agreement;

(E) The Concessionaire has been discharging its debt service obligations, including the repayment of principal and interest, in accordance with the provisions of the Financing Documents;

(F) The debt service obligations have not been rescheduled, waived or postponed in any manner during the past one year from the date hereof, and the Concessionaire is not in default of its debt service obligations under the Financing Documents; and

(G) The Concessionaire has decided to refinance all or part of its outstanding debt and has requested the Debt Fund to invest in its bonds, the proceeds of which shall be paid to the Senior Lenders as specified in Schedule-I.

Now, therefore, the Parties hereby agree and this agreement witnessed - as follows:

1. DEFINITIONS AND INTERPRETATIONS

1.1 For the purposes of this Agreement, the following terms shall have the meaning hereinafter respectively assigned to them:

"**Agreement**" means this Tripartite Agreement, and amendments if any thereto;

"**Bonds**" means the securities issued by the Concessionaire in consideration of the amounts paid for the investment thereof;

"**Concession Agreement**" means the executed Concession Agreement dated [date on which the Concession Agreement has been signed] for the Project, entered into between the Concessioning Authority and the Concessionaire,

and shall include all Schedules thereof and any amendments thereto made in accordance with the provisions contained in this behalf therein;

"**Financing Documents"** means financing documents under the Concession Agreement and documents executed on the date [...date of signing of the financing documents] for the Project and shall include all Schedules thereof and any amendments thereto made in accordance with the provisions contained in this behalf therein.

"Senior **Lenders"** means any Persons based in India or abroad providing Financial Assistance under the Financing Documents and includes a trustee for the holders of debentures/ or other debt instruments issued by the Concessionaire to finance the Project.

"Senior **Lenders' Representative"** shall have the same meaning as ascribed to it in the Financing Document, provided that, this would include the Trustees for any bonds issued by the Concessionaire. In absence of one such person/ entity having the authority to sign, Senior Lenders Representative shall mean all the Senior Lenders, and/or the Trustees for any bonds issued by the Concessionaire.

"**Parties**" means the parties to this Agreement collectively and "Party" shall mean any of the parties to this Agreement individually;

1.2 The words and expressions beginning with or in capital letters used in this Agreement and not defined herein but defined in the Concession Agreement shall have, unless repugnant to the context, the meaning respectively assigned to them in the Concession Agreement**.**

1.3 **Interpretation**

1.3.1 In this Agreement, unless the context otherwise requires,

references to any legislation or any provision thereof, or any rules, regulations, bylaws or notifications thereunder, shall include amendment or re-enactment or consolidation of such legislation or any provision thereof so far as such amendment or re-enactment or consolidation applies or is capable of applying to any transaction entered into hereunder;

references to "**development**" include, unless the context otherwise requires, construction, renovation, refurbishing, augmentation, upgradation and other activities incidental thereto, and "**develop**" shall be construed accordingly;

"**lakh**" means a hundred thousand (100,000) and "**crore**" means ten million (10,000,000);

save and except as otherwise provided in this Agreement, any reference, at any time, to any agreement, deed, instrument, licence or document of any description shall be construed as reference to that agreement, deed, instrument, licence or other document as amended, varied, supplemented, modified or suspended at the time of such reference; provided that this Sub-clause shall not operate so as to increase liabilities or obligations of the Debt Fund hereunder or pursuant hereto in any manner whatsoever;

any agreement, consent, approval, authorisation, notice, communication, information or report required under or pursuant to this Agreement from or by any Party shall be valid and effective only if it is in writing under the hand of a duly authorised representative of such Party in this behalf and not otherwise;

the Recitals and Annexes to this Agreement form an integral part of this Agreement and will be in full force and effect as though they were expressly set out in the body of this Agreement; and

time shall be of the essence in the performance of the Parties' respective obligations. If any time period specified herein is extended, such extended time shall also be of the essence.

1.3.2 Any word or expression used in this Agreement shall, be construed as per the definition given in the General Clauses Act, 1897 failing which it shall bear the ordinary English meaning.

2. ISSUE OF BONDS

2.1 The Parties agree that the Concessionaire may, in accordance with the provisions of this Agreement, issue Bonds for the amounts subscribed by the Debt Fund; provided that the total value of such Bonds shall not exceed 94% (ninety four percent) of compensation payment from the Concessioning Authority on day of signing this Tripartite Agreement**(as specified in Schedule II)**; [provided further that the Concessionaire may, with prior written approval of the Concessioning Authority, which approval the Concessioning Authority may in its sole discretion deny, issue additional Bonds for a total value not exceeding the balance of the said compensation payable][5].

2.2 Upon investment in Bonds pursuant to Paragraph 2.1, the Debt Fund shall be deemed to be a Senior Lender and shall thereupon be entitled to all the rights and privileges of a Senior Lender under the Concession Agreement.

2.3 The tenor of the Bonds, in accordance with the provisions of this Agreement shall be such that at least 50% (fifty per cent) and 75% (seventy five per cent) of the total nominal value thereof shall be fully redeemed by the Concessionaire no later than the expiry of 75% (seventy five per cent) and 85% (eighty five per cent) of the Concession Period respectively and the balance, if any, shall be redeemed no later than 2 (two) years prior to the expiry of the Concession Period.

2.4 Subject to the clause 2.3 of this Agreement, the tenure, rate of interest and other commercial terms of the Bonds shall be determined by mutual agreement between the Debt Fund and the Concessionaire.

2.5 The Bonds shall be in such denomination as the Debt Fund and the Concessionaire may determine, but not less than Rs [10,000 (Rupees ten thousand)] in any case.

2.6 Subject to the provisions of Paragraph 4.1, the Debt Fund and the Concessionaire may, with prior written approval of the Concessioning Authority, which approval the Concessioning Authority may in its sole discretion deny, allocate and bear the foreign exchange risks for and in respect of any foreign-exchange denominated Bonds, in such manner as they may mutually agree. For the avoidance of doubt, the Parties expressly agree that if the foreign exchange risk for any or all Bonds is borne by the Concessionaire. The compensation to be made by the Concessioning Authority for and in respect of such Bonds shall be adjusted to cover the variation between the nominal value of Bonds and the actual amount payable to the Debt Fund, such that the liability of the Concessionaire for redemption of the Bonds hereunder is fully discharged by the Concessioning Authority.

2.7 The Parties expressly agree and confirm that repayment of the principal and interest in respect of the Bonds shall have a prior charge over the Senior Lenders on appropriation of compensation under Articles 9, 16 and 17 of the Concession Agreement, and only the balance remaining shall be paid to the other Senior Lenders.

2.8 Any delay in the repayment of the principal or interest for and in respect of the Bonds shall attract interest at a rate of 3% (three per cent) above the rate of interest applicable for the Bonds.

2.9 The Parties agree and confirm that upon execution of this Agreement, the Debt Fund shall, acting through the Senior Lenders' Representatives, be deemed to be a party to the Escrow Agreement and the Substitution Agreement for the Project, and all rights, privileges and obligations of the Senior Lenders shall also vest in the Debt Fund. The Parties further agree and confirm that the provisions of the Concession Agreement and all other agreements, including the Escrow Agreement, Substitution Agreement and Financing Documents, shall be read and construed so as to give effect to the provisions of this Agreement, but without increasing any financial obligations and/ or liabilities of the Concessioning Authority under the Concession Agreement.

2.10 By counter-signing the Tripartite Agreement, the Senior Lenders' Representative, acting on behalf of the Senior Lenders agrees, confirms and undertakes that the *paripassu* rights, title or interest of the Lenders in compensation, to the extent such rights, title or interest are provided in the Concession Agreement, Substitution Agreement, Escrow Agreement, Financing Documents or any other agreement, shall be subordinate to the rights, title or interest created by the Bonds in favour of the Debt Fund, and accordingly, the

compensation shall be applied first for the redemption of Bonds and only the balance remaining, if any, shall be paid into the Escrow Account for meeting other obligations including the balance Debt Due. For the avoidance of doubt, the Parties expressly agree that the Debt Fund may, in its discretion, exercise all the rights and privileges of the Senior Lenders' Representative under the Concession Agreement, Substitution Agreement, Escrow Agreement and this Agreement. The Parties further agree that save and except the application of compensation for redemption of Bonds in pursuance of this Agreement and subject to the provisions of Paragraph 2.7, the Senior Lenders shall have *paripassu* charge on the revenues of the Concessionaire in accordance with the provisions of the Concession Agreement.

2.11 The Debt Fund may, by notice to the Parties, transfer all or any Bonds to any other person, and upon such transfer, the rights and obligations of the Debt Fund shall vest in such person. Provided that no such notice shall be required for transfer of Bonds if they have been listed in any recognized Stock Exchange and such transfer is in accordance with the regulations of the Stock Exchange.

2.12 Notwithstanding anything to the contrary contained in this Agreement, the Debt Fund may have the option to extend a term loan to the Concessionaire for an amount not exceeding 50% (fifty per cent) of its total exposure to the Concessionaire and the provisions of this Agreement shall apply *mutatis mutandis* to such term loan as if it were a Bond.

3. REDEMPTION OF BONDS

3.1 The Concessionaire agrees and undertakes that upon completion of the tenor of the Bonds, it shall redeem the same by making full and complete payment of the outstanding principle and the interest thereon.

3.2 Notwithstanding anything to the contrary in this Agreement, the Debt Fund may by notice require the Concessionaire to redeem upto 10% (ten per cent) of the value of the Bonds in any financial year and upon notice in this behalf, the Concessionaire shall redeem such Bonds no later than 120 (one hundred and twenty) days from the date of receipt of such notice.

3.3 The Parties expressly agree that the Debt Fund and the Concessionaire may at any time by mutual agreement undertake early redemption of the Bonds and upon full redemption thereof, this Agreement shall cease to be in force.

3.4 The Parties expressly agree and confirm that in terms of Articles 15, 16 and 17 of the Concession Agreement, the Concessioning Authority has covenanted that in the event of termination of the Concession Agreement, the Concessioning Authority shall pay compensation in accordance with the provisions of the Concession Agreement, which shall be applied for redemption of the Bonds in accordance with the provisions of this Agreement. The Parties further agree and confirm that upon termination on account of a Concessionaire Event of Default or Concessioning Authority Event of Default, the Concessioning Authority shall pay compensation in accordance with the provisions of the Concession Agreement.

3.5 The Parties agree and confirm that in the event of default in Debt Service by the Concessionaire, the Senior Lenders shall have the right to enforce termination of the Concession Agreement in terms of Article 15.1.1 and 17.1.2 of the Concession Agreement, which *inter alia* requires the Concessioning Authority to pay compensation in accordance with the provisions of the Concession Agreement. The Parties further agree that in the event the Concessioning Authority approves the issuance of additional Bonds under the provisions of Paragraph 2.1 of this Agreement, the liability of the Concessioning Authority shall, notwithstanding the provisions of the Concession Agreement, extend to an amount equal to 100% of the compensation in Concessionaire Event of Default.

3.6 The Concessioning Authority agrees and undertakes that upon receipt of a notice under and in accordance with the provisions of Article 3.2 of the Substitution Agreement, it shall, no later than 15 (fifteen) days from the date of receipt of such notice, issue a notice to the Concessionaire requiring it to cure the Financial Default and in the event the default is not cured before the expiry of the Remedial Period specified in Article 15.4 of the Concession Agreement, a Concessionaire Default shall have occurred and the Concessioning Authority shall issue the Termination Notice forthwith, but no later than 15 (fifteen) days from the date of occurrence of Concessionaire Default, and shall make compensation no later than 15(fifteen) days from the date of Termination Notice. The Parties expressly agree that the timelines specified in the Paragraph 3.6 of this Agreement are not in modification of the Concession Agreement but only in elaboration thereof.

3.7 The Parties expressly agree and confirm that the rights of the Debt Fund and the Senior Lenders' Representative to enforce termination of the Concession Agreement in accordance with Paragraph 3.6 may be exercised individually or jointly, as the case may be, by the Debt Fund and/or the Senior Lenders' Representative.

3.8 The Parties expressly agree that the Concessioning Authority shall, instead of depositing the compensation in the Escrow Account of the Project, redeem the Bonds by making payments due and payable to the Debt Fund, and the balance, if any, shall be paid into the Escrow Account. The Parties further agree that the provisions hereof shall in no way be construed to increase the financial liability of the Concessioning Authority for and in respect of the compensation [save and except as provided in Paragraph 3.5 for and in respect of the additional bonds specified therein].

3.9 The Parties agree and confirm that the amounts, if any, paid by the Concessioning Authority for redemption of Bonds and the balance compensation, if any, paid as per the Concession Agreement into the Escrow Account shall be deemed to be a valid discharge of its obligations to make compensation under and in accordance with the Concession Agreement.

4. FEES

4.1 The Debt Fund shall pay to the Concessioning Authority, 0.05% (zero point zero five per cent) per annum of the outstanding debt financed by the IDF, by way of a guarantee fee in consideration of the obligations of the Concessioning Authority hereunder; [provided that the guarantee fee shall be 1% (one per cent) in respect of Bonds for which the foreign exchange risk is to be borne by the Concessionaire] [provided further that the guarantee fee for and in respect of the additional Bonds specified in Paragraph 2.1 shall be 3% (three per cent) per annum of the nominal value thereof].

4.2 The guarantee fee specified in Paragraph 4.1 shall be due and payable annually before commencement of the financial year to which it relates. In the event of delay in payment of the guarantee fee, the Debt Fund shall pay interest at the rate of 14% (fourteen per cent) per annum, to be computed on a daily basis and compounded every month for the period of delay; provided, however, that if such delay exceeds the period of 180 (one hundred and eighty) days this Agreement shall cease to be in force, and upon termination of the Concession Agreement at any time thereafter, the Concessioning Authority's obligation to pay the compensation to the Debt Fund shall be deemed to be reduced by 20% (twenty per cent) thereof.

5. REPRESENTATIONS AND WARRANTIES

5.1 Each of the Parties represent, warrant and confirm the following:

(a) This Agreement constitutes its legal, valid and binding obligation, enforceable against it in accordance with the terms hereof, and its obligations under this Agreement will be legally valid, binding and obligations enforceable against it in accordance with its terms;

(b) the execution, delivery and performance of this Agreement will not conflict with or result in a breach or constitute default under or accelerate performance required by any of the terms of Memorandum and Articles of Association of any Party or any applicable law or any covenant, contract, arrangement or understanding, or any decree or order of any court to which it is a party or by which it or any of its properties or assets is bound or affected;

(c) all information provided by the Party is true and accurate in all material respect;

(d) there are no actions, suits, proceedings or investigations pending or to its knowledge threatened against it at law or in equity before any court or any other judicial, quasi judicial or other authority or body, the outcome of which may result in a material breach of this Agreement;

(e) the Party has complied with all Applicable Laws and Applicable Permits in all material respects;

(f) the Concessionaire is not in a material breach of the Concession Agreement or of any Project Contracts or Financing Documents; and

(g) no representation or warranty contained herein or in the Concession Agreement or any other document furnished by the Party contains or will contain any untrue or misleading statement of material facts or omits or will omit to state a material fact necessary to make such representation or warranty not misleading.

5.2 In the event of any occurrence or circumstance coming to the knowledge of the Party making any representation hereunder which renders any of its aforesaid representations or warranties untrue or incorrect at any time during the subsistence of this Agreement, such Party shall immediately notify the other Parties hereto about the same. Such notification shall not have the effect of remedying any such representation or warranty that has been found to be incorrect or untrue.

6. ARBITRATION

6.1 Any Dispute which is not resolved amicably by conciliation shall be finally decided by reference to arbitration by a Board of Arbitrators appointed in accordance with Paragraph 6.2 of this Agreement. Such arbitration shall be held in accordance with the Rules of Arbitration of the International Centre for Alternative Dispute Resolution, New Delhi (the "**Rules**"), or such other rules as may be mutually agreed by the Parties, and shall be subject to the provisions of the Arbitration Act. The venue of such arbitration shall be Delhi, and the language of arbitration proceedings shall be English.

6.2 In the event of a dispute between two Parties, there shall be a Board of three arbitrators, of whom each Party shall select one, and the third arbitrator shall be appointed by the two arbitrators so selected, and in the event of disagreement between the two arbitrators, the appointment shall be made in accordance with the Rules. In the event of a dispute involving all the Parties, a single arbitrator shall be appointed in accordance with the Rules.

6.3 The arbitrators shall make a reasoned award (the "**Award**"). Any Award made in any arbitration held pursuant to this Paragraph 6 shall be final and binding on the Parties as from the date it is made, and the Parties agree and undertake to carry out such Award without delay.

6.4 The Parties agree that an Award may be enforced against the Concessionaire, the Concessioning Authority and/or the Debt Fund, as the case may be, and their respective assets wherever situated.

6.5 This Agreement and the rights and obligations of the Parties shall remain in full force and effect, pending the Award in any arbitration proceedings hereunder.

7. COMING INTO FORCE AND DURATION OF THE AGREEMENT

This Agreement shall come into force and effect on the date hereof and shall remain in force until the redemption of all Bonds.

IN WITNESS WHEREOF, this Agreement has been executed on the day and year first above written.

For and on behalf of the **Concessioning Authority**

Signature :

Name :

Designation :

For and on behalf of the **Debt Fund**

Signature :

Name :

Designation :

For and on behalf of the **Concessionaire**

Signature :

Name :

Designation :

Agreed, Accepted, Countersigned and Witnessed by the Senior Lenders' Representatives for and on behalf of **Senior Lenders** by

Signature :

Name :

Designation :

SCHEDULE-I

(Refer Recital G)

No.	**Name of Senior Lenders/Bond holders' Trustee with Address**	**Amount to be refinanced IDF by way of Bonds/Loan (Rs. in crore)**	**Remarks, if any**
1.			
2.			
3.			
4.			

5.			
6.			
7.			
8.			
9.			
10.			

SCHEDULE-II

(Quantum of compensation)

As per the definition in the Concession Agreement, the quantum of (i) Book Value, (ii) 90% of Debt Due and (iii) Total Project Cost as on the date of execution of this Agreement, and at the end of each financial year until the end of the concession period is mentioned in the table below:

(Rs. In Crores)

Date	Book Value	% of Debt Due	Total Project Cost	Amount of Compensation

41. Annexure XIX: Auditors

41.1. Appointment of Auditors

41.1.1. The Concessionaire shall appoint, and have during the subsistence of this Agreement as its Statutory Auditors, a firm chosen by it from the mutually agreed list of 5 (five) reputable firms of chartered accountants ("Panel of Chartered Accountants"), such list to be prepared substantially in accordance with the criteria set forth in Schedule P. All fees and expenses of the Statutory Auditors shall be borne by the Concessionaire.

41.1.2. The Concessionaire may terminate the appointment of its Statutory Auditors in accordance with the provisions of the Companies Act, 2013, subject to the replacement Statutory Auditors being appointed from the Panel of Chartered Accountants.

41.1.3. Notwithstanding anything to the contrary contained in this Agreement, the Authority has the right, but not the obligation, to appoint at its cost from time to time and at any time, another firm ("**Additional Auditors**") from the Panel of Chartered Accountants to audit and verify all those matters, expenses, costs, realisations and things which the Statutory Auditors are required to do, undertake or certify pursuant to this Agreement.

41.1.4. Further, the Concessionaire shall change the Statutory Auditor from time to time to comply with the provisions of the Companies Act, 2013 and any rules and regulations framed thereunder.

41.2. Panel of Chartered Accountants

Pursuant to the provisions of the Agreement, the Authority and the Concessionaire shall prepare a mutually agreed panel of 5 (five) reputable firms of Chartered Accountants having their registered offices in India ("**Panel of Chartered Accountants**"). The criteria for preparing such Panel and the procedure to be adopted in this behalf shall be as set forth in this Annexure XIX.

41.2.1. Invitation for Empanelment

The Authority shall invite offers from all reputed firms of Chartered Accountants who fulfil the following eligibility criteria, namely:

(a) the firm should have conducted statutory audit of the annual accounts of at least one hundred companies registered under the Companies Act, 2013, including any re-enactment or amendment thereof, of which at least ten should have been public sector undertakings;

(b) the firm should have at least 5 (five) practising Chartered Accountants on its

rolls, each with a minimum experience of 10 (ten) years in the profession;

(c) the firm or any of its partners should not have been disqualified or black-listed by the Comptroller and Auditor General of India or the Authority; and

(d) the firm should have an office in the State or in an adjacent State with at least 2 (two) practising Chartered Accountants on its rolls in such State.

Interested firms meeting the eligibility criteria shall be required to submit a statement of their capability, including the bio-data of all the practising Chartered Accountants, on its rolls. In particular, each firm shall be required to furnish year-wise information relating to the names of all the companies with an annual turnover exceeding Rs. 25,00,00,000 (Rupees Twenty Five Crore) whose annual accounts were audited by such firm in any of the preceding 5 (five) Accounting Years.

41.2.2. Evaluation and Selection

The information furnished by each firm shall be scrutinised and evaluated by the Authority and 1 (one) point shall be awarded for each annual audit of the companies specified in Paragraph 0 above. (By way of illustration, a firm which has conducted audit of the annual accounts of any such company for 5 (five) years shall be awarded 5 (five) points).

The Authority shall prepare a list of all the eligible firms along with the points scored by each such firm and 5 (five) firms scoring the highest points shall be identified and included in the draft Panel of Chartered Accountants.

41.2.3. Consultation with the Concessionaire

The Authority shall convey the aforesaid panel of firms to the Concessionaire for scrutiny and comments, if any. The Concessionaire shall be entitled to scrutinise the relevant records of the Authority to ascertain whether the selection of firms has been undertaken in accordance with the prescribed procedure and it shall send its comments, if any, to the Authority within 15 (fifteen) days of receiving the aforesaid panel.

41.2.4. Mutually Agreed Panel

The Authority shall, after considering all relevant factors including the comments, if any, of the Concessionaire, finalise and constitute a panel of 5 (five) firms which shall be deemed to be the mutually agreed Panel of Chartered Accountants.

After completion of every 5 (five) years from the date of preparing the mutually agreed Panel of Chartered Accountants, or such earlier period as may be agreed between the Authority and the Concessionaire, a new panel shall be prepared in accordance with the provisions of this Annexure XIX.