Government of Bihar
BIHAR URBAN INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED

NATIONAL COMPETITIVE BIDDING

BIDDING DOCUMENTS

Issued on:

For A Contract

TO (i) DESIGN AND BUILD SEWAGE TREATMENT PLANTOF CAPACITY 60 MLD INCLUDING MAIN PUMPING STATION – (MPS) (97 MLD) AND ALL APPURTENANT STRUCTURES AND ALLIED WORKS; (ii) OPERATION & MAINTENANCE OF THE COMPLETE WORKS OF SEWAGE TREATMENT PLANTFOR A PERIOD OF 15 YEARS AT PAHARI IN PATNA, STATE OF BIHAR, INDIA.

NCB Contract Package No.NGRBA

BUIDCo
Building Better Tomorrow

Project	:	**NATIONAL GANGA RIVER BASIN PROJECT**
Owner	:	**Managing Director** **Bihar Urban Infrastructure Development Corporation Limited** SFC Building, 2nd floor, Daroga Rai Path, Road no-2, R- Block, Patna 800001 Ph. No.-0612-2506109 Fax No.-91-612-2506132 Web-http://buidco.in Email – mdbuidco@gmail.com

Bidding Documents

FOR A CONTRACT

TO (i) DESIGN AND BUILD SEWAGE TREATMENT PLANTOF CAPACITY 60 MLD INCLUDING MAIN PUMPING STATION – (MPS) (97 MLD) AND ALL APPURTENANT STRUCTURES AND ALLIED WORKS; (ii) OPERATION & MAINTENANCE OF THE COMPLETE WORKS OF SEWAGE TREATMENT PLANTFOR A PERIOD OF 15 YEARS AT PAHARI IN PATNA, STATE OF BIHAR, INDIA.

.

Invitation for Bids

FOR A CONTRACT

TO (i) DESIGN AND BUILD SEWAGE TREATMENT PLANTOF CAPACITY 60 MLD INCLUDING MAIN PUMPING STATION – (MPS) (97 MLD) AND ALL APPURTENANT STRUCTURES AND ALLIED WORKS; (ii) OPERATION & MAINTENANCE OF THE COMPLETE WORKS OF SEWAGE TREATMENT PLANTFOR A PERIOD OF 15 YEARS AT PAHARI IN PATNA, STATE OF BIHAR, INDIA.

BIHAR URBAN INFRASTRUCTURE DEVELOPMENT CORPORATION LTD

[A Govt of Bihar Undertaking]

INVITATION FOR BIDS (IFB)

COUNTRY - INDIA

NATIONAL GANGA RIVER BASIN PROJECT

(WORLD BANK FUNDED)

National Competitive Bidding

Loan no. 8065-IN, Credit No. 4955-IN

1. **IFB No: IN-NMCG-3027-CW-RFB** **Dt: . . . . . .**
2. The National Ganga River Basin Authority (NGRBA), Ministry of Water Resources, River Development & Ganga Rejuvenatio Government of India has received financing of US$ 1 billion from the World Bank towards the cost of the National Ganga River Basin Project and intends to apply a part of the proceeds towards payments under the contract for work detailed below.
3. The NMCG, State Governments of Uttarakhand, Uttar Pradesh, Bihar, Jharkhand and West Bengal and the ULB have entered into a Memorandum of Agreement for implementation of the NGRBA programme in the respective States.
4. The State Government of Bihar, Bihar Urban Infrastructure Development Corporation (BUIDCo), Patna Municipal Corporation and MoEF have entered into a Memorandum of Understanding towards the implementation of this project forming a part of the NGRBA Programme.
5. Qualification requirements as listed briefly below are required to be fulfilled by the bidder. [Bidders are advised to refer to the bidding documents for complete details]

   Financial:

   (a) Net worth of **INR 500 Million** in each of the last **3** financial years (i.e.2014-2015to 2016-2017).

   (b) Cash credit facility of **INR 200 Million.**

   (c) Minimum Average annual construction turnover of INR 800 million during last 5 years

   Technical:

   (a) Experience of design, build & commissioning, one STP of minimum **40 MLD** capacity in the last **7** years; and operating and maintaining an STP of the same capacity for minimum **1** year in the last **7** Years(i.e.2010-2011to 2016-2017).

   (b) If a Bidder has offered STP of a different technology from the one it has built as per (a) above, his nominated Sub Contractor should have experience in designing and building STP of minimum 40 **MLD** of same technology as offered.

(c) The Bidder shall provide evidence of experience in operating and maintaining successfully at least one Sewage Treatment Plant of 40 MLD capacity of any process technology for 1 year during the last 7 years.

(d) The Bidder shall provide evidence that the technology proposed for this contract has been adopted in at least three (**3)** other locations having similar climatic conditions during last **7** financial years (i.e.2010-2011 to 2016-2017).

6. Bidding will be conducted through the National Competitive Bidding Procedure as specified in the World Bank's Guidelines: Procurement of Goods, Works and Non-consulting Services under IBRD Loans and IDA Credits & Grants, January 2011, revised July, 2014, and is open to all eligible bidders as defined in the Guidelines.In addition, please refer to paragraphs 1.6 and 1.7 of the Guidelines setting forth the World Bank's policy on conflict of interest.

7. The **Bihar Urban Infrastructure Development Corporation Ltd** (Owner) in the State of Bihar, India invites sealed bids from eligible bidders for the works detailed in the table below. The bidders may submit bids for the following work as per Instructions to Bidders and the Annexures thereto.

Name of the Work	Bid Security	Cost of Bidding Document	Period
(i) Design and build Sewage Treatment Plant of capacity 60 **Mld** including MPS (97 MLD) and all appurtenant structures and allied works; (ii) Operation & Maintenance of the complete works of sewage treatment plant for 15 years, at **Pahari in Patna**, **State of Bihar, India.**	**INR 22 Million**	**INR 20,000/-** including SGT/VAT.	Design, Build, Test and Commissioning period of **2.5 years**, and Operation and Maintenance period of **15 years.**

8. Interested eligible bidders may obtain further information from and inspect the bidding documents at the office of **The Managing Director**, **BUIDCo, Patna**, at the address given below during office hours i.e. **10:00** to **17:30** hours.

9. A complete set of bidding documents will be available on the **BUIDCo's** website (**www.buidco.in**) w.e.f. 13.09.2017. The bidders who are interested to participate in the bidding process can download the bid documents from the website for their reference. Bidders may obtain the hard copy of the bidding documents for preparation of their bids.

10. The bidders who will download the documents from the website and use the same for submission of the bids should note that if there is any discrepancy between the downloaded document and the hard copy of the document issued to the bidders, the hard copy shall be treated as final and shall prevail over the downloaded documents.

11. The bidders who download the documents shall have to pay along with their bid submission, the non-refundable cost of **INR 20,000**/- including GST in the form of a Certified Cheque/Demand Draft issued by a nationalized bank / foreign bank listed with the Reserve Bank of India having its branches in India, payable to **The Managing Director, BUIDCo, Patna** payable at **Patna, Bihar**.

12. Bidders can also purchase the bid documents commencing from **12.09.2017** on payment of **INR 20,000**/- including GST in the form of a Demand Draft issued by a nationalized bank/ foreign bank listed with the

Reserve Bank of India having its branches in India, payable to **The Managing Director, BUIDCo, Patna** payable at **Patna, State of Bihar**. Bid documents requested by post shall be sent through speed post/ registered post on payment of an extra amount of **INR 3000/-** The BUIDCo will not be held responsible for the postal delay if any, in the delivery of the documents or non-receipt of the same.

13. The bidders may also note that the pre-bid proceedings, corrigendum if any will also be uploaded on the website mentioned herein above.
14. All bids must be accompanied by Bid Security of the amount specified in Sl.no-7 above, drawn in favour of **The Managing Director, BUIDCo, Patna**.
15. Bids must be delivered to **The Managing Director, BUIDCo, Patna** on or before **15:00 hours** on **17.10.2017**. Electronic bidding will not be permitted. Bids will be opened on the same day at **15:30 hours**, in the presence of the bidders' representatives who choose to attend. If the office happens to be closed on the date of receipt of the bids as specified, the bids will be received and opened on the next working day at the same time and venue. Late bids will be rejected.

Address:

Managing Director,

SFC Building, 2nd floor, Daroga Rai Path

Road no-2, R- Block,

Patna 800001

Ph. No.-0612-2506109

Fax No.-91-612-2506132

Web-http://buidco.in

Email – mdbuidco@gmail.com

Managing Director

BUIDCo

BIHAR URBAN INFRASTRUCTURE DEVELOPMENT CORPORATION LTD

[A Govt of Bihar Undertaking]

INVITATION FOR BIDS (IFB)

COUNTRY - INDIA

NATIONAL GANGA RIVER BASIN PROJECT

(WORLD BANK FUNDED)

National Competitive Bidding

IFB No: IN-NMCG-3027-CW-RFB **Dt: . . . . . .**

1. The **Bihar Urban Infrastructure Development Corporation Ltd. (BUIDCo)** (Owner) in the State of **Bihar**, India invites sealed bids (to be submitted in hard copy only) from eligible Bidders for the works comprising (i) Design and build Sewage Treatment Plant of capacity **60 MLD** including MPS (**97** MLD) and all appurtenant structures and allied works; (ii) operation & maintenance of the complete works of Sewage Treatment Plant, at Pahari in Patna, State of Bihar, India. Period for design/ redesign, build, test and commissioning is **2.5 years**, and Operation and Maintenance period is **15 years.**
2. Detailed Invitation for Bid which includes instructions for submission of bids and all other relevant information is available on **BUIDCo's** website i.e. www.buidco.in. Bidding Documents will be available with effect from **12.09.2017**.
3. The last date & time of bid submission is **17.10.2017** at **15:00** hours. The bids will be opened on the same day at **15:30** hours. E-bidding will not be permitted.
4. The interested eligible bidders may participate in the bidding process as per instructions given in the bidding documents.

Address:

Managing Director,

Bihar Urban Infrastructure Development Corporation Ltd. (BUIDCo),

SFC Building, 2nd floor, Daroga Rai Path

Road no-2, R- Block,

Patna 800001

Ph. No.-0612-2506109

Fax No.-91-612-2506132

Web-http://buidco.in

Email – mdbuidco@gmail.com

Managing Director

BUIDCo

INSTRUCTION TO BIDDERS

FOR A CONTRACT

TO (i) DESIGN AND BUILD SEWAGE TREATMENT PLANTOF CAPACITY 60 MLDINCLUDING MAIN PUMPING STATION (97 MLD) AND ALL APPURTENANT STRUCTURES AND ALLIED WORKS; (ii) FOR OPERATION & MAINTENANCE OF THE COMPLETE WORKS OF SEWAGE TREATMENT PLANT FOR A PERIOD OF 15 YEARS AT PAHARI IN PATNA, STATE OF BIHAR, INDIA.

Table of Clauses

INSTRUCTIONS TO BIDDERS

Section 1. Introduction

1.1. Source of Funds & Scope of work

a. The Borrower **named in the Bid Data Sheet** has received loan/credit (hereafter called "loan") from the International Bank for Reconstruction and Development (IBRD) (hereafter interchangeably called "the Bank") of the U.S. dollar amount **indicated in the Bid Data Sheet**. The loan will be used in various currencies toward the cost of the Project **named in the Bid Data Sheet**. The Borrower intends to apply a portion of the proceeds of this loan to eligible payments under the contract for which these Bidding Documents are issued.

b. The State and Urban Local Body (ULB) **named in the Bid Data Sheet** shall, provide a portion of the Capital Cost and Operation and Maintenance Cost for the Operations Period as per the provisions of this Contract.

c. Payment by the Bank will be made only at the request of the Borrower and upon approval by the Bank, in accordance with the terms and conditions of the loan agreement, and will be subject in all respects to the terms and conditions of that agreement. The loan agreement prohibits a withdrawal from the loan account for the purpose of any payment to persons or entities, or for any import of Plant and Equipment, if such payment or import, to the knowledge of the Bank, is prohibited by a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations. No party other than the Borrower shall derive any rights from the loan agreement or have any claim to the loan proceeds.

d. Scope of work: The bidder's scope of work shall include (i) design and build sewage treatment plant of installed capacity**indicated in theBid Data Sheet**and all appurtenant structures and allied works; (ii) operation & maintenanceafter successful commissioning and testing of the complete works **("Project")** of sewage treatment plant, for a period of 15 years at the Place and State**indicated in the Bid Data Sheet**.

e. The Owner **named in the Bid Data Sheet** shall make available (i) the Right of Way and the land area for the Sewage Treatment Plant and all appurtenant structuresup to the area allocated for this facility as **indicated in the Bid Data Sheet**.

f. For Sewage Treatment Plant: the selected Bidder shall adopt the most appropriate and techno economically feasible treatment process technology and Design the Sewage Treatment Plant ensuring that the Design standards and the performance standards as specified in the

Contract are satisfied along with other conditions as may be applicable under the law.

1.2. Eligible Bidders

1.2.1 A bidder may be a firm that is a private entity, a government-owned entity—subject to ITB 1.2.5 — or any combination of such entities in the form of a joint venture (JV) under an existing agreement or with the intent to enter into such an agreement supported by a letter of intent. In the case of a joint venture, all members shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms. The JV shall nominate a Representative who shall have the authority to conduct all business for and on behalf of any and all the members of the JV during the bidding process and, in the event the JV is awarded the Contract, during contract execution. Unless **specified in the BDS**, there is no limit on the number of members in a JV.

1.2.2 Bidder shall not have a conflict of interest. Any Bidder found to have a conflict of interest shall be disqualified. A Bidder may be considered to have a conflict of interest for the purpose of this bidding process, if the Bidder:

(a) directly or indirectly controls, is controlled by or is under common control with another Bidder; or

(b) receives or has received any direct or indirect subsidy from another Bidder; or

(c) has the same legal representative as another Bidder; or

(d) has a relationship with another Bidder, directly or through common third parties, that puts it in a position to influence the bid of another Bidder, or influence the decisions of the Employer regarding this bidding process; or

(e) participates in more than one bid in this bidding process. Participation by a Bidder in more than one Bid will result in the disqualification of all Bids in which such Bidder is involved. However, this does not limit the inclusion of the same subcontractor in more than one bid; or

(f) any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the works that are the subject of the bid; or

(g) any of its affiliates has been hired (or is proposed to be hired) by the Owner or Borrower as Engineer for the Contract implementation; or

(h) would be providing goods, works, or non-consulting services resulting from or directly related to consulting services for the preparation or implementation of the project specified in the BDS ITB 1.1(a) that it provided or were provided by any

affiliate that directly or indirectly controls, is controlled by, or is under common control with that firm; or

(i) has a close business or family relationship with a professional staff of the Borrower (or of the project implementing agency, or of a recipient of a part of the loan) who: (i) are directly or indirectly involved in the preparation of the bidding documents or specifications of the contract, and/or the bid evaluation process of such contract; or (ii) would be involved in the implementation or supervision of such contract unlessthe conflict stemming from such relationship has been resolved in a manneracceptable to the Bank throughout the procurement process and execution of the contract.

1.2.3 A Bidder may have the nationality of any country, subject to the restrictions pursuant to ITB 1.2.7. A Bidder shall be deemed to have the nationality of a country if the Bidder is constituted, incorporated or registered in and operates in conformity with the provisions of the laws of that country, as evidenced by its articles of incorporation (or equivalent documents of constitution or association) and its registration documents, as the case may be. This criterion also shall apply to the determination of the nationality of proposed sub-contractors or sub-consultants for any part of the Contract including related Services.

1.2.4 A Bidder that has been sanctioned by the Bank in accordance with the ITB 6.8, including in accordance with the Bank's Guidelines on Preventing and Combating Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants ("Anti-Corruption Guidelines"), shall be ineligible to be prequalified for, bid for, or be awarded a Bank-financed contract or benefit from a Bank-financed contract, financially or otherwise, during such period of time as the Bank shall have determined. The list of debarred firms and individuals is available as **specified in the BDS.**

1.2.5 Bidders that are Government-owned enterprises or institutions in the Owner's Country may participate only if they can establish that they (i) are legally and financially autonomous (ii) operate under commercial law, and (iii) are not dependent agencies of the Owner. To be eligible, a government-owned enterprise or institution shall establish to the Bank's satisfaction, through all relevant documents, including its Charter and other information the Bank may request, that it: (i) is a legal entity separate from the government (ii) does not currently receive substantial subsidies or budget support; (iii) operates like any commercial enterprise, and, inter alia, is not obliged to pass on its surplus to the government, can acquire rights and liabilities, borrow funds and be liable for repayment of its debts, and can be declared bankrupt; and (iv) is not bidding for a contract to be awarded by the department or agency of the government which under their applicable laws or regulations is the reporting or supervisory authority of the enterprise or has the ability to exercise influence or control over the enterprise or institution.

1.2.6 ABidder shall not be under suspension from bidding by the Employer as the result of the operation of a Bid–Securing Declaration.

1.2.7 Firms and individuals may be ineligible if so indicated in **Annexure A Part g** and (a) as a matter of law or official regulations, the Borrower's country prohibits commercial relations with that country, provided that the Bank is satisfied that such exclusion does not preclude effective competition for the supply of goods or the contracting of works or services required; or (b) by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, the Borrower's country prohibits any import of goods or contracting of works or services from that country, or any payments to any country, person, or entity in that country.

1.2.8 A Bidder shall provide such evidence of eligibility satisfactory to the Owner, as the Owner shall reasonably request.

1.3. Eligible Material, Plant and Equipment and Services

The materials, equipment and services to be supplied under the Contract and financed by the Bank may have their origin in any country, subject to the restrictions specified in **Annexure A - Part g -** Eligible Countries, and all expenditures under the Contract will not contravene such restrictions. At the Owner's request, Bidders may be required to provide evidence of the origin of materials, equipment and services.

1.4. Inspection and Audit

The Bank requires compliance with its policy in regard to corrupt and fraudulent practices as set forth in Section 6.8. In further pursuance of this policy, Bidders shall permit and shall cause its agents (whether declared or not), sub-contractors, sub-consultants, service providers, or suppliers and any personnel thereof, to permit the Bank to inspect all accounts, records and other documents relating to any prequalification process, bid submission, and contract performance (in the case of award), and to have them audited by auditors appointed by the Bank.

1.5. Cost of Bidding

The Bidder shall bear all costs associated with the preparation and submission of its bid, and the Owner will in no case be responsible for these costs, regardless of the conduct or outcome of the bidding process.

Section 2. The Bidding Documents

2.1. Content of Bidding Documents

a. The nature of the services, the site and the plant that are to be designed, built, operated and maintained by the Bidder, the procedures that are to be followed during the bidding process and the contract terms and technical requirements are prescribed in the Bidding Documents. The Bidding Documents consist of:

1. The Instructions to Bidders (ITB)
2. the Bid Data Sheet;
3. Annexure A to the Bidding Documents – Forms
    a. Bidder's Bid Form
    b. Bidder's Price Schedules
    c. Form of Bid Security
    d. Form of Performance Security
    e. Format of Curriculum Vitae for Proposed Key Staff
    f. Form for Clarification Questions
    g. List of eligible Countries
    h. Qualification Criteria
    i. Information Forms
    j. Declaration Format for Deemed Export Benefits
    k. Form of Letter of Intent by JV Partners
    l. Form of Power of Attorney for Joint Venture
    m. Form of undertaking by JV Partners
    n. Format for evidence of access to or availability of credit facilities
4. Annexure B to the Bidding Documents – the contract (the "Draft Contract") consisting of:
    i. Form of Contract;
    ii. General Conditions of the Contract; and
    iii. Schedules attached to the Contract
5. Addenda to the documents listed in ITB Section 2.1(a) (1) to (4), if any are issued by the Owner.

The Invitation for Bids issued by the Owner is not part of the Bidding Documents.

2.1.1. The documents listed in ITB Section2.1(a) (1), (2), (3), (4)and (5) are collectively the "Bidding Documents".

2.1.2. Each Bidder shall examine all instructions, terms and conditions, forms, specifications and other information contained in the Bidding Documents. If the Bidder fails to provide all documentation and information required by the Bidding Documents; or submits a Bid which is not substantially responsive to the terms and conditions of the Bidding Documents, such action is at the Bidder's risk and the Owner may determine that the Bid is non-responsive to the Bidding Documents and may reject it.

2.2. Clarification of Bidding Documents

a. A prospective Bidder requiring any clarification of the Bidding Documents may notify the Owner in writing by mail, courier, fax or hand delivery at the Owner's mailing address **indicated in the Bid Data Sheet**. Similarly, if a Bidder feels that any important provision in the Bidding Documents, such as those listed in ITB Section 3.3, will be unacceptable, such an issue must be raised during the clarification stage.

b. All such queries and requests for clarification shall be submitted using the Form for Clarification Questions contained in Annexure A Part f to the Bidding Documents.

c. The Owner will respond in writing to any request for clarification or modification of the Bidding Documents that it receives on the Form for Clarification Questions no later than the date **set out in the timetable in the Bid Data Sheet**. Written copies of the Owner's response, including an explanation of the query but not identification of its source, (the "Response to Questions Document") will be sent to all prospective Bidders that have received the Bidding Documents. If similar or repeated queries are made by Bidders, the Owner may list those queries as one query & respond to such query only once.

2.3. Site Visit

a. Each Bidder is advised to visit and inspect the site/alignment of (a) the proposed Sewage Treatment Plant; and (b) the Sewerage Network,SPS (the "Site Visit") and their surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the Bid and entering into the Contract. The Owner will schedule a time on or after the date set out in the timetable **specified in the Bid Data Sheet** and develop a procedure for Bidders to conduct a Site Visit. The costs of visiting the site shall be at the Bidder's own expense.

b. Each Bidder and any of its personnel or agents will be granted permission by the Owner to enter upon its premises and lands for the purpose of such a Site Visit, but only upon the express condition that the Bidder, its personnel and agents will release and indemnify the Owner, the Borrower and their personnel and agents from and against all liability in respect thereof and will be responsible for death or

personal injury, loss of or damage to property and any other loss, damage, costs and expenses incurred as a result of the Site Visit.

2.4. Data Room and Background Information

Owner shall establish a data room (the "Data Room") at the location **specified in Bid Data Sheet** with a collection of relevant data to be accessible to Bidders or their representatives from the date set out in the timetable **specified in the Bid Data Sheet** until the deadline for submission of Bids (the "Submission Deadline"), in accordance with a schedule established by the Owner.

2.5 Pre-Bid Meeting

Each prospective Bidder is invited to attend a Pre-Bid Meeting, which will take place at the venue and time **stipulated in the Bid Data Sheet**. While attendance at the pre-bid meeting is not mandatory, Bidders are strongly encouraged to attend. The purpose of the pre-bid meeting is to provide a technical presentation and to clarify issues and answer questions on any matter that may be raised at the meeting. Each prospective Bidder is requested, as far as possible, to submit any question in writing to reach the Owner not later than one week before the pre-bid meeting. It may not be practicable at the meeting to answer questions received late, but questions and responses will be transmitted as indicated hereafter. Minutes of the pre-bid meeting including the text of the questions asked by Bidders, without identifying the source, and the responses given, together with any responses prepared after the meeting will be transmitted without delay to all prospective Bidders that have been issued Bidding Documents. Any modification to the Bidding Documents that may become necessary as a result of the pre-bid meeting shall be made by the Owner exclusively through the issue of an addendum pursuant to ITB 2.6 and not through the minutes of the pre-bid meeting. The proceedings of the pre-bid meeting, reply to the queries and corrigendum/addendum if any will also be uploaded on the website **specified in the Bid Data Sheet**.

2.6. Amendment of Bidding Documents

a. At any time prior to the Submission Deadline, the Owner may, for any reason, whether at its own initiative, or in response to a clarification requested by a prospective Bidder, amend the Bidding Documents by addendum. No other communications of any kind whatsoever, including, without limitation, the minutes of the pre-bid meeting or the Response to Questions Document, shall modify the Bidding Documents.

b. Addenda, if any, will be sent in writing by air mail, courier or facsimile to all prospective Bidders and will be binding on them. Bidders shall immediately acknowledge receipt to the Owner of any such amendment, and it will be assumed that the information contained therein has been taken into account by the Bidder in its Bid. Such Addenda will also be uploaded on the website specified in ITB 2.5.

c. In order to afford prospective Bidders reasonable time in which to take the amendment into account in preparing their Bids, the Owner may, at its discretion, extend the Submission Deadline, in which case, the Owner will notify all prospective Bidders in writing of the extended deadline.

2.7. Contact with the Owner for the Purpose of Clarification

The prospective Bidders shall contact only the persons **named at the addresses in the Bid Data Sheet** for the purpose of requesting information and clarification or for any other purpose relating to the bidding process. The prospective Bidders shall not contact any other person at the Owner during the bidding process. From the time of Bid opening to the time of Contract award, if any Bidder wishes to contact the Owner on any matter related to the bidding process, it may do so in writing.

2.8. Information Provided by the Owner/Bidders Due Diligence

a. Each Bidder is solely responsible for conducting its own independent research, due diligence, and any other work or investigations and for seeking any other independent advice necessary for the preparation of Bids, negotiation of agreements, and the subsequent delivery of all services to be provided by the Bidder that has been successful in the bidding process (the "Successful Bidder"). The Bidder shall submit its bid considering that the treated effluent from the STP has to be discharged into the location as specified in the **Bid Data Sheet** under ITB 3.3(b).

b. No representation or warranty, express or implied, is made and no responsibility of any kind is accepted by the Owner or its advisors, employees, consultants or agents, for the completeness or accuracy of any information contained in the Bidding Documents or the Response to Questions Document, or provided during the bidding process or during the term of the Contract. The Owner and its advisors, employees, consultants and agents shall not be liable to any person or entity as a result of the use of any information contained in the Bidding Documents or the Response to Questions Document, or provided during the bidding process or during the term of the Contract.

c. Bidders shall not rely on any oral statements made by the Owner or its advisors, employees, consultants or agents.

d. All Bidders shall, prior to submitting their Bid, review all requirements with respect to corporate registration and all other requirements that apply to companies that wish to conduct business in the Owner's country. The Bidders are solely responsible for all matters relating to their legal capacity to operate in the jurisdiction to which this bidding process applies.

2.9. Time Table

a. The estimated timetable, from the issuance of the Bidding Documents to the identification by the Owner of the Successful Bidder and the execution of the Contract, is **set out in the Bid Data Sheet**.

b. The Owner may, in its sole discretion and without prior notice to the Bidders, amend the estimated timetable specified in the Bid Data Sheet. Bidders shall not rely in any way whatsoever on the estimated timetable **specified in the Bid Data Sheet** and the Owner shall not incur any liability whatsoever arising out of amendments to the estimated timetable. The Owner shall give notice of timetable changes, if any, by addenda.

Section 3. Preparation of Bids

3.1. Language of Bid

The Bid prepared by the Bidder, all correspondence and documents related to the Bid exchanged by the Bidder and the Owner and the bidding process shall be written in the language **specified in the Bid Data Sheet**, provided that any printed literature furnished by the Bidder may be written in another language, as long as such literature is accompanied by a translation of its pertinent passages in the language specified in the Bid Data Sheet, in which case, for purposes of interpretation of the Bid, the translation shall govern.

3.2. Documents Comprising the Bid

a. Each Bidder shall submit only one Bid which shall consist of,

   1. One Technical Section which contains the following parts in the following order:

      i. Part I – the information required by ITB Section 3.3;

      ii. Part II – the Bid Security required by ITB Section 3.4;

      iii. Part III – the Bid Form required by ITB Section 3.5(a), and the information required by ITB Section 3.5(b) and Appendix to Bid containing completed Tables of Schedule of Adjustment Data as required by ITB Section 3.11 b;

      iv. Part IV – where applicable, the joint venture documents required by ITB Section 3.6;

      v. Part V – the power of attorney required by ITB Section 3.7;

      vi. Part VI – the declaration of commissions and gratuities required by ITB Section 3.8;

      vii. Part VII – Optional, separately bound pre-printed literature as per ITB Section 3.9; and

   2. One Financial Section which shall consist of the Price Schedules completed in accordance with ITB Section 3.10.

b. Each Bidder shall also submit an initialled Draft Contract, in accordance with ITB Section 3.15 (b), in the same envelope as its Technical Section.

3.3. Technical Section – Part I – Technical and Staffing Information

The Bidder, while making his technical proposal shall consider the following aspects.

a. The Owner shall make available the right of way and the land area allocated for this facility as indicated in the Bid Data Sheet clause 1.1

(e) for setting up of Sewage Treatment Plant. The bidders will be free to offer STP based on a technology of their choice and indicate in their bid the actual land requirement for setting up treatment facility as offered by them. The status of availability and ownership of the land is **specified in the Bid Data Sheet**.

b. The location for disposal of treated Sewage and sludge shall be as specified in the **Bid Data Sheet**.

c. The land that will be required for STP, roads, drains and other appurtenant structures shall be indicated by the bidder and the cost of such Land requirement as determined on the basis of land price specified in the **Bid Data Sheet** shall be added to the bid price for evaluation of the lowest evaluated substantially responsive bidder.

d. The Operator shall design and construct the STP with installed capacity as indicated in the Bid Data Sheet clause 1.1(d).

Part-I of the Technical Section of the Bid

e. : Part-I of the Technical Section of the Bid shall consist of the following sub-parts in the following order:

1. An executive summary of the Technical Section;

2. A detailed design-build work plan including a detailed program timetable (the "Design-Build Work plan") setting out the manner in which the Bidder proposes to carry out the Design-build services as defined in the Draft Contract (the "Design-Build Services") and meet the Design-build technical standards in accordance with the Technical Standards Schedule to the General Conditions.The Design-Build Work plan shall be divided into the following sections:

   i. A well-defined proposal for the treatment process technology proposed by the Bidder, Plan for treated water reuse as per details in bid data sheet alongwith conceptual drawingsThe Owner will make available the land required for the STP and ancillary works up to the limit specified in Section 3.3(a) above. The Bidder's Design should aim at optimizing the land requirement. This shall also include details of modules of the treatment process and the details of modular approach to capacity addition if adopted in the proposal.

   ii. a section entitled "Drawings" which consists of conceptual drawings that are sufficiently detailed to communicate the Bidder's Design intent for all components of the proposed Sewage Treatment Plant.The conceptual drawings shall include the following:

a. a site plan showing the location of the STP area, alignment and limits to the Bidders construction activities; along with the land required for the total planned area for STP. The site plan / layout shall include new STP, Layout of various units of preliminary and secondary treatment, Layout of piping between various units and unit bypass for each unit, plant bypass, Layout of internal roads, hard standing, parking, compound wall and gate house, etc. Location of power transformer, switch room, control room and switchgear, Power wiring and underground cable layout, Relative location of administrative office, lab and control centre, Internal roads and parking provisions, Landscaping and reservations for future expansion, possible future tertiary treatment and Any other features for safe and efficient working during operations and maintenance.

b. a site plan showing all proposed works listed in the **Bid Data Sheet**;

c. a detailed narrative in support of the conceptual drawings setting out the Bidder's plan for compliance with the Design-Build Services Schedule and the technical standards set out in the Technical Standards Schedule, to include construction quality assurance and control;

iii. a detailed program and schedule setting out the proposed sequence of works to be undertaken, including estimated start date, finish date and time allocations for individual units of the works, proposed resources to be allocated and the identification of all major milestones, including the submission of schematic Design documents, Design development documents, the Design-Build Documents and the commissioning of individual units of the Sewage Treatment Plant (STP); and

3. an itemised list of the principal codes of practice and standards proposed to be used for the Design-Build Services

4. a section specifying the power consumption for Operations and Maintenance of the STP on an annual basis. The Bidder shall further provide the breakup of electricity consumption in various facilities in the STP on an annual basis. The Bidder shall provide the total estimated connected load in KW, maximum power demand, average energy consumption in KwH per day with full load up to the installed capacity of the STP, estimated power factor, any proposals for improving efficiency in terms of lower power consumption.

5. Part-I of the Technical Section of the Bid shall further consist of the following sub-parts in the following order:

   a section entitled "Plant and Equipment and Operator's Equipment" which consists of a list of proposed suppliers of major Plant and Equipment and Operator's Equipment (Design-Build) and Operator's Equipment (Operations), including:

   i. plant and equipment;

   ii. materials including pipe work and principal construction materials.

   For all items listed in ITB Section 3.3(f)(1), the Bidders shall provide either catalogues or detailed information with respect to manufacturer and source, model Designation, primary specifications, and year of manufacture, as applicable.

6. a detailed work plan (the "Operations Work Plan") setting out the manner in which the Bidder proposes to carry out the operation of the STP and Sewerage Pumping Station as set out in the Contract (the "Operations Services") and meet the operating technical standards in accordance with the Technical Standards Schedule to the General Conditions. The Operations Work Plan shall contain a section entitled "Operation and Maintenance Plan" which provides an outline contents and overview of the Bidder's proposed plans and programs for Operations and Maintenance of STP;

7. a detailed description of the Bidder's plans and methodologies to ensure that the requirements of the applicable Environmental Management Plan specified in the special conditions of contract for the proposed STP, and allied services at Site will be implemented and monitored;

8. a detailed staffing plan (the "Staffing Plan") setting out the Bidder's proposed staffing arrangements for the carrying out of the Design-Build and Operations Services. The Staffing Plan shall be divided into the following sections:

   i. two sub-sections, (one for the Design-Build Services and one for the Operations Services) each entitled the "Staffing Chart" and each consisting of a chart setting out a list of all proposed Operator's Personnel positions, the role of each position, the duration of existence of the position, and the location of the staff person filling the position during the periods of assignment to carry out the Design-Build and Operations Services;

   ii. a section entitled "Summary of Staff Qualifications" which consists of a summary table setting out,

a. for the Key Staff positions, the names of the Bidder's employees who will occupy the Key Staff positions during Design-Build Services; and

b. all proposed positions for the Operator's Key Personnel and the qualifications, years of experience and areas of expertise, including a clear indication of the expertise that the staff will provide consistent with the requirements set out in the **Bid Data Sheet** for each of the proposed positions; The Bidder's personnel as indicated in the bid proposals shall not be changed during the period of the contract. In case if the successful Bidder, intends to change the key staff, such change will be subject to approval from the Owner on justification provided by the successful Bidder. The replaced key staff shall have to be of equivalent or higher qualification and experience.

iii. a section entitled, "Curriculum Vitae" which contains the signed curriculum vitae for each of the Key Staff, in the format set out in Annexure A Part e to the Bidding Documents;

9. For the purpose of ITB Section 3.3(f)(4), "Key Staff" means those individuals that will fill the positions listed in the Bid Data Sheet; and A list of all nominated sub-contractor and sub- consultants and a detailed description of the services to be carried out or the Plant and Equipment to be provided by the nominated sub-Contractor and sub-consultants. The Bidder shall provide the name and nationality of all nominated sub-contractors and sub-consultants. The Bidder shall ensure that all nominated sub-contractorsand sub consultants complywith ITB Section 1.3. The Bidder shall not exceed the maximum percentage of subcontracting and sub consulting set out in **Bid Data Sheet**.**Environmental, Social, Health and Safety (ESHS) Code of Conduct (For both STP and Network -combined or separate)**

10. The Bidder shall submit the Environmental, Social, Health and Safety (ESHS) Code of Conduct that will apply to the Contractor's employees and subcontractors. The Code of Conduct shall ensure compliance with the ESHS provisions of the contractincluding those described in the following documents.

a. *[Scope of work];*

b. *[Environmental and Social Impact Assessment (ESIA)];*

c. *[Environmental and Social Management Plan (ESMP)];*

d. *[Consent Conditions (regulatory authority conditions attached to any permits or approvals for the project)]; and*

e. Environmental and Social Management Framework for the NGRBA / Namami Gange Program

f. *[Deleted*]

i. The code of conduct will contain obligations on all project staff (including sub-contractors and day workers) that are suitable to address the following issues, as a minimum. Additional obligations may be added to respond to particular concerns of the region, the location and the project sector or to specific project requirements. The issues to be addressed include:

   i. Compliance with applicable laws, rules, and regulations of the jurisdiction

   ii. Compliance with applicable health and safety requirements (including wearing prescribed personal protective equipment, preventing avoidable accidents and a duty to report conditions or practices that pose a safety hazard or threaten the environment)

   iii. The use of illegal substances

   iv. Non-Discrimination (for example on the basis of family status, ethnicity, race, gender, religion, language, marital status, birth, age, disability, or political conviction)

   v. Interactions with community members (for example to convey an attitude of respect and non-discrimination)

   vi. Sexual harassment (for example to prohibit use of language or behavior, in particular towards women or children, that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate)

   vii. Violence or exploitation (for example the prohibition of the exchange of money, employment, goods, or services for sex, including sexual favors or other forms of humiliating, degrading or exploitative behavior)

   viii. Protection of children (including prohibitions against abuse, defilement, or otherwise unacceptable behavior with children, limiting interactions with children, and ensuring their safety in project areas)

   ix. Sanitation requirements (for example, to ensure workers use specified sanitary facilities provided by their employer and not open areas)

   x. Avoidance of conflicts of interest (such that benefits, contracts, or employment, or any sort of preferential treatment or favors, are not provided to any person with whom there is a financial, family, or personal connection)

xi. Respecting reasonable work instructions (including regarding environmental and social norms)

xii. Protection and proper use of property (for example, to prohibit theft, carelessness or waste)

xiii. Duty to report violations of this Code

xiv. Non retaliation against workers who report violations of the Code, if that report is made in good faith.

ii. The Code of Conduct should be written in plain language and signed by each worker to indicate that they have:

i. received a copy of the code;

ii. had the code explained to them;

iii. acknowledged that adherence to this Code of Conduct is a condition of employment; and

iv. understood that violations of the Code can result in serious consequences, up to and including dismissal, or referral to legal authorities.

iii. In addition, the Bidder shall submit an outline of how this Code of Conduct will be implemented. This will include: how it will be introduced into conditions of employment/engagement, what training will be provided, how it will be monitored and how the Contractor proposes to deal with any breaches.

3.4. Technical Section – Part II – Bid Security

a. In Part II of the Technical Section of its Bid, the Bidder shall furnish, as part of its Bid, a Bid security in the amount and currency **stipulated in the Bid Data Sheet**. The bid security of a Joint Venture must define as "Bidder" all Joint Venture Partners and list them in the following manner:

"a Joint Venture consisting of '.....', '.....' and '.....'.

b. The Bid Security shall, at the Bidder's option, be in the form of a certified cheque, but only if the certified cheque shows a validity date, letter of credit/ demand draft or a bank guarantee from a reputable bank or insurance company selected by the Bidder and located in any eligible country. If the institution issuing the security is located outside the country of the Borrower, it shall have a correspondent financial institution located in the country of the Borrower to make it enforceable. The format of any bank guarantee provided by a Bidder shall be in accordance with the form of Bid Security contained in Annexure APart c to the Bidding Documents. The Bidder shall ensure that the Bid Security remains valid for a period of **45 days** after the end of the original Bid Validity Period, as defined in ITB Section 3.14(a), and **45 days** after any extension subsequently requested by the Owner in accordance with ITB Section 3.14(b).

c. Any Bid not accompanied by an acceptable Bid Security shall be rejected by the Owner as being non-responsive. The Bid Security of a

joint venture must be in the name of all of the participants in the joint venture submitting the Bid.

d. The Owner will return the Bid Securities of the unsuccessful Bidders as promptly as possible, upon the successful Bidder's signing the contract and furnishing the required performance securityand ESHS Performance Security.

e. The Bid Security of the Successful Bidder will be returned when the Bidder has signed the Form of Contract pursuant to ITB Section 6.4 and has provided the required Performance Security and ESHS Performance Security as set out in the Contract and ITB Section 6.5.

f. The Bid Security may be forfeited,

   1. if the Bidder withdraws its Bid during the Bid Validity Period; or

   2. in the case of the Successful Bidder, if the Successful Bidder fails within the specified time limit,

      i. to execute the Form of Contract in accordance with ITB Section 6.4; or

      ii. to furnish the Performance Security and ESHS Performance Security to the Owner in accordance with ITB Section 6.5.

3.5. Technical Section – Part III – Bid Form and Qualification Information

a. In Part III of the Technical Section of its Bid, each Bidder shall provide a completed Bid Form in the same form and substance as the Bid Form contained in Annexure A Part a to the Bidding Documents.

b. In Part III of the Technical Section of its Bid, Bidders shall submit Information Forms duly completed to evidence compliance with the Qualification Criteria provided in the AnnexureAPart h to the bidding documents. The Information Forms are provided in the Annexure A Part i to the Bidding Documents.

3.6. Technical Section – Part IV - Joint Venture Documents and Requirements

a. Each Joint Venture Bidder shall submit, as Part IV of the Technical Section of its Bid, a written commitment, in the form of a letter duly executed by an authorized officer of each joint venture participant which,

   1. Confirms each joint venture participant's commitment to the joint venture and acceptance of the joint venture arrangements described in the Bid in accordance with ITB Section 3.6(b);

   2. Confirms each joint venture participant's willingness to provide a joint and several guarantee to the Owner to underwrite the performance of the joint venture in respect of the Contract; and

   3. Identifies which joint venture participant,

i. will assume the leading role on behalf of the other joint venture participants; and

ii. will have the authority to commit all joint venture participants.

iii. will have the authority to incur liabilities and receive instructions for and on behalf of any and all participants of the joint venture.

b. A copy of the Joint Venture Agreement entered into by the Partners (JV Participants) shall be submitted with the bid. Alternatively, a Letter of Intent as per format provided under Annexure A – Part K to execute a Joint Venture Agreement in the event of a successful bid shall be signed by all partners and submitted with the bid together with a copy of the proposed Agreement, clearly indicating the objectives of the joint venture, the proposed management structure, the contribution of each participant to the joint venture operations, the commitment of the participants to joint and several liability for performance of the contract, recourse or sanctions within the joint venture in the event of default or withdrawal of any participant, and arrangements for providing the required indemnities.

c. If the Successful Bidder is a Joint Venture to whom the contract is awarded, each partner of the Joint Venture shall sign and execute the contract with the Owner and shall be jointly and severally responsible to Owner for the performance of the contract.

3.7. Technical Section – Part V – Power of Attorney

Each Bidder shall provide, as Part V of the Technical Section of its Bid, a written power of attorney in accordance with ITB Section 3.15(c).

3.8. Technical Section – Part VI – Commissions and Gratuities

In Part VI of the Technical Section of its Bid, each Bidder shall provide detailed information listing all commissions and gratuities, if any, paid or to be paid by the Bidder to agents relating to this Bid or the Contract if the Bidder is awarded the Contract. The Bidder shall list the name and address of any agents, the amount and currency paid or to be paid to the agents and the purpose of the commission or gratuity. If no such commissions and gratuities have been paid, the Bidder shall provide this information in Part VI of the Technical Section of its Bid.

3.9. Technical Section – Part VII – Pre-Printed Literature

If the Bidder wishes to provide pre-printed literature about the Bidder or the joint venture participants, that pre-printed literature shall be contained in Part VII of the Technical Section of the Bid only and shall be separately bound.

3.10. Financial Section – Price Schedules

Each Bidder shall submit completed and properly executed Price Schedules in the forms contained in Annexure A to the Bidding

Documents. Bidders shall complete the Price Schedules in full and shall not amend or change the form in any way. The Financial Section of each Bidder's Bid shall consist of only completed and properly executed Price Schedules.

3.11. Financial Section – Bid Prices

a. Bidders shall quote their Bid Price covering the total cost of (i) design, construction, testing, commissioning of the Sewage Treatment Plant; and of (ii) operation and maintenance of the complete works of Sewage Treatment Plant, for a further period of 15 years on a "single responsibility" basis such that the total Bid Price covers all of the Operator's obligations mentioned in or to be reasonably inferred from the Bidding Documents in respect of the design/redesign, construction, commissioning, installation, testing, operation and maintenance etc. of the Sewage Treatment Plant (including Main pumping stations) as set out in the Contract.

b. The Bidders shall quote their Bid Price in the following components:

For Sewage Treatment Plant:

1) **Part A - Design-Build Price:**

The Bidder shall quote total cost of design, development, construction, testing and commissioning of the STP including the cost for all materials, electrical energy consumption, electro mechanical equipment, labour, temporary works required for the construction, ancillary & allied works, consumables, acquisition of all permits / approvals / licences, duties and taxes and all related items of work as may be necessary for setting up the STP and making it fully functional in compliance with the provisions of the Contract.

Design-Build Price shall remain firm and fixed and will not be subject to price adjustment unless **specified otherwise in the Bid Data Sheet**.

In case the contract is subject to price adjustment, the Bidder shall furnish in the Schedule of Adjustment Data proposed weightings for various indices for the price adjustment formulae. The Owner may require the Bidder to justify its proposed weightings.

The bidder shall furnish requirement of land that will be required for the proposed STP (considering the technology offered by the bidder), roads, drains and other appurtenant structures, in accordance with ITB 3.3 (c). The cost of such land requirement as determined on the basis of land price specified in the BDS ITB 3.3 (c) shall be indicated in the Price Schedule for determining the evaluated bid price.

The bidder should make a realistic assessment of land requirement. The bidder's attention is also drawn to provision under SCC Clause 4.2 which will apply if the successful bidder finds at the time of construction of the facility that the requirement indicated in its bid is inadequate.

Total area allocated for Two (2) STP Plant 50 MLD & 60 MLD at Pahari, is Approx. 3 Hect. Land is available. Since limited area of the land is available for both the plant, so bidder should require to built on any advanced technology so it take less area of land and treated effluent as per CPHEEO manual.

2) **Part B - Annual O & M Prices of STP for treatment of Threshold Sewage Flow indicated in the Bid Data Sheet**

The bidder shall quote annual O&M prices for treatment of sewage up to threshold sewage flow rate for each of 15 years after commencement of the Operations Period, including skilled and unskilled manpower, establishment costs, consumables, electrical energy consumption including energy consumption from the back-up Power Supply unit, replacements, routine maintenance and periodic maintenance of the STP in compliance with the provisions of the Contract, etc. While quoting O&M prices, the bidder shall assume that full requirements of power for operating the STP shall be met by supply from the Electricity Utility Company throughout the O&M period. The Payment of O&M price to the Operator shall, however, be subject to adjustment for the extra cost incurred by the Operator for using the power supply from the back-up power supply unit (DG set) when power from the Electricity Utility Company is not available.

The bidder is advised to refer to Schedule 6 of the Contract - Terms and Procedure of Payment while quoting the O&M prices.

The Annual O&M price quoted for treatment of the Threshold Sewage Flow Rate shall be the base (minimum) price which shall not be subject to adjustment in case actual sewage flow falls short of the Threshold Sewage Flow Rate.

3) **Part C – Additional O&M Prices for treatment of sewage flow in excess of Threshold Sewage Flow on a per MLD basis** for each of the 15 years after commencement of Operations Period and shall include all the fixed and variable costs such as costs of skilled and unskilled manpower, establishment, consumables, chemicals, energy consumption, etc. for treatment of the additional sewage flow in compliance with the provisions of the Contract.

c. O&M Prices (Part B and Part C,) shall be subject to adjustment only on account of variation in electricity tariff evidenced by the electricity

bills paid by the Operator for the Sewage Treatment Plant to be operated and maintained by him as per Contract, with reference to the "Base Rate of Electricity Tariff" **stipulated in BDS**.

d. The Bidder shall provide Guaranteed Energy Consumption per MLD of the sewage handled by the Sewage Treatment Plant and the Pumping Station(s). Adjustment of O&M prices shall be applicable for the actual energy consumption evidenced by the electricity bills subject to the ceiling as per guaranteed energy consumption level in accordance with provisions of Schedule 6 of the Contract.

e. For the purpose of submitting Bids, Bidders should note that the Bid Price shall include all kinds of taxes, Goods and Services Tax, duties, levies or charges of the Owner's country in accordance with the Contract.

Note:

Contractor have to be quoted their rate inclusive of all taxes/GST/. No excise exemption will be given by BUIDCo to the Contractor.

f. Bidders are advised to review GC Section 5.6 and the Terms and Procedures of Payment Schedule (Schedule 6 of the Contract) prior to completing their Price Schedules and submitting their Bid Prices.

3.12. Financial Section – Bid Currencies

Bidders shall quote their prices in Indian Rupees only.

3.13. Bidding of alternatives not to be considered

a. The Bidders shall base their Bids on the terms and conditions of the Bidding Documents and, without limiting the generality of the foregoing, shall,

1. Submit their prices based on the terms and conditions in the Bidding Documents;
2. submit their Bids based on the assumption that the final Contract will be the same as the Draft Contract and shall not base their Bids on the premise that they may be able to change the Draft Contract; and
3. Include in their Bids a Form of Contract and Draft Contract initialled on each page in accordance with ITB Section 3.15(b) (3).

b. No Bidder shall submit a Bid that contains statements that are inconsistent with the Bidding Documents.

c. A Bidder shall not submit a Bid that proposes an arrangement between the Owner and the Bidder which, in the discretion of the Owner, is different than the arrangement set out in the Bidding Documents (an "Alternative Bid"). The Owner intends to enter into a contract to design, build and operate a Sewage Treatment Facility based on the terms and conditions of the Bidding Documents. If a Bidder submits an

Alternative Bid it will be returned to the Bidder and will not be considered, in any way, by the Owner.

3.14. Period of Validity of Bid

a. Bids shall remain valid for the period **named in the Bid Data Sheet** after the Submission Deadline or any extension thereof prescribed by the Owner for the receipt of Bids, pursuant to ITB Section 3.14(b). A Bid valid for a shorter period shall be rejected by the Owner as being non-responsive.

b. In exceptional circumstances, the Owner may solicit the Bidders' consent to an extension of the Bid Validity Period. The request and responses thereto shall be made in writing and sent by air mail, courier or fax. If a Bidder accepts to prolong the Bid Validity Period, the Bid Security shall also be suitably extended. A Bidder may refuse the request without forfeiting its Bid Security. A Bidder granting the request will not be required nor permitted to modify its Bid, except as provided in ITB Section 4.4.

3.15. Format and Signing of Bid

a. Each Bidder shall prepare and submit one signed and initialled original of its Bid and the number of copies of the Bid as **set out in the Bid Data Sheet**, clearly marking one each as "Original Bid", "Copy No. 1", or "Copy No. 2", etc. as appropriate. In the event of any discrepancy between the copies and the original, the original shall govern.

b. The original and all copies of the Bid, each consisting of the documents listed in ITB Section 3.2, shall be typed or written in indelible ink. The person or persons duly authorized to bind the Bidder to the Bid and Contract shall sign the Bid by,

   1. signing the original of the Bid Form;

   2. initialling all of the pages of the original of the Bid, except for un-amended printed literature; and

   3. initialling the Form of Contract and initialling all pages of the Draft Contract.

c. The authority of the person or persons signing the Bid to bind the Bidder shall be demonstrated by a written and duly notarized power of attorney included in the Bid and submitted as Part V of the Technical Section of the Bid and which shall bind the Bidder for the full length of the Bid Validity Period.

d. The Bid shall contain no alterations, omissions or additions, unless such corrections are initialled by the person or persons signing the Bid.

Section 4. Submission of Bids

4.1. Sealing and Marking of Bids

a. Each Bidder shall seal the original and each copy of the Bid in separate envelopes, duly marking the envelopes as "Original Bid" and "Copy No….". The envelopes shall then be sealed in an outer envelope.

b. The inner and outer envelopes shall:

1. be addressed to the Owner at the address **specified in the Bid Data Sheet**; and

2. Bear the Contract name **indicated in the Bid Data Sheet** and the statement "DO NOT OPEN BEFORE 01/11/2017, 3.30 PM_ Hours", with the date and time **specified in the Bid Data Sheet** pursuant to ITB Section 5.1.

c. The inner envelopes shall indicate the name and address of the Bidder so that the Bid can be returned unopened in the event that it is declared "late".

d. If the outer envelope or package is not sealed and marked as required by this ITB Section 4.1, the Owner will assume no responsibility for the Bid's misplacement or premature opening. If any of the outer envelope or package discloses the Bidder's identity, the Owner will not guarantee the anonymity of the Bid but this disclosure shall not constitute grounds for Bid rejection.

4.2. Deadline for Submission of Bids

a. Bids must be received by the Owner at the address **specified in the Bid Data Sheet** no later than the time and date **stated in the Bid Data Sheet** as the Submission Deadline.

b. The Owner may, at its discretion, extend the Submission Deadline by amending the Bidding Documents in accordance with ITB Sections 2.6 and 2.9(b), in which case all rights and obligations of Owner and Bidders will thereafter be subject to the Submission Deadline as extended.

c. Each Bidder shall deliver its Bid by hand or by courier. A Bidder shall not submit a Bid by facsimile or electronic means. Each Bidder shall be responsible for the timely delivery of its Bid to the address **set out in the Bid Data Sheet** irrespective of any delivery or local difficulties.

4.3. Late Bids

Any Bid received by the Owner after the Submission Deadline prescribed by the Owner, pursuant to ITB Section 4.2, will be rejected and returned unopened to the Bidder.

4.4. Withdrawal, Substitution, and Modification of Bids

1) A Bidder may withdraw, substitute, or modify its bid after it has been submitted by sending a written notice, duly signed by an authorized representative,and shall include a copy of the authorization in accordance with ITB Sections 3.15 b and 3.15 c, (except that withdrawal notices do not require copies). The corresponding substitution or modification of the bid must accompany the respective written notice. All notices must be prepared and substituted in accordance with ITB Sections 3.15 and 4.1 (except that withdrawal notices do not require copies) and in addition, the respective envelops shall be clearly marked “Withdrawal”, “Substitution”, “Modification”. Such notices shall be received by the Owner prior to the deadline for submission of bids in accordance with ITB Section 4.2.

2) Bids requested to be withdrawn in accordance with ITB Section 4.4 (1) shall be returned unopened to the Bidders.

3) No Bid may be modified, substituted or withdrawn in the interval between the deadline for Bid Submission and the expiration of the Bid Validity Period. Withdrawal of a Bid during this interval may result in the Bidder’s forfeiture of its Bid Security, pursuant to ITB Section 3.4(f).

Section 5. Bid Opening and Evaluation

5.1. Opening of Bids by Owner

(a) The Owner shall conduct the bid opening in public at the address, date and time **specified in theBDS.**

(b) First, envelopes marked "WITHDRAWAL" shall be opened and read out and the envelope with the corresponding bid shall not be opened, but returned to the Bidder. If the withdrawal envelope does not contain a copy of the "power of attorney" confirming the signature as a person duly authorized to sign on behalf of the Bidder, the corresponding bid will be opened. No bid withdrawal shall be permitted unless the corresponding withdrawal notice contains a valid authorization to request the withdrawal and is read out at bid opening. Next, envelopes marked "SUBSTITUTION" shall be opened and read out and exchanged with the corresponding Bid being substituted, and the substituted Bid shall not be opened, but returned to the Bidder. No Bid substitution shall be permitted unless the corresponding substitution notice contains a valid authorization to request the substitution and is read out at bid opening. Envelopes marked "MODIFICATION" shall be opened and read out with the corresponding Bid. No Bid modification shall be permitted unless the corresponding modification notice contains a valid authorization to request the modification and is read out at Bid opening. Only envelopes that are opened and read out at Bid opening shall be considered further.

(c) All other envelopes shall be opened one at a time, reading out: the name of the Bidder and whether there is a modification; the Bid Prices, including any discounts and alternative offers; the presence of a Bid Security or Bid-Securing Declaration, if required; and any other details as the Owner may consider appropriate. Only discounts and alternative offers read out at Bid opening shall be considered for evaluation. No Bid shall be rejected at Bid opening except for late bids, in accordance with ITB section 4.3.

(d) The Owner shall prepare a record of the Bid opening that shall include, as a minimum: the name of the Bidder and whether there is a withdrawal, substitution, or modification; the Bid Price, per lot if applicable, including any discounts, and alternative offers if they were permitted; and the presence or absence of a Bid Security. The Bidders' representatives who are present shall be requested to sign the attendance sheet. A copy of the record shall be distributed to all Bidders who submitted bids in time.

5.2. Clarification of Bids

During Bid evaluation, the Owner may, at its discretion, ask the Bidder for a clarification of its Bid. The request for clarification and the response

shall be in writing, and no change in the price or substance of the Bid shall be sought, offered or permitted.

5.3. Preliminary Examination of Bids

a. The Owner will examine each Bid to determine whether it is complete, whether any computational errors have been made, whether required securities have been furnished, whether the documents have been properly signed, and whether the Bid is generally in order.

b. Arithmetical errors in the Bids will be rectified on the following basis:

1. If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail, and the total price shall be corrected unless in the opinion of the Owner there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price shall be corrected;

2. If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and

3. If there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (1) and (2) above.

Bidders shall be requested to accept correction of arithmetical errors. If a Bidder does not accept the correction in accordance with ITB 5.3, its Bid shall be rejected.

c. The Owner may waive any minor informality, nonconformity or irregularity in a Bid that does not constitute a material deviation, and that does not prejudice or affect the relative ranking of any Bidder as a result of the technical and price evaluation pursuant to ITB Sections 5.5 and 5.6.

d. Prior to the detailed evaluation, the Owner will determine whether each Bid is of acceptable quality, is complete and is substantially responsive to the Bidding Documents. For purposes of this determination, a substantially responsive Bid is one that conforms to all the terms, conditions and specifications of the Bidding Documents without material deviations, objections, conditionalities or reservations. A material deviation, objection, conditionality or reservation is one,

1. that affects in any substantial way the scope, quality or performance of the contract;

2. that limits in any substantial way, inconsistent with the Bidding documents, the Owner's rights or the Successful Bidder's obligations under the contract; or

3. whose rectification would unfairly affect the competitive position of other Bidders who are presenting substantially responsive Bids.

e. If a Bid is not substantially responsive, it will be rejected by the Owner, and may not subsequently be made responsive by the Bidder by correction of the nonconformity. The Owner's determination of a Bid's responsiveness is to be based on the contents of the Bid itself without recourse to extrinsic evidence.

5.4. Conversion to Single Currency

Not Applicable

5.5. Technical Evaluation

a. The Owner will carry out a detailed evaluation of the Technical Sections previously determined to be substantially responsive in order to determine on a pass/fail basis whether the technical aspects are in accordance with the requirements set forth in the Bidding Documents. Bidders acknowledge that, in order to reach such a determination, the Owner will examine and analyse the technical aspects of each Bid on the basis of the information supplied by Bidders, taking into account the completeness, consistency and level of detail of the following factors:

1. with respect to the Design-Build construction plan,

i. the Bidder's ability to demonstrate how it will meet the Owner's project objective and requirements, the technical standards and the Environmental Management Plan;

ii. the soundness of the proposed methodology and approach, and the extent to which the Design-Build Work plan demonstrates an understanding of the local conditions and specific Project requirements;

2. with respect to the Operation and Maintenance Work plan,

i. the extent to which the Operations Work plan addresses all of the Operations Services that are to be provided in accordance with the Contract;

ii. the soundness of the proposed methodology and approach, and the extent to which the Operations Work plan demonstrates an understanding of the local conditions and specific Project requirements; and the Bidder's ability to demonstrate how it will meet the technical standards; and

3. with respect to the Staffing Plan,

i. the qualifications and competence of the Key Staff; and

ii. the overall quality of the Staffing Plan, including the depth and organisational strength demonstrated by the Plan and

the extent to which it meets the expertise requirements set out in the BDS under ITB 3.3 (h) (4) and ITB 3.3 (h) (5).

b. For the purpose of ITB Section 5.5(a) (3)(ii), the evaluation of the overall quality of the Staffing Plan shall be based on,

1. the clarity, comprehensiveness and level of detail of the Staffing Plan;

2. the extent to which the expertise required by the Operator's Key Staff as specified in the BDS underITB 3.3 (h) (4) and ITB 3.3 (h)(5) is included in the Staffing Plan; and

3. the extent to which the Staffing Plan addresses the specific Services that are required by the Design-Build and Operations Services Schedules to the General Conditions.

5.6. Price Evaluation and Comparison of Bids

a. The Owner shall examine each Bidder's Financial Section to determine whether such Financial Section is complete and substantially responsive to the Bidding Documents.

b. The Financial Sections, which are substantially responsive to the Bidding Documents, shall be evaluated to determine the lowest evaluated bid.

c. The Owner shall evaluate the bid by determining and adding various components of cost and prices as under:

i. Price adjustment for correction of arithmetic errors in accordance with Section 5.3(b); plus

ii. Cost of design, development, construction, testing and successful commissioning of STP; plus

iii. Cost of land requirement for STP indicated by the bidder and as determined in accordance with ITB Section 3.3(c); plus

iv. NPV of the yearly payments due on account of O & M of STP over 15 years of O & M assuming "Indicative Sewage Flow for STP" reaching the STP during respective years of the Operation Period as indicated in Appendix to Bid (Indicative Flow). For the purpose of determining the NPV discount factor of 10 % per annum shall be applicable.

d. The Owner shall compare the evaluated prices of all substantially responsive bids to determine the lowest evaluated bid.

5.7. Qualification of the Bidder

a. The Owner shall determine to its satisfaction whether the Bidder that is selected as having submitted the lowest evaluated and substantially responsive bid meets the Qualification Criteria specified in Annexure A Part h of bidding documents.

b. The determination shall be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to Section 3.5 (b).

c. An affirmative determination shall be a prerequisite for award of the Contract to the Bidder. A negative determination shall result in disqualification of the bid, in which event the Owner shall proceed to the next lowest evaluated bid to make a similar determination of that Bidder's qualifications to perform satisfactorily.

5.8. Contacting the Owner

a. From the time of bid opening to the time of Contract award, if any Bidder wishes to contact the Owner, it must do so in writing.

b. Any effort by a Bidder to influence the Owner, its advisors, employees, consultants or agents, in the Owner's Bid evaluation, Bid comparison, or Contract award decision may, in the discretion of the Owner, result in rejection of the Bidder's Bid.

Section 6. Award of Contract

6.1. Award Criteria

Subject to ITB Section 6.2, the Owner will award the Contract to the Bidder whose Bid has been determined, by the technical and price evaluation, to be substantially responsive, has received a "pass" in the technical evaluation, and has the lowest evaluated Bid Price, provided further that the Bidder is determined to be qualified to perform the contract satisfactorily.

6.2. Owner's Right to Accept or Reject and Waive Irregularities

a. The Owner reserves the right to,

1. accept any Bid;
2. reject any Bid;
3. annul the bidding process and reject all Bids;
4. annul the bidding process and commence a new process; and
5. waive irregularities, minor informalities, or minor non-conformities which do not constitute material deviations in the submitted Bids from the Bidding Documents, at any time prior to the award of the Contract without incurring any liability to the affected Bidder or Bidders and without any obligation to inform the affected Bidder or Bidders of the grounds for the Owner's actions.

b. Nothing in ITB Section 6.2(a) is intended to permit the Owner to refuse to provide reasons for rejection to an unsuccessful Bidder.

6.3. Notification of Award

Prior to the expiration of the Bid Validity Period, the Owner shall notify the Successful Bidder in writing by courier that its Bid has been accepted by the Owner (the "Notification of Award"). The effectiveness of the Contract shall be as of the date of the Owner's signing of the Contract contingent on final approval by the Bank. At the same time, the Owner shall also notify all other Bidders of the results of the bidding, and shall publish on the website indicated in the **BDS**, the following information:

(i) name of each Bidder who submitted a Bid;

(ii) bid prices as read out at Bid Opening;

(iii) name and evaluated price of each Bid that was evaluated;

(iv) names of bidders whose bids were rejected and the reasons for their rejection; and

(v) name of the winning Bidder, and the Price it offered, as well as the duration and summary scope of the contract awarded.

Until a formal contract is prepared and executed, the notification of award shall constitute a binding Contract.

The Owner shall promptly respond in writing to any unsuccessful Bidder who, after notification of award in accordance with ITB 6.3, requests in writing the grounds on which its bid was not selected.

6.4. Signing the Form of Contract

a. Promptly upon issuance of the Notification of Award as per ITB 5.3, the Owner shall send the Successful Bidder,

   1. Form of Contract; and

   2. the other Contract Documents.

b. Not later than 30 days after the Successful Bidder's receipt of the Notification of Award, the Form of Contract and the other Contract Documents pursuant to ITB Sections 6.3 and 6.4(a), the Successful Bidder shall sign and date the Form of Contract and initial each page of the Contract and return them to the Owner.

6.5. Performance Security

a. No later than 30 days after the Successful Bidder's receipt of the Notification of Award, the Successful Bidder shall provide the Owner with the performance security and ESHS Performance Security in the amounts **given in the Bid Data Sheet** and in the substance and form set out in **Annexure A Part d** or in another form approved by the Owner. The Performance Security and ESHS Performance Security Forms of a Joint Venture shall be in the name of Joint Venture.

b. In case if the Owner finds from the break-up of design build prices of STP contained in Price Schedules that the prices indicated therein are unbalanced or front loaded in the opinion of the Owner, the Owner may require the successful bidder to provide additional performance guarantee of an amount sufficient to protect the Owner against financial loss in the event of default of the successful Bidder under the Contract.

6.6. Failure to Sign the Form of Contract or provide the Performance Security

If the Successful Bidder fails to comply with the provisions of ITB Sections 6.4(b) or 6.5, this failure shall constitute sufficient grounds for annulment of the award and forfeiture of the Bid Security, and in which event the Owner may make the award to the next lowest evaluated Bidder or call for new bids.

6.7. Adjudicator

The Owner proposes that the person **named in the Bid Data Sheet** be appointed as Adjudicator under the contract, at a fee **stated in the Bid Data Sheet**. A résumé of the named person is **attached to the Bid Data Sheet**, as well as a description of the expenses that would be considered

reimbursable. If a Bidder does not accept the Adjudicator proposed by the Owner, it should so state in its Bid Form and make a counterproposal of an Adjudicator and an hourly fee. If, on the day the Form of Contract is signed, the Owner and the Operator have not agreed on the appointment of the Adjudicator, the Adjudicator shall be appointed, at the request of either party, by the Appointing Authority specified in the Special Conditions of Contract.

6.8. Fraud and Corruption

It is the Bank's policy to require that Borrowers (including beneficiaries of Bank loans), bidders, suppliers, Operators and their agents (whether declared or not), sub-contractor, sub-consultants, service providers or suppliers, and any personnel thereof, observe the highest standard of ethics during the procurement and execution of Bank-financed contracts.[1] In pursuance of this policy, the Bank:

(a) defines, for the purposes of this provision, the terms set forth below as follows:

(i) "Corrupt practice" is the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;[2]

(ii) "Fraudulent practice" is any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;[3]

(iii) "Collusive practice" is an arrangement between two or more parties designed to achieve an improper purpose, including toinfluence improperly the actions of another party;[4]

(iv) "Coercive practice" is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;[5]

---

[1] In this context, any action to influence the procurement process or contract execution for undue advantage is improper.

[2] For the purpose of this sub-paragraph, "*another party*" refers to a public official acting in relation to the procurement process or contract execution. In this context, "*public official*" includes World Bank staff and employees of other organizations taking or reviewing procurement decisions.

[3] For the purpose of this sub-paragraph, "party" refers to a public official; the terms "benefit" and "obligation" relate to the procurement process or contract execution; and the "act or omission" is intended to influence the procurement process or contract execution.

[4] For the purpose of this sub-paragraph, "parties" refers to participants in the procurement process (including public officials) attempting either themselves, or through another person or entity not participating in the procurement or selection process, to simulate competition or to establish bid prices at artificial, non-competitive levels, or are privy to each other's bid prices or other conditions.

(v) "Obstructive practice" is

(aa) Deliberately destroying, falsifying, altering, or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Bank investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation, or

(bb) acts intended to materially impede the exercise of the Bank's inspection and audit rights provided for under the Contract.

(b) will reject a proposal for award if it determines that the bidder recommended for award, or any of its personnel, or its agents, or its sub-consultants, sub-Operators, service providers, suppliers and/or their employees, has, directly or indirectly, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for the contract in question;

(c) will declare misprocurement and cancel the portion of the loan allocated to a contract if it determines at any time that representatives of the Borrower or of a recipient of any part of the proceeds of the loan engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices during the procurement or the implementation of the contract in question, without the Borrower having taken timely and appropriate action satisfactory to the Bank to address such practices when they occur, including by failing to inform the Bank in a timely manner at the time they knew of the practices;

(d) will sanction a firm or individual, at any time, in accordance with the prevailing Bank's sanctions procedures,[6] including by publicly declaring such firm or individual ineligible, either indefinitely or for a stated period of time: (i) to be awarded a Bank-financed contract;

---

[5]For the purpose of this sub-paragraph, "party" refers to a participant in the procurement process or contract execution

[6] A firm or individual may be declared ineligible to be awarded a Bank financed contract upon: (i) completion of the Bank's sanctions proceedings as per its sanctions procedures, including, inter alia, cross-debarment as agreed with other International Financial Institutions, including Multilateral Development Banks, and through the application the World Bank Group corporate administrative procurement sanctions procedures for fraud and corruption; and (ii) as a result of temporary suspension or early temporary suspension in connection with an ongoing sanctions proceeding. See footnote 14 and paragraph 8 of Appendix 1 of these Guidelines.

and (ii) to be a nominated[7] sub-Operator, consultant, manufacturer or supplier, or service provider of an otherwise eligible firm being awarded a Bank-financed contract;

(e) will require that a clause be included in bidding documents and in contracts financed by a Bank loan, requiring bidders, suppliers and Operators, and their sub-Operators, agents, personnel, consultants, service providers, or suppliers, to permit the Bank to inspect all accounts, records, and other documents relating to the submission of bids and contract performance, and to have them audited by auditors appointed

6.9 Procurement Related Complaint

The procedures for making a Procurement-related Complaint are as specified in the BDS.

[7] A nominated sub-contractor, consultant, manufacturer or supplier, or service provider (different names are used depending on the particular bidding document) is one which has either been: (i) included by the bidder in its pre-qualification application or bid because itbrings specific and critical experience and know-how that allow the bidder to meet the qualification requirements for the particular bid; or (ii) appointed by the Borrower.

Bid Data Sheet

The following bid-specific data for the facility and services to be procured shall amend or supplement the provisions in the Instructions to Bidders (ITB). Whenever there is a conflict, the provisions herein shall prevail over those in the ITB.

ITB SECTION REFERENCE	REQUIRED INFORMATION
ITB 1.1(a)	Name of the Borrower: Government of India
ITB 1.1(a)	Credit number: 4955-IN Loan number: 8065-IN Total Loan &Credit amount: US$ 1 billion
ITB 1.1(a)	**Project Name: National Ganga River Basin Project.** The STP at Pahari, Patna, State of Bihar, India, forms a part of the above mentioned Project being undertaken by Ministry of Water Resources, River Development & Ganga Rejuvenation, Government of India.
ITB 1.1 (b)	The State is:Bihar The ULB is: **Patna Municipal Corporation**
ITB 1.1 (d)	The installed capacity of the STP is (Average Flow = **60 MLD**; Peak Flow = **5625 m^3/hour**), **Main Pumping Station (MPS)** (**97 MLD),** and is located at **Pahari in Patna**. Only the civil structure of MPS will be designed and constructed for 97 MLD, Plants and machinery will be provided to match STP capacity of 60 MLD).
ITB 1.1 (e)	Name of Owner: **Bihar Urban Infrastructure Development Corporation Ltd. (BUIDCo)**
ITB 1.1 (e)	The maximum area of land available and allocated for the Sewage Treatment Plant and reuse infrastructure is 2.94 Hectare.
ITB 1.2.1	Number of members in a JV shall not exceed 2, (1 + 1).
ITB 1.2.4 (6.8)	The electronic address of firms and individuals debarred by the Bank is: http://www.worldbank.org/debarr.
ITB 2.2(a)	Address of Owner: **The Managing Director**, **Bihar Urban Infrastructure Development Corporation Limited,** SFC Building, 2nd floor, Daroga Rai Path, Road no-2, R- Block, Patna 800001 **Bihar, India.**
ITB 2.2 c	Request for clarification of the Bidding Documents shall be received indicated in the BDS under ITB 4.2.
ITB 2.4	Data Room:**will be available from the date of bid invitation** Data Room is at the following location:

ITB SECTION REFERENCE	REQUIRED INFORMATION
	Bihar Urban Infrastructure Development Corporation Limited, SFC Building, 2nd floor, Daroga Rai Path Road no-2, R- Block, Patna 800001
ITB 2.5	**Venue and time of pre-bid meeting:** Conference Room, **Bihar Urban Infrastructure Development Corporation Limited,** SFC Building, 2nd floor, Daroga Rai Path Road no-2, R- Block, Patna 800001 Email :- mdbuidco@gmail.com **Date : 21-09-2017 Time: 14:00 Hrs. IST** The website where proceedings of the pre-bid meeting, reply to the queries and corrigendum if any will also be uploaded is: **www.buidco.in**

ITB SECTION REFERENCE	REQUIRED INFORMATION
ITB 2.7	Address of Owner, telephone, email and facsimile of contact persons: **The Managing Director**, **Bihar Urban Infrastructure Development Corporation Limited,** SFC Building, 2nd floor, Daroga Rai Path, Road no-2, R- Block, Patna 800001 Ph. No.-0612-2506109 Fax No.-91-612-2506132 Web-http://buidco.in Email – mdbuidco@gmail.com
ITB 2.9(a), 2.2(c), 2.3(a), 2.4, 2.9(b)	The estimated timetable is: (a) Issue of Bidding Documents: [From 12.09.2017 to 16.10.2017 up to 14:00 hrs. IST] (b) Bidders to Submit preliminary Questions on Bidding Documents [19.09.2017] (c)SiteVisits [From 18.09.2017 to 19.09.2017] (d) Pre-Bid Meeting [21.09.2017] (e) Last Day for Bidders to Submit Supplementary Questions (arising out of Site Visits & prebid meeting only)[19.09.2017] (f) Issue of Response to Questions [04.10.2017] (h) Deadline for Submission of Bids [17.10.2017] (Bid Submission Date) 15:00 hrs.IST.local time (i) Opening of Bids (Bid opening date) [17.10.2017] 15:30 hrs. IST local time (j) Identification of Successful Bidder [15.11.2017] (k) Notification of Award [28.11.2017] (l) Contract Signature [12.12.2017] (m)Design-Build-Starting Date [26.12.2017] (n) Completion of STP and treated effluent reuse arrangement [25.06.2020]
ITB 3.1	Language of Bid is English.
ITB 3.3 (a), 3.3 (e)	Status of availability and Ownership of Land for STP: **Land is under Government custody**

<table>
<tr><th>ITB SECTION REFERENCE</th><th>REQUIRED INFORMATION</th></tr>
<tr><td>ITB 3.3(b)</td><td>Location of disposal of Sludge: Municipal Solid Waste Dumping Site of Patna Municipal Corporation at <u>Village Ramchak Bairia on the Gaya Road</u>
Distance of location of sludge disposal from STP: <u>Approximately</u> 5 Km. The treated effuluent shall be discharged at Badsahi Nalah, Outlet level shall be designed and planned with reference to Ganga River HFL which is 51.51 m, at a distance of approx. 25 Km.</td></tr>
<tr><td>ITB 3.3 (c)</td><td>Price of Land to be considered for evaluation of the Bid Prices: 37,074 Rs. / Sq. M</td></tr>
<tr><td>ITB 3.3(e)(2)(i)</td><td>Minimum Percetage of treated effluent available for reuse should be as per Article 13 of Design-Build Services Schedule (Schedule 2 to the Contract).</td></tr>
<tr><td>ITB 3.3(e)(2)(ii)(b)</td><td>Works to be specified in Site plan for STP:
1. Intake arrangement for receiving the raw sewage into the STP,
2. Main Pumping Station (MPS)
3. Initial screening;
4. Various components of primary,and secondarySewage Treatment processes, disinfection facilities, including tertiary treatment if proposed by the bidder;
5. Sludge treatment and reuse of sludge in power generation for operation of STP (if any)
6. Sludge disposal arrangements
7. Treated sewage reuse and disposal arrangements,
8. Onsite testing facility for parameters mentioned in SCC
9. Staff Quarters and Campus Development Works
10. Infrastructure for Electricity generation from solar photovoltaic arrangement (minimum 1000 watts for STP to take care of internal lighting, fans etc)
11. Any other facility as required to conform to effluent standards</td></tr>
<tr><td>ITB SCC 2</td><td>Language capabilities for Bidder’s Personnel: English</td></tr>
<tr><td>ITB 3.3(f)(4)(ii)(b), 3.3(f)(5)</td><td>List of Key Staff to be deployed by the Operator during the Design buildservices for STP as stipulated in SCC 8.3 is reproduced here.
<table>
<tr><th>S.No</th><th>Staff</th><th>No *</th><th>Minimum Qualifications</th></tr>
<tr><td>1</td><td>Project Manager</td><td>1</td><td>A Graduate in Civil Engineering with not less than 10 years’ experience in construction of Sewage Treatment Plants.</td></tr>
<tr><td>2</td><td>Civil Engineer</td><td>2</td><td>A Civil Engineer (Graduate Engineer) with not less than eight years’</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>ITB SECTION REFERENCE</th><th>REQUIRED INFORMATION</th></tr>
<tr><td></td><td>
<table>
<tr><td></td><td></td><td></td><td>experience in construction of similar engineering works or Diploma in Civil Engineering with 8 years' experience</td></tr>
<tr><td>3</td><td>Electro Mechanical Engineer</td><td>1</td><td>A Electro /Mechanical Engineer (Graduate Engineer) with not less than8years' experience in construction of similar engineering works or Diploma in Electro/ Mechanical Engineering with 10years' experience</td></tr>
<tr><td>4</td><td>Civil Supervisors</td><td>3</td><td>Diploma in Civil Engineering with minimum 2 years' experience in Construction of Civil Engineering works</td></tr>
<tr><td>5</td><td>Environmental Engineer</td><td>1</td><td>Graduate in civil Engineering / environmental Science / environmental planning with total 5 years' experience of which minimum 3 years'experience in environmental management works of urban infrastructure projects.</td></tr>
<tr><td>6</td><td>Health and safety Engineer</td><td>1</td><td>Graduate in any field with specialised qualification in Occupational Health and safety (OHS) with total 5 years' of experience of which 3 years' in management of OHS works in infrastructure projects.</td></tr>
<tr><td>7</td><td>Social Expert</td><td>1</td><td>Degree in Social science / Sociology / Social Work / Anthropology / Planning with total 5 years' experience of which 3 years in management of social safeguard activities in infrastructure projects.</td></tr>
</table>
CVs of key staff shall be submitted along with the bid and shall be subject to approval of Owner.

Bidder's attention is drawn to Article 7.2 of Schedule 2 (Design Build Services Schedule) of the Contract which shall be applicable, if the Operator proposes to replace any Key Staff during Design & build services period.

For O&M services, qualifications and experience of the Key Staff have been specified in Article 2.6 of Schedule 3 (Operations and Maintenance Services Schedule) of Contract. The bidder shall take the same into account while submitting the Staffing Plan for O&M services with its bid.
</td></tr>
<tr><td>ITB 3.3 (e)(10)</td><td>Maximum percentage of sub-contracting the design-build services is 25%. However the nominated sub-contractor whose experience and qualification have been claimed for meeting the qualification criteria in</td></tr>
</table>

ITB SECTION REFERENCE	REQUIRED INFORMATION
	accordance with stipulations in AnnexureA part h shall be excluded while applying the ceiling of 25 %.
ITB 11	The Bidder shall submit the following additional documents in its Bid: Code of Conduct (ESHS) The Bidder shall submit its Code of Conduct that will apply to Operator's Personnel (as defined in Sub-clause 1.1.2.7 of the GC), to ensure compliance with its Environmental, Social, Health and Safety (ESHS) obligations under the contract. [Note: Complete and include the risks to be addressed by the Code in accordance with works' requirements, e.g. risks associated with: labor influx, spread of communicable diseases, sexual harassment, gender based violence, illicit behavior and crime, and maintaining a safe environment etc.] In addition, the Bidder shall detail how this Code of Conduct will be implemented. This will include: how it will be introduced into conditions of employment/engagement, what training will be provided, how it will be monitored and how the Operator proposes to deal with any breaches. The Operatorshall be required to implement the agreed Code of Conduct. In addition, the Operator shall be required to submit for approval, and subsequently implement, the Operator's Environment and Social Management Plan (O-ESMP) and management strategies and implementation plan to manage ESHS risks, in accordance with Appendix 1 to Schedule 2 (Design Build Services), that includes the agreed Management Strategies and Implementation Plans described here.
ITB 3.4(a)	**Amount of Bid Security: INR 22 Million (Rupees Twenty two Million only)**.
ITB 3.11 a	Period (i) for design, construction, testing, commissioning of the STP including MPS and allied worksis: **2.5** years.
ITB 3.11 b (1)	The Design-Build prices quoted by the bidder for STP i.e. Part A of the Bid Prices ***"shall be"*** subject to price adjustment. Price adjustment shall be applied in accordance with Schedule 8.
ITB 3.11 b 2& 3.11 b 3	The Threshold Sewage Flow is: **20 Mld**. The threshold sewage flow means the expected level of sewage flow available for treatment immediately on completion of the STP facility
ITB 3.11 c	The prevailing electricity tariff referred to as "Base Rate of Electricity Tariff" is Rs **6.50** per KWh.
ITB 3.14(a)	Bid Validity Period: **120** days
ITB 3.15(a), 4.1(a)	Original and 1 copy.

ITB SECTION REFERENCE	REQUIRED INFORMATION
ITB 4.1(b)(1), 4.1(b)(2), 4.2(a), 4.2(c)	Address for Bid submission: **Bihar Urban Infrastructure Development Corporation Limited,** SFC Building, 2nd floor, Daroga Rai Path Road no-2, R- Block, Patna 800001 Ph. No.-0612-2506109 Fax No.-91-612-2506132 Web-http://buidco.in Date: 17-10-2017 Time: 15:00 hrs. IST
ITB 4.1(b)(2),	**Name of Contract:** Design, Build Sewage Treatment Plant (STP) of **60 MLD** capacity including MPS (97 MLD) and Operation&Maintenance for a period of **15** years at Pahariin Patna, State of Bihar, India.
ITB 4.1(b)(2), 5.1(a)(2)	**Location, date and time of opening of Bid:** **Conference Room**, **Bihar Urban Infrastructure Development Corporation Limited,** SFC Building, 2nd floor, Daroga Rai Path Road no-2, R- Block, Patna 800001 Ph. No.-0612-2506109 Fax No.-91-612-2506132 Web-http://buidco.in **Date:.17-10-2017 Time: 15:30 Hrs. IST.**

ITB SECTION REFERENCE	REQUIRED INFORMATION
ITB 6.5	Amount of Performance Security = 9 % of the total Contract Price, which will be determined as under. **Total Contract Price** = Design-Build price of STP as per Part A of Price Schedule plus Total O&M Price for 15 years, as per Parts B & C, assuming indicative sewage flow rate reaching the STP during respective years of the O&M period as indicated in Appendix to Bid (Indicative Flow) 15Amount of Environmental, Social, Health and Safety (ESHS) Performance Security = 1% of the Total Contract Price determined in the manner specified above.
ITB 6.7	Name of the Adjudicator proposed by the Owner: Shri A K Sharma (Daily fee for the Adjudicator: **INR 10,000**/day**+ reimbursementstowards travel, transportation, lodging, boarding etc**) *[CV of the proposed Adjudicator is attached]*
ITB 6.9.1	If a Bidder wishes to make a Procurement-related Complaint, it should submit its complaint in writing (by the quickest means available, that is either by email or fax), to: **For the attention**: *[insert full name of person receiving complaints]* **Title/position/address**: *[MD BUIDCo]* **Email address***: [mdbuidco@gmail.com]* **Fax number**: *[*91-612-2506132*]* Procurement-related Complaint may challenge any of the following: **1.** the terms of the Bidding Documents; and **2.** the Owner's decision to award the contract
ITB SECTION REFERENCE	Required Information
	Title/position: *[MD BUIDCo]* **Employer:***[BUIDCo]* **Email address***: [mdbuidco@gmail.com]* **Fax number**: *[*91-612-2506132*]*

ITB SECTION REFERENCE	REQUIRED INFORMATION
	In summary, a Procurement-related Complaint may challenge any of the following: **3.** the terms of the Bidding Documents; and the Employer's decision to award the contract.

Annexure A to the Bidding Documents

a. Bidder's Bid Form

b. Bidder's Price Schedules

c. Form of Bid Security

d. Form of Performance Security

e. Format of Curriculum Vitae for Proposed Key Staff

f. Form for Clarification Questions

g. List of Eligible Countries

h. Qualification Criteria

i. Information Forms

j. Declaration Format for Deemed Export Benefits

k. Form of Letter of Intent by JV Partners

l. Form of Power of Attorney for Joint Venture

m. Form of undertaking by JV Partners

n. Format for evidence of access to or availability of Credit Facilities

Annexure A – Part a

BIDDER'S BID FORM

NATIONAL GANGA RIVER BASIN PROJECT

Date:

Loan/Credit No: 8065-IN/4955-IN

Contract No:

[Name of Contract]: (i) Design and build Sewage Treatment Plant of installed capacity **60 MLD**including MPS (97 MLD) and all appurtenant structures and allied works; (ii) operation & maintenance of the complete works of sewage treatment plant, for a period of 15 years at Pahariin Patna, State of Bihar, India.

To: **TheManaging Director,**,
Bihar Urban Infrastructure Development Corporation Limited,

SFC Building, 2nd floor, Daroga Rai Path, Road no-2, R- Block,

Patna 800001

Ph. No.-0612-2506109

Fax No.-91-612-2506132

Web-http://buidco.in

Email – mdbuidco@gmail.com

Bihar, India.

Gentlemen,

Having examined the Bidding Documents, including Addendum Nos.***[insert numbers]***, the receipt of which is hereby acknowledged, we, the undersigned, offer to (i) Design, Build, Test, pre-commission and commission the STP; (ii) perform the subsequent Operation and Maintenance services under the above-named Contract in full conformity with the said Bidding Documents for the following amounts in accordance with the Bidder's Price Schedules attached herewith and are made part of this Bid:

Grand Summary

No.	Component	Price/Currency
1.	Price Schedule: Part A – Design-Build Price	
2A.	Total O & M Price for 15 Years	

2 B	NPV of Total O & M Price for 15 years	
	Total Price based on quoted O&M prices (1+2A) *[in figures]* *In words:* Total Price based on NPV of quoted O & M prices (1+2B) *[in figures]* *In words:*	

We meet the eligibility requirements and have no conflict of interest in accordance with ITB 1.2.2.

We have not been suspended nor declared ineligible by the Employer based on execution of a Bid Securing Declaration in the Owner's country in accordance with ITB 1.2.4.

We undertake, if our Bid is accepted, to commence the construction of STP and to achieve Completion within the respective times stated in the Bidding Documents.

If our Bid is accepted, we undertake to provide an advance payment security and the Performance Security Security *and an Environmental, Social, Health and Safety (ESHS) Performance Security* in the form, in the amounts, and within the times specified in the Bidding Documents.

We are not participating, as a Bidder or as a subcontractor, in more than one bid in this bidding process in accordance with ITB 1.2.2 (e), other than alternative bids submitted in accordance with ITB 3.13;

We, including any of our subcontractors or suppliers for any part of the contract,have not been declared ineligible by the Bank,under the Employer's country laws or official regulations or by an act of compliance with a decision of the United Nations Security Council;

We are not a government owned entity / We are a government owned entity but meet the requirements of ITB 1.2.3;

We have paid, or will pay the following commissions, gratuities, or fees with respect to the bidding process or execution of the Contract:

Name of Recipient	Address	Reason	Amount
----------	----------	----------	----------
----------	----------	----------	----------
----------	----------	----------	----------
----------	----------	----------	----------

(If none has been paid or is to be paid, indicate "none.")

[We accept the appointment of *[name proposed in Bid Data Sheet]* as the Adjudicator.]

or

[We do not accept the appointment of *[name proposed in Bid Data Sheet]* as the Adjudicator, and we propose instead that *[name]* be appointed as Adjudicator, whose résumé and hourly fees are attached.]

We agree to abide by this Bid, which consists of this letter and the other documents listed in ITB Section 3.2, for the period identified in the Bid Data Sheet as the length of the Bid Validity Period, and it shall remain binding upon us and may be accepted by you at any time before the expiration of that period.

Until a formal contract is prepared and executed between us, this Bid, together with your written acceptance thereof and your notification of award, shall constitute a binding contract between us.

We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in any type of fraud and corruption.

We understand that you are not bound to accept the lowest or any Bid you may receive.

Dated this …… day of ……. ,*[Year]*.

_____

[signature]

In the capacity of _____

[position]

Duly authorized to sign this bid for and on behalf of _____

[name of Bidder]

Appendix to Bid

Schedule of Adjustment Data

In Tables A below, the Bidder shall indicate its amount of local currency payment, and proposed weightings for various Indices.

Bidders' attention is drawn to the following definition provided in Schedule 8 of the Contract.

Base Date: For the purpose of Price Adjustment Clause, 'Base Date' shall be the date 28 days prior to the deadline for submission of bids for the contract.

Table A

Index code*	Index description*	Source of index*	Base value and date*	Bidder's related currency amount	Bidder's proposed weighting*
A	Consumer price index for industrial workers for **Mungher Jamalpur**, Bihar centre	Labour Bureau, Ministry of Labour & Employment, Government of India	— -	— -	A.0. 30 - 0.40
B...	Material	All India Wholesale Price Index (all commodities published by Economic Advisor to the Government of India			B: 0.60- 0.70
			Total		**1.00**

[*The Bidder shall specify a value in the last column of the Table within the range indicated therein such that the total weighting = 1.00]

Indicative Flow

Indicative Flow for the purpose of evaluation of bids in accordance with ITB 5.6 (c) (iv) during the Operations Period shall be as follows:

For STP& MPS

Year of Operations	**Indicative Sewage flow rate for STP& MPS (MLD)***
1- Year One	42
2- Year Two	43.13
3- Year Three	44.33
4- Year Four	45.56
5- Year Five	46.83
6- Year Six	48.13
7- Year Seven	49.47
8- Year Eight	50.85
9- Year Nine	52.26
10- Year Ten	53.71
11- Year Eleven	55.2
12- Year Twelve	56.73
13- Year Thirteen	58.31
14- Year Fourteen	59.93
15- Year Fifteen	60.00

***"Indicative flow rate** for STP" means the rate of sewage flow which is projected by the Owner to be available for treatment in the STP facility for each of the 15 years of the O&M period.

Annexure A – Part b

BIDDER'S PRICE SCHEDULES

1.1 The Price Schedules do not give a full description of the STP, and O & M for 15 years and other services, to be supplied and the Services to be performed under each item. Bidders are deemed to have read the Draft Contract, including the Technical Specifications Schedule, consisting of the Design-Build Services Schedule, Operations Services Schedule and Technical Standards Schedule, and other sections of the Bidding Documents to ascertain the full scope of the requirements of the Contract included in each item prior to filling in the prices. The entered prices are deemed to include the full scope as aforesaid, including overheads and profit.

1.2 If Bidders are unclear or uncertain as to the scope of any item, they shall seek clarification in accordance with the Instructions to Bidders in the Bidding Documents prior to submitting their Bid.

1.3 Prices shall be filled in indelible ink, and any alterations necessary due to errors shall be initialled by the Bidder. As specified in the Bid Data Sheet, prices shall be fixed and firm for the duration of the Contract, except if as adjusted in accordance with the Contract.

1.4 The Bid Price shall be quoted in the manner indicated and in the currencies specified in the Instructions to Bidders in the Bidding Documents. For each item, Bidders shall complete each appropriate column in the respective Schedules, giving the price breakdown as indicated in the Schedules.

1.5 Bidder shall submit with its bid details evidencing that the cost claimed for the payment is based on a realistic assessment of setting up the STP. The Owner shall have the option to seek further details including details of costs of similar contracts executed by the Bidder in the past.

1.6 Prices given in the Schedules Part A to Part C against each item shall be for the scope covered by that item as detailed in the Draft Contract or elsewhere in the Bidding Documents.

1.7 The Owner will make payments in the INR quoted by the bidder under respective items.

SEWAGE TREATMENT PLANT

Grand Summary

No.	Component	Price
1.	Design-Build price for STP and allied infrastructure	
2A.	Total O & M Price for the "Indicative Sewage Flow Rate" for 15 years	
2B	NPV of Total O & M Price for the "Indicative Sewage Flow Rate" for 15 years	
3.	Cost of Land requirement for setting up the STP facility as indicated in the bid	
Total Price based on quoted O&M prices including price of land (1+2A+3) = *[in figures]* *[In words]*		
Total Price based on NPV of quoted O&M prices including price of land (1+2B+3) = *[in figures]* *[In words]*		

.

Table Ab2 - Price Schedule: PART A (STP) – Design-Build Price

S.N.	Works Activity	Design-Build Price
1	Design, development, supply of equipment, erection of equipment, civil, electro mechanical and instrumentation control works, including testing, commissioning of 60 MLD STP including 97 MLD MPS at Pahariin Patna with appropriate and cost effective technology.	

Break-up of Price of item 1 above		
1A	Civil and Structural Works (including that required for disposal and reuse)	
1B	Installation, testing and commissioning of Electro – mechanical and Instrumentation equipment and accessories including equipments for electricity generation from solar photovoltaic arrangement.	
C	Ancillary works like, internal roads, area grading etc.	
	Total Design Build Price	
	Amount in Words	

Table Ab3 - Price Schedule

PARTS B & C (STP) and Annual O&M Price and Additional O&M Price

Year of Operations	Currency INR	PART B Annual O & M Price for treatment of Threshold Sewage Flow of 10 MLD (Amount) (a)	PART C Annual Additional O&M Price for treatment of additional sewage flow in excess of the Threshold flow on a per MLD basis (Amount Per MLD) (b)	Total Annual O&M Price, assuming Indicative Sewage Flow reaching the STP c = a + b* x (x = indicative flow minus threshold sewage flow)	NPV factor (d) (Based on discount factor of 10% p.a.)	Value e= c*d
1					0.909	
2					0.826	
3					0.751	
4					0.683	
5					0.621	
6					0.564	
7					0.513	
8					0.467	
9					0.424	
10					0.386	
11					0.350	
12					0.319	
13					0.290	
14					0.263	

15					**0.239**	
Total O&M Price (Gross) for 15 years assuming "Indicative Sewage Flow Rate" (as per Total of Column 'c') in figures: in words: **NPV of Total O&M Price for 15 years assuming "Indicative Sewage Flow Rate"** (as per Total of Column 'e') in figures: in words:						

The area of the land that is required for the STP, roads, drains and other appurtenant

Cost of Land

S. N.	Component	
1.	Area of Land Required for STP as per ITB Clause 3.3 c in SQM	
2.	Price of Land per square meter as per Bid Data Sheet clause 3.3 (c)	
Total Price of Land**(INR)**:		
Amount in Words:		

1.9 Part D (STP)- The Electricity Consumption guaranteed by the bidder (for the purpose of ITB 3.11 (c) and 3.11 (d) shall be as under:

Table Ab4 - Part D (STP&MPS) Guaranteed Electricity Consumption

Year of Operations	***Guaranteed Electricity Consumption for the year (KWh / MLD)***
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

Notes B:

1. Bidder shall indicate the land requirement for STP, roads, drains and other appurtenant structures in Square Metres in reference to ITB 3.3 c, along with calculations considering the proposed treatment process.
2. The Bidder shall provide along with the price schedule a separate table giving details of taxes, GST, duties, levies and other applicable taxes considered by him and included in the prices offered under Part A & Part B.

3. The prices quoted in each of the sub parts of the Price Schedules shall be supported by sufficient justification, financial model and support materials / calculations showing the methods and the rates assumed at arriving these numbers.

Signature of the Bidder
Name of the Bidders
Rubber stamp with Designation

Signature of the Engineer
Name of the Engineer
Designation

Date

Annexure A – Part c

FORM OF BID SECURITY (BANK GUARANTEE)

WHEREAS, ...(*name of Bidder including names of all Joint Venture Participants*) (hereinafter called "the Bidder") has submitted its Bid (hereinafter called the "Bid") dated (*date*) for the performance of (*name of Contract*).

KNOW ALL PEOPLE by these presents that We ..... (name of Bank) of

..... (name of country) having our registered office at ..... (hereinafter called "the Bank") are bound unto ..... (hereinafter called "the Owner") in the sum of .....for which payment well and truly to be made to the said Owner, the Bank binds itself, its successors, and assigns by these presents.

[The Bidder should insert the amount of the guarantee in words and in figures. This figure should be the same amount as set out in ITB Section 3.4(a) and the Bid Data Sheet. The details related to the Bid Security are set out in the same ITB Section 3.4.]

The CONDITIONS of this obligation are:

a. if the Bidder withdraws its Bid during the Bid Validity Period; or

b. if the Bidder, having been notified of the acceptance of its Bid by the Owner during the period of Bid validity,

   1. fails to sign the Form of Contract in accordance with and when required by ITB Section 6.4; or

   2. fails to provide the performance security to the Owner in accordance with and when required by ITB Section 6.5.

We undertake to pay to the Owner up to the above amount upon receipt of its first written demand, without the Owner having to substantiate its demand, provided that in its demand the Owner will note that the amount claimed by it is due to it owing to the occurrence of one or more of the conditions set out above, specifying the occurred condition or conditions.

This Guarantee will remain in full force up to and including 45 days after the expiry of the Bid Validity Period and it may be extended by the Owner in accordance with the Bidding Documents, notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this Guarantee should reach the Bank not later than the above date or the extended date.This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758.except that the supporting statement under Article 15(a) is hereby excluded.

SEALED with the Common Seal of the said

Bank this ..... day of ....., *[Year]*.

_____	_____
WITNESS	SIGNATURE OF THE BANK
(signature, name and address)	SEAL
	Name: _____
	Position: _____

Annexure A – Part d

FORM OF PERFORMANCE SECURITY

_____*[Bank's Name, and Address of Issuing Branch or Office]*

Beneficiary: _____*[Name and Address of Owner]*

Date: _____

PERFORMANCE GUARANTEE NO.: _____

We have been informed that *[name of Bidder]* (hereinafter called "the Bidder") has entered into Contract No. *[reference number of the contract]* dated with you, concerning a contract to Design, build, operate and transfer STP, Pumping Stations, all appurtenant structures and allied works in ……..*[city and State]*(hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, a performance guarantee is required.

At the request of the Operator, we *[name of Bank]* hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of *[amount in figures]* ()*[amount in words]*, upon receipt by us of your first demand in writing accompanied by a written statement stating that the Operator is in breach of its obligations under the Contract, without your needing to prove or to show grounds for your demand or the sum specified therein.

This guarantee shall expire no later than the earlier of:

(a) six months after the End Date, as defined in the Contract; or

(b) six months after the date of termination of the Contract pursuant to its terms.

Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758 except that the supporting statement under Article 15(a) is hereby excluded.

Yours truly,

*[Name of Bank]*_____

Authorised Signature

Annexure A – Part d1

Environmental, Social, Health and Safety (ESHS) Performance Security

[Guarantor letterhead or SWIFT identifier code]

Beneficiary: *[insert name and Address of* Employer*]*

Date: _ *[Insert date of issue]*

ESHS PERFORMANCE GUARANTEE No.: *[Insert reference number]*

Guarantor: *[Insert name and address of place of issue, unless indicated in the letterhead]*

We have been informed that _____ (hereinafter called "the Applicant") has entered into Contract No. _____ dated _____ with the Beneficiary, for the execution of _____ (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, a performance guarantee is required.

At the request of the Applicant, we as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of _____ (),[1] such sum being payable in the types and proportions of currencies in which the Contract Price is payable, upon receipt by us of the Beneficiary's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating that the Applicant is in breach of its Environmental, Social, Health and/or Safety (ESHS) obligation(s) under the Contract, without the Beneficiary needing to prove or to show grounds for your demand or the sum specified therein.

This guarantee shall expire, no later than the …. Day of ……, 2… *[insert the date six months after the End Date, as defined in the Contract]*, and any demand for payment under it must be received by us at this office indicated above on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

[1] *The Guarantor shall insert an amount representing the percentage of the Accepted Contract Amount specified in the Letter of Acceptance, less provisional sums, if any, and denominated either in the currency (cies) of the Contract or a freely convertible currency acceptable to the Beneficiary.*

_____

[signature(s)]

Note: All italicized text (including footnotes) is for use in preparing this form and shall be deleted from the final product.

Annexure A – Part e

FORMAT OF CURRICULUM VITAE (CV) FOR PROPOSED KEY STAFF

Proposed Position: _____

Name of Firm: _____

Name of Staff: _____

Profession: _____

Date of Birth: _____

Years with Firm/Entity: _____ Nationality: _____

Membership in Professional Societies: _____

_____

Detailed Tasks Assigned: _____

_____

Key Qualifications:

[Give an outline of staff member's experience and training most pertinent to tasks on assignment. Describe degree of responsibility held by staff member on relevant previous assignments and give dates and locations. Use about half a page.]

_____

Education:

[Summarize college/university and other specialized education of staff member, give names of schools, dates attended, and degrees obtained. Use about one quarter of a page.]

_____

Employment Record:

[Starting with present position, list in reverse order every employment held. List all positions held by staff member since graduation, giving dates, names of employment organizations, titles of positions held, and locations of assignments. For experience in last ten years, also give types of activities performed and client references, where appropriate. Use about two pages.]

_____

Languages:

[For each language indicate proficiency: excellent, good, fair or poor in speaking, reading and writing.]

_____

_____

Certification:

I, the undersigned, certify that to the best of my knowledge and belief, these data correctly describe me, my qualifications, and my experience. I also certify that I have only given permission for my CV to be included in the Bid submitted by

_____*[Fill in name of Bidder here.]*

_____ Date: _

_____

[Signature of staff member and authorized representative of the firm]
Day/Month/Year

Full name of staff member: _____

_____

Full name of authorized representative: _____

_____

Annexure A – Part f

FORM FOR CLARIFICATION QUESTIONS

Bidder's Name: _____

Bidder's Address: _____			Date Submitted: _____	
Item No.	**Section Reference**	**Page No.**	**Section or Article No.**	**Question / Query / Clarification / Comment**
1.				

2.				
3.				
4.				
5.				
6.				

Annexure A – Part g

Eligible Countries

Eligibility for the Provision of Goods, Works and Non Consulting Services in Bank-Financed Procurement

In reference to ITB 1.7and ITB 1.3, for the information of the Bidders, at the present time firms, goods and services from the following countries are excluded from this bidding process:

Under ITB 1.2.7(a) and 1.3: None

Under ITB 1.2.7(b) and 1.3: None

Annexure A – Part h

QUALIFICATION CRITERIA

Section 1. QUALIFICATION CRITERIA

1.1. General

a. Evaluation of the Bidders' qualifications will be based on compliance with all the following minimum pass-fail criteria regarding their general Design, build, construct, operation and maintenance experience of Sewage Treatment Plant, financial strength, personnel and management capabilities, and other relevant information as demonstrated by the Bidders' responses in the Information Forms that they submit as per the attached Bid Forms. Additional requirements for joint ventures are given in Section 2.

b. Bidders may submit the Bid either as,

   1. A stand-alone firm, company, legal entity formed as per the applicable law; or

   2. A joint venture of up to a maximum of 2 (1+1) partners,

   Provided that they meet the requirements of the Bidding Documents. For the purpose of assessing some qualification criteria, the qualifications and experience of Sub-Contractors may be included and the specific provisions in this regard are set out in Section 1.34.

1.2. Subcontracting

a. Bidders will be evaluated based on the qualifications of,

   1. the Bidder; and

   2. Nominated Sub-Contractors and Sub-Consultants only with respect to the experience evaluation as set out in Section 1.4, and only if the Sub-Contractors and Sub-Consultants are nominated for the purpose of this bid.

   For the purposes of Section 1.6, Bidders may nominate personnel of Sub-Contractors and Sub-Consultants to fill the key positions, during the Design-Build Period and O&M period, as listed/referred to in the BDS - ITB 3.3 (f) (4).

b. The Bidder shall provide a detailed list of all nominated Sub-Contractors and Sub-Consultants and a record of their experience and qualifications in the applicable Information Forms. The Operator under the Contract shall be prohibited from entering into a contract or contracts that will result in the Operator exceeding the maximum

percentage of subcontracting and sub-consulting permitted by the Owner, as set out in the BDS - ITB 3.3(f)(4),

c. Bidders will not be permitted to change the Sub-Contractors and Sub-Consultants nominated in their Bid.

1.3. Operator's Responsibility

After award of the Contract, the subcontracting of any part of the work, except for those Sub-Contractors and Sub-Consultants nominated in the Bid, shall require the prior written consent of the Owner. Notwithstanding such consent, the Operator shall remain responsible for the acts, defaults, and neglects of all Sub-Contractors and Sub-Consultants during Contract implementation.

1.4. Experience in Construction and Operation and Maintenance of Sewage Treatment Plant

For the purpose of determining a bidder's compliance with the qualification criteria specified in Annexure A – Part h, following definitions shall apply:

"Sewage Treatment Plant (STP) means a treatment facility designed, developed and constructed, and operated for primary and secondary treatment of sewage for its safe disposal complying with the regulatory norms. Waste stabilization pond / other pond process will not be covered under this definition";

(a) The Bidder shall provide evidence that

1. It has Designed, developed, built, tested and commissioned at least one Sewage Treatment Plant of **40 MLD** capacity of secondary treatment of sewage during the last **07 Years** preceding the bid submission date.

2. If a bidder has offered STP of a different technology from the one it has built as per (a) above, his nominated sub-contractor should have designed, developed, built, tested and successfully commissioned at least one Sewage Treatment Plant of 40 MLD capacity of secondary treatment of sewerage having same process technology as proposed for this Contract which has been operating successfully (meeting the required performance standards) for a period of minimum 1 year over a period of last 07 years.

3. The Bidder has the experience in operating and maintaining successfully at least one Sewage Treatment Plant of 40 MLD capacity for secondary treatment of sewage of any process technology for a period of 1 year during the last 7 years preceding the bid submission date.

4. The period of 07 years referred to in Section 1.4 will be the period from year 2010-11 to year 2016-17.

(b) For the purpose of demonstrating the design experience requirement in accordance with Section 1.4 (a), the Bidder, whether a single entity or a joint venture Bidder may claim the experience of its sub-contractors and sub-consultants.

The Bidder shall submit with its bid, details of the qualification and experience of the nominated sub-contractors and sub-consultants in the prescribed Information Forms in accordance with Section 1.2 (b).

(c) The bidder shall also provide evidence that the treatment technology proposed for this contract has been adopted in STPs (not necessarily built by the bidder himself) in at least 3 locations during last 7 years and that each such STP has been operating successfully (meeting the required performance standards) for a period of minimum 2 consecutive years over the last 7 years.

1.5. Financial Capabilities

(a) The bidder shall demonstrate that it possesses a net worth equivalent to minimum of INR 500 Million in each of the last three financial years preceding the date of submission of the bid (i.e. 2014-2015 to 2016-2017)

(b) The bidder shall demonstrate by submitting along with the bid, a banker's certificate on the prescribed format (given at Annexure A-Part n) that it has available cash credit facility equivalent to minimum INR 200 million as on the date of submission of bid.

(c) The Bidder‘s audited balance sheets or, if not required by the laws of the bidders country, other financial statements acceptable to the owner ,for the last five years shall be submitted and must demonstrate the current soundness of the Bidder‘s financial position and indicate its prospective long-term profitability. If deemed necessary by the Owner, the Owner shall have the authority to make inquiries with the Bidder‘s bankers.

(d) The bidder should not have made losses in at least three years in last five years (i.e. years 2012-2013 to 2016-2017).

(e) The Minimum Average Annual Turnover: The Bidder should have achieved minimum average annual construction turnover of INR 800 million calculated as total certified payments received for contracts in progress and/or completed during the last five years (i.e, 2012, 2013, 2014, 2015 and 2016), divided by five.

1.6. Personnel Capabilities

The Bidder shall supply general information on the management structure of the firm, and shall make provision for suitably qualified personnel to fill the key positions listed in the BDS – ITB 3.3(f)(4)(ii)(b), 3.3(f)(5), as

required during Contract implementation. The Bidder shall supply information on a candidate for each key position, who shall meet the experience requirements specified. The Bidder may nominate personnel of sub-contractors and sub consultants to fill key positions listed in the BDS.

1.7. Litigation History and Legal Matters and ESHS Performance

The Bidder shall provide accurate information on the "Historical Contract Non-Performance Form" and "Environmental Social Health and Safety (ESHS) Performance Declaration" about contract non-performance, pending litigation and ESHS performance with respect to contracts completed or ongoing under its execution over the last five years. A consistent history of awards and non-performance against the Bidder or any Partner of a joint venture may result in rejection of the Bid.

1.8. Right to Waive

The Owner reserves the right to waive minor deviations in the qualification criteria if they do not materially affect the capability of a Bidder to perform the Contract.

Section 2. JOINT VENTURES

2.1. Qualification Criteria

a) The lead member of the joint venture shall satisfy the criteria specified in Section 1.4 (a) (1). However, other partner(s) should have the minimum experience of 25% of the requirements. The lead member or other Joint Venture partner(s) shall satisfy the criteria specified in Sections 1.4(a) (2) and 1.4 (a) 3. Each JV partner shall have experience of Design, Construction & commissioning an STP during the last 7 years (i.e. FY 2010-11 to FY 2016-17).

b) For the purpose of satisfying the qualification criteria set out in Section 1.5 - Financial capabilities, Joint Venture must satisfy the following qualification criteria:

1) Joint venture (all partners combined) must satisfy the requirements mentioned in the Sections 1.4 (a), 1.4 (b), 1.4 (c) and 1.5., However the lead partner should meet minimum 51% and other member should meet minimum 25% of the requirements.

2) All the Joint venture partners should comply with all the other requirements set out in the qualification criteria.

c. Each partner of a joint venture Bidder shall provide the information to evidence compliance with the criteria set out in Sections 2.1(a) and 2.1 (b).

2.2. **(a) Lead Partner**

One of the joint venture Partners who is responsible for performing a key function in contract management or in executing a major component of the proposed Contract shall be nominated as being in charge during the bidding process and, in the event of a successful bid, during Contract execution (the "Lead Partner"). The Lead Partner shall be authorized to incur liabilities and receive instructions for and on behalf of any and all partners of the joint venture. This authorization shall be evidenced by the submission of a power of attorney signed by legally authorized signatories of each of the joint venture Partners as per proforma enclosed in Annexure A Part L, as part of the Bid.

(b) All Partners

All partners of the joint venture shall be liable jointly and severally for the execution of the Contract in accordance with the Contract terms and a copy of the undertaking as per format provided under Annexure A – Part M signed by the joint venture partners shall be submitted with the bid.

Annexure A – Part i

INFORMATION FORMS

Information Form (1)

General Information

All individual firms and each participant in a joint venture submitting the bids are required to complete the information in this form. Nationality information should be provided for all Bidders that are partnerships or individually owned firms.

If the Bidder proposes to use nominated sub-contractors or sub-consultants, the following information should also be supplied for the sub-contractor(s) and sub-consultant(s).

1.	Name of firm	
2.	Head office address	
3.	Telephone	Contact
4.	Fax	Telex
5.	Place of incorporation / registration	Year of incorporation / registration

Nationality of Owners[1]		
Name		Nationality
1.		
2.		
3.		
4.		
5.		

1. To be completed by all Owners of partnerships or individually owned firms.

INFORMATION FORM (2)

(ref. Annexure A Part h Section **Error! Reference source not found.**)

General Design, Build, Operation and Management Experience Information

Name of Bidder or participant of a joint venture

All individual firms and all participants of a joint venture are requested to complete the information in this form with regard to their experience in Designing, building, operating, managing and maintaining Sewage Treatment Plants.

Description of Contract/ STP Components along with its Capacity and appurtenant structures	
Name of Joint Venture Participant Responsible	
Name of City	
Country	
Population served	
Contract Role (joint venture participant, sub-contractor, sub consultant, lead, etc.) and percentage share in the total contract	
Nature, role and extent of participation (describe fully)	
Date of contract commencement	
Date of contract termination	
Contract value (INR)	
Individual for reference	
Address, Telephone, Fax for reference	

INFORMATION FORM (2A)

(Ref. Annexure A Part h Section 1.5)

Financial Capability Information[#]

Name of Bidder or participant of a joint venture

All individual firms and all participants of a joint venture are requested to complete the information in this form with regard to their experience in Designing, building, operating, managing and maintaining STP. The information supplied should be the annual turnover of the Bidder (or each partner of a joint venture) in terms of the amounts billed to clients for each year for work in progress or completed, converted to INR at the rate of exchange at the end of the period reported. The annual periods should be calendar years, with partial accounting for the year up to the date of submission of Applications.

Use a separate sheet for each participant of a joint venture.

Bidders should not enclose testimonials, certificates, and publicity material with their Application as they will not be taken into account in the evaluation of qualifications.

Annual financial data (in the area of infrastructure development and engineering construction).			
Year	Turnover (Rs. Million)	Net Worth (Rs. Million)	Net Cash Accruals (Rs. Million)
[Year]			
[Year]			
[Year]			
[Year]			
[Year]			

Instructions and Applicable Conditions:

1. The applicant shall provide details of its own financial capacity;
2. The Applicant / its constituent Joint Venture Partners shall attach copies of balance sheets, financial statements and Annual report for 5 (five) years preceding the Application due date. The financial statements shall:
    a. Reflect the financial situation of the Bidder or Joint Venture Partners,
    b. Be audited by a statutory auditor
    c. Be complete including all notes to the Financial statements; and
    d. Correspond to accounting periods already completed and audited (no statements for partial periods shall be requested or accepted)
3. Net Worth (The definition of Net Worth shall be as follows: Based on the type of the Applicant whether a company, partnership firm, etc. the net worth is defined as follow:
    a. In case of a company registered under Companies Act, 1956: Net worth shall mean the sum of subscribed and paid up equity share capital and reserves from which shall be deducted the sum of revaluation reserves,

miscellaneous expenditure not written off and reserves not available for distribution to equity share holders.

For the company = (Subscribed and Paid-up Equity + Reserves) less (Revaluation reserves + miscellaneous expenditure not written off + reserves not available for distribution to equity share holders).

b. In case of a Partnership firm: Net worth shall mean the sum of Aggregate of partners' capital account and Reserves from which the aggregate of drawings by partners and aggregate of advances to partners shall be deducted.

For Partnership Firm = Aggregate of partners' capital account + Reserves - Aggregate of drawings by partners - Aggregate of advances to partners

c. In case of a Trust / Society: Net worth shall mean the sum of corpus and the returns not set aside for any particular purpose.

For Trust / Society = corpus + returns not set aside for any particular purpose

4. Net Cash Accruals shall be defined as follows: Net Cash Accruals = Profit after Tax + Depreciation;

5. Year 1 will be the latest completed financial year, preceding the bidding. Year 2 shall be immediately preceding year 1 and so on. In case the Bid Submission date falls within 3 (three) months of the close of the latest financial year of the applicant, it shall ignore such financial year for the purpose of its bid and furnish all its information and certification with reference to the 5 (five) years preceding its latest financial year. For the avoidance of doubt, financial year shall, for the purpose of the Bid hereunder, mean the accounting year followed by the Bidder in the course of its normal business.

6. The Bidder shall provide an Auditor’s Certificate specifying the Net Worth and Net Cash Accruals of the Bidder and also specifying the methodology adopted for calculating such net worth in accordance with the formula mentioned in point 3 and 4 above.

7. The Bidder shall provide from its concerned client (s) or Statutory Auditor, certificate(s) stating the payments made / received or works commissioned, as the case may be, during the past 5 (five) years in respect of the Projects specified in Information Forms 2, 3A and 3B.

INFORMATION FORM (2B)

Joint Venture Summary

Names of all participants of a joint venture
1. Lead Participant
2. Participant
3. Participant
4. Participant

Annual turnover data (in the area of infrastructure development and engineering construction).

Participant	Information Form (2A) page no.	*[Year]*	*[Year]*	*[Year]*	*[Year]*	*[Year]*
1. Lead Participant						
2. Participant						
3. Participant						
4. Participant						
Totals						

Bidders shall append to Form 2B:

a. A document confirming the percentage shareholding of each joint venture participant in the company to be established including the financial stake of each partner in the JV partnership; and

b. A description of the role and responsibility of each joint venture participant. (Bidders shall make the precise role of each joint venture participant clear in this description).

Bidders are reminded to submit the appropriate powers of attorney as required by Section 2.2 ofAnnexure A – Part h. The Joint Venture Bidders may also note the requirements mentioned in ITB Section 3.6 for compliance while submitting the Bid.

INFORMATION FORM (3A)

(Ref. Annexure A - Part h Section **Error! Reference source not found.**)

Design, development, construction, testing and commissioning of STP

Name of Bidder or participant of a joint venture

Description of Contract/ STP	
Name of Joint Venture Participant Responsible	
Name of City	
Country	
Capacity of STP	
Population served	
Contract Role (joint venture participant, sub-contractor, sub consultant, lead, etc.) and percentage share in the total contract	
Nature, role and extent of participation (describe fully)	
Date of contract commencement	
Date of contract termination	
Contract value in INR or equivalent to US$	
Individual for reference	
Address, Telephone, Fax for reference	

Provide a complete description of the services provided under this contract demonstrating that the definition of a STPin Section 1.4 of Annexure A Part h to Bidding documents has been met.

Information Form (3b)

(Ref. Annexure A Part h Section 1.4)

Successful experience in Operating and Maintaining STP

Name of Bidder or participant of a joint venture

Description of Contract/STP	
Name of Joint Venture Participant Responsible	
Name of City/Urban area	
Country	
Capacity of STP	
Number of years operated (with period)	
Population served	
Contract Role (joint venture participant, sub-contractor, sub consultant, lead, etc.) and percentage share in the total contract	
Nature, role and extent of participation (describe fully)	
Date of contract commencement	
Date of contract termination	
Contract value in INR or equivalent to US$	
Individual for reference	
Address, Telephone, Fax for reference	

Provide a complete description of the services provided under this contract demonstrating that the definition of a Sewage Treatment Plant in Section 1.4 of Annexure A Part h to Bidding documents has been met.

Information Form (4)

Financial Capabilities

Name of Bidder or participant of a joint venture

Bidders, including each partner of a joint venture, shall provide financial information to demonstrate that they meet the requirements stated in the Schedule to ITB. Each Bidder or participant of a joint venture shall complete this form. If necessary, separate sheets shall be used to provide complete banker information. A copy of the audited balance sheets shall be attached.

Banker	Name of banker	
	Address of banker	
	Telephone	Contact name and title
	Fax	Telex

Summarize actual assets and liabilities in INR or equivalent to U.S. dollar (at the rates of exchange current at the end of each year) for the previous five calendar years. Based upon known commitments, summarize Projected assets and liabilities in INR or equivalent to U.S. dollar for the next two calendar years, unless the withholding of such information by stock market listed public companies can be substantiated by the Bidder.

Financial information in INR or equivalent to US$	Actual: Previous five years					Projected: Next two years	
	[Year]	*[Year]*	*[Year]*	*[Year]*	*[Year]*	*[Year]*	*[Year]*
1. Total assets							
2. Current assets							
3. Total liabilities							
4. Current liabilities							
5. Profits before taxes							
6. Profits after taxes							

Specify proposed sources of financing, such as liquid assets, unencumbered real assets, lines of credit, and other financial means, net of current commitments, available to meet the total construction cash flow demands of the subject Contract or contracts as indicated in Schedule to ITB 1.5(2).

Source of Financing	Amount in INR or equivalent to US $
1.	
2.	
3.	
4.	

Attach audited financial statements—including, as a minimum, profit and loss account, balance sheet, and explanatory notes—for the period stated in Section 1.5 of Annexure A Part h to Bidding documents (for the individual Bidder or each participant of a joint venture).

If audits are not required by the laws of Bidders' countries of origin, partnerships and firms owned by individuals may submit their balance sheets certified by a registered accountant, and supported by copies of tax returns.

Information Form (5)

(ref. Annexure A Part h - Section 1.6)

Personnel Capabilities

Name of Bidder or participant of a joint venture

For specific positionsnoted below, Bidders must provide the names of a candidate qualified to meet the specified requirements stated for each position. The data on their experience should be supplied on separate sheets using one Form (5A) for each candidate.

Bidders may propose alternative management and implementation arrangements requiring different key personnel, whose experience records should be provided.

1.	Title of position*
	Name of candidate
2.	Title of position*
	Name of candidate
3.	Title of position*
	Name of candidate
4.	Title of position*
	Name of candidate
5.	Title of position*
	Name of candidate
6.	Title of position*
	Name of candidate

**As listed in BDS - ITB 3.3 (f) 4& 3.3 (f) 5in respect of* Section 1.6 of Annexure A part h to Bidding documents.

Information Form (5A)

(ref.Annexure A – Part h – Section 1.6)

Candidate Summary

Name of Bidder or participant of a joint venture

Position		Candidate
Candidate Information	Name of Candidate	Date of Birth
	Professional qualifications	
Present Employment	Name of Owner	
	Address of Owner	
	Telephone	Contact (manager/personnel officer)
	Fax	Telex
	Job title of candidate	Years with present Owner

Summarize professional experience over the last twenty years, in reverse chronological order. Indicate particular technical and managerial experience relevant to the Project.

From	To	Company/Project/Position/Relevant technical and management experience

Contractor's Representative and Key Personnel Schedule

Bidders should provide the names and details of the suitably qualified Contractor's Representative and Key Personnel to perform the Contract. The data on their experience should be supplied using the Form PER-2 below for each candidate.

Contractor' Representative and Key Personnel

1.	**Title of position:** Contractor's Representative	
	Name of candidate:	
	Duration of appointment:	[*insert the whole period (start and end dates) for which this position will be engaged*]
	Time commitment: for this position:	[*insert the number of days/week/months/ that has been scheduled for this position*]
	Expected time schedule for this position:	[*insert the expected time schedule for this position (e.g. attach high level Gantt chart*]
2.	**Title of position:** *[Environmental Specialist]*	
	Name of candidate:	
	Duration of appointment:	[*insert the whole period (start and end dates) for which this position will be engaged*]
	Time commitment: for this position:	[*insert the number of days/week/months/ that has been scheduled for this position*]
	Expected time schedule for this position:	[*insert the expected time schedule for this position (e.g. attach high level Gantt chart*]
3.	**Title of position:** *[Health and Safety Specialist]*	
	Name of candidate:	
	Duration of appointment:	[*insert the whole period (start and end dates) for which this position will be engaged*]
	Time commitment: for this position:	[*insert the number of days/week/months/ that has been scheduled for this position*]

	Expected time schedule for this position:	[*insert the expected time schedule for this position (e.g. attach high level Gantt chart*]
4.	**Title of position:** *[Social Specialist]*	
	Name of candidate:	
	Duration of appointment:	[*insert the whole period (start and end dates) for which this position will be engaged*]
	Time commitment: for this position:	[*insert the number of days/week/months/ that has been scheduled for this position*]
	Expected time schedule for this position:	[*insert the expected time schedule for this position (e.g. attach high level Gantt chart*]
5.	**Title of position:** *[insert title]*	
	Name of candidate	
	Duration of appointment:	[*insert the whole period (start and end dates) for which this position will be engaged*]
	Time commitment: for this position:	[*insert the number of days/week/months/ that has been scheduled for this position*]
	Expected time schedule for this position:	[*insert the expected time schedule for this position (e.g. attach high level Gantt chart*]

Form ……:
Resume and Declaration
Contractor's Representative and Key Personnel

Name of Bidder

Position [*#1*]: [*title of position from Form PER-1*]		
Personnel information	**Name:**	**Date of birth:**
	Address:	**E-mail:**
	Professional qualifications:	
	Academic qualifications:	
	Language proficiency:*[language and levels of speaking, reading and writing skills]*	
Details		
	Address of employer:	
	Telephone:	**Contact (manager / personnel officer):**
	Fax:	

	Job title:	Years with present employer:

Summarize professional experience in reverse chronological order. Indicate particular technical and managerial experience relevant to the project.

Project	Role	Duration of involvement	Relevant experience
[main project details]	*[role and responsibilities on the project]*	*[time in role]*	*[describe the experience relevant to this position]*

Declaration

I, the undersigned *[insert either "Contractor's Representative" or "Key Personnel" as applicable]*, certify that to the best of my knowledge and belief, the information contained in this Form PER-2 correctly describes myself, my qualifications and my experience.

I confirm that I am available as certified in the following table and throughout theexpected time schedule for this position as provided in the Bid:

Commitment	Details
Commitment to duration of contract:	*[insert period (start and end dates) for which this Contractor's Representative or Key Personnel is available to work on this contract]*
Time commitment:	*[insert period (start and end dates) for which this Contractor's Representative or Key Personnel is available to work on this contract]*

I understand that any misrepresentation or omission in this Form may:

(a) be taken into consideration during Bid evaluation;

(b) result in my disqualification from participatingin the Bid;

(c) result in my dismissal from the contract.

Name of Contractor's Representative or **Key Personnel: [*insert name*]**

Signature: _____

Date: (day month year): _____

Countersignature of authorized representative of the Bidder:

Signature: _____

Date: (day month year): _____

Information Form (6)

Historical Contract Non-Performance
(ref. Section 1.7 of Annexure A part h to Bidding documents)

[The following table shall be filled in for the Bidder and for each partner of a Joint Venture]

Bidder's Legal Name: *[insert full name]*
Date: *[insert day, month, year]*
Joint Venture Party Legal Name: *[insert full name]*
NCBNo. and title: *[insert NCBnumber and title]*
Page *[insert page number]* of *[insert total number] pages*

Non-Performing Contracts in accordance with Section 1.7 of Annexure A Part h to ITB			
Contract non-performance did not occur during the [number] years specified in Section 1.7of Annexure A Part h to ITB. Contract(s) not performed during the [number] years specified in Section 1.7of Annexure A Part h to ITB.			
Year	**Non performed portion of contract**	**Contract Identification**	**Total Contract Amount (current value in** INR or equivalent **US$)**
[insert year]	*[insert amount and percentage]*	Contract Identification: *[indicate complete contract name/number, and any other identification]* Name of Employer: *[insert full name]* Address of Employer: *[insert street/city/country]* Reason(s) for non-performance: *[indicate main reason(s)]*	*[insert amount]*
Pending Litigation, in accordance with Section 1.7 of Annexure A Part h of Bidding documents.			
No pending litigation in accordance with Section 1.7 of Annexure A Part h of Bidding documents Pending litigation in accordance with Section 1.7 of Annexure A Part h of Bidding documents			

InformationForm (7)

Environmental, Social, Health, and Safety Performance Declaration

[The following table shall be filled in for the Bidder, each member of a Joint Venture and each Specialized Subcontractor]

Bidder's Name: *[insert full name]*
Date: *[insert day, month, year]*
Joint Venture Member's or Specialized Subcontractor's Name: *[insertfull name]*
RFB No. and title: *[insert RFB number and title]*
Page *[insert page number]* of *[insert total number]* pages

Environmental, Social, Health, and Safety Performance Declaration

in accordance with Section 3, Qualification Criteria, and Requirements

☐ **No suspension or termination of contract**: An employer has not suspended or terminated a contract and/or called the performance security for a contract for reasons related to Environmental, Social, Health, or Safety (ESHS) performance since the date specified in Section 3, Qualification Criteria, and Requirements, Sub-Factor 2.5.

☐ **Declaration of suspension or termination of contract**: The following contract(s) has/have been suspended or terminated and/or Performance Security called by an employer(s) for reasons related to Environmental, Social, Health, or Safety (ESHS) performance since the date specified in Section 3, Qualification Criteria, and Requirements, Sub-Factor 2.5. Details are described below:

Year	**Suspended or terminated portion of contract**	**Contract Identification**	**Total Contract Amount (current value, currency, exchange rate and US$ equivalent)**
[insert year]	*[insert amount and percentage]*	Contract Identification: *[indicate complete contract name/ number, and any other identification]* Name of Employer: *[insert full name]* Address of Employer: *[insert street/city/country]* Reason(s) for suspension or termination: *[indicate main reason(s)]*	*[insert amount]*
[insert year]	*[insert amount and percentage]*	Contract Identification: *[indicate complete contract name/ number, and any other identification]* Name of Employer: *[insert full name]* Address of Employer: *[insert street/city/country]* Reason(s) for suspension or termination: *[indicate main reason(s)]*	*[insert amount]*
…	…	*[list all applicable contracts]*	…

Performance Security called by an employer(s) for reasons related to ESHS performance

Year	Contract Identification	Total Contract Amount (current value, currency, exchange rate and US$ equivalent)
[insert year]	Contract Identification: *[indicate complete contract name/ number, and any other identification]* Name of Employer: *[insert full name]* Address of Employer: *[insert street/city/country]* Reason(s) for calling of performance security: *[indicate main reason(s)]*	*[insert amount]*

Annexure A – Part j

Deleted

FORM OF LETTER OF INTENT BY JV PARTNERS TO ENTER INTO JV AGREEMENT

THIS LETTER OF INTENT signed on this..... day of..... Two Thousand and .....by..... a company incorporated under the laws of ..... and having its Registered Office at .....(hereinafter called the "Party No.1" which expression shall include its successors, executors and permitted assigns) and M/s .... a company incorporated under the laws of ..... and having its Registered Office at .....(hereinafter called the "Party No.2" which expression shall include its successors, executors and permitted assigns) and M/s.. .. .. a Company incorporated under the laws of ..... and having its Registered Office at ..... (hereinafter called the "Party No.3" which expression shall include its successors, executors and permitted assigns) for the purpose of making a bid and entering into a contract [hereinafter called the "Contract" (in case of award) against the work for the design and build Sewage Treatment Plant and all Appurtenant Structures and Allied Works, and O & M of Complete Works associated with …….. ……..(hereinafter called the "Owner").

WHEREAS the Party No.1, Party No.2 and Party No.3 intend to enter into a JointVenture Agreement

AND WHEREAS the Owner invited bids as per the above mentioned Specification to design and build Sewage Treatment Plant and all Appurtenant Structures and Allied Works, and O & M of Complete Works stipulated in the bidding documents.

AND WHEREAS ITB Clause 3.6 and Annexure A Part h Qualification Criteria forming part of the bidding documents, inter-alia, stipulates that two or more qualified partners, meeting the requirements of 'Qualification Requirement of the Bidder', as applicable may bid, provided, they submit a Letter of Intent to enter into Joint Venture Agreement and the Joint Venture Partners fulfill all other requirements under ITB Clause 5.7 ‘Qualification of the Bidder’ and in such a case, the Letter of Bid (Bid Form) shall be signed by the Partner - In Charge so as to legally bind all the Partners of the Joint Venture, who will be jointly and severally liable to perform the Contract by entering into Joint Venture Agreement as per proforma submitted with the Bid in accordance with ITB 3.6 which will be legally binding on all partners and all obligations hereunder.

The above clause further states that this Letter of Intent shall be attached to the bid and the Contract performance guarantee will be as per the format enclosed with the bidding document without any restrictions or liability for either party.

AND WHEREAS the bid is being submitted to the Owner vide proposal No.....dated..... by Party No.1 based on this letter of Intent between all the parties; under these presents and the bid has been signed by all the parties.

NOW THIS UNDERTAKING WITNESSETH AS UNDER:

In consideration of the above premises and agreements all the parties of this letter of Intent do here by declare and undertake:

1. In requirement of the award of the Contract by the Owner to the Joint Venture Partners, we, the Parties do here by undertake that M/s..... the Party No.1, shall act as lead Partner and further declare and confirm that we the parties to the Joint Venture shall jointly and severally be bound unto the Owner for the successful performance of the Contract and shall be fully responsible for the design and build Sewage Treatment Plant and all Appurtenant Structures and Allied Works, and O & M of Complete Works accordance with the Contract for which we shall enter into Joint Venture Agreement as per proforma submitted with the Bid which will be legally binding on all partners:
2. If the Contract is awarded to Joint Venture then in case of any breach or default of the said Contract by

any of the parties to the Joint Venture, the party (s) will be fully responsible for the successful performance of the Contract and to carry out all the obligations and responsibilities under the Contract in accordance with the requirements of the Contract.

3. Further, if the Owner suffers any loss or damage on account of any breach in the Contract or any short fall in the performance of the equipment in meeting the performances guaranteed as per the specification in terms of the Contract, the Party(s) of the represents will promptly make good such loss or damages caused to the Owner, on its demand without any demur. It shall not be necessary or obligatory for the Owner to proceed against lead Partner to these presents before proceeding against or dealing with the other Party(s), the Owner can proceed against any of the parties whos hall be jointly and severally liable for the performance and all other liabilities/obligations under the Contract to the Owner.
4. The financialliability of the Parties of the Deed of Undertaking to the Owner in the even to faward of Contract on the Joint Venture, with respect to any of the claims a rising out of the performance or non-performance of the obligations set for thin the Deed of Undertaking, read in conjunction with there levant conditions of the Contract shall, however not be limit edinany way so as to restrict or limit the liabilities or obligations of any of the Parties of the Deed of Undertaking.
5. It is expressly understood and agreed between the Parties to this Letter of Intent that there sponsibilities and obligations of each of the Parties shall be as delineated in Appendix-I (to be suitably appended by the Parties along with this Letter of Intent in its bid). It is further undertaken by the parties that the above sharing of responsibilities and obligations shall not in any way be alimitation of joint and several responsibilities of the Parties under the Contract in the event of award on Joint Venture.
6. It is also understood that this Letter of Intent is provided for the purposes of undertaking joint and several liabilities of the partners to the Joint Venture for submission of the bid and performance of the Contract if awarded and that this Letter of Intent shall not be deemed to give rise to any additional liabilities or obligations, in any manner or any law, on any of the Parties to this Letter of Intent or on the Joint Venture, other than the express provisions of the Contract.
7. *This Letter ofIntent shallbeconstrued and interpreted in accordance with the provisions of the Contract.*
8. *In case of an award of a Contract, we the parties to this Letter of Intent do hereby agree that we shall enter into Joint Venture Agreement as per performa submitted with the Bid which will be legally binding on all partners and we shall be jointly and severally responsible for furnishing a Contract performance security from a bank in favor of the Owner in the currency/currencies of the Contract.*
9. It is further agreed that this Letter of Intent shall be irrevocable and shall form an integral part of the bid. It shall be effective from the date first mentioned abovefor all purposes and intents.

IN WITNESS WHEREOF, the Parties to this Letter of Intent have through their authorized representatives executed these presents and affixed Common Seals of their companies,on theday,month and year first mentioned above.

Common Seal of ..... has been affixed in my/ our presence pursuant to Board of Director's Resolution dated	For Lead Partner (PartyNo.-1) For and on be half of M/s
Name…….	
Designation …….	
Signature…….	Signature of the authorized representative)

WITNESS:

I…….

II…….

Common Seal of ..... has been affixed in my/ our presence pursuant to Board of Director's Resolution dated	For Party No.-2 For and on behalf of M/s
Name.……	
Designation ……..…	
Signature…….	Signature of the authorized representative)

WITNESS:

I…….

II…….

Annexure A – Part L

FORM OF POWER OF ATTORNEY FOR JOINT VENTURE

(On Non-judicial Stamp Paper of Appropriate value, if required as per laws of the country of the bidder, to be purchased in the Name of Joint Venture)

KNOW ALL MEN BY THESE PRESENTS THAT WE, the Partners whose details are given here under.....have formed a Joint Venture under the laws of .....(*)/ intend to form a Joint Venture (*) [(*) delete whichever is not applicable] and having our Registered Office(s)/Head Office(s) at.....(herein after called the 'Joint Venture' which expression shall unless repugnant to the context or meaning there of, include its successors, administrators andassigns) acting through M/s ..... being the Partner in-chargedo hereby constitute, nominate and appoint M/s..... a Company incorporate under the laws of.....and having its Registered/Head Office at.....as our duly constituted lawfull Attorney (herein after called "Attorney" or "Authorized Representative" or "Partner In-charge") to exercise all or any of the powers for and on behalf of the Joint Venture in regard to work for the bids for which have been invited by……..,……..(hereinafter called the Owner 'Owner') to undertake the following acts:

i) To sign and submit proposal and participate in the aforesaid Bid Specification of the Owner on behalf of the "Joint Venture".

ii) To negotiate with the Owner the terms and conditions for award of the Contract pursuant to the aforesaid Bid and to sign the Contract with the Owner for and on behalf of the "Joint Venture".

iii) To do any other act or submit any document related to the above.

iv) To receive, accept and execute the Contract for and on be half of the "Joint Venture".

For the above purpose, the person(s) authorized by the Partner In-charge shall be the person(s) authorized to act on behalf of the"Joint Venture" as per the Power of Attorney given to him/her/them by the Partner In-Charge,

It is clearly understood that all the partners of the joint venture shall be liable jointly and severally for the execution of the Contract in accordance with the Contract terms and the Partner-In-charge (Lead Partner) shall ensure performance of the Contract(s) and if one or more Partner fail to perform their respective portions of the Contract(s), the same shall be deemed to be a default by all the Partners.

It is expressly understood that this Power of Attorney shall remain valid binding and irrevocable till completion of the Design Build as well as the Operations and Maintenance Periodinterms of the Contract.

The Joint Venture hereby agrees and undertakes to ratify and confirm all the what so ever the said Attorney/Authorized Representatives/Partnerin-charge quotes in the bid, negotiates and signs the Contract with the Owner and/or proposes to act on behalf of the Joint Venture by virtue of this Power of Attorney and the same shall bind the Joint Venture as if done by itself.

IN WITNESS THERE OF the Partners Constituting the Joint Venture as aforesaid have executed these presents on this .....day of .....under the Common Seal(s) of their Companies.

For and on behalf of the

The Common Seal of the above Partners of the JointVenture:

The Common Seal has been affixed the reunto inthe presence of: WITNESS

1. Signature……..

   Name…… Designation……..

   Occupation……..

2. Signature……

   Name……

   Designation…….. Occupation……..

Annexure A – Part M

FORM OF UNDERTAKING BY THE JOINT VENTURE PARTNERS

(On Non-Judicial Stamp Paper of AppropriateValue, if required as per laws of the country of the bidder, to be purchased in the Name of Joint Venture)

THIS JOINT DEED OF UNDERTAKING executed on this .....dayof .....Two

Thousand and .....by ..... a company incorporated under the lawsof ..... and having its Registered Office at..... (hereinafter called the"PartyNo.1which expression shall include its successors, executors and permitted assigns) and M/s ..... a company incorporated under the lawsof ..... and having its Registered Officeat .....(hereinafter called the"PartyNo.2"which expression shall include its successors, executors and permitted assigns) which expression shall include its successors, executors and permitted assigns) for the purpose of making abid and enterin g into a contract [hereinafter called the "Contract" (in case ofaward) against the work to design and build Sewage Treatment Plant and all Appurtenant Structures and Allied Works, and O & M of Complete Worksassociated with ……(hereinafter called the "Owner").

WHEREAS the Party No.1, PartyNo.2 have entered into an Agreement dated.....

AND WHERE AS the Owner invited bids as per the above mentioned Specification to design and build Sewage Treatment Plant and all Appurtenant Structures and Allied Works, and O & M of Complete Works stipulated in the bidding documents.

AND WHEREAS ITB Clause 3.6 and Annexure A Part h Qualification Criteria form ing part of the bidding documents, inter -alia, stipulate that an undertaking of two or more qualified partners, meetingthe requirements of 'QualificationCriteria ofthe Bidder', as applicable may bid, provided, the Joint Venture ful-fill s all other requirements under Clause 5.7 'Qualification of the Bidder'and in such a case, the Letter of Bid (Bid Form) shall be signed by the Partner- In Charge so as to legally bind all the two Partner s of the Joint Venture, who will be jointly and severally liable to perform the Contract and all obligations hereunder.

The above clause further states that this Under taking shall be attached to the bid and the Contract performance guarantee will be as per the format enclosed with the bidding document without anyrestrictionsorliabilityforeitherparty.

AND WHEREAS the bid is being submitted to the Owner vide proposal No.....dated..... by Party No.1 based on this Undertaking between all the parties; under these presents and the bid in accordance with the requirements of ITB Clause 3.6 and Annexure A Part h Qualification Criteria, has been signed by all the parties.

NOW THIS UNDERTAKING WITNESSETH AS UNDER:

In consideration of the above premises and agreements all the parties of this Deed of Undertaking do hereby declare and undertake:

1. In requirement of the award of the Contract by the Owner to the Joint Venture Partners, we, the Parties do hereby undertake that M/s..... the Party No.1, shall act as Lead Partner and further declare and confirm that we the parties to the Joint Venture shall jointly and severally be bound unto the Owner for the successful performance of the Contract and shall be fully responsible to design and build Sewage Treatment Plant and all Appurtenant Structures and Allied Works, and O & M of Complete Works in accordance with the Contract.
2. In case of any breach or default of the said Contract by any of the parties to the Joint Venture, the parties do hereby undertake to be fully responsible for the successful performance of the Contract and to carry out all the obligations and responsibilities under the Contract in accordance with the requirements of the Contract.
3. Further, if the Owner suffers any loss or damage on account of any breach in the Contract or any shortfall in the performance of the equipment in meeting the performances guaranteed as per the specification in terms of the Contract, the Party(s) of these presents undertake to promptly make good such loss or damages caused to the Owner, on its demand without any demur. It shall not be necessary or obligatory for the Owner to proceed against Lead Partner to these presents before proceeding against or dealing with the other Party(s), the Owner can proceed against any of the parties who shall be jointly and severally liable for the performance and all other liabilities/obligations under the Contract to the Owner.
4. The financial liability of the Parties of this Deed of Undertaking to the Owner, with respect to any of the claims arising out of the performance or non-performance of the obligations set forth in this Deed of Undertaking, read in conjunction with the relevant conditions of the Contract shall, however not be limited in any way so as to restrict or limit the liabilities or obligations of any of the Parties of this Deed of Undertaking.
5. It is expressly understood and agreed between the Parties to this Undertaking that the responsibilities and obligations of each of the Parties shall be as delineated in Appendix - I (to be suitably appended by the Parties along with this undertaking in its bid). It is further undertaken by the parties that the above sharing of responsibilities and obligations shall not in any way be a limitation of joint and several responsibilities of the Parties under the Contract.
6. It is also understood that this Undertaking is provided for the purposes of undertaking joint and several liabilities of the partners to the Joint Venture for submission of the bid and performance of the Contract if awarded and that this Undertaking shall not be deemed to give rise to any additional liabilities or obligations, in any manner or any law, on any of the Parties to this Undertaking or on the Joint Venture, other than the express provisions of the Contract.
7. ***This Undertaking shall be construed and interpreted in accordance with the provisions of the Contract.***
8. ***In case of an award of a Contract, we the parties to this Deed of Undertaking do hereby agree that we shall be jointly and severally responsibleforfurnishingaContractperformancesecurityfrom abank in favour of the Ownerinthecurrency/currenciesoftheContract.***
9. It is further agreed that this Deed of Undertaking shall be irrevocable and shall form an integral part of the bid and shall continue to be enforceable till the Owner discharges the same or upon the completion of the Contract in accordance with its provisions, which ever is earlier. It shall be effective from the date first mentioned above for all purposes and intents.

IN WITNESS WHERE OF, the Parties to this Deed of Undertaking have through their authorized representatives executed these presents and affixed Common Seals of their companies, on the day, month and year first mentioned above.

Common Seal of ..... has been affixed in my/ our presence pursuant to Board of Director's Resolution dated	For Lead Partner (PartyNo.-1) For and on behalf of M/s
Name…….	

Designation ……

Signature……. Signature of the authorized representative)

For PartyNo. - 2

For and on behalf of M/s……..

WITNESS:

I…….

II…….

Common Seal of ..... has been affixed in my/ our presence pursuant to Board of Director's Resolution dated .....

For PartyNo.-2For and on behalf of M/s

Name…….

Designation ……

Signature……. Signature of the authorized representative)

WITNESS:

I…….

II…….

Annexure A- Part n

(Refer Section 1.5 (b) of Annexure A - Part h of bidding document)

FORMAT FOR EVIDENCE OF ACCESS TO OR AVAILABILITY OF CREDIT FACILITIES

BANK CERTIFICATE (FOR SINGLE ENTITY)

This is to certify that M/s. …… is a reputed company with a good financial standing.

If the contract for the work, namely ……. (Funded by the World Bank) is awarded to the above firm, we shall be able to provide them overdraft/credit facilities to the extent of INR…… to meet their working capital requirements for executing the above contract.

(Signature)

Name of Bank Manager

Name of Bank

Address of the Bank

Note: In case of a Joint Venture bidder, all partners should furnish the Bank's certificates on the following format. Certificate should be given by each JV partner fixing the amount in the certificate in proportion to its financial participation in the contract so that the aggregate amount meets the specified requirement of credit facility.

BANK CERTIFICATE (FOR JOINT VENTURE PARTNERS)

This is to certify that M/s. ……. who has formed a JV with M/s. …….. and M/s. ……...for participating in this bid, is a reputed company with a good financial standing.

If the contract for the work, namely …… (Funded by the World Bank) is awarded to the above Joint Venture, we shall be able to provide overdraft/credit facilities to the extent of INR……to M/s ……..… to meet the working capital requirements for executing the above contract.

(Signature)

Name of Bank Manager

Name of Bank

Address of the Bank

Annex B to the Bidding Documents

The Draft Contract

a. Form of Contract

b. General Conditions of the Contract

c. Schedules attached to the Contract

Government of Bihar

BIHAR URBAN INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED

AGREEMENT NO. _____

NATIONAL COMPETITIVE BIDDING

TO(i) DESIGN AND BUILD SEWAGE TREATMENT PLANT OF CAPACITY 60 MLD INCLUDING MAIN PUMPING STATION (97MLD) AND ALL APPURTENANT STRUCTURES AND ALLIED WORKS; (ii) OPERATION & MAINTENANCE OF THE COMPLETE WORKS OF SEWAGE TREATMENT PLANT FOR A PERIOD OF 15 YEARS AT PAHARI IN PATNA, STATE OF BIHAR, INDIA.

NCB Contract Package No: ……

Managing Director

Bihar Urban Infrastructure Development Corporation Limited

SFC Building, 2nd floor, Daroga Rai Path, Road no-2, R- Block,

Patna 800001

Ph. No.-0612-2506109

Fax No.-91-612-2506132

Web-http://buidco.in

Email –mdbuidco@gmail.com

CONTRACT TO (i) DESIGN AND BUILD SEWAGE TREATMENT PLANT OF CAPACITY 60 MLDINCLUDING MAIN PUMPING STATION (97MLD)AND ALL APPURTENANT STRUCTURES AND ALLIED WORKS; (ii) OPERATION & MAINTENANCE OF THE COMPLETE WORKS OF SEWAGE TREATMENT PLANT FOR A PERIOD OF 15 YEARS AT PAHARIIN PATNA, STATE OF BIHAR, INDIA.

FORM OF CONTRACT

THIS CONTRACT is made and entered into this ____ day of _____, *[Year]*

Between

Bihar Urban Infrastructure Development Corporation Ltd_____, a corporation _____ under _____ law and having its principal place of business at **Bihar Urban Infrastructure Development Corporation Limited**, SFC Building, 2nd floor, Daroga Rai Path, Road no-2, R-Block,

Patna 800001

Ph. No.-0612-2506109

Fax No.-91-612-2506132

Web-http://buidco.in

Email – mdbuidco@gmail.com

(hereafter the "Owner")

– and –

[Name of Joint Venture formed by the Successful Bidder or the Individual successful Bidder goes here] with its principal place of business at *[Address of theOperator]*

(hereafter the "Operator")

WHEREAS:

a. The Owner has the jurisdiction to enter into the Contract, as defined in Section 1.1 below, pursuant to the Applicable Law;

b. The Owner has received all requisite approvals necessary and has conformed with all requisite laws in accordance with the Applicable Law to permit theOwner to enter into the Contract;

c. The Owner desires to engage the Operator to (i) design and buildsewage treatment plantof installed capacity 60 Mld and all appurtenant structures including infrastructure for reuse and allied works;(ii) operation & maintenance of the complete works of sewage treatment plant, for a period of 15 years at Pahari in Patna Cityand ensure the effectiveness and sustainability of the said facility;

d. The Operator has represented to the Owner that it has the skills and ability to (i) design and buildsewage treatment plantof installed capacity 60 Mld and all appurtenant structures and allied works; (ii) ensure operation & maintenance of the complete works of sewage treatment plant, for a period of 15 years at Pahari in Patna City and ensure the effectiveness and sustainability of the said facility in an economical and effective manner and agrees to do so upon and subject to the terms and conditions of the Contract Documents;

e. The Operator responded to the Bidding Documents dated……..[xx.xx.xx] organized by the Owner and was selected as the recommended Operator to fulfil the Design-Build and Operating Services set out in the Technical Standards Schedule;

f. The Operator has the corporate capacity and authority to enter into the Contract;

NOW THEREFORE, in consideration of the mutual covenants and Agreements hereinafter set forth, the Owner and the Operator agree as follows:

ARTICLE 1. CONTRACT DOCUMENTS

1.1. Contract Documents

This Contract to (i) design and buildsewage treatment plantof installed capacity 60 MLDincluding MPS (MLD)and all appurtenant structures including infrastructure for reuse and allied works;(ii) operation & maintenance of the complete works of sewage treatment plant, for a period of 15 years at Paharii in Patnabetween the Owner and the Operator (the "Contract") consists of the following documents (collectively, the "Contract Documents"), and each of the following shall be read and construed as an integral part of the Contract:

a. Form of Contract
b. Letter of Acceptance
c. Corrigenda Nos. ___
d. Minutes of Pre bid conference dated _____
e. Special Conditions of Contract (Schedule 1 to GCC)
f. General Conditions of Contract
g. Schedule "2" – Design Build Services ("the Design Build Services Schedule")

h. Schedule "3" – Operations and Maintenance Services ("the Operations and Maintenance Services Schedule")
i. Schedule "4" – Description of Site and Service Area
j. Schedule "5" – Operator's Price Schedule
k. Schedule "6" – Terms and Procedure of Payment
l. Schedule "7" –Liquidated Damages - Operations
m. Schedule "8" – Price Adjustment
n. Schedule "9" - Schedule of Performance Guarantee
o. Schedule "10" – Technical Specifications
p. Schedule "11" – MoU between the Central Government, the State Government and the ULB [Deleted].

1.2. Order of Precedence

a. In the event of any ambiguity or conflict between the Contract Documents listed in Section 1.1 of this Form of Contract, the order of precedence shall be the order in which the Contract Documents are listed in Section 1.1 of this Form of Contract.

b. Notwithstanding Section 1.2(a) of this Form of Contract and any other term or condition in the Contract Documents, if any statement or provision in Operator's Bid incorporated in the Contract is not consistent with or conflicts with any other term or condition in the remainder of the Contract Documents, the remainder of the Contract Documents shall govern.

1.3. Definitions

Capitalized words and phrases used herein shall have the same meanings as are ascribed to them in the General Conditions of Contract and various Schedules attached to the Contract.

ARTICLE 2. OPERATOR'S COMPENSATION AND TERMS OF PAYMENT

2.1. Operator's Compensation

The Owner hereby agrees to pay to the Operator the Contract Price, in consideration of the performance by the Operator of its obligations hereunder, and the Contract Price isspecified in Schedule 5 of the Contract (Operator's Price Schedule).

2.2. Terms of Payment

The terms and procedures of payment by which the Owner will compensate the Operatorare set out in the General Conditions of the Contract.

ARTICLE 3. EFFECTIVE DATE AND STARTING DATES

3.1. Effective Date and Starting Date

The Effective Date, the Design-Build Starting Date and Operations Starting Date for the Contract shall be determined in accordance with the General Conditions of the Contract.

IN WITNESS WHEREOF the Owner and the Operator have caused this Form of Contract to be duly executed by their duly authorized representatives.

EXECUTED as of the date first written above.

[The Owner]

By: _____
Name: _____
Title: _____
Witness: _____

[TheOperator]

By: _____
Name: _____
Title: _____
Witness: _____

Annexure B to the bidding document

The Draft Contract

NATIONAL GANGA RIVER BASIN PROJECT

UNDER WORLD BANK FINANCE

AGREEMENT NO. _____

General Conditions of Contract (GCC)

GENERAL CONDITIONS

FOR A CONTRACT

TO(i) DESIGN AND BUILD SEWAGE TREATMENT PLANT OF CAPACITY 60 MLD INCLUDING MAIN PUMPING STATION (97MLD) AND ALL APPURTENANT STRUCTURES AND ALLIED WORKS; (ii)OPERATION & MAINTENANCE OF THE COMPLETE WORKS OF SEWAGE TREATMENT PLANT, FOR A PERIOD OF 15 YEARS AT PAHARI IN PATNA, STATE OF BIHAR, INDIA.

TABLE OF CONTENTS

GENERAL CONDITIONS OF CONTRACT

ARTICLE 1. CONTRACT AND INTERPRETATION

1.1. Definitions

Unless the context otherwise requires, the following terms wherever used in this Contract have the following meanings:

"**Adjudicator**" means the person that is named in the SCC;

"**Applicable Law**" means the laws and any other instruments having the force of law in the Country specified in the SCC, as they may be issued and in force from time to time, including any decree of the President or government of the Country;

"**Appointing Authority**" is the authority specified in the SCC;

"**Authorities**" means the Owner, ULB and the Country as specified in the SCC;

"**Background Information Document**" means the Background Information Document provided to the Operator by the Owner during the bidding process that preceded this Contract;

"**Bank**" means the World Bank;

"**Bidding Documents**" means the documents issued by the Owner in respect of the bidding process for the selection of an operator to Design, build and operate the Project Facility and to perform the Services;

"**Capital Investment Program**" means the capital investment program of the Owner, if any, referred to in OSA Section 10.2(2);

"**Change**" is defined in GC Section 10.1.1(1);

"**Change Order**" is defined in GC Section 10.1.2(4);

"**Completion**" means that the Project Facility and all Design-Build Services have been completed operationally and structurally and put in a tight and clean condition in accordance with the Technical Standards Schedule, and the Operator is entitled to have a Operational Acceptance Certificate issued in respect of the Project Facility, or part thereof, in accordance with DBSS Section 6.3;

"**Operational Acceptance Certificate**" means a certificate issued by the Design-Build-Operations Engineer in accordance with DBSS Section 6.3;

"**Contract**" means the agreement between the Owner and the Operator which consists of the Contract Documents;

"**Contract Documents**" means the Form of Contract, General Conditions, and all appendices to the General Conditions as set out in GC Section 1.2;

"**Contract Price**" is defined in Section 2.1 of the Form of Contract;

"**Contract Records**" is defined in GC Section 1.8.1(1);

"**Contract Term**" means the term of the Contract, including any renewals approved by theOwner, commencing on the Effective Date and continuing to, and including, the End Date;

"**Costs**" means all expenditures reasonably incurred, or to be incurred, by the Operator including overhead but excluding profit;

"**Country**" means the country specified in the SCC;

"**Country of Origin**" means the countries and territories eligible under the rules of the World Bank as defined under the *Guidelines: Procurement under IBRD Loans and IDA Credits& Grants 2011, revised 2014*;

"**Customers**" mean all persons to which the Operator provides services, including those customers in existence as of the Operations Starting Date and persons who become customers after the Operations Starting Date;

"**Data Room**" means the data room which may be established by the Owner in the bidding process as set out in the Bidding Documents;

"**DBSS Section**" means Design-Build Services Schedule Section;

"**Design-Build Documents**" means the plans, specifications, designs, models, electronic models and other documents and materials relating to the design and construction of the Site and Project Facility as may be set out or contemplated in the Design-Build Services Schedule or agreed to by the Parties from time to time during the Contract Term;

"**Design-Build-Operations Engineer**" means the Consultant or Owner's representative retained by the Owner to supervise the Operator, in accordance with the Contract Documents, in carrying out the Design-Build and Operations Services;

"**Design-Build Period**" is defined in GC Section 2.2(a);

"**Design-Build Services**" means the Design-build services to be performed by the Operator as contemplated by the General Conditions and the Design-Build Services Schedule;

"**Design-Build Starting Date**" is defined in GC Section 2.1.3(1);

"**Discharge Point**" means the point at which the Residual Treated Water is discharged from the treatment plant, and where the sample of the Residual Treated Water shall be drawn periodically for the purpose of testing it for conformity with the Discharge Standards;

"**Effective Date**" means the date on which this Contract comes into force and effect pursuant to GC Section 2.1.1;

"**End Date**" is defined in GC Section 2.1.2;

'Environmental Management Plan (EMP)' – A set of mitigationmeasures to be implemented by the DBO Operator as indicated in [Appendix 1] which shall be implemented by the Operator;

[Please insert reference of the Schedule/Section of the bidding document where EMP have been specified] which shall be implemented by the Operator;

."**Environmental, Social, Health and Safety Management Plan**"- A set of mitigation and management measures to be implemented by the DBO operator as indicated in Appendix 1 Schedule 2 (design Build Services)which shall be implemented by the Operator;

"**Extension Date**" is defined in GC Section 2.4.3;

"**Force Majeure**" is defined in GC Section 9.8(1);

"**GC Section**" means General Conditions of Contract Section;

"IBRD" means International Bank for Reconstruction and Development;

"**IDA**" means the International Development Agency;

"**including**"means including without limitation and "**includes**" means includes without limitation, unless expressly stated otherwise;

"Indicative Flow for STP" means the rate of sewage flow which is projected by the Owner to be available for treatment in the STP facility for each of the 15 years of the O&M period.

"**Liquidated Damages – Delay**" is defined in GC Section 2.3.6(2);

"**Liquidated Damages – Operations**" is as defined in GCC Clause 5.4 read with SCC Clause 5.4;

"**Manager**" is defined in GC Section 8.2(3);

"**Monthly Operations Payment**" is defined in Para 4 of Schedule 6 of the Contract;

"**Operations Period**" is defined in GC Section 2.2(b);

"**Operations Starting Date**" is defined in GC Section 2.1.3(2);

"**Operational Acceptance**" means the acceptance by the Owner of the Project Facility, or part thereof, in accordance with DBSS Section 6.3;

"**Operations Services**" means the Operations Services to be performed by the Operator as contemplated by the General Conditions and the Operations Services Schedule;

"**Operator**" means the Sewerage Treatment Plant Operatorretained by theOwner to carry out the Services and is the Party named as the Operator in the Form of Contract;

"**Operator's Equipment (Design-Build)**" means all machinery, apparatus, vehicles and other equipment required for the execution and completion of the Design-Build Services and the remedying of any defects, but does not include material, machinery, apparatus and other equipment forming part of the Plant and Equipment of the Project Facility;

"**Operator's Equipment (Operations)**" means all things of any kind whatsoever, including the equipment, materials, supplies, vehicles and consumables required to operate, maintain and repair the Site and Project Facility;

"**Operator's Personnel**" is defined in GC Section 8.3(1);

"**Operator's Representative**" is defined in GC Section 8.1.2(1);

"**OSA Section**" means Operations Services Schedule Section;

"**Owner**" means the Party named as Owner in the Form of Contract;

"**Owner's Representative**" is defined in GC Section 8.1.1(1);

"**Party**" means theOwner or the Operator, as the case may be, and "Parties" means both of them;

"**Performance Security**" is defined in GC Section 5.4.1(1);/5.5.1(1)

"**Plant and Equipment**" means the permanent plant, equipment, machinery, apparatus, articles and things of all kinds to be provided and intended to permanently form or forming part of the Project Facility;

"Project Facility" means the Sewerage Treatment Plant, Designed, Built, refurbished, Operated and Maintained by the Operator pursuant to this Contract;

"**Services**" means the Design-Build Services and the Operations Services to be performed by the Operator as set out in the General Conditions and the Appendices to the General Conditions;

"Sewage" or "Wastewater" means the night soil and other discharges from water closets, latrines, privy, urinals, cesspools or drains and polluted water from sinks, bathroom, stables, cattle sheds and other like places and includes domestic sewage and wastewater effluents and discharges from manufacturers of all kinds;

"Sewage Treatment Plant" or "STP" means the new plant for treatment and processing including safe disposal of treated wastewater which shall be designed, built, operated and maintained by the Operator in accordance with the provisions of this Contract;

;

"**Site**" means the physical area as set out in the Site Schedule identified for the location of the Project Facility;

"**Site Information**" is defined in GC Section 3.5(1);

"**Subcontract**" means any contract, whether written or verbal, entered into by the Operator and a Sub-contractor for the performance of any part of the Services;

"**Sub-contractor**" means any person or entity to which the Operator subcontracts or sub-consults any part of the Services in accordance with the provisions of GC Section 8.6, including any person or entity engaged for the supply of any Plant and Equipment, Operator's Equipment (Design-Build) or Operator's Equipment (Operations) or for the provision of any Services;

"**Submission Deadline**" means the date for the submission of bids, as stated or awarded by the Bidding Documents;

"**Subsequent Operator**" means the operator that is to assume the provision of the Services upon termination or completion of the Contract and may include one of the Authorities;

"**Taxes**" is defined in GC Section 5.6;

"**Technical Standards**" is defined in the Technical Standards Schedule;

"**Tests on Completion**" means those tests set out in Attachment 1 to the Technical Standards Schedule as conducted pursuant to DBSSSection 6.2;

"Testing, Trial and Commissioning Period" shall have the meaning as defined in Clause 2.3.2 of Special Conditions of Contract, Schedule 2;

"**Third Party**" means any person or entity other than the Parties;

"Threshold Sewage Flow" means the expected level of sewage flow available for treatment immediately on completion of the STP facility.

"**Time for Completion**" is defined in GC Section 2.3.2;

"**Time Schedule**" is defined in GC Section 2.3.3(1);

"**Transition Assistance**" is defined in GC Section 2.4.2;

"**TSS Section**" means Technical Standards Schedule Section;

"**Unforeseeable**" means not reasonably foreseeable on the Submission Deadline by an experienced operator that conducted or should have conducted the inspections and examinations or who knew or should have known the information described in GC Section 3.5; and

"**War Risks**" is defined in GC Section 9.9(1).

1.2. Contract Documents

Subject to the Form of Contract provisions, all documents forming part of the Contract, and all parts thereof, are intended to be correlative, complementary and mutually explanatory. The Contract shall be read as a whole. The following schedules which are incorporated by reference into the Contract shall be referred to as follows:

Schedule "1" – Special Conditions of Contract (the "SCC")

Schedule "2" – Design Build Services ("the Design Build Services Schedule")

Schedule "3" – Operations and Maintenance Services ("the Operations and Maintenance Services Schedule")

Schedule "4" – Description of Site and Service Area

Schedule "5" – Operator's Price Schedule

Schedule "6" – Terms and Procedure of Payment

Schedule "7" – Liquidated Damages – Operations

Schedule "8" – Price Adjustment

Schedule "9' - Schedule of Performance Guarantee

Schedule"10" – Technical Specifications

Schedule "11" – MoU between the Central Government, the State Government and the ULB [Deleted]

" _

1.3. Interpretation

1.3.1. Language

(1) All Contract Documents, all correspondence and communications to be given, and all other documentation to be prepared and supplied under the Contract shall be written in the language specified in the SCC and the Contract shall be construed and interpreted in accordance with that language.

(2) If any of the Contract Documents, correspondence or communications are prepared in any language other than the governing language under GC Section 1.3.1(1), the translation of such documents, correspondence or communications into the governing language shall prevail in matters of interpretation.

1.3.2. Singular or Plural

The singular shall include the plural and the plural shall include the singular except where the context otherwise requires.

1.3.3. Headings

The headings in the Contract Documents are included for ease of reference and shall neither constitute a part of the Contract nor affect its interpretation.

1.3.4. Persons

Words importing persons or entities shall include firms, corporations and government entities.

1.3.5. Incoterms

Unless inconsistent with any provision of the Contract, the meaning of any trade term and the rights and obligations of the Parties there under shall be prescribed by Incoterms 2010. Incoterms means international rules for interpreting trade terms published by the International Chamber of Commerce, 38 Cours Albert 1er, 75008 Paris, France.

1.3.6. Entire Agreement

This Contract constitutes the entire agreement between the Owner and the Operator with respect to the subject matter of the Contract and supersedes all communications, negotiations and agreements, whether written or oral, made by the Parties with respect thereto made prior to the date of the Contract.

1.3.7. Amendment

No amendment or other variation of the Contract shall be effective unless it is in writing, is dated, expressly refers to the Contract and is signed by a duly authorised representative of each Party to the Contract.

1.3.8. Number of Days

Except as expressly stated to the contrary elsewhere herein, in computing the number of days for the purposes of the Contract all days shall be counted, including Saturdays, Sundays and legal holidays in the Country, provided, however, that if the final day of any period shall fall on a Saturday, Sunday, or legal holiday in the Country, then the final day shall be deemed to be the next day which is not a Saturday, Sunday or legal holiday in the Country.

1.3.9. Independent Operator

(1) The Operator shall be an independent Operator in its performance of the Contract. The Contract does not create any agency, partnership, joint venture or other joint relationship between the Owner and the Operator or its Shareholders.

(2) Subject to the provisions of the Contract, the Operator shall be solely responsible for the manner in which the Contract is performed. All employees, agents, representatives or Sub-contractors engaged by the Operator in connection with the performance of the Contract shall be under the complete control of the Operator and shall not be deemed to be employees of the Owner, and nothing contained in the Contract, or in any Subcontract awarded by the Operator, shall be construed to create any contractual relationship or legal obligation between the Operator's employees, agents, representatives or Sub-contractors and the Owner.

1.3.10. Joint Venture

(1) If the Operator consists of a joint venture of more than one person, all the Partners hereby authorise the representative named in the SCC to act on their behalf in exercising all the Partner's and Operator's rights and obligations toward the Owner under this Contract, including the receiving of approvals, consents, orders, certificates, instructions and payments from the Owner, amendment of the Contract and in all other matters under the Contract, including the settlement of disputes.

(2) If the Operator is a joint venture of two or more Partners, each Partner of the joint venture, shall be jointly and severally bound to theOwner for the fulfilment of the provisions of the Contract by the Operator.

(3) The composition, control or constitution of the Operator shall be in accordance with the Operator's Bid and shall not be altered without the prior consent of the Owner.

1.3.11. Non-waiver

(1) Subject to GC Section 1.3.11(2), no relaxation, waiver, forbearance, delay or indulgence by either Party in enforcing any of the terms and conditions of the Contract or the granting of time by either Party to the other shall prejudice, affect or restrict the rights of that Party under the Contract, nor shall any waiver by either Party of any breach of Contract operate as waiver of any subsequent or continuing breach of Contract.

(2) To be a valid waiver, any waiver of a Party's rights, powers or remedies under the Contract shall,

(a) be in writing;

(b) be dated and signed by the Owner's or Operator's Representative, whichever is granting such waiver; and

(c) specify the right, power or remedy being waived and the extent to which it is being waived.

1.3.12. Severability

If any provision or condition of the Contract is prohibited or rendered invalid or unenforceable, such prohibition, invalidity or unenforceability shall not affect the validity or enforceability of any other provisions and conditions of the Contract.

1.3.13. Country of Origin

"Origin" means the place where the materials, equipment and other supplies for the Project Facility are mined, grown, produced or manufactured, and from which the services are provided.

1.3.14. Survival of Obligations

Upon the termination or expiration of the Contract pursuant to the Contract, all rights and obligations of the Parties hereunder shall cease, except those noted in the SCC.

1.4. Notice

(1) All notices to be given under the Contract shall be in writing and shall be sent by personal delivery, courier or facsimile to the address for notice of the relevant Party as set out in the SCC and the following provisions apply:

(a) Any notice sent by facsimile shall be confirmed by the sender no later than two days after dispatch by a notice sent by courier;

(b) Any notice sent by courier shall be deemed to have been delivered 10 days after dispatch. In proving the fact of dispatch, it shall be sufficient to show that the envelope containing such notice was properly addressed, with proper payment for the courier, and conveyed to the courier service for transmission; and

(c) Any notice delivered personally or sent by facsimile shall be deemed to have been delivered on the date of dispatch.

(2) A Party may change its address for notice pursuant to this Contract by giving the other Party notice of change in accordance with this GC Section 1.4.

(3) The Operator's address for the purpose of giving notice pursuant to this GC Section 1.4 shall be in the Country named in the SCC.

(4) Notices shall be deemed to include any approvals, consents, instructions, orders, certificates and similar communications to be given under the Contract.

1.5. Governing Law

This Contract, its meaning and interpretation, and the relation between the Parties shall be governed by the Applicable Law.

1.6. Settlement of Disputes

1.6.1. Adjudicator

(1) If any dispute of any kind whatsoever arises between the Owner and the Operator in connection with or arising out of the Contract including,

(a) any question regarding the existence, validity or termination of the Contract; and

(b) any matter related to the performance of the Services,

the Parties shall seek to resolve any such dispute or difference by mutual consultation. If the Parties fail to resolve such a dispute or difference by mutual consultation, the dispute

shall be referred in writing, by either the Operator or the Owner, to the Adjudicator with a copy to the other Party or Parties.

(2) GC Section 1.6.1(1) shall apply,

(a) during the execution of the Services and after the completion of the Services; and

(b) before and after the termination, abandonment or breach of the Contract.

(3) The Adjudicator shall give its decision in writing to both Parties no later than 30 days after the referral of a dispute. If the Adjudicator has rendered its decision within the 30 day time limit, and no notice of intention to commence arbitration has been given by either the Owner or the Operator prior to the expiration of 60 days after the reference of the dispute to the Adjudicator, the Adjudicator's decision shall become final and binding upon the Owner and the Operator. Any decision that has become final and binding shall be implemented by the Parties forthwith.

(4) The Adjudicator shall be paid a fee at the rate specified in the SCC plus reasonable expenditures incurred in the execution of its duties as Adjudicator, and these costs shall be divided equally between the Owner and the Operator.

(5) If the Adjudicator resigns or dies, or the Owner and the Operator agree that the Adjudicator is not fulfilling its functions in accordance with the provisions of the Contract, a new Adjudicator shall be jointly appointed by the Owner and the Operator. If the Owner and the Operator cannot agree on a new Adjudicator within 30 days after the resignation, death or removal of the existing Adjudicator, the new Adjudicator shall be appointed at the request of either Party by the Appointing Authority specified in the SCC.

1.6.2. Arbitration

(1) If either the Owner or the Operator is dissatisfied with the Adjudicator's decision, or if the Adjudicator fails to give a decision within 30 days after a dispute being referred to it, then either the Owner or the Operator may, within 60 days after such reference, give notice to the other Party, with a copy for information to the Adjudicator, of its intention to commence arbitration, as hereinafter provided, as to the matter in dispute, and no arbitration in respect of this matter may be commenced unless such notice is given.

(2) Any dispute in respect of which a notice of intention to commence arbitration has been given, in accordance with GC Section 1.6.2(1), shall be finally settled by arbitration.

(3) Arbitration proceedings shall be conducted in accordance with the rules of procedure Designated in the SCC.

1.6.3. Obligations during Arbitration

Notwithstanding any reference to the Adjudicator or arbitration herein,

(a) the Parties shall continue to perform their respective obligations under the Contract unless they otherwise agreed; and

(b) the Owner shall pay the Operator any monies due to the Operator.

1.7. Assignment

(1) The Operator shall not assign to any Third Party the Contract, or any part thereof, or any right, benefit, obligation or interest therein or thereunder without the prior consent of the Owner, which consent may not be unreasonably withheld.

(2) The Operator may assign, absolutely or by way of charge, any monies due and payable to it or that may become due and payable to it under the Contract.

(3) To be a valid assignment which has been approved by the Owner pursuant to GC Section 1.7(1), the assignment must,

(a) be in writing;

(b) be dated and signed by the Owner's Representative; and

(c) state the specific details of the assignment.

1.8. Contract Records, Accounting and Auditing

1.8.1. Contract Records

(1) Except as provided in GC Section 6.1, all data, information, documentation, account, plans, programs, reports, surveys and guidelines of any kind whatsoever (the "Contract Records") prepared by the Operator in performing the Services shall become and remain the property of the Owner and the Operator shall deliver all Contract Records and a detailed inventory of those Contract Records to the Owner no later than the date of termination or expiration of the Contract, except in respect of such Contract Records that are required to be delivered at an earlier date.

(2) The Contract Records shall include,

(a) information of any kind whatsoever related to the finances, revenues or expenditures of the Owner's operations;

(b) all files, documents, plans, drawings, specifications, notes, minutes of meetings and minutes of conversations;

(c) all the plans, programs, reports, surveys and guidelines prepared by the Operator in carrying out the Operations Services;

(d) the accounts of the Sewerage Treatment operations at the Project Facility;

(e) all manuals, reports, condition surveys, safety records, audit records, inventories, laboratory test results, procurement records, customer information, financial information, financial statements, invoices, accounting records, subcontracts and personnel records; and

(f) the Design-Build Documents, whether stored in hard copy or electronically.

(3) The Operator shall provide the Owner with unrestricted access to the Contract Records during the term of the Contract, including the right to make and retain copies.

(4) The Operator may retain a copy of the Contract Records but shall not use them for purposes unrelated to this Contract without the prior approval of the Owner. This GC Section 1.8.1(4) does not in any way relieve the Operator of its obligation of confidentiality pursuant to GC Section 6.2.

(5) Except as provided in GC Section 6.1, the Operator acknowledges that the Owner, as Owner of the Contract Records, may deal with the Contract Records in any way it determines, including making the Contract Records publicly available and making them available to prospective Bidders who may be involved in the process to select a Subsequent Operator.

1.8.2. Accounting

The Operator shall keep accurate and systematic accounts in respect of the Services and the Contract in accordance with internationally accepted accounting principles.

1.8.3. Auditing the Operator's Own Accounts and the Contract Records

(1) The Owner may, in its sole discretion, audit,

(a) the Operator's own accounts, financial information, financial statements and technical information at any reasonable time and with 24 hours' notice to the Operator; and

(b) the Contract Records and Design-Build Documents at any reasonable time and without notice to the Operator,

in respect of any matters related to the Contract.

(2) The Owner may complete the audit or audits itself or may retain an independent auditor, at the Owner's expense, to complete the audit or audits.

1.8.4. Operator's Audited Accounts

The Operator shall submit to the Owner, no later than 90 days after the end of the Operator's fiscal year, the annual audited accounts of its own finances for each of the Operator's fiscal years that occur during the Contract Term.

1.8.5. Inspections and Audit by the Bank

The Operator shall permit the Bank and/or persons appointed by the Bank to inspect the Site and/or the Owner's accounts and records relating to the performance of the Contract and to have such accounts and records audited by auditors appointed by the Bank if required by the Bank.

1.9. Operator's Claims during the Design-Build Period

(1) If the Operator considers itself to be entitled to any extension of the Time for Completion or any additional payment, under any section related to the Design-Build Services of these General Conditions, the Operator shall give notice to the Design-Build-Operations Engineer, describing the event or circumstance giving rise to the claim. The notice shall be given as soon as practicable, and no later than 30 days, after the Operator became aware, or should have become aware, of the event or circumstance.

(2) If the Operator fails to give notice of a claim within such period of 30 days, the Time for Completion shall not be extended, the Operator shall not be entitled to additional payment, and the Owner shall be discharged from all liability in connection with the claim. Otherwise, the following provisions of this GC Section 1.9 shall apply.

(3) The Operator shall also submit any other notices related to the Design-Build Services which are required by the Contract, and supporting particulars for the claim, that are relevant to such event or circumstance.

(4) The Operator shall keep such contemporary records as may be necessary to substantiate any claim related to the Design-Build Services, either on the Site or at another location acceptable to the Design-Build-Operations Engineer. Without admitting the Owner's liability, the Design-Build-Operations Engineer may, after receiving any notice under this GC Section 1.9, monitor the record-keeping or instruct the Operator to keep further contemporary records. The Operator shall permit the Design-Build-Operations Engineer to inspect all these records, and shall, if instructed, submit copies to the Design-Build-Operations Engineer.

(5) No later than 42 days after the Operator became aware, or should have become aware, of the event or circumstance giving rise to the claim, or within such other period as may be proposed by the Operator and approved by the Design-Build-Operations Engineer, the Operator shall send to the Design-Build-Operations Engineer a fully detailed claim which includes full supporting particulars of the basis of the claim and of the extension of time or additional payment claimed. If the event or circumstance giving rise to the claim has a continuing effect,

(a) this fully detailed claim shall be considered as interim;

(b) the Operator shall send further interim claims at monthly intervals, giving the accumulated delay or amount claimed, and such further particulars as the Design-Build-Operations Engineer may reasonable require; and

(c) the Operator shall send a final claim no later than 30 days after the end of the effects resulting from the event or circumstance, or within such other period as may be proposed by the Operator and approved by the Design-Build-Operations Engineer.

(6) No later than 42 days after receiving a claim or any further particulars supporting a previous claim, or within such other period as may be proposed by the Design-Build-Operations Engineer and approved by the Operator, the Design-Build-Operations Engineer shall respond with approval, or with disapproval and detailed comments. The Design-Build-Operations Engineer may also request any necessary further particulars, but shall nevertheless give his response on the principles of the claim within such time.

(7) Each invoice sent by the Operator shall include such amounts for any claim as have been reasonably substantiated as due under the relevant provision of the Contract. Unless and until the particulars supplied are sufficient to substantiate the whole of the claim, the Operator shall only be entitled to payment for such part of the claim as it has been able to substantiate.

(8) The Operator shall proceed in accordance with GC Section 7.2.6 to request,

(a) an extension, if any, of the Time for Completion before or after its expiry in accordance with GC Section 2.3.4; or

(b) an additional payment, if any, to which the Operator believes it is entitled under the Contract.

(9) The requirements of this GC Section 1.9 are in addition to those of any other provision which may apply to a claim. If the Operator fails to comply with this or another provision in relation to any claim, any extension of or additional payment shall take account of the extent, if any, to which the failure has prevented or prejudiced proper investigation of the claim, unless the claim is excluded under GC Section 1.9(2).

(10) This GC Section 1.9 shall apply only in respect of the Design-Build Services excluding the Existing Operations Services.

ARTICLE 2. CONTRACT TERM, TIMING AND COMPLETION

2.1. General

2.1.1. Effectiveness of Contract

The Form of Contract shall be signed by the Operator, and all partners, if the Operator is a joint venture company, prior to its signing by the Owner. The Contract shall come into force and effect on the date the Form of Contract is signed by the Owner (the "Effective Date"), contingent on final approval by the Bank.

2.1.2. Expiration of Contract

This Contract shall terminate on either,

(1) the specified number of months after the Operations Starting Date named in the SCC;

(2) the Extension Date pursuant to GC Section 2.4.3; or

(3) the date of Contract termination pursuant to GC Section 11.2,

(the "End Date"), whichever is applicable.

2.1.3. Commencement of Services

(1) Unless otherwise stated in the SCC, the Design-Build Starting Date shall be no later than 30 days after the Effective Date and the Owner shall give the Operator at least seven days prior notice of the Design-Build Starting Date.

(2) The "Operations Starting Date" shall be the date of the Operational Acceptance Certificate.

2.2. Design-Build Period and Operations Period

The Contract Term shall be divided into two periods as follows:

(a) the period commencing on the Effective Date and ending on the day immediately prior to the Operations Starting Date (the "Design-Build Period"); and

(b) the period commencing on the Operations Starting Date and ending on the End Date (the "Operations Period"), namely the date of completion of the Operation and Maintenance period of 15 years, commencing from the date of Operational Acceptance of the STP, and all appurtenant and allied works.

2.3. Design-Build Period – Commencement, Delays and Suspension

2.3.1. Commencement of the Design-Build Services

The Operator shall commence the Design-Build Services no later than the Design-Build Starting Date, and shall then proceed with the Design-Build Services with due expedition and without delay.

2.3.2. Time for Completion

The Operator shall complete the whole of the Design-Build Services in accordance with the time for completion set out in the SCC ("Time for Completion") for the Design-Build Services including,

(a) successfully completing the Tests on Commissioning; and

(b) completing all of the Design-Build Services such that the completed Project Facility can be used as a fully operational Project Facility in accordance with the Contract.

2.3.3. Design-Build Time Schedule

(1) The Operator shall submit a detailed time programme (the "Time Schedule") to the Design-Build-Operations Engineer no later than 30 days after the Design-Build Starting Date. The Operator shall also submit a revised Time Schedule whenever the previous Time Schedule is inconsistent with actual progress or with the Operator's obligations. Each Time Schedule shall include a description of,

(a) the order in which the Operator intends to carry out the Design-Build Services, including the anticipated timing of each stage of Design, Design-Build Documents, procurement, manufacture, inspection, delivery to the Site, construction, erection, testing and commissioning;

(b) the periods for review and any other submissions, approvals and consents specified in the Contract;

(c) the sequence and timing of inspections and tests specified in the Contract;

(d) the scheduled Time for Completion, the planned Time for Completion and the planned Operations Starting Date;

(e) all major events and activities in the production of Design-Build Documents; and

(f) all major phases and milestones of the Design-Build Services.

(2) The Design-Build-Operations Engineer shall review each Time Schedule and provide comments to the Operator as to whether the Time Schedule complies with the Contract. If the Design-Build-Operations Engineer fails to provide such comments prior to the expiration of 21 days after receiving a Time Schedule, the Operator shall proceed in accordance with the Time Schedule, subject to its other obligations under the Contract. The Operator shall be entitled to rely upon the Time Schedule when planning its activities.

(3) The Operator shall promptly give notice to the Design-Build-Operations Engineer of specific probable future events or circumstances which may adversely affect the Design-Build Services or delay the execution of the Design-Build Services. The Design-Build-Operations Engineer may require the Operator to submit an estimate of the anticipated effect of the future event or circumstances, or a proposal under GC Section 10.1.3.

(4) If, at any time, the Design-Build-Operations Engineer gives notice to the Operator that a Time Schedule fails, to the extent stated, to comply with the Contract or to be consistent with actual progress and the Operator's stated intentions, the Operator shall submit a revised Time Schedule to the Design-Build-Operations Engineer in accordance with this GC Section 2.3.3.

2.3.4. Extension of the Time for Completion

(1) The Time for Completion shall be extended if the Operator is delayed or impeded in the performance of the Design-Build Services by reason of any of the following:

(a) a Change, unless the Parties have already agreed to an adjustment to the Time for Completion as part of the applicable Change;

(b) an occurrence of Force Majeure as provided in GC Section 9.8, Unforeseeable physical conditions as provided for in GC Section 9.7, or loss or damage as a result of the occurrences set out in GC Section 9.4(2);

(c) any suspension order given by the Owner pursuant to GC Section 11.1.1;

(d) any change in the Applicable Law in accordance with GC Section 9.10;

(e) any default or breach of the Contract by the Owner or any activity, act or omission of any other Operators employed by the Owner; or

(f) any other matter specifically mentioned in the Contract.

by such period as shall be fair and reasonable in all the circumstances and as shall fairly reflect the actual delay or impediment sustained by the Operator.

(2) The Operator shall submit, to the Design-Build-Operations Engineer, any notice of a claim for an extension of the Time for Completion in accordance with GC Section 10.1.3.

(3) The Operator shall, at all times, use reasonable efforts to minimize any delay in the performance of its obligations under the Contract.

2.3.5. Rate of Progress

(1) If, at any time, the Operator's progress in respect of the Design-Build Services,

(a) is too slow to complete the Design-Build Services in accordance with the Time for Completion; or

(b) has fallen, or will fall, behind the current Time Schedule

other than as a result of a cause listed in GC Section 2.3.4, then the Design-Build-Operations Engineer may instruct the Operator to submit a revised Time Schedule and supporting report describing the revised methods which the Operator proposes to adopt in order to expedite progress and complete the Design-Build Services.

(2) Unless the Design-Build-Operations Engineer notifies otherwise, the Operator shall adopt the revised methods referred to in GC Section 2.3.5(2), which may require increases in,

(a) The working hours or in the numbers of Operator's Personnel, or both; or

(b) Plant and Equipment,

at the risk and cost of the Operator. If these revised methods cause the Owner to incur additional costs, the Operator shall, subject to GC Section 1.9, pay these costs to the Owner, in addition to delay damages, if any, under GC Section 2.3.6.

2.3.6. Delay of Completion – Liquidated Damages - Delay

(1) The Operator guarantees that it shall attain Completion of the Project Facility in accordance with the Time for Completion specified in the SCC and GC Section 2.3.2 or in accordance with an extension of the Time for Completion granted to the Operator in accordance with GC Section 2.3.4.

(2) If the Operator fails to attain Completion of the Project Facility within the Time for Completion, or any extension thereof in accordance with GC Section 2.3.4, the Operator shall pay to the Owner liquidated damages in the amount specified in the SCC ("Liquidated Damages-Delay"). The aggregate amount of Liquidated Damages - Delay shall in no event exceed the amount specified as "Maximum" in the SCC. The Owner may terminate the Contract pursuant to GC Section 11.2.3 if the Operator reaches the "Maximum" level for Liquidated Damages – Delay.

(3) The payment or payments by the Operator of Liquidated Damages – Delay shall completely satisfy the Operator's obligation to attain Completion of the Project Facility within the Time for Completion or any extension thereof pursuant to GC Section 2.3.4.

(4) The payment or payments by the Operator of Liquidated Damages – Delay shall not in any way relieve the Operator of its obligations to complete the Project Facility or any other obligations and liabilities of the Operator under the Contract.

(5) If the Operator attains Completion of the Project Facility before the Time for Completion or any extension thereof pursuant to GC Section 2.3.4, and if the Owner intends to pay a bonus to the Operator for early completion, the amount of the bonus is as set out in the SCC. The aggregate amount of such bonus shall in no event succeed the amount specified as "Maximum" in the SCC.

2.3.7. Design-Build Period –(Special operation requirements) Deleted

2.4. Operations Period

2.4.1. Commencement of the Operations - Services

The Operator shall commence the Operations Services no later than the Operations Starting Date and shall then proceed with the Operations Services with due exception and without delay.

2.4.2. Services after the End Date

The Operator, upon written request by the Owner no later than 60 days prior to the End Date, shall provide assistance to the Owner, at no cost to the Owner, during a transitional period of up to 60 days after the End Date (the "Transition Assistance"). The purpose of the Transition Assistance is to ensure a smooth transition between the Operator and a

Subsequent Operator of the Project Facility. The Transition Assistance shall be related to only transition services and shall not be the full range of Services as set out in the Operations Services Schedule.

2.4.3. Extension of the Contract

If both Parties agree, this Contract may be extended for a period of up to 5 years after the End Date. The Owner shall notify the Operator no later than 6 months prior to the End Date if it wishes to enter into negotiations in order to extend the duration of the Contract. The date on which the Contract is to expire as a result of an extension shall be the Extension Date.

ARTICLE 3. OBLIGATIONS OF THE OPERATOR

3.1. General – Services and Standards of Performance

The Operator shall,

(a) Perform the Design-Build Services set out in the Design-Build Services Schedule;

(b) Perform the Operations Services set out in the Operations Services Schedule; and

(c) Perform the Services in accordance with the Technical Standards set out in the Technical Standards Schedulile,

3.2. Law Governing Services

The Operator shall comply with the Applicable Law and shall ensure that the Operator's Personnel and Sub-contractors comply with the Applicable Law. The Operator shall indemnify and hold harmless the Owner from and against any and all liabilities, damages, claims, fines, penalties and expenses of whatever nature arising or resulting from violation of the Applicable Law by the Operator, the Operator's Personnel the Sub-contractors and the Sub-contractors' personnel.

3.3. Conflict of Interest

(1) The compensation of the Operator pursuant to GC Article 5 shall constitute the Operator's sole compensation in connection with this Contract and, except as provided in GC Article 5, the Operator shall not accept for its own benefit any trade commission, discount or similar payment in connection with activities pursuant to this Contract or in the discharge of its obligations hereunder, and the Operator shall use its best efforts to ensure that the Operator's Personnel, Sub-contractors, and the Sub-contractors' employees and agents, similarly shall not receive any such additional remuneration.

(2) The Operator, Sub-contractors and any entity affiliated with the Operator or the Sub-contractors, shall be disqualified, during the Contract Term from providing goods, works or services, other than the Services, with respect to,

(a) the goods, works and services purchased from the Contingency Fund; and

(b) the Capital Investment Program.

(3) The Operator, Operator's Personnel, Sub-contractors and the employees and affiliates of the Sub-contractors shall not engage, either directly or indirectly, in any business or professional activities which would conflict with the activities assigned to them under this Contract.

(4) The Operator and its Shareholders shall not participate in any discussions or work and shall not provide any services or advice to the Owner related to,

(a) Except with respect to their responsibilities as set out in the Operations Services Schedule, institutional restructuring or reorganisation of the Owner or a utility or department of the Owner;

(b) The development or review of bidding documents to retain any Subsequent Operator; or

(c) The preparations for the procurement process to retain any Subsequent Operator.

(5) Failure of the Operator or the Shareholders to comply with this GC Section 3.3, in addition to constituting a breach of this Contract, may result in the disqualification of the Operator and the Shareholders from bidding in the procurement process to retain any Subsequent Operator.

3.4. Plant and Equipment, Operator's Equipment (Design-Build) and Operations Equipment (Operations)

(1) Any Plant and Equipment, Operator's Equipment (Design-Build) and Operator's Equipment (Operations) that will be incorporated in or be required for the Site and Project Facility or the Operation Services shall have their origin as specified under GC Section 1.1 ("Country of Origin").

(2) The Operator shall prepare a list of all Operator's Equipment (Design-Build) and Operator's Equipment (Operations) (the "Operator's Equipment Lists"). The Operator shall update the Operator's Equipment Lists on an annual basis and shall provide the updated Operator's Equipment Lists to the Owner no later than 30 days after the end of each of the Operator's fiscal years during the Contract Term.

3.5. Site Information and Investigation

(1) The Operator acknowledges that the Owner made available to the Operator, during the bidding process, either directly or by placing the data in the Data Room and Background Information Document, all available data on hydrological and sub-surface conditions of the Site, and studies on environmental impact that had been obtained by or on behalf of the Owner from investigations in anticipation of the Design-Build and Operations Services (the "Site Information"). The Operator shall be responsible for interpreting all data about the Site that is provided to it by the Owner.

(2) The Operator shall be deemed to have inspected and examined the Site, its surroundings, the Site Information and other available information, and to have satisfied itself before entering into the Contract, as to,

(a) the form and nature of the Site, including the sub-surface conditions;

(b) the applicable hydrological, hydro-geological and climatic conditions;

(c) the extent and nature of the work, Plant and Equipment, Operator's Equipment (Design-Build) and Operator's Equipment (Operations) necessary for the execution and completion of the Services, and the remedying of any defects; and

(d) the Operator's requirements for access to the Site, accommodation, personnel, power, transport, water and other services.

(3) The Operator shall be deemed to have obtained all necessary information as to risks, contingencies and all other circumstances that may influence or affect the performance of its obligations under the Contract.

(4) "The Operator shall not commence any Works, including mobilization and/or pre-construction activities (e.g. limited clearance for haul roads, site accesses and

work site establishment, geotechnical investigations or investigations to select ancillary features such as quarries and borrow pits), unless the Engineer is satisfied that appropriate measures are in place to address environmental, social, health and safety risks and impacts. At a minimum, the Operator shall apply the Management Strategies and Implementation Plans and Code of Conduct, submitted as part of the Bid and agreed as part of the Contract. The Operator shall submit, on a continuing basis, for the Engineer's prior approval, such supplementary Management Strategies and Implementation Plans as are necessary to manage the ESHS risks and impacts of ongoing works. These Management Strategies and Implementation Plans collectively comprise the Operator's Environmental and Social Management Plan (O-ESMP). The O-ESMP shall be approved prior to the commencement of construction activities (e.g. excavation, earth works, bridge and structure works, stream and road diversions, quarrying or extraction of materials, concrete batching and asphalt manufacture). The approved O-ESMP shall be reviewed, periodically (but not less than every six (6) months), and updated in a timely manner, as required, by the Operator to ensure that it contains measures appropriate to the Works activities to be undertaken. The updated O-ESMP shall be subject to prior approval by the Engineer.

(5) To the extent the Operator did not make any of the interpretations, investigations or examinations, or did not satisfy itself, or did not obtain such information as called for in this GC Section 3.5, the Operator represents and warrants that it is willing to assume and does hereby assume responsibility for any and all loss and damage from any cause whatsoever which the Operator's interpretations, investigations, examinations and obtaining of information may have avoided and agrees to indemnify the Owner from all risk thereof and from conditions arising or developing in the course of performing the Services which may make the performance of the Services more onerous and more expensive to fulfil or perform than was contemplated on the Effective Date. Notwithstanding anything in the Contract to the contrary, the Operator acknowledges and declares that in entering into the Contract it did not and does not rely upon any information or report provided by or on behalf of the Owner or its agents, representatives or employees.

3.6. Access to the Site and Project Facility

(1) The Operator shall, during both the Design-Build Period and the Operations Period, provide free and open access to the Site and the Project Facility at the Owner's request. The Owner shall make reasonable efforts to provide reasonable notice to the Operator prior to the Owner's access but such notice is not mandatory. The Owner's representative on the Site, or at the Project Facility shall observe all safety and health regulations and reasonable instructions of the Operator.

(2) The Operator shall give all reasonable access to any other Operators employed by the Owner on or near the Site to carry out their work.

(3) If the Operator makes available to other Operators any roads or ways the maintenance for which the Operator is responsible, permits the use by such other Operators of the Operator's Equipment (Design-Build) and Operator's Equipment (Operations), or provides any other service of whatsoever nature for such other Operators, the Owner shall fully compensate the Operator for any loss or damage caused or occasioned by such other Operators in respect of any such use or service, and shall pay to the Operator reasonable remuneration for the use of such equipment or the provision of such services.

(4) The Operator shall also arrange to perform its work so as to minimize, to the extent possible, interference with the work of other Operators. The Design-Build-Operations Engineer shall determine the resolution of any difference or conflict that may arise between the Operator and other Operators and the workers of the Owner in regard to their work.

(5) The Operator shall notify the Design-Build-Operations Engineer, as applicable, promptly of any defects in the other Operators' work that come to its notice, and that could affect the performance of the Services by the Operator. The Design-Build-Operations Engineer, as applicable, shall determine the corrective measures, if any, required to rectify the situation after inspection of the Site, the STP and the Netwok. Decisions made by the Design-Build-Operations Engineer, as applicable, shall be binding on the Operator.

3.7. Safety Procedures

The operator shall:

(a) comply with all applicable safety regulations,

(b) take care for the safety of all persons entitled to be on the Site,

(c) use reasonable efforts to keep the Site and Works clear of unnecessary obstruction so as to avoid danger to these persons,

(d) provide fencing, lighting, guarding and watching of the Works until completion and taking over under Clause 10 [Employer's Taking Over], and

(e) provide any Temporary Works (including roadways, footways, guards and fences) which may be necessary, because of the execution of the Works, for the use and protection of the public and of owners and occupiers of adjacent land.

3.8. Fossils

All fossils, coins, articles of value or antiquity, and structures and other remains or items of geological or archaeological interest found on the Site shall be placed under the care and authority of the Employer. The Operator shall take reasonable precautions to prevent Operator's Personnel or other persons from removing or damaging any of these findings.

The Operator shall, upon discovery of any such finding, promptly give notice to the Engineer, who shall issue instructions for dealing with it. If the Operator suffers delay and/or incurs Cost from complying with the instructions, the Operator shall give a further notice to the Engineer and shall be entitled subject to Sub-Clause 1.9 [Contractor's Claims] to:

(a) an extension of time for any such delay, if completion is or will be delayed, under GCC clause 2.3.4 [Extension of Time for Completion], and

(b) payment of any such Cost, which shall be included in the Contract Price.

After receiving this further notice, the Engineer shall proceed in accordance with GC.

ARTICLE 4. OBLIGATIONS OF THE OWNER

4.1. Owner's Assistance to the Operator

Owner shall obtain consent from the respective pollution control board/authority and all other requisite clearances to establish and operate the STP unless the same have been obtained already.

The Owner shall use reasonable efforts to,

(a) provide the Operator, Sub-contractors and Operator's Personnel with work permits and such other documents as shall be necessary to enable the Operator, Sub-contractors or Operator's Personnel to perform the Services;

(b) arrange for Operator's Personnel and, if appropriate, their eligible dependants to obtain promptly all necessary entry and exit visas, residence permits, exchange permits and any other documents required for their stay in the Country;

(c) facilitate the prompt clearance through customs of any property required for the Services and of the personal effects of the Operator's Personnel and their eligible dependants; and

(d) issue to officials, agents and representatives of theOwner all such instructions as may be necessary or appropriate for the prompt and effective implementation of the Services.

4.2. Access to the Site and Project Facility

The Owner shall be responsible for acquiring and providing legal and physical possession of the Site and access thereto and for providing possession and access to all other areas reasonably required for the proper execution of the Contract including all requisite rights of way. The Owner shall provide the Operator, free of charge, full possession of the Site and the Project Facility during the term of the Contract.

4.3. Reviews and Approvals of Submissions

(1) Except as otherwise provided in the Contract, if the Operator submits a plan, report or other documentation to the Owner in writing, and the Owner, or the Design-Build-Operations Engineer, is required to approve that submission, the Design-Build-Operations Engineer as applicable, shall review and either approve or provide written comment on the Operator's submission no later than 14 days after the day of submission by the Operator to the Design-Build-Operations Engineer.

(2) If the Design-Build-Operations Engineer, as applicable, fails to approve or refuses to approve the Operator's submission in accordance with GC Section 4.3(1), the Operator shall notify the Owner in writing that it has not received a response to its submission.

(3) If the Design-Build-Operations Engineer, as applicable, fails to respond to the Operator's written notification pursuant to GC Section 4.3(2) within 14 days after the receipt by the Design-Build-Operations Engineer, as applicable, of the Operator's written notification, the Operator's submission shall be deemed to be approved.

CONTRACT PRICE AND PAYMENT

4.4. Contract Price

(1) The Contract Price shall be as specified in the Price Schedules offered by the Operator and accepted by the Owner while awarding the Contract. These prices have been incorporated in Schedule 5 of the Contract.

(2) Subject to GC Section 9.7, the Operator shall be deemed to have satisfied itself as to the correctness and sufficiency of the Contract Price, which shall, except as otherwise provided for in the Contract, cover all its obligations under the Contract, including all costs and expenses for the Design, Building, Successful Commissioning, Operation & Maintenance of the Project Facility in accordance with the provisions of this Contract.

(3) Unless indicted in the SCC, the contract price shall not be subject to any alteration except in the event of a change to the design build services in accordance with GC section 10.1 or a change to the operations services in accordance with GC Section 10.2 and 10.3.

4.5. Terms of Payment

(1) The Contract Price shall be paid as specified in the SCC.

(2) No payment made by the Owner herein shall be deemed to constitute acceptance by the Owner of the Project Facility or any part thereof.

(3) In the event that the Owner fails to make any payment by its respective due date or within the period of 60 days, the Owner shall pay to the Operator interest on the amount of such delayed payment at the rate shown in the SCC and as specified in the SCC for the period of delay until payment has been made in full.

(4) The currency or currencies in which payments are made to the Operator under this Contract shall be specified in the SCC, subject to the general principle that payments will be made in the currency or currencies in which the Contract Price has been stated in the Operator's Bid.

(5) All payments shall be made in the currency or currencies specified in the Article 2 of the Contract.

(6) if the Operator was, or is, failing to perform any ESHS obligations or work under the Contract, the value of this work or obligation, as determined by the Engineer, may be withheld until the work or obligation has been performed, and/or the cost of rectification or replacement, as determined by the Engineer, may be withheld until rectification or replacement has been completed. Failure to perform includes, but is not limited to the following:

(i) failure to comply with any ESHS obligations or work described in the Works' Requirements which may include: working outside site boundaries, excessive dust, failure to keep public roads in a safe usable condition, damage to offsite vegetation, pollution of water courses from oils or sedimentation, contamination of land e.g.

from oils, human waste, damage to archeology or cultural heritage features, air pollution as a result of unauthorized and/or inefficient combustion;

(ii) failure to regularly review C-ESMP and/or update it in a timely manner to address emerging ESHS issues, or anticipated risks or impacts;

(iii) failure to implement the C-ESMP;

(iv) failing to have appropriate consents/permits prior to undertaking Works or related activities;

(v) failure to submit ESHS report/s (as described in Appendix 1 of Schedule 2 (Design Build Services), or failure to submit such reports in a timely manner;

(vi) failure to implement remediation as instructed by the Engineer within the specified timeframe (e.g. remediation addressing non-compliance/s).

4.6. Performance Incentive Compensation

If the Owner intends to pay the Operator performance incentive compensation, the Owner will pay such compensation at the end of the Operations Period and in accordance with the Performance Incentive Compensation Schedule.

4.7. Liquidated Damages - Operations

The Operator shall pay the Owner liquidated damages for failure to meet Technical and Operational Standards as set out in SCC.

4.8. Securities

4.8.1. Performance Security

(1) The Operator shall provide a security for the Operator's proper performance of the Contract to the Owner no later than the date specified in the Bidding Documents (the "Performance Security").

(2) The Performance Security shall be,

(a) In the amount specified in the SCC;

(b) Denominated in the currency or currencies of the Contract, or in a freely convertible currency acceptable to the Owner; and

(c) Shall be in the form specified in the Bidding Documents or in another form approved by the Owner.

(3) The Performance Security is a bank guarantee and shall be issued by either,

(a) A bank or insurance company located in the Country; or

(b) A foreign bank or insurance company through a correspondent bank or insurance company located in the Country.

(4) The Performance Security shall be valid until 180 days after the End Date, or any extension to the End Date.

(5) The Owner shall return the Performance Security no later than 14 days after its expiration.

(6) The cost of complying with this GC Section 5.5.1 shall be borne by the Operator.

4.8.2. Advance Payment Security

(1) The Operator shall provide a security in an amount equal to the advance payment calculated in accordance with the Terms and Procedures of Payment Schedule and in the same currency or currencies.

(2) The mobilization advance paid to the Operator by the Owner shall be recovered commencing from the date on which the payment to the Operator has reached 25% of the part A and Part D price and shall be fully recovered by completion of 90% of the time for completing the works under part A and Part D.

4.9. Taxes and Duties

(1) Except as otherwise specifically provided in the Contract, the Operator shall bear and pay all taxes, duties, levies and charges (the "Taxes") assessed on the Operator, its Sub-contractors or their employees by all municipal, state or national government authorities in connection with the Services in and outside of the Country.

(2) Service Tax if applicable shall be reimbursed by the Owner against evidence of applicability and payment.

(3) If any tax exemptions, reductions, allowances or privileges and benefits may be available to the Operator in the Country, the same shall be passed on by the operator to the Owner.

ARTICLE 5. COPYRIGHT : DESIGN-BUILD DOCUMENTS

5.1. Copyright – Design-Build Documents

(1) As between the Parties, the Operator shall retain the copyright and other intellectual property rights in the Design-Build Documents made by or on behalf of the Operator.

(2) The Operator shall be deemed, by signing the Contract, to give the Owner a non-terminable, transferable, non-exclusive, royalty-free licence to copy, use and communicate the Design-Build Documents, including making and using modifications of them. This licence shall,

(a) apply throughout the actual or intended working life, whichever is longer, of the relevant parts of the Site or Project Facility;

(b) entitle any person in proper possession of the relevant part of the Site or Project Facility to copy, use and communicate the Design-Build Documents for the purposes of completing, managing, operating, maintaining, altering, adjusting, and repairing the Project Facility;

(c) in the case of Design-Build Documents which are in the form of computer programs and other software, permit their use on any computer on the Site or at the Project Facility and other places as envisaged by the Contract, including replacements of any computers supplied by the Operator; and

(d) entitle the Owner to make the Design-Build Documents available for inspection by a prospective Bidder who may be involved in the process to select a Subsequent Operator.

(3) The Owner shall not, without the Operator's consent, use, copy or communicate the Design-Build Documents to a Third Party by, or on behalf of, the Owner for purposes other than those permitted under GC Section 6.1(2).

5.2. Confidentiality

(1) The Operator shall keep confidential and shall not, without the written consent of the Owner, divulge to any Third Party any documents, data or other information arising directly or indirectly from the performance of Services under the Contract, whether such information has been furnished prior to, during or following termination of the Contract. Notwithstanding this GC Section 6.2(1), the Operator may furnish to its Sub-contractors such documents, data and other information to the extent required for the Sub-contractors to perform their work under the Contract, in which event the Operator shall obtain from such Sub-contractors an undertaking of confidentiality similar to that imposed on the Operator under this GC Section 6.2(1).

(2) The Operator shall not use such documents, data and other information received from the Owner for any purpose other than the Services as are required for the performance of the Contract. The Operator shall not publish, permit to be published, or disclose any particulars of the Services, Site or Project Facility in any trade or technical paper or advertising materials without the prior written consent of the Owner.

(3) The obligations of the Operator under GC Sections 6.2(1) and 6.2(2), shall not apply to that information which,

(a) Now or hereafter enters the public domain through no fault of the Operator;

(b) Can be proven to have been possessed by the Operator at the time of disclosure and which was not previously obtained, directly or indirectly, from the Owner; or

(c) Otherwise lawfully becomes available to the Operator from a Third Party that has no obligation of confidentiality.

ARTICLE 6. CONTRACT ADMINISTRATION AND SUPERVISION DURING THE DESIGN-BUILD AND OPERATIONS PERIODS

6.1. General

The Parties acknowledge that two separate approaches to contract administration and supervision will be in place during the Contract Term as follows:

(a) from the Effective Date until the Operations Starting Date, the Design-Build Supervision approach will be put in place by the Owner; and

(b) from the Operations Starting Date until the End Date, the Operations Supervision approach will be put in place by the Owner.

6.2. Design-Build Supervision

6.2.1. Supervision during the Design-Build Period

GC Section 7.2 shall apply only during the Design-Build Period.

6.2.2. Design-Build-Operations Engineer's Duties and Authority (Design-Build Period)

(1) The Owner shall appoint the Design-Build-Operations Engineer who shall be responsible for day to day contract management and supervision during the Design-Build Period. The Design-Build-Operations Engineer's staff shall include suitably qualified engineers and other professionals who are competent to carry out these duties.

(2) The Design-Build-Operations Engineer shall have no authority to amend the Contract.

(3) Except, as specifically provided otherwise in the Contract, the Design-Build-Operations Engineer may exercise the authority attributable to the Design-Build-Operations Engineer as specified in or necessarily to be implied from the Contract. The Owner undertakes not to impose further constraints on the Design-Build-Operations Engineer's authority, except as agreed with the Operator.

(4) If the Design-Build-Operations Engineer is obligated to obtain the approval of the Owner before exercising a specific authority, these restrictions shall be shall be set out in the SCC. If the Design-Build-Operations Engineer exercises a specified authority for which the Owner's approval is required then, for the purposes of the Contract, the Owner shall be deemed to have given approval.

(5) Except as otherwise stated in the Contract,

(a) if the Design-Build-Operations Engineer carries out duties or exercises authority, specified in or implied by the Contract, the Design-Build-Operations Engineer shall be deemed to act for the Owner;

(b) the Design-Build-Operations Engineer has no authority to relieve any Party of any duties, obligations or responsibilities under the Contract; and

(c) any approval, check, certificate, consent, examination, inspection, instruction, notice, proposal, request, test or similar act by the Design-Build-Operations Engineer, including absence of disapproval, shall not relieve the Operator from any responsibility it has under the Contract, including responsibility for errors, omissions, discrepancies and non-compliances.

6.2.3. Delegation by the Design-Build-Operations Engineer

(1) The Design-Build-Operations Engineer may from time to time assign duties and delegate authority to assistants, and may also revoke such assignment or delegation. These assistants may include a resident engineer, or independent inspectors appointed to inspect or test items of Plant or Equipment. The assignment, delegation or revocation shall be in writing and shall not take effect until copies have been received by both Parties. Unless otherwise agreed by both Parties, the Design-Build-Operations Engineer shall not delegate the authority to determine any matter in accordance with GC Section 7.2.6.

(2) Assistants shall be suitably qualified persons, who are competent to carry out these duties and exercise this authority, and who are fluent in the language for communications defined in GC Section 1.3.1.

(3) Each assistant, to whom duties have been assigned or authority has been delegated, shall only be authorized to issue instructions to the Operator to the extent defined by the delegation. Any approval, check, certificate, consent, examination, inspection, instruction, notice, proposal, request, test, or similar act by an assistant, in accordance with the delegation, shall have the same effect as though the act had been an act of the Design-Build-Operations Engineer. However,

(a) any failure to disapprove any work or Plant and Equipment shall not constitute approval, and shall therefore not prejudice the right of the Design-Build-Operations Engineer to reject the work or the Plant and Equipment; and

(b) if the Operator questions any determination or instruction of an assistant, the Operator may refer the matter to the Design-Build-Operations Engineer, who shall promptly confirm, reverse or vary the determination or instruction.

6.2.4. Instructions of the Design-Build-Operations Engineer

(1) The Design-Build-Operations Engineer may issue to the Operator, at any time during the Design-Build Period, instructions which may be necessary for the execution of the Design-Build Services and the remedying of any defects, all in accordance with the Contract. The Operator shall only take instructions from the Design-Build-Operations Engineer, or from an assistant to whom the appropriate authority has been delegated under GC Section 10.1.

(2) The Operator shall comply with the instructions given by the Design-Build-Operations Engineer or delegated assistant, on any matter related to the Contract. These instructions shall be given in writing.

6.2.5. Replacement of the Design-Build-Operations Engineer

If the Owner intends to replace the Design-Build-Operations Engineer, the Owner shall, not less than 42 days before the intended date of replacement, give notice to the Operator of the name, address and relevant experience of the intended replacement Design-Build-Operations Engineer. The Owner shall not replace the Design-Build-Operations

Engineerwith a person against whom the Operator raises reasonable objection by notice to the Owner, with supporting particulars.

6.2.6. Determinations by the Design-Build-Operations Engineer

(1) Whenever the Contract provides that the Design-Build-Operations Engineer shall proceed in accordance with this GC Section 7.2.6 to agree or determine any matter, the Design-Build-Operations Engineer shall consult with each Party in an endeavour to reach agreement. If agreement is not achieved, the Design-Build-Operations Engineer shall make a fair determination in accordance with the Contract, taking due regard of all relevant circumstances.

(2) The Design-Build-Operations Engineer shall give notice to the Parties of each agreement or determination, with supporting particulars. Each Party shall give effect to each agreement or determination unless and until revised under GC Section 1.9.

6.3. Operations Supervision

6.3.1. Supervision during the Operations Period

This GC Section 7.3 shall apply only during the Operations Period and the period of time immediately after the End Date solely for the purpose of resolving transition issues and any outstanding issues arising during the Operations Period.

6.3.2. The Owner shall appoint its Representative for supervision of the "Operations' during the O & M period of 15 years in accordance with SCC clause 8.1.1 (1) (b).

ARTICLE 7. REPRESENTATIVES, STAFF AND SUBCONTRACTING

7.1. Representatives

7.1.1. Owner's Representative

(1) The Owner's representative (the "Owner's Representative") shall be as follows:

(a) During the Design-Build Period, the Owner's Representative shall be the Design-Build-Operations Engineer; and

(b) During the Operations Period, the Owner's Representative shall be the as mentioned in SCC

(2) The Owner shall name its representative,

(a) No later than 14 days after the Effective Date for the Design-Build-Operations Engineer; and

(3) The Owner may change its representative from time to time and shall give notice of the change without delay. The Owner shall not change its representative at a time and in such a manner as to impede the progress of either the Design-Build Services or the Operations Services.

(4) The Owner's Representative shall represent and act for the Owner at all times during the performance of the Contract. All notices, instructions, orders, certificates, approvals and all other communications under the Contract by the Owner shall be given by the Design-Build-Operations Engineer as applicable, except as herein otherwise provided.

(5) All notices, instructions, information and other communications given by the Operator to the Owner under the Contract shall be given to the Design-Build-Operations Engineer as applicable, except as herein otherwise provided.

7.1.2. Operator's Representative

(1) If the Operator's representative is not named in the SCC, the Operator shall name its representative (the "Operator's Representative") no later than 14 days after the Effective Date and shall request the Owner to approve the proposed Operator's Representative. If the Owner makes no objection to the proposed Operator's Representative, the Operator's Representative shall be deemed to have been approved.

(2) If the Owner objects to the proposed Operator's Representative before the expiration of 14 days after the proposal, the Operator shall propose a replacement no later than 14 days after receiving the Owner's objection and reasons for the objection and GC Section 8.1.2(1) shall apply to the proposed replacement.

(3) The Operator's Representative shall represent and act for the Operator at all times during the performance of the Contract. All notices, instructions, orders, certificates, approvals and all other communications under the Contract by the Operator shall be given by the Operator's Representative, except as herein otherwise provided.

(4) All notices, instructions, information, and other communications given by the Owner to the Operator under the Contract shall be given to the Operator's Representative as established pursuant to this GC Section 8.1.2.

(5) The Operator shall not revoke the appointment of the Operator's Representative without the Owner's prior written consent, which shall not be unreasonably withheld. If the Owner consents thereto, the Operator shall appoint some other person as the Operator's Representative, pursuant to the procedure set out in this GC Section 8.1.2.

(6) The Operator's Representative may, subject to the approval of the Owner, which shall not be unreasonably withheld, at any time delegate to any person any of the powers, functions and authorities vested in him or her. Any such delegation may be revoked at any time. Any such delegation or revocation shall be subject to a prior notice signed by the Operator's Representative, and shall specify the powers, functions and authorities thereby delegated or revoked. No such delegation or revocation shall take effect unless and until a copy thereof has been delivered to the Owner and the Design-Build-Operations Engineer.

(7) Any act or exercise by any person of powers, functions and authorities so delegated to him or her in accordance with GC Section 8.1.2(6) shall be deemed to be an act or exercise by the Operator's Representative.

7.2. Operator's Superintendence

(1) Throughout the term of the Contract, the Operator shall provide all necessary superintendence to plan, arrange, direct, manage, inspect and test the Services.

(2) Superintendence shall be given by a sufficient number of persons having adequate knowledge of the language for communications as set out in the SCC and of the operations to be carried out, including the methods and techniques required, the hazards likely to be encountered and methods of preventing accidents, for the satisfactory and safe execution of the Services.

(3) The Operator's Representative shall appoint a suitable person as construction or operations manager as applicable (the "Manager"). The Manager shall supervise all work done at the Site and Project Facility by the Operator and shall be present at the Site or Project Facility through normal working hours except when on leave, sick or absence connected with the proper performance of the Contract. Whenever the Manager is absent from the Site Project Facility, a suitable person shall be appointed to act as his or her deputy.

7.3. Operator's Personnel

(1) The Operator shall provide and employ on the Site for the performance of the Services such skilled, semi-skilled and unskilled labour as is necessary for the proper and timely execution of the Contract (the "Operator's Personnel"). The Operator is encouraged to use local labour that has the necessary skills. The Operator shall provide all expertise needed to carry out the Services including the Key Staff with the expertise specified in the SCC for the design build services.

(2) Unless otherwise provided in the Contract, the Operator shall be responsible for the recruitment, employment, transportation, accommodation and catering of all labour, local or expatriate, required for the execution of the Contract and for all payments in connection therewith.

(3) The Operator shall be responsible for obtaining all necessary permits and visas from the appropriate authorities for the entry of all labour and personnel to be employed on the Site into the Country.

(4) The Operator shall at its own expense provide the means of repatriation to all of its and its Sub-contractor's personnel employed on the Contract at the Site to their various home countries. It shall also provide suitable temporary maintenance of all such persons from the cessation of their employment on the Contract to the date programmed for their departure. In the event that the Operator defaults in providing such means of transportation and temporary maintenance, the Owner may provide the same to such personnel and recover the cost of doing so from the Operator.

(5) The Operator shall at all times during the progress of the Contract use its best endeavours to prevent any unlawful, riotous or disorderly conduct or behaviour by or amongst its employees and the labour of its Sub-contractors.

(6) The Operator shall, in all dealings with its labour and the labour of its Sub-contractors currently employed on or connected with the Contract, pay due regard to all recognized festivals, official holidays, religious or other customs and all local laws and regulations pertaining to the employment of labour.

7.4. Replacement of Operator's Personnel

The Owner or Design-Build-Operations Engineer may require the Operator to remove and replace any member of the Operator's Personnel who,

(a) Persists in any misconduct or lack of care;

(b) Carries out duties incompetently or negligently;

(c) Fails to comply with any provision of the Contract; or

(d) Persists in any conduct which gives the Owner reasonable cause to be dissatisfied with him or herOrundertakes behavior which breaches the Code of Conduct (ESHS) (e.g. spreading communicable diseases, sexual harassment, gender based violence, illicit activity or crime)."

"If appropriate, the Contractor shall then appoint (or cause to be appointed) a suitable replacement person."

"The Contractor's Personnel includes Key Personnel. If the Contractor intends to replace a Key Personnel, the Contractor shall, not less than 30 days before the intended date of replacement, give notice to the Engineer, the name, address, academic qualifications and relevant experience of the intended replacement Key Personnel. The Contractor shall not, without the prior consent of the Engineer, revoke the appointment of the Key Personnel or appoint a replacement."

7.5. Existing Staff

If the Operator is obliged to retain staff employed by the Owner as stated in the SCC, it shall do so in accordance with the Existing Staff Schedule.

7.6. Sub-contractors

(1) The Operator shall not enter into any contract or contracts that will result in the Operator exceeding the maximum percentage of subcontracting permitted by the Owner in respect of the Design-Build Services and the Operations Services, as set out in the Bidding Documents.

(2) Except with respect to the Sub-contractors named in the Operator's Bid, the Operator shall not enter into a contract with any Sub-contractor without the prior consent of the Owner.

(3) The Operator shall be responsible for the observance by Sub-contractors of the terms and conditions of the Contract and shall ensure that all relevant terms of the Contract are included in the Operator's contracts with Sub-contractors.

(4) Subcontracting by the Operator shall not relieve the Operator of any of its obligations under the Contract and the Operator shall be responsible for the acts, omissions and defaults of all Sub-contractors, and the Sub-contractors, employees, agents and sub-sub-contractors, as fully as if they were acts, omissions or defaults of the Operator or the Operator's Personnel.

ARTICLE 8. LIABILITY AND RISK DISTRIBUTION

8.1. Defect Liability -

(1) The Operator warrants that the Site and Project Facility or any part thereof shall be free from defects in the Design, engineering, materials and workmanship of the Plant and Equipment supplied and of the work executed.

(2) The Defect Liability Period shall be 24 months after the date of Completion of the STP and successful completion of three months trial run of the Project Facility, whichever first occurs, unless specified otherwise in the SCC.

(3) If during the Defect Liability Period any defect should be found in the Design, engineering, materials and workmanship of the Site, Project Facility or Plant and Equipment supplied or of the work executed by the Operator, the Operator shall promptly, in consultation and agreement with the Owner regarding appropriate remedying of the defects, and at its cost, repair, replace or otherwise make good, as the Operator shall, at its discretion, determine, such defect as well as any damage to the Project Facility caused by such defect. The Operator shall not be responsible for the repair, replacement or making good of any defect or of any damage to the Project Facility arising out of or resulting from normal wear and tear.

(4) The Operator's obligations under this GC Section 9.1 shall not apply to,

(a) Any Designs, specifications or other data Designed, supplied or specified by or on behalf of the Owner; and

(b) Any other materials supplied or any other work executed by or on behalf of the Owner, except for the work executed by the Owner under GC Section 9.1(10).

(5) The Owner shall give the Operator a notice stating the nature of any such defect together with all available evidence thereof, promptly following the discovery thereof. The Owner shall give all reasonable opportunity for the Operator to inspect any such defect.

(6) The Owner shall give the Operator all necessary access to the Project Facility and the Site to enable the Operator to perform its obligations under this GC Section 9.1.

(7) The Operator may, with the consent of the Owner, remove from the Site any Plant and Equipment, Operator's Equipment (Design-Build) and Operator's Equipment (Operations) or any part of the Project Facility that are defective if the nature of the defect, or any damage to the Project Facility caused by the defect, is such that repairs cannot be expeditiously carried out at the Site.

(8) If the repair, replacement or making good is of such a character that it may affect the efficiency of the Project Facility or any part thereof, the Owner may give to the Operator a notice requiring that tests of the defective part of the Project Facility shall be made by the Operator immediately upon completion of such remedial work, whereupon the Operator shall carry out such tests.

(9) If such part fails the tests, the Operator shall carry out further repair, replacement or making good, as the case may be, until that part of the Project Facility passes such tests. The tests shall be agreed upon by the Owner and the Operator.

(10) If the Operator fails to commence the work necessary to remedy such defect or any damage to the Project Facility caused by such defect within a reasonable time, which shall in no event be considered to be less than 15 days, the Owner may, following notice to the Operator, proceed to do such work, and the reasonable costs incurred by the Owner in connection therewith shall be paid to the Owner by the Operator or may be deducted by the Owner from any monies due the Operator or claimed under the Performance Security.

(11) If the Project Facility or any part thereof cannot be used by reason of such defect or making good of such defect, the Defect Liability Period of the Project Facility or such part, as the case may be, shall be extended by a period equal to the period during which the Project Facility or such part cannot be used by the Owner because of any of the aforesaid reasons.

(12) Except as provided in GC Sections 9.1 and 9.5, the Operator shall be under no liability whatsoever and howsoever arising, and whether under the Contract or at law, in respect of defects in the Project Facility or any part thereof, the Plant and Equipment, Design or engineering or work executed that appear after Completion of the Site, the Project Facility or any part thereof, except where such defects are the result of the gross negligence, fraud, criminal or wilful action of the Operator.

(13) The Operator shall also provide an extended warranty for any such component of the Project Facility and during the period of time as may be specified in the SCC. Such obligation shall be in addition to the Defect Liability Period specified under GC Section 9.1(2).

8.2. Limitation of Liability

Except in cases of criminal negligence or wilful misconduct,

(a) the Operator shall not be liable to the Owner in contract, tort, or otherwise, for any indirect or consequential loss or damage, loss of use, loss of production, or loss of profits of interest costs, provided that this exclusion shall not apply to any obligation of the Operator to pay liquidated damages to the Owner; and

(b) the aggregate liability of the Operator to the Owner, whether under the Contract, in tort or otherwise, shall not exceed the aggregate of the total Contract Price (including the Monthly payment during the Operations Period) and the total available Performance Incentive Compensation, provided that this limitation shall not apply to any obligation of the Operator to indemnify the Owner with respect to patent infringement.

8.3. Transfer of Ownership and Existing Equipment and Materials

8.3.1. Transfer of Ownership

(1) Ownership of the Plant and Equipment, including spare parts, to be imported into the Country shall be transferred to the Owner upon delivery at the Site.

(2) Ownership of the Plant and Equipment procured in the Country shall be transferred to the Owner when the Plant and Equipment are brought on to the Site.

(3) Ownership of any Plant and Equipment in excess of the requirements of the Project Facility shall revert to the Operator upon Completion of the Project Facility or such earlier time if the Owner and the Operator agree that the Plant and Equipment in question are no longer required for the Project Facility.

(4) Subject to GC Section 9.3.1(5), Ownership of the Operator's Equipment (Design-Build) and Operator's Equipment (Operations), including spare parts, shall remain with the Operator or its Sub-contractors.

(5) The Owner may, in its sole discretion, purchase as of the End Date any of the Operator's Equipment (Operations), including spare parts, at the fair market value of such Operator's Equipment (Operations) as determined by an independent valuator and the Operator shall transfer Ownership and possession of such Operator's Equipment (Operations) to the Owner as of the End Date.

(6) Notwithstanding the transfer of Ownership of the Plant and Equipment, the responsibility for care and custody of the Plant and Equipment, Operator's Equipment (Design-Build) and Operator's Equipment (Operations), together with the risk of loss or damage thereto, shall remain with the Operator pursuant to GC Section 9.4 until the End Date.

8.3.2. (Existing Equipment and Materials) Deleted

8.4. Care of the Site and Project Facility

(1) Except as provided in GC Sections 9.9 and 9.4(2), the Operator shall be responsible for the care and custody of the Site and Project Facility or any part thereof until the End Date and shall make good at its own cost any loss or damage that may occur to the Site or Project Facility from any cause whatsoever during such period. The Operator shall also be responsible for any loss or damage to the Site or Project Facility caused by the Operator or its Sub-contractors in the course of any work carried out, pursuant to GC Section 9.1.

(2) If any loss or damage occurs to the Site or Project Facility or any part thereof by reason of,

(a) insofar as they relate to the Country, nuclear reaction, nuclear radiation, radioactive contamination, pressure wave caused by aircraft or other aerial objects, or any other occurrences that an experienced Operator or operator could not reasonably foresee, or if reasonably foreseeable could not reasonably make provision for or insure against, insofar as such risks are not normally insurable on the insurance market and are mentioned in the general exclusions of the policy of insurance, including War Risks, taken out under GC Section 9.6;

(b) any use or occupation by the Owner or any Third Party, other than a Sub-contractor, authorized by the Owner of any part of the Site or Project Facility; or

(c) any use of or reliance upon any Design, data or specification provided or Designated by or on behalf of the Owner, or any such matter for which the Operator has disclaimed responsibility herein,

The Owner shall pay to the Operator all sums payable in respect of the Site executed, notwithstanding that the same be lost, destroyed or damaged. If the Owner requests the Operator in writing to make good any loss or damage to the Plant thereby occasioned, the Operator shall make good the same at the cost of the Owner in accordance with GC Section 10.1.If the Owner does not request the Operator in writing to make good any loss or damage to the Project Facility thereby occasioned, the Owner shall either request a change in accordance with GC Section 10.1, excluding the performance of that part of the Project Facility thereby lost, destroyed or damaged, or, where the loss or damage affects a substantial part of the Project Facility, the Owner shall terminate the Contract pursuant to GC Section 11.2.1.

(3) The Operator shall be liable for any loss of or damage to any Operator's Equipment (Design-Build), Operator's Equipment (Operations) or any other property of the Operator used or intended to be used for purposes of the Site or the Project Facility, except where such loss or damage arises by reason of any of the matters specified in GC Sections 9.4(2)(b) and 9.9.

(4) With respect to any loss or damage caused to the Project Facility or any part thereof, the Operator's Equipment (Design-Build) or the Operator's Equipment (Operations) by reason of any of the matters specified in GC Section 9.9(1), the provisions of GC Section 9.9(3) shall apply.

8.5. Indemnification

(1) Subject to GC Section 9.5(5), the Operator shall indemnify and hold harmless the Owner and its employees and officers from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of whatsoever nature, including attorney's fees and expenses, in respect of the death or injury of any person or loss of or damage to any property, arising in connection with the Operator's performance of the Services and by reason of the negligence of the Operator or its Sub-contractors, or their employees, officers or agents, except any injury, death or property damage caused by the negligence of the Owner, its Operators, employees, officers or agents.

(2) If any proceedings are brought or any claim is made against the Owner that might subject the Operator to liability under GC Section 9.5(1), the Owner shall promptly give the Operator a notice thereof and the Operator may at its own expense and in the Owner's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claim.

(3) If the Operator fails to notify the Owner prior to the expiration of 30 days after receipt of a notice given pursuant to GC Section 9.5(2) that it intends to conduct any such proceedings or claim, then the Owner shall be free to conduct the same on its own behalf. Unless the Operator has so failed to notify the Owner within the 30 day period, the Owner shall make no admission that may be prejudicial to the defence of any such proceedings or claim.

(4) The Owner shall, at the Operator's request, provide all available assistance to the Operator in conducting such proceedings or claim, and shall be reimbursed by the Operator for all reasonable expenses incurred in so doing.

(5) The Owner shall indemnify and hold harmless the Operator and its employees, officers and Sub-contractors from any liability for loss of or damage to property of the Owner that is caused by fire, explosion or any other perils, in excess of the amount recoverable from insurances procured under GC Section 9.6, provided that such fire, explosion or other perils were not caused by any act or omission of the Operator.

(6) The Party entitled to the benefit of an indemnity under this GC Section 9.5 shall take all reasonable measures to mitigate any loss or damage which has occurred. If the Party fails to take such measures, the other Party's liabilities shall be correspondingly reduced.

8.6. Insurance

The Insurance to be provided by the operator during his entire duration of Contract Term has been specified in SCC.

8.7. Unforeseeable Physical Conditions

(1) In this GC Section 9.7, "physical conditions" means natural physical conditions and man-made and other physical obstructions and pollutants, which the Operator encounters at the Site when performing of the Design-Build Services, including sub-surface and hydrological conditions but excluding climatic conditions.

(2) If the Operator encounters adverse physical conditions which it considers to have been Unforeseeable, the Operator shall give notice to the Design-Build-Operations Engineer as soon as practicable.

(3) The Operator's Notice pursuant to GC Section 9.7(2) shall describe the physical conditions, so that they can be inspected by the Design-Build-Operations Engineer, and shall set out the reasons why the Operator considers them to be Unforeseeable. The Operator shall continue performing the Design-Build Services, using such proper and reasonable measures as are appropriate for the physical conditions, and shall comply with any instructions which the Design-Build-Operations Engineer may give. If an instruction constitutes a Change GC Section 10.1.3 shall apply.

(4) If and to the extent that the Operator encounters physical conditions which are Unforeseeable, gives the notice required by GC Section 9.7(2), and suffers delay or incurs Cost due to these conditions, the Operator shall be entitled subject to GC Section 1.9 to,

(a) An extension of time for any such delay, if completion is or will be delayed, under GC Section 2.3.4; and

(b) Payment of any such Cost, which shall be included in the Contract Price.

(5) After receiving such notice and inspecting or investigating these physical conditions, the Design-Build-Operations Engineer shall proceed in accordance with GC Section 7.2.6 to agree or determine,

(a) Whether and to what extent these physical conditions were Unforeseeable; and

(b) The amount of delay or Cost, if any, pursuant to GC Section 9.7(4).

(6) Before additional Cost is finally agreed or determined under GC Section 9.7(5), the Design-Build-Operations Engineer, pursuant to GC Section 7.2.6, may also review whether other physical conditions were more favourable than could reasonably have been foreseen when the Operator submitted the Bid. If and to the extent that these more favourable conditions were encountered, the Design-Build-Operations Engineer may proceed in accordance with GC Section 7.2.6 to agree or determine the reductions in Cost which were due to these conditions, which may be included, as deductions, in the Contract Price. The net effect of all adjustments under GC Section 9.7(4)(b) and all these reductions, for all the physical conditions encountered on the Site, shall not result in a net reduction in the Contract Price.

(7) The Design-Build-Operations Engineer may take account of any evidence of the physical conditions foreseen by the Operator when submitting the Bid, which may be made available by the Operator, but shall not be bound by any such evidence.

8.8. Force Majeure

(1) "Force Majeure" shall mean any event,

(a) Beyond the reasonable control of the Owner or of the Operator, as the case may be; and

(b) Which is unavoidable notwithstanding the reasonable care of the Party affected.

(2) Force Majeure shall include the events listed below in this GC Section 9.8(2) if the conditions set out in GC Section 9.8(1)(a) and (b) are satisfied:

(a) war, hostilities or warlike operations, whether a state of war be declared or not, invasion, act of foreign enemy and civil war;

(b) rebellion, revolution, insurrection, mutiny, usurpation of civil or military government, conspiracy, riot, civil commotion and terrorist acts;

(c) confiscation, nationalization, mobilization, commandeering or requisition by or under the order of any government or de jure or de facto authority or ruler or any other act or failure to act of any local state or national government authority;

(d) strike, sabotage, lockout, embargo, import restriction, port congestion, lack of usual means of public transportation and communication, industrial dispute, shipwreck, shortage or restriction of power supply, epidemics, quarantine and plague;

(e) earthquake, landslide, volcanic activity, fire, flood or inundation, tidal wave, typhoon or cyclone, hurricane, storm, lightning, or other inclement weather condition, nuclear and pressure waves or other natural or physical disaster; and

(f) shortage of labour, materials or utilities where caused by circumstances that are themselves Force Majeure.

(3) If the Parties are prevented, hindered or delayed from or in performing any of their obligations under the Contract by an event of Force Majeure, then it shall notify the other in writing of the occurrence of such event and the circumstances thereof within 14 days after the occurrence of such event.

(4) The Party who has given such notice shall be excused from the performance or punctual performance of its obligations under the Contract for so long as the relevant event of Force Majeure continues and to the extent that such Party's performance is prevented, hindered or delayed. The Time for Completion shall be extended in accordance with GC Section 2.3.4(1) for events of Force Majeure during the Design-Build Period. If the Time for Completion is extended in accordance with GC Section 2.3.4(1), the End Date shall be extended for a period of time equal to the period of time during which the relevant event of Force Majeure continued.

(5) The Party or Parties affected by the event of Force Majeure shall use reasonable efforts to mitigate the effect thereof upon its or their performance of the Contract and to fulfil its or their obligations under the Contract, but without prejudice to either Party's right to terminate the Contract under GC Sections 9.8(7) and 9.9(6).

(6) No delay or non-performance by either Party hereto caused by the occurrence of any event of Force Majeure shall,

(a) Constitute a default or breach of the Contract; or

(b) Subject to GC Sections 9.4(2), 9.9(3) and 9.9(5), give rise to any claim for damages or additional Cost occasioned thereby,

If and to the extent that such delay or non-performance is caused by the occurrence of an event of Force Majeure.

(7) If the performance of the Contract is substantially prevented, hindered or delayed for a single period of more than 60 days or an aggregate period of more than 120 days on account of one or more events of Force Majeure during the term of the Contract, the Parties will attempt to develop a mutually satisfactory solution, failing which either Party may terminate the Contract by giving a notice to the other, but without prejudice to either Party's right to terminate the Contract under GC Section 9.9(6).

(8) In the event of termination pursuant to GC Section 9.8(7), the rights and obligations of the Owner and the Operator shall be as specified in GC Sections 11.2.1(2) and 11.2.2(1).

(9) Notwithstanding GC Section 9.8(6), Force Majeure shall not apply to any obligation of the Owner to make payments to the Operator herein.

8.9. War Risks

(1) "War Risks" shall mean any event specified in GC Section 9.8(2)(a) and (b) and any explosion or impact of any mine, bomb, shell, grenade or other Projectile, missile, munitions or explosive of war, occurring or existing in or near the Country.

(2) Notwithstanding anything contained in the Contract, the Operator shall have no liability whatsoever for or with respect to,

(a) Destruction of or damage to the Site and Plant and Equipment or any part thereof;

(b) Destruction of or damage to property of the Owner or any Third Party; or

(c) Injury or loss of life,

if such destruction, damage, injury or loss of life is caused by any War Risks, and the Owner shall indemnify and hold the Operator harmless from and against any and all claims, liabilities, actions, lawsuits, damages, costs, charges or expenses arising in consequence of or in connection with the same.

(3) If the Site, Project Facility or any Plant and Equipment, Operator's Equipment (Design-Build), Operator's Equipment (Operations) or any other property of the Operator used or intended to be used for the purposes of the Services sustains destruction or damage by reason of any War Risks, the Owner shall pay the Operator for,

(a) any part of the Project Facility or the Plant and Equipment so destroyed or damaged, to the extent not already paid for by the Owner;

(b) replacing or making good any Operator's Equipment (Design-Build), Operator's Equipment (Operations) or other property of the Operator so destroyed or damaged; and

(c) so far as may be required by the Owner, and as may be necessary for completion of the Services, replacing or making good any such destruction or damage to the Site, Project Facility or the Plant and Equipment or any part thereof.

(4) If the Owner does not require the Operator to replace or make good any such destruction or damage to the Site or Project Facility, the Owner shall either request a Change in accordance with GC Section 10.1 excluding the performance of that part of the Project Facility thereby destroyed or damaged or, where the loss, destruction or damage affects a substantial part of the Site or Project Facility, shall terminate the Contract, pursuant to GC Section 11.2.1.

(5) Notwithstanding anything contained in the Contract, the Owner shall pay the Operator for any increased Costs that are in any way attributable to, consequent on, resulting from, or in any way connected with any War Risks, if the Operator notifies the Owner in writing of any such increased Cost as soon as practicable.

(6) If, during the term of the Contract, any War Risks occur that financially or otherwise materially affect the execution of the Contract by the Operator, the Operator shall use its reasonable efforts to execute the Contract with due and proper consideration given to the safety of its and its Sub-contractors' personnel engaged in the work on the Services. If the execution of the Services becomes impossible or is substantially prevented for a single period of more than 60 days or an aggregate period of more than 120 days on account of any War Risks, the Parties will attempt to develop a mutually satisfactory solution, failing which either Party may terminate the Contract by giving a notice to the other.

(7) In the event of termination pursuant to GC Section 9.9(4) or 9.9(6), the rights and obligations of the Owner and the Operator shall be as specified in GC Section 11.2.1(2) and 11.2.2(1).

8.10. Change in Laws and Regulations

If, after a date which 30 days is prior to the Submission Deadline in the Bidding Documents, in the Country, any law, regulation, ordinance, order or by-law having the force of law is enacted, promulgated, abrogated or changed, which shall be deemed to

include any change in interpretation or application by the competent authorities, that subsequently affects the costs and expenses of the Operator or the Time for Completion, the Contract Price shall be correspondingly increased or decreased, or the Time for Completion shall be reasonably adjusted to the extent that the Operator has thereby been affected in the performance of any of its obligations under the Contract. Notwithstanding the foregoing, such additional or reduced costs shall not be separately paid or credited if the same has already been accounted for in the Contract Price adjustment provisions where applicable, in accordance with the SCC if so provided.

8.11. Patent Indemnity

8.11.1. Indemnity by Operator

The Operator shall indemnify and hold harmless the Owner and its employees and officers from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of whatsoever nature, including attorney's fees and expenses, which the Owner may suffer as a result of any infringement or alleged infringement by the Operator, Sub-contractors, or their employees, agents, or representatives, of any patent, utility model, registered Design, trademark, copyright or other intellectual property right registered or otherwise existing.

8.11.2. Notice of Claim

(1) If any proceedings are brought or any claim is made against the Owner arising out of the matters referred to in GC Section 9.11.1, the Owner shall promptly give the Operator a notice thereof, and the Operator may at its own expense and in the Owner's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claim.

(2) If the Operator fails to notify the Owner no later than 30 days after receipt of such notice that it intends to conduct any such proceedings or claim, then the Owner shall be free to conduct the same on its own behalf. Unless the Operator has so failed to notify the Owner no later than the 30 day period, the Owner shall make no admission that may be prejudicial to the defence of any such proceedings or claim.

(3) The Owner shall, at the Operator's request, give all available assistance to the Operator in conducting such proceedings or claim, and shall be reimbursed by the Operator for all reasonable expenses incurred in so doing.

8.11.3. Indemnity by Owner

The Owner shall indemnify and hold harmless the Operator and its employees, officers and Sub-contractors from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of whatsoever nature, including attorney's fees and expenses, which the Operator may suffer as a result of any infringement or alleged infringement by the Owner of any patent, utility model, registered Design, trademark, copyright or other intellectual property right registered or otherwise existing at the Effective Date arising out of or in connection with any Design, data, drawing, specification, or other documents or materials provided or Designed by or on behalf of the Owner.

8.12. Functional Guarantees

(1) The Operator guarantees that during the Tests and Inspection set out in DBSS Article 5, the Project Facility and all parts thereof shall attain the Functional Guarantees as required.

(2) If, for reasons attributable to the Operator, the minimum level of the Functional Guarantees are not met either in whole or in part, the Operator shall at its cost and expense make any such changes, modifications or additions to the Project Facility or any part thereof as may be necessary to meet at least the minimum level of the Functional Guarantees. The Operator shall notify the Owner upon completion of the necessary changes, modifications or additions, and shall request the Owner to repeat the applicable Tests and Inspection until the minimum level of the Functional Guarantees has been met. If the Operator eventually fails to meet the minimum level of Functional Guarantees, the Owner may consider termination of the Contract, pursuant to GC Section 11.2.3.

(3) If, for any reasons attributable to the Operator, the Functional Guarantees are not attained either in whole or in part, but the minimum level of the Functional Guarantees is met, the Operator shall, at the Operator's option, either

(a) make such changes, modifications or additions to the Project Facility or any part thereof that are necessary to attain the Functional Guarantees at its cost and expense, and shall request the Owner to repeat the Tests and Inspection; or

(b) pay liquidated damages to the Owner in respect of the failure to meet the Functional Guarantees in accordance with the provisions of the Liquidated Damages.

The payment of liquidated damages under GC Section 9.12(3) up to the limitation of liability specified in the SCC, shall completely satisfy the Operator's guarantees under GC Section 9.12(3), and the Operator shall have no further liability whatsoever to the Owner in respect thereof.

ARTICLE 9. CHANGE IN CONTRACT ELEMENTS

9.1. Change to the Design-Build Services

9.1.1. Introducing a Change

(1) Subject to GC Sections 10.1.2(6) and 10.1.2(10), the Owner shall have the right to propose, and subsequently require, that the Design-Build-Operations Engineer order the Operator from time to time during the performance of the Contract to make any change, modification, addition or deletion to, in or from the Design-Build Services (the "Change"), provided that such Change falls within the general scope of the Design-Build Services and does not constitute unrelated work and that it is technically practicable, taking into account both the state of advancement of the Design-Build Services and the technical compatibility of the Change envisaged with the nature of the Design-Build Services as specified in the Contract and any changes suggested by the statutory pollution control authority while giving consent to establish or operate the STP..

(2) The Operator may from time to time during its performance of the Contract propose to the Owner, with a copy to the Design-Build-Operations Engineer, any Change that the Operator considers necessary or desirable to improve the quality, efficiency or safety of the Design-Build Services. The Owner may at its discretion approve or reject any Change proposed by the Operator.

(3) Notwithstanding GC Section 10.1.1(1) and 10.1.1(2), no change made necessary because of any default of the Operator in the performance of its obligations under the Contract shall be deemed to be a Change, and such change shall not result in any adjustment of the Contract Price or the Time for Completion.

(4) The procedure on how to proceed with and execute Changes is specified in GC Section 10.1.2 and 10.1.3, and the Design-Build-Operations Engineer shall provide Operator with further details and sample forms on the Change procedures prior to the Design-Build Starting Date.

9.1.2. Changes Originating from Owner

(1) If the Owner proposes a Change pursuant to GC Section 10.1.1(1), it shall send to the Operator a "Request for Change Proposal," requiring the Operator to prepare and furnish to the Design-Build-Operations Engineer as soon as reasonably practicable a "Change Proposal," which shall include the following:

(a) Brief description of the Change;

(b) Effect on the Time for Completion;

(c) Estimated cost of the Change; and

(d) Effect on any other provisions of the Contract.

(2) Prior to preparing and submitting the Change Proposal, the Operator shall submit to the Design-Build-Operations Engineer an "Estimate for Change Proposal," which shall be an estimate of the cost of preparing and submitting the Change Proposal.

(3) Upon receipt of the Operator's Estimate for Change Proposal, the Owner shall,

(a) Accept the Operator's estimate with instructions to the Operator to proceed with the preparation of the Change Proposal;

(b) Advise the Operator of any part of its Estimate for Change Proposal that is unacceptable and request the Operator to review its estimate; or

(c) Advise the Operator that the Owner does not intend to proceed with the Change.

(4) Upon receipt of the Owner's instruction to proceed under GC Section 10.1.2(3)(a) (the "Change Order"), the Operator shall, with proper expedition, proceed with the preparation of the Change Proposal, in accordance with GC Section 10.1.2(1).

(5) The pricing of any Change shall, as far as practicable, be calculated in accordance with the prices included in the Contract. If such prices are inequitable, the Parties thereto shall agree on specific rates for the valuation of the Change.

(6) If, before or during the preparation of the Change Proposal, it becomes apparent that the aggregate effect of compliance therewith and with all other Change Orders that have already become binding upon the Operator under this GC Section 10.1 would be to increase or decrease the Contract Price by more than 15 per cent, the Operator may give a written notice of objection thereto prior to furnishing the Change Proposal. If the Owner accepts the Operator's objection, the Owner shall withdraw the proposed Change and shall notify the Operator in writing thereof.

(7) The Operator's failure to object pursuant to GC Section 10.1.2(6) shall neither affect its right to object to any subsequent requested Changes or Change Orders herein, nor affect its right to take into account, when making such subsequent objection, the percentage increase or decrease in the Contract Price that any Change not objected to by the Operator represents.

(8) Upon receipt of the Change Proposal, the Owner and the Operator shall mutually agree upon all matters therein contained. No later than 14 days after such agreement, the Owner shall, if it intends to proceed with the Change, issue the Operator with a Change Order.

(9) If the Owner decides not to proceed with the Change for whatever reason, it shall notify the Operator prior to the expiration of 14 days after the agreement on the Change. Under such circumstances, the Operator shall be entitled to reimbursement of all costs reasonably incurred by it in the preparation of the Change Proposal, provided that these do not exceed the amount given by the Operator in its Estimate for Change Proposal submitted in accordance with GC Section 10.1.2(2).

(10) If the Owner and the Operator cannot reach agreement on the price for the Change, an equitable adjustment to the Time for Completion, or any other matters identified in the Change Proposal, the Owner may nevertheless instruct the Operator to proceed with the Change by issue of a "Pending Agreement Change Order."

(11) Upon receipt of a Pending Agreement Change Order, the Operator shall immediately proceed with effecting the Changes covered by such Order. The parties shall thereafter attempt to reach agreement on the outstanding issues under the Change Proposal.

(12) If the Parties cannot reach agreement prior to the expiration of 60 days after the date of issue of the Pending Agreement Change Order, then the matter may be referred to the Adjudicator in accordance with the provisions of GC Section 1.6.1.

9.1.3. Changes Originating from Operator

(1) If the Operator proposes a Change pursuant to GC Section 10.1.1(2), the Operator shall submit to the Design-Build-Operations Engineer a written "Application for Change Proposal," giving reasons for the proposed Change and including the information specified in GC Section 10.1.2(1).

(2) Upon receipt of the Application for Change Proposal, the Parties shall follow the procedures outlined in GC Sections 10.1.2(8) and 10.1.2(10). If the Owner chooses not to proceed, the Operator shall not be entitled to recover the costs of preparing the Application for Change Proposal.

9.1.4. Payment in Applicable Currencies

If the Contract provides for payment of the Contract Price in more than one currency, then whenever a Change is agreed, approved or determined pursuant to GC Section 10.1.2 or 10.1.3, the amount payable in each of the applicable currencies shall be specified. For this purpose, reference shall be made to the actual or expected currency proportions of the Cost of the Change, and to the proportions of various currencies specified for payment of the Contract Price.

9.1.5. Design-Build Period

GC Sections 10.1.1 to 10.1.4 shall apply during only the Design-Build Period.

9.2. Change to the Operations Services

(1) Except as specifically provided in GC Section 10.2(2) or elsewhere in the Contract, the Operator shall make no claim whatsoever for any adjustment to the Contract Price during the Operations Period.

(2) The Operator or the Owner may request an adjustment to the Monthly O & M Payment if the quantity of sewage delivered to the Site changes in accordance with the SCC. In the event of such a change to the volume of sewage, the Operator or the Owner, as applicable, shall be entitled to receive an increase or decrease equal to the actual increase or decrease in Cost demonstrated by the Operator.

ARTICLE 10. SUSPENSION AND TERMINATION

10.1. Suspension

10.1.1. Suspension by the Owner

(1) The Owner may request the Design-Build-Operations Engineer, as applicable, by notice to the Operator, to order the Operator to suspend performance of any or all of its obligations under the Contract. Such notice shall specify the obligation of which performance is to be suspended, the effective date of the suspension and the reasons therefore. The Operator shall thereupon suspend performance of such obligation, except those obligations necessary for the care or preservation of the Site or Project Facility, until ordered in writing to resume such performance by the Design-Build-Operations Engineer as applicable.

(2) If, by virtue of a suspension order given by the Design-Build-Operations Engineer, as applicable, other than by reason of the Operator's default or breach of the Contract, the Operator's performance of any of its obligations is suspended for an aggregate period of more than 90 days, then at any time thereafter and provided that at that time such performance is still suspended, the Operator may give a notice to the Design-Build-Operations Engineer as applicable, requiring that the Owner shall, no later than 30 days after the Owner's receipt of the notice, order the resumption of such performance or request and subsequently order a Change in accordance with GC Section 10.1, excluding the performance of the suspended obligations from the Contract.

(3) If the Owner fails to order the resumption of performance in accordance with GC Section 11.1.1(2), the Operator may, by a further notice to the Design-Build-Operations Engineer, elect to treat the suspension, where it affects a part only of the Services, as a deletion of such part in accordance with GC Section 10.1 or, where it affects the whole of the Services, as termination of the Contract pursuant to GC Section 11.2.1.

10.1.2. Suspension by the Operator

(1) If, the Owner has,

(a) Failed to pay the Operator any sum due under the Contract within the period specified in the Contract;

(b) Failed to approve any invoice or supporting documents without just cause under the Contract; or

(c) Has committed a substantial breach of the Contract,

The Operator may give a notice to the Owner that requires payment of such sum, with interest thereon as stipulated in GC Section 5.2(3) requires approval of an invoice or supporting documents, or specifies a breach & requires the Owner to remedy the same, as the case may be.

(2) If the Owner fails to pay the sums required by the Operator in accordance with GC Section 11.1.2(1) or fails to remedy the breach or take steps to remedy the breach no later than 14 days after receipt of the Operator's notice, then the Operator may, upon giving 14 days' notice to the Owner, suspend performance of all or any of its obligations under the Contract, or, in the case of the Design-Build Services, reduce the Operator's rate of progress.

(3) If the Operator is unable to carry out any of its obligations under the Contract for any reason attributable to the Owner, including the Owner's failure to provide possession of or access to the Site or other areas in accordance with GC Section 4.2, then the Operator may, upon giving 14 days' notice to the Owner, suspend performance of all or any of its obligations under the Contract, or, in the case of the Design-Build Services, reduce the Operator's rate of progress.

(4) If the Operator's performance of its obligations is suspended or the rate of progress is reduced pursuant to this GC Section 11.1.2, then the Time for Completion shall be extended in accordance with GC Section 2.3.4, and additional Costs incurred by the Operator as a result of such suspension or reduction shall be paid by the Owner to the Operator in addition to the Contract Price, except in the case of suspension order or reduction in the rate of progress by reason of the Operator's default or breach of the Contract.

(5) During the period of suspension, the Operator shall not remove from the Site or Project Facility any Plant and Equipment, Operator's Equipment (Design-Build), Operator's Equipment (Operations), or any part of the Project Facility, without the prior written consent of the Owner.

10.2. Termination

10.2.1. Termination for Owner's Convenience

(1) The Owner may at any time terminate the Contract for any reason by giving the Operator a notice of termination that refers to this GC Section 11.2.1(1).

(2) Upon receipt of the notice of termination under GC Section 11.2.1(1),

(a) the Operator shall, either immediately or upon the date specified in the notice of termination,

(i) cease all further work, except for such work as the Owner may specify in the notice of termination for the sole purpose of protecting that part of the Facility already executed, or any work required to leave the Site in a clean and safe condition;

(ii) terminate all Subcontracts; and

(iii) remove all Operator's Equipment (Design-Build) and, except if the Owner asserts its rights pursuant to GC Section 9.3.1(5), Operator's Equipment (Operations) from the Site, repatriate the Operator's Personnel and its Sub-contractors' personnel from the Site, remove from the Site any wreckage, rubbish and debris of any kind, and leave the whole of the Site in a clean and safe condition; and

(b) the Operator, subject to the payment specified in GC Section 11.2.2, shall,

(i) deliver to the Owner the parts of the Project Facility executed by the Operator and all materials which have been paid for by the owner up to the date of termination; and

(ii) deliver to the Owner all the Contract Records, including the Design-Build Documents, prepared by the Operator or its Sub-contractors as at the date of termination.

10.2.2. Payment upon Termination by the Owner for Convenience

(1) Upon termination of this Contract pursuant to GC Section 11.2.1, the Owner shall make only the following payments to the Operator,

(a) any portion of the Contract Price payable to the Operator for Services satisfactorily performed prior to the date of termination and calculated as set out in GC Section 5.2;

(b) the Costs reasonably incurred by the Operator in the removal of the Operator's Equipment (Design-Build) and, except if the Owner asserts its rights pursuant to GC Section 9.3.1(5), Operator's Equipment (Operations) from the Site and in the repatriation of the Operator's Personnel and its Sub-contractors' personnel;

(c) any amounts required to be paid by the Operator to its Sub-contractors in connection with the termination of any Subcontracts, including any reasonable cancellation charges;

(d) the reasonable Costs incurred by the Operator in protecting the Site, Existing Facility and Project Facility and leaving the Site in a clean and safe condition pursuant to GC Section 11.2.1(2)(a)(i); and

(e) the reasonable Cost of satisfying all other obligations, commitments and claims that the Operator may in good faith have undertaken with Third Parties in connection with the Contract and that are not covered by GC Section 11.2.2(1).

(2) The Operator acknowledges that the only payments to be made to the Operator on termination by the Owner are set out in this GC Section 11.2.2. The Operator shall not make a claim for lost or foregone profits, revenues, consequential damages or any other costs, damages, expenses or losses of any kind as a result of or in connection with the termination of this Contract.

10.2.3. Termination for Operator's Default

(1) The Owner, without prejudice to any other rights or remedies it may possess, may terminate the Contract forthwith in the following circumstances, by giving a notice of termination and its reasons therefore to the Operator, referring to this GC Section 11.2.3(1):

(a) If the Operator becomes bankrupt or insolvent, has a receiving order issued against it, compounds with its creditors, or, if the Operator is a corporation, a resolution is passed or order is made for its winding up, other than a voluntary liquidation for the purposes of amalgamation or reconstruction, a receiver is appointed over any part of its undertaking or assets, or if the Operator takes or suffers any other analogous action in consequence of debt;

(b) If the Operator assigns or transfers the Contract or any right or interest therein in violation of the provision of GC Section 1.7; or

(2) If the Operator,

(a) has abandoned or repudiated the Contract;

(b) has without valid reason failed to commence work on the Site or Project Facility promptly or has suspended, other than pursuant to GC Section 11.1.1(2), the progress of Contract performance for more than 30 days after receiving a written instruction from the Owner to proceed;

(c) persistently fails to carry out the Services in accordance with the Contract or persistently neglects to carry out its obligations under the Contract without just cause; or

(d) refuses or is unable to provide sufficient materials, services, labour or personnel to perform the Services,

Then the Owner may, without prejudice to any other rights it may possess under the Contract, give a notice to the Operator stating the nature of the default and requiring the Operator to remedy the same. If the Operator fails to remedy or to take steps to remedy the same within 14 days after its receipt of such notice, then the Owner may terminate the Contract forthwith by giving a notice of termination to the Operator that refers to this GC Section 11.2.3(2).

(3) Upon receipt of the notice of termination under GC Sections 11.2.3(1) or 11.2.3(2) the Operator shall, either immediately or upon such date as is specified in the notice of termination,

(a) Cease all further work, except for such work as the Owner may specify in the notice of termination for the sole purpose of protecting that part of the Site and Project Facility already executed, or any work required to leave the Site and Project Facility in a clean and safe condition;

(b) Terminate all Subcontracts;

(c) Deliver to the Owner the parts of the Project Facility executed by the Operator up to the date of termination; and

(d) Deliver to the Owner all Contract Records, including the Design-Build Documents, prepared by the Operator or its Sub-contractors as of the date of termination.

(4) The Owner may enter the Project Facility and upon the Site, expel the Operator, and, if the Project Facility is not completed, the Owner may complete the Facility itself or by employing any Third Party. The Owner may, to the exclusion of any right of the Operator over the same, take over and use with the payment of a fair rental rate to the Operator, with all the maintenance costs to the account of the Owner and with an indemnification by the Owner for all liability including damage or injury to persons arising out of the Owner's use of such equipment, any Operator's Equipment (Design-Build) and Operator's Equipment (Operations) owned by the Operator and on the Site in connection with the Project Facility for such reasonable period as the Owner considers expedient for the completion of the Project Facility. Upon completion of the Project Facility or at such earlier date as the Owner thinks appropriate, the Owner shall give notice to the Operator that such Operator's Equipment (Design-Build) and, except if the Owner asserts its rights pursuant to GC Section 9.3.1(5), Operator's Equipment (Operations) will be returned to the Operator at or near the Site and shall return such Operator's Equipment (Design-Build) and Operator's Equipment (Operations) to the Operator in accordance with such notice. The Operator shall thereafter without delay and at its cost remove or arrange removal of the same from the Site.

10.2.3.1. Corrupt or Fraudulent Practices

If the Owner determines, based on reasonable evidence, that the Operator has engaged in corrupt, fraudulent, collusive or coercive practices, in competing for or in executing the Contract, then the Owner may, after giving 14 days' notice to the Operator, terminate the Contract and expel him from the Site, and the provisions of Section 11.2 shall apply as if such termination had been made under Section 11.2.3 [Termination for Operator's Default].

Should any employee of the Operator be determined, based on reasonable evidence, to have engaged in corrupt, fraudulent or coercive practice during the execution of the work, then that employee shall be removed in accordance with Section 8.4 [Replacement of Operator's Personnel].

For the purposes of this Sub-Clause:

(i) "Corrupt practice" is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party[8];

(ii) "Fraudulent practice" is any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;[9]

[8]"Another party" refers to a public official acting in relation to the procurement process or contract execution]. In this context, "public official" includes World Bank staff and employees of other organizations taking or reviewing procurement decisions.

[9]"Party" refers to a public official; the terms "benefit" and "obligation" relate to the procurement process or contract execution; and the "act or omission" is intended to influence the procurement process or contract execution.

(iii) "Collusive practice" is an arrangement between two or more parties Designed to achieve an improper purpose, including to influence improperly the actions of another party;[10]

(iv) "Coercive practice" is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;[11]

(v) "Obstructive practice" is

(i) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Bank investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation, or

(ii) acts intended to materially impede the exercise of the Bank's inspection and audit rights provided for under Section 1.8.5 [Inspections and Audits by the Bank].

10.2.4. Payment upon Termination for Operator's Default

(1) If the Contract is terminated pursuant to GC Section 11.2.3 and, subject to GC Section 11.2.4(2), the Operator shall be entitled to be paid,

(a) Any portion of the Contract Price payable to the Operator for Services satisfactorily performed prior to the date of termination;

(b) The value of any unused or partially used Plant and Equipment on the Site, except to the extent that such Plant and Equipment have already been paid for by the Owner; and

(c) The Costs, if any, incurred by the Operator in protecting the Site and Project Facility and in leaving the Site in a clean and safe condition pursuant to GC Section 11.2.3(3)(a).

Any sums due the Owner from the Operator accruing prior to the date of termination shall be deducted from the amount to be paid to the Operator under this Contract.

(2) If the Owner completes the Project Facility pursuant to GC Section 11.2.3(4), the cost of completing the Project Facility by the Owner shall be determined, and, if the sum that the Operator is entitled to be paid, pursuant to GC Section 11.2.4(1), plus the reasonable costs incurred by the Owner in completing the Project Facility, exceeds the Contract Price, the Operator shall be liable for such excess as follows;

(a) If such excess is greater than the sums due the Operator under GC Section 11.2.4(1), the Operator shall pay the balance to the Owner; or

[10]"Parties" refers to participants in the procurement process (including public officials) attempting to establish bid prices at artificial, non competitive levels.

[11]"Party" refers to aparticipant in the procurement process or contract execution.

(b) if such excess is less than the sums due the Operator under GC Section 11.2.4(1), the Owner shall pay the balance to the Operator.

(3) The Parties shall agree in writing on the computation described in GC Section 11.2.4(2) and the manner in which any sums shall be paid.

10.2.5. Termination by Operator

(1) If,

(a) The Owner has,

(i) Failed to pay the Operator any sum due under the Contract within the specified period, has failed to approve any invoice or supporting documents without just cause pursuant to the corresponding Terms and Procedures of Payment Schedule, or commits a substantial breach of the Contract, the Operator may give a notice to the Owner that requires payment of such sum, with interest thereon as stipulated in GC Section 5.2(3), requires approval of such invoice or supporting documents, or specifies the breach and requires the Owner to remedy the same, as the case may be; and

(ii) Failed to pay such sum together with such interest, failed to approve such invoice or supporting documents or give its reasons for withholding such approval, failed to remedy the breach or take steps to remedy the breach no later than 14 days after receipt of the Operator's notice; or

(b) The Operator is unable to carry out any of its obligations under the Contract for any reason attributable to the Owner, including the Owner's failure to provide possession of or access to the Site or other areas,

then the Operator may give a notice to the Owner thereof, and if the Owner has failed to pay the outstanding sum, to approve the invoice or supporting documents, to give its reasons for withholding such approval, or to remedy the breach no later than 30 days after receipt of such notice, or if the Operator is still unable to carry out any of its obligations under the Contract for any reason attributable to the Owner no later than 30 days after receipt of the notice, the Operator may, by a further notice to the Owner referring to this GC Section 11.2.5(1), forthwith terminate the Contract.

(2) The Operator may terminate the Contract forthwith by giving a notice to the Owner to that effect, referring to this GC Section 11.2.5(2),

(a) If the Owner becomes bankrupt or insolvent;

(b) Has a receiving order issued against it, or compounds with its creditors;

(c) Being a corporation, if a resolution is passed or order is made for its winding up, other than a voluntary liquidation for the purposes of amalgamation or reconstruction; or

(d) A receiver is appointed over any part of its undertaking or assets, or if the Owner takes or suffers any other analogous action in consequence of debt.

(3) If the Contract is terminated under GC Section 11.2.5(1) or 11.2.5(2), then,

(a) The Operator shall immediately,

(i) Cease all further work, except for such work as may be necessary for the purpose of protecting that part of the Site and Project Facility already executed, or any work required to leave the Site in a clean and safe condition; and

(ii) Terminate all Subcontracts; and

(b) The Operator, subject to the payment specified in GC Section 11.2.6, shall

(i) Deliver to the Owner the parts of the Project Facility executed by the Operator up to the date of termination; and

(ii) Deliver to the Owner all Contract Records, including the Design-Build Documents, in existence as of the date of termination.

(4) Termination by the Operator pursuant to this GC Section 11.2.5 is without prejudice to any other rights or remedies of the Operator that may be exercised in lieu of or in addition to rights conferred by this GC Section 11.2.5.

10.2.6. Payment upon Termination by Operator

If the Contract is terminated under GC Sections 11.2.5(1) or 11.2.5(2), the Owner shall pay to the Operator all payments specified in GC Section 11.2.2(1), and reasonable compensation for all loss, except for loss of profit, or damage sustained by the Operator arising out of, in connection with or in consequence of such termination.

10.2.7. General Provisions - Termination

(1) In this GC Section 11.2, the expression "Project Facility executed" shall include all work executed, Services provided, and all Plant and Equipment acquired, or subject to a legally binding obligation to purchase by the Operator and used or intended to be used for the purpose of the performing the Services, up to and including the date of termination.

(2) In this GC Section 11.2, in calculating any monies due from the Owner to the Operator, account shall be taken of,

(a) Any sum previously paid by the Owner to the Operator under the Contract, including any advance payment paid pursuant to the Terms and Procedures of Payment Schedule;

(b) Any sum owing by the Operator to the Owner under the Contract, including Liquidated Damages – Delay or liquidated damages calculated pursuant to GC Section 5.4.

Schedule 1
Special Conditions of Contract

FOR A CONTRACT

TO (I) DESIGN AND BUILD SEWAGE TREATMENT PLANT OF CAPACITY 60 MLDINCLUDING MAIN PUMPING STATION (97MLD)AND ALL APPURTENANT STRUCTURES AND ALLIED WORKS; (II) OPERATION & MAINTENANCE OF THE COMPLETE WORKS OF SEWAGE TREATMENT PLANT FOR A PERIOD OF 15 YEARS AT PAHARIIN PATNA

SPECIAL CONDITIONS OF CONTRACT

The following Special Conditions of Contract (SCC) shall supplement the General Conditions. Whenever there is a conflict, the provisions herein shall prevail over those in the General Conditions of Contract (GCC). The corresponding article and section numbers of the General Conditions are indicated in parentheses.

Article 1: Contract and interpretation

1. **Definitions (GC Section 1.1)** No change

2. **Clause 1.3.1 – Language**

The language shall be "**English"**

3. **Clause 1.3.14 – Survival of Obligations**

Upon termination or expiration of the Contract, the following rights and obligations of the Parties survive:

(a) Such rights and obligations as may have accrued or to which the Parties may be entitled on the date of termination, and any rights which a Party may have under Applicable Law;

(b) On termination or expiration of the contract, the rights and obligations of the parties towards settlement of disputes through arbitration in the form of an arbitration clause / agreement.

(c) The Operator's obligations with respect to Contract Records, accounting and auditing set out in GC Section 1.8;

(d) The Operator's obligations with respect to Transition Assistance set out in GC Section 2.4.2;

(e) The Parties' rights and obligations with respect to copyright set out in GC Section 6.1;

(f) The Operator's obligations of confidentiality as set out in GC Section 6.2;

(g) The Parties' rights and obligations with respect to defect liability set out in GC Section 9.1; and

(h) The Parties' rights and obligations with respect to indemnification set out in GC Section 9.5.

4. **Clause 1.4 – Notice**

All notices to the relevant party shall be sent to the following address:

a. Operator

_____

_____

b. Owner

The Managing Director,

Bihar Urban Infrastructure Development Corporation Limited,

SFC Building, 2nd floor, Daroga Rai Path

Road no-2, R- Block,

Patna 800001

5. Clause 1.5– Governing Law

The Applicable Law will be the Laws of India as well as the laws prevailing in the State of Bihar, India.

6. Clause 1.6.1 (4) - Adjudicator

The Adjudicator is: *[To be added at the time of signing of Contract]*

[Name, address, telephone and facsimile numbers]

The adjudicator shall be paid a fee @ INR10,000/- per day of effective hearing plus actual expenditure towards travel, transportation, lodging, and boarding. The fees and expenditure shall be shared equally by the Operator and the Owner.

7. Clause 1.6.1 (5)- Adjudicator

The authority to appoint new adjudicator shall be with **Chairman, Bihar State Centre, The Institution of Engineers (India), Patna**.

8. Clause 1.6.2 – Arbitration

All disputes arising in connection with this contract shall be finally settled under the arbitration rules of the United Nations Commission on International Trade Law (UNICITRAL) by one or more arbitrators appointed in accordance with the rules. However, if the contract is with the domestic Operator arbitration shall be conducted in accordance with the Arbitration & Conciliation Act 1996.

The place of arbitration shall be (i) the location from where the Contract has been issued if the contract is with a domestic Operator, or (ii) a neutral location if the contract is with a foreign Operator. The arbitration shall be conducted in the language for communications defined in GC Clause 1.3.1 [Language].

Article 2: Contract Term, Timing and Completion

9. Clause 2.1.2 (1) – Expiration of Contract

The Contract shall terminate 15 years after Operations Starting Date.

10. Clause 2.3.2 and Clause 2.3.6 (1) Time for Completion

The Time for completion of the Design – Build Services shall be 2.5 Years from the Effective Date.

11. Clause 2.3.6 (2) – Maximum Liquidated Damages – Delay

The Maximum Liquidated Damages – Delay shall be **10 %** of the Design-Build price of the Project.

12. Clause 2.3.6 (2) Delay in Completion - Liquidated Damages

The Operator shall be liable to pay Liquidated Damages to the Owner in accordance with GCC clause 2.3.6 (2) if the Operator fails to achieve the contracted activities for ensuring completion of the works as follows.

S.N	Activity/Milestone	Target Completion Time	Liquidated damages per day for delay in completion of activity/Milestone
1	Completion of works of 10% of Contract value of Design Build Services stipulated in the signed contract	5 months	INR 50,000/-
2	Completion of works of 20% (cumulative) of Contract value of Design Build Services stipulated in the signed contract	10. months	INR 1,00,000/-
3	Completion of works of 40% (cumulative) of Contract value of Design Build Services stipulated in the signed contract	15. months	INR2,00,000/-
4	Completion of works of 60% (cumulative) of Contract value of Design Build Services stipulated in the signed contract	20. months	INR3,00,000/-
5	Completion of works of 75% (cumulative) of Contract value of Design Build Services stipulated in the signed contract	25. months	INR 3,75,000/-
6	Completion of works of contracted Design-Build Services in all respects	30. months	0.05 % (Zero point zero five Percent) of the Value of the Design Build Services stipulated in the signed contract for each day of delay beyond the Completion Time.

Note

1. The value of works stipulated in column 2 of the table above excludes the value of materials intended for the works but not used or incorporated in the works.
2. The target time for completion stipulated in column3 will be subject to revision, if justified, in the event of extension of time for completion agreed under GCC clause 2.3.4.

Liquidated Damages recovered on account of delay in completion of an activity/activities listed in serial number 1 to 5 of the table above, will qualify for refund to the Operator, if the contracted works of the design-build services part of the contract are completed in all

respects within the stipulated period or the revised completion period if so agreed to by the parties in accordance GCC clause 2.3.4.

13. Clause 2.3.6 (5)

This sub-paragraph is deleted.

Article 4: Obligations of the Owner

14. Clause 4.2 – Access to the Site and Project Facility

Delete the existing clause and replace it with the following clauses:

(1) The Owner shall be responsible for acquiring and providing legal and physical possession land as per requirement indicated by the Operator in his bid (as incorporated in Schedule 5 of the Contract), subject to a ceiling of approximately 5.88 Hectare for setting up the STP facility and allied works at the site of proposed STP and infrastructure required to be built for reuse of treated effluent from STPand shall provide access thereto and all other areas reasonably required for the proper execution of the contract including all rights of way.

(2) The Owner shall be responsible for acquiring and providing legal and physical access to land at Baria Village located at a distance of 5 km approximately from the STP site, for disposal of treated Sludge and providing legal and physical access to Badshahi Nala located at a distance of 1.75 Km from the STP site for disposal and reuse arrangement of treated Wastewater.

(3) The Owner shall provide the operator free of charge full possession and access of the above mentioned sites and right of way for the Project Facility only during the Contract Term.

(4) The Operator shall complete the work on the sites handed over to him from time to time within in the specified time, as and when so instructed by the Design-Build-Operations Engineer or advised by the Owner, so as to minimize the inconvenience to the households and the public over prolonged durations of time.

Article 5: Contract Price and Payment

15. Clause 5.1(3)– Contract Price

(a) Price Adjustment for Design Build Price

The prices for the Design Build works and services shall be subject to price adjustment during the performance of the contract. If price adjustment is applicable, details stipulated in Schedule 8 shall apply.

(b) Price Adjustment for O&M Price

Price adjustment for the O&M price payable during the O&M period will be determined in accordance with Schedule 6.

16. Clause 5.2 – Terms of Payment

Provisions in Clause 5.2 (1), (3) and (4) shall be replaced with the following clauses:

(1) The Contract Price shall be paid in accordance with the provisions in Schedule 5 – Operator's Price Schedule and Schedule 6 – Terms and procedures of Payment of the Contract.

(3) In the event that the Owner fails to make any payment by its respective due date or within the period of 60 days from the date of submission of monthly statement of claim submitted in accordance with Schedule 6, the Owner shall pay to the Operator interest on the amount of such delayed payment at the rate of **8 %** annually for the period of delay until payment has been made in full.

(4) Payments shall be made in Indian Rupees only.

17. Performance Incentive Compensation

This clause is deleted.

18. Clause 5.4 – Liquidated Damages - Operations

The Operator shall pay to the Owner liquidated damages for failure to meet Performance Standards as set out in the Liquidated Damages – Operations Schedule, i.e. Schedule 7 of the Contract.

19. Clause 5.5.1 (2) (a) and 5.5.1 (4) – Performance Security

The Operator shall provide a Performance Security of 9 % (Nine Percent) and ESHS Performance Security of 1% (One Percent) of the total Contract Price, i.e. Design-Build price plus total O&M Price for the O&M period of 15 years.For this purpose, the Total Contract Price shall be determined as under on the basis of Operator's Bid Prices quoted in various Parts of the Price Schedule and incorporated in Schedule 5 of the Contract:

Total Contract Price = Design Build Price for STP as per Part A + Total O & M Price for STP for 15 years period as per Parts B & C, assuming indicative sewage flow rate reaching the STP during respective years of the O&M period as indicated in Appendix to Bid (Indicative Flow)

5.5.1 (4)

In the event that the Operator is unable to obtain from its bank, Performance Securities valid until 180 days after the End Date or any extension to the End Date, it shall furnish to the Owner an explanation for the same. If the Owner is satisfied with such explanation, Operator will be allowed to submit Performance Securities valid initially until 180 days beyond the Time for Completion of the Design-Build Services stipulated in SCC 10 (in reference to GCC 2.3.2) subject to the condition that the Performance Securities shall be renewed from time to time, in the manner specified in the following paragraph, so as to be valid until 180 days after the End Date (i.e. completion of the O&M period of 15 years) or any extension to the End Date.

It shall be the responsibility of the Operator to furnish extension of the Performance Securities from time to time 120 days prior to the expiry of the current Performance Securities.

In case the renewed Performance Securities are not received by the Owner at least 60 days prior to the expiry date of the current Performance Securities, the Owner will be entitled to take measures for enforcement/forfeiture of the Performance Securities without any further notice to the Operator.

20. Clause 5.5.2 (2) – Advance Payment Security

Provisions in Clause 5.5.2 (2) shall be replaced with the following clause

(2) The Mobilization Advance paid to the Operator by the Owner shall be recovered commencing from the date on which the payment to the Operator has reached **20%** of the value of Design, Build and Commissioning Services and shall be recovered at the rate of **15%** from each bill submitted by the Operator for the payment. The entire amount of mobilization advance shall be recovered latest by the time **90%** of the value of Design Build and Commissioning services has been claimed by the Operator.

Article 7: Contract administration and supervision during the Design-Build and Operations Periods

21. Clause 7.2 - Design-Build Supervision

Provisions in Clause 7.2 shall be replaced with the following clauses.

7.2.1 Supervision during the Design-Build Period

GC Section 7.2 shall apply during the Design-Build Period and Operations Period and immediately after the End date solely for the purpose of resolving transition issues and any outstanding issues arising during the Operations Period.

7.2.2 Design-Build-Operations Engineer's Duties and Authority (Design-Build and Operations Period)

(1) The Owner shall appoint the Design-Build-Operations Engineer who shall be responsible for day to day contract management and supervision during the Design-Build Period and the Operations Period. The Design-Build-Operations Engineer's staff shall include suitably qualified engineers and other professionals who are competent to carry out these duties.

(2) The Design-Build-Operations Engineer shall have no authority to amend the Contract.

(3) Except, as specifically provided otherwise in the Contract, the Design-Build-Operations Engineer may exercise the authority attributable to the Design-Build-Operations Engineer as specified in or necessarily to be implied from the Contract. The Owner undertakes not to impose further constraints on the Design-Build-Operations Engineer's authority, except as agreed with the Operator.

(4) The Design-Build-Operations Engineer is obligated to obtain the approval of the Ownerfor matters specified in the sub-clause 7.22 (5) (d) of the SCC. If the Design-Build-Operations Engineer exercises a specified authority for which the Owner's approval is required then, for the purposes of the Contract, the Owner shall be deemed to have given approval.

(5) Except as otherwise stated in the Contract,

(a) if the Design-Build-Operations Engineer carries out duties or exercises authority, specified in or implied by the Contract, the Design-Build-Operations Engineer shall be deemed to act for the Owner;

(b) the Design-Build-Operations Engineer has no authority to relieve any Party of any duties, obligations or responsibilities under the Contract; and

(c) any approval, check, certificate, consent, examination, inspection, instruction, notice, proposal, request, test or similar act by the Design-Build-Operations Engineer, including absence of disapproval, shall not relieve the Operator from any responsibility it has under the Contract, including responsibility for errors, omissions, discrepancies and non-compliances.

(d) The Design Build **Operations** Engineer shall obtain the approval of the Owner before exercising its authority in the following circumstances:

(a) approving assignment of the Contract, or any part thereof;
(b) determining an extension of the Time for Completion;
(c) certifying additional costs determined under GCC 1.9(8)(b); and
(d) issuing a Change Order, except:
a. in an emergency situation, as reasonably determined by the Design-Build-Operations Engineer; or
b. if such Change Order would increase the Contract Price by less than 1%.

7.2.3 Delegation by the Design-Build-Operations Engineer

(1) The Design-Build-Operations Engineer may from time to time assign duties and delegate authority to assistants, and may also revoke such assignment or delegation. These assistants may include a resident engineer, or independent inspectors appointed to inspect or test items of Plant or Equipment. The assignment, delegation or revocation shall be in writing and shall not take effect until copies have been received by both Parties. Unless otherwise agreed by both Parties, the Design-Build-Operations Engineer shall not delegate the authority to determine any matter in accordance with GC Section 7.2.6.

(2) Assistants shall be suitably qualified persons, who are competent to carry out these duties and exercise this authority, and who are fluent in the language for communications defined in GC Section 1.3.1.

(3) Each assistant, to whom duties have been assigned or authority has been delegated, shall only be authorized to issue instructions to the Operator to the extent defined by the delegation. Any approval, check, certificate, consent, examination, inspection, instruction, notice, proposal, request, test, or similar act by an assistant, in accordance with the delegation, shall have the same effect as though the act had been an act of the Design-Build-Operations Engineer. However,

(a) any failure to disapprove any work or Plant and Equipment shall not constitute approval, and shall therefore not prejudice the right of the Design-Build-Operations Engineer to reject the work or the Plant and Equipment; and

(b) if the Operator questions any determination or instruction of an assistant, the Operator may refer the matter to the Design-Build-Operations Engineer, who shall promptly confirm, reverse or vary the determination or instruction.

7.2.4 Instructions of the Design-Build-Operations Engineer

(1) The Design-Build-Operations Engineer may issue to the Operator, at any time during the Design-Build Period, instructions which may be necessary for the execution of the Design-Build Services and the remedying of any defects, all in accordance with the Contract. The Operator shall only take instructions from the Design-Build-Operations Engineer, or from an assistant to whom the appropriate authority has been delegated under GC Section 7.2.3. If an instruction constitutes a Change, GC Section 10.1 shall apply.

(2) The Operator shall comply with the instructions given by the Design-Build-Operations Engineer or delegated assistant, on any matter related to the Contract. These instructions shall be given in writing.

7.2.5 Replacement of the Design-Build-Operations Engineer

If the Owner intends to replace the Design-Build-Operations Engineer, the Owner shall, not less than 42 days before the intended date of replacement, give notice to the Operator of the name, address and relevant experience of the intended replacement Design-Build-Operations Engineer. The Ownershall not replace the Design-Build-Operations Engineer with a person against whom the Operator raises reasonable objection by notice to the Owner, with supporting particulars.

7.2.6 Determinations by the Design-Build-Operations Engineer

(1) Whenever the Contract provides that the Design-Build-Operations Engineer shall proceed in accordance with this GC Section 7.2.6 to agree or determine any matter, the Design-Build-Operations Engineer shall consult with each Party in an endeavour to reach agreement. If agreement is not achieved, the Design-Build-Operations Engineer shall make a fair determination in accordance with the Contract, taking due regard of all relevant circumstances.

(2) The Design-Build-Operations Engineer shall give notice to the Parties of each agreement or determination, with supporting particulars. Each Party shall give effect to each agreement or determination unless and until revised under GC Section 1.9.

22. Clause 7.3 Operations Supervision

This clause stands deleted

Article 8: Representatives Staff and Sub-contracting

23. Clause 8.1.2 (1) Operator's Representative

The Operator's Representative is: _____

24. Clause 8.1 Existing Staff

The Operator is not obliged to retain staff employed by the Owner.

25. Clause 8.3 Operator's Personnel

The Operator's Key Staff employed during the design build services shall have the expertise and qualifications specified in the Table below.

S.No	Staff	No	Minimum Qualifications
1	Project	1	A Graduate in Civil Engineer with not

	Manager		less than 10 years' experience in construction of Sewage Treatment Plants.
2	Civil Engineer	2	A Civil Engineer (Graduate Engineer) with not less thaneightyears' experience in construction of similar engineering works or Diploma in Civil Engineer with 10 years' experience
3	Electro Mechanical Engineer	1	A Electro /Mechanical Engineer (Graduate Engineer) with not less than 8 years' experience in construction of similar engineering works or Diploma in Electro/ Mechanical Engineering with 10 years' experience
5	Environmental Engineer	1	Graduate Degree in civil Engineering / environmental Science / environmental planning with total 5 years' experience of which minimum 3 years' experience in environmental management works of urban infrastructure projects.
6	Health and Safety Engineer	1	Graduate in any field with specialised qualification in Occupational Health and safety (OHS) with total 5 years' of experience of which 3 years' in management of OHS works in infrastructure projects.
7	Social Expert	1	Degree in Social Science / Sociology / Social Work / Anthropology / Planning with total 5 years' experience of which 3 years in management of social safeguard activities in infrastructure projects.
8	Civil Supervisors	3	Diploma in Civil Engineering with minimum 2 years' experience in Construction of Civil Engineering works

26. Clause 8.6 (1) Maximum Percentage of Sub contracting

Sub-contracting shall not exceed **25%** percent. However, the nominated Sub-contractor whose experience and qualification have been claimed for meeting the qualification criteria in

accordance with stipulations in Annexure A - part h shall be excluded while applying the ceiling of 25 %.

Article 9: Liability and Risk Distribution

27. Clause 9.1 Defect Liability Period

Clause 9.1 is hereby deleted. The Operator shall be responsible for the repair and maintenance of the STP, and other facilities at his own cost during the O&M period of 15 years as stipulated in Schedule 3 – Operation and Maintenance Services Schedule.

28. Clause 9.6 - Insurance

Delete the existing clause and replace it with the following clause:

In this Clause, "insuring Party" means, for each type of insurance, the Party responsible for effecting and maintaining the insurance specified in the relevant Sub-Clause. Wherever the Operator is the insuring Party, eachinsurance shall be affected with insurers and in terms approved by the Owner. These terms shall be consistent with any terms agreed by both Parties before the date of the Letter of Acceptance. This agreement of terms shall take precedence over the provisions of this Clause.

Wherever the Owner is the insuring Party, each insurance shall be affected with insurers and in terms consistent with the details contained under this contract. If a policy is required to indemnify joint insured, the cover shall apply separately to each insured as though a separate policy had been issued for each of the joint insured. If a policy indemnifies additional joint insured, namely in addition to the insured specified in this Clause, (i) the Operator shall act under the policy on behalf of these additional joint insured except that the Owner shall act for Owner's Personnel, (ii) additional joint insured shall not be entitled to receive payments directly from the insurer or to have any other direct dealings with the insurer, and (iii) the insuring Party shall require all additional joint insured to comply with the conditions stipulated in the policy.

Each policy insuring against loss or damage shall provide for payments to be made in the currencies required to rectify the loss or damage. Payments received from insurers shall be used for the rectification of the loss or damage.

The relevant insuring Party shall, within28 days from the Effective Date submit to the other Party:

a) evidence that the insurances described in this Clause have been effected, and

b) copies of the policies for the insurances described in Sub-Clause 9.6.2 (Insurance for works and Operator's Equipment) and Sub-Clause 9.6.3 (Insurance against Injury to Persons and Damage to Property).

When each premium is paid, the insuring Party shall submit evidence of payment to the other Party. Whenever evidence or policies are submitted, the insuring Party shall also give notice to the Design Build Operations Engineer.

Each Party shall comply with the conditions stipulated in each of the insurance policies. The insuring Party shall keep the insurers informed of any relevant changes to the execution of the Project and ensure that insurancea is maintained in accordance with this Clause. Neither Party

shall make any material alteration to the terms of any insurance without the prior approval of the other Party. If an insurer makes (or attempts to make) any alteration, the Party first notified by the insurer shall promptly give notice to the other Party.

If the insuring Party fails to effect and keep in force any of the insurances it is required to effect and maintain under the Contract, or fails to provide satisfactory evidence and copies of policies in accordance with this Sub-Clause, the other Party may (at its option and without prejudice to any other right or remedy) effect insurance for the relevant coverage and pay the premiums due. The insuring Party shall pay the amount of these premiums to the other Party, and the Contract Price shall be adjusted accordingly.

Nothing in this Clause limits the obligations, liabilities or responsibilities of the Operator or the Owner, under the other terms of the Contract or otherwise. Any amounts not insured or not recovered from the insurers shall be borne by the Operator and/or the Owner in accordance with these obligations, liabilities or responsibilities. However, if the insuring Party fails to effect and keep in force an insurance which is available and which it is required to effect and maintain under the Contract, and the other Party neither approves the omission nor effects insurance for the coverage relevant to this default, any moneys which should have been recoverable under this insurance shall be paid by the insuring Party.

Payments by one Party to the other Party shall be subject to the provisions of GCC & SCC as contained in this contract as applicable. The Operator shall be entitled to place all insurance relating to the Contract (including, but not limited to the insurance referred to Clause 9.6) with insurers from any eligible source country.

9.6(2) Insurance for Works and Operator's Equipment

The insuring Party shall insure the Works, Plant, Materials and Operator's Documents for not less than the full reinstatement cost including the costs of demolition, removal of debris and professional fees and profit. This insurance shall be effective from the date by which the evidence is to be submitted under sub-paragraph (a) of Sub-Clause 9.6.1 (General Requirements for Insurances), until the End Date.

The insuring Party shall maintain this insurance to provide cover until the End Date, for loss or damage for which the Operator is liable arising from a cause occurring prior to the End Date, and for loss or damage caused by the Operator in the course of any other operations.

The insuring Party shall insure the Operator's Equipment for not less than the full replacement value, including delivery to Site. For each item of Operator's Equipment, the insurance shall be effective while it is being transported to the Site and until it is no longer required as Operator's Equipment.

Unless otherwise stated in the Particular Conditions, insurances under this Sub-Clause:

a) shall be effected and maintained by the Operator as insuring Party,

b) shall be in the joint names of the Parties, who shall be jointly entitled to receive payments from the insurers, payments being held or allocated between the Parties for the sole purpose of rectifying the loss or damage,

c) shall cover all loss and damage from any cause not listed in the GCC / SCC of this contract.

d) shall also cover loss or damage to a part of the Projects which is attributable to the use or occupation by the Owner of another part of the Works, and loss or damage from the Owner's risks listed in the GCC / SCC excluding (in each case) risks which are not insurable at commercially reasonable terms, with deductibles per occurrence of not more than the amount stated in the Contract Data (if an amount is not so stated, this sub-paragraph (d) shall not apply), and

e) may however exclude loss of, damage to, and reinstatement of: (i) a part of the Works which is in a defective condition due to a defect in its design, materials or workmanship (but cover shall include any other parts which are lost or damaged as a direct result of this defective condition and not as described in sub-paragraph (ii) below), (ii) a part of the Works which is lost or damaged in order to reinstate any other part of the Works if this other part is in a defective condition due to a defect in its design, materials or workmanship, (iii) a part of the Works which has been taken over by the Owner, except to the extent that the Operator is liable for the loss or damage, and (iv) Goods while they are not in the Country, subject to the provisions of GCC / SCC contained in this contract as applicable.

If, more than one year after the Base Date, the cover described in sub-paragraph (d) above ceases to be available at commercially reasonable terms, the Operator shall (as insuring Party) give notice to the Owner, with supporting particulars. The Owner shall then (i) be entitled subject to provisions of GCC / SCC contained in this contract as applicable. to payment of an amount equivalent to such commercially reasonable terms as the Operator should have expected to have paid for such cover, and (ii) be deemed, unless he obtains the cover at commercially reasonable terms, to have approved the omission under Sub-Clause 9.6.1 [General Requirements for Insurances].

9.6.(3) Insurance against Injury to Persons and Damage to Property

The insuring Party shall insure against each Party's liability for any loss, damage, death or bodily injury which may occur to any physical property {except things insured under Clause 9.6.(2) [Insurance for Works and Operator's Equipment]} or to any person {except persons insured under Sub-Clause 9.6.(2) [Insurance for Operator's Personnel]}, which may arise out of the Operator's performance of the Contract and occurring before the issue of the Performance Certificate.

The Insurance cover under this clause shall be as under and to be borne by the Operator:

1. Loss of human life – INR2.4 million or equivalent amount in convertible currency and to be recouped as and when it is used.
2. Permanent Disability of human beings –INR 2.4million or equivalent amount in convertible currency and to be recouped as and when it is used..
3. Human Body Injury not resulting into permanent disability -Rs. 0.1million or equivalent amount in convertible currency and to be recouped as and when it is used.

Unless otherwise stated in the Particular Conditions, the insurances specified in this Sub-Clause:

a) shall be effected and maintained by the Operator as insuring Party,

b) shall be in the joint names of the Parties,

c) shall be extended to cover liability for all loss and damage to the Owner's property (except things insured under Sub-Clause 18.2) arising out of the Operator's performance of the Contract, and

d) may however exclude liability to the extent that it arises from:

i. the Owner's right to have the Project executed on, over, under, in or through any land, and to occupy this land for the Project,

ii. damage which is an unavoidable result of the Operator's obligations to execute the Works and remedy any defects, and

iii. a cause listed as Owner's Risks as contained in GCC / SCC, except to the extent that cover is available at commercially reasonable terms.

9.6. (4) Insurance for Operator's Personnel

The Operator shall effect and maintain insurance against liability for claims, damages, losses and expenses (including legal fees and expenses) arising from injury, sickness, disease or death of any person employed by the Operator or any other of the Operator's Personnel. The Owner and the Design Build Operate Engineer shall also be indemnified under the policy of insurance, except that this insurance may exclude losses and claims to the extent that they arise from any act or neglect of the Owner or of the Owner's Personnel.

The insurance shall be maintained in full force and effect during the whole time that these personnel are assisting in the execution of the Works. For Sub-contractor's employees, the insurance may be affected by the Sub-contractors, but the Operator shall be responsible for compliance with this Clause

Article 10: Change in Contract Elements

29. Clause 10.2 - Change to Operations Services

(a) GCC sub-clause 10.2 (1) is amended to read as under:

"Except as specifically provided in Schedule 6 of the Contract (Terms and Procedure of Payment) or elsewhere in the Contract, the Operator shall make no claim whatsoever for any adjustment to the Contract Price during the Operations Period."

(b) GCC sub-clause 10.2 (2) and 10.2 (3) shall stand deleted.

Schedule 2

Design Build Services Schedule (DBSS)

For A Contract

TO (i) DESIGN AND BUILD SEWAGE TREATMENT PLANTOF CAPACITY 60 MLD INCLUDING MAIN PUMPING STATION (97MLD) **AND ALL APPURTENANT STRUCTURES AND ALLIED WORKS; (ii) OPERATION & MAINTENANCE OF THE COMPLETE WORKS OF SEWAGE TREATMENT PLANTFOR A PERIOD OF 15 YEARS AT PAHARI IN PATNA STATE OFBIHAR, INDIA.**

ARTICLE 11. General

11.1. Description of Design-Build Services:

For STP

The Operator shall carry out and be responsible for the Design and construction of the STP and all allied appurtenant structures. The Operator's work and services as part of the "Design-Build Services" shall cover all necessary or desirable services / activities for the Design and construction of the STP and all allied works in accordance with and as contemplated by the Design-Build Documents and the Technical Standards including,

a. the Design services in respect of the STP, reuse infrastructure, electricity generation by photovoltaic cell and all allied works including treatment process, hydraulic, structural, electrical, instrumentation, mechanical and piping Design, and all civil, mechanical, electrical and piping drawing including architectural & construction drawings and environmental assessment with necessary mitigation measures, as set out in DBSS.

b. Demolition of existing units in a planned and phased manner so that one unit of existing STP continues to be in operation till one unit of new STP is ready to take over the incoming flow

c. the building and construction work and services in respect of the STP and all allied works as set out in DBSS;

11.2. Supplementing the General Conditions

The provisions contained in this Design-Build Services Schedule are to be read in conjunction with the General Conditions of Contract and Special Conditions of Contract as contained in this bid document for the purpose of providing greater specificity of the Design-Build Services that the Operator shall perform.

ARTICLE 12. DESIGN SERVICES

For STP

12.1. General

12.1.1. Design and Engineering

a. The Operator shall execute the basic and detailed Design of STP, infrastructure required for reuse of treated water and allied structures and its execution in compliance with the technical specifications and requirements contained in the contract, codes of practices as published by the Bureau of Indian Standard (BIS) or its equivalent standard as well as the latest version of "Manual on Sewerage and Sewage Treatment" as published by the Central PublicHealth Engineering Organization (CPHEEO) of the Ministry of Urban Development, Government of India. Wherever, the codes, standards and manual do not provide for the Design and execution of some component i.e. required to be Designed and executed, the operator shall follow the standard engineering practices as approved by Design-Build-Operations Engineer.The indicative influent parameters to be considered for design shall be as mentioned below for domestic sewage.

Sr. No.	**Parameter**	Concentration Range
	PH value	7 – 7.5
	BOD (5 days at 20°C), mg/L	180 - 250
	COD, mg/L	325 - 450
	Total suspended solids, mg/L	300 - 400
	VSS mg/L	225 - 300
	Total Nitrogen, mg/L	40 - 60
	Organic Nitrogen, mg/L	10 - 15
	Amonia Nitrogen, mg/L	27 - 37
	Nitrate Nitrogen, mg/L	3 - 6
	Total Phosphorus , mg/l	5 - 8
	Ortho Phosphorus , mg/l	4 - 6

b.

12.1.2. Proposed treatment scheme

The treatment scheme shall include facilities (complete in all respects) for receiving sewage, screening, degritting, any proven treatment unit, flow measurement, disinfection, infrastructure for reuse and sludge management. Provision of exact components shall depend on the proposed technology. In addition, the following units shall be provided:

i. Electrical substation

ii. Adequate lighting to all the units.

iii. Fire-fighting equipment as per state Government department of Fire services

iv. Environmental, Social, Health and Safety Plan (ESHS) management Planmust plan must be incorporated for the management of all staff and activities undertaken in construction and O&M of the STP.

v. Provisions for power generation units(if power generation is found feasible), engine rooms with gas engines and accessories.

12.1.3. The following general rules shall be followed in arranging the Plant:

i. Minimum clear distance of 6 m shall be allowed between adjacent units of treatment or fixed structures to permit safe and convenient access for operation and maintenance;

ii. Open area with necessary pavement, adjacent to all mechanical Plant shall be provided as a maintenance lay down area;

iii. Fixed runways, lifting eyes or other means shall be provided to permit the removal of Plant equipment that may logically be required to be removed during the course of its normal operational life for maintenance or any other purpose;

iv. Areas where leakage is likely to occur whether in normal use or during maintenance, shall be provided with covered drainage channels which shall direct the spillage either to a suitable drain or to a sump from where it can be pumped;

v. Provided acoustic coverings where necessary to limit the noise produced during normal operation to the limits detailed in these documents;

vi. Plant shall be arranged and the building designed to permit convenient maintenance and removal of equipment whenever deemed necessary;

vii. Management of environmental impacts during construction and installation/erection works and O&M shall be carried out as per the Environmental Management Plan provided in *Appendix 1* of Schedule 2 (Design Build Services), recommendations of Environmental and Social Impact Assessment Report of theproject (shared as part of the information to the bidders), ESHS implementation plan in line with the ESHS code of Practice submitted.

viii. Provide adequate supports and restraints for process piping, valves and appurtenances.

ix. Connect pipework to equipment with flexible connections or make other provisions to avoid transfer of pipe loads to devices.

x. All electro mechanical equipment, electronic instrumentation and Air conditioning facilities shall be designed to withstand the corrosive environment that will be prevailing in the STP.

xi. All sluice gates, valves, piping, Screens, degritting equipment, aerators and air piping, sludge handling equipment, etc., which will be submerged in or in contact with sewage or sludge and stairs or ladders and hand railings for access and platforms and walkways shall be designed with Corrosive resistant material.

xii. Chemical piping for supply and feed of approved chemicals and polymer shall be of corrosion resistant material and shall be secured to racks or trays to be fixed to duct walls or walls of tanks and buildings as necessary. The method of securing the pipes to the racks and / or trays shall be by clips or similar devices and shall be of corrosion – resistant material facilitating ease of

xiii. removal in such a way that individual runs can be changed without dismantling adjacent pipes.

xiv. All chemical piping shall be colour banded and suitably labelled to enable individual lines to be identified throughout their run.

xv. Particular attention shall be paid to the layout of the chemical piping, which shall be functional and neat in appearance. Generally, where pipework is installed in ducts, it shall be supported not less than 150 mm clear of the floor.

xvi. Where materials subject to UV degradation are employed, they shall be shielded from direct sunlight.

xvii. Provide necessary platforms and walkways at all levels for operation of valves, gates and

xviii. mechanical equipment with stairs or ladders and hand railings for access.

xix. Human contact with the sewage or sludge during O&M of STP shall be strictly avoided

12.1.4. Provision of Modular Construction for Sewage Treatment Plants

All the treatment units shall be designed and constructed for their respective flows / capacities mentioned in these technical specifications and shall be constructed in suitable modular or treatment train capacities. The minimum number of modules or treatment trains and the minimum number of each unit process component required shall be provided to facilitate O&M.Wherever no modular approach and stand by equipment is being proposed, the Operator will provide proper justification and certify that the proposed system will fulfill effluent design standards and other safeguards in all possible flow fluctuations.

It shall also be ensured that at least one stabilisation pond main pumping station, pre treatment units, and office building of the existing treatment plant shall be available to continuously receive and treat the sewage of Pahari zone of Patna during the construction of the new treatment plant. At no point of time either during construction or operation phase, the sewage shall be left untreated into the river.

12.1.5. Receiving of Sewage

Raw Sewage will be delivered through 1600 mm dia with invert level of 43.289 m at the ground level of 48.515 m. into a Receiving Chamber to be constructed in this contract and from where it will be taken into downstream screens. Receiving Chamber shall be of adequate size to meet the working space requirements. The flow from the receiving chamber will lead to further units such as screening/ grit chamber/ secondary treatment unit etc. based on the technology and process flow being proposed by the bidder..

12.1.6. Flow Measurement:

All pumps shall be provided with flow meters and an ultrasonic flow transmitter shall also be provided in the common header of the raw sewage Pumps..

12.1.7. Disinfection:

The Treated Sewage from the Secondary treatment units will be disinfected using **U V Disinfection** technology. The treated and disinfected sewage is to be disposed into the water streamby suitable outfall arrangements.

12.1.8. Sludge Handing System – meet the relevant disposal standards:

Efforts shall be made to reduce the sludge volume to the extent possible in a cost-effective manner. Sludge should be stabilised before disposal. Human contact with sludge shall be avoided.

12.1.9. Design criteria:

a. The bidder/ Operator shall adopt the same nomenclature as mentioned in the bid document(to the extent possible) used for various treatment units in their design report.Wherever new/ proprietary terms are being used, they shall be explained in sufficient detail.

b. The STP shall be designed for60mld capacity. The land provided is for augmenting the capacity to the ultimate flow of 97mld. The General Arrangement Drawing (GAD) supported by hydraulic sizing calculation for ultimate flow of 97mld shall be provided. However the detailed design shall be furnished for only 60mld.

c. To the extent possible, the plant must be designed in modules so as to augment the capacity as and when the plant reaches its designed capacity. It is also informed that the expected sewage flows cannot be generated immediately after construction and that the sewage flows are likely to increase gradually and that the STP should be able to perform at the designed levels even with these low flows.

d. The process design of various units shall be done as per the norms prescribed in the CPHEEO Sewerage Manual (Latest Edition).If no guidelines are mandated by

CPHEEO for a certain component, the OPerator shall demonstrate that the guidelines being adopted are based on past successful experiences in similar situations and conform to best engineering practices.

e. The Designs and drawings as formulated by the operator shall be subject to approval by the owner or its authorized representative.

f. The Operator shall be responsible for any discrepancies, errors or omissions in the specifications, drawings and other technical documents, desired output / performance of the STP, whether specifications, drawings and other documents have been approved by the Owner or its representative or not, provided that such discrepancies, errors or omissions are not because of inaccurate information furnished in writing to the Operator by or on behalf of the Owner.

12.1.10. Codes and Standards

Wherever references are made in the Contract to codes and standards, in accordance with which the Contract shall be executed, the edition or the revised version of such codes and standards 30 days prior to the Submission Deadline shall apply unless otherwise specified.During Contract execution, any changes in such codes and standards shall be applied after approval by the Owner/Owner's Representative and shall be treated in accordance with GC Section 10.1.

12.1.11. Design Responsibilities

a. The Operator's Design and Design-related services shall include, but not limited to the following:

1. Siteinvestigationanddatacollectionincludinggeotechnical assessmentandsoilanalysis forthe Design and construction of the structuresrequired fortheSTP and allied works;
2. DELETED
3. Selection, adoption and detailed engineering Designs for the most appropriate techno economically feasible cost effective treatment process technology for the treatment of the sewage ensuring that the treated sewage meets with the stringent of the disposal standards prescribed by the MOEF / CPCB and in the contract as may be applicable.:

EFFLUENT DISCHARGED STANDARDS FOR SEWAGE TREATMENT PLANT

Sr. No.	**Parameters**	**Parameters** Limit (Standards)
1	**pH**	**6.5 – 9**
2	**BOD (mg/l)**	**Not more than 10**
3	**COD (mg/l)**	**Not more than 50**
4	**TSS (mg/l)**	**Not more than 20**

5	**NH4-N (mg/l)**	**Not more than 5**
6	**N-total (mg/l)**	**Not more than 10**
7	**Fecal Coliform (MPN/100m1)**	**Less than 100**

All units in mg/l unless specified;

AA – as arising when other parameters are satisfied

4. the acquisition of all data and information necessary to prepare the Design and that are required to demonstrate that the 60 MLD STP meets or exceeds the Technical Standards;

5. Preparation of Design development documents, based on the approved HFD /schematic Design documents accepted by the Owner, consisting of drawings and other documents appropriate to the size of the 60 MLD STP to describe the units and character of the entire proposed plant including architectural, mechanical, civil works, and electrical systems, materials, operations, landscaping, and such other elements as may be appropriate;

6. The preparation of Design-Build Documents setting forth in detail the requirements for construction based on the Design development documents accepted by the Owner;

7. Obtaining all approvals, permits, including building permits, and licenses for the Design-Build Services, necessary compliances with environmental management plan and ESHS Management requirements as specified in Appendix 1 of the Schedule 2 (Design Build services)except for those approvals, permits or licenses that the Owner is explicitly required to obtain itself under the Applicable Lawin which case the Operator shall prepare all documentation and provide assistance to the Owner in obtaining such approval, permits or licenses;

8. The conducting of general reviews of the progress of theDesign process, to the extentnecessary, in order to determine tothe Operator'ssatisfaction that the Design services are performed in compliance with the requirements of the Contract and Applicable Laws.

12.1.12. Design-Build Documents

a. The Operator shall prepare all the Design-Build Documents. The Design Build Documentsshallinclude the plans, Designs, drawings, as-builtdocuments, operations manuals, specifications, schematic Design documents, Design development documents, and all modifications thereto required in order to properly and fully test for, analyses for, plan, Design and build the STP and all allied works as contemplated in the Technical Standards and the remaining provisions of the Contract.

b. The Operator shall prepare any other document, as may be requested by the Design-Build-Operations Engineer, that the Owner considers necessary to monitor the progress of the Design-Build Services and assess the Operator's compliance with the Contract.

c. The Operator shall provide the Owner with three sets of all of the Design-Build Documents in reproducible form and shall modify them to keep them up-to-date as requested by the Owner acting in a professionally reasonable manner.The Design-Build Documents, with the exception of the as-built documents, shall be subject to the review and approval of the Owner prior to performing any of the services set out in DBSS in respect of any Design-Build Document.

d. When the Operator notifies the Owner in accordance with DBSS, the Operator shallprovide to the Owner one copy of the "as built Designs, Drawings/Documents" in reproducible form showing the exact as built locations, sizes and details of the STP.The STP shall not be considered to have reached Completion for the purposes of DBSS until such Design-Build Documents havebeen provided. The Operator shall update the as built Designs, Build Drawings/Documents asnecessary for the correction of defects or deficiencies contemplated by DBSS.

12.1.13. Design Considerations

In preparing the Design for the STP and allied works and the Design-Build Documents, the Operator shall,

a. Protect public health and safety, including by the means set out in DBSS

b. maximize the protection of the environment and minimize any adverse environmental impacts caused by the construction of STP throughout the Service Area and Country, including as may be required, recommended or advisable pursuant to any technical standard or environmental assessments conducted on, at or near the STP site and by the means set out in DBSS;

c. Consider the existing infrastructure and the Sewage Treatment Plant to be connected with the Trunk infrastructure.

d. The existing treatment plant at Pahari is proposed to be made defunct/ demolished after the construction of the new STP. However the operator shall ensure that till such time new STP or its module is operational the wastewater currently being received at the existing STP will continue getting the treatment as on date either by diverting the same to one of the existing lagoons or any other arrangement.. The operation of existing STP will rest with Bihar Rajya Jal Parishad till it is demolished.

e. Ensure the STP and allied works has the capacity to accommodate the anticipated sewage based upon the verifications prepared by the Operator pursuant to DBSS;

12.2. Design Responsibilities – On Site Issues

In preparing the Design for the STP and the Design-Build Documents, the Operator shall ensure that the Design,

a. makes adequate preparation and plans to ensure traffic movement and safety during the execution of work.

b. makes adequate preparation and plans and takes adequate measures for controlling access to the STP site by animals and humans and vehicular traffic at the perimeter of the site, including plans for plantings and vegetation, fencing, lockable gates at

vehicular access points, and the creation of an internal (perimeter access corridor inside or, with appropriate local and other approvals, surrounding the Site;

c. provides for allied works like control valves chambers, anchor /thrust /pedestal blocks, internal access roads within the site and proposed units within the STP site;

d. provides for all utility services required for all of the Services

e. provides utilities services at the STP site such as electricity, telephone, potable water, non- potable water and sewage collection and disposal.

12.3. Sewage Treatment Plant Layout and operation sequence

a. The Operator shall be responsible for the planning and Designing of the area of the Site for 97MLD STP, including,

b. Design and Construction of 60 MLD STP including MPS (97MLD**)** and all allied /ancillary works with an approach road to enter the facility and then carry out STP Operation & Maintenance for 15 years by way of other services. Operator shall verify these details as per site condition.

c. The STP shall comprise treatment process, as may be techno economically feasible and cost effective, leading to stringent of the effluent quality as prescribed by MoEF / CPCB/ NRCD/ contract as may be applicable.

d. The Operator shall have responsibility to dispose the treated sewage at the designated location under the Contract. The Operator shall have no right over the use of treated wastewater and sludge except for generation of power (if found feasible) from sludge for use in the STP.

e. On completion of the 15years O & M period, the operator shall have to handover the STP to the Owner in full working condition, with necessary replacements of the components towards the end of their economic life as suggested by the manufacturers / operations manuals etc.

f. Landscaping of plant area, internal roads with access to all units, illumination of the entire STP site, pathways, storm water drainage, store house for tools and spares, laboratory with water supply and waste water disposal arrangements, main road connecting to various units shall be of 7 m carriageway, wheras interlinking roads shall be 3.75m wide , O&M manual and as-built drawings for all civil, electrical & mechanical works. All units shall be provided with draining arrangements with suitable valves/gates with chambers.

g. Supply and providing safety equipment namely gas mask, breathing apparatus, Air hose respirator, portable lighting equipment, non-sparking lighting equipment, portable air blowers, safety belts, inhalators and diver suit at the commencement of O & M.

h. The operator shall train the Owner’s selected staff for on job training during the specified 6 months of O & M period. A Maximum of Fifteen (15) staff of Owner will be trained for a total period of 45 days during the last year of the Operations Period.

i. Handing over of the Plant in good working condition with all relevant documents such as as-built drawings, physical & operational condition of the assets, rights on proprietary technologies, software, systems, O&M manual, periodical reports along with soft copy to Owner.

j. Design shall be such that the plant requires minimum land foot print within the total land made available under this contract and also lesser energy and less manpower requirement with full automation for its sustainable and efficient operation & maintenance.

k. Proposed STP shall include but not be limited to the following criteria:

i. The disinfected effluent shall be discharged in to the receiving water body through a suitable outlet channel and should be designed for the appropriate peak flow from the STP (. A suitable flow meter preferably ultrasonic electromagnetic shall be provided for measuring the flow through the outlet channel

ii. Sludge Handing and disposal System shall form an integral part of the treatment system. This should include stabilization of sludge before disposal and reuse for beneficial purposes including gas recovery and power generation to operate the STP, agriculture manure, making stabilized clay bricks, etc.

iii. Characteristics and properties of the stabilized sludge before disposal shall be in conformance with the applicable environmental norms and CPHEEO guidelines.

iv. For the disposal of Grit and screening materials, solid waste etc., the same shall be disposed of by the operator at his own cost at the site Designated by the Owner

12.4. Designation of 97 MLD STP on Site Areas for Other Uses

a. In preparing the Design and layout for the STP, the Operator shall Designate areas of the STP site for use in,

i. Sewage Treatment Unitsincluding receiving well/ equalisation chamber, pumping arrangement and other elctro-mechanical units/ equipment;;

ii. MPS (97MLD)

iii. Sludge handling facilities;

iv. Ancillary works;

v. Site administration and Lab building (15m x10m ;(G+1));

vi. Perimeter buffer zones;

vii. Staff quarters(Type A –7m X 6.5m X 3m, 2 Nos; G+1),

12.5. Surface and Ground Water Management

In preparing the Design for the STP and all allied works and the Design-Build Documents, the Operator shall,

a. plan and Design the surface drainage at the Site of STP with adequate water drainage channels, pipes, sewers, structures and appurtenances, adequate to manage the highest seasonal levels and volumes of storm water; and,

b. plan and Design the STP site with adequate protection from flooding whether from rain, groundwater, high rivers, storms or any other source.

12.6. Site Administrative Facility

a. The Operator shall be responsible for the administration of the STP and all allied works during the Design-Build Period and the Operator shall Design,

b. temporary office facilities for use by the Operator and its Sub Operators in the administration and execution of the Design-Build Services;

c. Project Facility for use in the administration of the Operations Services to accommodate personnel, furniture, utility services, a lunch room, washrooms and public toilets adequate or the Operations staff;

d. appropriate signage for the Site and the STP, including signs that,

   i. identify the STP and its units;

   ii. provide warning and hazard notification in Designated areas where warranted; and

   iii. identify areas of the STP that are restricted to visitors and are accessible to only Designated employees of the Operator;

e. the landscaping for the Facility as per the Design-Build Documents;

12.7. Other Design Responsibilities

The Operator shall carry out the following Design or Design-related responsibilities:

a. the Operator shall prepare plans and Designs for all temporary works as required by the Operator's Design and as required by the Contract

b. the Operators shall prepare plans and Designs for landscaping of the site;

c. the Operator shall prepare plans and Designs for the acquisition of all data and information necessary to prepare the Design, including, but not limited to, any intrusive site investigations, off-site surveys and environmental baseline monitoring required or contemplated under the Contract; and

d. the Operator shall prepare detailed plans and methodologies for the testing and inspection of the Plant and Equipment.

e. The Operator shall make use of solar photovoltaic cells for electricity generation (minimum 1000 watts for STP to take care of internal lighting, fans etc) and shall preparedetailed plans and design for the Solar Photovoltaic - Electricity and Equipment

f. **Re use of Treated Water**: The Operaror shall ensure that the percentage of the treated water as listed in the table below would available for reuse at the discharge points meeting the Reuse infrastructure has to be constructed for the reuse of treated water by the locality.Arrangement for contol & measuring the flow of reuse at the starting and at the end of effluent channel shall be provided.

Year	Reuse Percentage of treated water
First Year	20%
Second Year	40%
Third year	60%
Fourth Year	80%
Fifth Year	100%

ARTICLE 13. BUILDING AND CONSTRUCTION SERVICES

13.1. General

a. T**he Operator shall carry** o**ut all building, refurbishment and construction of STP** (including reuse infrastructure and infrastructure/ equipments required for electricity generation from solar photovoltaic cells **and**pursuant to Articles of DBSS

b. The Operator shall provide allof the demolition, excavation,building,co-ordination, repair,warranty, review, inspection, testing, quality assurance and control, monitoring, scheduling, clean-up etc. for connecting incoming sewage network, construction of the STP and all appurtenant structures and allied works as contemplated by Design-Build Documents.

c. The Operator shall effectively direct and supervise these services so as to ensure conformity with the Design-Build Documents.

d. The Operator shall be solely responsible for installation methodology, construction means, methods, techniques, sequences, and procedures and for co-ordinating the various parts of the Design-Build Services under the Contract.

13.2. Procurement and Transportation

a. Subject to GC Section 3.4, the Operator shall procure and transport all the equipment in an expeditious and orderly manner to the Site.

b. The Operators shall at its own risk and expense for transport all equipment, to the site.

c. The Operator shall be responsible for obtaining, if necessary, approvals from the authorities for transportation of Equipment, to the Site. The Operator shall indemnify andhold harmless the Owner from and against anyclaim for damage to roads, bridges or any other traffic facilities that may be caused by the transport of the to the Site.

d. The Operator shall, at its own expense, handle all imported Equipment, at the point(s) of import and shall handle any formalities for customs clearance.If the Applicable Law requires any application or act to be made by or in the name of the Owner, the Owner shall take all necessary steps to comply with such Applicable Law.In the event of delays in customs clearance that are not the fault of the Operator, the Operator shall be entitled to an extension in the Time for Completion, pursuant to GC Section 2.3.4.

13.2.1. Temporary Supports, Structures and Utility Services

a. The Operatorshall have the sole responsibility for the Design, erection, operation, maintenance, and removal of temporary supports, structures and utility services and the Design and execution of construction methods required in their use.

b. TheOperatorshallengage and pay for registeredprofessionalengineering personnel skilledin theappropriate disciplines to perform thosefunctions referred to in DBSS where required by law or by the Design- Build Documents and in all cases where such temporary supports, structures and utility services and their Designs and method of construction are of such a nature that professional engineering skill is required to produce safe and satisfactory results

13.2.2. Document Review

The Operator shall review the Design-Build Documents and shall report promptly to the Owner any error, inconsistency or omission the Operator may discover. If the Operator does discover any error, inconsistency or omission in the Design-Build Documents, the Operator shall not proceed with the work affected until the Operator has corrected any such errors or inconsistency or supplied any missing information and these corrections have been approved in writing by the Owner.

13.2.3. Plant and Equipment

a. The Operator shall provide and pay for labor, Plant and Equipment, tools, construction and maintenance machinery and equipment, materials and supplies, water, heat, light, power, transportation, and all other facilities and services necessary for the performance of the Design-Build Services in accordance with the Design-Build Documents.

b. The Operator shall ensure that all Plant and Equipment provided are new. Plant and Equipment which are not specified shall be of a quality consistent with those specified and their use shall be acceptable to the Owner.

13.2.4. Documents at the Site

The Operator shall keep one copy of the Design-Build Documents as up-dated, submittals, reports and records of meetings at the Site, in good order and shall make them available to the Owner upon request and at any reasonable time.

13.2.5. For STP

Use of the 97 MLD STP site

a. The Operator shall confine construction machinery and equipment, storage of Plant and Equipment, Operator's Equipment (Design-Build) and Operator's Equipment (Operations), and operations of Operator's Personnel to limits indicated by laws, ordinances, permits or the Design-Build Documents and shall not unreasonably encumber the Site with Plant and Equipment, Operator's Equipment (Design-Build) or Operator's Equipment (Operations).

b. The Operator shall not store Plant and Equipment, Operator's Equipment (Design-Build) or Operator's Equipment (Operations) at the Site which are not necessary for the construction of the STP.

13.2.6. Quality Assurance

a. The Operator shall institute a quality assurance system to ensure compliance with the requirements of the DBSS. Compliance with the quality assurance system shall not relieve the Operator of its duties, obligations or responsibilities.

b. The Operator shall submit for approval details of all quality assurance procedures and documents relating to Operator's compliance with the quality assurance system to the Owner before each stage of the Design-Build Services is commenced as set out in the Time Schedule. When any document is issued to the Owner, it shall be accompanied by the signed quality statements for such document, if any. The Owner may audit any aspect of the quality assurance system and the Operator shall take any corrective action as the Owner may deem appropriate.

13.2.7. Operator's Access Routes and Rights of Way during the Design-Build Period

a. The Operator shall satisfy itself as to the suitability and availability of the access routes it chooses to use during the Design-Build Period for access to and from the Site. He shall, as between the Parties, be responsible for the maintenance of access routes during the Design-Build Period. The Owner will not be responsible for any claims which may arise from the use or otherwise of any access route. The Owner does not guarantee the suitability or availability of any particular access route, and will not entertain any claim for any non-suitability or non-availability for continuous use, during the Design-Build Period, of any such route.

b. The Operator shall bear all costs and charges for special or temporary rights-of- way required by it for access to the Site. The Operator shall also provide, at its own cost, any additional facilities outside the Site if required by it for the purposes of the Design-Build Services.

13.2.8. Site Regulations and Safety

a. The Operator shall establish Site regulations setting out the rules to be observed in the execution of the Contract at the Site and shall comply therewith. He shall prepare and

submit to the Owner, proposed Site regulations for the Owner's approval, which approval shall not be unreasonably withheld. Such Site regulations shall include rules in respect of security, safety of Plant, gate control, sanitation, medical care, emergency preparedness, emergency response, on-site safety training of employees and fire prevention.

b. The Operator shall comply with all applicable safety regulations in providing the Design-Build Services and in occupying any part of the Site, Unless otherwise stated in the Design-Build Documents, the Operator shall, during the Design- Build Period, provide secure fencing, lighting, guarding and watching; provide temporary roadways, footways, guards and fences which may be necessary for the accommodation and protection of its employees, Site visitors, Owners and occupiers of adjacent land, the public and others; carry out safety briefings of applicable site regulations to all employees, Sub-contractors, agents, representatives and visitors to the Site prior to permitting first access of the applicable person to the and at regular intervals thereafter.

c. During the Design-Build Period, the Operator shall develop and implement a comprehensive occupational health and safety program for the protection of the Operator's Personnel and all other persons who may attend at the site. The program shall include a description of how the Operator will,

   i. carry out all occupational health and safety responsibilities in respect of construction of STP as required under the Applicable Law;

   ii. develop and manage all required occupational health and safety reporting procedures; and

   iii. manage all occupational health and safety claims.

13.2.9. Operator's Equipment (Design-Build) and Site Clearance

a. All Operator's Equipment (Design-Build) brought by the Operator onto the Site shall be deemed to be intended to be used exclusively for the execution of the Contract. The Operator shall not remove the same from the Site without the Owner's consent that such Operator's Equipment (Design-Build) is no longer required for the execution of the Contract.

b. The Operator shall maintain the site of construction and installation in a tidy condition and free from the accumulation of waste products and debris. The Operator shall remove waste products and debris resulting from the construction / laying and shall leave the Facility clean and suitable for occupancy and performance of the Operations Services before attainment of Substantial Completion. The Operator shall remove products, tools, construction machinery, and equipment, including the Operator's Equipment (Design-Build), not required for the performance of the remaining Design-Build Services.

c. Prior to notifying the Owner pursuant to DBSS 6.2(1), the Operator shall remove products, tools, construction machinery and equipment, and waste products and debris, including the Operator's Equipment (Design-Build).

d. Upon the issue of any Completion Certificate, the Operator shall clear away and remove, from the site, all Operators' Equipment (Design-Build), surplus material, wreckage, rubbish and temporary work or structures. The Operator shall ensure that the site is in a clean and safe condition to the satisfaction of the Owner.

e. If the Operator fails to remove, no later than 30 days after the issue of the CompletionCertificate, any remaining Operator's Equipment (Design-Build), surplus material, wreckage, rubbish and temporary work or structures, the Owner may sell or otherwise dispose of such items. The Owner shall be entitled to retain, from the proceeds of such sale, a sum sufficient to meet the costs incurred in connection with the sale or disposal, and in restoring the area around the STPsites. Any balance of the proceeds shall be paid to the Operator. If the proceeds of the sale are insufficient to meet the Owner's costs, the outstanding balance shall be recoverable from the Operator by the Owner.

f. The Owner will, if requested, use reasonable efforts to assist the Operator in obtaining any local, state or national government permission required by the Operator for the export of the Operator's Equipment (Design-Build) imported by the Operator solely for use in the execution of the Contract that is no longer required for the execution of the Contract.

13.2.10. Protection of the Environment

a. The Operator shall take all reasonable steps to protect the environment, both on and off the Site, and to limit damage and nuisance to people and property resulting from pollution, noise, dust and other results of its Services, including,

1. adopting working practices that prevent or minimize the transfer of any pollutant off-site; maintaining the access roads in good repair;
2. using appropriate dust suppressant methods;
3. restricting trucking and loud machinery and equipment use to daylight hours;
4. using mufflers, silencers and other appropriate methods to minimize the noise of the construction;
5. Maintaining clean STP, thatare free of garbage.

b. The Operator shall, at all times during building and construction, ensure that the Environmental Management Plan specified in Appendix 1of Schedule 2 (Design Build Services) is fully complied and measures recommended in Environmental and Social Impact Assessment Study for the project (shared with the bidders as part of the information to the bidders) and ESHS implementation plans are implemented as per the ESHS code of practice.

c. The Operator shall monitor water quality upstream and downstream of the 60MLD STP site, prior to and throughout the process of construction.

13.2.11. Emergency Work

a. If, by reason of an emergency arising in connection with and during the execution of the Design-Build Services, any protective or remedial work is necessary as a matter of urgency to prevent damage to the STPinfrastructure, the Operator shall immediately carry out such work.

b. If the Operator is unable or unwilling to do such work immediately, the Owner may do or cause such work to be done as the Owner may determine is necessary in order to prevent damage to the Sewerage Infrastructure.In such event the Owner shall, as soon as practicable after the occurrence of any such emergency, notify the Operator in writing of such emergency, the work done and the reasons therefore. If the work done or caused to be done by the Owner is work that the Operator was liable to do at its own expense under the Contract, the reasonable costs incurred by the Owner in connection therewith shall be paid by the Operator to the Owner. Otherwise, the cost of such remedial work shall be borne by the Owner.

ARTICLE 14. TEST AND INSPECTION

14.1. Tests and Inspection

a. The Operator shall at its own expense carry out at the place of manufacture or on the Site all such tests and inspections of the Plant & Equipment. The Operator shall, in addition to those tests and inspections set out in the Contract, develop a plan for all testing and inspection of the equipment that is required in order to complete the STPin accordance with the Technical Standards Schedule and implement such quality assurance plan.

.

b. The Owner or their Designated representatives shall be entitled to attend any test or inspection, provided that the Operator shall bear all costs and expenses incurred in connection with such attendance including, but not limited to, all traveling and board and lodging expenses.

c. Whenever the Operator is ready to carry out any test or inspection, the Operator shall give a reasonable advance notice of such test or inspection and of the place and time thereof to the Owner.The Operator shall obtain from any relevant third party or manufacturer any necessary permissionorconsent to enable theOwnerortheir Designated representatives to attend the test or inspection.

d. The Operator shall provide the Owner with a certified report of the results of any test or inspection. The Operator will also maintain photographic records with coordinates of all construction activities and use it in support of quality of construction and to support payments – more importantly shoring, bedding, bailing of water etc have to be supported by photographic evidence with proper referencing.

e. If the Owner, or their Designated representatives, fails to attend the test or inspection, or if it is agreed between the Parties that such persons shall not do so, then the Operator may proceed with the test or inspection in the absence of such persons, and shall provide the Owner with a certified report of the results thereof.

f. The Owner may require the Operator to carry out any test or inspection not required by the Contract, provided that the Operator's reasonable costs and expenses incurred in the carrying out of such test or inspection shall be added to the Contract Price. Further, if such test or inspection impedes the progress of work on the STP or the Operator's performance of its other obligations under the Contract, due allowance will be made in respect of the Time for Completion and the other obligations so affected.

g. If any Plant and Equipment or any part of the STP fails to pass any test or inspection, the Operator shall either rectify or replace such Plant and Equipment or part of the STP shall repeat the test or inspection upon giving a notice under DBSS Section 5.1(3).

h. If any dispute or difference of opinion arises between the Parties in connection with or arising out of the test or inspection of the Plant and Equipment or part of the STP that cannot be settled between the parties within a reasonable period of time, it may be referred to an Adjudicator for determination in accordance with GC Section 1.6.1(1).

i. The Operator shall give the Owner, at the Owner's expense, access at any reasonable time to any part of the STP or any place where the Plant and Equipment are being manufactured or installed in the STP, in order to inspect the progress of the work and the manner of manufacture or installation, provided that the Owner shall give the Operator a reasonable prior notice.

j. The Operator agrees that neither the execution of a test or inspection of Plant and Equipment or any part of the Site, STP,nor the attendance by the Owner, nor the issue of any test certificate pursuant to DBSS, shall release the Operator from any other responsibilities under the Contract.

k. No part of the STP, and foundations shall be covered up on the Site without the Operator carrying out any test or inspection required under the Contract. The Operator shall give a reasonable notice to the Owner whenever any such part of the plant or foundations is ready or about to be ready for test or inspection; such test or inspection and notice thereof shall be subject to the requirements of the Contract.

ARTICLE 15. COMPLETION OF THE STP

15.1. Monthly Progress Notice

a. The Operator shall submit to the Owner after the end of each month six copies, each signed by the Operator's Representative named in accordance with GC Section 8.1.2, a notice (the "Monthly Progress Notice") in such form as the Owner may from time to time prescribe, showing the percentage of completion that the Operator considers it has effected in the preceding month, in respect of the Design-Build Services.

b. The Owner shall, no later than 30 days after receipt of the Monthly Progress Notice, deliver to the Owner a statement (the "Design-Build-Operations Engineer's Statement") indicating, separately, the percentage of completion of the Design-Build Services with documentary evidence such as photographs etc. that the Owner considers the Operator has effected in the applicable month.

c. If the Owner notifies the Operator of any defects or deficiencies, or both, in any of the Design-Build Services, the Operator shall then correct the defects or deficiencies, and shall repeat the procedure described in DBSS Section 5.1(a).

15.2. Completion

a) As soon as the Design-Build Services have, in the opinion of the Operator, been completed in accordance with the Technical Standards Schedule (including restoration of services and roads cut to lay sewer lines),excluding minor items not materially affecting the operation or safety of the STP, has satisfactorily passed all Tests on Completion as set out in DBSS and Technical Standards Schedule, the Operator shall so notify the Owner in writing (the "Notice of Completion") and provide the as-built Design-Build Documents referred to in DBSS..

b) The Owner shall, no later than 30 days after receipt of the Operator's notice under DBSS Section 5.2(a) either issue a Completion Certificate stating that the STP and has reached Completion as of the date of the Operator's notice under DBSS Section 5.2(a), or notify the Operator in writing of any defects or deficiencies or both.

c) If the Owner is not satisfied that the Design-Build Services are complete, the Owner shall notify the Operator in writing of any defects or deficiencies no later than 14 days after receipt of the Notice of Completion.

d) If the Owner notifies the Operator of any defects or deficiencies or both, the Operator shall then correct such defects or deficiencies, and shall repeat the procedure described in DBSS Section 5.2(a).

e) If the Owner is satisfied that the Design-Build Services have reached Completion, the Owner shall, no later than 7 days after receipt of the Operator's repeated Notice of Completion, issue a Completion Certificate stating that the Design-Build Services have reached Completion as of the date of the Operator's repeated Notice of Completion.

f) If the Owner fails to issue the Completion Certificate and fails to inform the Operator of any defects or deficiencies 14 days after receipt of the Notice of Completion or 7 days after receipt of the Operator's repeated Notice of Completion, then the Design-Build Services shall be deemed to have reached Completion as of the date of the Notice of Completion or repeated Notice of Completion as the case may be.

g) As soon as possible after Completion, the Operator shall complete all outstanding minor items so that the STP are fully in accordance with the requirements of the Contract, failing which the Owner will undertake such completion and deduct the costs thereof from any monies owing to the Operator.

ARTICLE 16. COMMISSIONING AND OPERATIONAL ACCEPTANCE

16.1. Commissioning

Commissioning of the STP shall be commenced by the Operator immediately after issue of the Completion Certificate by the Design-Build-Operations Engineer, pursuant to DBSS Section5.2 (b) or immediately after issue of the deemed Completion, under DBSS Section 5.2 (f).

16.2. Testson Commissioning

a. The Tests on Commissioning as set out the Technical Standards Schedule, and repeats thereof, shall be conducted by the Operator during Commissioning of the STP and all allied works to ascertain whether the STP or the relevant part can attain the technical standards as required in the contract. The Operator's and Design-Build-Operations Engineer's advisory personnel shall attend the Tests on Commissioning, and shall advise and assist the Owner. The Owner shall promptly provide the Operator with such information as the Operator may reasonably require in relation to the conduct and results of the Tests on Commissioning, and any repeats thereof.

b. If for reasons not attributable to the Operator, the Tests on Commissioning of the STP cannot be successfully completed within 21 days after the period from the date of Completion specified in the SCC or any other period agreed upon by the Owner and the Operator, the Operator shall be deemed to have fulfilled its obligations with respect to the Tests on Commissioning.

16.3. Operational Acceptance

a. Operational Acceptance shall occur in respect of the STP when the Tests on Commissioning have been successfully completed.

b. The operator shall be responsible to obtain consent to operate in compliance to consent to establish from BPCB / CPCB.

c. At any time after the successful completion of the Tests on Commissioning, the Operator may give a notice to the Owner requesting the issue of an Operational Acceptance Certificate in respect of the STP.

d. The Owner shall, after consultation with the Owner, and no later than 7 days after receipt of the Operator's notice, issue an Operational Acceptance Certificate.

e. If within 7 days after receipt of the Operator's notice, the Owner fails to issue the Operational Acceptance Certificate or fails to inform the Operator in writing of the justifiable reasons why the Owner has not issued the Operational Acceptance Certificate, the STP shall be deemed to have been accepted as of the date of the Operator's said notice.

ARTICLE 17. REPORTING DURING THE DESIGN-BUILD PERIOD

17.1. Design-Build Progress Reports

a. The Operator shall prepare monthly progress reports of the Design-Build Services during the Design-BuildPeriod and submit sixcopies of the reports to the Design-Build-Operations Engineer. The first report shall cover the period up to the end of the calendar month after that in which the Design-Build Starting Date occurred and reports shall be submitted monthly thereafter, each no later than 14 days after the last day of the month to which it applies.

b. The Design-Build Services monthly reports shall include the following information:

1. Photographs and detailed descriptions of progress, including each stage of design, procurement, manufacture, delivery to the STPsite, construction, laying, erection, testing and commissioning;

2. Charts showing the status of Design-Build Documents, purchase orders, manufacture and construction;

3. For the manufacture of each main item, equipment, machinery, floor or component of the STP, the name of manufacturer, manufacture location, percentage progress, and the actual or expected dates of commencement of manufacture, Operator's inspections, tests and delivery relating thereto;

4. Detailed records of the Operator's Personnel and Operator's Equipment (Design-Build) on the STP site, and the actual usage of the Operator's Equipment (Design- Build) during the reporting period and the tasks performed by the Operator's Personnel;

5. Copies of quality assurance documents, test results and certificates of the Plant and Equipment;

6. All monitoring results;

7. the Environmental, Social, Health and Safety (ESHS) metrics set out in Appendix 1 of Schedule 2 (Design Build Services) Part 3";

8. Percentage completion achieved compared with the planned percentage completion for each activity; and

9. Where any activity is behind in the scheduled completion, comments and likely consequences and a description of the corrective action being taken.

"The Contractor shall provide immediate notification to the Engineer of incidents in the following categories. Full details of such incidents shall be provided to the Engineer within the timeframe agreed with the Engineer.

(a) confirmed or likely violation of any law or international agreement;

(b) any fatality or serious (lost time) injury;

(c) significant adverse effects or damage to private property (e.g. vehicle accident, damage from fly rock, working beyond the boundary)

(d) major pollution of drinking water aquifer or damage or destruction of rare or endangered habitat (including protected areas) or species; or

(e) any allegation of sexual harassment or sexual misbehavior, child abuse, defilement, or other violations involving children.

17.2. Replacement of KeyStaffto be deployed by the Operator duringtheDesignbuild period.

If replacement of any Key Staff during design & build services period becomes necessary, the Operator shall submit a proposal for Owner's approval, advising therein the name of the replacement staff of equivalent or higher qualifications duly supported by his CV.

The overlap period of the new key staff and the staff to be replaced shall be minimum of one month.

APPENDIX 1

Environmental Management Plan (EMP) and Environmental, Social, Health and Safety Management Implementation Plan (ESHS-MSIP)

Part 1: Environmental Management Plan

Please include EMP chapter of ESMP Report (without cost details of the EMP) here

Part 2: Environmental, Social, Health and Safety Management Implementation Plan (ESHS-MSIP)

The operator shall submit Management Strategies and Implementation Plans (MSIP) to manage the following key Environmental, Social, Health and Safety (ESHS) risks, specific to the detailed design of the contract.

The plan should integrate environmental protection, occupational and community health and safety, gender, equality, child protection, vulnerable people (including those with disabilities), gender-based violence (GBV), HIV/AIDS awareness and prevention and specific to the activities involved in the execution of the Works.The plan should also include mechanisms for monitoring, continuously improving processes and activities and for reporting on the compliance with the policy.

As a minimum, the plan should, include:

1. *traffic management plan to ensure safety of local communities from construction traffic];*
2. *water resource protection plan to prevent contamination of drinking water];*
3. *boundary marking and protection strategy for mobilization and construction to prevent offsite adverse impacts];*
4. *strategy for obtaining Consents/Permits prior to the start of relevant works such as opening a quarry or borrow pit].*
5. *apply good international industry practiceto protect and conserve the natural environment and to minimize unavoidable impacts;*
6. *provide and maintain a healthy and safe work environment and safe systems of work;*
7. *protect the health and safety of local communities and users, with particular concern for those who are disabled, elderly, or otherwise vulnerable;*
8. *ensure that terms of employment and working conditions of all workers engaged in the Works meet the requirements of the ILO labour conventions to which the host country is a signatory;*
9. *be intolerant of, and enforce disciplinary measures for illegal activities. To be intolerant of, and enforce disciplinary measures for GBV, child sacrifice, child defilement, and sexual harassment;*

10. *incorporate a gender perspective and provide an enabling environment where women and men have equal opportunity to participate in, and benefit from, planning and development of the Works;*
11. *work co-operatively, including with end users of the Works, relevant authorities, contractors and local communities;*
12. *engage with and listen to affected persons and organizations and be responsive to their concerns, with special regard for vulnerable, disabled, and elderly people;*
13. *provide an environment that fosters the exchange of information, views, and ideas that is free of any fear of retaliation;*
14. *minimize the risk of HIV transmission and to mitigate the effects of HIV/AIDS associated with the execution of the Works;*

Part 3: **Environmental, Social, Health and Safety (ESHS) - Content of Progress Report**

Contents for regular reporting:

a. environmental incidents or non-compliances with contract requirements, including contamination, pollution or damage to ground or water supplies;

b. health and safety incidents, accidents, injuries and all fatalities that require treatment;

c. interactions with regulators: identify agency, dates, subjects, outcomes (report the negative if none);

d. status of all permits and agreements:

   i. work permits: number required, number received, actions taken for those not received;

   ii. status of permits and consents:

   - list areas/facilities with permits required (quarries, asphalt & batch plants), dates of application, dates issued (actions to follow up if not issued), dates submitted to resident engineer (or equivalent), status of area (waiting for permits, working, abandoned without reclamation, decommissioning plan being implemented, etc.);
   - list areas with landowner agreements required (borrow and spoil areas, camp sites), dates of agreements, dates submitted to resident engineer (or equivalent);
   - identify major activities undertaken in each area this month and highlights of environmental and social protection (land clearing, boundary marking, topsoil salvage, traffic management, decommissioning planning, decommissioning implementation);
   - for quarries: status of relocation and compensation (completed, or details of monthly activities and current status).

e. health and safety supervision:

   i. safety officer: number days worked, number of full inspections & partial inspections, reports to construction/project management;

   ii. number of workers, work hours, metric of PPE use (percentage of workers with full personal protection equipment (PPE), partial, etc.), worker violations observed (by type of violation, PPE or otherwise), warnings given, repeat warnings given, follow-up actions taken (if any);

f. worker accommodations:

iii. number of expats housed in accommodations, number of locals;

iv. date of last inspection, and highlights of inspection including status of accommodations' compliance with national and local law and good practice, including sanitation, space, etc.;

v. actions taken to recommend/require improved conditions, or to improve conditions.

g. HIV/AIDS: provider of health services, information and/or training, location of clinic, number of non-safety disease or illness treatments and diagnoses (no names to be provided);

h. gender (for expats and locals separately): number of female workers, percentage of workforce, gender issues raised and dealt with (cross-reference grievances or other sections as needed);

i. training:

vi. number of new workers, number receiving induction training, dates of induction training;

vii. number and dates of toolbox talks, number of workers receiving Occupational Health and Safety (OHS), environmental and social training;

viii. number and dates of HIV/AIDS sensitization training, no. workers receiving training (this month and in the past); same questions for gender sensitization, flaglady/flagman training.

j. environmental and social supervision:

ix. environmentalist: days worked, areas inspected and numbers of inspections of each (road section, work camp, accommodations, quarries, borrow areas, spoil areas, swamps, forest crossings, etc.), highlights of activities/findings (including violations of environmental and/or social best practices, actions taken), reports to environmental and/or social specialist/construction/site management;

x. sociologist: days worked, number of partial and full site inspections (by area: road section, work camp, accommodations, quarries, borrow areas, spoil areas, clinic, HIV/AIDS center, community centers, etc.), highlights of activities (including violations of environmental and/or social requirements observed, actions taken), reports to environmental and/or social specialist/construction/site management; and

xi. community liaison person(s): days worked (hours community center open), number of people met, highlights of activities (issues raised, etc.), reports to environmental and/or social specialist /construction/site management.

k. Grievances: list this month's and unresolved past grievances by date received, complainant, how received, to whom referred to for action, resolution and date (if completed), data resolution reported to complainant, any required follow-up(Cross-reference other sections as needed):

xii. Worker grievances;

xiii. Community grievances

l. Traffic and vehicles/equipment:

xiv. traffic accidents involving project vehicles & equipment: provide date, location, damage, cause, follow-up;

xv. accidents involving non-project vehicles or property (also reported under immediate metrics): provide date, location, damage, cause, follow-up;

xvi. overall condition of vehicles/equipment (subjective judgment by environmentalist); non-routine repairs and maintenance needed to improve safety and/or environmental performance (to control smoke, etc.).

m. Environmental mitigations and issues (what has been done):

xvii. dust: number of working bowsers, number of waterings/day, number of complaints, warnings given by environmentalist, actions taken to resolve; highlights of quarry dust control (covers, sprays, operational status); % of rock/muram/spoil lorries with covers, actions taken for uncovered vehicles;

xviii. erosion control: controls implemented by location, status of water crossings, environmentalist inspections and results, actions taken to resolve issues, emergency repairs needed to control erosion/sedimentation;

xix. quarries, borrow areas, spoil areas, asphalt plants, batch plants: identify major activities undertaken this month at each, and highlights of environmental and social protection: land clearing, boundary marking, topsoil salvage, traffic management, decommissioning planning, decommissioning implementation;

xx. blasting: number of blasts (and locations), status of implementation of blasting plan (including notices, evacuations, etc.), incidents of off-site damage or complaints (cross-reference other sections as needed);

xxi. spill cleanups, if any: material spilled, location, amount, actions taken, material disposal (report all spills that result in water or soil contamination;

xxii. waste management: types and quantities generated and managed, including amount taken offsite (and by whom) or reused/recycled/disposed on-site;

xxiii. details of tree plantings and other mitigations required undertaken this month;

xxiv. details of water and swamp protection mitigations required undertaken this month.

n. compliance:

xxv. compliance status for conditions of all relevant consents/permits, for the Work, including quarries, etc.): statement of compliance or listing of issues and actions taken (or to be taken) to reach compliance;

xxvi. compliance status of ESMP/ESIP requirements: statement of compliance or listing of issues and actions taken (or to be taken) to reach compliance

other unresolved issues from previous months related to environmental and social: continued violations, continued failure of equipment, continued lack of vehicle covers, spills not dealt with, continued compensation or blasting issues, etc. Cross-reference other sections as needed.

Summarizes the generic environmental management plan for low category investment that identifies the potential issues of various activities that are anticipated in the design and development, construction, and operation phases of the proposed STP in Pahari area Patna. The Project Components Includes:

a) Pahari STP of 60 MLD;

The environmental management plan ensures to suggest appropriate mitigation measure against the issues/ concerns identified during the environmental and social assessment study.

In general, the BUIDCO (with assistance from DBO Operator and Independent Engineer/Supervision Consultant) is the responsible entity for ensuring that the mitigation

measures as suggested in the ESMP. The roles and responsibilities of the involved institutes are described below.

1.1.1 Implementation of EMP Specific activities by BUIDCO

The role of BUIDCO in the implementation of EMP involves the following activities:

1.1.2 Specific activities by Design Built Operate (DBO) Operator

The operatorshall implement the mitigation measures as recommended in EMP attached to the bid document.

1.1.3 Implementation of EMP

The DBO Operator shall have prime responsibility to implement the EMP. "The DBO engineer" shall monitor the compliance of the EMP. DBO engineer and BUIDCo will have secondary responsibility for implementation of EMP.

The Operator shall ensure that:

- Ensure that sewer laying process does not create hazardous movement situation. Also ensure that public is pre-warned about the activities, construction area is barricaded, all debris is well managed causing minimum inconvenience to public and other measures are implemented as indicated under EMP.
- Specific area shall be earmarked for intermittent storage of biodegradable and non-biodegradable waste at STP site.
- Tree plantation (minimum two row) shall be made on the periphery of STPto prevent spread of bad odour and undertake landscaping to enhance aesthetic at STPlocations.

Feedback from the local residents can also be taken from time to time to cross check the contractor's report. Project management consultants should make inspection visits at construction site to check

the implementation of Environment Management Plan as per the contract. Broad Institutional arrangement for implementation of EMP is shown in figure 8.1 below:

Table : Environmental Management Plan for Pahari STP Project (60 MLD)

Activity		Potential Negative Impact/Concern	Duration of impact	Mitigation Measures	Responsible agency
A. Design and Development Phase					
Sewage Treatment plant	Treated water disposal into nearby stream	• Pollution of received water body (river) or land due to inefficient treatment or non-operation of STP	Temporary	• The treated water quality shall comply with the prescribed standards of the bid document and other applicable conditions of consent to establish issued by the state pollution control board. • Selection of best available sewage treatment technology with High BOD removal efficiency. • Ensuring development and compliance to standard operation and maintenance practices. • Provision of effective screening at inlet of STP for removal of grit, fine plastics and other suspended solids • Provision of effective separation and controlled disposal of digested sludge • Provision effective disinfection before discharge of treated water for irrigation or to river • Ensure that reuse of waste water after treatment in different purposes i.e Urban Development, Industrial reuse, agriculture	DBO Operator

				purposes, Recreational reuse, Flushing of sewers, gardening, house floor cleaning, Power sectors etc for its utilization and to minimize disposal load on river Ganga.	
	STP Breakdown	• Discharge of untreated sewage leading river pollution.	Temporary	• Provision of adequate holding capacity adequate for storage of sewage to prevent flow of untreated sewage to river.	DBO Operator
	Flooding due to rain water run off	• Rain water may flood the STP area in absence of adequate provision of diverting rain water flow towards STP from periphery	Temporary	• Suitable drainage provision shall be made to divert the rain water likely to be accumulated from peripheral catchment area of STP, to natural drainage stream or area.	DBO Operator

		area.			
	Sludge disposal	• Disposal of sludge leading to contamination of land and water.	Permanent	• Efficient Sludge dewatering with minimum land involvement shall be adopted. • Provision shall be made for intermittent storage of digested sludge at STP site. • The digested sludge shall be utilised as manure or disposed to suitable site as approved by DBO engineer. If disposal is made for land fill, the site shall be located away from habitation and water bodies and shall be pre-approved by concerned authorities like Municipal corporation, Pollution Control Board or urban development authority.	DBO Operator
	Provision for safety of workers and safe operation of STPs	• Accidents leading to injury or death of workers (Fall of workers from Height, Fall into deep water tanks, Short Circuiting) • Accidental slip, trip and fall in walk	Permanent	• Ensure adequate provision of Handrails on both sides of walkways close to deeper tanks and STPs need to be ensured; • All electric switches (including unit specific on-off switches installed at respective units) and panels should have adequate protection from rain water to prevent short circuiting • Proper earthling with installation of earth circuit breakers shall be made • Walk ways designs shall be made with proper slope to avoid accumulation of rain water. Material handling and storage shall be so designed that walk way surface remains free from wet or oil surface situation to prevent slips, trip or fall accidents. • Provision of interlock system to either stop	DBO Operator

		ways or work areas • Fire • Exposure to toxic gas		STP or divert untreated effluent to holding tanks in case of short circuiting, or mall functioning of STP • Prepare emergency preparedness plan including identification of assembly area in case of fire	
	Location of STP	• Noise/Odour/ fly nuisance hazards to neighbouring areas. • Cutting of Trees	Permanent	• Ensure minimum noise generation; at pump station in STP • Minimize Tree cutting if involved. • Tree plantation of at least two rows around the periphery of STP site and landscaping to prevent spread of bad odour with large canopy/ broad leaves trees like Sesum, Neem, Bargad, Teak, Sal, etc. • Accumulated sludge and solid waste to be cleared within 24 hours and spraying of suitable herbicides on accumulated sludge/solid waste to reduce odour.	DBO Operator
B. Construction phase					
Sewage treatment plant	Excavation	Loss of topsoil due to excavation activities.	Temporary	• The existing STP shall not be demolished till alternate arrangement for treatment of existing sewage is made to ensure that untreated sewage is not discharged to river. • Excavation shall be planned in such a manner that such that no damage occurs to existing structures. • Top soil should be separately stockpiled and utilized for green belt development or landscaping after completion of work	DBO Operator

		Construction waste	Temporary	• All the associated construction waste should be properly managed by storing and disposing off at suitable refusal sites approved by DBO engineer.	DBO Operator
		Nuisance due to domestic solid waste disposal	Temporary	• Provide two bins for recyclable and non-recyclable wastes. • Ensure that recyclable and non-recyclable wastes are collected in segregated manner in theses bins before disposal. Recyclable material should be sold. Non-recyclable material should be disposed to designated land fill area of the city. • Provide adequate sanitation facility for workers at construction sites.	DBO Operator
		Dust Generation due to construction activities	Temporary	• Excavated material transported by trucks will be covered and/or wetted to prevent dust nuisance. • Suppressing dust generation by spraying water on stockpiles and unpaved movement areas • Water sprinkling over excavated areas, unpaved movement areas and stockpiles. • Transportation of loose construction material through covered trucks. • Use dust curtains (polysheets/ sheets) around the construction area for containing dust spread. • Construction equipment must comply with pollution norms and carry Pollution Under Control certificate.	• DBO Operator

		Temporary flooding due to uneven dumping of construction waste	Temporary	• The construction waste material should be stored on the higher areas of the site and or areas where water may accumulate creating flooding like situation	DBO Operator
		Spillage of fuel and oil	Temporary	• Care to be taken to store fuel and oil (if required) at a place away from any drainage channel/nalla preferably to be stored in drums mounted on a concrete paved platform with slop draining to small spills collection pit.	DBO Operator
		Noise and vibration disturbances to residents and businesses	Temporary	• Construction activities to be carried out in day time with prior intimation to local residents and shop keepers. • Use of low noise and vibrating equipment (such as enclosed generators with mufflers, instruments with built in vibration dampening and improved exhaust), to meet standards as prescribed by CPCB[12]. • Provision of protective equipment (PPE) like ear muffs and plugs for construction workers. • Provision of noise barriers as feasible in inhabited areas, particularly near sensitive zones like hospitals, schools etc. • DG set to be fitted acoustic enclosure.	DBO Operator
Construction camps	Sanitation	Nuisance due to absence of facility of sanitation and solid waste	Temporary	• Labour camp if provided, must have adequate provision of shelter, water supply, sanitation and solid waste management	DBO Operator

[12]http://moef.gov.in/citizen/specinfo/noise.html

		management			
General: safety during construction	Safety and Health Hazard	Safety hazards to labours and public. Workers are seen to working without any PPE even at height.	Temporary	• Comply with the Occupational health and Safety act of India • Ensure that the contact details of the police or security company and ambulance services nearby to the site. • Ensure that the handling of equipment and materials is supervised and adequately instructed. • Follow safe practices for working at height or confined area or underground working for safety of workers • Erect warning signs/ tapes and temporary barriers and/or danger tape, marking flags, lights and flagmen around the exposed construction works warn the public and traffic flow of the inherent dangers. • Provide adequate PPE to workers such as helmets, safety shoes, gloves, dust masks, gumboots, etc. to workers • Provide handrails on both sides of walkways close to deeper tanks and STPs need to be ensured; • Smaller on and off switches at STP units to be installed with protection from rain water to minimize electrical short circuit; • Monthly reporting of all accidents and immediate reporting to DBO engineer and owner.	DBO Operator

C. Operation phase					
Sewage treatment plant	Treatment and Disposal of Treated Water and Sludge	River, land or ground water pollution due to discharge of untreated or partially treated sewage due to inadequate or inefficient STP operations.	Temporary	• Monitor the treated sewage quality and ensure compliance with PCB standards for effluent disposal into surface water bodies, on land or for the agricultural use. • Follow standard operating procedures for operation and maintenance. • Undertake periodic audit as per these procedures. • Comply with all applicable condition of consent to operate • Quarterly monitoring of influent sewage, treated sewage, upstream and downstream point of treated sewage disposal point to river	DBO Operator
		Problems arising due to bad odour, insects, polluted air,	Temporary	• Maintain the green belt as per provision of design to prevent spread of bad odour with large canopy/ broad leaves trees like Sesum, Neem, Bargad, Teak, Sal, etc. • Accumulated sludge and solid waste to be cleared within 24 hours and spraying of suitable herbicides on accumulated sludge/solid waste to reduce odour. • Quarterly monitoring of Ambient Air Quality with respect to PM10, PM2.5, Sox and NOx, CO and Odour at three locations (at STP site, minimum 500 m away from STP site in up-wind and down-wind direction of STP area.	DBO Operator

		Increase in Ambient Noise Level and discomfort to neighbouring people	Temporary	• Proper handling and regular maintenance of operating machines including pumps, generators, air diffusers, etc. • Quarterly Monitoring of Ambient Noise level to check compliance to standards. • Quarterly monitoring of ambient noise levels (day and night) at same locations as of ambient air monitoring	DBO Operator
		Indiscriminate disposal of sludge leading to contamination of land and soil.	Temporary	• Prepares sludge disposal plan as per desire stage provisions and guidelines and adhere to the same. • Ensure proper functioning of STP for digestion of sludge and ensure adequate functioning of dewatering units for efficient functioning of system	DBO Operator
		River, land or ground water pollution due to discharge of untreated or partially treated sewage due to inadequate or inefficient STP operations.	Temporary	• Ensure compliance with PCB standards for effluent disposal into surface water bodies, on land or for the agricultural use. • Follow standard operating procedures for operation and maintenance. • Undertake periodic audit as per these procedures. • Comply with all applicable condition of consent to operate	DBO Operator
General Safety	Workers exposure to	• Serious/health/ safety hazards	Temporary	• Ensure availability of PPE for maintenance workers. • Follow safety measures and Emergency	DBO Operator

	hazardous materials/situations			preparedness plan evolved at design stage	

Schedule 3

Operation and Maintenance Services Schedule

For A Contract

TO (i) DESIGN AND BUILD SEWAGE TREATMENT PLANTOF CAPACITY 60 MLDINCLUDING MAIN PUMPING STATION (97MLD) AND ALL APPURTENANT STRUCTURES AND ALLIED WORKS;(ii) OPERATION & MAINTENANCE OF THE COMPLETE WORKS OF SEWAGE TREATMENT PLANTFOR A PERIOD OF 15 YEARS AT PAHARIIN PATNA, STATE OF BIHAR, INDIA.

ARTICLE 1. Introduction

The Operator shall ensure the Operation and Maintenance of the STP, and other allied works in compliance to the guidelines contained in the Manual on “Sewerage & Sewage Treatment”, latest edition as published by the Central Public Health Environmental Engineering Organization (CPHEEO), Ministry of Urban Development, Government of India, New Delhi and the prescription laid down hereunder.

Presently the existing STP is being maintained by Bihar Rajya Jal Parishad and Bihar Rajya Jal Parishad will continue to maintain the one module (one Pond, MPS and disposal arrangements) till proposed STP or one of its module is operational and the existing STP is required to be demolished.

ARTICLE 2. Scope of Work

For STP

2.1. Operate the STP, for a period of 15 years as specified below:

2.1.1. General Scope

a. The Operator shall operate and maintain the STP under the Contract complete including the road works, landscaping, civil/structural, mechanical components, instrumentation system, Electrical System, all utility and ancillary buildings for the period of fifteen (15) years from the date of successful completion of "Tests after Completion of the Works".

b. The Operator shall make his own arrangements at his own cost for Works operation personnel, lubricants, diesel, spares, tools and tackles, routine maintenance, screenings collection, desilted material collection, transportation and disposal, co-ordination with respective pollution control board, agency supplying power to the STP, and any other activity required for the operation and maintenance of the constructed Works in full compliance with all applicable rules, regulations, laws, codes, effluent quality requirements and any other limitations.

c. Carrying out continuous flow measurements and recording of treated & untreated sewage at outlet and inlet of STP, regular calibration, cleaning, maintenance and replacement when required of measuring devices;

d. Collecting samples of influent and effluent and analyzing & testing them on a daily basis (inhouse) and getting tests done at weekly basis from laboratory of Bihar PCBto determine the quality of sewage and performance of the treatment plant. Minimum 3 grab samples representative of different flow conditions (quantum and quality wise) in the day of the treated effluent shall be drawn every week jointly by

the Owner and the Operator and the results of the test report shall be binding on both the parties.;

e. Take all necessary measures to minimize the power consumption in carrying out its operations.

f. operate electrical equipment during power failures by making appropriate alternative arrangements,

g. Store or dispose: (i) the Residual Matter obtained after the processing and treatment of the Sewage such as sludge, grit, waste screens etc.; and (ii) the Residual Treated Water obtained from treatment of Sewage in a manner which is compliant to all applicable environmental laws and rules;

h. The Operator shall submit a weekly report to the Owner detailing the Operation and Maintenance indicating the labour hours expended, Electrical Power Consumed and other Consumables consumed and also problems faced and rectified.

i. The Operator shall submit detailed schedule/manual of all O& M activities with references of equipment manufacturers' maintenance schedules/manuals to the Owner for review and approval.

j. The Operator shall submit Guidelines and Instructions manual for the maintenance staff of all levels for all the tools, plants and equipment and Operating STP to maintain the service levels within the standards prescribed within the contract;

k. The Operator shall carry out all O&M activities as per the approved Operation and Maintenance Manuals.

l. During the Operation and Maintenance period, the Operator shall ensure that the sewage detention time in wet well not exceeds 30 min. and there is no backflow of sewage.

m. The Operator's responsibility shall also include the safety and security of the Works during the course of Operation and Maintenance.

n. Acquire and maintain sufficient stock of consumables such as chemicals, algal nutrients, safety gear, grit screens etc. and procure necessary electrical and mechanical equipment required for operations and maintenance of STP to ensure continuous operations.

o. Establish a Project office to manage the Project. The Project office can be located at the sewage treatment plant campus or at any other appropriate location where land is made available by the Owner.

p. All Project sites shall be well secured and kept in a clean and hygienic condition with sufficient measures for safety and security of man-power, built structures, equipment and other system components.

q. During Operation and Maintenance period, the Operator shall appoint an Operator and Electrical/Mechanical Technician. In addition, the Operator shall appoint suitable number of operators, drivers, cleaners,fitters, electricians, helpers, gardeners, office peons, security guards, labourers as required for the operation and maintenance of complete proposed STP for three shifts and adequate other staff / supporting personnel during general Shift. Security of man-power, built structures, equipment and other system components

2.1.2. General Scope

a. To Operate and maintain the sewage treatment plant, all instruments and mechanical, electrical equipment in accordance with the aim and purpose of treatment. The plant &equipment covered under the above contract will be totally attended to, by the Operator including any "Troubleshooting" to ensure smooth and trouble free operation.

b. The Operator will monitor the performance of the sewage treatment plant; conduct the analysis of the inlet sewage and water quality after treatment. Operator shall initiate and take adequate actions to ensure smooth and satisfactory performance / running of the plants on a 24 hours / round the clock basis.

c. The Operator shall prepare and implement an effective plant maintenance programme in consultation with the Owner. It is an absolutely operator's responsibility to look after all sorts of maintenance whether preventive, Minor, Major, or break-down

d. The Operator will determine operating parameters, select settling (Chemical doses etc.) and generally optimize the process, and working of the treatment plant. Excessive chemical dozing i.e. dose more than normal should be avoided otherwise penalty shall be levied and recovered from the Operator.

e. The Operator should plan & procure all spares, Polyelectrolyte and all consumables including chemicals, grease, lubricating oil, cleaning agents, laboratory reagents etc. Further the Operator will plan about the requirement well in advance (At least 4 months) and procure the material from the market.

f. The Operator will be responsible for keeping up-to-date record of documents including History Card for equipment and maintaining every day log book relating to various analysis performed.

g. The Operator shall maintain and update logbook, in which details of operational parameters are recorded in every shift and at regular interval say hourly or as decided mutually.

h. The Operator will prepare and submit a daily report of plant performance and will assist the Owner in preparing the necessary documents for their purpose and records.

i. The Operator will be responsible to carry out day to day periodic maintenance, necessary to ensure to smooth and efficient performance / running of all equipment / instruments comprising the sewage treatment plant and maintaining the record of the same.

j. The Operator shall have to issue identity cards with photographs to all the staff employed for Operation and Maintenance. The list of the same shall be submitted to the Owner mentioning qualification & experience.

k. The Operator will also be responsible to carry out day to day Maintenance of the rising main inside the STP premises.

l. The Operator will employ minimum staff for operation and maintenance of the Plant as per the list mentioned in the detailed scope of work.

m. The above staff shall be distributed in three shifts as per mutual agreement between Operator and Owner As per agreement the number of staff in each shift should always remain present otherwise penalty towards absence of any staff shall be recovered from the Operator as per Volume-I GCC. The Operator shall make the arrangement of reliever for weekly off/holiday etc. Absence on any ground like weekly off or holiday shall not be considered. The presence of staff in each shift should be marked in muster to be maintained at office of shift in charge at Sewage Treatment Plant that shall be considered as final. The Operator's staff must mark their presence in this muster. The Operator may maintain a separate register for his own purpose.

n. The staff of Operator will always remain in contact with the Junior Engineer, Assistance Engineer/Electrical Supervisor, in charge of the Plant deployed by the Owner and follow their instruction.

o. Unsatisfactory and inefficient running of the plant and unnecessary and excessive usage of spare, consumable, etc. supported by the reasons which are under control of Operator will be highly objected. In such cases Design Build Operations Engineer . 's decision will be final and binding to the Operator.

p. It is required that at least once in every one month a technical expert other than the Monthly Staff of the Operator will visit the plant and will suggest if required, to improve the efficiency and working of the plant etc. No separate payment will be made for such visits. The visit must be recorded and outcome of the visit/minutes of the meeting should be got signed by Owner authorities without which the visit shall not be considered.

q. Operator will comply with all safety rules and regulations as followed by the Owner.

r. The Owner will not be responsible for any accident /injury to the staff of the Operator. Further the Owner will not provide any insurance or medical facility to the staff of Operator. The responsibility lies with the Operator.

s. All Central/State Government / Semi-Government / Local Body's Rules and Regulations pertaining to this contract shall be followed and observed by the Operator without any extra cost to the Owner.

t. No accommodation / guesthouse / transportation facility will be provided by the to the Operator. Operation & maintenance staff will not be allowed any accommodation facility inside the plant premises.

u. The duration of the O&M shall be 120 months from the date of successful commissioning of the STP. The same can be extended for the further period if the Owner so desires. The Operator should employ all the staff within two days of successful commissioning. The Operator will provide the necessary tools and tackles required for day-to-day maintenance.

v. The scope of work also includes cleaning of complete plant area including floor, toilet block railing, door, windows, light fixtures and ceiling etc. The entire premises of the plant area shall also be cleaned and maintain by the Operator regularly.

w. This work is inclusive of but not limited to operation, maintenance, housekeeping, cleaning, removing sludge by its own carrier arrangement & disposes it off as per Owner's instructions. Preparing data recording, correspondence work to Owner and Government Departments, etc. All this work should be done as per standard practices and by following labour, factory, electrical, STATE PCB, and all other latest updated regulations, Indian standards etc. as applied of Local, State and Central Government of India.

x. The Operator will not employ persons who are, pronounced guilty or charged with indiscipline.

y. Right is reserved by Owner of suspension, dismiss ion, termination of any officer / staff employed by Operator. He shall have taken prior permission to employ or to terminate his personals.

z. No watch and ward, safety insurance, security, storage, housing accommodation etc. will be provided by Owner. This will be responsibility of Operator.

aa. Consumable items like rubber bush, graphite packing, rubber sheet, nut-bolts, material required for cleaning and housekeeping etc. are to be brought by the Operator.

bb. Monitoring should be done as per guideline given by Design Build Operations Engineer . . Operator has to maintain all the parameter of effluent within stipulated limit or he will be penalized for not maintaining the parameters given by STATE PCB and Owner. All expenditure incurred for the same like, suite fee,

court fee, case fee, or the penalty as decided by Engineer of Owner and penalty charged by STATE PCB will be charged to Operator and deducted from his bills, S.D etc.

cc. Operator shall have to test the effluent / influent at his own cost at the plant lab on daily basis. The same be verified by and checked by Owner whenever required. The Operator shall also have to test the effluent / influent at STATE PCB lab for different parameter on weekly basis at his own cost.

dd. No equipment shall remain ideal or un-attended or damaged for the period of 3 days..

ee. The payment of O & M charges will be made as per the tender conditions. The other terms and condition described in these complete tender documents, wherever applicable shall remain unchanged. In case of any discrepancy the decision of Design Build Operations Engineer . will remain final & binding on the Operator.

ff. During Operation & Maintenance period, Operator has to supply all the spares, at his cost during preventive, major-minor breakdown, replacement and maintenance work. No extra payment will be made for such maintenance on any ground. The payment for the same will be made strictly as per tender document irrespective of the number of break down / minor, major repairs replacements. During the O & M Operator will have to enter annual maintenance agreement with Manufacturers of all major Mechanical Equipments like Centrifuge, Air Blowers, Screens, Decanters etc.

gg. Operator will have to maintain required Power Factor as per STATE EB rules and regulations. Incase penalty is levied by STATE EB for not maintaining the Power Factor the same will be recovered from the. Operator

hh. Maintenance of Garden, Lawns, Plants, Bushes, Plantation of new Plants, Lawns etc. and feeding, gardening, cleaning etc. is in the scope of the Operator. No separate payment will be made for the same.

ii. The Operator during his O&M period will have to follow all the guidelines set by STATE PCB for Operation & Maintenance of STP.

jj. Operation and maintenance of all General facilities and utility services including all other components of work done under this contract.

kk. Operation and maintenance of PLC based automation system and all instruments installed in the STP including all repairs, replacements towards the entire instrumentation works during the O & M period shall be in the scope of Operator.

ll. Any other services required for smooth running of the scheme.

mm. The Operator shall also dispose off the sludge, screenings, grit and any other material, as per specifications and to the satisfaction of the Design Build Operations Engineer . . It is to be noted that all costs during the O&M period, to be borne by the Operator. The Operator is to ensure that the following guarantees are maintained during the operation & maintenance period:

i. for quality of treated effluent

ii. for consumption of chemicals

iii. for automation

nn. The Operator shall provide on job training to the Local body staff as per specifications.

oo. At the end of every 2(1/2) year of operation & maintenance period, an assessment of the condition of the plant has to be done by the Owner through third party inspection at Owner's cost and based on that assessment the Operator shall, at no extra cost to the Owner, repair and re-condition all the mechanical equipment in the concluding year of the O&M contract to a condition so that they are in running condition with regular preventive and recommended maintenance as per manufacturer's recommendations or as per CPHEEO manual.

pp. Variability of through output: If the quantity of treated sewage from the Facility can be increased in the existing system without impacting the annual fixed costs to the Operator, the Operator shall comply with such requirements. For a sustained requirement of higher throughout from the Facility, the Operator may be required to frame and submit a proposal that shall be implemented if mutually acceptable.

2.1.3. Treated Sludge Disposal

The Operator shall operate the Sewage Treatment Plant such that the sludge produced is of a spreadable consistency and the volume of sludge produced after necessary process is minimum. The sludge generated from the STP shall be disposed of through proper approved means of transport to the Compost yard site as designated by the Owner

2.1.4. Chemical Requirements

All chemicals consumed to operate the Sewage Treatment Plant and other facilities under this contract will be borne by the Operator.

2.2. Adverse Operating Condition

During which the raw sewage

flow falls 20% of the threshold flowand quality deteriorates beyond the parameters specified below

S. No.	Parameter	Concentration Range
1	PH value	5.6 – 9
2	BOD (5 days at 20°C), mg/L	144 – 300
3	COD, mg/L	260 – 540
4	Total suspended solids, mg/L	240 – 480
5	VSS mg/L	180 – 360
6	Total Nitrogen, mg/L	32 – 72
7	Organic Nitrogen, mg/L	8 – 18
8	Amonia Nitrogen, mg/L	21.6 - 44.4
9	Nitrate Nitrogen, mg/L	2.4 - 7.2
10	Total Phosphorus , mg/l	4 - 9.6
11	Ortho Phosphorus , mg/l	3.2 - 7.2

All units in mg/l unless specified;

and over and above the standards prescribed below

S No.	Characterstics	Standards (values in mg/l)
1	Arsenic (as As)	0.2
2	Mercury (as Hg)	0.01
3	Lead (as Pb)	0.1
4	Cadmium (as Cd)	2.0
5	Hexavalent Chromium (as Cr 6+)	0.1
6	Total Chromium (as Cr)	2.0
7	Copper (as Cu)	3.0

8	Zinc (as Zn)	5.0
9	Selenium (as Se)	0.05
10	Nickel (as Ni)	3.0
11	Cyanide (as CN)	0.2
12	Fluoride (as F)	2.0
13	Dissolved phosphates (as P)	5.0
14	Sulphide (as S)	2.0
15	Phenolic compounds (as C_6h_5OH)	1.0
16	Manganese (as Mn)	2.0
17	Iron (as Fe)	3.0
18	Vanadium (as V)	0.2

~~beyond the Specifications in Volume I~~, the following provisions will be applicable

a. If the raw sewage can still be treated to meet the Output Standards, the Operator shall comply with such specifications.

b. In the event it is not possible to meet the Output Standards, the Operator shall immediately inform the Owner.

c. In the event it is possible to meet the Output Standards, but an increase in fixed and variable costs is unavoidable, the Operator shall, as soon as practically possible, inform the Owner and as directed by DBO engineer either treat to the alternate standards at no additional cost for maximum duration of adverse condition specified below or meet the output standards and charge the owner the increased additional fixed and variable costs.

2.2.1. Alternate Output Standards;

The treated effluent output BOD, shall be maximum 7% of the influent BOD, the maximum period of adverse condition is 30 days.

2.3. Output and Operational Guarantees

The Operator is fully responsible for treating all the Sewage reaching the Receiving chamber. The performance of the Operator shall be treated as unsatisfactory if he fails to treat the complete sewage or does not maintain the guarantees listed in this clause excepting in force majeure condition or fails to fulfill other conditions of the contract.

2.4. Treated Effluent Quality

The Operator shall operate the Sewage Treatment Plant in such a way that the treated effluent quality attains the following parameters:-

EFFLUENT DISCHARGED STANDARDS FOR SEWAGE TREATMENT PLANT

Sr. No.	Parameters	**Parameters** Limit (Standards)
1	pH	6.5 – 9
2	BOD (mg/l)	Not more than 10
3	COD (mg/l)	Not more than 50
4	TSS (mg/l)	Not more than 20
5	NH4-N (mg/l)	Not more than 5
6	N-total (mg/l)	Not more than 10
7	Fecal Coliform (MPN/100m1)	Less than 100

All units in mg/l unless specified;

AA – as arising when other parameters are satisfied

This Treated Effluent Quality in accordance to article 12 Design Services clause no. 12.1.11 Design Responsibilities.

2.4.1 Treated Sludge Disposal

The Operator shall operate the Sewage Treatment Plant such that the sludge produced is of a spreadable consistency and the volume of sludge produced after necessary process, is minimum. The sludge generated from the STP shall be disposed off through proper approved means of transport to the place / yard site as Designated by the Owner

2.4.2 Undertaking capacity building measures:

Conduct a training and handholding assistance programme for six months in aspects of Operation and Maintenance of the Sewage Treatment Plant for maximum fifteen employees of the ULB.

2.5 Tests to be undertaken during the operations period:

The Operator should get analyzed / checked the untreated as well as treated sewage samples every week from respective pollution control authority/ Laboratory specified by Ownerfor

parameters mentioned in Section 2.4. The necessary testing charges are to be borne by the Operator.

The parameters shall also be tested daily inhouse by the operator.

2.6. Staff:

The qualification and experience of the personnel required for O & M are specified below. However, the Operator shall mention the personnel proposed for O&M in his bid.

S. No.	Key Staff	Nos. Required	Minimum Qualifications
1.	Manager	1	Degree in Civil Engineering / Mechanical Engineering with minimum 5 years' experience in Operating & Maintaining a sewage treatment plant
2.	Shift Engineer/ Assistant Engineer	1	B. Tech in Civil / Mechanical Engineeringwith 2 years' experience or Diploma in Civil/Mechanical Engineering with 5 years' experience in managing STPs
3.	STP Operators/ Junior Engineer	2	Diploma in Civil / Mechanical. Engineeringwith 2 years' experience in Operating STPs
4.	Electro – mechanical engineer	1	(Degree in Mechanical /Electrical Engineering with minimum 1 years' experience in Operating /Maintaining STP)
5.	Electrician	1	ITI "C" certification with minimum 3 years experience in operating/ maintaining any STP
6.	Plumbers / fitters	1	Experience in laying / maintaining and operating STP and related electromechanical works for a minimum of 1 year.
7.	Lab Technician	1	Degrree in Bsc Chemistry with minimum experience of 1 years in operating and

S. No.	Key Staff	Nos. Required	Minimum Qualifications
			maintaining STP LAB

The work shall be carried out on a 24 hr. basis, without intermission and the staff deployed by the Operator shall be in accordance with this contract.

a. The Operator shall give or provide all necessary superintendence during the O&M and as long thereafter as the Owner may consider necessary. Such superintendence shall be given by a competent person having adequate knowledge of the operation and Maintenance to be carried out (including the methods and techniques required), the hazards likely to be encountered and methods of preventing accident) as may be required for the satisfactory working of the entire plant.

b. No labor below the age to 18 years shall be employed on the work. List of staff is to be given by the agency to the Owner and advance intimation to be given before deputing/removing any staff from site during the period of contract. Not more than one of the Operator's key staff shall be absent from the Project site at any given time. In case it is necessary for more than one of the key personnel to be absent at a given time, the Operator shall provide replacement of equivalent or better qualifications. The CVs of such key staff replacements shall be got approved from Owner in advance.

c. Owner shall be authorized to direct the contracting agency to remove any or all staff employed on O&M of the STP if in his opinion continued presence of such staff is detrimental to safety or proper O&M of the STP. The Operator shall comply with such directions & post suitable substitute(s) thereof. Whenever the Engineer has to inform the Operator in writing that any person on the work is in his opinion unsatisfactory or/incompetent or unfaithful or dishonest, untruthful or disorderly or to be otherwise unsuitable/such person shall be discharged by the Operator from the work and shall not be employed again on it.

2.7. Reporting and Record Keeping:

a. Maintain a periodical reporting system to provide access and retrieval of Sewage Treatment Plant operating data including all such information which is necessary to verify costs and expenses incurred and otherwise to confirm that the Operator is in compliance with its obligations under the terms and conditions of this Contract;

b. The Operator will prepare daily and monthly reports (in Owner format) of pumping/treatment and project performance and submit to the Design Build Operations Engineer . and will assist the department in preparing the necessary documents for their purpose and record as per proforma given from time to time. The reports shall contain, inter-alia, the following:

c. Raw Sewage quantity and quality and effluent quality as per the on-line monitoring programme and other tests as specified in Clause 3.0 of this section and print outs of online monitoring shall be submitted to Engineer-in charge.

d. A description of the maintenance work carried out in the reporting period.

e. A report on major failures, if any, their causes and remedial actions taken.

f. Sludge quality and quantity (daily basis) in the reporting period.

g. Power and chemicals consumed in the reporting period.

h. An inventory of the chemicals and spare parts available at the end of the reporting period.

i. O&M staff deployed by the Operator during the reporting period. Any major repair works, if any.

a. Operator shall maintain separate register/computerized records at all sites of following information:

    1. Pumping register
    2. Quantity of sewage treatment and performance register D
    3. Working hours register
    4. Electric break down register
    5. Maintenance register
    6. Staff attendance register
    7. Equipment breakdown, repair record and extent of repair
    8. UV equipment and inventory of Spare part, operating and using register

b. The Operator shall maintain a record for the entire Term of the following:

    1. status or progress report of the operation and maintenance of each of the Sewage Treatment Plant components;
    2. record of all consumables, tools, equipment's manhole covers, etc. used / replaced towards operations and maintenance of the STP;
    3. report certifying that the quality and quantity of the Residual Treated Water at the Discharge Point;
    4. Report certifying the reuse (quantity and quality) of treated effluent.
    5. daily readings of the meters at the Receipt Point;
    6. daily readings of the meters at the Discharge Point;
    7. methods of disposal used for Residual Matter; and

8. Nature and scope of any ancillary activities being carried out in accordance with the terms and conditions of this Contract.
9. Provide reports on accidents in respect of the Sewage Treatment Plant, if any
10. Daily readings of the meters at the inlet of the STP;
11. Nature and scope of any ancillary activities being carried out in accordance with the terms and conditions of this Contract; and
12. Provide reports on accidents in respect of the Sewage Treatment Plant, if any.

c. The Operator shall provide an accurate, complete and up-to-date record, report or document in relation to any aspect of modernization, expansion, operation, maintenance and management of the Sewage Treatment Plant to Owner as and when a request is made as soon as reasonably practicable and in any event within any time limit prescribed by Owner for the production of such record, report or other document.

d. Provide a copy to Owner of its annual audited accounts of expenditure by the Operator in the implementation of the Project as at the end of and for that accounting period.

e. Report to Owner regarding any litigation or material claims, disputes or actions, threatened or filed, concerning the Sewage Treatment Plant or the obligations to be performed by the Operator under this Contract;

f. Report to Owner any refusal or threatened refusal to grant, renew or extend or any action pending or threatened that might affect the granting, renewal or extension of any Applicable Approval;

g. Report to Owner any material information concerning new or significant aspects of the operations, maintenance and management of the Sewage Treatment Plant, any material complaint about the Sewage Treatment Plant from any person or any other information received by the Operator which is material to the Operation and Maintenance of the Sewage Treatment Plant

h. Hourly record of Flow as measured / recorded through the Notch / Weir / Flow meter:

Date/ Time	**Head Over The Notch / Weir / Meter**	**Rate Of Flow**	**Average Rate Of Flow In Past Hour**	**Flow Quantity**

2.8. SAFETY/SECURITY

The Operator shall take all safety precautions under various Acts/Rules under central/State Govt. from time to time and he shall be responsible for safety of its staff and the consequences thereof. The Operator shall deploy round the clock security personnel at entrance of plant's premises and in the compound for the safety of the plant and premises for the safety of the plant, equipment and personnel during this period.

2.8.1. Responsibility for damages

a. The care of the whole of the permanent works shall remain with the Operator who shall be responsible for all accidents or damages from whatever cause arising and chargeable for anything that may be stolen, removed destroyed or damaged to whomsoever belonging and also for making good all defects and damages to the said works or to any property adjoining or any cause whatever, whether such damage or defects were occasioned by the negligence of the Operator or not or may be or might have been discovered during the progress to be known after the completion whereof or whether payment may wholly or partially have been made or the works approved as supposed to have been properly done and no certificate of approval of any works by any officers or members of the Board shall affect or prejudice the right of the STATE PCB against the Operator or be considered or held as at all conclusive as to the sufficiency of any work materials.

b. Adequate safety precautions against fire, flooding, lightening, electrical shocks, accident due to moving/non-moving heavy/light equipments shall be strictly observed by the Operator at his own cost. Suitable safety measures like gumboots, gloves, safety belts, ladders, safety lamps, gas masks, Oxygen apparatus, insulated tools, alarms etc. shall be provided by the Operator. Necessary medical first aid kit shall be made available all the time. In absence of observance of above safety precautions, the Operator shall be responsible for any unforeseen loss of the equipments or persons dealing with it. Special care shall be taken by the Operator while carrying out the work in sewage gas zone. Any incidence of human life or accident will be totally Operator's responsibility.

c. The Operator shall ensure that the staff employed takes all necessary precautions while carrying out the work either in shift duties or any general shift as per Indian Electricity Rules/Factory Act/CPHEEO Manual, or manufacturer's special instruction for safety / gas handling. The staff should use Gas masks, Oxygen apparatus, Gum Boots, Safety Belts and Safety Lamps, etc. while carrying out the work in Bar Screens, sumps etc.

d. The Operator will make arrangement for all necessary safety equipments for persons working at STP as per Factory Act/Safety Rules. In the event of any accident on or off site, in which the Operator or his personnel are involved, in which an injury occurs to any person whether directly concerned with the project or a third party, the Operator shall inform Owner within 24 hrs. of the occurrence of the event. The plant will be open to local/state/central agencies for verification of safety/emission/acts compliance.

e. During night hours, the main gate should be locked. However, shift duty staff should be alert and open the gate during surprise checking of Owner staff or any other Government Authorities or his nominee without any wait. Only bona-fide persons be allowed in the plant premises being a prohibited area. Smoking and drinking are prohibited in the plant. The staff engaged shall wear common uniform with name plate indicating name and designation during duty hours.

2.9. Operation and maintenance manual

a. The Operator shall prepare a detailed program (referred to as O&M Manual) covering the operation and maintenance of the treatment plants as a whole. This program shall include the work and activities described in this Chapter, as relevant to the specific items and technology.

b. The Operator shall provide 6 copies of draft O&M Manual to the Owner, at the time of the commissioning of the Project and on approval of draft, 10 copies of operation &maintenance manual shall be supplied by the Operator.

c. The O&M Manual shall include the daily, weekly, monthly, quarterly, half yearly and annual checks and remedies if necessary to be performed for effective operation of the plant, elaborate detail, all operating and maintenance procedures and policies which are required, advisable and / or necessary for the Facility to achieve full compliance with the operational guarantees and to achieve maintenance and repair standard for the Facility which will ensure compliance with the maintenance specifications. The O&M manual shall include interalia full explanation of all plant procedures and processes.

d. Without limiting the generality of the foregoing the O&M Manual shall include descriptions, procedures and shall comply with the requirements, set forth in the provisions of the Bid Documents.

e. The draft of the O&M Manual shall be subject to the review and approval of Owner, which shall have the right to make any changes and revisions to the O&M Manual as it may deem appropriate. The Operator shall revise such draft O&M Manual prior to the commencement of the O&M period.

f. At the end of the construction period, the Operator shall revise the draft O&M Manual to reflect any updates, changes or revisions it deems appropriate, inter-alia based on its experience and as necessary to reflect any modifications or adjustments to the plant. Without limiting the above, the Operator shall annually fully review, revise, update and modify the draft O&M Manual as may be necessary or appropriate. Any revision to the draft O&M Manual shall be subject to the review and approval of Owner.

g. Owner shall have the right to require revisions to the draft O&M Manual as it may deem appropriate. The Operator shall prepare and submit to Owner, for its review and approval, 30 days prior to the proposed date of commencement of O&M, a revised draft O&M Manual which reflects all changes, revisions and modifications. The Operator shall prepare the O&M Manual, as approved by the Owner, prior to the start of O&M.

h. During the term of this Agreement, the Operator shall promptly notify Owner of any revisions, additions or modifications which he, in his professional opinion, believes should be made to the O&M Manual, whether as a result of additional experience in operating and maintaining the Facility, changes in influent quality or volume, changes or modifications to any equipment part, component or structure incorporated in the Facility.

i. Such notification shall set forth the reason for the proposed revision. Any proposed revision shall be subject to the approval of the Owner. In addition, during the term of this Agreement, Owner shall have the right to require relevant changes, revisions, or additions to the O&M Manual as it, shall deem appropriate to ensure full compliance with the O&M Standards.

j. The Operator shall submit 10 copies of the final O & M manual along with a soft copy in Microsoft Word Format.

2.10. Technical Audit

a. The Owner has the right to conduct a technical audit of the Facility and to perform any analysis or inspection he deems necessary. The Operator shall at his cost provide all assistance the Owner required to complete these inspections. Such audits may cover all or any of the obligations of the Operator, including without limitation,

b. Verification of the system capacity and save for normal wear and tear during the O&M Period

c. Verification of the performance standards and useful life of the individual assets of the Facility, save for normal wear and tear during the O&M Period

d. Verification of the capacity of the Facility to meet Output Standards during the residual life of the Facility and save for normal deterioration expected during such residual life

e. Sampling, testing and verification of the Output Standards for treated sewage, sewage losses

2.11. Facility Visits

a. At any time or at the end of each twelve month period, or at the initiative of the STATE PCB, a visit shall be organized so that both parties can check the condition of the installations at the facility.

b. A report shall be drawn up to record the opinions of the both parties. The STATE PCB reserves the right to call the equipment manufacturers or specialized technicians for these visits. All expenses are to be borne by the Operator for the purpose.

2.12. Maintenance schedules

a. The Operator shall prepare and follow a Maintenance plan, detailing the maintenance activities scheduled for each of the component of the STP on a periodic approved by Design-Build-Operations Engineer and / or the Owner.

b. Every part of the works and all the materials to be used therein shall be subjected to such tests from time to time during the execution of the work as the Owner may direct and the whole of such tests shall in all cases be made at the Operator's sole expense.

c. The work shall be carried on and completed under the exclusive control direction and supervision and to the satisfaction of the Owner. The Owner shall likewise have full power to reject or condemn any work or material that he may deem unsuitable. In case of any work or material being rejected by the Engineer in-charge, the Operator shall immediately remove and replace the same to the satisfaction of the Owner or the Owner shall have full powers to get the same removed and replaced and deduct the expenditure incurred in the process from any amount due or that may become due to the Operator.

d. The Operator shall use only the original and genuine spares of the original equipment as per recommendations given in the maintenance booklet of the manufactures/as per directions of the Owner. Adequate stock of such spares is to be maintained by the Operator. Test certificate of manufacturer is required for bearings along with supplies. Test certificate of all major equipment will be submitted from the manufacturer.

e. The Operator shall also be responsible to maintain cleanliness in around the plant including machineries, disposal of floating removed from the Bar Screens/reactors, etc. Grit and other unwanted material.

f. If any material brought to the site of works, be in the judgment of the Engineer, found inferior or improper & not as per described standards, the said materials or workmanship shall where required by the Owner shall be removed or amended by the Operator forthwith or within such period for every breach by the Operator in this clause.

g. All leakages should be attended promptly to avoid any nuisance etc. Chokages should be removed at once. All the valves/gates which are not used regularly should be operated at least once a week and make sure that they are properly lubricated /greased.

h. All safety valves should be checked daily and ensure that they are working properly. In case of any fault the same should be attended immediately without any wait. The maintenance of the plant shall be as per maintenance manuals of the manufacturer for all equipment. Operator shall keep all the safety devices in working order.

i. All the steel structures and machines installed in open areas should be painted after every monsoon period after cleaning the surface as per the instructions of the Engineer- in-charge. Entire plant including all civil structures, mechanical equipment, HT panel and Transformers etc. shall be repainted after every 2(1/2) years as per original painting specifications.

j. All safety valves should be checked daily and ensure that they are working properly. In case of any fault the same should be attended immediately without any wait. The maintenance of the plant shall be as per maintenance manuals of the manufacturer for all equipment. Operator shall keep all the safety devices in working order.

k. The Operator should make sure that no unwanted material should float/grow in and around different units. In case it is found the same shall be removed /cleaned immediately. He shall also be responsible for cleaning/sweeping the plant buildings inside and outside, roads, foot path etc.

l. Launders/Weirs etc. of reactors etc. to be maintained clean round the clock. During preventive/ breakdown maintenance, the Operator has to visit the unit/units as and when needed. The pumping units or other machineries required if any shall have to be arranged by the Operator at his own costs for completing the work. In case of battery operated auto system panels and also system alarm etc., batteries are required to be maintained and replaced as and when needed by the Operator.

m. Consumables such as POL (petrol/Diesel Oil & Lubricants) etc. has to be arranged by the Operator as and when needed as per manufactures recommendations for periodical maintenance of entire Network. The Owner shall not provide such items.

n. In case of major repair due to normal wear and tear/break down, the Operator should bring the same to the notice of the Owner immediately and necessary measures for its repair should be taken simultaneously. Breakdown, all repairs of any kind are to be attended by the Operator. Any unit/equipment being irreparable in the opinion of the Owner will be replaced by the Operator at no cost to Owner.

o. The Operator shall give his telephone no., contact addresses, etc. to the Owner as well as shift duty shift to contact him during emergency/odd hours etc.

p. The Operator will be responsible to carry day to day as well as periodic maintenance, necessary to ensure smooth and efficient performance/running of all equipment instruments installed at the STP. He shall be responsible for maintenance/replacement of street light poles and light etc. also. All the plant, building land, Sewage treated/untreated/sludge, etc. shall remain the property of Owner.

2.12.1. Oil & Grease Schedule

a. Routine & preventive maintenance of electrical /Mechanical/ hydraulic/ machines & equipments is to be carried out as per the operation & maintenance manual. Minimum oil & grease requirement for one year Operation & maintenance of the Plant to be procured by the Operator well in advance

2.13. Routine, Preventive, Minor & Major maintenance of all Civil, Electrical, Mechanical, hydraulic machines & Equipment of the plant

a. The Operator should prepare schedule of daily maintenance & preventive maintenance of all the equipment & machineries operated & run by him in the premises of the plant. The schedule should be as per the guidelines mentioned in the tender &as per the O& M manual. The scope covers Routine, Preventive, Minor & Major maintenance of all major minor equipment and machines in the Plant like Submersible pumps, Coarse &Fine screens Grit Removal Mechanism, Channel gates, Decanters, Sludge pumps, Centrifuge feed pumps, Centrifuges, All dosing systems including Chemical Dosing equipment, if required etc.

b. The scope also covers Routine, Preventive, Minor & Major maintenance of all the instrumentation system installed like PLC, Actuators, Flow meters level indicators etc. The Operator should also carry out Routine, Preventive, Minor & Major maintenance of all major minor electrical equipment like Electrical Panels, Switch Gears, Power Cables, Control cables, Changeover switches DG set etc. so as to ensure uninterrupted round the clock operation of the Plant.

c. The Operator should maintain all civil structures including Administrative building, Store room, Storm Drains, fencing etc. in a neat manner. He should maintain all civil structures of the plant sturdy to complete the natural/Designed lifetime.

d. The Operator should carry out the safety audit of the plant & necessary certificate from the competent authorities. This item includes all types of Routine, Preventive, Minor & Major maintenance of all Civil, Electrical, Mechanical, hydraulic machines & equipment of the plant covering supply erection test &trial run of the part/machine to be repaired/ replaced with material &labor expenses, necessary hardware's, sundry materials, lubricant oils, power oils, grease other materials plus machining charges etc.

e. The Operator should procure all the spares required for all types of maintenances in advance. The part/equipment/machine to be repaired /replaced should be as per the Owner approved list & as per the O& M manual or as per the existing manufacturer's brand.

f. The Operator, after first notifying the BPCB shall be responsible for fulfilling all requirements associated with any release of any substance into the environment (form the facility or the site) as required by Applicable law or by any Legal Entitlement including but not limit to the notification or reporting of releases /

g. Hazardous substances or Hazardous Waste. The Operator shall prepare a memorandum evidence such notification or reporting and provide copies thereof to the Owner, along with any documents provided to the relevant regulatory agency regarding such release.

h. The Operator shall process and obtain the clearance of all such agencies as required for the purpose, including all clearances during O&M period. He shall be fully responsible to comply with all requirements of Laws including hazardous substances, emission standards for air, discharge standards for effluent oil, sub-soil pollution. The contracting agency shall not release any hazardous/toxic materials inside the premises.

2.14. Site Order Book

Site order Book shall be kept by the Engineer -in-charge at the plant site. Orders entered in this Book by the Design Build Operations Engineer . or his authorised representative shall be held to have been formally communicated to the Operator. The Design Build Operations Engineer . or his authorised representative shall sign each order as it is entered and will hand over the duplicate to the Operator or his agent, who shall sign the original in acknowledgment of having received the order

ARTICLE 3.Taking Over

3.1. TRANSITION PLAN

(1) At least two years prior to the End Date, the Operator shall develop a plan to hand-over the STP, and all appurtenant structures and allied works to the Subsequent Operator at the end of the term of the Contract (the "Transition Plan").

(2) The Transition Plan shall include,

(a) plans to transfer the STP to the Subsequent Operator;

(b) transition plans with respect to the Operator's Personnel including a plan for transition of the Operator's Personnel to a Subsequent Operator;

(c) a proposed process for the transfer of all Contract Records to the Owner;

(d) plans to transfer operations and maintenance functions to the Subsequent Operator; and

(e) a program to train staff of the Owner in all aspects of the operation and maintenance of the New Facility.

3.2. TAKING OVER

(a) The STP, and all appurtenant structures and allied works will be taken over by Owner on satisfactory completion of the Operation & Maintenance of the plant provided that

i. The plant /equipment are in good, smooth running condition.

ii. The result of the treated wastewater quality for last three months of operation of the plant is within the limits specified.

iii. In case of major repairs /replacement of equipment, the performance guarantee is extended by six months from the date of putting back into satisfactory operation of such unit/equipment, in case such putting back is at the end of completion of operation & maintenance period.

iv. All records of operation & maintenance are handed over to Owner in proper condition.

v. The Third Party Inspection of the STP, and all appurtenant structures and allied works viz: Civil units, Mechanical units/equipment, Electrical units/equipment, instruments, & all other Major & minor units/machines has to be carried out & the defects unsatisfactory working performances of the equipment/ machines are to be corrected by the Operator at his own cost. The necessary Third Party inspection Charges shall be borne by the Owner.

vi. The Operator should repaint the STP, and all appurtenant structures and allied works including all civil structures, mechanical, electrical equipment/ units /structures as per the tender specifications

(b) In case taking over is delayed on account of Operator's failure to meet the requirement specified in sub clause (a) above, the operation & maintenance period will be extended further till it meets the requirement without any additional cost to Owner.

Schedule 4

SITE AND SITE AREA

For A Contract

TO **(i) DESIGN AND BUILD SEWAGE TREATMENT PLANTOF CAPACITY 60 MLDINCLUDING MAIN PUMPING STATION (97MLD) AND ALL APPURTENANT STRUCTURES AND ALLIED WORKS; (ii) OPERATION & MAINTENANCE OF THE COMPLETE WORKS OF SEWAGE TREATMENT PLANTFOR A PERIOD OF 15 YEARS AT PAHARIIN PATNA, STATE OF BIHAR, INDIA.**

Schedule 4- Site and Site Area

1. **General Project Background: Patna City**

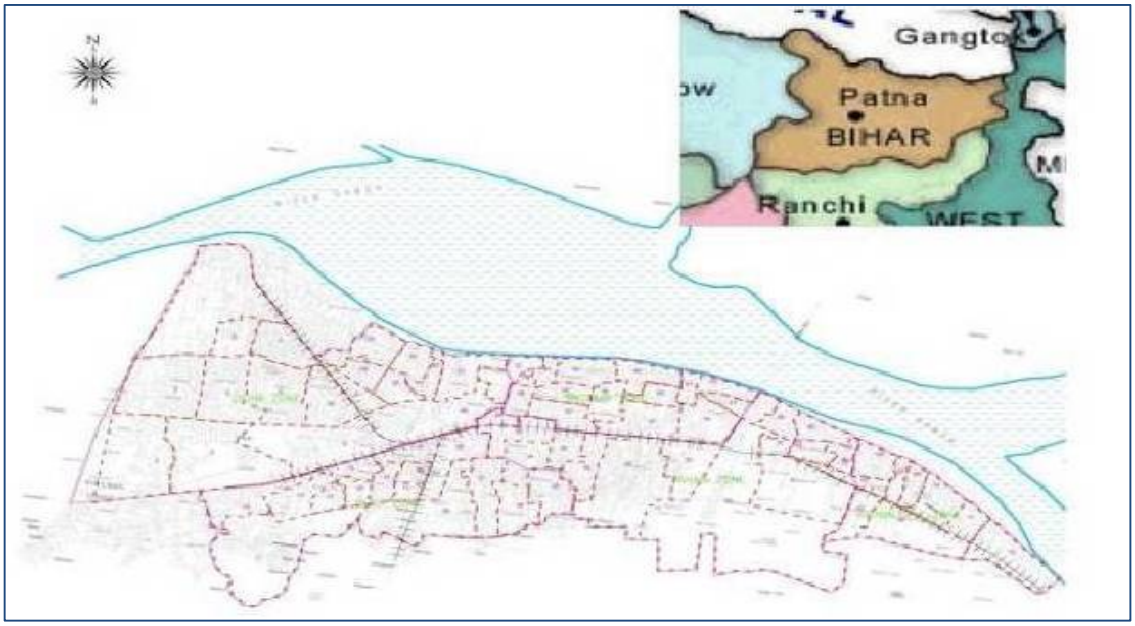
Patna is the capital of Bihar and the second largest city in Eastern India (in terms of population). Patna is one of the oldest inhabitated & civilized places in the world. Ancient Patna, known as Pataliputra, was the capital of the Magadha Empire under the Haryanka, Nanda, Mauryan, Sunga, Gupta, Pala and Suri dynasties. Patna is located on the south bank of the Ganga River. The Ganga River is the largest. The modern city of Patna is situated on the southern bank of the Ganges. Patna is approximately 25 km long and 9 km to 10 km wide. The city has grown up gradually from the ancient age with the name 'Pataliputra'. It is located between the river Ganges in the North, the river 'Pun Pun' in the South and the river 'Sone' in the west. The geographical location of the Patna Urban Area is on the southern bank of River Ganges between latitudes 25° 30'N & 25° 40'N and longitudes 85°0'E &85° -15'E. It is the 14th most populous agglomeration in India and 168 in the world with a population of approximately 1.8 million. It is the second largest city in eastern India, after Kolkata. Today, all major industries have a base in Patna reflecting the growing importance of the city. There has been significant enhancement in GDP of Bihar in the last decade. The growth of economy, urbanization & population trends are indicators that city shall continue to develop rapidly in next two-three decades. It is also fast emerging as a hub of higher education with institutes of national repute being started in Patna

2. **History of Patna City**

The history and tradition of Patna go back to the earliest dawn of civilization. The original name of Patna was Pataliputra or Patalipattan and its history dates back to 600 B.C. Ancient Patna covers area of 42 sq km. The name Patna has undergone many changes at its earliest stages like Pataligram, Kusumpur, Patliputra, Azimabad, etc., ultimately terminating to the present one. Chandragupta Maurya made it his capital in the 4 century A.D. Thereafter the city lost its importance until Sherkhan Suri rose to power in the early 16th century A.D. Another version that comes to focus is that there existed a village named Pattan or Patthan, which later turned into Patna. It has been said that Pataliputra was founded by Ajatashatru. Patna, therefore, has become inextricably bound up with the ancient Pataliputra. The ancient village was named 'Patali' and the word 'Pattan' was added to it. Greek history mentions 'Palibothra' which perhaps is Pataliputra itself. Apart from being the administrative centre of the state and its historic importance, the city is also a major educational and medical centre. The economy of Patna is based on the local service industry. Ancient Patna, known as Pataliputra, was the capital of the Magadha Empire under the Haryanka, Nanda, Mauryan, Sunga, Gupta, Pala and Suri dynasties. Pataliputra was also a famous seat of learning and fine arts. Its population during the Maurya period (around 300 BCE) was about 400,000.

Google Image of Patna City

The walled old area, called Patna City by the locals, is a major trading centre. The Buddhist, Hindu, and Jain pilgrim centres of Vaishali, Rajgir, Nalanda, Bodhgaya, and Pawapuri are nearby and Patna is also a sacred city for Sikhs. Guru Gobind Singh, (December 22, 1666 – October 7, 1708), the tenth Guru of the Sikhs, was born in Patna. His birthplace, Harmandir saheb, is one of the most sacred pilgrimages for Sikhs. By 1620 the city of Patna was the great centre of Northern India - "the largest town in Bengal and the most famous for trade". This was before the founding of the city of Calcutta. In present day India, Patna has the distinction of giving Dr Rajendra Prasad, as the President of the Constituent Assembly(1946-1949) & later, as the First President of the Republic of India. Image of Patna City is shown in fig. below.



3. Topography

The district can be divided into two prominent natural features comprising:-

A narrow strip of somewhat high land about 8 km in width along the Southern bank of the Ganges having very fertile soil & alluvial fertile plains in the remaining portions. Patna does not contain any hilly region. It has an entirely alluvial and flat region.

Patna is located on the south bank of the Ganga River. The town is situated at an altitude of 48 - 51 m above mean sea level

The land in the district is too fertile to be left for wild growth. The district is devoid of any forest wealth of consequences. The alluvial text of land yields rice, sugarcane and other food grains. The area under cultivation is studded with mango orchads and bamboo clumps. In the fields adjoining the Ganges weeds such as ammannia, citriculari, hygrophile and sesbania grow. But palmyra and date palm and mango orchards are found near habitations. Dry shrub jungles are sometimes seen in the villages away from the rivers. Trees commonly met with are bel, siris, jack fruits and the red cotton tree.

4. Climate

The district by and large is homogenous. It is of moderate type characterized by quite hot summers to moderately cold winters. The day temperature generally ranges from 21.1 ºC in January to 38.7 ºC in May and night temperature from 7.3 ºC in December to 27.7 ºC in June. The summer begins in April and peaks in June/July with the temperature soaring up to 43 °C till the moisture laden monsoon wind bring some much-needed relief to the parched fields. The rains last through August & September and continue into early October

5. Rainfall

The normal annual rainfall in the district is around 1230 mm. The timely and well-distributed rainfall during Kharif and Rabi has a deciding influence on the land use and cropping pattern of the district.

6. Geomorphology & Soils

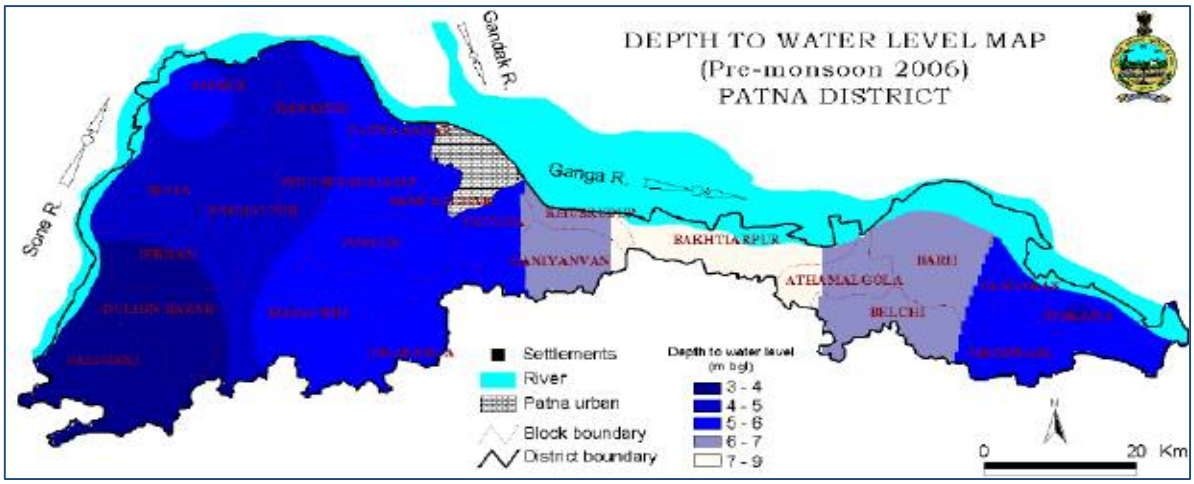
Patna district is a part of the Indo Gangetic alluvium. The district forming a part of the flood plains of the Ganga has a monotonously flat relief. Patna region is underlain by alluvial sediments of quaternary age. The quaternary sediments are deposited unconformable on the Archaean basement. The district has mainly four types of soils ranging from moderately well drained to poorly drained, acidic to slightly alkaline and medium to heavy textured. The land in the district is too fertile to be left for wild growth. The district is devoid of any forest wealth of consequences. The alluvial text of land yields rice, sugarcane and other food grains. The area under cultivation is studded with mango orchads and bamboo clumps. In the fields adjoining the Ganges weeds such as ammannia, citriculari, hygrophile and sesbania grow. But palmyra and date palm and mango orchards are found near habitations. Dry shrub jungles are sometimes seen in the villages away from the rivers. Trees commonly met with are bel, siris, jack fruits and the red cotton tree

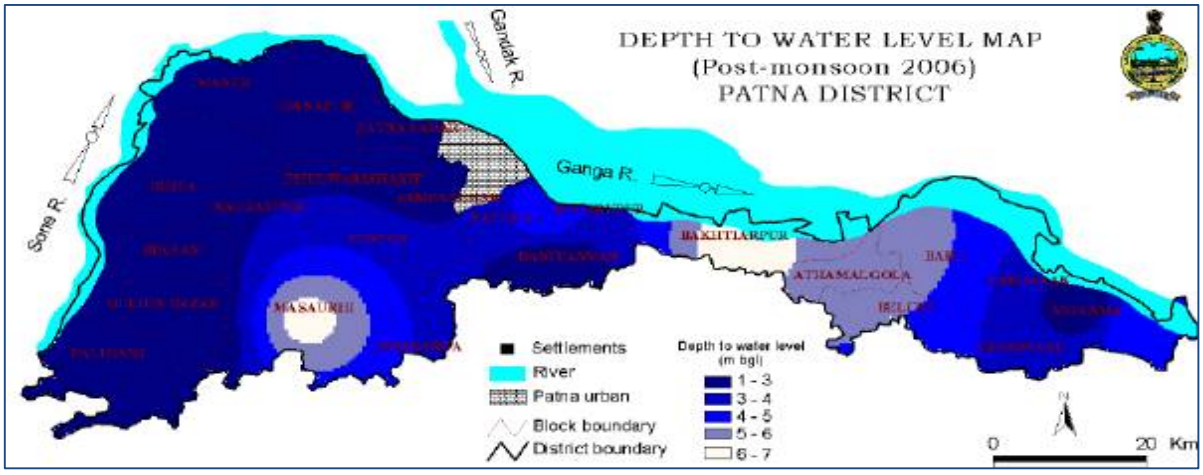
7. Seismicity

The project area falls in seismic zone – IV as per the BIS (1893, Part-1, 2002) category of seismic zoning map of India.

8. Ground Water Scenario

Besides State Ground Water Investigation Department, Govt. of Bihar, CGWB has established a network of observation wells under National Hydrograph Network (HNS) programme to ascertain fluctuation and quality of groundwater in the district. There are about 12 HNS monitoring locations identified and being monitored every year regularly during January, May, August and November. During pre-monsoon season, the minimum and maximum water levels were observed as 3.00 and 8.57 m bgl respectively. About 25 % of the wells have the water level in the range of 2 – 5 m bgl. In majority of the wells (76 %), the water levels remain in the range of 5 – 10 m bgl. Below figures depict water level map of Patna district post monsoon and pre monsoon in year 2006.





9. Transportation & Connectivity:

Patna was one of the first places in India to use horse-drawn trams for public transport. Public transportation today is provided for by buses, auto rickshaws and local trains. Auto rickshaws are said to be the lifeline of the city. BSRTC has started City bus service on all major routes of Patna. Recently, radio cab facility has also started.

Railway: The Patna Junction railway station is connected to most of the major cities in India by the railway network. Patna lies in between New Delhi and Kolkata which is one of the busiest rail route in India. The city is a major railway hub and is well connected with Gaya, Jehanabad Biharsharif, Rajgir, Islampur with excessive train services. The plan also includes the modernisation of Patna Junction.

Airways: There is an airport, Lok Nayak Jayaprakash Airport, which is classified as a restricted international airport. The arrival of several low-cost carriers and a number of new destinations have caused a growth in air traffic in recent years, as has an improvement in the situation with regard to law and order. For the period April toDecember 2009 the airport ranked first in a survey of 46 airports in the country in terms of percentage growth of domestic passengers as well as domestic aircraft movement.[44] New airport is expected to be built at Bihta. Flights are unable to land at the Patna airport during a foggy weather.

Roadways: The city is served by several major road highways and state highways, including National Highways 19, 30, 31, and 83. It is 1,015 kilometres (631 mi) from Delhi, 1,802 kilometres (1,120 mi) from Mumbai and 556 kilometres (345 mi) from Kolkata. Luxury bus service between Patna and several neighbouring cities is provided by the Bihar State Tourism Development Corporation and the Bihar State Road Transport Corporation.

Waterways: Patna has a fixed terminal on National Waterway No. 1 which was established in October 1986. This 1,620 kilometres (1,010 mi) route of navigable water runs from Haldia on the Bay of Bengal, across the extremity of Jharkhand province, across the centre of Bihar and then to Allahabad in Uttar Pradesh.

10. State Level Authority

The Government of Bihar (GOB) through its Urban Development and Housing Department (UD & HD) has been implementing both these program in the state.

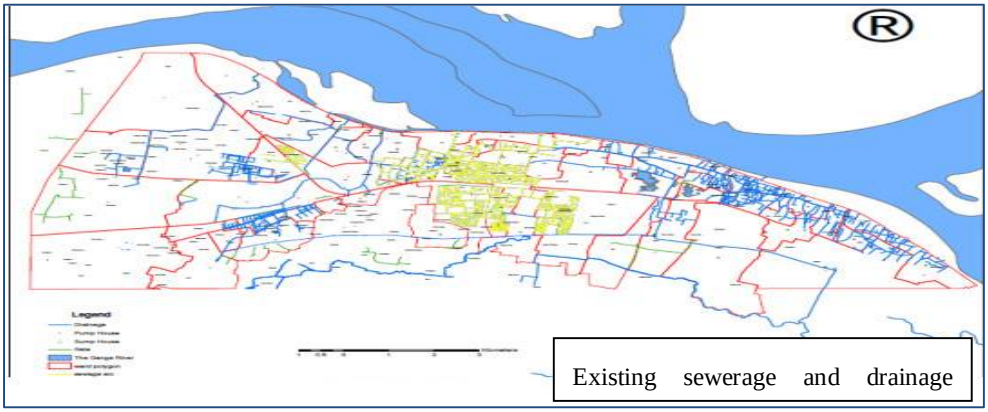
11. Bihar Urban Infrastructure Development Corporation Ltd.

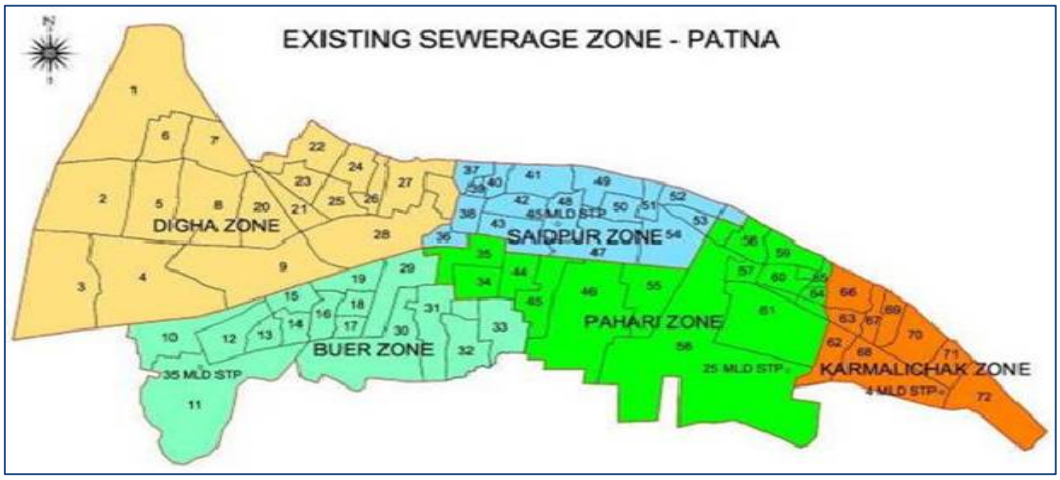
BUIDCo is a Flagship company to implement and accelerate urban infrastructure projects in the State of Bihar. These projects include basic infrastructure amenities such as Solid Waste Management, Water Supply, Drainage Network and Sewerage & Sewage Treatment. Also, projects of urban beautification like River Front Development, Amusement Parks, Commercial works, Hotels etc. are also being developed by the BUIDCo.

12. Sewerage System

The sewerage system in Patna was established in 1936. The city has four sewage treatment plants located at Saidpur (45 MLD), Beur (35 MLD), Pahari (25 MLD) and Karmali Chak (4 MLD) although the quantum of sewage reaching the plants is lower than installed capacity. It can be clearly concluded that the majority of the city is uncovered by sewer network. Inhabitants living in area without sewer network have to rely on either decentralised

collection system in form of inhouse septic tanks or on unhygienic open defecation practise. Figure below depicts the existing sewerage network (Shown by yellow lines on the map):





PMC is now sub divided into Six sewerage zones namely; Digha Zone, Beur Zone, Saidpur Zone, Pahari Zone, Kankarbagh and Karmali Chak Zone

Although sewerage systems were first started in Patna city during the year 1936-39 but its penetration at present still lags behind other Indian cities of comparable population and growth rates. The installed capacities of Sewage treatment plants is 109 MLD, but are receiving approximately 61 MLD of sewage, as the existing scheme requires renovation/ maintenance to run the STPs at their installed capacity. Out of the six sewerage zones depicted above, four have STPs in them whereas sewage collected from Digha zone finds its way to the Beur STP.

13. Pahari STP& Sewerage Network

This zone is on the southern side of Ganga River and lies on the eastern side of Saidpur Zone. This zone comprises of ward numbers 34, 35, 44, 45, 46, 53, 55, 56, 57, 58, 59, 60, 61, 63, 64 and 65 covering a total area of 21.10 sq.km (i.e. around 21.10% of the total project area). Sewage generated in this zone is treated at 25 MLD Aerated Lagoon based STP located in ward 56. This STP was constructed in year 1994. At present this plant is operating at a treatment capacity of 10 MLD as a 60 H.P. motor and two aerators requires repair work. The

treated sewage flows into the Punpun River. The STP is operated and Maintained by Bihar Rajya Jal Parishad. STP layout for the Pahari zone is as shown below.

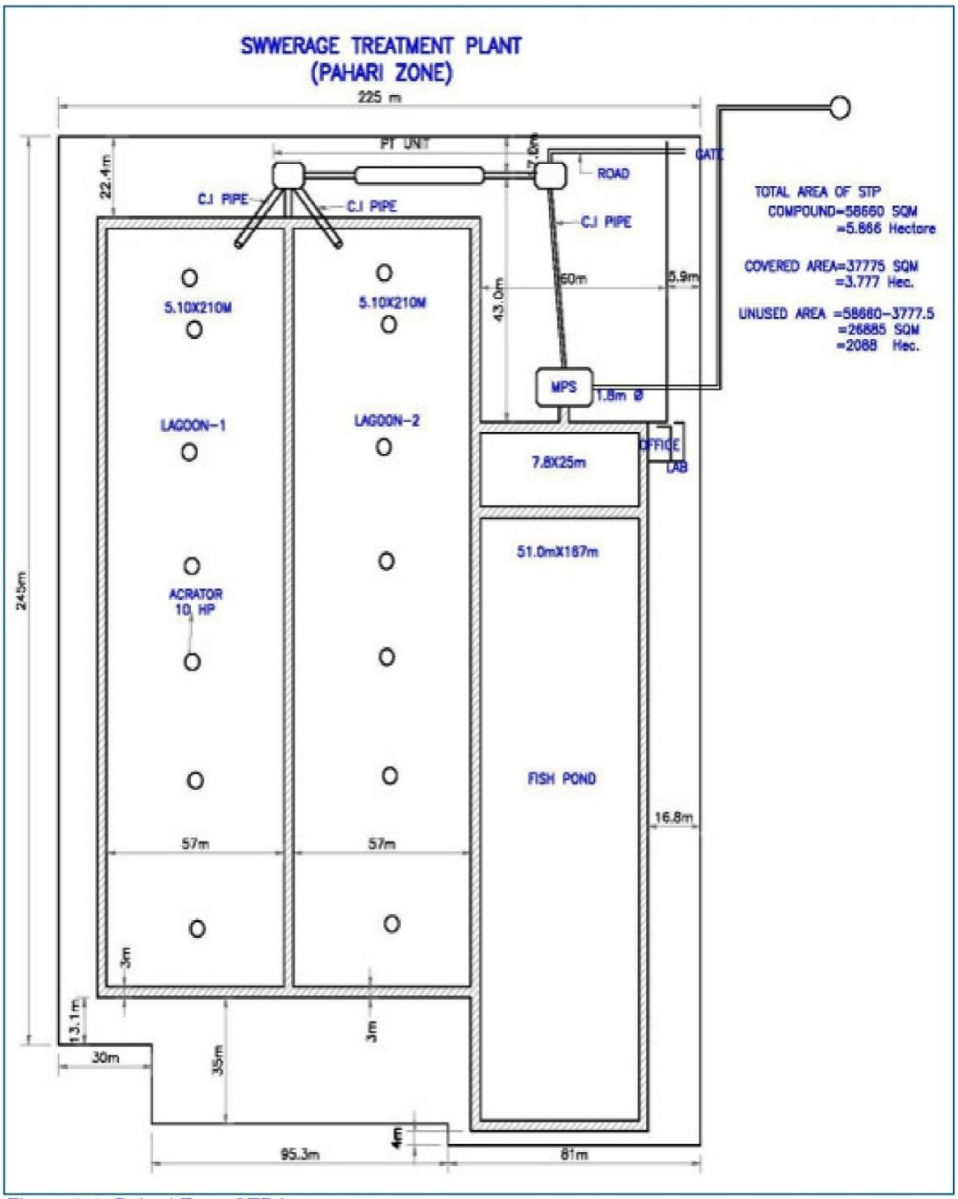


Figure 3-1: Pahari Zone STP Layout

Summary of Geotechnical Investigation Report

BK SOIL CONSULTANTS PVT LTD carried out four bore holes 15.00 m depth and and laboratory tests for proposed STP sites in Patna. Based on our investigation in field and laboratory, it is revealed that the soils at site are sandy silt primarily. The soil strata , thickness of layer, consistency of soil SPT values has been presented on bore logs and soil profile location wise. The ground water table has been encountered at 3.00 m to 11.00 m depth at the time of our investigation. Following are the foundation recommendations and net safe bearing capacity of soil.

Locations of STP	Foundationd epth	Recommended net SBC
BEAUR	2.00m	8.9t/m^2
PAHARI	2.00m	12.5t/m^2
KARMALTCHAK	2.00m	8.1t/m^2
KURTHAL	2.00m	13.9t/m^2

Schedule 5

OPERATOR'S PRICE SCHEDULE

FOR A CONTRACT

TO **(i) DESIGN AND BUILD SEWAGE TREATMENT PLANT OF CAPACITY 60 MLD INCLUDING MAIN PUMPING STATION (97MLD) AND ALL APPURTENANT STRUCTURES AND ALLIED WORKS;**

(ii) OPERATION & MAINTENANCE OF THE COMPLETE WORKS OF SEWAGE TREATMENT PLANT FOR A PERIOD OF 15 YEARS AT PAHARI IN PATNA, STATE OF BIHAR, INDIA.

Schedule 6

TERMS AND PROCEDURE OF PAYMENT

FOR A CONTRACT

TO **(i) DESIGN AND BUILD SEWAGE TREATMENT PLANTOF CAPACITY 60 MLD INCLUDING MAIN PUMPING STATION (97MLD) AND ALL APPURTENANT STRUCTURES AND ALLIED WORKS; (ii) OPERATION & MAINTENANCE OF THE COMPLETE WORKS OF SEWAGE TREATMENT PLANTFOR A PERIOD OF 15 YEARS AT PAHARI IN PATNA, STATE OF BIHAR, INDIA.**

Schedule 6

ARTICLE 1. Terms And Procedure of Payment

1. 1 Mobilisation Advance:

Advance payment as an interest free loan for mobilisation and cash flow support for an amount equal to 10 % of the Design-Build Price as stipulated in the contract shall be paid to the Operator against 'Bank Guarantee for Advance Payment' for the same amount in two instalments as under subject to the provisions of this Contract.

(i) 5% within 30 days of effective date of contract; and

(ii) 5% on mobilization at the site including setting up of the Operator's office, deployment of manpower and machinery & equipments for construction.

Repayment of Mobilisation advance:

The Mobilization Advance paid to the Operator by the Owner shall be recovered commencing from the date on which the payment to the Operator has reached 20 % of the Value of Design, Build and Commissioning Services and shall be recovered at the rate of 15 % from each bill submitted by the Operator for payment. The entire amount of mobilization advance shall be recovered latest by the time payments up to 90% of the Value of Design, Build and Commissioning Services have been claimed by the Operator.

1.2 Secured Advance:

Secured Advance for the following non-perishable materials brought to site:

a. **STP** – DG Set, pumps, motors, and transformers subject to acceptance of the rate by the Design, Build Operations Engineer; and

Secured advance will be limited to 75% of invoice value or market value whichever is lower and will be subject to following conditions:

a. The quantities of materials are not excessive and shall be used within a reasonable time (not exceeding 3 months) as determined by the Owner.

b. The materials are in accordance with the specifications.

c. The materials have been delivered to site and are properly stored and protected against damage or deterioration to the satisfaction of the Owner.

d. The Operator's records of the requirement, orders, receipt and use of materials are kept in a form approved by the Owner and such records shall be available for inspection by the Owner.

e. The Operator has submitted with his monthly statement, the estimated value of the materials on site together with such documents as may be required by the Owner, for the purpose of valuation of materials and providing evidence of ownership and payment thereof.

f. Ownership of such materials shall be deemed to vest in the Owner for which the Operator has submitted an indemnity bond in an acceptable format.

Repayment of Secured advance:

The secured advance shall be repaid from each succeeding monthly payments to the extent the materials (for which advance was previously paid) have been incorporated into the works.

2. Payment of Design-Build Price (STP)

Subject to the provisions of this Contract Agreement and in consideration of the Operator undertaking the implementation of the Project, the Operator shall be paid as per the terms of payment contained hereunder:

Design-Build Price shall be paid in monthly amounts equal to the percentage of the Design-Build Services that the **Design-Build-Operations Engineer** indicates in the Design-Build Engineer's Statement were completed or supplied, as applicable, in the preceding month. The amount of payments for completion of each stage of works shall not exceed the amounts indicated below.

1.0	Mobilization Advance	10% as per Para 1 above
1A	**Civil works**	
	(a) Completion of Design and detailed engineering	5% of Contract Price as per SN 1A of Price Schedule Part A
	(b) After Completion of various stages of civil structures	
	Stage 1	20% of cost of itemised Contract Price as per SN 1A of Price Schedule Part A
	Stage 2	30% of cost of itemised Contract Price as per SN 1A of Price Schedule Part A
	Stage 3	20% of cost of itemised Contract Price as per SN 1A of Price Schedule Part A
	Stage 4	10% of cost of itemised Contract Price as per SN 1A of Price Schedule Part A
	(c) Finishing testing & commissioning,	15% of Contract Price as per SN 1A of Price Schedule Part A
1B	Installation, testing and commissioning of Electro – mechanical and Instrumentation equipment and accessories. Power connection of 1100 kw including construction of electrical	

	substation. Supply & Installation of as per required capacity Diesel Generating set	
	Completion of Design and detailed engineering	5% of Contract Price as per SN 1B of Price Schedule Part A
	Supply & Installation of equipment including Completion of allied works for mechanical/electrical /instrumentation works	80% of cost of itemised Contract Price as per SN 1B of Price Schedule Part A
	Testing at site	5% of cost of itemised Contract Price as per SN 1B of Price Schedule Part A
	Commissioning & Trial run	10% of cost of itemised Contract Price as per SN 1B of Price Schedule Part A
1C	Ancillary works like approach roads, bridges, compound wall with gates, internal roads, area grading etc.	
	After Completion of each activity	90%
	After commissioning & trial run	10%

2a. Description of various stages of construction of civil structures

Sl. No.	Stages of works	Completion stage	Type of Civil Structures
1	Stage- 1	Completion of Excavation & construction of Foundation including bottom raft/ pile foundation with pile cap, columns etc.	All type of water storage tanks including all type of settling tanks/ basins, disifection tanks, sumps of sludge/ filtrate/ effluent pumping stations, open channels etc.
		Completion up to Foundation & Columns/ beams/walls up to plinth level	Pumping stations, sludge pumping stations, filtrate pumping stations disinfection/ Disinfection unit building, control rooms, Panel rooms etc.
2	Stage 2	Completion of side walls up to 60% height	All type of water storage tanks including disinfection tanks, sumps of sludge/ filtrate/ effluent pumping stations, open channels etc.
		Completion of super structures including columns, beams,	Pumping stations, sludge pumping stations, filtrate pumping stations disinfection/

		walls, lintels, roof slab etc.	Disinfection unit building, control rooms, Panel rooms etc.
3	Stage 3	Completion of side walls up to 100% height	All type of water storage tanks including Disinfection unit, sumps of sludge/ filtrate/ effluent pumping stations, open channels etc.
		After completion of all required fittings, e.g. internal electrification, shutters, doors & windows & plastering etc.	Pumping stations, sludge pumping stations, filtrate pumping stations disinfection Unit building, control rooms, Panel rooms etc.
4	Stage 4	Completion of all type of ancillary structures including required interconnection with other units & any other required for completion of the structures.	All type of water storage tanks including Disinfection unit, sumps of sludge/ filtrate/ effluent pumping stations, open channels etc.
		Completion of ancillary structures roof treatment, plastering, flooring, cable trench, painting, varnishing, apron, drainage etc and any other work required for proper completion of the structure.	Pumping stations, sludge pumping stations, filtrate pumping stations disinfection Unit building, control rooms, Panel rooms etc.

2.1 The Operator shall submit his claim for the price adjustment, if applicable to this contract as per SCC 5.1(3), along with his claim for payment for the work done during the month, and price adjustment will be paid as per formulae stipulated in sSchedule 8 – Price Adjustment attached to the Contract.

3. Payment of Annual Operations and Maintenance Price for treatment of sewage up to the Threshold Sewage Flow (Part B of price schedule) (For STP):

a. Subject to deduction of Liquidated damages for Operation determined in accordance with SCC 5.4, and other provisions of this Contract Agreement and in consideration of the Operator undertaking the implementation of the Project, Owner shall pay, from the Operations Starting Date to the Operator, Annual O&M Price in equal monthly instalments, as determined in accordance with the provisions of this Clause and other relevant provisions of this Contract Agreement. The O&M Prices in respect of Operation and Maintenance services shall be paid for a period of 15 years as equated monthly amounts. The monthly payments shall be taken as one twelfth of the Annual Operations and Maintenance Price payable by the Owner to the Operator.

The Annual O&M price quoted for treatment of the Threshold Sewage Flow Rate shall be the base (minimum) price which shall not be subject to adjustment in case actual sewage flow rate falls short of the Threshold Sewage Flow Rate.

b. In the event that the occurrence of the Operations Starting Date is delayed due to Owner or Force Majeure events, the Annual O&M Price shall be paid from the date of delayed Operations Start Date till the end of the Term (which shall be extended by the numbers of days of delay) so as to achieve total O&M period of 15 years.

4. Payment of Additional Operations and Maintenance Price per MLD (for STP):

a. Additional Operation and Maintenance Prices shall be paid only in the event the amount of sewage treated by the STP exceeds the specified Threshold Sewage Flow as per the provisions of this Contract.

b. Subject to the provisions of this Contract Agreement and in the event of the Operator treating sewage in excess of the Threshold Sewage Flow, Owner shall pay on a monthly basis, Additional O&M Prices for each MLD of sewage above the Threshold Sewage Flow level treated and disposed in an environmentally compliant manner, as determined in accordance with the provisions of this Clause and other relevant provisions of this Contract Agreement. The Additional Operation and Maintenance Price stipulated in the contract for the relevant year shall be multiplied with the additional quantity of the Sewage treated and measured at the outfall point for that particular month.

5. Payment for power connection from Electricity Utility Company

The Operator shall be responsible for obtaining power connection at his cost for meeting power requirements during the **Design Build Period**, and all costs of energy consumption during this period shall be borne by the Operator.

For meeting power requirement during **Operation and Maintenance Period**, the Operator shall approach the Electricity Utility Company for getting the required sanction and power connection. The Owner shall assist the Operator on best effort basis in obtaining such power connection. The Operator will make all payments required for obtaining the power connection including security deposit, if any, and such amounts will be reimbursed by the Owner within 60 days of submission of Operator's claim.

However, the Operator shall be responsible for making payments directly to the Utility Company against all bills ("Electricity Dues") for electricity consumed in operation of the Sewage Treatment Plant (and MPS if included in the scope of the contract), as the cost of electrical energy needed for O&M is included in the O&M price stipulated in the contract.

6. Certification of payments by Design-Build- Operations Engineer

The Operator shall submit all monthly statements of claims for payment during the Design-Build Period and monthly bills for payment of the O&M charges and also the quarterly bills relating to additional O&M charges (referred to in paragraph 4 above) during the O&M Period to the Design-Build-Operations Engineer. After examining these bills, the Design-Build-Operations Engineer shall forward

them to the Owner along with the Interim Payment Certificate (IPC) for the amount considered payable by him as per terms and conditions of the Contract.

Each IPC submitted by the Design-Build-Operations Engineer shall carry a stipulation that the Performance Securities of the required amounts furnished by the Operator continues to be valid for a minimum of 120 days as on the date of **certification of payment** and the same shall be **verified by the paying authority** before releasing the payment against the IPC.

7. Price adjustment for O&M Prices

7.1 Owner shall pay O&M prices to the Operator subject to adjustments as per following sub-paragraphs.

7.2 Adjustment for Variation in Electricity Tariff

O&M prices shall be subject to adjustment on account of variation in the Electricity Tariff during the O&M period with reference to 'Base Rate of Electricity Tariff' specified at the time of invitation of bids, namely INR 6.50 per KWh. The said adjustment shall be determined on the basis of the actual electricity consumption and the Tariff evidenced by the Electricity bills paid by the Operator to the Electricity Utility Company, subject to the following provisions:

(a) Variation shall be limited to the Guaranteed Energy Consumption applicable for the level of effluent treated by STP, and for the level of effluent pumped by the respective SPSs during the quarter.

(b) Guaranteed Energy Consumption for the actual level of effluent handled by the STP will be calculated based on the energy consumption/MLD for the relevant year of the O&M period as quoted in the Operator's Price Schedule incorporated in Schedule 5 of the Contract.

The variation applicable as per this sub-paragraph 7.2 shall be claimed by the Operator on Quarterly basis.

7.3 Determination of cost of Diesel used in DG set

The Operator shall use back-up power supply from the DG set referred to in the preceding sub-paragraph during the period power supply from the Electricity Utility Company is not available. The DG set which shall be equipped with standard accessories will inter alia record (i) energy supplied/generated by it and (ii) total duration for which it was operated in a month/quarter. Cost of Diesel incurred by the Operator on account of energy obtained from the back-up power supply unit shall be determined as under:

a. Operator's representative and the Design Build Operations Engineer shall jointly take the readings from the meters and gauges (sealed jointly by them at the commencement of the O&M period) of DG set every month to arrive at the total number of energy units (KWh) obtained from the back-up power supply unit.

b. Number of energy units (KWh) obtained from the back-up power supply unit during the month determined as per (a) above shall, however, be adjusted so that the **'adjusted units of back-up energy supply'** shall not exceed the Guaranteed Energy Consumption applicable for the level of effluent treated by STP, and for the level of effluent pumped by the respective SPSs during the

month **minus** units of energy (KWh) obtained during the month from the Electricity Utility Company as evidenced by the Bill of the Utility Company for the corresponding month.

c. Rated specific fuel consumption of the DG set specified by the Manufacturer in its Specifications will be adopted for determining the estimated diesel consumption during the month for producing the 'adjusted units of back-up energy supply'.

d. Cost of estimated Diesel consumption in a month for producing the 'adjusted units of back-up energy supply' shall be based on the price of diesel prevailing at mid-point of the month in IOC or HPCL's retail outlets in the city/cities where STP and each SPS is installed. Cost figures of three months shall be added to arrive at the Cost of Diesel consumption in a quarter.

7.4 Adjustment in O&M Price for energy taken from the back-up power supply unit

O&M prices quoted in the Operator's Price Schedule incorporated in Schedule 5 take into account energy requirements of the STP and each SPS being met fully from power supplied by the Electricity Utility Company. Compensation payable to the Operator for Energy supply taken from an alternate source, namely the back-up power supply Unit shall be corrected as under:

Adjustment in quarterly O&M price = Cost of Diesel consumption in a quarter determined in accordance with sub-paragraph 7.3 (d) above **minus** 'adjusted units of back-up energy supply' determined as per sub-paragraph 7.3 (b) as applicable for the quarter multiplied by the 'Base Rate of Electricity Tariff'.

The variation in O&M price applicable as per sub-paragraphs 7.3 and 7.4 shall be claimed by the Operator on Quarterly basis.

8 Right to withhold:

The Design-Build-Operations Engineer / Owner may refuse to approve any payment, because of subsequently discovered evidence as a result of subsequent inspections or tests, nullify any such payment previously approved and pay to such extent as may be necessary in the opinion of the Design-Build-Operations Engineer because (a) the work is defective (b) third party claims have been filed or there is reasonable evidence indicating probability of such claims (c) of the Operator's failure to make payment properly to sub-contractors or for labor, materials or equipment (d) of damage to another Operator or to the property of others caused by the Operator (e) of the Operator's neglect or unsatisfactory proceeding of the work (f) Operator owes a liability or a sum to Owner.

When the grounds for withholding payments are removed, payments shall be made for amounts withheld to the extent the Operator is entitled to payment.

Schedule 7

LIQUIDATED DAMAGES - OPERATIONS

FOR A CONTRACT

TO **(i) DESIGN AND BUILD SEWAGE TREATMENT PLANTOF CAPACITY 60 MLD INCLUDING MAIN PUMPING STATION (97MLD) AND ALL APPURTENANT STRUCTURES AND ALLIED WORKS; (ii) OPERATION & MAINTENANCE OF THE COMPLETE WORKS OF SEWAGE TREATMENT PLANTFOR A PERIOD OF 15 YEARS AT PAHARI IN PATNA, STATE OF BIHAR, INDIA.**

ARTICLE 1. Liquidated Damages (Operations) for STP

Liquidated Damages (GC Section 5.4)

1) In case the Operator fails to meet the technical standards more specifically towards the quality of the treated sewage, the Operator shall pay to the owner Liquidated Damages amounting to **INR.37,000**/-per day of occurrence, over and above the costs and compensation that might be required by the Owner to pay to the affected people and parties in the effluent discharge area.

2) Applicability of the Liquidated Damages shall be determined based on the weekly monitoring report of the quality of the treated effluent, submitted by the nominated Laboratory, namely.Bihar State Pollution Control Board, Patna. The said Laboratory will test the samples [minimum 3 grab samples representative of different flow conditions (quantum and quality wise) in the day] of the treated effluent drawn every week jointly by the Owner and the Operator and the results of the test reports shall be binding on both the parties.

3) If any of the grab samples of the effluent so tested fails to meet with the CPCB /State PCB standards stipulated in the Contract, Liquidated Damages as stated herein above shall be deducted from the O & M payments due to the Operator for all the seven days of the week.

4) The Operator shall maintain the STP for treating the sewage without any interruption by ensuring timely measures for preventive maintenance. However, if the STP is unavailable for treating the sewage for a period exceeding 24. Hours for reasons attributable to the Operator, Liquidated Damages shall be levied by the Owner at the rate of INR 37,000/per day or part of the day for the period the STP is not available beyond the allowed time of 24Hours as referred to above for repair/rectification. The Liquidate Damages shall apply over and above the costs and compensation which shall be reimbursed by the Operator in case such costs/compensations are required to be paid by the Owner to the affected people and parties in the effluent discharge area.

5) The Operator shall maintain the minimum percentage of treated water available for reuse as described in schedule 2 clause 13.7 (e) without any interruption, Liquidated Damages shall be levied by the Owner at the rate of INR 2,50,000/ per quarter for the period the reuse percentage is less than the prescribed value by more than 5% for reasons attributed to the operator. The Liquidated Damages shall be reimbursed to the Operator in case operator achive the average minimum availability for reuse for a year. However, the value of minimum reuse availability specified for the year shall be binding on the Operator.

Schedule 8

Price Adjustment

For A Contract

TO **(i) DESIGN AND BUILD SEWAGE TREATMENT PLANTOF CAPACITY 60 MLD INCLUDING MAIN PUMPING STATION (97MLD)AND ALL APPURTENANT STRUCTURES AND ALLIED WORKS; (ii) OPERATION & MAINTENANCE OF THE COMPLETE WORKS OF SEWAGE TREATMENT PLANTFOR A PERIOD OF 15 YEARS AT PAHARI IN PATNA, STATE OF BIHAR, INDIA.**

SCHEDULE 8

PRICE ADJUSTMENT FOR DESIGN BUILD PRICE

1.1 For the purpose of Price Adjustment, the following definition/terms shall be applicable.

Base Date: For the purpose of Price Adjustment Clause, 'Base Date' shall be the date 28 days prior to the deadline for submission of bids for the contract. Thus Base date for this contract is..... *[EA should insert the date at the time of signing the contract.]*

R = Total value of work done during the month, certified by the Design-Build Operations Engineer. It would include the amount of secured advance for materials paid for (if any) during the quarter, less the amount of the secured advance recovered, during the quarter. It will exclude value for works executed under variations for which price adjustment will be worked separately based on the terms mutually agreed.

Weightages for labor and various materials to be used in the Price Adjustment formulas laid down in this Schedule 8 shall be based on the figures quoted by the Operatoras a part of its bid under the Schedule of Adjustment Data (in the Appendix to Bid), and as accepted by the Owner.

1.2 Price Adjustment for Sewage Treatment Plant

The amounts payable to the Operator towards Part A (STP) of the price schedule shall be adjusted for rises or falls in the cost of labour, goods and other inputs to the Design Build Services, by the addition or deduction of the amounts determined by the formulae prescribed in this Sub-Clause. To the extent that full compensation for any rise or fall in costs is not covered by the provisions of this or other Clauses, the Accepted Contract Amount shall be deemed to have included amounts to cover the contingency of other rises and falls in costs.

1.2.1 Adjustment of Price for Labour component

(i) Price adjustment for increase or decrease in the cost due to labour shall be paid in accordance with the following formula:

$$\mathbf{V_L} = 0.85 \times W_L \times R \times (L_i - L_o)/L_o$$

V_L = increase or decrease in the cost of work during the month under consideration due to changes in rates for local labour.

L_o = the consumer price index for industrial workers for Munger Jamalpur, Biharentre as on the Base Date as published by Labour Bureau, Ministry of Labour & Employment, Government of India.

L_i = The average consumer price index for industrial workers for Munger Jamalpur, Bihar centre published by Labour Bureau, Ministry of Labour & Employment,

Government of India - applicable on the date 49 days prior to the last day of the month to which the particular payment relates.

W_L = Weightage for Labour Component

[1] *Index numbers are available in the website http://labourbureau.nic.in/indnum.htm*

1.2.2 Adjustment of Price for Local materials

(ii) Price adjustment for increase or decrease in cost of local materials other procured by the Operator shall be paid in accordance with the following formula:

$$\mathbf{V_m = 0}.85 \times W_M \times R \times (M_i - M_o)/M_o$$

V_m = Increase or decrease in the cost of work during the month under consideration due to changes in rates for local materials.

M_o = The all India average wholesale price index (all commodities) for the base date, as published Economic Advisor to the Government of India, Ministry of Commerce and Industry..

M_i = The all India average Wholesale Price Index (all commodities) published by Economic Advisor to the Government of India, Ministry of Commerce and Industry - applicable on the date 49 days prior to the last day of the month to which the particular payment relates.

W_M= Weightage for Local Materials

Schedule 9

SCHEDULE OF PERFORMANCE GUARANTEE

For A Contract

TO **(i) DESIGN AND BUILD SEWAGE TREATMENT PLANTOF CAPACITY 60 MLD INCLUDING MAIN PUMPING STATION (97MLD)AND ALL APPURTENANT STRUCTURES AND ALLIED WORKS;(ii) OPERATION & MAINTENANCE OF THE COMPLETE WORKS OF SEWAGE TREATMENT PLANT, FOR A PERIOD OF 15 YEARS AT PAHARI IN PATNA, STATE OF BIHAR, INDIA.**

FORM OF PERFORMANCE GUARANTEE

_____*[Bank's Name, and Address of Issuing Branch or Office]*

Beneficiary: _____*[Name and Address of Owner]*

Date: _____

PERFORMANCE GUARANTEE NO.: _____

We have been informed that _____*[name of Bidder]* (hereinafter called "the Bidder") has entered into Contract No. _____*[reference number of the contract]* dated _____ with you, concerning a contract to design, build, refurbish and operate a Sewerage Treatment Plant in *[Name of Location]* (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, a performance guarantee is required.

At the request of the Operator, we _____*[name of Bank]* hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of _____*[amount in figures]* (_____)*[amount in words]*, upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contract is in breach of its obligations under the Contract, without your needing to prove or to show grounds for your demand or the sum specified therein.

This guarantee shall expire no later than the earlier of:

(a) six months after the End Date, as defined in the Contract; or

(b) six months after the date of termination of the Contract pursuant to its terms.

Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees, (URDG) 2010 Revision, ICC Publication No. 758 except that the supporting statement under Article 15(a) is hereby excluded.

Yours truly,

[Name of Bank]

_____

Authorised Signature

Environmental, Social, Health and Safety (ESHS) Performance Security

[Guarantor letterhead or SWIFT identifier code]

Beneficiary: *[insert name and Address of* Employer*]*

Date: _ *[Insert date of issue]*

ESHS PERFORMANCE GUARANTEE No.: *[Insert reference number]*

Guarantor: *[Insert name and address of place of issue, unless indicated in the letterhead]*

We have been informed that _____ (hereinafter called "the Applicant") has entered into Contract No. _____ dated _____ with the Beneficiary, for the execution of _____ (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, a performance guarantee is required.

At the request of the Applicant, we as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of _____ (),[1] such sum being payable in the types and proportions of currencies in which the Contract Price is payable, upon receipt by us of the Beneficiary's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating that the Applicant is in breach of its Environmental, Social, Health and/or Safety (ESHS) obligation(s) under the Contract, without the Beneficiary needing to prove or to show grounds for your demand or the sum specified therein.

This guarantee shall expire, no later than the …. Day of ……, 2… *[insert the date six months after the End Date, as defined in the Contract]*, and any demand for payment under it must be received by us at this office indicated above on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

_____

[signature(s)]

[1] *The Guarantor shall insert an amount representing the percentage of the Accepted Contract Amount specified in the Letter of Acceptance, less provisional sums, if any, and denominated either in the currency (cies) of the Contract or a freely convertible currency acceptable to the Beneficiary.*

Note: All italicized text (including footnotes) is for use in preparing this form and shall be deleted from the final product.

FORM OF BANK GUARANTEE – ADVANCE PAYMENT

[Name of Contract]

To: *[Name and address of Owner]*

Dear Ladies and/or Gentlemen,

We refer to the Contract Agreement ("the Contract") signed on *[date]* between you and *[name of Operator]* ("the Operator") concerning the Services set out in the Contract to Design, Build, Refurbish and Operate a Sewage Treatment Plant.

Whereas, in accordance with the terms of the Contract, the Owner agreed to pay or cause to be paid to the Operator an advance payment in the amount of *[number]* percent (____%) of the Contract Price for the Design-Build, Refurbish, Commission, Operate and Maintaining STP for 15 years, namely a payment of: *[amount of foreign currency in words], [amount in figures],* and *[amount of local currency in words], [amount in figures].*

By this letter we, the undersigned, *[name of Bank]*, a Bank (or company) organised under the laws of *[country of Bank]* and having its registered/principal office at *[address of Bank]*, do hereby jointly and severally with the bidder irrevocably guarantee repayment of the amounts upon the first demand of the Owner without cavil or argument in the event that the bidder fails to commence or fulfil its obligations under the terms of the Contract, and in the event of such failure, refuses to repay all or part (as the case may be) of the advance payment to the Owner.

Provided always that the Bank's obligation shall be limited to an amount equal to the outstanding balance of the advance payment, taking into account such amounts that have been repaid by the Bidder from time to time in accordance with the terms of payment of the Contract as evidenced by appropriate shipping documents or payments certificates.

This Guarantee shall remain in full force from the date upon which the advance payment is received by the bidder until the date upon which the bidder has fully repaid the amount is advanced to the Owner in accordance with the terms of the Contract. At the time at which the outstanding amount isnil, this Guarantee shall become null and void, whether the original is returned to us or not.

Any claims to be made under this Guarantee must be received by the Bank during its period of validity.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

Yours truly,

[Name of the Bank] & Authorized Signature

Schedule10

TECHNICAL SPECIFICATIONS FOR CONSTRUCTION AND OPERATION AND MAINTENANCE PHASE[13]

For A Contract

TO **(i) DESIGN AND BUILD SEWAGE TREATMENT PLANT OF CAPACITY 60 MLD INCLUDING MAIN PUMPING STATION (97MLD) AND ALL APPURTENANT STRUCTURES AND ALLIED WORKS; (ii) OPERATION & MAINTENANCE OF THE COMPLETE WORKS OF SEWAGE TREATMENT PLANT FOR A PERIOD OF 15 YEARS AT PAHARI IN PATNA, STATE OFBIHAR, INDIA.**

[13] *Specifications pertaining to general civil works and the material requirements have been specified herewith. However the specifications and the testing requirements for STP shall be specified in accordance with the technology being selected by the bidder and the detailed design submitted.*

GENERAL

The 60 MLD capacity sewage treatment plant to be Designed, Build, Tested and Commissioned by the Operator / Operator shall comply with the guidelines contained in "Manual on Sewerage and Sewage Treatment" Latest Edition published by the Central Public Health & Environmental Engineering Organization (CPHEEO), Ministry of Urban Development, Government of India. The Technical Standards and Specifications contained in this contract shall be read along with the following standard specifications (latest versions) published by the Bureau of Indian Standard listed below: The list is not exclusive and the operator shall be responsible to follow the appropriate standards:

i) IS 6280 – 1971 – Sewage Screens

ii) IS 8413 – 1982 – Biological Treatment Equipment – Part II and its modifications

iii) IS 10037 – Part I – 1981 & Part II & III – 1983 – Sludge dewatering equipments

iv) IS 10261 – Requirements for settling tank for waste water.

v) EPA Design Manual: Municipal Wastewater Disinfection (1986), EPA UV disinfection guidance Manual (2003), *Guidelines for Environmental Management Disinfection of Treated Wastewater EPA Victoria* and other relevant National /International guidelines.

vi) IS 5600 – 1970 - Sewage and Drainage Pumps

vii) IS 6279 – 1971 – Grit Removal devices

Documents Comprising the Technical Standards Appendix

The Technical Standards Appendixconsists of Technical Specification to be followed for during Construction of Sewage treatment Plant, and other ancillary/ allied works for all Civil, Mechanical, Electrical, Instrumentation required to be executed under this Contract. Notwithstanding to the said specification, the bidder is instructed the adopt and follow necessary standard and approved Codes /specification wherever required for fulfillment of all the works under this contract.

Supplementing the General Conditions and Design-Build or Operating Services Appendix

The Technical Standards specified in Schedule 10 shall be read along with the GCC / SCC and Design-Build and Operations Services Appendices for the purpose of providing greater specificity of the technical standards which the Bidder is required to meet.

Design-Build or Operations Services Appendix Description

The descriptions contained in the Technical Standards Appendix Chart entitled, "Description of Service" are for the convenience of the Bidder and do not supersede the actual wording of the Design-Build and Operations Services Appendices.

General Quality Standards

The term "General Quality Standard" means a standard of performance which,

(a) is competent, efficient, economical and in accordance with internationally accepted techniques used in the sewer disposal and civil works construction industries;

(b) is in accordance with professional engineering, accounting and consulting standards, as applicable, recognized by national or international professional bodies;

(c) is in accordance with sound management, commercial, technical, design and engineering practices;

(d) employs appropriate technology and safe and effective equipment, machinery and methods;

(e) is in accordance with national and local standards and codes in the Owner's Country;

(f) protects the interests of the Authorities;

(g) is in accordance with the Applicable Law;

(h) is in accordance with the technical specifications and design standards of the Owner as provided to the Bidder;

(i) is in accordance with the applicable Environmental Assessment and Environmental Management and Mitigation Plan; and

(j) is in accordance with the Design-Build Documents as approved by the Owner.

In the event of any conflict or inconsistency between any standards that comprise the General Quality Standard, local and national standards in the Owner's Country shall prevail over international standards.

The Operator shall, at all times, carry out the Services in accordance with the Technical Standards as specified and, where a specific technical standard of quality of performance has not been specified, the Bidder shall perform the Services to the standard of "General Quality Standards".

If the Owner is subjected to fines or penalties as a result of the operator's breach of these Technical Standards, such fines or penalties shall be paid by the Bidder

Design-Build Services

In respect of the Design-Build Services, the operator shall ensure that the design of the STP is prepared by qualified designers who are professionally recognized to design the Sewage Treatment Plant and allied services.

The Operator warrants that the operator and its designers have the experience and capability necessary for the design.

The offers shall be based on the operator's own design and operating philosophy which is to be based on the selected modern treatment technologies and should be within the overall framework and guidelines specified in the bid document and its specifications. The bidder's design for the entire facility shall be such that the project shall

- Require minimum land space
- Require minimum energy for treatment of sewage
- Generates treated effluent that can be recycled

Planning of the entire system should be done in such a manner so as to optimize capital and operational costs of treatment of sewage and maintenance of the Plant on whole on sustainable basis.The design submitted by the operator shall be proof checked by qualified Engineering Institute (Approved by the DBO Engineer), for which the charges shall be borne by the operator. The delay in checking designs by the third party as above shall be treated as the delay on the partof the operator for operation of the tender clause

CIVIL WORKS

1 Specific Civil/Structural Work Requirement

1.1 Design Submissions:

Complete detailed design /hydraulic calculations & drawings of foundations and superstructure together with general arrangement drawings and explanatory sketches shall be submitted to the Owner. Separate calculations for foundations or superstructures submitted independent of each other shall be deemed to be incomplete and will not be accepted. Though no GA drawings of all units are required along with the bid, a schematic layout /GAD shall be submitted along with the bid. The design considerations described herewith establish the minimum basic requirements of plain and reinforcement concrete structures, masonry structures and structural steel works. However, any particular structure shall be designed for the satisfactory performance of the functions for which the same is being constructed. The Operator shall also take care to check the stability of partly.

1.2 Design Standards

All designs shall be based on the latest International or Indian Standard (IS) Specifications or Codes of Practice. The design standards adopted shall follow the best modern engineering practice in the field based on any other international standard or specialist literature subject to such standard reference or extract of such literature in the English language being supplied to and approved by the Owner or Owner's Representative. In case of any variation or contradiction between the provision of the IS Standards or Code and the specifications given with the submitted bid document, the provision given in the Specification shall be followed.

1.3 Design Loadings

All buildings and structures / underground structures shall be designed to resist the worst combination of the following loads/stresses under test and working conditions these include dead load, live load, wind load, seismic load, stresses due to temperature changes, shrinkage and creep in materials, dynamic loads and uplift pressure.

i. **Dead Load:** This shall comprise all permanent construction including walls, floors, roofs, partitions, stairways, fixed service equipment and other items of machinery. In estimating the loads of process equipment all fixtures and attached piping shall be included, but excluding contents shall be considered. The following minimum loads shall be considered in design of structures:

S.No	Parameter	Load

1	Weight of water	10.0 KN /m3
2	Weight of soil (irrespective of strata available at site and type of soil used for filling etc) However, for checking stability against uplift, actual weight of soil as determined by field test shall be considered	20.0 KN/m3
3	Weight of plain concrete	24.0 KN/m3
4	Weight of reinforced concrete	25.0 KN/m3
5	Weight of brickwork (exclusive of plaster)	22.0 KN/m3
6	Weight of plaster to masonry surface	18.0 KN/m3
7	Weight of granolithic terrazzo finish or rendering screed, etc	24.0 KN/m3
8	Weight of sand (filter media)	25.0 KN/m3
9	Roof Treatment	25.0 KN/m3
10	Brick bat coba for toilet filling	20.0 KN/m3

ii. **Live Load:** Live loads shall be in general as per IS 875. However, the following minimum loads shall be considered in the design of structures.

S.No	Location	Live Load
1	Floor supporting Pumping Machinery	1000 kg/sq.m
2	Storage, Maintenance Bay, Air Blower	750 kg/sq.m
3	Platform, Staircase, Corridors, Walkways	500 kg/sq.m
4	Toilet	200 kg/sq.m
5	Roof Slab	150 kg/sq.m

In the absence of any suitable provisions for live loads in IS Codes or as given above for any particular type of floor or structure, assumptions made must receive the approval of the Owner's Representative prior to starting the design work. Apart from the specified live loads or any other loads due to material stored any other equipment load or possible overloading during maintenance or erection/construction shall be considered and shall be partial or full whichever causes the most critical condition.

iii. **Wind Load:** Wind loads shall be as per IS: 875- 2002 Part-III.

iv. **Dynamic Load:** Dynamic loads due to working of plant items such as pumps, blowers, compressors, switchgears, traveling cranes, etc shall be considered in the design of structures.

v. **Other Loads:** In addition to earth pressure and water pressure etc., the surcharge of 1 Ton/sq.m shall be taken into account in the design for channels, tanks, pit etc.

vi. **Earthquake Load:** This shall be computed as per IS: 1893 – 2000.

1.4 Joints

Movement joints such as expansion joints, complete contraction joints, partial contraction joints and sliding joints shall be designed to suit the structure as per relevant IS code provisions. Expansion joints of suitable gap at intervals not more than 30 m shall be provided in walls, floors and roof slabs of water retaining structures.

Construction joints shall be provided at right angles to the general direction of the member. The locations of construction joints shall be decided on convenience of construction. To avoid segregation of concrete in walls, horizontal construction joints are normally to be provided at every 2 m height, GI 18 guage/PVC water stops of suitable type and minimum 230 mm width, 6 m thick shall be used for walls and base slabs.

1.5 Water Retaining Structures

Liquid retaining/conveying structures including the members covering the same (such as roof of a chamber, channel etc.) shall be designed by uncracked method of design as per BIS: 3370 and 6494. Basement RC walls and slabs below ground shall also be designed by uncracked method of design as liquid retaining structures. Shear shall be checked by working stress method as per BIS: 456. Minimum temperature and shrinkage reinforcement shall be 0.3% in each direction.

All underground or partly underground liquid containing structures shall be designed for the following conditions:

- Liquid depth up to full height of wall: no relief due to soil pressure from outside to be considered.
- Structure empty (i.e. empty of liquid, any material, etc) full earth pressure including saturated condition and surcharge pressure wherever applicable to be considered.
- Structures shall be designed for uplift in empty conditions as per water table indicated in the geotechnical report or high flood level, whichever is maximum. No reduction factor for the uplift force shall be considered.

- The dead weight of the empty structures should provide a safety factor of not less than 1.2 against uplift pressures during construction and in service.
- Wall shall be designed under operating conditions to resist earthquake forces from earth pressure mobilization and dynamic water loads;
- Underground or partially underground structures shall be checked against stresses developed due to any combination of full and empty compartments with appropriate ground/uplift pressures from below to base slab
- The walls and base slabs shall be designed for saturated earth/water pressure corresponding to high flood level or finished plot level whichever is higher.
- For design purpose, sub soil water level is to be considered as 2 meter below the average natural ground level. (Uplift pressure on the foundation shall be considered as per water table at site, in the rainy season. However, for design purpose,minimum water table shall be considered at 2 m below the average ground level

1.6 Foundation

- The minimum depth of foundations for all structures, equipment's buildings and frame foundations and load bearing walls shall be as per IS: 1094.
- The earth fill above virgin ground level till formation level shall be taken as a surcharge load and shall be added in the loads coming on foundations appropriately
- Care shall be taken to avoid the foundations of adjacent buildings or structure foundations, either existing or not within the scope of this Contract Suitable adjustments in depth, location and sizes may have to be made depending on site conditions. No extra claims for such adjustments shall be accepted by the Owner.
- Special attention is drawn to danger of uplift being caused by the ground water table
- Plinth level of all structures/top of tanks shall be at least (1000) mm above high flood level.

1.7 Design Requirements

The following are the design requirements for all reinforced or plain concrete structures:

- All blinding and leveling concrete shall be minimum 100 mm thick in concrete grade M10 for Building & 150 mm thick in concrete grade M15 for Water Retaining Structures as per IS -3370 (Part- 1)-2009 latest version..
- All structural reinforced concrete shall be with a maximum 25 mm aggregate size for footings and base slabs and with a maximum 20 mm aggregate size for all the Water Retaining Structures & other structural members.
- All liquid retaining structures shall be designed as per IS: 3370. The minimum grade of concrete shall be M30 using Sulphate resistant Cement.
- All Buildings, Pipe Pedestals, Thrust Block, Pump Foundation & other structures shall be designed as per IS-456. The minimum grade of concrete shall be M20.

- The maximum free water cement ratio shall not exceed 0.5 for all liquid retaining structures.
- The amount of reinforcement in each of the two directions at right angles within each surface zone should not be less than the minimum specified as IS:3370 or IS:456 which ever is applicable for the type of structure.
- Use of pressure relief valves to reduce uplift pressure due to ground water table shall not be allowed.
- All buildings shall have a minimum 1.0 m wide, 100mm thick plinth protection paving in M15 grade concrete or stone slabs/tiles. All plinth protection shall be supported on well-compacted strata.

The following minimum thickness shall be used for different reinforced concrete members irrespective of design thickness.

S.No	Civil Member	Width(mm)
1	Walls for liquid retaining structures	200
2	Base Slab of liquid retaining structures	350
3	Wall foundation (At Junction of Base Slab & Wall) of liquid retaining structures	400
4	Roof Slab of liquid retaining structures	150
5	Walls of Launders	150
6	Base slab of Launders	125
7	Floor slabs including roof slabs, walkways canopy slabs	100
8	Walls of cables/pipe trenches, underground pits, etc	125
9	Footing – Edge Thickness	250
10	Footing – At the Face of Column	450
11	Column	300 (width) 300 (depth)
12	Parapets, chajja	100
13	Precast trench cover	75
14	Beam	300 (width) 300 (depth)

1.8 MINIMUM COVER TO REINFORCEMENT

S.No.	Member	Details	Cover (mm)

1	Slab	Free Face	20
		Face in contact with earth	30
2	Beam	Top /Bottom	40
		Side	30
		Face in contact with earth	40
3	Column and pedestal	Super Structure	40
		Face in contact with earth	40
4	Retaining wall, Basement and Pit wall	Free side	30
		Face in contact with earth	30
5	Liquid Retaining Structure	Face in contact with liquid	40
		Face in contact with earth	40
		Free face	40
6	Foundation	Bottom	60
		Top	60

1.9 Minimum Bar Diameter

S.No	Member	Diameter (mm)
1	Major Foundation	10
2	Block Foundation Main Bars	8
3	Block Foundation – Tie Bars	8
4	Minor Foundation (Local Foundation etc.)	8
5	Column, Pedestal – Main Bars	12
6	Column, Pedestal – Ties	8
7	Beam – Main Bars	12
8	Beam – Anchor Bars	10
9	Beam – Stirrups	8
10	Slab – Main Bars	8

S.No	Member	Diameter (mm)
11	Slab – Distribution Bars	8
12	Wall – Main Bars	10
13	Wall – Distribution Bars	8
14	Minor elements such as chajjas, Lintel Beams etc	8

1.10 Bar Spacing

S.No	Member	Minimum (mm)	Maximum (mm)
1	Foundations	125	200
2	Slabs	100	300
3	Stirrups for Beams	100	300
4	Ties for Columns, Pedestals	100	300
5	Walls	100	300

• Bar spacing shall be provided in multiple of 25 mm.

The design submitted by the operator shall be proof checked from the nearest IIT / Engineering college (Approved by the competent authority), for which the scrutiny charges shall be borne by the operator. The delay in checking designs by the third party as above shall be treated as the delay on the part of the operator for operation of the tender clause.

2 MATERIALS IN GENERAL

The term “Materials” shall mean all materials, goods and articles of every kind whether raw, processed or manufactured and equipment and plant of every kind to be supplied by the Bidder for incorporation in the Works.

Expect as may be otherwise specified for particular parts of the works the provision of clauses in “Materials and Workmanship” shall apply to materials and workmanship for any part of the works. All materials shall be new and of the kinds and qualities described in the Contract and shall be at least equal to approved samples.

As soon as practicable after receiving the order to commence the works, the Bidder shall inform the Owner’s Representative of the names of the suppliers from whom he proposes to obtain any materials but he shall not place any order without the approval of the Owner’s Representative which may be withheld until samples have been submitted and satisfactorily tested. The Bidder shall thereafter keep the Owner’s Representative informed of orders for and delivery dates of all materials.

Materials shall be transported handled and stored in such a manner as to prevent deterioration damage or contamination failing which such damaged materials will be rejected and shall not be used on any part of the Works under this contract.

2.1 Cement

The Cement shall be Sulphate Resistant Cement grade - 43 in all water retaining structures and SRC 43 grade cement for other structures, confirming to the relevant B.I.S. codes and approved by the Owner's Representative. Manufacturers Test Certificate shall have to be furnished. Minimum cement consumption for RCC M20 shall be considered as 350 kg/cum and for RCC M25 shall be 380 kg/cum. mixing of fly ash in the concrete shall not be considered. Approved Manufacturers of Cement of reputed firm with ISO certification shall be used

2.2 Reinforcement Steel

Reinforcement Steel shall confirm to BIS Specification 432-1966 (with up to date revision) and B.I.S. Specification 1786-1985 (with up to date revision). All Reinforcement Steel will be TMT Grade approved by the Owner.

2.3 Minimum Cement Content

The minimum cement content for each grade of concrete shall be as per table below.

S.No.	Grade of Concrete	Minimum Cement Content in Concrete (Kg/m3 of finished concrete)
1	M15	240
2	M20	300
3	M25	300
4	M30	320

Please refer clause no. 8.2.4 Table no: 5 for reinforced concrete of IS code 456 – 2000 (latest version)

3 SAMPLES AND TESTS OF MATERIALS

The operator shall submit samples of such materials as may be required by the Owner and shall carry out the specified tests directed at the site or at the supplier's premises or at the laboratory approved by the Owner or the Owner's Representative. Samples shall be submitted and tests carried out sufficiently early to enable further samples to be submitted and tested if required by the Owner.

The operator shall give the Owner seven days' notice in writing of the date on which any of the materials will be ready for testing or inspection at the supplier's premises or at a laboratory approved by the Owner. Owner or the Owner's Representative shall attend the test at the appointed place within seven days of the said date on which the materials are expected to be ready for testing or inspection

according to the Bidder, failing which the test may proceed in his absence unless instructed by the Owner's Representative to carry out such a test on a mutually agreed date in his presence.

The operatorshall in any case submit to Owner within seven days of every test such number of certified copies (3) of the test results as the Owner's Representative may require.

Approval by the Owner's Representative as to the placing of orders for materials or as to samples or tests shall not prejudice any of the Owner's Representative powers under the Contract. The provisions of this clause shall also apply to materials supplied under any nominated sub-contract.

4 ORIENTATION

The works shall be laid out within the confines of the site in order to be compatible with the existing infrastructural facilities, inlet and outlet pipe work/channels and nearby water bodies. Underground services requiring to be relocated in order to accommodate the proposed site layout shall be relocated by the operatorto alignments approved by the Owners Representative.

4.1 Buildings and Structures

All the building and structure works shall generally comply with the following Owner's Requirements unless otherwise specified elsewhere:

All building works shall be of reinforced concrete framework.

All external walls shall be in 230 mm thick brick masonry built in cement mortar (1:5). Transoms and mullions of 115 mm x 230 mm size with four numbers 6 mm bars and 6 mm links at 150 mm c/c shall be provided to form panels not exceeding 3,500 mm x 3,500 mm in size. All internal partition walls except for toilets shall be in 230 mm thick brick masonry built in cement mortar 1:5 with transoms and mullions as in (b) above. Toilet partition walls shall be in 115 mm thick brick masonry built in cement mortar 1:4 and shall have transoms and mullions as in (b) above and shall form panels not exceeding 1,200 mm x 1,200 mm in size.

Finishes to concrete liquid retaining structures shall be:

a. F1 - External surfaces, buried

b. F2 - External surfaces exposed and up to 300 mm below ground level

c. F2 - Internal surfaces

Finishes to other concrete structures shall be:

a. F1 – Buried

b. F1 - Exposed, where plastering is specified

c. F2 – Exposed

All internal masonry surfaces finish shall have 12 mm thick plain faced cement plaster in cement mortar (1:4) with neat cement finish on top. Over this, one coat of primer and two coats of plastic emulsion paint of approved quality and shade shall be provided.

All external masonry and concrete with rough board finish shall have 20 mm thick sand faced cement plaster in two coats, base coat 12 mm thick in cement mortar 1:4 and finishing coat 8 mm thick in cement mortar 1:4. Waterproofing compound of approved make and quality shall be added to the cement mortar in proportions as specified by the manufacturer.

All external surfaces above ground level shall have one coat of primer and two coats of waterproof cement based paint of approved quality and shade. A coat of silicone water repellent paint shall also be applied thereon.

Toilet areas, walls and ceilings, shall have one coat of primer and two coats of plastic emulsion paint. Toilet floor slab shall be filled with brick bat coba (broken bricks in lime) and provided with waterproofing as per the specifications of an approved specialist waterproofing company. The finished floor level in toilet areas shall be 25 mm below general finished floor level elsewhere in the building.

The flooring in all areas except toilets and staircases, pumping stations, Disinfection unit building, centrifuge building, workshop, store room D.G. room shall be in 250 mm x 250 mm x 20 mm thick marble mosaic tiles of approved make unless otherwise specified, shade and pattern and placed in cement mortar 1:4 to give overall thickness of 50 mm. Half tile skirting shall also be provided in these areas.

The flooring in the pumping stations, Disinfection unit building, centrifuge building, workshop, D.G.room shall be 60mm thick cement flooring with metallic concrete hardener topping, under layer of 42mm thick cement concrete 1:2:4 (1 cement : 2 coarse : 4 graded stone aggregate 16mm thick nominal size) and top layer of 18mm thick metallic concrete hardener consisting of mix 1:2 (1 cement : 2 stone aggregate 6mm nominal size) by volume & mixed with metallic hardening compound of approved quality @ 3 kg/m2 including cement slurry and rounding off edges.

The flooring in Operator's room, loading/unloading bay, MCC cum Panel room shall be in 25mm thick Kota stone slab of approved shade and pattern and placed over 20 mm thick base of cement mortar 1:4 to give overall thickness of 45 mm. Half tile skirting shall also be provided in these areas.

Toilet areas shall have 450 mm x 450 mm x 25 mm thick polished Kota stone tiles placed in cement mortar 1:4 to give an overall thickness of 50 mm. 2100 mm high dado, in 150 mm x 150 mm x 6 mm thick glazed tiles (approved make, shade and pattern) placed in cement mortar 1:3 shall also be provided in these areas.

The flooring along with skirting in administration cum laboratory building shall be 20 mm thick mirror polished, machine cut granite slab of approved shade and pattern placed in cement mortar

(1:4). 150mm high skirting shall be provided in these areas. Granite stone shall be provided for laboratory platforms fixed over double sandwiched cuddappa support as directed and the edges of granite is to be embedded into the wall.

The toilet facilities shall include at least:

a. 3 Nos. Water closets with white porcelain Orissa pan minimum 580 mm long with low level flushing cistern of 10 litres capacity.

b. 4 Nos. urinals of sizes 600 mm x 400 mm x 300 mm flat back type in white porcelain separated by a marble partition of size 680 mm x 300 mm.

c. 3 Nos. wash basins of size 510 mm x 400 mm in white porcelain with inlet, outlet and overflow arrangements.

d. 3 Nos. mirror of size 400 mm x 600 mm wall mounted type fitted over wash basins.

e. 2 Nos. plastic liquid soap bottles

f. 2 Nos. chromium plated brass towel rails minimum 750 mm long.

g. All stopcocks, valves and pillar cocks shall be heavy duty chromium plated brass.

h. All fittings such as `P' or `S' traps, floor traps, pipes, down take pipes etc.

The sewage from toilet blocks shall be led to the wet well of terminal sewage pumping station if present or included under this contract or to the closest gravity sewer.

All staircases shall have 25 mm thick chequered mosaic tiles for treads and 25 mm thick plain mosaic tiles for risers of approved make and shade and half tile skirting set in cement mortar in 1:4 to give an overall thickness of 50 mm.

All concrete stairs shall have aluminum nosing over 2 mm thick rubber strip of width same as nosing for the full length of the tread. Nosing shall be fixed with countersunk screws. Stairways shall be provided to permit access between different levels within buildings. Staircase shall be minimum 1000mm wide unless specified otherwise. Staircases in general shall not be steeper than 40°. Staircases having space constraints may be steeper than 400. The maximum vertical run for a single flight of stairs shall be 3.0 M.

All roof tops and overhead tanks shall be made accessible with ladder provision. Vertical step ladders fitted with landing point extensions will be permitted where considered appropriate by the Engineer to access areas not frequently visited.

Steel staircases shall be constructed of standard channel stringers with M.S. grating treads 25mm thick with non skid nosing. Steel Ladders shall be minimum 600mm wide and shall not exceed 6m of straight run. The ladders shall be painted with epoxy paint.

All hand railing shall be provided with G.I "C" Class Pipe confirming to latest Indian standards. The minimum height of hand railing shall be 1m.

The reinforced concrete roofs shall be made waterproof by application of an approved roof polythene / bitumen membrane / brick bat coba. The finished roof surface shall have adequate slope to drain quickly the rain water to R.W down take inlet points.

All roof floors shall have minimum 750 mm height solid concrete block parapet wall where accessible is provided and shall have minimum 300 mm height solid concrete block parapet wall where accessible is not provided.

For roofing drainage, cast iron or uPVC rainwater down takes with C.I. bell mouth or u PVC bend and C.I. or uPVC grating at top shall be provided. For roof areas up to 40 sq m minimum two nos. 100 mm diameter down take pipes shall be provided. For every additional area of 40 sq m or part thereof, at least one no. 100 mm dia. down take pipe shall be provided.

Top surfaces of chajjas and canopies shall be made waterproof by providing a screed layer of adequate slope or application of an approved roof membrane and sloped to drain the rain water.

Building plinth shall be minimum 450 mm above average finished ground level around building or high flood level whichever is more.

All doors, windows, rolling shutters shall have lintels above. Chajja protection to lintels on external walls shall be such as to prevent the rain water splashing into the building. Chajja projection of minimum 750 mm for rolling shutters, 600 mm for doors and 450 mm for windows shall be provided to prevent the rain water splashing into the building. Chajja shall be projected 150 mm on either side from size of doors/windows/rolling shutters. All windows and ventilators shall have 25 mm thick Kota stone sills bedded in cement mortar (1:3).

All doors and windows shall be painted with two coats of synthetic enamel paint over a priming coat (ready mixed Zinc Chromate Yellow primer of approved brand and manufacturer confirming to I.S.: 127-106, 341 and 340).

All doors, windows and ventilators shall be made of aluminium confirming to latest version of IS: 1948. All fixtures for doors, windows and ventilators shall also be of aluminium. Aluminium grills shall be provided in all the windows. Doors shall be in two panel and both panels shall be glazed/unglazed. Minimum weight of aluminum doors & windows shall be as follows

1. Single Glazed Window : (Weights indicated shall be aluminum)
    - Open able Outer Frame: Weight 0.70 kg/Rmt
    - Shutter Frame: Weight 0.97 kg/Rmt
    - Intermediate Mullion: Weight 0.97 kg/RMt.
    - Beading: Weight 0.31 kg/Rmt
    - Fixing Louvers windows/ventilators
    - Outer Frame: Weight 0.46 kg/Rmt
2. Double Glazed Window
    - Outer Frame: Weight 0.72 kg/Rmt
    - Shutter Frame: Weight 0.97 kg/ Rmt
    - Intermediate Mullion: Weight 0.98 kg/ Rmt
    - Beading: Weight 0.31 kg/ Rmt
3. Sliding Windows
    - Bottom & Top Frame: Weight 0.70 kg/m
    - Shutter Frame: Weight 0.42 kg/m
    - Interlocking Section: Weight 0.47 kg/m
4. Aluminum Door
    - Outer Frame: Weight 2.508 kg/Rmt
    - Shutter Frame: Weight 2.508 kg/Rmt
    - Bottom Stile: Weight 2.508 kg/Rmt
    - Glazing shall be 5.5 mm thick glass.

a) Openings of the windows & ventilators shall be minimum 25% of the external wall area.
b) Ventilator shall be provided where height of floor is more than 3m.
c) All windows and ventilators shall have wire mesh. Frame of doors, windows and ventilators shall be of aluminum of standard rolled section. Doors, Windows and Ventilators shall be of size as per schedule to be submitted by the Operator for approval of Engineer. The minimum size shall be as per below:
    a. Door of opening size 1.2m x 2.1m
    b. Door of opening size 0.75m x 2.1m for toilets
    c. Glazed widows of minimum size 1.2m x 1.2m
    d. Ventilators of minimum size 0.6m x 0.6m
d) Rolling shutters shall be made of 80 x 1.25 mm MS laths. Rolling shutter shall be of minimum size 3m wide x 3.0m high. Rolling shutter shall be provided in MCC cum panel room, Disinfection unit, at entry and exit of the pump house for access to pumps, motors, valves, panels and as wherever required.
e) All concrete channels and ducts used for conveying liquid shall have inside finish of type F2. The width of concrete channels shall not be less than 500 mm. All open channels shall be provided with Stainless Steel Type 304 hand railings or concrete walls to a minimum height of 1 m from the access surface elevation. All concrete surfaces of structures conveying raw sewage or primary effluent shall be protected with Epoxy Coating as specified in Clause 10.21.
f) Kerbs to be provided below the hand railing on the catwalks/pathways should be as per relevant sections of Factory Act. It shall not be less than 150 mm.

g) All exposed surfaces of inserts embedded in concrete shall be painted with two coats of enamel paint over one coat of red oxide zinc chrome primer. Surfaces in contact with concrete shall not be painted.
h) All structural steel members shall be painted with two coats of enamel paint over one shop and one field coat of red oxide zinc chrome primer.
i) All rooms in the treatment plant buildings shall be provided with appropriate sign boards indicating the function of the rooms involved written in Marathi and English Languages.
j) The design of buildings shall reflect the climatic conditions existing on site. Process buildings shall as far as is possible permit the entry of natural light, and the use of glazed panelling shall be kept to a minimum and preference given to wall openings protected by weather canopies.
k) Emergency exit doorways shall be provided from all buildings in order to comply with local and international regulations.Stairways and paved areas shall be provided at the exit points.
l) Toilet blocks in process buildings and control blocks shall be provided with a sink with two drinking water taps of 20 mm size with adequate inlet and outlet connections.
m) All the walkways in shall have minimum 1 m width and shall be covered with mosaic tiles.
n) Hand railings shall be made up of G.I "C" Class Pipe confirming to latest Indian standards.
o) For structures containing water or process liquid, the top of the wall shall be at least 0.5m higher than the maximum water surface level calculated at high flood level and peak plant flow. The top level of internal plant roads and approaches shall be at least 0.5m above the site High Flood Level.
p) If the High flood level is more then Ground Level then road shall be constructed on the earthen embankment. Earthen embankment shall be constructed with side slope of atleast 2 horizontal to 1 vertical. Stone pitching shall be provided at both sides of the embankment as per IS: 8237. Top width of embankment shall be taken as 6.0m. Top level of embankment shall be 0.5m above high flood level. Excavated earth from the plant can be used for embankment construction and if required, extra earth can be borrowed from the borrow pit as approved by Engineer.

4.2 Roadways, Pathways & Hard standings

a. Internal roads shall be provided around the treatment plant to link in with the existing units and the approach road and permit access to the plant for necessary maintenance, delivery of consumables and personnel access. All roads shall be of asphalt macadam and minimum 3.75 meters wide. Vehicular access shall be provided for all Plant structures and buildings. All roads shall be provided with drainage and shall be constructed to prevent standing water.
b. Hard standing areas with shading facility shall be provided to permit the parking of vehicles involved in the delivery of consumables from blocking site roadways during unloading or loading..

5 Site Drainage

The operatorshall provide a site drainage system. The system shall comprise of the following:

- Storm Water Drainage
- Foul Drainage (if any)

5.1 Storm Water Drainage

(a) Storm water drains adjacent to the existing and proposed roads (under this Contract) shall be sized for a rainfall intensity of 50 mm/hr, allowing for 100% runoff. Drains adjacent to roads shall be in stone masonry in CM (1:4) of appropriate thickness, topped with 75 mm thick M10 concrete and internally flush pointed in cement mortar (1:4), 20 mm thick. The minimum width of drain shall be 450mm.

(b) The storm water drainage system shall also be designed to cater the run-off from the existing plot areas and structures, if necessary depending upon the site topography.

5.2 Foul Drainage

(a) The foul drainage system shall accept discharge from toilets, washrooms, offices and the laboratory. The foul drainage system shall be conveyed to the nearest public sewer wherever exist or to a pumping station or a new soak pit followed by septic tank shall be constructed.

6 Cable and Pipe work Trenches

(a) Cable and pipe work trenches shall generally be constructed in reinforced concrete. However, 500 mm x 500 mm size or smaller trenches, not on fill may be constructed in 200 mm thick solid cement concrete blocks over 150mm thick M 15 PCC base. The trenches will be 20mm thick plastered internally with cement mortar (1:4) and externally in cement mortar (1:3).

(b) All floor cut-outs and cable ducts, etc. shall be covered with M20 precast concrete covers (Heavy Duty) or MS grating as per direction of Engineer in outdoor areas and M.S. chequered plates, suitably painted of adequate thickness in indoor areas. All uncovered openings shall be protected with hand railing. The pipe, cable trenches shall be suitably sloped to drain off rainwater to a suitable location.

(c) Layout of trenches outside the buildings shall allow space for construction of future trenches where necessary with due consideration for planning for future developments. This aspect shall be brought to the notice of the Engineer while planning the works.

7 Pipes and Ducts

(a) R.C.C ducts for drainage shall have minimum 1 metre pre-cast cover (M20 concrete, Heavy duty) while laid under roads. Access shafts of size not less than 600 mm x 1000 mm shall be provided.

(b) All drains (except storm water drains adjacent to roads) shall be covered and designed structurally for appropriate loads.

(a) **Landscaping**

(a) The site shall be landscaped once the works are substantially complete. Landscaping area shall be marked in the layout plan of STP.

(b) Landscaping shall include planting of suitable trees and development of lawn/grassed areas. Landscaping in general shall meet ecological and environmental conditions of the site. Road

widths shall determine the size of the tree height and spread to be selected for planting. Trees suitable for local conditions shall be selected as approved by the Engineer. Medicinal and fruit trees shall be avoided. Landscaping shall be maintained in good condition till the completion of the contract.

8 Tree Planting

(a) Pits dug a few days in advance of actual planting shall be allowed to weather and be filled with top soil mixed with manure. Size of the pit shall be as per standard requirement. Only one tree shall be planted in each pit. A guard made of bamboo with wire mesh or bricks or M.S. ring as approved by Engineer, shall be provided.

9 EARTH WORK AND EXCAVATION

11.1 General

Applicable provisions of Conditions of contract shall govern work under this section. The Bidder shall report any water conditions encountered and will be given directions as to the type of procedure to be adopted in such cases. The Indian Standards wherever referred to herein shall be the latest edition of such Standards.

11.2 Excavation for Foundation, Trenches, Pits, etc.

All foundation trenches shall be excavated to the full-widths and depths shown on the drawings or to such greater or smaller depths as may be found necessary or so ordered to him.

Should any excavation be taken down below the specified levels, the operatorshall fill in such excavation at his own cost with concrete as specified for foundations, well rammed in position until it is brought up to the level. The operatorshall notify to the Owner when the excavation is completed and no concrete or masonry shall be laid until the Owner has approved of the soil for each individual footing, rafts, etc.

The operatorshall keep the site clear of water at all times. To this end he shall provide arrangements for building or pumping of water as required. All foundation pits shall be refilled to the original surface of the ground with approved material, which shall be suitably consolidated.No extra will be paid for bailing out water collected in excavation due to rains, ordinarysprings etc.

11.3 Earth Filling

The space around the foundations in the trenches or sites shall be cleared of all trash and loose debris and filled with approved excavated earth, all clods being broken. Filling shall be done in 200 mm layers; each layer to be moistened and well rammed. This shall be done in step with the foundation masonry or foundation concrete work the difference between the tops of masonry and filling not exceeding a day’s work. The top of filling shall be finished off 150 mm above ground level to allow for settlement only pit or depressions occurring within twelve months of completion shall be filled up and rammed by the Bidder or his own expense.

11.4 Shoring, Planking & Shuttering

Shoring shall be done when sides of excavation do not stand up by themselves and sloping or stepping is not feasible or economical.

The shoring shall consist of vertical planks 38 mm to 50 mm thick and of Available width and required length. The planks shall be held by walling, vertical places and struts, and this to form a frame. The struts shall be not more than 1.5 m. apart, and the timber shall be sufficiently strong not to wrap. The planks shall be held tight by means of wedges between them and walling. The planks shall be driven in by cutting the earth beneath their toes or driving each plank separately after removing the wedges. The planks shall be driven in vertically and shall be set touching one another.

The shoring shall be adequate to prevent caving in of the trench walls of subsidence of areas adjacent to the trench. In narrow trenches of limited depth, a simple form of shoring shall consist of a pair of 40 to 50 mm thick and 30 cm wide planks set vertically at intervals and firmly strutted. For wider and deeper trenches a system of wall plates (Wales) and struts of heavy timber section is commonly used. Continuous sheeting shall be provided outside the wall plates to maintain the stability of the trench walls. The number and the size of the wall plates shall be fixed considering the depth of trench and type of soil. The cross struts shall be fixed in a manner to maintain pressure against the wall plates which in turn shall be kept pressed against the timber sheeting by means of timber wedges or dog spikes.

11.5 Wet Foundation:

As soon as water is encountered in foundations, a sump shall be dug for removing the water. The bottom level of this sump shall be kept 500 mm or more below the lowest level of the excavation. The difference between the levels of the bottom of the excavation and of the sump shall be kept constant as excavation depth is increased. If the excavation is to be taken to a substantial depth and a large quantity of water is encountered, two sumps shall be excavated and deepened alternatively so that the pump does not require to be stopped whilst the sump is deepened.

11.6 Earthwork in Site Levelling

All materials required for the purpose of filling shall be taken from high areas and stockpile, which are to be levelled to specified reduced level as required. Roots, sods, wood or other organic matter shall not be placed in the fill. Before a new layer is laid the existing ruts or other unevenness in the surface of the layer shall be removed and the surface of the layer shall be scarified and roughened by borrowing and ploughing to obtain bond with the material to be placed. The materials shall be placed continuous horizontal layers not greater than 200 mm thickness. The earth fill shall be kept slightly sloping from center to the edges to avoid formation of pools during the rain.

Section 3. CONCRETE

12 Concrete

12.1 General

Applicable provisions of Conditions of Contract shall govern work under this section.

All concrete work, plain or reinforced shall be carried out in strict accordance with this specification and any working drawing or instructions given from time to time to the operator. The operator's rates shall allow for wastage in all materials as well as for all tests of materials and for concrete. No concrete shall be cast in the absence of the Owner's representative or any other person duly authorized by him. The operator's Engineer shall personally check that both the formwork and reinforcement have been correctly placed and fixed, and shall satisfy himself that all work preparatory to the casting is completely ready, before calling the Owner's representative for final inspection and approval and for which purpose at least 24 hours' notice shall be given by the operator. The Indian Standards wherever referred to herein shall be the latest edition of such Standards.

12.2 Cement

Cement shall be ordinary Portland cement as per I.S. 269 or Sulphate Resistance Cement as per IS 12330. Cement tests shall have to be carried out at operator's expense as and when directed.

12.3 Aggregate

The fine and coarse aggregate shall conform to IS: 383 & IS: 456. The necessary test indicated in IS – 383 and IS – 456 shall have to be carried out to ensure the acceptability and shall meet prior approval of the Owner.

12.4 Reinforcement

The Reinforcement Steel shall confirm to BIS Specification 432-1966 (with up to date revision) and B.I.S. Specification 1786-1985 (with up to date revision). All Reinforcement Steel will be TMT Grade approved by the Owner. It shall also comply with relevant part of IS. 456. All reinforcement shall be clean and free from dirt, oil, paint, grease, mill scale or loose or thick rust at the time of placing. The reinforcement shall be bent to the shapes shown on the drawings prior to placing and all bars must be bent cold. The Steel shall be placed in such a way that it is rigidly held in position while concrete is being cast. The correct clearance from the form shall be maintained by either precast mortar blocks or by metal supporting chairs to be supplied by the operator free of charge. The intersections of rods crossing one another shall bound together with soft pliable wire No. 16 S.W.G. at frequent intervals so that reinforcement will not be displaced during the process of depositing concrete. The loops of binding wire should be tightened by pliers.

12.5 Water

Water shall conform to IS: 456, clean and free from alkali, oil or injurious amounts of deleterious material. As far as possible, the water should be of such quality that is potable. If any chemical

analysis of the water is necessary and ordered the same shall be got done at approval laboratory at the operator's expense.

12.6 Concrete Proportioning

The concrete proportion shall be as indicated on the approved drawings and shall conform to IS: 456.The minimum cover to main reinforcement shall be 25 mm or the diameter of the bar whichever is greater. In the case of surfaces exposed to corrosive action as in sumps, the cover shall be increased up to 50 mm as directed.

Type of joints, spacing of joints, use of all jointing materials and other features pertaining to the provision of movement joints in liquid retaining structures shall be got approved prior to commencement of construction. All reinforced concrete work shall be thoroughly and efficiently vibrated during laying by use of vibrators.

For liquid retaining structures M:30 grade (SRC) shall be used, the same shall be deemed to be satisfactorily watertight if the external faces show no signs of leakage and remain apparently dry over the period of observation of 7 days after allowing a period of 7 days for absorption after filling. Covered tank, where all faces are not accessible for inspection, shall be kept filled with water for 7 days and thereafter the drop of water over the next 7 days shall not exceed totally a depth of 12.5 mm per day. Approved corrective measures, if necessary, shall be undertaken by the Bidder at his own expense. The operatorshall use appropriate water proofing compound during the process of pouring of concrete in required proportion.

12.7 Workmanship

All concreting work shall be carried out according to the IS: 456 'Indian Standard Code of Practice for Plain and Reinforced Concrete for general Building Construction'. It should, however, be note that for Over 60 m3 of concrete placed or for every one day's work a minimum of 6 (six) cubes shall be cast for test purposes and tested at the operator's expense in an approved laboratory.

12.8 Formwork

The formwork shall conform to IS: 456. Centering ; Only steel / plywood centering shall be used

12.9 Curing

The concrete shall be cured according to IS: 456 or as directed.

12.10 Concrete Finish:

The concrete surface on removal of form work shall be such that no finishing is necessary. If however the surface is not satisfactory, the operator shall, if so instructed, remove unwanted projecting parts by chipping and smoothening the surface with cement at his own expense and coated with corrosion resistance epoxy paint.

12.11 Construction Joints / Water Stops

These shall be in accordance with IS: 456 or as shown on the approved drawings.

The centering for forming, the construction joint shall be firmly fixed and adequately slotted for reinforcement extending beyond the joint. If any concrete has set, care shall be taken not to disturb the reinforcing steel in casting the second half of a member with a construction joint and thereby crack the concrete previously placed. The PVC joints shall be of the 'rebated' or 'keyed' type and shall have a minimum width of 300 mm inclined 'feather' or 'straight joints' shall not be permitted. The Joints/Water stops shall be got approved by the Engineer before their placement into the structure.

12.12 Expansion Joints

Expansion joints shall be provided at positions shown on the approved drawing or as directed and shall comply strictly with the details shown on construction drawings. Reinforcement shall not extend across any expansion joint and the break between the two sections MUST be complete. Unless otherwise specified, the gap shall be filled with an elastic joint filler consisting of the following ingredients (by weight), preheated to a temperature of 190 (375 F).

a) Very find sand 60%

b) Hot bitumen emulsion 33%

c) Cement 5%

d) Fine chopped hemp 2%

12.13 Operator'sSupervision

The operatorshall provide constant and strict supervision of all the item of construction during progress of work, including the proportioning and mixing of the concrete and bending and placing of reinforcement. Before any important operation such as concreting or stripping of formwork is begun, adequate notice shall be given.

12.14 Laying Cement Concrete in Foundations & Under Floors

Before laying the concrete, the bottom and sides of the trench up to the proposed height of the concrete shall be moistened. The concrete shall be tamped immediately after laying.

12.15 Protective Epoxy Paint Treatment:

Epoxy Paint of standard specifications manufactured/purchased from a reputed firm approved by IS shall be applied to the outside Concrete surface of R.C.C. Underground sump and all mild steel works within and near the sump. The coverage capacity of layers shall be at 125 Microns D.F.T. 7.60 sq. mt. /Litre.(Exposed steel inserts, embedded in concrete and ladders, submerged in water shall be provided with epoxy paint 360 microns)

12.16 Chases, Holes, Recesses and Inserts:

All chases, holes and recesses for foundation bolts, various services and other requirements must be formed as shown on the drawings or as directed by the Owner's Engineer during the execution of the work, without extra charge. The operatorshall fix all necessary inserts in the concrete for support of

hangers for pipes and cables, ceiling clamps for lights and fans or for duct etc. If any of the inserts are to be supplied by other agencies not extra payment will be made to the Bidder for placing the inserts position.

12.17 Load Testing of Structures

Load tests shall be carried out in accordance with IS: 456, if required by the Executive Engineer.

12.18 TESTING AND COMMISSIONING

Testing at site

All water retaining structures shall be tested before commissioning and trial run as per the specifications in CPHEEO Manual on Sewerage and Sewage treatment (latest edition) and as per relevant IS Cdoe. All the structures are to be checked for water tightness and the sole responsibility of arranging the necessary equipments and apparatus lies with the Operator at his own cost. Any damage during testing shall be Operator's responsibility and shall be rectified by him free of cost. Water for testing shall be arranged by the Operator at his own cost.

Section 4. BRICK WORK

13 Brick Work

13.1
General

Applicable provisions of Conditions of Contract shall govern the work under this section. The operatorshall build the whole of brickwork shown on the drawings with first-class bricks in cement mortar. The Indian Standard wherever referred to herein shall be the latest edition of such Standards.

13.2 Materials

Bricks	The bricks used shall generally conform to IS: 1077
Cement	The cement used shall conform to IS: 269
Sand	The sand used shall conform to IS: 1344
Water	The water used shall be clean and free from injurious amounts of deleterious materials. As far as possible, the water should be of such quality that it is potable

13.3 Mortar Proportion

Unless otherwise specified, the proportions of cement-sand-mortar by volume for various classes of work shall be as under:

Type of work	Cement	Sand
Ordinary brickwork for building	1	5
Brickwork in pillars	1	4
Half-brick thick or brick-on edge partition wall	1	4

13.4 Workmanship

The cement and sand shall be thoroughly mixed dry in specified proportions. Water shall then be added by a sprinkler just sufficient to make a stiff and workable paste. The mortar shall be used within half an hour of mixing. The mortar, which is unused within half an hour of mixing, shall be removed from the site.

13.5 Brick-work

All the bricks shall be kept in water till they are completely soaked & only thoroughly soaked bricks shall be used in the work. The operatorshall set out & build all brickwork to the respective dimensions, thickness and height, as shown on the drawings.

The operatorshall build all brickwork uniformly, no one portion being raised more than 1 meter above another at one time. The operatorshall keep wet all brickwork for at least 10 days after laying. The surface of unfinished work shall be cleaned and thoroughly wetted before joining new work to it.

In curved brickwork, the bricks shall be dressed to shape obtain joints redial to the curve. The joints shall not exceed 12 mm in thickness and should extend the full thickness of the curved brickwork.

13.6 Damp-proof Course

Damp-proof course shall be provided at positions where ever necessary. In masonry walls of buildings, it shall normally be placed above the external ground level. It shall be laid for the full width of solid walls and shall be prepared as specified.

A layer of cement concrete 1:2:4 (cement: sand: coarse aggregate) mix, and of specified thickness shall be provided. If a damp-proof course requiring the use of bitumen felt is specified, bitumen used shall conform to IS: 1322 and workmanship shall conform to IS: 1609. All exposed surface of the damp-proof course shall be finished fair and smooth. The external edge shall be chamfered if specified, and shall be finished flush with masonry surface.

Section 5. FLOORS AND PAVEMENTS

14. General

Applicable provisions of Conditions of Contract shall govern work under this section. The Indian Standards wherever referred to herein shall be the latest edition of such standards.

14.2 Types of Floors and Pavements

The principal types of floors and pavements considered in this specification are as under:

a) Cast-in-situ artificial stone flooring (plain)

b) Natural stone slab flooring

c) Pre-cast artificial stone flooring (Plain/Textured)

14.3 Materials

1. **Cement**

   Ordinary Portland cement and white and colored cement shall conform to IS: 269.

2. **Lime**

   Where lime is required to be used, it shall conform to IS: 712 and slaking of lime shall be done according to IS: 1635.

- **Aggregates**

  The aggregates shall conform to IS: 383. Fine aggregates shall range in size from 1.5 mm to 6 mm. unless specified otherwise. Not more than 5 percent of grains shall pass IS sieve 15 (0.151 mm mesh) and not more than 10 per cent shall pass IS sieve 30 (0.296 mm mesh). Coarse aggregate shall all pass through 19 mm mesh, unless specified otherwise and shall be graded as directed. The coarse aggregate for concrete pavements for approaches and driveways shall all pass through 25 mm ring and shall be formed by mixing 80% of 25 mm to 12 mm size and 20% of 12 mm to 6 mm size. The above proportion shall be altered to suit workability if so approved.

- **Natural Stone Slabs**

  The stone slabs if used shall be best quality obtainable from Neemuch, Kotah, Shahabad, Tandur or other places as specified and shall be hard, even durable, uniform in color and free from cracks, flakes and other defects. No stone shall be thinner at its thinnest part than 25 mm. unless otherwise specified; the stones shall be 300 mm x 300 mm in size dressed square and with straight edges. The top surface of stones shall be smooth or polished as specified and edges dressed to a true fir or chisel dressed as directed.

- **Water**

  Water shall be clean and free from injurious amounts of deleterious materials. As far as possible, water shall be of potable quality.

14.4 Cast in situ Artificial Stone Flooring

Grey and colored artificial stone is to be composed of 4 parts of fine stone chips 12 mm and below 2 parts of sand and properly screened to one part of cement. The topping in all cases and to consist of clean and fine sand and cement (2:1) and sufficient skin thickness to be kept and finally trowelled with neat cement finish perfectly smooth to satisfaction. In the case of dados and skirting the total thickness is to be 19 mm of which the bottom layer is to be 12 mm and the toping 6 mm thick in all cases both the layers are to be laid simultaneously without hiatus so that it will in effect be one complete layer; the mixing be made in two different lots.

14.5 Natural stone slab flooring

The stone slabs shall be evenly and firmly bedded to the required level and slopes as directed. Unless otherwise specified, the thickness of joints shall not exceed 6 mm for unpolished stone slabs and 1 mm for polished stones. The joints shall be raked out to an adequate depth and pointed flush or slightly sunk, as directed, with cement-sand mortar of 1:2 proportions. The stone slabs shall be laid to pattern which shall be approved prior to ordering the stones. The flooring shall be kept wet with wet sand or water for at least seven days. The flooring shall be well washed and shall be perfectly clean and free from all mortar stains etc. when completed

Section 6. PLASTERING AND POINTING

15. General

Applicable provisions of Conditions of Contract shall govern work under this section. The Indian Standards wherever referred to herein shall be the latest edition of such Standards.

15.2 Cement Plaster Materials

Cement shall confirm to IS: 269 and Sand shall confirm to IS: 1542. Other materials, tools and Accessories, they shall confirm to relevant IS codes listed above and to the requirements specified in IS: 1661.

15.3 Proportioning and thickness of Cement Plasters:

The proportions of materials, number of coats and thickness of each coat shall be as a specified or as directed.

15.4 Workmanship

Unless otherwise specified, all plasterwork shall be carried out as per IS: 1661 “Code of Practice for Cement and Cement-Lime Plaster Finished on Walls and Ceilings”.Special finishing textures to the plaster shall be executed according to Clause 16 of IS: 1661 and/or as directed.

15.5 Curing

After the completion of the work, the pointed face shall be kept well wetted for at least for 10 days in the case of Cement Pointing.

Section 7. PAINTING AND GLAZING

16. General

Applicable provisions of Conditions of Contract shall govern work under this section. The Indian Standards wherever referred to herein shall be the latest edition of such standards.

16.2 Painting of Iron and Steel Work

Painting of iron and steel work shall generally be carried out as per IS: 1447 (Part I).

16.3 Preparation of Surfaces:

The surface to be painted shall be cleaned free of dirt, oil rust, mill scale and be thoroughly dry before painting. Cleaning, degreasing, and descaling wherever necessary shall be carried out as specified in IS: 1477 (Part I) and the method adopted for surface preparation shall have prior approval.

16.4 Primer Coat:

Unless otherwise specified, the primer coat for steel and iron work shall be of Red Lead paint, conforming to IS: 102. The Red Lead primer shall be applied by means of approved brushes. The Red Lead paint shall be allowed to dry sufficiently hard before the application of the succeeding coat A red lead painted surface shall not however be left exposed permanently, as it is liable to heavy chalking. The primer coat shall be applied as specified in IS: 1477 (Part-I) and the number of coats shall be as necessary for as directed.

16.5 Finish Coat

The type of intermediate and finish coat and the number of coats to be applied shall be as necessary or as directed. Intermediate and finish coats may be oil bound bituminous, aluminum or other types of paints. Aluminum conforms to IS: 165. The intermediate and finish coats for structural steel work, sheet metal work and cast iron work shall be applied as specified in IS: 1477 (Part-I).

Section 8. GlazingMaterials

17. Glass

All glass used in the work shall be best quality glass free from specks, bubbles, smokes, wanes, air holes and other defects, Unless other-wise specified, sheet glass shall be transparent and of the following weights. For panes up to 600 mm x 600 mm in size, glass weighing not less than 7.97 kg/sq.m. shall be used for panes 750 mm x 750 mm to 900 mm x 900 mm size, the weight of glass shall be 9.76 kg/sq.m. Unless other-wise specified, for sizes of glass above 900 mm x 900, plate glass shall be used.

17.2 Putty

Putty for use on wooden frames shall conform to IS: 419 and on metal frames to IS: 420.

17.3 Workmanship

All glass be cut according to the sizes required as per drawings. Glazing of metal doors, windows and ventilators shall conform to IS: 1081 and glazing of timber doors, windows, and ventilators shall conform to IS: 1003, unless specified otherwise. For glazing wooden doors and windows, the wooden frame, particularly the rebate, shall be well oiled to prevent oil from putty being sucked in by wood. The Bidder shall thoroughly clean all glass and replace all putty or glass damaged during the work.

Section 9. MISCELLANEOUS STEEL AND IRON WORK

18. General

Applicable provisions of Conditions of Contract shall govern work under this section.

The Indian Standards wherever referred to herein shall be the latest edition of such Standard.

18.2 Iron Grills

The grills for Windows, verandahs, balconies, etc. shall be of mild steel or wrought iron as specified for the work. The design of grills and shapes and sizes of various components shall be as approved. The edges, angles and corners shall be clean and true to shape. The joints shall be mechanically inter-locked and overlapping areas spot welded in such a way that the grill is rigid.

Where moulded grills are specified, the moulded work shall be as approved, and shall have clean, straight and sharply defined profiles. The operatorshall do the necessary cutting, fitting, drilling, tapping, scribing etc. required to fix grills to adjacent surfaces. The grills shall be fixed plumb, in line and level. Unless otherwise specified, grills shall be painted with two coats of red lead paint conforming to IS: 102 before they are fixed.

18.3 Rolling Shutters

Rolling shutters, where specified shall be of the size to suit the openings and shall be positioned as shown on the drawings and/or as directed.

The rolling shutter shall be fabricated from 18 B.G. Steel and machine rolled with 75 mm rolling contras with effective bridge depth of 12 mm lath sections, interlocked with each other and ends locked with malleable cast iron. The guides shall be either rolled or pressed deep channel sections 75 mm deep and 25 mm wide fitted with necessary fittings and fixtures.

The suspension shaft shall be formed from solid drawn seamless tubes 60 mm O.D. of wall thickness of 25 mm in 3 segments coupled 2 with 2 pairs C.I. dog-tailed flange coupling forming one complete unit eliminating deflection in the center to a minimum.

The springs shall be imported high tensile English flat springs 50/60 mm breadth and 1.6/1.8 mm thickness hardened and tempered. These shall be fitted inside the fabricated housing on either ends, which counterbalance the shutter curtain. The ball bearings shall be double row self aligning ball bearing fitted inside C.I. housing fixed on side brackets holding the suspension shaft at either end.The suspension of the curtain shall be belted in specially fabricated cages formed from MS flats, and plates all are welded. The hood cover shall be made of 20 gauge G.P. sheets with necessary stiffeners and framework to prevent sag, the bottom lock plate shall be made of 3 mm thick M.S. plate and 95 mm wide reinforced with angle/T iron of suitable section with 6 mm dia. M.S.rivets interlocked with last stride of curtain.

The locking arrangement shall consist of hasp and staple on the bottom plate, lockable from both sides. Unless otherwise specified, for overall area of rolling shutters up to 9 sq. m. pull and push type hand-operated shutters shall be used, for area between 9 and 12 sq. m. Pull and Push type shutters shall be provided with ball bearings; for area larger than 12 sq. m, Mechanical Gear type shutters shall be supplied.

18.4 Collapsible Gates

Collapsible gates shall be of the size and type as specified by the Owner's Engineer. The gates shall be manufactured out of M.S. channel pickets of size 20 mm x 10 mm and flats 20 mm x 6 mm. The top runner flat shall be at least 50 mm x 12 mm in section. The bottom guide shall consist of a channel or two angles of specified size laid in the flooring to guide the free movement of the gate. The gate shall move in the guide channel on rollers of adequate size fixed at the top and bottom of the gate as specified. The gate shall be painted with one coat of red lead paint conforming to IS : 102 before fixing in position.

Section 10. WOOD WORK AND JOINARY

19. Wood:

All wood required to be used, shall be dry, well-seasoned, Bulsar teak wood and shall be free from knots, cracks or any other kind of defects frames for doors and windows.

19.2 Jointing Materials:

All nails, screws, fixtures shall be of standard quality as approved by the Owner.

19.3 Cutting Edges:

Cutting edge for well to be fabricated as per the drawing approved by Owner's engineer The structural steel to be used, should confirm to IS: 226-1961 and IS: 2062-1962. The steel shall be free from defects as mentioned in IS: 226-1962 and shall have a smooth uniform finish. Material shall be

free from loose mile scale, rusting or other defects affecting its strength and durability. The test certificates shall have to be submitted for the structural steel used in cutting edge.

21 ILLUMINATION:

All internal and external areas shall be provided with lighting. The illumination levels to be achieved shall be as follows:

AREA	LUX
Office and labs	300 Lux
Switchgear Room	200 Lux
Control Room	300 Lux
Pump House	200 Lux
DG set room	200 Lux
Chemical and general store	150 Lux
Chemical Plant room	200 Lux
Other indoor areas	100 Lux
Outdoor plant from and	50 Lux
Building entrance	100 Lux
Indoor Plant Area	200 Lux
Outdoor Plant Area	50 Lux
Transformer Area	100 Lux
Roads	10 Lux

Fluorescent luminaries shall be used primarily for internal lighting. High pressure vapour or metal halide type luminaries shall be used in indoor application where their use is appropriate. If mercury or metal halide is used in indoor then they should be supplemented with fluorescent luminaries to assure that minimum illumination levels are maintained following momentary power dips. All other internal

areas shall be lit with fluorescent luminaries. Where specific recommendations of lux level are not covered above, illumination level in such areas shall be finalized in consultation with Owner.

Owner shall be required to measure levels of illumination after completion of lighting installation work and short fall in illumination level shall be made good by the Bidder. Complete set of calculations showing, room, index, copy MF shall be given during detailed engineering.

21.6.1 Switches / sockets of piano type shall be used in general and in offices of staff, control room, MMI room, decorative modular switches shall be used. Suitable fans shall be provided in rooms/ plant areas as per standards. For exhaust fans it must be provided in panel rooms, pump rooms, chemical rooms, stores, toilets and at least 20 air changes per hour must be maintained.

21.6.2 The following type of lighting fixtures shall be proposed:

a) Decorative type 2x36W fixtures for fluorescent luminaries inside office/ administrative buildings and control rooms.

b) Corrosion resistant fixture with canopy made of FRP for fluorescent luminaries for corrosive areas like chemical store or area with corrosive smell/gases etc.

c) Industrial type vitreous enameled fixture for fluorescent luminaries inside 415V switchgear, MCC room and pump house.

d) In outdoor process areas, lighting fixtures shall be sodium vapour type subjected to minimum of IP protection class.

e) All outside lights as plant field lights, building outside lights, flood lights etc. which are to be switched on only during night hours should be controlled through photo cell/ clock switch installed at a central place. All lights shall have minimum IP65 protection class.

f) Street lighting wiring shall be through buried underground.

g) All bulb fittings (except fluorescent lamps) will have screw type caps.

h) For outdoor lighting, the lighting feeder shall be operated through a contactor, controlled by photocell/ clock switch and shall also have a manual by pass switch.

21.6.3 Luminaries shall be installed to permit ease of maintenance i.e. it shall not be necessary to shut down plant in order to carryout maintenance or to access luminaries located over areas of water etc. The Operator shall provide all equipment necessary to carryout maintenance on the lighting installation and demonstrate its operation to the satisfaction of Owner

21.6.4 Indoor lighting circuit will be arranged in such a way that 50% lighting can be put off in each room through switches. All lighting circuits will be wired with 2.5sq.mm. Stranded copper wire or through 2.5 sq.mm. armoured cable laid in cable trays. Sub circuit from switch to

fixture could be wired with1.5 sq.mm. stranded copper wire in MS conduits or armoured copper cable of similar size provided total voltage drop in any lighting distribution board to last lighting point shall not exceed 2%. All lighting circuits will have separate neutral, separate earth from Lighting Distribution Board. For illumination of roads, outdoors areas where operation of equipment or units required and sub station area, lighting fixtures of appropriate type (such as street lighting type, flood lighting type, post top lanterns etc.) incorporating high pressure sodium vapour lamps shall be proposed. Street light poles shall not have less than 7500 mm height above the finished road level and the arm shall not project more than 1200 mm along the road width. Poles of bigger heights may also be used if some outdoor areas are to be illuminated. Poles of 4 / 4.5 Mtrs using post top lantern may be used in gate office walk way or in front of office area. Complete area, streets, lanes, boundary shall be covered with street lighting.

21.6.5 Receptacles (Lighting & Small Power) :

a) Decorative and industrial type units of above shall be proposed in all plant areas, offices, stores, workshop, plant room and they shall be located at least two numbers in each room. Distance between two receptacles shall not be more than 8 – 10 mtr. All small 5 amps 5 pin lighting & small power sockets shall be wired by multi stranded copper wire of 2.5 sq. mm laid in rigid MS conduits along with earth wire of1.5 sq.mm flexible copper wire or equivalent size armoured cables. All wiring shall be coded with Red, Yellow, Blue & Black as per the phase used. If required, wiring can be done alternatively through armoured copper cables of similar size laid in MS perforated trays of minimum 2.0 mm thick.

b) Three phase power receptacles (convenience outlets) suitable for operation of 415V,3 Phase 4 wire, 50 Hz power supply shall be proposed. In indoor areas one such unit shall be provided to cover areas of 20 meter radius (or at least one in each room housing plant items) and in outdoors areas on such unit shall be provided at 50 meter interval. Actual requirement of such units shall be finalized by MMC during detailed engineering. One three phase receptacle shall be provided near entrance of each building for utilities like welding.

c) Single phase 15 Amp 5 Pin / 6 Pin receptacles will be provided in each room and in halls they will be provided in such a way that with 15 meter cord we should reach every place in building. These shall be wired with 4 sq. mm copper earth wire in MS rigid conduits along with 2.5 sq. mm earth wire. Not more than two sockets shall be looped in one circuit. Alternatively they can also be connected through armoured cable of 4 sq. mm running in appropriate cable trays.

21.6.6 Separate lighting panels and lighting distribution boards shall be installed and they shall not take tapping for power from motor control centers or power distribution boards.

Section 11. WOODWORK AND JOINARY

20. Wood:

All wood required to be used, shall be dry, well-seasoned, Bulsar teak wood and shall be free from knots, cracks or any other kind of defects frames for doors and windows.

20.2 Jointing Materials:

All nails, screws, fixtures shall be of standard

Section 12. PIPING WORK

21. **Cast Iron Pipes & Fittings**

21.2 All protection and bedding of sewers work shall be carried out in strict accordance with the specification and methods laid out in the CPHEEO manual.

21.3 Applicable Codes

The manufacturing, testing, supplying, jointing and testing at work sites of cast iron pipes and fittings shall comply with all currently applicable statutes, regulations, standards and codes. In particular, the following standards, unless otherwise specified herein, shall be referred. In all cases, the latest revision of the codes shall be referred to. If requirements of this specification conflict with the requirements of the code of standards, this specification shall govern.

- IS:210 - Specification for grey iron casting
- IS: 290 - Specification for coal tar black paint.
- IS: 638 - Specification for sheet rubber jointing and rubber insertion jointing.
- IS:782 - Specification for caulking lead
- IS:1387 - General requirements for the supply of Metallurgical material
- IS: 1537 - Specification for vertically cast iron pressure pipes for water, gas and sewage.
- IS:1536 - Specification for centrifugally cast (spun) iron pressure pipes for water, gas and sewage
- IS: 1538 - Specification for cast iron fittings for pressure pipes for Water, gas and sewage.
- IS: 1500 - Method for Brinell hardness test for grey cast iron.
- IS: 2078 - Method for tensile testing of grey cast iron.
- IS:5382 - Specification for rubber sealing rings for gas mains, water mains, and sewers
- IS: 6587 - Specification for spun hemp yarn.
- IS: 3114 - Code of practice for laying of cast iron pipes.

22. Mild Steel ERW Pipe

The manufacturing, testing, supplying, jointing and testing at work sites of mild steel pipes and fittings shall comply with all currently applicable status, regulations, standards and codes. In particular, the following standards, unless otherwise specified herein, shall be referred. In all cases, the latest revision of the codes shall be referred to. If requirements of this specification conflict with the requirements of the code standards, Design Build Operations Engineer . decision shall be final.

Materials

a. IS:226 : Specification for structural steel (standard quality).
b. IS: 2062 : Specification for structural steel (fusion welding quality).
c. IS: 6631 : Specification for steel pipes for hydraulic purposes.
d. IS:3589 : Specification for electrically welded steel pipes for water, gas and sewage (150 mm to 2000 mm nominal dia).
e. IS:6392 : Specification for steel pipe flanges
f. IS:814 : Specifications for electrodes for metal arc welding of structural steels: Part 2 welding sheets.

Code of Practice

a. IS: 5822 : Code of practice for laying of electric welded steel pipes.
b. IS: 11906: Recommendations for cement mortar lining for mild steel pipes and fittings for transportation of water.
c. IS:10221 : Code of practice for coating and wrapping of underground mild steel pipelines.
d. IS: 816 : Code of practice for use of metal arc welding for general construction in mild steel.

23. HDPE Pipes

These pipes have been used for carrying the effluent from distribution boxes to Feeding boxes of the Reactors. These pipes shall meet specifications as per IS: 4984.

23.2 Jointing

HDPE pipe shall be jointed properly with HDPE socketted specials to get smooth inner side surface without any extrusion to avoid any obstruction to the flow of wastewater. If in any particular case butt welding has to be done, smooth inner surface of pipe without intrusion inside shall be ensured.

24. Glazed Stone Wares Pipes

The drain pipes and filtrate pipes are to be made up of GSW. The GSW pipes to be provided should be of IS Specifications. They should be properly laid to proper gradient and as per drawings and approved by Design Build Operations Engineer . .

25. VALVES

25.2 Gate (Sluice) Valves

Gate Valves shall be either solid wedge or knife gate unless specifically defined on the drawings.

The materials used for the manufacture of each component shall be the best available for the specific purpose and shall not, in any case be inferior to the following:

Cast Iron - IS. 210 Grade 20

Stainless Steel - IS. 1570 Grade, B.S. 970 Type EN, ASTM A 473.

Gun Metal - BS.1400-LG 2 -C or the equivalent Indian Standard.

Cast Steel - Plain Carbon Steel complying with IS. 1570 Grade, or BS: 970 Grade 431 S 29.

Valve Bodies shall be in cast steel for sewage treatment plants, Spindle shall conform to Stainless Steel and Valve Gates shall conform to Stainless Steel

26. Specifications Referred

The specifications contained herein are not exhaustive and for such items of works which may arise and which are not covered by this specification, or by the relevant Indian Standards, the provisions in the P.W.D. Handbook Vol. I and II (latest edition) shall apply. A list of few important Indian Standards is given below: Wherever reference to the Indian Standards mentioned below or otherwise appears in this specification, it shall be taken as a reference to the latest version of the standard.

IS No.	Description
General	
IS : 456	Code of Practice for Plain and Reinforced Concrete for General Building Construction
IS 3764	Safety code for excavation
IS : 1200	Method of measurement of building and engineering (Part 1 to 28) works
IS : 3385	Code of practice for measurement of Civil Engineering works.
IS : 1642	Fire safety of buildings (General): Details of Construction Code of Practice.
IS : 4082	Recommendations on stacking and storing of construction materials at site.
Sand	
IS: 2116	Sand for Masonry, Mortar
IS: 1542	Sand for Plaster
Aggregates	
IS: 383	Aggregates, Coarse and fine from National Sources for Concrete.
IS: 515	Aggregates for use in Mass Concrete Natural and Manufactured.
Cement	
IS : 12330	Specification for sulphate Resisting Portland cement.
IS : 1489	Specification for Portland pozzolana cement
IS : 12269	Specification for 53 grade ordinary Portland cement.
Concrete Plain & Reinforced	
IS : 457	Code of practice for general construction of plain and reinforced concrete for dams and other massive structures.
IS: 3370	Concrete Structures for the Storage of liquids (Part I & Part II, III & IV)
IS : 432	Specification for mild steel and medium tensile steel

IS No.	Description
	(Part 1 and 2) bars and hard drawn steel wires for concrete reinforcement
IS : 1786	Specification for high strength deformed steel bars and wires for concrete reinforcement.
IS : 4326	Code of practice for earthquake resistant design and construction of building.
IS : 10262	Recommended guidelines for concrete mix design.
Code for Construction safety	
IS : 3696	Safety code for scaffolds and ladders. (Parts I and III)
IS : 7969	Safety code for handling and storage of building materials.
IS : 8989	Safety code for erection of concrete framed structures.
Brickwork	
IS : 1077	Common Burnt Clay Building Bricks.
Paving and Floor Finishes	
IS : 1237	Flooring Tiles, Cement Concrete
IS : 1443	Cement Concrete Flooring Tiles, Laying and Finishing of
Plastering & Pointing	
IS : 1661	Cement and Lime, Plaster Finishes on Walls and Ceilings
Roof Coverings	
IS : 459	Asbestos Cement Sheets, Unreinforced Corrugated Sheets
IS : 730	Fixing Accessories for Corrugated Sheet Roofing
Steel & Iron Work	
IS : 226	Structural Steel (Revised)
IS : 800	Use of Structural Steel in General Building Construction, code of Practice forPipes & Fittings Pipes
IS : 3486	Cast Iron Spigot & Socket Drain Pipes
IS : 1538	Cast Iron fittings for Pressure pipes for water, Gas & Sewage
IS : 1536	Centrifugally Cast Iron Pressure Pipes for water, Gas & Sewage.
IS : 458	Concrete pipes with or without reinforcement
IS : 783	Code of practice for laying Concrete pipes.
IS : 3114	Code of practice for laying of C.I. Pipes
IS : 1726	C.I. Manhole covers and frames intended for use in drainage works.

This list does not necessarily cover all the Standards referred to.

Section 13. Technical SpecificationsFOR ELECTRO-MECHANICAL WORKS OF SEWAGE TREATMENT PLANT

All works shall be carried out in accordance with the requirements of:

i. IE Rules

ii. State Electricity Board

iii. Rules and regulations of Local authorities, and

iv. The standards in this specification

The Operator is responsible for applying and obtaining necessary statutory approvals and shall ensure workmanship of good quality and shall assign qualified supervisor / engineers and competent labour who are skilled, careful and experienced in carrying out similar works.

1. General engineering specifications and practice for Electro-mechanical Works.

The following General engineering specifications and practice shall be adopted/adhered to for the Sewage Pumping Station and Sewage treatment plant:

a) Supply, Installation, Testing of the mechanical and electrical equipments, pipes, fittings & other accessories.

b) Adequate measure shall be taken to prevent dry running of the pump. Low level to trip the pump shall be above the top of pump casing. The sump floor shall have slope towards suction pit / channel. Care shall be taken especially for underground sludge sumps to provide suction pit of adequate size for emptying the sump for ease of maintenance.

c) Effective liquid depth of units shall be considered between levels corresponding to lowest level switch and highest level switch. Flooded suction requires that lowest level switch shall not be lower than the elevation of discharge flange of pump.

d) Monorail and chain pulley block (manually operated) shall be provided for all pump houses (both underground and above ground), Blower room, etc. as required of adequate capacity (minimum 1.5 times the weight of the heaviest equipment). Monorail shall be extended outside pumphouse / building to facilitate loading / unloading of equipment directly on vehicle, for which ramp approach shall be given.

e) All pump areas / pedestals shall be provided with kerb walls and suitable arrangement for collection of leakage and connection to the nearest piping/unit, keeping in mind the process requirement, shall be provided. In dry wells necessary drain collection pit and dewatering pump of sufficient capacity and head requirement having auto operation with low and high level

switches shall be provided in all pump houses, especially underground pump house for this purpose.

f) All motors shall have running indication.

g) Motors of all pumps and blowers shall be covered with canopy.

h) Mixers in chemical solution tanks (without baffle) shall be located off-centre to avoid vortex.

i) All chemical dosing pumps shall be provided with pulsation dampeners. Metering pumps shall have bypass with valves and external pressure safety valves.

j) Common delivery header and suction header of pumps (and blowers) shall be provided with a blind flange on one end.

k) Aeration blowers shall be located inside the blower room with necessary acoustic hoods complying with statutory and safety norms.

l) Flow measurement shall be provided at all chemical dosing lines as well as Air Blower discharge lines.

m) Knife Gate valves shall be provided for sludge application.

n) Flushing connections shall be provided for all sludge handling units and sludge lines.

o) The clear distance between adjacent pump / blower pedestal shall be minimum 1000mm. The clear distance from pedestal to internal face of walls shall not be less than 1500mm. The clear distance from pedestal to internal face of walls on motor side of the pumps shall not be less than 2000mm.

p) Minimum clearance of 500mm shall be provided around pumps, blowers, equipment pedestal for paving etc.

q) Safety shower and eye wash facility, service water connection shall be provided near chemical handling areas, especially Chjemical Storage and polyelectrolyte area.

r) All instrument indication facility shall be readable from grade.

s) All below grade valves (including sludge outlets of clarifiers and thickeners) shall be operable from grade by providing extended spindle and handwheel arrangement.

t) Epoxy lining in polyelectrolyte tanks and other units as required shall be provided. Complete wetted surface including free board and top of walls shall be lined.

u) Large tanks shall be able to be segregated for manual desludging, whenever required along with drain piping.

v) Operating platforms shall be provided for operation of any equipment or valve causing inconvenience to operate from ground/floor level. For operating height above 1.5m operating platform shall be provided. Platform shall have minimum width of 900mm with galvanized grating / chequered plate.

w) Main control room housing PLC/SCADA shall be located in the first floor such that entire STP is preferably visible to the operator through glazed windows. The control room layout shall be planned after taking into consideration the space requirement of various PLC/SCADA panels, HMI, etc. It shall be housed in administration/office building. It shall be properly air conditioned and shall be provided with false ceiling. Control room shall be aesthetically appealing.

x) All the sludge withdrawal valves of Primary Clarifier, Thickener and Digester shall be electrical actuator operated with auxiliary open/close limit switches and position transmitter for open/close position feedback.

y) H.T. & L.T. Room for electric Sub-station to serve the proposed Sewage pumping station and Sewage treatment plant.

z) Laboratory, Main Control Room housing PLC/SCDA system alongwith necessary office furniture.

aa) Water distribution network for drinking purpose/service water within the plant premises and sewage disposal

bb) All interconnecting pipes, channels, valves, fixtures, appurtenances.

cc) Setting up of the testing arrangement as per requirement.Getting of successful test results & obtaining approval from authorized Lab / Agency of the Pollution Control Board and relevant Authorities.

dd) Operation Maintenance of the entire system including consumables for the specified period. Supply, erection, testing, commissioning of various mechanical, electrical & instrumentation equipment required for the smooth working of the Sewage pumping station and Sewage treatment plant, including the 15 years O & M during guarantee period.

1.1 General Mechanical Equipments

Design, supply, erection, commissioning and testing of all mechanical equipments based on chosen technology of Sewage treatment process, shall generally comprise of:

a) Bar Screen with frame and scrapper

b) CI Sluice Gate

c) Air blowers with motor and related accessories.

d) Air distribution assembly.

e) Mech. arrangements for clarifier. if required

f) Sludge return pumps with motor and related accessories.

g) Sludge Loading pumps with motor and related accessories.

h) Agitator for equalization tank, if required.

i) Sludge dewatering System-Filter press/Centrifuge

j) Drainage sump pumps

k) Loading/Unloading System for Pump House

l) Flow measuring System

m) Level measuring System for well and Tank.

n) All Pipe-works and valves

o) UV Disinfaction System.

p) DG Set for Power back-up.

q) Fire fighting system.

r) Ventilation inside the Pump & Control room, as per requirement.

s) Any other equipment required.

1.2 General Electrical Equipments

Design, supply, erection, commissioning and testing of all Electrical equipments based on chosen technology of Sewage treatment process, shall generally comprise of:

a) HT/LT Transformer

b) Electric motors for all equipments as required.

c) Motor control center completes with all internal wiring and accessories.

d) Electrical cables from M.C.C panel to all electric motors and units.

e) Electric earthing stations as per I.E.E. rules.

f) Cable Trench, Cable Tray as per I.E.E. rules.

g) Gland and Lugs as per I.E.E. rules.

h) All internal lighting & exhaust system etc. for the Pump & Control Room.

1.3 Technical specifications of Mechanical Works for the proposed Sewage treatment plant:

1.3.1 Screening System.

— All Sewage Pumping Stations shall be provided with Mechanical screens as working and Manual Screen as Standby with conveyor system.

— The screens shall be made with welded stainless steel (AISI410) frame.

— Bye bass arrangement shall be provided on the upstream side, to avoid overflow of the screen channel in case of sudden power failure.

— Drainage facility shall also be provided in the individual screen channels to empty these channels for maintenance purposes.

— Individual screen channel should be designed to provide a velocity of min. 0.6 m/sec at average design flow.

— The effective area of opening of the screen should be such as to produce a velocity through the screen opening not exceeding 0.9 m/sec. at maximum expected flow.

— The top of the screen shall be at least 500 mm above the expected highest flow level.

1.3.2 Sluice Gate

— The gates shall be as per IS:13349/AWWA C 501 or relevant BS/DIN/ISO at their Latest revision.

— The gates shall be CI with rising type spindles.

— The unbalanced head shall never be more than 15 m.

— The gates shall be manually/Electrically operated.

— The gates shall be installed primarily in the screen chambers for isolation of flow for maintenance purposes.

1.3.3 Submersible Motor Sewage Pump

1. General

The pump shall be vertical, submersible, non-clog, single stage, bottom suction, monoblock type driven by single speed submersible motor suitable for pumping all kinds of sewage / sludge / storm water containing plastics and fibrous materials. The pumps must have fitted with in-built cutting and tearing system for foreign matters. The speed of the pump should not be more than 1450 r.p.m. The motor output power must have at least 15% margin over pump input power at duty point and the motor will never be overloaded throughout the entire pump operating range as shown in the performance curve. The pump performance must be stable from zero discharge to run out condition.

The design, manufacture and performance of the submersible pump-motor sets shall comply with the latest applicable Indian / International Standards. In particular, the equipment must conform to the latest revision of applicable specification. The pump shall be capable of developing the required total dynamic head at rated capacity and will be suitable for parallel and continuous operation. The head-capacity curve of the pump shall be continuously rising towards the shut-off with highest head at shut-off. The impeller of the pump shall preferably be of non-overloading type. The pump shall be designed to be protected against reverse direction of rotation due to the sewerage returning through the pump. The set rotor assembly weight and unbalanced hydraulic thrust of the impeller shall be carried out by the thrust bearings provided in pump assembly. The pump shall operate trouble free, smooth and without any undue noise and vibrations. The magnitude of peak-to-peak vibration at shop and at site installation will be limited to 75 microns and 50 microns respectively at the bearing housing.

The pump installation design should be such as to facilitate automatic installation and removal of pumps without having entry into the sewage pit. Profile gasket should be provided in automatic coupling system so as to avoid metal-to-metal contact between pump and delivery pipe bend to ensure leak proof joint.

2. Constructional Features

Casing

The pump casing, made of cast iron shall be hydrostatically tested at 1.5 times the shut-off head with maximum impeller size. The pump casing shall be of robust construction and the liquid passage in the casing shall be finished smooth.

Impeller

The non-clog, semi open / vortex type impeller will be both statically and dynamically balanced and will be keyed and positively held on the motor shaft. The impeller will also be secured against damages, if the direction of rotation should reverse due to liquid flowing backward through the pump. The impeller shall be capable of handling soft solids of minimum diameter 100 mm. The leading edge of the vanes shall be rounded and cut back to prevent rags, stringy materials etc. from impinging on the impeller vanes.

Shaft

The shaft, made of stainless steel shall be finished to close tolerance at the impeller and bearing diameters. The impeller shall firmly be secured to the shaft by key and / or nuts. The size of the shaft shall be calculated on the basis of maximum combined stresses. While designing the shaft the critical speed of the shaft must be taken into account which shall be at least 20% above / below the operating speed. The rotor shall be dynamically balanced to avoid any vibration during operation.

Seal

The pump shall have two mechanical seals in tandem arrangement. The lower mechanical seal shall have SiC / SiC face combination. Upper mechanical seal shall have with Carbon / TC face combination.

Bearing

Maintenance free antifriction deep grooved, permanently grease filled ball / roller bearings should be provided and this should take care of axial and radial thrust at any point of operation.

Motor

The motor should be dry, squirrel cage type, suitable for 3 ph, 415 ± 10% volt, 50 Hz supply, designed, manufactured and tested conforming to IS: 325. The motor should be rated for continuous duty with IP68 protection and class 'F' insulation or better. However, the motor frame size shall be liberally designed to restrict the temperature rise as per class 'B' insulation.

All squirrel cage induction motors shall be provided with electrolytic grade copper winding for stator and the rotor of the motor shall be of copper bars only.

3. Internal Protection Features for Pump sets (above 15 KW motor)

The pump sets shall at the minimum be provided with the following internal protections. The leads of all the protecting sensors shall be brought out from the motor with separate control cables.

Winding Temperature

The motors shall be provided with 3 sets of PT 100 type thermostats embedded in the winding to protect it from getting overheated.

Bearing Temperature

For detection of mechanical faults, both bearings, at drive end and non-drive end shall be provided with PT 100 type temperature sensors for monitoring the bearing temperature, protection and annunciation.

Moisture Sensors

The motors shall be provided with a resistance type sensor to sense entry of any moisture in the motor chamber. It shall operate on 230 V AC supply.

Monitoring Seal Leakage Chamber

The pump set shall be provided with a float switch type sensor assembled in the seal leakage collection chamber. In the event of any leakage this sensor will give the

tripping signal. The contacts of the float switch shall be rated for operation on 230 V 6A AC.

4. Material of Construction

Casing	:	Cast Iron, IS : 210, FG 260
Impeller	:	1.5% - 2% Ni-Cast Iron, IS : 210, FG 260
Shaft	:	Stainless Steel, AI SI : 410
Motor housing	:	Cast Iron, IS : 210, FG 260
Stator/Rotor core	:	CRGO Steel
Stator/Rotor winding	:	Electrolytic grade copper wire/bar
Fastners	:	Stainless Steel, AISI : 316
Auto coupling system	:	Cast Iron, IS : 210, FG 260
Lifting chain, Guide pipe	:	Stainless Steel, AISI : 410

5. Scope of Supply

The scope of supply will include Submersible Pump set along with Automatic coupling, Delivery bend and Cable, Guide pipe & chain of required length.

6. Painting

The pump set shall be painted with zinc rich epoxy primer plus two coats of epoxy paint. The paint shall be spray applied and dried in a painting booth to avoid ingress of foreign particles especially when the painted surface is not completely dry.

7. Inspection & Testing at Manufacturer's Works

The manufacturer will submit their QAP for Engineer's approval including the following inspections and testings which will be carried out at the manufacturer's works.

8. Hydrostatic Test

The pump casing will be hydrostatically tested for any leakage, with water at a pressure 1.5 times of closed valve pressure with maximum impeller size or 2.0 times of pump duty point pressure whichever is higher. Unless otherwise stated the minimum duration of testing will be 30 minutes.

9. Statical Balancing

All major rotating components must be statically balanced individually.

10. Dynamic Balancing

In addition to static balancing of individual component the whole rotor assembly of pump must be dynamically balanced at rated operational speed.

11. Performance Test

Each assembled pump shall be shop tested by the manufacturer to determine the following characteristics as furnished in the characteristics curve.

i) Capacity Vs. Total Dynamic Head Curve

ii) Capacity Vs. Brake Horse Power (KW) curve

iii) Capacity Vs. Efficiency (%) curve

iv) Capacity Vs. NPSHR curve

And also recording of

v) Vibration level

vi) Bearing Temperature

The above tests for each pump for its full operating range at rated speed shall be conducted in accordance with the latest revision of IS/BS/DIN/ISO specifications and/or Hydraulic Institute Standards USA.

During pump testing, reading to the extent possible, shall be taken correspond to its full working range from its closed valve condition to 30% increase of the rated output or corresponding to the output at its minimum head specified, whichever is higher.

Each pump performance shall be documented by obtaining concurrent readings showing motor voltage and amperage, pump suction head, pump discharge head, pump discharge etc. Such readings shall be documented for at least seven pumping conditions including one at the shut-off head and each power load shall be checked for proper current balance.

The curves produced from the above readings shall be used to determine the capability of pump sets to meet the guaranteed performance at site.

Bearing temperatures shall be determined by PT 100 or equivalent type temperature detector. A running time of at least 30 minutes shall be maintained for this test at shut off head if sufficient water is not available for a complete test.

After the test runs have been performed to the satisfaction of the Client or his representative that the pumping equipment complies with the stipulated specifications the Client shall be provided with the Manufacturer's Test Certificates.

All instruments and equipment required for such test shall be provided by the manufacturer and the instruments shall be calibrated and certified by an approved

independent testing authority not more than 15 days prior to the test in which they will be used.

In the event of any pump failing to meet the specified test requirements, it shall be modified and retested until the requirements are attained.

12. Non-Destructive Tests

Physical and Chemical tests of the major components of each pump must be done. These tests shall be conducted in accordance with relevant IS/BS/DIN/ISO standard. Prior to testing the tests and major components' identifications along with the actual standard to be followed, shall be submitted for Client's approval and only those, which will pass the tests successfully, shall be used for the manufacture of end product. All material test certificates to be submitted before machining operation to the Client for his approval and finally these 'Approved' test certificates will be produced during pump performance testing.

13. Visual Inspection

Pumps shall be offered for visual inspection to the Client before despatch. The pump assembly/ any component shall not be painted before inspection.

Testing At Site

All pump sets shall be tested at site in the presence of manufacturer's expert. The QH parameters can be measured, if space permits.

1.3.4 Monorail Crane With Chain Pulley Block

- Monorail Crane shall be used for lifting of Submersible motor pumps as and when required for maintenance.
- Monorail mounted hand operated chain pulley block shall be as per the requirement of BS:3243/ Equivalent.
- It shall be of required capacity having adequate chain length.
- The load chain shall conform to BS:2902/Equivalent.
- Guide shall be provided for effective guidance to the load chain and a stripper for effective disengagement of chain from wheel.

1.3.5 Pipe Works.

— Pipes carrying sewage shall be of ductile iron with flange or spigot and socket joints according to individual circumstances.

— Pump delivery line flow velocity shall be set at < 2.1 m/sec and individual delivery pipe & common header diameters shall be selected accordingly.

— All pipe work and fittings etc. shall conform to the appropriate Indian Standards and shall be to a class in excess of the maximum pressure they shall attain in service including any surge pressure and shall be supplied by an approved manufacturer. All pipelines shall be tested at 1.5 times the design working pressure.
— The pipe works shall include all pipes and fittings for connection to the rising main upto the stipulated length outside the pump house building. The pipes and fittings shall be as per latest revision of IS:1536/IS:1537/IS:1538/BS:4622/ IS 8329/ IS 9523 / Equivalent and must be suitable to withstand the pressure tested to at least double the close valve pressure.
— The diameter and length of the pipes shall be determined from the specified velocity of the sewage water and size of the pump house. The delivery pipe of the pump shall be connected with the pump through enlarger immediately after the pump so as to restrict the velocity of sewage water in the pipe line at delivery side.
— Each delivery pipe line shall include one puddle collar at the exit of the wet well.
— All the pipe lines shall be protected with anticorrosive paints of required quality to suit the site climatic condition.
— Necessary rubber insertion of suitable thickness shall be provided at all the flanged joints complete with supply and erection of necessary number of bolts, nuts, washers of suitable sizes.

1.3.6 Valves

— Each Sewage pump shall be fitted with a reflux valve and a sluice valve on the delivery side of the pump.
— All the sluice valves shall be as per IS:14846/BS 5150/DIN 3352 at their latest revision and rising spindle type, flat face, bolted bonnet with solid wedge disc.
— The valves above and including 400 DN shall be provided with spur/bevel gear arrangement for operation and be fitted with by-pass arrangement.
— The pressure rating of the valve shall be as per the Design working pressure. Wherever specifically mentioned the valve shall be fitted with extended spindle, head stock along with hand wheel for easy operation from the operating platform.
— The reflux valve ensures that backflow, from the rising main through the pump, does not occur when the pump is not operating. The Reflux valves shall be of Double flanged with hinged single/multi swinging disc complete with bypass arrangements. The reflux valve shall be of flat face bolted cover and shall be fitted with renewable body and disc seat. The reflux valve shall be as per IS:5312/BS:5153/ISO 2531 at their latest revision. The pressure rating of the valve shall be as per Design working pressure.
— The valves on the discharge pipe work are to be mounted in a separate Valve Chamber. This allows the operator in operation and maintenance of valves easier to carry out. The

separate valve pit also allows a suitable accessible point for the attachment of pressure gauges to check the performance of the pumps.

— The Air Release Valve shall be Single air valve (Large Orifice) confirming to IS-14845/2000 for automatically releasing/admitting air that may accumulate under pressure in a section of pipe line at the time of initial charging or draining of main.

— The pressure rating of the valve shall be as per Design working pressure and end connections shall be flanged as per IS specifications.The Air release valve shall be fitted with isolating sluice valve of same size.

1.3.7 Air Blower

Air blowers shall be either of positive displacement or centrifugal with pressure vessel type complete with motor, baseplate, inlet filter, intake silencer and off-load starting system outlet silencer, anti-vibration damper, flexible coupling, filter restriction indicator, non-return valve, pressure relief valve, V-belt system or direct drive coupling. The casing rotor shall be of cast iron construction. Bearings and gears shall be grease lubricated. Motor speed shall be 1500 rpm.
The capacity of the air blower shall be of required airflow rate and pressureto maintain required level of dissolved oxygen in the aeration tanks in operation.

.

1.3.8 Chemical Dosing

Chemical dosing pumps shall be complete with plastic suction and delivery piping, solution tank, mixing tank and feed arrangement. Pumps shall be complete with motor control center, cabling and connection.

1.3.9 Diesel generating set

The Diesel Generating set shall be of A.C type with totally enclosed air cooled multi cylinder, AMF Panel,alternator, 3 Phase, 415V, 50 Hz 0.8 p. f. for developing suitable BHP at 1500 rpm.The DG shall be designed with 10% overload with standard accessories, self excited self regulated, screen protected alternator with static excitation system running at 1500 RPM as per IS 4722□1968 with voltage regulation +/□ 5 %.
Both the engine and alternator shall be directly coupled on a common fabricated steel base plate with anti vibrating pad with control panel comprising of standard meters, switchgears, indicators connected with suitable wires/cables. The complete set shall be enclosed in acoustic enclosure made of 18 SWG CRCA Sheet, sound absorbing material, Rockwool covered from inside with ¾ mm holes perforated sheet to restrict sound level upto 75 dB at 1.0 m
The engine shall be supplied with first filling of oil, diesel etc. obtaining necessary approval from Electrical Inspector as per specification.

1.3.10 Wheel Barrow

Wheel barrows of Polyethylene moulded construction shall be supplied for carting up screenings. The wheel barrows shall have rubber tyred wheels. The moulded units shall be bought out items from ISO : 9000 certified manufactures.

1.3.11 Screenings Container

Portable galvanized steel container shall be provided to store the screenings until the time of pick up. The container shall have a capacity of approximate 2.5 m3 and shall be of a convenient height to permit the discharge of screenings manually. The container shall have hinged covers and its design shall permit their being lifted by an overhead hoist or packer truck. The container shall have four wheels of about 200 mm diameter and two of which shall be swivel castors. The maximum height of a container including wheels shall not be more than 660 mm. The sides shall be fabricated of 12 gauge H.T. steel and the bottom of the container shall be of 5 mm plate steel. The container shall be reinforced with 50 x 50 x 6 angle.

1.3.12 Exhaust Fan

Exhaust fans shall be provided at the places specifically mentioned for ventilation purpose. The cast aluminum alloy blades shall have high efficiency aerofoil section. Blades shall be directly mounted on motor shaft, dynamically balanced and shall conform to IS:2312. The means provided for securing the fan mounting or fan casing to the wall shall be such as to provide a secure fixing without damage to the fan or wall.

The drive motors shall be TEFC, squirrel cage, induction type suitable for 240 Volts $\pm$ 10%, 1 phase OR 415 Volts $\pm$ 10%, 3 phase, 50 Hz AC supply with IP54 enclosure and class B insulation.

Suitable designed guards shall be provided at the inlet and outlet side to prevent accidental contact. No inflammable material shall be used in the construction of fan. Moulded parts, if used, shall be of such materials as to withstand the maximum temperature attained in the adjacent component parts.

The fan shall have protective insulation may be of all insulated construction or have either double insulation or reinforced insulation. Each fan should be provided with a 10 sq.mm mesh bird screen. The sheet used for the cowl shall be 14 gauge.

The finish will be stove enameled glossy paint/epoxy paint with specially pre-treated components to enhance corrosion resistance.

The number and size of exhaust fan will be determined taking into account 12 complete changes of air per hour to the service area.

1.4 Technical specifications of Electrical Works for the proposed Sewage treatment plant:

1.4.1 Scope

This specification is intended to cover complete installation, testing and commissioning of electrical equipments i.e. motor control centres, power control centres, control panels, switch gears, motors, push button starters, transformers, etc. 11 KV HT Power is available at existing STP site. Bidders have to arrange power supply connection for the proposed STP and MPS. The fault level shall be 50 KA

The Rated Power Factor as per Bihar Electricity Grid Code 2010 is 0.95-0.85.The Power Factor to be maintained is 0.85.

The method of starting for feeder of motor up to 5.5 KW-DOL, for motor above 5.5 KW-150 KW Star-Delta and above 150 kW –soft-Starter (VFD as per process requirement)

The fault level to be considered is 50 KA for 1100 KV source Voltage

1.4.2 Code and standards

The installation, testing and commissioning of all electrical equipments shall comply with all currently applicable states, regulations, fire insurance and safety codes in the locality where the work will be carried out. Nothing in this specification shall be constructed to relieve operatorof his responsibility.

Unless otherwise specified, the work, material and accessories shall conform to the latest applicable Indian British of IEC standard. All items of switch starter panel shall confirm to their relevant specifications as under or its latest revision.

IS: 4237: 1982 General requirements of switch gear and control gear voltage not exceeding 1000 volts.
IS: 2959 : 1982 contactors
IS: 4064 (Part I): Isolators
IS: 3842 (Part- IV) Overload Relay
IS: 8544 Motor Starters
IS: 10118 Code of practice for installation and maintenance of motor starter.
IS: 1248 Indicating installments
IS: 2705 Current transformers
IS: 2147 Degree of protection for starters.

Good workmanship shall be in accordance with best engineering practices to ensure satisfactory performance and service life.

1.4.3 Detailed requirement of installation

1.4.3.1 Switch gear, Control panel, etc.

a) All alignment, leveling, grouting, anchoring, adjustments shall be carried out in accordance with manufacturer’s instructions and or as directed by theOwner.

b) All modules shall be taken out and shall be cleaned preferably with vacuum cleaner.

c) All connections of fixing of equipments in switch gear control panels etc. shall be completed, checked and adjusted to ensure safety and satisfactory operation of the equipment.

d) In some cases, minor modifications may have to be carried out at site in the wiring and mounting of the equipment to meet the requirements of the desired control scheme and theContractorshall have to do the same.

1.4.3.2 Motors

a) The installation of motors shall be carried out in accordance with manufacturer's instructions and / or as directed by theOwner.

b) Checking and cleaning of bearings and charging / filling of lubricants whatever necessary.

c) Cleaning of core and winding, varnishing and drying but the windings and measurements of air gap for motor assembly at site if demanded.

d) Motors shall be run on un-coupled condition for few hours before coupling them with the drive equipment.

e) Motors shall be coupled with drive, adjusted and shall be tested on load.

1.4.3.3 Miscellaneous Items

a) The Bidder shall install miscellaneous items such as motors starters, local start / stop push button starters etc.

b) These equipments will be generally wall, column or stand mounting. The exact location will be as shown in the final drawing.

c) All supports or brackets needed for installation shall be fabricated and painted by the Bidder.

d) All welding, cutting, chipping and grinding as and when necessary shall be carried out by the Bidder.

1.4.3.4 Cable termination

Cable Termination shall include the following

a) Making necessary holes in bottom / top plates for fixing cable gland / box.

b) Fixing cable gland / box, connecting armour clamp to cable armour.

c) Dressing cable, pouring, compound etc. wherever necessary to make termination complete.

d) Putting cable lugs, crimping them on to cores of cable, taping bare conductors upto lugs, wherever necessary.

e) Termination to equipment terminals.

f) Supply and fixing of cable and core identification ferrules.

WhereverOwner has not provided MS plates for fixing cable tray supports, Bidder shall install approved concrete fasteners for fixing cable tray supports.

1.4.3.5 Inspection

a) After completion of the erection / installation, each equipment shall be thoroughly inspected in presence ofOwner for correctness and completeness of installation.

b) A check list may be furnished by theOwner wherein all details to be checked and necessary instructions shall be listed. The inspection and checking shall strictly follow the check list.

c) On completion of the inspection two (2) copies of the check list duly filled in shall be jointly signed byContractorand theOwner, such endorsement, however, shall not relieve theContractorof his obligation under the contract.

1.4.3.6 Testing and commissioning

a) After completion of erection work tests shall be conducted by theContractoron each piece of the equipment as per list be supplied by theOwner or his authorized representative.

b) The Bidder shall provide all tools, instruments; materials labour supervisory personnel for carrying out tests on the equipment and materials under his scope of work.

c) The Bidder shall record the test results on approved Proforma and furnish four (4) copies of the results to theOwner for his approval within a week form the date of test completed.

d) Before commissioning of the equipment, theContractorshall set the relays to their recommended values.

e) On successful inspection and testing, the equipment shall be commissioned and put on trial run along with other equipment in a manner mutually agreed upon.

1.4.3.7 Rectification

The Bidder shall carry out all rectifications, repairs or adjustment work found necessary during testing, commissioning and trial run.

Unless otherwise specified the work, material and accessories shall conform to the latest applicable Indian, British of IEC Standards, some of which are listed below:

IS 3043 Code of Practice for earthing.

1.4.3.8 Installation of cables

1. The Bidder's scope of work includes, unloading, laying, fixing, jointing, bending and terminating of cables.Contractorshall also supply all the necessary hard-wares for jointing and terminating of cables. Cables shall be laid directly buried in earth, on cable trays and support in conduits and ducts or bare on walls, ceiling etc as shown in the approved Drawings.

2. All cable work and the allied apparatus shall be designed and arranged to reduce the risk of fire and any damage that may cause in the event of fire. Wherever cables pass through any floor or wall opening suitable bushes shall be supplied. If required by the Design Build Operations Engineer, the bushes shall be sealed using fire resisting materials to prevent fire spreading.

3. Standard cable installation tools shall be utilized for cable pulling. Maximum pull tension shall not exceed manufacturers recommended value. Cable grips, reels or pulleys used

shall be properly lubricated. The lubricant shall not injure the overall covering and shall not set up undesirable conditions of electrostatic stress. Cables pulling shall permit performance of collateral work without obstruction.

4. Sharp bending and kinking of cables shall be avoided. The bending radius for various types of cables shall be more than those specified by manufacturer.

5. Power and control cables shall be laid in separate cable trays. The order of laying of various cable in trenches and overload trays shall be as specified below:

6. Cables of highest system voltage at the top most tier with second highest voltage on the second tier from top, third highest on the third tier from top etc. with control instrumentation and other service cables in bottom most cable tier.

7. Where groups of HV and LV and control cables are to be laid along the same route, suitable barriers to segregate them physically shall be employed.

8. Where cables cross roads and water, oil gas or sewage pipes the cables shall be laid in reinforced spun concrete pipes of 15 mm minimum diameter, also 50% space shall be kept as space for future, if more than one cable is to be laid through pipe. For road crossing the pipe for the cable shall be buried at not less than one metre depth. Cable less than 15 mm unless otherwise approved by the Engineer. Cable shall be protected at all times from mechanical injury and from absorbing moisture.

9. Some extra length shall be kept in each cable run at a suitable point to enable one or two straight through joints to be made at a later date, if any fault occurs.

10. To facilitate visual tracing, cables in trays shall be laid only in single layers where design, permits. Cables shall be laid in proper sequence so as to avoid unnecessary crossing of other cables upon entering or leaving a run of tray. Cable splices shall not be permitted.

11. Cable jointing shall be in accordance with relevant Indian Standards Codes of Practice and Manufacturer’s special instructions. Materials and tools required for cable jointing

work shall be supplied by Concessionaire. Cable shall be firmly clamped on either sides of a straight joint at not more than 300 mm away from the joints. Identification tags shall be provided at each joint and at all cable terminations. Single core cable joints shall be marked so that phase identify at each joint can be determined easily. The joints shall be located at most suitable places. When two or more cables are laid together, joints shall be arranged to be staggered by about three meters. Before jointing insulation resistance of both sections of cables to be jointed shall be checked.

12. Bidder shall install and connect the power, control and heater supply cables, for motors.Contractorshall be responsible for correct phasing of the motor power connections and shall interchange connections at the motor terminal box if necessary after each motor is test run.

13. Metal sheath and armour of the cable shall be bonded to the earthing system of the station.

14. Cable clamps shall be minimum 3 mm thick and 25 mm wide galvanized MS flat spaced at every 1.0 m interval.

1.4.3.9 Cable trays, accessories and tray supports

Cable trays shall either be run in concrete trenches or overload supported from building steel, floor slab etc.

Cables shall be clamped to the cable trays in both horizontal runs and vertical runs by suitable site fabricated clamps.

Cable trays supporting system shall be adequately designed so as to keep maximum deflection within permissible limit.

1.4.3.10 Conduits and pipes

Bidder shall supply and install conduits, pipes as specified and as shown in drawings all accessories / fittings required for making installation complete shall be supplied by Contractor.

Conduits and pipes shall be of GI and of heavy duty type.

Flexible metallic conduits shall be used for termination of connections to equipments to be disconnected at periodic intervals.

Conduits or pipes shall run along walls, floors and ceilings, on steel supports, embedded in soil, floor, wall or foundation, in accordance with relevant layout drawings. Under ground portions of conduit installation to be embedded in the foundation or structural concrete shall be installed in close co-ordination with collateral work. Exposed conduit shall be neatly run and evenly spaced.

Exposed conduit shall be adequately supported by racks, clamps, straps or by other approved means. These fittings shall be of same material as conduits.

Each conduit run shall be marked with its designation as indicated on the drawings. Identification shall be made where possible by means of brass ribbon. So located that each run of conduit is readily identified at each end.

When one or more cables are drawn through a conduit, cables shall fill not more than 50% of the internal cross sectional area of the conduit.

Entire system of conduit after installation shall be tested for mechanical and electrical continuity throughout and permanently connected to earth by means of special approved type earthing clamp efficient fastened to the conduit.

For jointing purpose,Contractorshall have available at site, dies for threading pipe or conduit. All such threaded ends shall be reamed after treading and anti-corrosive paint applied.

1.4.3.11 Switch gear control panel / desks

Base of outdoor type units shall be sealed in an approved manner to MS channel concrete to prevent ingress of moisture.

Bidder shall take utmost care in handling delicate equipments and mechanism like instruments, relays, dragging shall be avoided as far as possible. Proper pies shall be provided underneath when dragging for short distance. Wherever the instruments and relays are supplied separately, they shall be mounted only after the associated control panels / desks have been erected and aligned. Any damage to relays and instruments shall be immediately reported to theOwner.

Contractor shall also make all necessary adjustments as specified by the manufacturer for proper functioning of the equipment. The setting of relays shall be carried out.

Outgoing feeders and incoming feeders of cable or bus duct shall be connected at the switch gear panel and as explained in the installation procedures of cables and bus ducts.

After installation of all power and control wiring, Contractor shall carry out operating tests, manufacturer’s installation tests. Meager tests for insulation, polarity checks on the instrument transformers.

TheContractorshall also carry out the drying of equipment in case of low insulation resistance.

1.4.3.12 Transformer

Sleepers shall be provided when unloading on bare ground. After placing on foundation alignment, leveling, etc. shall be carried out in neat workmanlike manner. Dehydration of silica gel rather shall be carried out.

For the power / control cables projecting above the ground the termination of cable box / marshalling box / shall be run in GI conduits of suitable cross section. Ends shall be sealed with bitumen compound.

The cable end box of the transformer of detachable type shall be supported properly enabling the transformer to be taken out for repair without disturbing the cables.

1.4.4 Specifications for erection, testing and commissioning of illuminationsystem

1.4.4.1 Scope

This specification covers complete installation, testing and commissioning of indoor and outdoor illumination system.

1.4.4.2 Scope and standards

The wiring, installation and commissioning of complete illumination system shall comply with all currently applicable statutes regulations. Fire insurance and safety codes in the locality where the work will be carried out. Nothing in this specification shall be construed to relieve vendor of this responsibility.

Unless otherwise specified, the work, material and accessories shall conform to the latest applicable Indian, British IEC Standards.

Good workmanship shall be in accordance with best engineering practices to ensure satisfactory performance and service life.

1.4.4.3 General requirements

Except as specifically approved by the site office installation of conduits and lighting fixtures shall be taken only after all major services such as piping, structural work etc. in that particular area have been completed.

Location of lighting fixtures, switches and receptacles shown on the drawings, are indicative and shall be relocated to suit site condition.

Except as noted mounting height of various lighting equipment from finish floor level shall be as follows:

i.	Lighting Panels		1200 mm
ii.	Lighting control switches		1000 mm
iii.	Receptacle with switch		
	a)	For indoor	500 mm
	b)	For outdoor	1000 mm

All cables and conduits from lighting panel upto first lighting fixture shall be identified with aluminium tags giving circuit reference number.

Lighting panel number shall be indicated when more than one panel for an area is to be provided.

A number of lighting panels shall be earmarked separately for supplying power to the space heater mounted in various switch gear panels and motors.

Steel surfaces exposed, to weather shall be thoroughly cleaned for removal of rust and shall be given a primary coat of zinc chromate and two finishing coat of paint. All metal parts not accessible for painting shall be made of corrosion resistant material.

Cable / Conduits separators shall be provided at an interval of 500 mm for horizontal runs and 750 mm for vertical runs.

Cable / Conduits shall be kept, wherever possible at least 300 mm away from pipes, heating devices and other equipments.

For the purpose of calculating connected loads of various circuits multiplying factor of 1.25 will be assured to the rated lump voltage for lamp fixtures to take into account the losses in the control gear.

Contractor shall supply junction boxes; pull boxes, terminal blocks, glands, conduits and accessories (elbows, tees, bends, etc). and supporting anchoring materials to make the installation complete.

Contractor shall work in co-ordination with the civilContractorwhen openings, sleeves are required in walls and floors. Holes byContractorshall necessarily be patches in a good and approved manner.

All types of wiring concealed or unconcealed shall be capable of easy inspection. In all types of wiring due consideration shall be given for neatness and good appearance.

In hazardous areas, the founding wire shall run along the conduits throughout the installation and all conduits and fixtures shall be effectively grounded. Conduits shall be grounded at the ends adjacent to switch “Concessioner”s at which they originate.

Wherever specified, DC lighting system shall be installed to provide necessary illumination in case of an emergency. Emergency lighting cables shall run in a separate conduit system.

For street lighting, steel tubular poles complete with fixing brackets shall be used. These poles shall be coated with bituminous preservative paint on the inside as well as embedded outside surface. Exposed outside surface shall be painted.

Before a completed installation, or an extension to an existing installation is put into service, installation test stipulated IS: 2274 and other codes of practices shall be carried out byContractorin the presence of Design Build Operations Engineer’s / Engineer’s representative.

1.4.4.4 Wiring in conduits

Individual lighting circuits inside building shall be wired with 250/440 volts grade copper / aluminium conductor PVC insulated flexible wires cables. The circuit wire shall be colour coded as follows:

White - Phase or DC positive wire

Black - Neutral or DC negative wire

Pull wires in a conduit shall be drawn simultaneously. No subsequent drawings are permissible. Necessary, pull wires shall be provided by the Concessionaire.

The wires shall not be pulled through more than two equivalent 90^0 bends in a single conduit run.

Wiring shall not be spliced at any place other than junction boxes with approved type connectors of terminal strips, and for lighting fixtures, connection shall be T'd off through suitable round conduit or junction bars.

For vertical run of wires in conduit, wires shall be suitably supported by means of wooden plays at each pull junction bores.

1.4.4.5 Outdoor lighting

Lighting for all outlying areas shall be carried out using 1.1 Kv grade. Aluminium conductor, PVC insulated steel wire armored cables between lighting panel an junction box near the lighting fixture.

All lighting poles shall be steeped tubular steel poles type ISTP 15 as per ID 2713 and shall be the painted type. length shall be as given in ES-5 c.

Except as noted cables for Road and outdoor lighting shall be directly buried in ground at a depth of 600 mm or routed in available cable trenches.

Lighting cables shall be taken through GI / Hume pipes buried in ground at 1000 mm below the Road / Rail track crossing.

1.4.4.6 Earthing

For outdoor earthing of lighting poles, Masts etc. cut GI wire shall be used. The wire shall be run buried in ground at a depth of 600 mm.

Lighting fixtures, receptacles, junction boxes, switches conduits and handrails shall be earthed using GI wire of minimum size 12 SWG.

The earthing wire shall run over the entire length of the conduit between fixtures and the corresponding lighting panel where it shall be connected to earth grid. For 3 phase power socket, outlets, separate grounting wire shall be provided.

1.4.4.7 Testing and commissioning

After completion of the work complete illumination system shall be thoroughly checked and tested byContractorin presence ofOwner or his representative as per the list.

TheContractorshall provide all tools, materials, labour and supervisory personnel for carrying out the tests.

TheContractorshall carry out all rectifications repairs or adjustments work found necessary during testing and commissioning.

TheContractorshall record the test results on approved Performa and furnish test report / results (4 copies) for approval.

On successful commissioning of the system and on carrying out necessary rectification work, theOwner will take over the installation either wholly or in parts, as the case may be, where it shall be connected to earth grid, for 3 phase power.

1.4.5 Specifications for earthing and lightening protection

1.4.5.1 Scope

This specification covers requirements of earthing and lighting protection system. The specifications in intended to cover complete supply, installation, testing and commissioning of the above system.

1.4.5.2 General information

The design supply and performance of the system comply with all currently applicable statutes, regulations and safety codes in the locality where the systems will be erected and commissioned.

The earthing and lighting system shall be installed in conformity with the requirement of Indian Electricity Act 1910 as amended and the Indian Electricity Rules, formed there under Indian Standard Code and practice and other statutory regulations that may be relevant to the erection.

Unless otherwise specified, the equipments, materials and accessories provided byContractorshall conform to the latest applicable Indian Standards or Indian Electricity Code standards, some of which are listed below:

IS : Code of practice for earthing.

IS : Code of practice for protection of building and allied structures against lighting.

1.4.5.3 Earthing system

Two separate and distinct earth leads shall be used for earthing each equipment / structures enclosing the power conductor and one earth lead for metallic structures adjacent to electrical installation.

Metallic frames of all electrical equipment rated above 250 volts, must be earthed by two distinct connections with earth system.

Earthing cables crossing other metallic structures such as conduits, pipe lines etc. shall be minimum 300 mm away from such structures.

All underground connections and joints in earthing system shall be blazed / welded. Connections with equipments / structures shall be bolted type.

Conducting petroleum jelly shall be applied to contact surface of all bolted joints and joints shall be covered with bituminous compound and taped.

When GI conductors are connected to aluminium conductors the contract surfaces of GI shall be covered with bituminous and taped.

Natural connections shall never be used for the equipment earthing.

Earthing conductors shall be protected against mechanical damage.

Earthing conductors running along the structures, wall etc shall be cleaned at every 750 mm interval.

Minimum size of earth conductor shall be in accordance with IS : 3043. However, sizes of earth conductors for equipments shall be at least half the size of power conductor, limited to maximum of 120 mm^2, of aluminium.

All earth lead connection shall be as short and direct as possible and shall be without kink.

1.4.5.4 Earthing and main grid

Adequate number of earthing pits and electrodes as shown in enclosed drawing shall be used in conjunction with earthing grid.

Minimum spacing between two adjacent earth pits shall not be less than size (6) meters and shall be kept sufficiently away from structures to clear footings.

Main grid loop for a building shall be installed outside boundary of the building, buried in backfill. It shall be installed at a minimum depth of 600 mm outside the building wall.

The main earth loop (MEL's) in plant areas shall be generally routed along cables when equipments are located away from MEL's suitable sub-loops may be run upto them for deriving connections for individual equipment.

1.4.5.5 Lightening protection

Tall structures shall be protected from lighting strokes by suitable lighting protection system to be erected and installed.

Down-comer shall not be tapped in between for equipment earthing.

Cable sheaths, metal conduits, casing etc. shall not be connected to lighting protection system.

Down-comers shall be as short as possible. Each down comer shall be provided with a testing point located at a height of about 1000 mm from ground level.

A minimum 2,meter separation shall be maintained between any other electric conductor and lighting protection system.

Earthing and lighting protection system shall be bounded to each other to prevent side flash over. If adequate clearance between two system can not be maintained.

1.4.5.6 **Indoor equipment earthing**

Each floor of building shall have its own earth bus embedded in concrete.

Earthing grid embedded in the floor slab shall have a minimum concrete cover of 50 mm.

Earth buses on different floor and main grid shall be connected by at least two conductors of main grid conductor size.

Every alternate column (Steel or RCC) of the building housing electrical equipments shall be connected to main earthing grid.

Every conductor shall be welded at interval of 1000 mm along their run on steel structure and shall be at interval of 750 mm along the wall.

1.4.5.7 **Outdoor equipment earthing**

Each transformer neutral shall be provided with two separate earth leads to two separate earth pits located near transformer.

Wherever earthing conductor crosses the trenches tunnels, railway track, etc., it shall be run below the trench etc.

Equipment structures shall be earthed at two diametrically opposite points.

Each pole of H.V. lighting arrestor and coupling capacitor shall be gounded with minimum one separate earth pit.

CTs secondary winding shall be connected to earthing grid by minimum two earthing conductors. CT and VT secondary neutral shall be earthed at the terminal block where they enter the control panel.

Every alternate post of switch yard fence shall be earthed and gate shall be earthed by flexible GI wire.

Any two diametrically opposite legs of each switch yard tower, without lightening protection shield wire, shall be earthed at the base of tower.

A well distributed earth mat shall be provided below ground on which operator would stand and operate the HV isolator or circuit breaker.

1.4.5.8 **Testing and commissioning**

Entire earthing system and lightening protection system shall be tested for continuity by ELV tester after installation.

For the earthing and lightening protection system, the connections shall be thoroughly checked.

The earth resistance shall be checked, recorded and resistance shall be improved in case it is higher than acceptable limits.

TheContractorshall carry out all rectifications, repairs or adjustment work found necessary during testing and commissioning.

1.4.5.9 Earthing and lightening protection system

Sizes and number of earth leads for earthing various items and other technical particulars shall be as specified.

Earthing conductors are shown diagrammatically. Exact location of earthing conductors, earth electrodes and test pits and earthing connections may be changed to suit the site conditions.

Earthing conductors in the building, running parallel to walls and columns shall not be less than 150 mm away from the wall / columns. Suitable earth risers shall be provided if the equipment is not available while carrying out earthing connections.

Wherever, earthing conductor passes through walls, galvanized iron sleeves shall be provided for the passage of earthing conductor. Water stop sleeves shall be provided. Water stops shall be provided wherever earthing conductor enters the building from outside.

Wherever the conductors are to be buried,Contractorshall co-ordinate with other civil Concessionaires to ensure that the conductors are installed before concreting.

All connection shall be low resistance. Contact resistance shall be minimum.

Steel conductors, above ground level shall be galvanized. All conductors shall be free from any defects.

Earthing conductors shall not run in direct contact with control and other cables. Single core cable armoured shall be earthed at one end. The cable trays shall be earthed to main grid at-least at two points and at every 25 meters intervals.

1.4.5.10 **Testing of earthing system**

Purchaser may ask to carry out earth continuity tests, earth resistance measurements and other tests in presence of him which in his opinion are necessary to prove that the system is in accordance with design, specification, Indian Code or Practice and Indian Electricity Rules.Contractorshall have to carry out all such tests. The lightening protection vertical air terminations and / or horizontal air termination conductors shall remain in their installed position even during severe weather conditions. All joints in the down conductors shall be of welded / brazed type. All metallic structures in the vicinity of down conductors shall be bonded to the down conductors. The rest joint for down conductors shall be directly connected to the earthing system.

1.4.6 Specifications for Diesel generating set

Supplying, Erecting and Commissioning of **Diesel generating set** with AMF Panel with alternator of output capacity as given below, 3 Phase, 415V, 50c/s 0.8 p. f. A.C a totally enclosed air cooled multi cylinder diesel engine developing suitable BHP at 1500 rpm with 10% overload for 1 hour in 24 hours with standard accessories, self excited self regulated, screen protected alternator with static excitation system running at 1500 RPM as per IS 4722-1968 with voltage regulation +/- 5 %.Both the engine and alternator direct coupled on a common fabricated steel

base plate with anti vibrating pad with control panel comprising of standard meters, switchgears, indicators connected with suitable wires/cables. The complete set enclosed in Acoustic enclosure made of 18 SWG CRCA Sheet, sound absorbing material, Rockwool covered from inside with ¾ mm holes perforated sheet to restrict sound level upto 75 dB at 1.0 m The engine with first filling of oil, diesel etc. obtaining necessary approval from Electrical Inspector as per specification.

1.4.7 Specifications for Power Transformer

Providing, erecting and commissioning out door type copper wound transformer continuously rated for 3 Ph, 50 Hz, at full load and temp. rise not exceeding 45º C by thermometer in oil and 50ºC by the resistance in winding after continuous run at full load rating, the transformer should have oil immersed winding having vector group DY 11, HT side connected in Delta and LT side connected in Star with neutral brought out connected to provided separate earthing. The transformer shall have power terminal arrangement, bushings / cable end box on HT side and cable end box on LT side. 2 Nos. channels with stoppers shall be provided and fixed on the provided plinth for mounting the transformer. The transformer should have following standard fittings. Transformer shall be of latest manufacturing standards as per amended IS specifications and the Load & No Load losses shall be limited to the values given below or as per IS.

- Oil conservator with filling hole with cap and plain oil level gauge.
- Silica gel dehydrating breather charged with Silica Gel.
- Oil drain valve.
- Oil filter valve.
- Lifting eyes / hooks.
- Two earthing terminals.
- Diagram and rating plate.
- Air Vent.
- Explosion Vent.
- 100 mm dia thermometer with thermometer pocket
- Four bi directional plain roller.

1.4.8 Specifications for Air Break Star –Delta,Switch Starter Panel with Control Pannel

Supply of fully automatic air break star -delta switch starter panel suitable for submersible motor pump for operation on 415V ± 1.0%, 3 phase, 50 ±3% Hz AC supply. Control panel shall consist of isolator & SFU, HRC fuses, contactors. 0/L relay, single phasing preventer, earth leakage relay, capacitor and accessories.

(a) Enclosure :

Enclosure shall be dust and vermin proof, wall mounting cum pedestal type and having lowers on upper and lower side of panel board. The fabrication box shall be of 16 SWG CR sheet and door shall also be of 16 SWG CR sheet.

All the components Inside the control panel shall be mounted on 16 SWG steel base plate. After applying Zinc cromate primer, the control panel shall be stoved enameled with two coats of final paints. The colour shade shall be of 631 of IS : 5.

All bolts, nuts, screw washers shall be galvanized, zinc/cadmium plated and passivated Proper rubber lining shall be provided for protection from dust. There shall be two entry for main cable to the switch andtwo outgoing cable entries from the starter. These shall be provided with suitable cable glands made of bi .sss metal.

(b) Isolator SFU:

This shall be of 300A x 415V air break, quick make quick break type confirming to IS : 4064 (Part I) 1978 suitable for AC-23 duty confliction. The operating handle shall be mounted on the door of the panel. The switch shall be interlocked with panel door to prevent opening of the door when the switch is 'ON' position and to prevent switching ON when the door is open.Combination SFU will not be acceptable.

(c) Contactors :

All the three contactors shall be air break type and having rating of minimum 200A for AC-3 duty utilization characteristic Coil voltage of 415V, auxiliary contacts 2 NO + 2 NC.

(d) Overload Relay:

The overload relay shall be 60-100 Amp Rating three element, positive acting, ambient temperature compensated type with adjustable setting range to ensure protection against single phasing and overload. The 0/L relay shall have manual reset facility. The range of the overload relay shall be decided by multiplying minimum .6 of minimum 1.5 times and maximum 1.6 times the HP rating of the motor.

(e) Timer:

Electronic timer for Star to Delta changeover shall be provided of the coil..

(f) Single Phasing Preventer : (Pump Guard) S.P.P. with 2/3 seconds lag to avoid nuisance tripping shall be provided. SPP shall be of unbalance current operated type. A bypass toggle switch with mechanical Interlocking shall be provided on the door of the control panel to bypass the same in case of emergency. Minllec series 8800 make 40 AMP.

(g) Main Fuses : 3 Nos. knife type HRC fuses of 160A, 415Bshall be provided.

(h) Control Fuses : 3 Nos. 16A HRC fuse fittings with 2A HRC fuse links shall be provided for the protection of the control circuit.

(I) Earth Leakage Relay : An E S R. with C.B.C.T. shall be provided of 10 mA to 600mA range. A bypass toggle sw itch with mechanical interlocking shall be also provided on the door of control panel to bypass the same in case of emergency. The E.L.R. shall have 2/3 seconds time lay to avoid nuisance tripping.

(j) Push Buttons :

Push button of 22.6 dia shall be provided of red green black colors for stop, start and 0/L reset respectively.

(k) Indicating Lamps : LED/filament type indicating lamps of 22.5 0 dia shall be provided for R.Y.B. phases, SPP (healthy), F...R (Fault), 0/L.trip). Star and Delta.

(1) Busbars and Links: Main bus bars and connecting links between, connectors shall be minimum of 1"x 1/8" size tinned electrolytic copper strip.

(m) Wiring and Terminals : Power and Control wiring shall be done with PVC insulated copper conductor having 660/1100V grade; Control wiring shall be done with minimum 1.5 sq. mm. Copper wire and Terminated with compression lugs of proper size. Each wire shall be terminated at both ends with PVC ferrules. Not more than two wires to be terminated at one terminal and 10%

Extra Spare Control Terminals, clip on type shall be provided. For connection of load side terminals, adequate copper bus link, shall be provided on conductor and overload may.

(n) Voltmeter : Sq-96 size, 0-500V voltmeter shall be provided with selector switch to read voltage in each phase.

(o) Ammeter: Sq-96 size, CT operated ammeter of 0-200A, having 6 times suppress scale shall be provided along with selector switch to read current In each phase.

(p) Earthing : Two nos of earthing terminal shall be provided for connecting the oarth, All non-current carrying metallic parts of the equipments shall be earthed. Earth bus of 10 x 3 mm shall be provided through out of the earth.

(q) Name Plates :

Labels shall be provided f or each equipment mounted on the panel.

(r) Accessibility: Checking, Testing, Fault finding and removal of components shall be possible without disturbing the adjusted equipments. Incoming supply terminal shall be shrouded with acrylic covers to prevent accidental contact.

(s) Drawing: The tenderer must submit GA drawing/wiring diagram and bill of material prior to manufacturing.

(t) Approval &Testing : After order and approvals of GA Drawing, wiring diagrams and bill of materials, the tenderer shall manufacture one panel which shall be approved by owner. Tenderer shall have to give following testing at his works at his own cost and risk.

1) Single Phasing in Each phase.
2) Under voltage cut off at 320V.
3) Over voltage cut off at 480V
4) Leakage Current Test. '
5) Unbalance tripping at 10% unbalance voltage
6) H. V. Test at 2.5 KV for power circuit.
7) H.V. Test 1.5 KV for control Circuit.
8) Meggar Test.

(u) Control Pannel

Cabinet height – 5' width – 4', depth – 2', legs – 3', fabricated from 40 mm x 6 mm size angle and 2.0 mm CRCA sheet of door and enclosure. It also requires following items :
a) 8 lever lock.
b) One lamp holder point and one 3 pin 15 Amp plug point lighting board.
c) 4 nos. cable gland for 3.5 core x 12 mm2. Alu.cable and double entry cable boxes.
d) Duly painted with 3 coat of light gray semi glossy shade 631.

(v) Capacitor : 30 KVAR capacitor. Capacitor shall be of mixed Dielectric -of polypropylene and paper with internal element fuses completely impregnated type non PCB oil. Capacitor with protection fuse.

(vi). REMARK:

The manufacturer must posses CPRI certificate for IP 55 test as per IS 2147 of 1962, and SOKA short circuit test (IS : 8G23, part I of 1993), for 1 second with Initial pick of 105.00 KA. The offer without CPW certificate or manufacturer who does not posses such certificate shall be straight away rejected.

The contactors used inside the control panel shall be of one make only using of different makes of contactors is not at all permissible.

1.4.9 Technical Specification for 315 Amps, 415 volts, 50 Hz TPN Switch Fuse Unit (SFU)

General Construction:-

1) SFU must confirming to I S 13947-1993 (With latest /revised Amendment)

2) SFU must be dust proof.

3) SFU must be triple pole with solid neutral.

4) SFU with 160 Amp HRC DIN type porcelain fuse links. (DIN-I) and fuse base should be of 400 Amp. (DIN -II)

5) Made from, sheet steel enclosure.

6) Fuse switch unit will not be acceptable.

7) Combination fuse switch unit will not be consider for technical evaluation.

8) Switch should be made from DMC (Dove Mould Compound) insulating material having AC-23 duty category.

9) Switch must be separate unit. Fuse base must be separate unit for each phase for replacement & each fuse base.

10) Switch and Fuse base should be mounted separately & they are interconnected with aluminum links.

11) A separate front door opening should be provided for replacement of Fuse links.

12) The fuse door must be such that, it can not be opened while the SFU is in 'ON' position.

13) Tenderer with deviation in above technical specification will not be consider for evaluation.

1.4.10 Technical Specification of Control Panel for requirement of Motor of LT/H service.

1. The Design of Section pillar must be such that required HT/ L.T. service box and its equipments must be technically fit in it comfortably.

2 It must have double door on front side and on back side.

3. Section Pillar must be fabricated from 40 mm width x 6 mm thick x 7 1/2 ft height size M.S. angle.

4 Enclosure and door must be made from 2.0 mm thick CRCA sheet. Bottom of cabinet must be made from 4 mm thick M.S. plate.

5 Cabinet internal Size must be of 39" width x 30" depth x 60" height.

6. Cabinet must have internal two vertical compartments one side 17"depth and backside 13" depth. Height of compartment 4 ft and separated with wooden plates. In the compartment upper and lower side 6" opening required.

7 It must be Dust pr oof, Rain water proof and Water jet spray proof. It must be as per IP55 test.

8 Hinge of cabinet's door must be welded with angle of section pillar.

9 Door must have internal stoppers to stop first closing door.

10. 3 nos cable gland hole of 51 mm dia required in cabinet as per requirement. (One side one and back side two)

11. Two nos, 6 levers lock must supply with section Pillar.

12. Light board with one lamp holder with switch and one 3-pin, 15 Amp Plug point and switch must be supplied with section pillar.

13. One Main single phase DP switch cut out must supply with section Pillar.

14. Section pillar must be duly painted with one coat Red oxide and two coat light semi glossy shade 631 from internal and outside.

15. On bottom of legs 4" dia 3 mm thick plate must be welded.

16. Four legs of section pillar must be fitted and welded with Tie Roads.

17. Hinges of the door must be heavy and made from the 20 mm width x 6 mm thick strips with 8 mm hinge pin.

1.4.11 ILLUMINATION:

Fluorescent luminaries shall be used primarily for internal lighting. High pressure vapour or metal halide type luminaries shall be used in indoor application where their use is appropriate. If mercury or metal halide is used in indoor then they should be supplemented with fluorescent luminaries to assure that minimum illumination levels are maintained following momentary power dips. All other internal areas shall be lit with fluorescent luminaries. Where specific recommendations of lux level are not covered above, illumination level in such areas shall be finalized in consultation with Owner.

Owner shall be required to measure levels of illumination after completion of lighting installation work and short fall in illumination level shall be made good by the Bidder. Complete set of calculations showing, room, index, copy MF shall be given during detailed engineering.

1.4.12 Testing and commissioning

1.4.12.1 **Standards:**

The testing and commissioning covered by this specification shall, unless otherwise stated, comply with the requirement of the latest editions of applicable Indian Standards and currently applicable regulations. The manufacturer's recommendation for testing and commissioning shall be followed.

1.4.12.2 **General:** The following physical tests shall be carried out on all the equipments.

Check for physical damage.

Check name plates as per specification.

Check adequacy in tightness of nuts, bolts, clamps, and other connecting terminals.

Check leakage of oil or air if any, oil level, air pressure wherever applicable.

Check earth connectors.

Check cleanliness and glaze of insulator and bushing surfaces.

Check proper lubrication provided for moving parts.

Any other checks, specified in the relevant code of installation and manufacturer's drawings / catalogues.

1.4.12.3 The test to be carried out on various equipments shall be as follows:

Insulation Resistance Test

The insulation resistance test shall be carried out on the following equipments:

EHV installation	by 5000 V megger
HV installation above 1 KV	by 2500 V megger
Power circuit of voltage up to 1 KV	by 1000 V megger
AC and DC auxiliary circuits	by 500 V megger

The results of all the above tests shall be submitted to theOwner.

TheOwner may ask for some additional tests to be carried out which in his opinion are necessary to determine that the works comply with the specifications, manufacturer's recommendations or IS standards. The Contractor shall also carry out such additional tests. Test and trial of pumping machinery shall be given by Contractor after satisfactory commissioning of machinery.

The Contractor shall carry out operation and maintenance of sub-station, pump house and the works involved in the technical specifications. The intention of carrying out operation and maintenance through Contractor is to operate the pumps as per the requirement of the department, impart training to the deptt. staff in a systematic manner so that the starting and stopping of pumps is done methodically, the records are maintained, checks, routine maintenance which shall be as under.

1.5 Liaison with State Electricity Board for Power Supply

The Contractor shall be responsible for:-

(a) Confirming short-circuit and earth fault current data.
(b) Finalising supply capacity and supply scheme.
(c) Establishing any special BSEB requirements.

(d) Finalising protection relay characteristics, settings and co-ordination.
(e) Agreeing procedures and responsibility for connection of incoming feeder cables to the metering panel and pre-commissioning testing.
(f) Responsibility of co-ordination with BSEB for overhead line work.

Liaison with the State Electricity Board shall be by the Contractor through the Engineer.

Liaison with Electrical Inspectorate

The Contractor shall be responsible for all the works required for obtaining all design approvals necessary from the local Electrical Inspectorates Chief Officer as well as obtaining a sanction for energising the new supplies. All liaison with the Electrical Inspectorate shall be by the Contractor through the Engineer.

4 Process Instrumentation, Control. and SCADA System

The instrumentation shall include online measurement of influent and effluent parameters for sewage, sludge and sludge gas. **Process Instrumentation, Control. and SCADA System** shall include continuous monitoring the process parameters, process flow, tank level and other equipment protection devices. These measurements shall be connected to a network of Programmable Logic Control (PLC) based unit process controllers that shall generate pre-programmed monitoring and control actions for process, equipment and other control devices.

A Supervisory Control and Data Acquisition (SCADA) system, networked to the PLC unit process controllers shall acquire and display process parameters, process flow, tank level, etc., monitor and issue remote control actions for maintaining process control. The SCADA system shall also achieve pre-determined process parameters and originate custom performance reports for management reporting.

5 Quality Control Laboratory

Laboratory for analyzing the wastewater and sludge samples is proposed at the Treatment Plant to be housed in Administration Building. The laboratory shall be equipped with the required equipment so as to analyze the parameters like pH / BOD / COD / TSS / TDS / TS / VSS / Alkalinity / Sulphates / Sulfides / Nitrates / Sludge Stability / fecal-coliform, etc.

The following is the minimum list of laboratory equipment, but not limited to be supplied to conduct the specified diagnostic tests:

ITEM DESCRIPTION QTY.

A. Instrument (Laboratory)

1) Oil free diaphragm type vacuum cum pressure pump :1 No

2) Laboratory Hot Air Oven :1 No

3) Muffle Furnace : 1 No

4) Digital Fully Automatic Electronically Controlled BOD Incubator : 1 No

5) Flocculation machine for Jar testing with 6 SS paddles, gear or other arrangement to adjust the desired RPM with illumination and 6 individual on/off switches, cord plug, etc. having stirring capacity 1 ltr : 1 No

6) Autoclave (vertical), 750mm x 500m with SS bracket, inner chamber SS, 6KW with pedallifting, pressure and temperature gauges and water level indicator with insulated radial locking arrangement. : 1 No

7) Laboratory Glassware : 1 Lot

8) Fecal Coliform Counter : 1 No.

Latest applicable standards specified below.

Code No.	Title
IS 13118 / BS 5311 / IEC 56, 694	Circuit Breakers
IS 3427 / BSEN60298 / IEC298	Metal Enclosed switchgear
IS 2705 / BS 7626	Current Transformers
IS 3156/BS 7625/IEC 186	Voltage Transformers
IS 5578, 11353	Arrangement for Switchgear Busbars, Main Connections and Auxiliary wiring
IS 2544 / BS 3297 / IEC 273	Busbar Support insulators
IS 13947 (Part 1) / IEC 947-1 / BSEN 60529	Degree of Protection
IS 3231, 3842 / BS 142 / IEC 255	Electrical Relays for Power system protection
IS 1248 / BS 89 / IEC 51	Electrical Indicating Instruments
IS 9385 / BS 2692 / IEC 282	High Voltage Fuses
IS 722, 8530 / BS 5685 / IEC 145, 211	AC Electricity Meters
IS 613	Specification for copper rods and bars for electrical purposes
IS 6005 / BS 3189	Code of practice for phosphating iron and steel

Code No.	Title
IS 9920 / IEC 129, 265 & 298	Alternating current Switches for voltages above 1000 V
IS 13703 / BS 1362 / IEC 269	Low voltage fuses
IS 3452 / BS 3676	Toggle switches
IS 10118	Code of practice for selection, installation and maintenance of switchgear and control gear
IS6875/BSEN 60947/IEC 947	Control switches

Title	Code No.
Basic climatic and mechanical durability tests for components for electronic and electrical equipment	**IS:9000**
Environmental tests for electronic and electrical equipment	**IS:9000**
Metal clad base material for printed circuits for use in electronic and telecommunication equipment	**IS:5921**
Transformers and inductors (power, audio, pulse and switching) for electronic equipment	**IS:6297**
Printed wiring boards	**IS:7405**
Environmental requirements for semi-conductor devices and integrated circuits	**IS 6553**
Terminals for electronic equipment	**IS:4007**
Factory built assemblies of switchgear and control gear for voltages upto and including 1000 V AC and 1200 V DC	**IS:8623/BS: 5486 /IEC:439**
Air break switches	**IS : 13947 (Part –3)BSEN60947-3**
Miniature circuit breakers	**IS 8828/BSEN:60898**
HRC cartridge fuses	**IS:9224/BS:88**
Contactors	**IS:13947(Part–3) /BS:775/ IEC:158-1**
Control switches/push buttons	**IS:6875**

Title	Code No.
Indicating instruments	**IS:1248/BC:89/ EC:51**
Degree of Protection	**IS:13947-(Part1)/IEC:947-1**
Climate-proofing of electrical equipment	**BSCP:1014**
Code of practice for phosphating iron and steel	**IS:6005/BS:3189**
Semi-conductor converters	**IEC:146**
Semi-conductor rectifier equipment safety code	**IS:6619**
Specification for copper rods and bars for electrical purposes	**IS : 613**

Code No.	**Title**
IS2026/BS171/IEC76	Power Transformer
IS3639	Fittings and Accessories
IS1180	Auxiliary Transformer
IS6600/BSCP.1010/IEC354	Loading of oil immersed transformer
IS335/BS 148/IEC296	Transformer Oil
IS2099/BS223/IEC137	Bushings for > 1000V, AC
IS7421	Bushings for ≤ 1000V, AC
IS13947 (Part 1) / IEC947-1	Degree of Protection
IS3637	Buchholz Relay
IS 1271/BS2757/IEC85	Insulation Materials for Electrical Machinery
IS 3202/ BSCP1014/ IEC354	Climate Proofing
IS 1886	Installation & Maintenance of Transformers
IS 2705	Current Transformers

IS 375	Marking & arrangement for switchgear, busbars, main connection and auxiliary wiring
IS 2147	Degree of Protection
IS 3202	Climate- proofing of electrical equipment

IS 5082	Aluminium Busbars
IS 8081	For Non-segregated phase bus-ducts.
IS 3202	Code of Practice for climate – proofing of electrical equipment
IS 2516	Alternating current Circuit Breakers (Relevant part/Section)
IS 3231	Electric Relays for Power System Protection
IS13947	Switchgear General Requirements
IS 3427	Metal Enclosed switchgear and control gear
IS 4237	General requirements for switch gear and control gear for voltage not exceeding 1000 volts
IS 694 Part I & II	PVC insulated cables (for voltages up to 1100V with copper and aluminium conductors)
IS 8623	Factory Built Assemblies of SWGR and Controlgear for Voltages upto and including 1000V AC & 1200V DC
IS 13947-P3	Air Break Switches
IS 8828	Miniature Circuit Breakers
IS 13703	Low voltage Fuses
IS13947	Contactors
IS13947	Starters
IS 6875	Control Switches / Push buttons
IS 2705	Current Transformers
IS 3156	Voltage Transformers
IS 1248	Direct Acting Electrical Indicating instruments
IS 2147	Degree of protection provided by enclosures for low voltage switch gears.
IS 2959	AC Contactors of voltage not exceeding 1000 volts
IS 11353	Marking and Identification of Conductors and Apparatus Terminals
IS 722	A.C. Electricity Meters
IS 10118	Selection installation and maintenance of switchgear and controlgear
IS : 2834	Shunt capacitors for power systems
IS : 2544	Specification for Porcelain Post Insulators (3.3 KV and above)
IS : 5553	Series Reactors (Part II)

IS : 12672	Internal fuses and internal overpressure disconnectors for shunt capacitors
IS:7098 (Part-II)	Cross linked polyethylene insulated PVC sheathed cables for working voltages from 3.3 kV up to and including 33 kV
IS : 5831	PVC insulation and sheath of Electric cables
IS : 6474	Polyethylene insulation and sheath for electric cables
IS : 8130	Conductors for insulated electric Cables
IS : 3975	Mild Steel wires, strips and tapes for armouring of cables
IS : 10810	Methods of test for cables
IS : 3961 (Part II)	Recommended current ratings for cables PVC insulated and PVC sheathed heavy duty cables
IS : 1753	Aluminium Conductors for insulated cables
IS : 10418	Specification for drums of Electric cables
IS : 2633	Methods of testing weight, thickness and uniformity of coating on hot dipped galvanized articles
IS : 209	Specifications for Zinc
IS : 694	PVC insulated cables (for Voltage up to 1100 V)
IS : 1554 (Part I)	PVC insulated heavy duty electric cables for working voltage up to and including 1100 volts
IS : 5831	PVC insulation and sheath of Electric cables
IS : 6474	Polyethylene insulation and sheath for electric cables
IS : 8130	Conductors for insulated electric Cables
IS : 3975	Mild Steel wires, strips and tapes for armouring of cables
IS : 10810	Methods of test for cables
IS : 3961 (Part II)	Recommended current ratings for cables PVC insulated and PVC sheathed heavy duty cables
IS : 1753	Aluminium Conductors for insulated cables
IS : 10418	Specification for drums of Electric cables
IS : 2633	Methods of testing weight, thickness and uniformity of coating on hot dipped galvanized articles

IS : 209	Specifications for Zinc
IS2026/BS171/IEC76	Power Transformer
IS3639	Fittings and Accessories
IS1180	Auxiliary Transformer
IS6600/BSCP.1010/IEC354	Loading of oil immersed transformer
IS335/BS 148/IEC296	Transformer Oil
IS2099/BS223/IEC137	Bushings for > 1000V, AC
IS7421	Bushings for ≤ 1000V, AC
IS13947 (Part 1) / IEC947-1	Degree of Protection
IS3637	Buchholz Relay
IS 1271/BS2757/IEC85	Insulation Materials for Electrical Machinery
IS 3202/ BSCP1014/ IEC354	Climate Proofing
IS 1886	Installation & Maintenance of Transformers
IS 2705	Current Transformers
I.S. 3043 – 1987.	Earth Pits

All mechanical equipment such as screens, de-gritting devices, sluice gates, sludge thickeners, centrifuges, belt presses etc which comes into contact with sewage or sludge shall be fabricated in non corrosive materials and metallic parts in contact with sewage shall conform to Stainless steel. All walkways shall be in RCC or stainless steel with stainless steel handrails. Provide appropriate explosion proof construction and devices at any enclosed locations components where incoming sewage is exposed to atmosphere.

Mechanical screens shall be operated with Shaftless screw conveyors to transfer screenings to the screw compactor to dewater and compact the screenings. The screen will be controlled by a timer as backup to level control, so that, the cleaning mechanism can run at a set interval.

The deposited grit will be removed from the grit chambers by appropriate and efficient removing mechanism. Grit removal shall be accompanied with a grit classifier and grit washing system to ensure the grit is free from organic matter before disposal.

All overflow weirs will be made from stainless steel and all fittings and fixtures will be stainless steel.

Parshall flumes downstream of each grit chamber structure shall be required where an ultrasonic flow meter will be installed for measuring and adding the total flow of raw sewage entering the site.

Isolation weir gates and bye pass shall be required to control and/or isolate flow to any one units

Treated sewage shall be disinfected

The gravity thickeners shall be provided where required to reduce the volume of sludge before feeding the anaerobic digesters depending on chosen technology. Thickener fixed bridge and rotating scraper mechanism shall be in Mild Steel with epoxy coating. All the fasteners under liquid shall be in Stainless steel MOC.

Thickened sludge will be pumped into sludge digesters wherein continuous pump recirculation/mixing shall be done to stimulate anaerobic sludge digestion. Design of the anaerobic digester shall allow sufficient height of the digester to remain filled with gas. This gas can be used for future power generation.

Storage of biogas shall be required and accomplished by either gas holders or, if floating digester covers are provided, be contained within the floating cover of the anaerobic digester.

A gas flow meter for measuring gas shall be provided and installed in the digester control room. The gas flow meter shall be electrical transmitting type, ring balancing with transmitter, indicator and integrator, recorder all complete.

The digested sludge shall be dewatered by belt-filter press equipment and addition of polymer. Necessary arrangements shall be made to dispose of the sludge after dewatering..

The treated effluent shall be conveyed to the disinfection point and final disposal point above the normal high water level of the nala or river identified for final disposal.

TRAINING AFTER COMMISSIONING & DEFECT LIABILITY PERIOD

27. TRAINING OF OWNER'S PERSONNEL

The Operator shall be responsible to provide practical training in all aspects of the operation, maintenance, and facilities to all personnel selected by the Owner, who will ultimately be responsible for the operation, maintenance and repair of the system and its facilities after15 year O&M..

For this purpose, the Operator shall provide a comprehensive training program for the Owner's personnel during the period of the O&M, and for as long as may be reasonably required to ensure that the designated personnel are adequately trained to take up their responsibilities.

All costs for the Operator's personnel and the training facilities required for the training during O &M period, and any incidental training expenses, shall be borne by the Operator.

28. TRIAL RUN OF THE SYSTEM

0After commissioning of works, the Operator shall maintain the works for 3 (three) months to demonstrate satisfactory performance to the Design Build Operations Engineer prior to taking over by the Owner. The cost of electricity, if required for operation & maintenance of works during the period of this trial run will be borne by the Owner. The cost towards Operator's Engineer and other operating personnel during the said period of trial run, along with cost of tools and spare parts which are required for operation and maintenance of the works and equipment during the trial run period shall be borne by the Operator and shall be included in the quoted bid price. In the event that the system or any of the facilities do not satisfactorily achieve the required performance standards during this period, the trial run period shall be extended until such time as the Operator has satisfactorily rectified any deficiencies as may be necessary to satisfy the performance requirements. No additional compensation will be paid to the Operator for such extension.

Schedule 11 [Deleted]

Project MOU between the Central Government, State Government and the ULB and State Guarantee on Payments

For A Contract

TO **(i) DESIGN AND BUILD SEWAGE TREATMENT PLANTOF CAPACITY 60 MLD INCLUDING MAIN PUMPING STATION (97MLD) AND ALL APPURTENANT STRUCTURES AND ALLIED WORKS; (ii) OPERATION & MAINTENANCE OF THE COMPLETE WORKS OF SEWAGE TREATMENT PLANT, FOR A PERIOD OF 15 YEARS AT PAHARI IN PATNA, STATE OF BIHAR, INDIA.**

LIST OF ANNEXURES

Annexure 1- CV of Adjudicator

Annexure 2 – Drawing

Annexure 2 – Drawing

List of Drawings

1. Site layout plan for STP.
2. Treated effluent channel layout for ultimate disposal, size and section
3. Contour map of STP site.

Drawing – 1 Site layout plan for STP

Drawing – 2 Treated effluent channel layout for ultimate disposal, size and section

Drawing – 3 Contour map of STP site