

9. DISCLAIMER

9.1. Disclaimer

9.1.1. The Concessionaire acknowledges that prior to the execution of this Agreement, the Concessionaire has, after a complete and careful examination, made an independent evaluation of the Request for Qualification, Request for Proposals, Scope of the Project, Specifications and Standards, Site, Local conditions, source of raw water, and all information provided by the Authority or obtained procured or gathered otherwise, and has determined to its satisfaction the accuracy or otherwise thereof and the nature and extent of difficulties, risks and hazards as are likely to arise or may be faced by it in the course of performance of its obligations hereunder. Save as provided in Clause 8.2, the Authority makes no representation whatsoever, express, implicit or otherwise, regarding the accuracy, adequacy, correctness, reliability and/or completeness of any assessment, assumptions, statement or information provided by it and the Concessionaire confirms that it shall have no claim whatsoever against the Authority in this regard.

9.1.2. The Concessionaire acknowledges and hereby accepts the risk of inadequacy, mistake or error in or relating to any of the matters set forth in Clause 9.1.1 above and hereby acknowledges and agrees that the Authority shall not be liable for the same in any manner whatsoever to the Concessionaire, the Consortium Members and their Associates or any person claiming through or under any of them.

9.1.3. The Parties agree that any mistake or error in or relating to any of the matters set forth in Clause 9.1.1 above shall not vitiate this Agreement.

9.1.4. In the event that either Party becomes aware of any mistake or error relating to any of the matters set forth in Clause 9.1.1 above, that Party shall immediately notify the other Party, specifying the mistake or error.

9.1.5. Except as otherwise provided in this Agreement, all risks relating to the Project shall be borne by the Concessionaire and the Authority shall not be liable in any manner for such risks or the consequences thereof.



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- (b) It has taken all necessary actions under the Applicable Laws to authorise the execution, delivery and performance of this Agreement;
- (c) It has the financial standing and capacity to perform its obligations under this Agreement;
- (d) This Agreement constitutes a legal, valid and binding obligation enforceable against it in accordance with the terms hereof;
- (e) There are no actions, suits or proceedings pending or, to its knowledge, threatened against it at law or in equity before any court or before any other judicial, quasi-judicial or other authority, the outcome of which may result in the default or breach of this Agreement or which individually or in the aggregate may result in any material impairment of its ability to perform its obligations under this Agreement;
- (f) It has no knowledge of any violation or default with respect to any order, writ, injunction or any decree of any court or any legally binding order of any Government Instrumentality which may result in any material adverse effect on the Authority's ability to perform its obligations under this Agreement;
- (g) It has complied with Applicable Laws in all material respects;
- (h) It has good and valid right to the Site, and has power and authority to grant a licence in respect thereto to the Concessionaire. All information provided by it in response to the Request for Qualification and Request for Proposals, including amendments thereto or disclosures thereunder, in connection with the Project is, to the best of its knowledge and belief, true and accurate in all material respects;

8.3. Disclosure

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


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or may have a material adverse effect on its ability to perform its obligations under this Agreement;

- (k) It shall at no time undertake or permit any Change in Ownership except in accordance with the provisions of Clause 5.3 and that the Consortium Members, together with their Associates, hold not less than 51% (fifty one percent) of its issued and paid up Equity as on the date of this Agreement; and that no member of the Consortium whose technical and financial capacity was evaluated for the purposes of pre-qualifications and short listing in response to the Request for Qualification shall hold less than 26% (twenty six percent) of such Equity during the Construction Period;
- (l) The selected bidder / Consortium Members and its Associates have the financial standing and resources to fund the required Equity and to raise the debt necessary for undertaking and implementing the Project in accordance with this Agreement;
- (m) The selected bidder / each Consortium Member is duly organized and validly existing under the laws of the jurisdiction of its incorporation, and has requested the Authority to enter into this Agreement with the Concessionaire pursuant to the Letter of Award, and has agreed to and unconditionally accepted the terms and conditions set forth in this Agreement;
- (n) All its rights and interests in the Project Water Supply System shall pass to and vest in the Authority on the Transfer Date free and clear of all liens, claims and Encumbrances, without any further act or deed on its part or that of the Authority, and that none of the Project Assets shall be acquired by it, subject to any agreement under which a security interest or other lien or Encumbrance is retained by any person, save and except as expressly provided in this Agreement;
- (o) No representation or warranty by it contained herein or in any other document furnished by it to the Authority or to any Government Instrumentality in relation to Applicable Permits contains or will contain any untrue or misleading statement of material fact or omits or will omit to state a material fact necessary to make such representation or warranty; and
- (p) No sums, in cash or kind, have been paid or will be paid, by it or on its behalf, to any person by way of fees, commission or otherwise for securing the Concession or entering into this Agreement or for influencing or attempting to influence any officer or employee of the Authority in connection therewith.
- (q) All information provided by the Consortium Members in response to the Request for Qualification and Request for Proposals or otherwise, is to the best of its knowledge and belief, true and accurate in all material respects;

8.2. Representations and Warranties of the Authority

The Authority represents and warrants to the Concessionaire that:

- (a) It has full power and authority to execute, deliver and perform its obligations under this Agreement and to carry out the transactions contemplated herein and that it has taken all actions necessary to execute this Agreement, exercise its rights and perform its obligations, under this Agreement;

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8. REPRESENTATION AND WARRANTIES

8.1. Representations and Warranties of the Concessionaire

The Concessionaire represents and warrants to the Authority that:

- (a) It is duly organized and validly existing under the laws of India, and has full power and authority to execute and perform its obligations under this Agreement and to carry out the transactions contemplated hereby;
- (b) It has taken all necessary corporate and other actions under Applicable Laws to authorize the execution and delivery of this Agreement and to validly exercise its rights and perform its obligations under this Agreement;
- (c) It has the financial standing and capacity to undertake the Project in accordance with the terms of this Agreement;
- (d) This Agreement constitutes its legal, valid and binding obligation, enforceable against it in accordance with the terms hereof, and its obligations under this Agreement will be legally valid, binding and enforceable obligations against it in accordance with the terms hereof;
- (e) It is subject to the laws of India, and hereby expressly and irrevocably waives any immunity in any jurisdiction in respect of this Agreement or matters arising thereunder including any obligation, liability or responsibility here under;
- (f) The information furnished in the Bid - and as update on or before the date of this Agreement is true and accurate in all respects as on the date of this Agreement;
- (g) The execution, delivery and performance of this Agreement will not conflict with, result in the breach of, constitute a default under, or accelerate performance required by any of the terms of its Memorandum and Articles of Association or those of any member of the Consortium or any Applicable Laws or any covenant, contract, agreement, arrangement, understanding, decree or order to which it is a party or by which it or any of its properties or assets is bound or affected;
- (h) There are no actions, suits, proceedings, or investigations pending or to its knowledge, threatened against it at law or in equity before any court or before any other judicial, quasi-judicial or other authority, the outcome of which may result in the breach of this Agreement or which individually or in the aggregate may result in any material impairment of its ability to perform any of its material obligations under this Agreement;
- (i) It has no knowledge of any violation or default with respect to any order writ, injunction or decree of any court or any legally binding order of any Government Instrumentality which may result in any material adverse effect on its ability to perform its obligations under this Agreement and no fact or circumstance exists which may give rise to such proceedings that would adversely affect the performance of its obligations under this Agreement;
- (j) It has complied with Applicable Laws in all material respects and has not been subject to any fines, penalties, injunctive relief or any other civil or criminal liabilities which in the aggregate



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7. SECURITY AND ILLEGAL OFFTAKE

The Concessionaire shall maintain security in relation to the Project Site and the Project Facilities. This will include procedures to monitor and identify the illegal off take of raw water from the source, treated water from the transmission mains and to take such action as is available to it (and which it can lawfully perform) in order to prevent such illegal off take. Upon written request from the Concessionaire, the Authority may provide reasonable assistance to the Concessionaire in order to prevent such illegal off take.



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- (l) upon written request from the Concessionaire and subject to the provisions of Clause 5.4, provide reasonable assistance to the Concessionaire and any expatriate personnel of the Concessionaire or its Contractors to obtain applicable visas and work permits for the purposes of discharge by the Concessionaire or its Contractors their obligations under this Agreement and the Project Agreements;
- (m) In case of non-availability of Raw Water from Munduli barrage of river Mahanadi, the Authority shall make alternative arrangement to ensure continuous supply of Raw Water to the Concessionaire at its own cost; and
- (n) The Authority shall pay the differential amount, if any, on the additional cost incurred by the Concessionaire for providing separate delivery pipelines to cater to the Contract Volume of IDCO as mentioned in Appendix-I of Bulk Water Supply Agreement after adjusting for savings in cost due to change in the pipe sizes and/or any other appurtenances due to this reason.



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6. OBLIGATIONS OF THE AUTHORITY

6.1. Obligations of the Authority

6.1.1. The Authority shall, at its own cost and expenses undertake, comply with and perform all its obligations set out in this Agreement or arising hereunder.

6.1.2. The Authority agrees to provide support to the Concessionaire and undertakes to observe, comply with and perform, subject to and in accordance with the provisions of this Agreement and the Applicable Laws, the following:

- (a) Upon written request from the Concessionaire, and subject to the Concessionaire complying with Applicable Laws, provide reasonable support and assistance to the Concessionaire in procuring Applicable Permits required from any Government Instrumentality for implementation and operation of the Project;
- (b) Upon written request from the Concessionaire, provide reasonable assistance to the Concessionaire in obtaining access to all necessary infrastructure facilities and utilities, including water and electricity at rates and on terms no less favourable to the Concessionaire than those generally available to commercial customers receiving substantially equivalent services;
- (c) Procure that no barriers are erected or placed on the Project Water Supply System by any Government Instrumentality or persons claiming through or under it, except for reasons of Emergency, national security, law and order or collection of inter-state taxes;
- (d) Will not supply or engage the services of any third party to supply water to the Bulk Users, during the Concession Period;
- (e) Undertakes to arrange Raw Water from Munduli barrage of river Mahanadi for treatment of water with effect from the Commercial Operations Date in accordance with Clause 27;
- (f) Subject to and in accordance with the Applicable Laws, grant to the Concessionaire the authority to supply water to the Bulk Users on the Project Water Supply System;
- (g) Will pay the Concessionaire the User Fees of ULBs in accordance with Clause 25;
- (h) Pay for Raw Water Charges to the third party and raise invoice to the Concessionaire for the applicable amount in accordance with Clause 27.3;
- (i) not do or omit to do any act, deed or thing which may in any manner be violative of any of the provisions of this Agreement;
- (j) support, cooperate with and facilitate the Concessionaire in the implementation and operation of the Project in accordance with the provisions of this Agreement;
- (k) discuss and finalize the Minimum Drawdown Level in consultation with the Concessionaire from time to time;

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5.8. Business Risks

Subject to the terms of this Agreement, the Concessionaire shall bear all business risks that are inherent in the development, construction, operation and maintenance of the Facilities.

5.9. Invoice for Water Payments

Post Commercial Operation Date (COD), the Concessionaire will raise a monthly invoice to the Bulk Users for the payment of User Fees.



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- (b) The indirect transfer or control of legal or beneficial ownership of Equity shall mean transfer of the direct or indirect beneficial ownership or control of any company or companies whether in India or abroad which results in the acquirer acquiring control over the shares or voting rights of shares of the Concessionaire; and
- (c) Power to appoint, whether by contract or by virtue of control or acquisition of share of any company holding directly or through on or more companies (whether situate in India or abroad) the Equity of the Concessionaire, not less than half of the directors on the Board of Directors of the Concessionaire or any company, directly or indirectly whether situate in India or abroad, having ultimate control of not less than 15% (fifteen percent) of the Equity of the Concessionaire shall constitute acquisition of control, directly or indirectly, of the Board of Directors of the Concessionaire.

5.4. Employment of foreign nationals

The Concessionaire acknowledges, agrees and undertakes that employment of foreign personnel by the Concessionaire and/or its contractors and their sub-contractors and their sub-contractors shall be subject to grant of requisite regulatory permits and approvals including employment/residential visas and work permits, if any required, and the obligation to apply for and obtain the same shall and will always be of the Concessionaire and, notwithstanding anything to the contrary contained in this Agreement, refusal of or inability to obtain any such permits and approvals by the Concessionaire or any of its contractors or sub-contractors shall not constitute Force Majeure Event, and shall not in any manner excuse the Concessionaire from the performance and discharge of its obligations and liabilities under this Agreement.

5.5. Employment of trained personnel

The Concessionaire shall ensure that the personnel engaged by it in the performance of its obligations under this Agreement are at all times properly trained for their respective functions.

5.6. Sole purpose of the Concessionaire

The Concessionaire having been set up for the sole purpose of exercising the rights and observing and performing its obligations and liabilities under this Agreement, the Concessionaire or any of its subsidiaries shall not, except with the previous written consent of the Authority, be or become directly or indirectly engaged, concerned or interest in any business other than as envisaged herein.

5.7. Branding of the Project

The Project Water Supply System or any part thereof shall not be branded in any manner to advertise, display or reflect the name or identity of the Concessionaire or its shareholders. The Concessionaire undertakes that it shall not, in any manner, use the name or entity of the Project to advertise or display its own identity, brand equity or business interests, including those of its shareholders, save and except as may be necessary in the normal course of business. For the avoidance of doubt, it is agreed that the Concessionaire may display its own name at a spot where other public notices are displayed for the Users. It is further agreed that the Project shall be known, promoted, displayed and advertised by the name of Bhubaneswar Bulk Water Supply System



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acknowledge and accept the Covenant and undertake to be bound by the same and not to seek any relief of remedy whatsoever from the Authority in the event of Termination of suspension.

5.2.5. Notwithstanding anything to the contrary contained in this Agreement, the Concessionaire agrees and acknowledges that selection or replacement of an O&M Contractor and execution of the O&M Contract shall be subject to the prior approval of the Authority from national security and public interest perspective, the decision of the Authority in this behalf being final, conclusive and binding on the Concessionaire, and undertakes that it shall not give effect to any such selection or contract without prior approval of the Authority. For the avoidance of doubt, it is expressly agreed that approval of the Authority hereunder shall be limited to national security and public interest perspective, and the Authority shall endeavour to convey its decision thereon expeditiously. It is also agreed that the Authority shall not be liable in any manner on account of grant or otherwise of such approval and that such approval or denial thereof shall not in any manner absolve the Concessionaire or its Contractors from any liability or obligation under this Agreement.

5.3. Obligations relating to Change in Ownership

5.3.1. The Concessionaire shall not undertake or permit any Change in Ownership, except with the prior approval of the Authority.

5.3.2. Notwithstanding anything to the contrary contained in this Agreement, the Concessionaire agrees and acknowledges that:

- (i) All acquisitions of Equity by an acquirer, either by himself or with any person acting in concert, directly or indirectly, including by transfer of the direct or indirect legal or beneficial ownership or control of any Equity, in aggregate of not less than 15% (fifteen percent) of the total Equity of the Concessionaire; or
- (ii) Acquisition of any control directly or indirectly of the Board of Directors of the Concessionaire by any person either by himself or together with any person or persons acting in concert with him

shall constitute a Change in Ownership requiring prior approval of the Authority from national security and public interest perspective, the decision of the Authority in this behalf being final, conclusive and binding on the Concessionaire, and undertakes that it shall not give effect to any such acquisition of Equity or control of the Board of Directors of the Concessionaire without such prior approval of the Authority. For the avoidance of doubt, it is expressly agreed that approval of the Authority hereunder shall be limited to national security and public interest perspective, and the Authority shall endeavour to convey its decision thereon expeditiously. It is also agreed that the Authority shall not be liable in any manner on account of grant or otherwise of such approval and that such approval or denial thereof shall not in any manner absolve the Concessionaire or its Contractors from any liability or obligation under this Agreement.

For the purposes of this Clause 5.3.2:

- (a) The expression "acquirer", "control" and "person acting in concert" shall have the meaning ascribed thereto in the securities and Exchange Board of India (Substantial Acquisition of Shares and Takeover) Regulations, 1997 or any statutory re-enactment thereof as in force as on date of acquisition of Equity, or the control of the Board of Directors, as the case may be, of the Concessionaire;


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- (k) Not do or omit to do any act, deed or thing which may in any manner be violative of any of the provisions of this Agreement;
- (l) Support, cooperate with and facilitate the Authority in the implementation and operation of the Project in accordance with the provisions of this Agreement; and
- (m) Transfer the Project Water Supply System to the Authority upon Termination of this Agreement, in accordance with the provisions thereof.

5.2. Obligations relating to Project Agreements

5.2.1. It is expressly agreed that the Concessionaire shall, at all times, be responsible and liable for all its obligations under this Agreement notwithstanding anything contained in the Project Agreements or any other agreement, and no default under any Project Agreement or agreement shall excuse the Concessionaire from its obligations or liability hereunder.

5.2.2. The Concessionaire shall submit to the Authority the drafts of all Project Agreements or any amendments or replacements thereto for its review and comments, and the Authority shall have the right but not the obligation to undertake such review and provide its comments, if any, to the Concessionaire within 15 (fifteen) days of the receipt of such drafts. Within 7 (seven) days of execution of any Project Agreement or amendment thereto, the Concessionaire shall submit to the Authority a true copy thereof, duly attested by a Director of the Concessionaire, for its record. For the avoidance of doubt, it is agreed that the reviews and comments hereunder shall be limited to ensuring compliance with the terms of this Agreement. It is further agreed that no review and/or observation of the Authority and/or its failure to review and/or convey its obligations on any document shall relieve the Concessionaire of its obligations and liabilities under this Agreement in any manner nor shall the Authority be liable for the same in any manner whatsoever.

5.2.3. The Concessionaire shall not make any addition, replacement or amendments to any of the Financing Agreements without the prior written consent of the Authority if such addition, replacement or amendment has, or may have, the effect of imposing or increasing any financial liability or obligation on the Authority, and in the event that any replacement or amendment is made without such consent, the Concessionaire shall not enforce such replacement or amendment nor permit enforcement thereof against the Authority. For the avoidance of doubt, the Authority acknowledges and agrees that it shall not unreasonably withhold its consent for restructuring or rescheduling of the Debt Due.

5.2.4. The Concessionaire shall procure that each of the Project Agreements contains provisions that entitle the Authority to step into such agreement, in its sole discretion, in substitution of the Concessionaire in the event of Termination or Suspension (the "**Covenant**"). For the avoidance of doubt, it is expressly agreed that in the event the Authority does not exercise such rights of substitution within a period of not exceeding 90 (ninety) days from the Transfer Date, the Project Agreements shall be deemed to cease to be in force and effect on the Transfer Date without any liability whatsoever on the Authority and the Covenant shall expressly provide for such eventuality. The Concessionaire expressly agrees to include the Covenant in all its Project Agreements and undertakes that it shall, in respect of each of the Project Agreement, procure and deliver to the Authority an acknowledgment and undertaking, in a form acceptable to the Authority, from the counter party(ies) of each of the Project Agreements, whereunder such counter party(ies) shall



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5. OBLIGATIONS OF THE CONCESSIONAIRE

5.1. Obligations of the Concessionaire

- 5.1.1. Subject to and on the terms and conditions of this Agreement, the Concessionaire shall at its own cost and expense procure finance for and undertake the design, engineering, procurement, construction, operation and maintenance of the Project Water Supply System and observe, fulfil, comply with and perform all its obligations set out in this Agreement or arising hereunder.
- 5.1.2. The Concessionaire shall comply with all Applicable Laws and Applicable Permits (including renewals as required) in the performance of its obligations under this Agreement.
- 5.1.3. Subject to the provisions of Clauses 5.1.1 and 5.1.2, the Concessionaire shall discharge its obligations in accordance with Good Industry Practice and as a reasonable and prudent person.
- 5.1.4. The Concessionaire shall, at its own cost and expense, in addition to and not in derogation of its obligation elsewhere set out in this Agreement:
- (a) Make, or cause to be made, necessary applications to the relevant Government Instrumentalities with such particulars and details as may be required for obtaining Applicable Permits (other than those set forth in Clause 4.1.2), and obtain and keep in force and effect such Applicable Permits in conformity with the Applicable Laws;
 - (b) Procure, as required, the appropriate proprietary rights, licenses, agreements and permissions for materials, methods, processes and systems used or incorporated into the Project Water Supply System;
 - (c) Perform and fulfil its obligations under the Financing Agreements;
 - (d) Make reasonable efforts to maintain harmony and good industrial relations among the personnel employed by it or its Contractors in connection with the performance of its obligations under this Agreement;
 - (e) Make reasonable efforts to facilitate the acquisition of land required for the purpose of the Agreement;
 - (f) Ensure and procure that its Contractors comply with all Applicable Permits and Applicable Laws in the performance by them of any of the Concessionaire's obligations under this Agreement;
 - (g) Discuss and finalize the Minimum Drawdown Level in consultation with the Authority from time to time;
 - (h) Supply treated water to the Bulk Users from the Commercial Operations Date in accordance with the Bulk Water Supply Agreement;
 - (i) Ensure that treated water is available for Bulk Users without any interruption or reduction in capacity and in accordance with Clause 27.2;
 - (j) Pay for Raw Water to the Authority in accordance with Clause 27.3;


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- (g) Delivered to the Authority from the Consortium Members, their respective confirmation, in original, of the correctness of their representations and warranties set forth in Sub clauses (k), (l) and (m) of Clause 8.1 of this Agreement; and
- (h) Delivered to the Authority a legal opinion from the legal counsel of the Concessionaire with respect to the Authority of the Concessionaire to enter into this Agreement and the enforceability of the provisions thereof;
- (i) Execution of the Bulk Water Supply Agreement (BWSA) within 30 (thirty) days from the signing of Concession Agreement.

Provided that upon request in writing by the Concessionaire, the Authority may, in its discretion, waive any of the Conditions Precedent set forth in this Clause 4.1.3.

4.1.4. Each party shall make all reasonable endeavours to satisfy the Conditions Precedent within the time stipulated and shall provide the other party with such reasonable cooperation as may be required to assist that Party in satisfying the Conditions Precedent for which that Party is responsible.

4.1.5. The Parties shall notify each other in writing at least once a month on the progress made in satisfying the Conditions Precedent. Each Party shall promptly inform the other Party when any Condition Precedent for which it is responsible has been satisfied.

4.2. Damages for delay by the Authority

In the event (i) the Authority does not procure fulfilment of any or all of the Conditions Precedent set forth in Clause 4.1.2 within the period specified in respect thereof; and (ii) the delay has not occurred as a result of breach of this Agreement by the Concessionaire or due to Force Majeure, the Authority shall pay to the Concessionaire Damages in an amount calculated at the rate of 0.1% (zero point one percent) of the Performance Security for each day's delay until the fulfilment of such Conditions Precedent, subject to a maximum of 20% (twenty percent) of the Performance Security.

4.3. Damages for delay by the Concessionaire

In the event that (i) the Concessionaire does not procure fulfilment of any or all of the Conditions Precedent set forth in Clause 4.1.3 within a period of 180 (one hundred eighty) days from the date of this Agreement, and (ii) the delay has not occurred as a result of failure to fulfil the obligations under Clause 4.1.2 or other breach of this Agreement by the Authority, or due to Force Majeure, the Concessionaire shall pay to the Authority Damages in an amount calculated at the rate of 0.2% (zero point two per cent) of the Performance Security for each day's delay until the fulfilment of such Conditions Precedent, subject to a maximum of 20% (twenty per cent) of the Performance Security.



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4. CONDITIONS PRECEDENT

4.1. Conditions Precedent

4.1.1. Save and except as expressly provided in Articles 4, 10, 11, 22, 31, 41 and 43 or unless the context otherwise requires, the respective rights and obligations of the Parties under this Agreement shall be subject to the satisfaction in full of the conditions precedent specified in this Clause 4.1 (the “**Conditions Precedent**”).

4.1.2. The Concessionaire may, upon providing the Performance Security to the Authority in accordance with Article 10, at any time after 90 (ninety) days from the date of this Agreement or on an earlier day acceptable to the Authority, by notice require the Authority to satisfy any or all of the Conditions Precedent set forth in this Clause 4.1.2 within a period of 30 (thirty) days of the notice, or such longer period not exceeding 60 (sixty) days as may be specified therein, and the conditions precedent required to be satisfied by the Authority prior to the Appointed Date shall be deemed to have been fulfilled when the Authority shall have:

- (a) Procured for the Concessionaire the Right of Way to the Site in accordance with the provisions of Clause 11.3.1;
- (b) Issued the Water tariff notification for the Bulk Water Supply Project;
- (c) Procured all necessary approvals & clearances required for the project;
- (d) Execution of the Bulk Water Supply Agreement (BWSA) within 30 (thirty) days from the signing of Concession Agreement.

Provided that the Authority may from time to time by notice extend, for up to an aggregate of 6 (six) months, the period for procuring the approval set forth in Sub-clause (c) above.

4.1.3. The Conditions Precedent required to be satisfied by the Concessionaire prior to the Appointed Date shall be deemed to have been fulfilled when the Concessionaire shall have:

- (a) Provided Performance Security to the Authority;
- (b) Executed and procured execution of the Escrow Agreement;
- (c) Executed and procured execution of the Substitution Agreement;
- (d) Procured all the Applicable Permits specified in Schedule-D unconditionally or if subject to conditions, then all such conditions shall have been satisfied in full and such Applicable Permits are in full force and effect;
- (e) Executed the Financing Agreements and delivered to the Authority 3 (three) true copies thereof, duly attested by a Director of the Concessionaire;
- (f) Delivered to the Authority 3 (three) true copies of the Financial Package and the Financial Model, duly attested by a Director of the Concessionaire, along with 3 (three) soft copies of the Financial Model in MS Excel version or any substitute thereof, which is acceptable to the Senior Lenders;

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3. GRANT OF CONCESSION

3.1. The Concession

- 3.1.1. Subject to and in accordance with the provisions of this Agreement, the Applicable Laws and the Applicable permits, the Authority hereby grants to the Concessionaire the concession set forth herein including the exclusive right, license and authority during the subsistence of this Agreement to construct, operate and maintain the Project (the “**Concession**”) for a period of **25 (twenty five) years** commencing from the Appointed Date, and the Concessionaire hereby accepts the Concession and agrees to implement the Project subject to and in accordance with the terms and conditions set forth herein:
- 3.1.2. Subject to an in accordance with the provisions of this Agreement, the Concession hereby granted shall oblige or entitle (as the case may be) the Concessionaire to:
- (a) Right of Way, access and licence to the Site for the purpose of and to the extent conferred by the provisions of this Agreement;
 - (b) finance and construct the Project Water Supply System;
 - (c) manage, operate and maintain the Project Water Supply System and regulate the use thereof by third parties;
 - (d) supply treated water to the Bulk Users from service reservoirs through Distribution Network, immediately from the Date of Operation, without interruption;
 - (e) draw up to a maximum of 70 MLD or 28.5 cusec of Raw Water from Mundali Barrage of River Mahanadi in accordance with Clause 27 of this Agreement for the Concession Period;
 - (f) read all Bulk meters, bill, charge, demand, collect the User Fees from the Bulk Users in accordance with Clause 26 and deposit the same in the designated account of the Escrow Account, for the services effective from the Commercial Operation Date till the Transfer Date;
 - (g) perform and fulfil all of the Concessionaire’s obligations under and in accordance with this Agreement;
 - (h) Save as otherwise expressly provided in this Agreement, bear and pay all costs, expenses and charges in connection with or incidental to the performance of the obligations of the Concessionaire under this Agreement; and
 - (i) neither assign, transfer or sublet or create any lien or Encumbrance on this Agreement, on this Agreement, or the Concession hereby granted or on the whole or any part of the Project Water Supply System nor transfer, lease or part possession thereof, save and except as expressly permitted by this Agreement or the Substitution Agreement.



Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



2. SCOPE OF THE PROJECT

The scope of the Project (the “**Scope of the Project**”) shall mean and include, during the Concession Period:

- (a) Construction of the Project Water Supply System on the Site set forth in Schedule-A and as specified in Schedule-B and in conformity with the Specifications and Standards set forth in Schedule-C;
- (b) operation and maintenance of the Project Water Supply System in accordance with the provisions of this Agreement; and
- (c) performance and fulfilment of all other obligations of the Concessionaire in accordance with the provisions of this Agreement and matters incidental thereto or necessary for the performance of any or all of the obligations of the Concessionaire under this Agreement.



**Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR**



PART – II
THE CONCESSION



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

- (a) between two or more Clauses of this Agreement, the provisions of a specific Clause relevant to the issue under consideration shall prevail over those in other Clauses;
- (b) between the Clauses of this Agreement and the Schedules, this Clauses shall prevail and between and between Schedules and Annexes, the Schedules shall prevail;
- (c) between any two Schedules, the Schedule relevant to the issue shall prevail;
- (d) between the written description on the Drawings and the Specifications and Standards, the latter shall prevail;
- (e) between the dimension scaled from the Drawing and its specific written dimension, the latter shall prevail; and
- (f) between any value written in numerals and that in words, the value in words will prevail;



Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

- (v) reference to Recitals, Article, Clauses, Sub-clauses or Schedules in this Agreement shall, except where the context otherwise requires, mean reference to Recitals, Articles, Clauses, Sub-clauses and Schedules of or to this Agreement an reference to a paragraph shall, subject to any contrary indication, be construed as s reference to a paragraph of this Agreement or of the Schedule in which such reference appears; and
- (w) the damages payable by either Party to the other of them, as set forth in this Agreement, whether on *per diem* basis or otherwise, are mutually agrees genuine pre-estimated loss and damage likely to be suffered and incurred by the Party entitled to receive the same and are not by way of penalty (the “**Damages**”).
- (x) time shall be of the essence in the performance of the Parties’ respective obligations. If any time period specified herein extended, such extended time shall also be of the essence.

1.2.2. Unless expressly provided other in this Agreement, any Documentation required to be provided or furnished by the Concessionaire to the Authority and/ or the Independent Engineer shall be provided free of Cost and in 5 (five) Copies, and if the Authority and/or the Independent Engineer is required to return any such Documentation with their comments and/or approval, they shall be entitled to retain two copies thereof.

1.2.3. The rule of Construction, if any, that a contract should be interpreted against the parties responsible for the drafting and preparation thereof, shall not apply.

1.2.4. Any word or expression used in this Agreement shall, unless otherwise defied or construct in this Agreement, bear its ordinary English meaning and. for these purpose, the General Clauses Act 1897 shall not apply.

1.3. Measurements and Arithmetic Conventions

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

1.4. Priority of agreements and errors/discrepancies

1.4.1. This Agreement, and all other agreements and documents forming part of this agreement are to be taken as mutually explanatory and, unless otherwise expressly provided elsewhere in this Agreement, the priority of this Agreement and other documents and agreements forming part hereof shall, in the event of any conflict between them, be in the following order:

- (a) This Agreement; and
- (b) All other agreements and documents forming part hereof;

i.e. the Agreement at (a) above shall prevail over the agreements and documents at (b) above.

1.4.2. Subject to the provisions of Clause 1.4.1, in case of ambiguities or discrepancies within this Agreement, the following shall apply:



Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

- (j) references to a “**business day**” shall be construed as a reference to a day (other than a Sunday) on which Public Health Engineering Organization (Urban) is generally open for business;
- (k) any references to month shall mean a reference to a Calendar month as per the Gregorian calendar;
- (l) references to any date, period or Project Milestone shall mean and include such date, period or Project Milestone as may be extended pursuant to this Agreement;
- (m) any reference to any period commencing “**from**” a specified day or date and “**till**” or “**until**” a specified day or date shall include both such days or dates; provided that if the last day of any period computed under this Agreement is not a business day, then the period shall run until the end of the next business day;
- (n) the words importing singular shall include plural and vice versa;
- (o) reference to any gender shall including the other and the natural gender;
- (p) “**lakh**” means a hundred thousand (100,000) and “**crore**” means a ten million (10,000,000)
- (q) “**indebtedness**” shall be construed so as to include any obligation (whether incurred as principal or surety) for the payment or repayment of money, whether present or future, actual or contingent;
- (r) reference to the “**winding – up**”, “**dissolution**”, “**insolvency**” or “**re-organisation**” of a company or corporation shall be constructed so as to include any equivalent or analogous proceeding under the law of the jurisdiction in which such company or corporation is incorporated or any jurisdiction in which such company or corporation carries on business including the seeking of liquidation, winding-up, re-organization, dissolution, arrangement, protection or relief of debtors;
- (s) save and except as otherwise provided in this Agreement, any reference, at any time, to any agreement, deed, instrument, licence or document of any description shall be construed as reference to that agreement, deed, instrument, licence or other document as amended, varied, supplemented, modified or suspended at the time of such reference; provided that this Sub-clause shall not operate so as to increase liabilities or obligations of the Authority hereunder or pursuant hereto in any manner whatsoever;
- (t) any agreement, consent, approval, authorisation, notice, communication, information or report required under or pursuant to this Agreement from or by any Party or the Independent Engineer shall be valid and effective only if it is in writing under the hand of a duly authorised representative of such Party or the Independent Engineer, as the case may be, in this behalf and not otherwise;
- (u) the Schedules and Recitals to this Agreement from an integral part of this Agreement and will be in full force and effect as though they were expressly set out in the body of this Agreement;



Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



1. DEFINITIONS AND INTERPRETATIONS

1.1. Definitions

The words and expressions beginning with capital letters and defined in this Agreement (including those in Article-44) shall, unless the context otherwise requires, have the meaning ascribed thereto herein, and the words and expressions defined in the Schedules and used therein shall have the meaning ascribed thereto in the Schedules.

1.2. Interpretation

1.2.1. In this Agreement, unless the context otherwise specified:

- (a) references to any legislation or any provision thereof shall include amendment or re-enactment or consolidation of such as such legislation or any provision thereof so far as amendment or re-enactment or consolidation applies or is capable of applying to any transaction entered into hereunder;
- (b) references to law of India or Indian law or regulation having the force of law shall include the laws ,acts, ordinances, rules, regulations, bye laws or notifications which have the force of law on the territory of India and as from time to time may be amended, modified, supplemented, extend or re-enacted;
- (c) references to a “**person**” and words denoting a natural person shall be construed as a reference to any individual, firm, company, corporation, society, trust, government, state or agency of a state or any association or partnership (whether or not having separate legal personality) of two or more of the above and shall include successors and assigns;
- (d) the table of contents, heading or sub heading in this Agreement are for convenience reference only and shall not be used in, and shall not affect the construction or interpretation of this Agreement;
- (e) The words “**include**” and “**including**” are to be construed without limitation and shall be deemed to be followed by “**without limitation**” or “**but not limited to**” whether or not they are followed by such phrases;
- (f) references to “**construction**” or “**building**” include, unless the context otherwise requires, investigation, design, developing, engineering, procurement, delivery, transportation, installation, processing, fabrication ,testing, commissioning and other activates incidental to the construction, and “**construct**” or “**build**” shall be construed accordingly;
- (g) references to “**development**” include, unless the context otherwise requires, construction, renovation, refurbishing, augmentation, upgradation and other activities incidental thereto, and “**develop**” shall be construed accordingly;
- (h) any references to any period of time shall mean a reference to that according to Indian Standard Time;
- (i) any reference to day shall mean a reference to a Calendar day;



Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

WHEREAS:

- A.** The Department of Housing & Urban Development (H&UD), Government of Odisha had entrusted to the Authority the development, maintenance and management of Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and ULBs.
- B.** The Authority had resolved to implement the Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and ULBs on design, build, finance, operate and transfer (DBFOT) basis in accordance with the terms and conditions to be set forth in this concession agreement to be entered into.
- C.** The Authority had accordingly invited proposals by its Notice/ Request for Qualification No. CEPH-01/2012-13 dated 19.04.2012 (the “**Request for Qualification**” or “**RFQ**”) for short listing of bidders for construction, operation and maintenance of the Bulk Water Supply Project on DBFOT basis and had shortlisted certain bidders including, inter alia, the Consortium comprising M/s Megha Engineering & Infrastructures Limited and Koya & Company Construction Limited (Collectively the “**Consortium**”) with M/s Megha Engineering & Infrastructures Limited as its Lead Member.
- D.** The Authority had prescribed the technical and commercial terms and conditions, and invited bids (the “**Request for Proposals**” or “**RFP**”) from the bidders shortlisted pursuant to the RFQ for undertaking the Project.
- E.** After evaluation of the bids received, the Authority had accepted the bid of the Consortium and issued its Letter of Award No. (PB) 169 dated 22.02.2014 (hereinafter called the “**LOA**”) to the Consortium requiring, inter alia, the execution of this Concession Agreement within 30 (thirty) days of the date of issue thereof.
- F.** The Consortium has since promoted and incorporated the Concessionaire as a limited liability company under the Companies Act 1956, and has requested the Authority to accept the Concessionaire as the entity which shall undertake and perform the obligations and exercise the rights of the Consortium under the LOA, including the obligation to enter into this Concession Agreement pursuant to the LOA for executing the Project.
- G.** By its letter dated 29.02.2014, the Concessionaire has also joined in the said request of the selected bidder/ Consortium to the Authority to accept it as the entity which shall undertake and perform the obligations and exercise the rights of the Consortium including the obligation to enter into this Concession Agreement pursuant to the LOA. The Concessionaire has further represented to the effect that it has been promoted by the Consortium for the purposes hereof.
- H.** The Authority has agreed to the said request of the Consortium and the Concessionaire, and has accordingly agreed to enter into this Concession Agreement with the Concessionaire for execution of the Project on DBFOT basis, subject to and on the terms and conditions set forth hereinafter.

NOW THEREFORE in consideration of the foregoing and the respective covenants and agreements set forth in this Concession Agreement, the sufficiency and adequacy of which is hereby acknowledged, and intending to be legally bound hereby, the Parties agree as follows:

**Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR**



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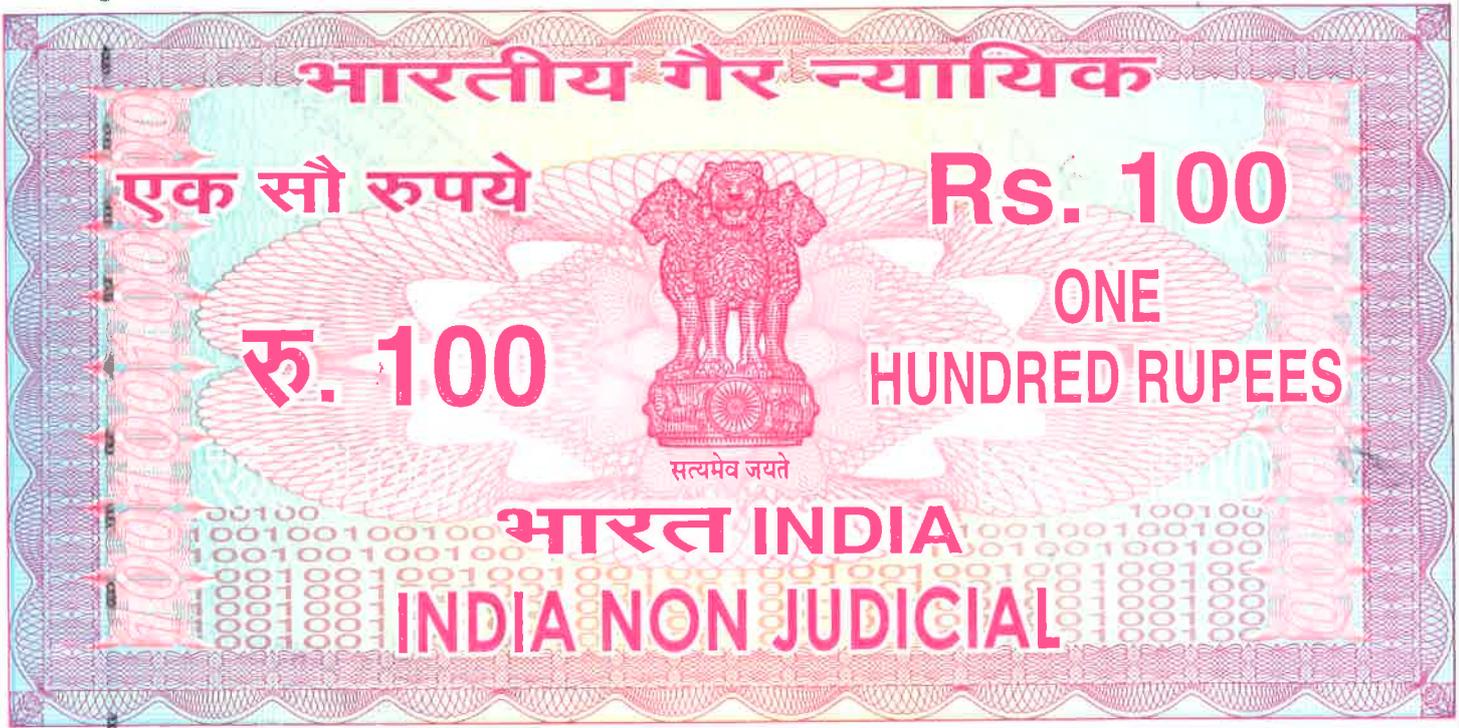
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DISTRICT TREASURY
KHURDA, BHUBANESWAR
20 SEP 2014
ADDL. TREASURY OFFICER

ISHWAR CHANDRA SAHOO
S.V.S.R. office, BBSR.

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CONCESSION AGREEMENT

THIS AGREEMENT is entered into on this the 27th day of October 2014

BETWEEN

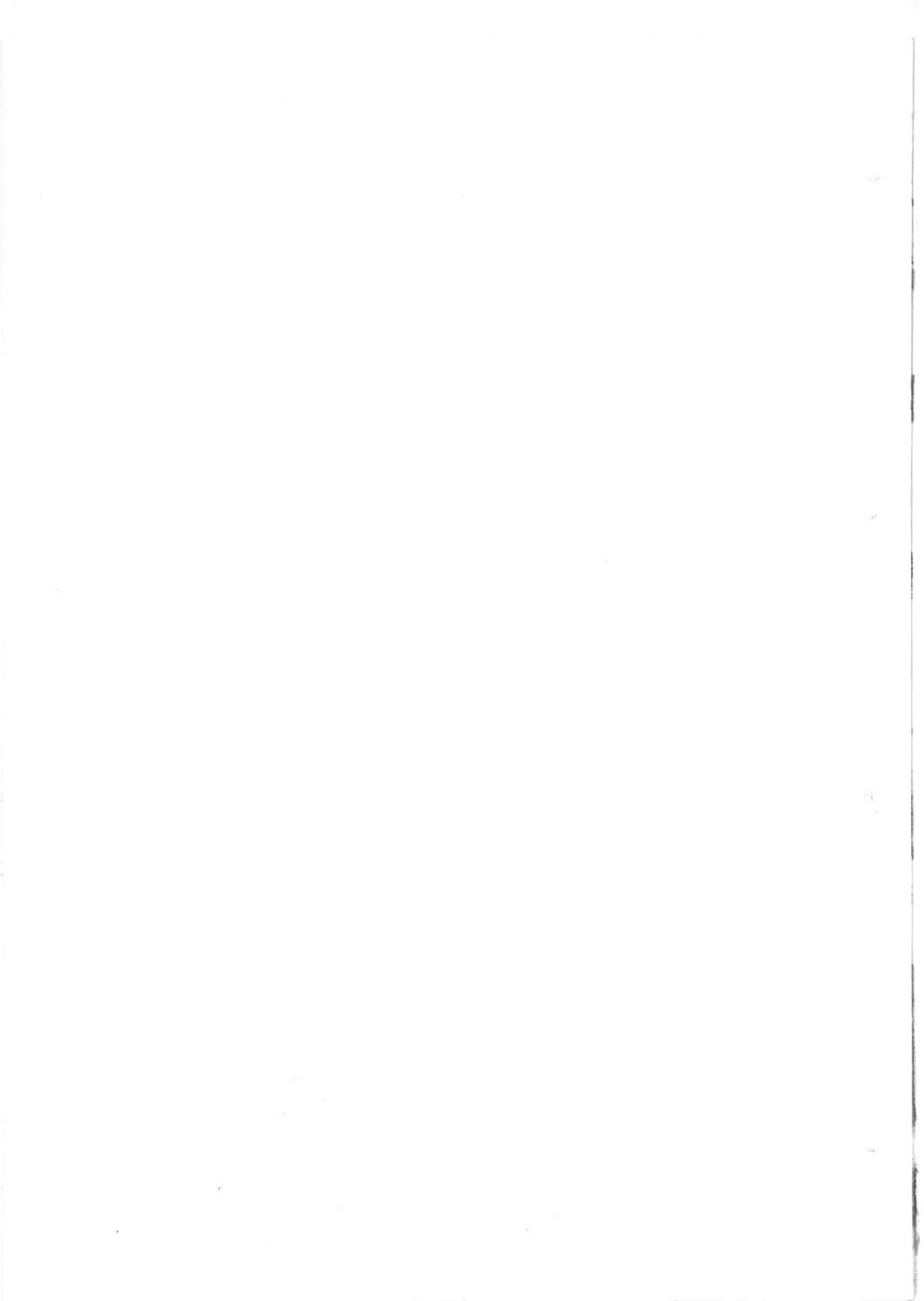
1 THE PUBLIC HEALTH ENGINEERING ORGANIZATION (URBAN) represented by the Chief Engineer, PHEO (U) and having its principal office at Heads of Department Building, 1st floor, Unit-V, Bhubaneswar – 751001, Odisha (hereinafter referred to as the “**Authority**” which expression shall, unless repugnant to the context or meaning thereof, include its administrators, successors and assigns) of One Part;

AND

2 MEIL (BHUBANESWAR) BULK WATER PROJECT PRIVATE LIMITED, a company incorporated under the provisions of the Companies Act, 1956, having its registered office at S-2, Technocrat Industrial Estate, Balanagar, Hyderabad – 500037, India, (hereinafter referred to as the “**Concessionaire**” which expression shall, unless repugnant to the context or meaning thereof, include its successors and permitted assigns and substitutes) of the Other Part.


Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBGR





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THE NATIONAL BUREAU OF STANDARDS
WASHINGTON, D. C. 20540

UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

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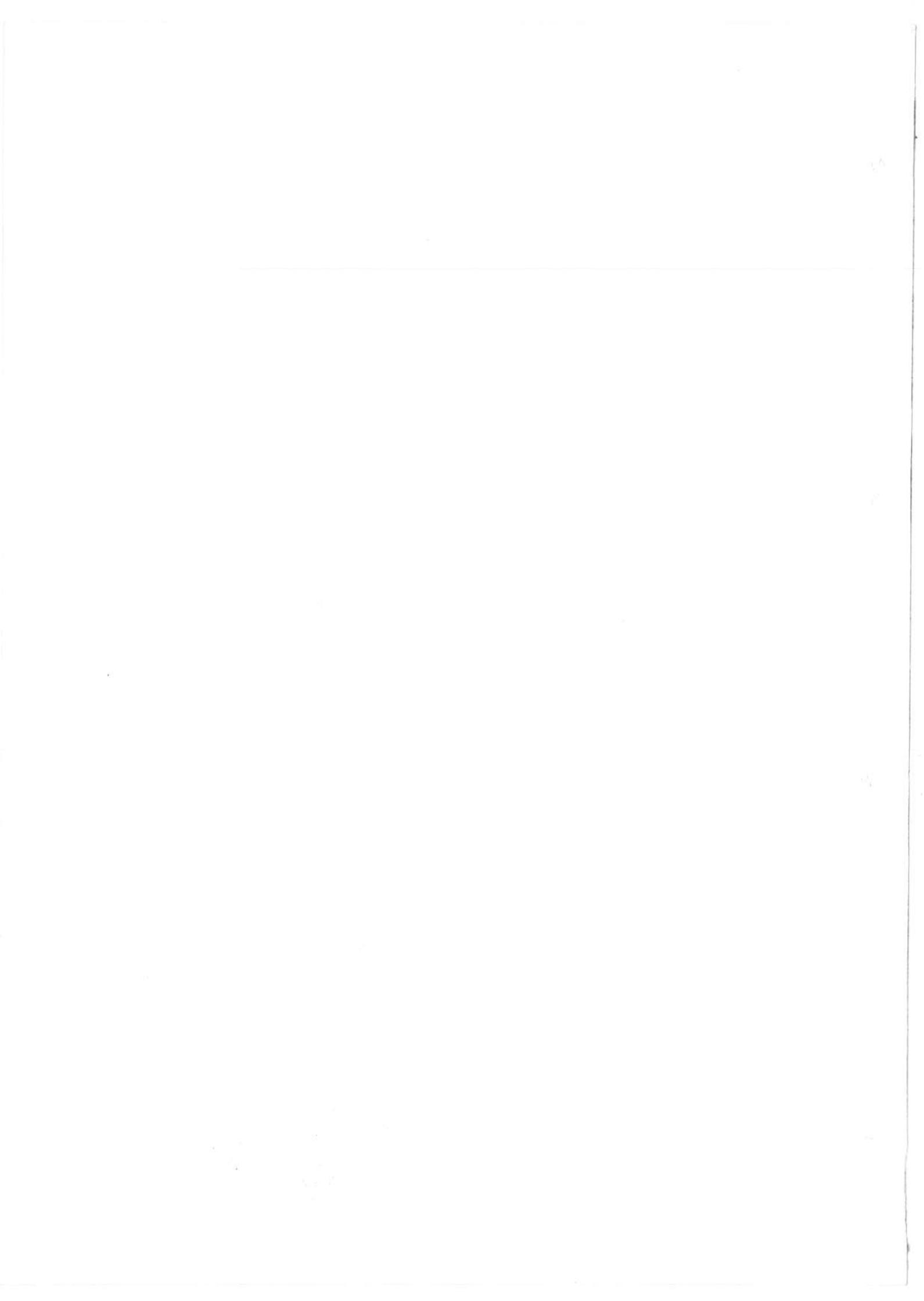
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CONCESSION AGREEMENT





**BULK WATER SUPPLY PROJECT FOR IIT BHUBANESWAR, NATIONAL
INSTITUTE OF SCIENCE, EDUCATION & RESEARCH (NISER),
INFOCITY-II AND ADJOINING AREAS
ON
PUBLIC-PRIVATE PARTNERSHIP (PPP) MODE ON DESIGN, BUILD,
FINANCE, OPERATE AND TRANSFER ("DBFOT") BASIS**

CONCESSION AGREEMENT

BETWEEN

**OFFICE OF THE ENGINEER-IN-CHIEF, PUBLIC HEALTH, ODISHA,
BHUBANESWAR**

**REPRESENTED BY
THE CHIEF ENGINEER, PH (U)
HEADS OF DEPARTMENT BUILDING, 1ST FLOOR, UNIT-V,
BHUBANESWAR - 751001
PHONE (O): 0674 - 2393909
FAX NO. 0674 - 2396935**

AND

**MEIL (BHUBANESWAR) BULK WATER PROJECT PRIVATE LIMITED
S-2, TECHNOCRAT INDUSTRIAL ESTATE, BALANAGAR,
HYDERABAD - 500037, INDIA**

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Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

Sl.	Description of Permissions	Responsibility
17	Building Permits	Concessionaire
18	Waste Management Licence	Concessionaire
19	Health and Safety Certificate	Concessionaire
20	Approval from Labour Inspector	Concessionaire
21	Right to use Electrical Power	Concessionaire
22	Any other permit or clearances as required	Concessionaire



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SCHEDULE – D: APPLICABLE PERMITS

Sl.	Description of Permissions	Responsibility
1	Off-take of Raw Water from Mundali Barrage of River Mahanadi from the Water Resources Department (WRD), Government of Odisha.	Authority
2	Provision of Land for all facilities (intake, WTP, reservoirs, pumping stations and pipeline, electrical systems) from the Revenue Department, Government of Odisha.	Authority
3	Intake Construction from Water Resources Department, Government of Odisha	Concessionaire
4	Construction Power from Central Electricity Supply Utility of Odisha	Concessionaire
5	Permanent Power from Central Electricity Supply Utility of Odisha	Concessionaire
6	Right of Way permission for pipeline from the following: 1. Water Resources Deptt. 2. Public Works Deptt. 3. NHAI 4. Bhubaneswar Development Authorities 5. Revenue Deptt 6. Forest Department.	Authority
8	Clearance for pipe line crossings at NH, railways and any other roads from NHAI/ Railways/ PWD	Authority
9	Specific Approval for laying of Water pipe line required from Bhubaneswar Municipality Corporation	Authority
10	Specific approval for laying of water pipe line from Traffic Police	Authority
11	Shifting of Electric Poles & Transformers from Central Electricity Supply Utility of Odisha	Authority
12	Shifting of Water Supply Pipeline if any from PHED	Authority
13	Shifting of OFC Cable from BSNL/ Idea/ Airtel/ Reliance	Concessionaire
14	Crossing of pipelines over natural streams/channels from Water Resources Deptt.	Authority
15	Vehicle and Plant Licences	Concessionaire
16	Licence to store and use Chemical	Concessionaire
16	Licence to use Machinery	Concessionaire


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- ASTM GI4 - Standard Test Method for Impact Resistance of Pipeline Coatings (Falling Weight Test)
- ASTM G17 - Standard Test Method for Penetration Resistance of Pipeline Coatings (Blunt Rod)
- ANSI/AWWA C209 – Standard for cold applied tape coatings for the exterior of special sections, connections and fittings for steel water pipelines.
- ANSI/AWWA C 216 – Standard for Heat – Shrinkable cross linked Polyolefin coatings for exterior of special sections, connections and fittings of steel water pipelines.
- NACE RP-O2-74 - High-Voltage Electrical Inspection of Pipeline Coatings Prior to Installation
- SSPC-PA 2 - Measurement of Dry Paint Thickness with Magnetic Gauges
- SSPC-SP 1 - Solvent Cleaning
- SSPC-SP 6/NACE No. 3 - Commercial Blast Cleaning
- IS-8062 Code of practice for the protection of steel pipes
- AWWA C 210-07--Epoxy lining/coating
- IS-11906: Cement mortar lining for mild steel & ductile iron pipes.
- IS10221: Coating & wrapping of underground mild steel pipes

(B) Reinforced Concrete Structural Design

- I.S. 456: Code of Practice for plain and reinforced concrete
- I.S. 875: Code of Practice for design loads for buildings and structures
- I.S. 1893: Criteria for earthquake resistant design of structures
- I.S. 2974: Code of Practice for design and construction of machine foundations (Part 1 to 4)
- BS 8007: Design of concrete structures for retaining aqueous liquids
- IS 3370: Code of Practice for Liquid Retaining Structures

(C) Structural Steel Design

- I.S. 800: Code of Practice for general construction in steel
- I.S. 806: Code of Practice for use of steel tubes in general building construction.



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- **IS 7861** - Indian Standard Specification for Recommended Practice Part-I & II for Extreme Weather Concreting.
- **IS 7969** - Safety Code for Storage and Handling of Building Materials.
- **IS 8041E** - Indian Standard Specification for Rapid Hardening Portland Cement.
- **IS 8112** - Indian Standard Specification for high strength Ordinary Portland Cement.
- **IS 8142** - Indian Standard Specification for Determining Setting time of Concrete by Penetration Resistance.
- **IS 9013** - Indian Standard Specification for Method of Making, Curing and Determining Compressive Strength of Accelerated-cured Concrete Test Specimens.
- **IS 9077** - Code of Practice for Corrosion Protection of Steel Rails in RB and RCC Construction.
- **IS 9103** - Indian Standard Specification for Admixtures for Concrete.

NOTE

FOR ALL OTHER SPECIFICATIONS, THE ORISSA STANDARD DETAILED SPECIFICATIONS (ODSS) WILL BE FOLLOWED.

The Standards for reinforced concrete structural design, structural steel design and Quality standards of the project as per IS codes are provided below:

QUALITY STANDARDS

(A) Water Supply

- Manual on Water Supply and Treatment, CPHEEO, Ministry of Urban Development, 1999
- IS 1172:1993 Code of Basic Requirements For Water Supply, Drainage & Sanitation
- IS 10500: 1991 Drinking Water – Specification
- IS 3589: 2001 Steel Pipes for Water & Sewage (168.3 to 2 540 mm Outside Diameter) - Specification
- IS 5822: 1994 Code of Practice for Laying of Electrically Welded Steel Pipes for Water Supply
- IS 1537: 1976 Specification For Vertically Cast Iron Pressure Pipes For Water, Gas & Sewage - Specification
- IS 1538: 1993 Cast Iron Fittings For Pressure Pipes For Water, Gas & Sewage – Specification
- IS 8329: 2000 Centrifugally Cast (Spun) Ductile Iron Pressure Pipes For Water, Gas & Sewage – Specification
- IS 9668: Code Of Practice For Provision And Maintenance Of Water Supplies And Fire Fighting
- ANSI/ASTM D570 - Standard Test Method for Water Absorption of Plastics
- ANSI/ASTM D4218 - Standard Test Method for Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique.
- ASTM E96 - Standard Test Methods for Water Vapour Transmission of Materials


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- **IS 2514** - Indian Standard Specification for Concrete Vibrating Tables.
- **IS 2722** - Indian Standard Specification for Portable Swing Weigh Batcher for Concrete (Single and Double Bucket type).
- **IS 2751** - Code of Practice for Welding of Mild Steel Bars used for Reinforced Concrete Construction.
- **IS 2770** - Indian Standard Specification for Method of Testing Bond in Reinforced Concrete.
- **IS 3025** - Indian Standard Specification for Methods of Sampling and Test (Physical and Chemical) for Water used in Industry.
- **IS 3550** - Indian Standard Specification for Method of Test for Routine Control for Water used in Industry.
- **IS 3558** - Code of Practice for use of Immersion Vibrators for Consolidating Concrete.
- **IS 3696** - Safety code for scaffolding and ladders.
- **IS 4082** - Indian Standard Specification for Recommendation on Stacking and Storage of Construction Materials at site.
- **IS 4634** - Indian Standard Specification for Method of Testing Performance of Batch-type Concrete Mixes.
- **IS 4656** - Indian Standard Specification for Form Vibrators for Concrete.
- **IS 4925** - Indian Standard Specification for Concrete Batching and Mixing Plant.
- **IS 4926** - Indian Standard Specification for Ready Mixed Concrete.
- **IS 4990** - Indian Standard Specification for Plywood for Concrete Shuttering work.
- **IS 5513** - Indian Standard Specification for Vicat Apparatus.
- **IS 5515** - Indian Standard Specification for Compaction Factor Apparatus.
- **IS 5751** - Indian Standard Specification for Precast Concrete Coping Blocks
- **IS 5816** - Indian Standard Specification for Method of Test for Splitting Tensile Strength of Concrete Cylinders.
- **IS 5891** - Indian Standard Specification for hand Operated Concrete Mixers.
- **IS 6452** - Indian Standard Specification for High Alumina Cement for Structural Use.
- **IS 6923** - Indian Standard Specification for Method of Test for Performance of Screed Board Concrete Vibrators.
- **IS 6925** - Indian Standard Specification for Method of Test for Determination of Water Soluble Chloride in Concrete Admixtures.
- **IS 7242** - Indian Standard Specification for Concrete Spreaders.
- **IS 7246** - Indian Standard Specification for Table Vibrators for Consolidating Concrete.
- **IS 7251** - Indian Standard Specification for Concrete Finishers.
- **IS 7320** - Indian Standard Specification for Concrete Slump Test Apparatus.


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ANNEX-II OF SCHEDULE-C: STANDARDS AND SPECIFICATIONS

LIST OF I S CODES AND STANDARDS FOR REFERENCE

All work under this specification shall, unless specified otherwise, conform to the latest revisions and and / or replacement of the following or any other Indian Standard Specifications and Codes of Practice (Latest Revision). In case any particular aspect of work is not specifically covered by Indian Standard Specifications, any other standard practice, as may be specified by the Independent Engineer, shall be followed:

- **IS 216** – Indian Standard Specification for Coal Tar Pitch.
- **IS 226** – Indian Standard Specification for Structural Steel (Standard quality).
- **IS 269** – Indian Standard Specification for Ordinary and Low Heat Portland Cement.
- **IS 383**– Indian Standard Specification for Coarse and Fine Aggregate from Natural Sources for Concrete.
- **IS 432**– Indian Standard Specification for Mild Steel and Medium Tensile Steel Bars and Hard Drawn Steel Wire for concrete Reinforcement.
- **IS 455**– Indian Standard Specification for Slag Cement.
- **IS 456**– Indian Standard Code of Practice for Plain and Reinforced Concrete.
- **IS 457**– Indian Standard Code of Practice for General Construction of Plain and Reinforced Concrete for Dams and other massive structures.
- **IS 516** – Indian Standard Specification for Methods of Test for Strength of Concrete.
- **IS 1139** – Indian Standard Specification for Hot Rolled Mild Steel and Medium Tensile Steel and High Yield Strength Steel Deformed Bars for Concrete Reinforcement.
- **IS 1199** – Indian Standard Specification for Methods of Sampling and Analysis of Concrete.
- **IS 1200** - Indian Standard Specification for Method of measurement Part-II Cement Concrete Works.
- **IS 1200** - Indian Standard Specification for Method of Measurement Part-V of Formwork.
- **IS 1322** - Indian Standard Specification for Bitumen Felts for Waterproofing and Damp-proofing.
- **IS 1566** - Indian Standard Specification for methods of Sampling and Analysis of Concrete.
- **IS 1609** - Code of Practice for Laying Damp-proof Treatment using Bitumen Felts.
- **IS 1786** - Indian Standard Specification for Cold-twisted Steel Bars for Concrete Reinforcement.
- **IS 1791** - Indian Standard Specification for Batch Type Concrete Mixers.
- **IS 2386** - Indian Standard Specification for Methods of Test for Aggregates for Concrete – Part-I to VIII.
- **IS 2502** - Indian Standard Code of Practice for Bending and Fixing of Bars for Concrete Reinforcement.
- **IS 2505** - Indian Standard Specification for Concrete Vibrators, Immersion Type.
- **IS 2506** - Indian Standard Specification for Screed Board Concrete Vibrators.


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1.5 GENERAL CARE AND PROTECTION

- 1.5.1 Treatment shall not be made the soil or fill is excessively wet or immediately after heavy rains to avoid surface flow of toxicant from application site. Unless the treated areas are to be immediately covered, precautions shall be taken to prevent disturbance of the treatment by human or animal contact with treated soil.

The work should be executed in stages according to the progress of work and in co-ordination with the general building and other contractors. idle labour, if any, for the same shall not be entertained.

2 FIRE DOORS

2.1 GENERAL

Fire rating up to 1 hour of high quality galvanized steel doors that inhibit fire, insect attacks and organic decay. Special double rebate frame made of 1.6mm (16 SWG) galvanized sheet, with holdfasts/Anchor fasteners provided for grouting. Shutter of overall thickness 43mm thick formed out of two outer skin panels of 1.25mm Galvanized steel sheets. Doors made using the multibend construction and weldless lock seam joinery technique for a dent free finish. Reinforcements at the top, bottom and locking area make the door burglar resistant.

2.2 FINISH

Etch primer coating on frames and shutter, followed by an epoxy zinc phosphate primer, and a final coat of high quality NC paint for higher durability and resistance against corrosion. Premium quality SS ball bearing hinges that are flushed with the frame. Proprietary Non asbestos environment friendly infill material.

2.3 SPECIAL REQUIREMENT

Vision panel.

Anti-panic exit device. Door closer.

Hardware fittings. Smoke seal.

Intumescent seal. Nitrocellulose Paint

Anchor Bolts in lieu of Holdfasts.

2.4 ACCEPTANCE CRITERIA

Successfully tested for the two performance criteria of Stability and Integrity as per BS 476 Part 22 & IS 3614 Part II, at the Central Building Research Institute (CBRI), Roorkee,

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1.4.2 TREATMENT OF TOP SURFACE OF PLINTH FILLING / SOLI UNDER FLOORS

Prior to laying the sand bed or subgrade for the ground floor of the building, top surface of the existing ground level / consolidated earth filling, within the plinth walls should be leveled and treated with chemical emulsion to 5 liters sqm. of the surface. If the consolidated earth fill does not allow the chemicals emulsion to seep through, 50 to 75 mm deep holes are made at 150 mm centers both ways with crow bars on the earth surface to permit easy seepage and to achieve uniform absorption of the chemical emulsion by the earth fill.

1.4.3 TREATMENT OF JUNCTIONS OF THE WALL AND THE FLOOR

The junction of walls and the floors require special attention to ensure effective soil treatment. For this it is important to establish vertical continuity of the poisoned soil barrier on inner wall surface upto making 30 mm wide and 30 mm deep channels at the junction of walls and columns with the earth filling in plinth. Holes are thereafter made in the channel at

150 mm apart upto ground level with crow bar and then chemical emulsion is poured in the channel @7.5 liters per sqm of the vertical wall or column surface. After the treatment the earth should be immediately tamped back into the holes and channel.

1.4.4 TREATMENT SOIL UNDER APRON ALONG EXTERNAL PERIMETER OF BUILDING

Top surface of the consolidated earth over which the apron is to be laid shall be treated with chemical emulsion at the rate of 5 liters per square meter of the vertical surface before the apron is laid. If consolidated earth does not allow emulsion to sleep through, holes upto

50 to 75 mm deep at 150 mm centers both ways shall be made with 12 mm diameter mild steel rod on the surface to facilitate saturation of the soil with the chemical emulsion.

1.4.5 TREATMENT OF SOIL SURROUNDING PIPES, WASTES AND CONDUITS

When pipes, wastes and conduits enter the soil inside the area of the foundations, soils surrounding the point of entry shall be loosed around each of such pipe, waste or conduit for a distance of 150 mm and to a depth of 75 mm before treatment is commenced. When they enter the soil external to the foundations, they shall be similarly treated for a distance of over 300 mm unless they stand clear of the walls of the building by about 75 mm.

1.4.6 TREATMENT OF SOIL ALONG EXTERNAL PERIMETER OF BUILDING

After the building is completed the earth along the external perimeter of the building should be rodded at intervals of 150 mm and to a depth of 300 mm. The rod should be moved backward and forward parallel to the wall to back up the earth and chemical emulsion poured along the wall at the rate of 7.5 liters per square meter of vertical surfaces. After the treatment, the earth should be tempted back into place. Should the earth outside the building be graded on completion of the building, this treatment should be carried out on completion of such grading.

In the event of filling being more than 300 mm, the external perimeter treatment shall be extended to the full depth of filling upto the ground level so as to ensure continuity to the chemical barrier.


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- 11) Clean the tile surface with the help of a wet sponge or clean cloth immediately before setting time of joint fillers.
- 12) After 24 hours of applying of joint filler, wash the surface with water and if required use any available mild detergent to remove from tiles.
- 13) It is recommended to not to use the laid tiles before 48 hours of fixing and/or before 24 hours of filling of joint.

MISCELLANEOUS ITEMS

1. PRE CONSTRUCTION ANTI-TERMITE TREATMENT

Soil treatment shall conform to the following

1.1 CHEMICALS

The treatment of the area shall be carried out by applying of chlorpyriphos chemical 20% EC at not less than the designated concentration.

1.2 RECORDS

A daily record shall be maintained by the Concessionaire indicating the amount of work done and quantity of chemical consumed for the work.

1.3 TESTS

The Concessionaire should perform test at his own cost of the chemical to be used in the work and the result of the test should be submitted to the Independent Engineer.

1.4. METHOD OF APPLICATION

The following paragraph specify the manner and sequence of operations, which must be followed. The rates of applications of chemical as indicated in the following paras for various operation should be followed. This specifications represent the minimum rates of application of each operation and the Concessionaire shall actually apply chemical at rates higher than those specified to the extent he may consider then necessary for effectiveness during the 10 years guarantee period. In other words onus of responsibility of applying adequate amounts of chemicals as required to sustain the 10 years guarantee shall be that of the Concessionaire, but in no case shall actual rates of applications be less than those specified in the Technical specifications.

1.4.1 BACKFILL IN IMMEDIATE CONTACT WITH RCC FOUNDATION

The treatment will start at a depth of 500 mm below the ground level except when such ground level is raised or lowered by filling or cutting after the foundation have been cast. In such cases the depth of 500 mm shall be determined from the filling of cutting mentioned above and soil in immediate contact with vertical surface of R.C.C. foundation shall be treated at the rates of 7.5 liters per square meter of vertical surfaces and the excavated soil shall also be carried out on completion of such grading.


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PAVIT – VITRIFIED PAVEMENT TILES

1 SUBSTRATE PREPARATION

- 1) The ground on which the tiles have to be compacted properly by ramming and applying water on it as per the standard practice to create a firm base and to avoid settlement of base.
- 2) On this base apply 4l thick RCC (reinforced Cement Concrete) in 124 for Heavy Duty Traffic. Lay this layer in such a way that the proper line and level is attained.

2 LAYING METHOD

- 1) Prepare base mortar by mixing sand and cement in 1:4 proportion.
- 2) Lay the mortar on the substrate prepared as mentioned above in required line and level. It should be noted that in an mortar thickness should not have more than 1" thickness.
- 3) Mark the centerline and fix the tiles on all the corners and center in the required level. Preferably, start fixing tiles parallel to longer span.
- 4) Prepare thick cement paste by mixing water & cement. Apply this paste on the backside of the tile to fix it.
- 5) Fixing of tile has to be done with minimum gap of 5mm to 15 mm. We do not recommend tiles to be laid without gap.
- 6) Lay the tiles on this firm base and ram lightly with the help of rubber hammer OR rubber trowel from top. See that the tile top surface is laid in required line and level with proper joint gap.
- 7) Utmost care should be taken while fixing other tiles in terms of matching lines and keeping exact joint width between tile maintaining joint width spacer are recommended of required joint thickness)

After 24 hours when the tiles are properly set and cured, fill the joint gaps with any well-known joint filler. Prepare the con paste as per the method instructed by the joint filler manufacturer. Fill the joint with the help of rubber trowel. Before grouting, all the joints should be free from any dust and impurities.

- 9) For filling the joints, keep the filler paste on the .tiles and fill the gaps by spreading it in the space between the tiles with the h' rubber trowel in such a way that the entire area of joint gaps are filled with the joint filler paste. Apply light pressure of finger in such a way that it creates' U 'Shape between two consecutive tiles and works as a small channel to pass water through it.
- 10) Remove the excess material from the tile surface before the setting time of joint filler recommended by the supplier with the rubber trowel.

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For openings of pipes, sleeves etc. whose sides are not finished, no deductions shall be made for openings up to 0.1 sqm. in each area and full deductions shall be made for all openings above 0.1 sqm. in each area.

No extra payment will be made for painting, etc., done around openings, sleeves, pipes, ducts, inserts, etc.

No extra payment shall be made for painting etc. on wall features such as grooves, ducts, beads, projections, cornices, etc., unless given a different finish or otherwise specified in the schedule of item. The actual area of the features shall be girthed and included in the wall measurements.

For painting for uneven surfaces, doors, windows, ventilators, louvers, guard bars, balustrades, gratings, railings, gates, etc., equivalent plain areas shall be measured as given in Clause 17 (Table II) of IS1200.

Corrugated surfaces shall be measured flat as fixed and not girthed. The quantities as measured shall be multiplied by the following factors to get equivalent plain areas. Corrugated steel sheets shall be multiplied by 1.14.

For painting pipes for sanitary and plumbing work no separate measurement shall be made and the cost shall be included in the installation of pipes.

Unless specifically stated on the Schedule of items, all painting, varnishing or polishing of wood shall be measured and paid on the area treated. For measurement of uneven surfaces, equivalent main area shall be measured as per Clause 17.2 (Table II) of IS 1200, unless specified otherwise.

INTERLOCKING PAVEMENT BLOCKS

Interlocking pavement blocks (thickness of 65 mm) of compressive strength of M25 grade.

1 SUBSTRATE PREPARATION

- 1) The ground on which the blocks have to be compacted properly by ramming and applying water on it as per the standard practice to create a firm base and to avoid settlement of base.
- 2) On this base apply 100 mm thick BBCC (Brick Bats Cement Concrete).

2 LAYING METHOD

- 1) Lay pavement blocks on 50mm silver sand base by maintaining proper interlocking system as per specification of manufacturer. Level and centre line should be properly accomplished as per the instruction of Independent Engineer.
- 2) Utmost care should be taken while fixing other blocks in terms of matching lines and keeping exact joint width between block maintaining joint width spacer are recommended of required joint thickness)

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Now the wooden surface is ready for painting with the top coat Application

Apply by brush or short-pile mohair roller. Apply one full coat of Wood Primer. Allow 6-8 hours to dry.

J5. GENERAL CARE AND PROTECTION

Furniture and other moveable objects, equipment, fittings and accessories shall be moved, protected and replaced upon completion of work. All stationary equipment shall be well covered so that no paint can fall on them. If applicable, work finished by other agencies shall be well protected. All protection shall be done as per instructions of the engineer.

5.1 CLEANING UP OF WORK PLACE

In addition to provisions for general conditions the Concessionaire upon completion of painted work, remove all marks and make good surfaces where paint has been spilled, splashed or splattered, including all equipment, fixtures, glass, furniture, fittings, etc., to the satisfaction of the engineer.

5.2 STORAGE

The Concessionaire shall arrange for safe and proper storage of all materials and working tools. The storage space, if allotted, within the building shall be adequately protected from damage, disfigurement and stains. Paint shall be kept well covered at all times and mixing shall be done in suitable containers. All necessary precautions shall be taken by the Concessionaire in order to combat with the fire hazards that are associated with inflammable ingredients in regard to painting / polishing work.

5.3 ACCEPTANCE CRITERIA

All painted surfaces shall be uniform and pleasing in appearance.

All varnished surfaces shall be of uniform texture and high glossy finish.

The colour tint / texture, touched up surfaces shall match exactly with approved samples. All stains, splashes and splatters of paint and varnish shall be removed from surrounding surfaces.

Painting or white washing of concrete or masonry shall be measured on the area painted. For measurement of openings whose jambs, sills, soffits etc. are to be painted, the following procedure shall be adopted.

For opening up to 0.5 sqm. no deductions shall be made and no additions shall be allowed for jambs, sills, etc.

For openings exceeding 0.5 sqm. but not exceeding 3.0 sqm., each deduction shall be made for half the area of openings and no additions shall be made for jambs, sills, etc.

For openings exceeding 3.0 sqm., each deduction shall be made for the whole area and additions shall be made for the jambs, sills, soffits, reveals, etc.


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4.1 PROCEDURE FOR 100% ACRYLIC LATEX PAINT

Surface to be coated with 100% acrylic latex paint shall be washed and brushed down. As soon as the moisture has disappeared, the surface shall be given one coat of paint. After the first coat has dried (4 to 6 hours), the second coat shall be applied in a similar manner

4.2 PROCEDURE FOR ACRYLIC EMULSION PAINT

Plaster of paris / lime gauged cement plaster surface shall not be painted for at least 4 weeks respectively after plastering. A sample patch shall be painted to check alkali reaction if so desired by the engineer. Painting shall be strictly as per manufacturer's specification.

4.3 PROCEDURE FOR SYNTHETIC ENAMEL PAINT

The synthetic enamel paint shall be applied on properly primed surface. Subsequent coats shall not be applied till the previous coat becomes dry. The previous coat shall always be lightly sand papered for better adhesion prior to undertaking subsequent coats.

4.4 PROCEDURE FOR RED OXIDE PRIMER

Preparation Ensure all surfaces are clean, dry and free from dirt, grease and other contaminants.

Bare metal : Ensure any loose or flaking rust is removed by wire brushing. Sand down and wipe clean.

Application : Stir well with a broad stirring stick to the bottom of the can. Apply 2 coats using a brush suitable for solvent-based paints. Sand down lightly and wipe clean between coats.

Drying time : Touch dry in 2 hours. Overcoat in 6 hours.

4.5. PROCEDURE FOR ZINC CHROMATE PRIMER

Surface Preparation - Surface should be properly degreased, derusted and sand blasted or phosphate coated before applying this primer.

Application BY Brush - It is ready for use

By Spray - Thin with Thinner to application viscosity of 40 secs. by Flow cup No.4 and apply at 40-50 lbs p.s.i. pressure

4.6 PROCEDURE FOR WOODEN PRIMER

Surface Preparation

Previously painted wooden surfaces must be properly sanded to remove any dust or grease. Apply wood primer by brush, after thinning to given ratio by recommended thinner.

Allow it to dry for 6-8 hr then apply putty Sand the applied putty with number 180 sand paper and then apply second coat of wood primer.


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Surface shall be free from all oil, grease, efflorescence, mildew, loose paint or other foreign loose materials. Masonry cracks shall be cleaned out and patch filled with mortar similar to the original surface and uniformly textured. Where this type of re-surfacing may lead to the finishing paint being different in shade from the original surfaces, the re-surfaced area shall be treated with minimum one coat of cement primer, which should be continued to the surrounding area for a distance of minimum 100 mm.

3.3 METAL

All metal surfaces shall be absolutely clean, dry and free from wax, grease or dried soap films. In addition, all steel and iron surfaces shall be free from rust, surfaces shall be cleaned by mechanical power tools to remove mill scales unless otherwise approved by the Engineer. For epoxy chemical resistant paints, surfaces shall be blast cleaned to near white metal. All galvanized iron surfaces shall be pre-treated with a compatible primer according to the manufacturer's directions. Any abrasion in shop coat shall be touched up with the same quality of paint as the original coat.

4 APPLICATION OF PAINT

The method of application shall be as recommended by the manufacturer. In case of selection of special shades and colour (not available in standard shades), the Concessionaire shall mix different shades and prepare test panels of minimum size 1 metre square, as per instructions of the Engineer and obtain his approval prior of application of finishing paints.

Proper tools and implements shall be used. Scaffoldings if used, shall be independent of the surface to be painted, to avoid shade differences of the freshly repaired anchor holes.

Painting shall be done by skilled painters in a workmanlike manner. All materials shall be evenly applied so as to be free of sags, runs, crawls or other defects. All coats shall be of proper consistency. In case of application by brush, no brush marks shall be visible. The brushes shall be of good quality, properly cleaned and in good condition before application of paint. All priming undercoats for painting shall be applied by brush only and rollers. Spray equipment, etc., shall not be used.

No work shall be done under conditions that are unsuitable for production of good results. No painting shall be done when plastering is in progress or is drying. Application of paint which seals the surfaces to moisture shall only be done after the moisture on and below the surface has dried out.

All coats shall be thoroughly dry before succeeding coat is applied. In case the surface is not covered properly by applying the specified number of coats, further coats shall be applied by the Concessionaire when so desired by the engineer.

All primers and under coats shall be tinted to approximate the colour of the finishing coats. Finished coats shall be of exact colour and shade as per approved samples and all finish shall be uniform in colour and texture. All parts of mouldings and ornament shall be left clean and true to finish.

Painting on ferrous metal surface shall be done as per IS 1477 (Part 1 & 2). The total dry thickness of the film should not be less than 120 micron.


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Surface preparation it is to be ensured that plaster is completely dry and thoroughly clean and free from any grime, dust flake, grease etc. ensure that all water leakage, seepage are repaired before painting.

2.4 ACRYLIC EMULSION PAINT

Water-based acrylic emulsion having low VOC shall be used. It shall exhibit excellent adhesion to plaster and cement surface and shall resist deterioration by alkali salts. The paint film shall allow the moisture in wall to escape without peeling or blistering. The paint, after dried up, shall be able to withstand washing with mild soap and water without any deterioration in colour, or without showing flaking, blistering or peeling like LUXOL SILK LUXURY PREMIUM EMULSION (of Berger make).

Surface preparation it is to be ensured that POP surface is completely dry and thoroughly clean and free from any grime, dust flake, grease etc. ensure that all water leakage, seepage are repaired before painting.

2.5 SYNTHETIC ENAMEL PAINT

Synthetic Enamel Paint shall be made from synthetic resins and drying oil with rutile titanium dioxide and other selected pigments to give a smooth, hard, durable and glossy finish to all exterior and interior surfaces. White and pastel shades shall resist yellowing and darkening with ageing. The painting shall conform to IS 2932 and IS 2933. of approved make synthetic enamel paint of approved shade is to be used.

2.6 METALLICA EXTERIOR PAINT OF BERGER

Surface preparation Before starting the work the Concessionaire shall obtain the approval of the Independent Engineer regarding the soundness and readiness of the surface to be painted on. Directions of Application Apply the first finishing coat over the base coat as mentioned below and allow to dry for at least 6 to 8 hrs. for plain metallic finish, After the first coat dries apply the second coat and allow to dry overnight

Dilution Ratio - No dilution required.

Base Coat Two coats of Weathercoat of Berger make as base coat stated earlier.

3 SURFACE PREPARATION

3.1 WOOD

All surfaces shall be free from dirt and loose or peeling paints. The surface shall be rubbed down smooth. All nails and screws shall be sunk below the surface and filled with putty after applying an undercoat. Small knots that do not justify cutting and sap streaks shall be covered with minimum 2 coats of pure shellac coating applied thinly and extended 25mm beyond the area. All large, loose or resinous knots shall be removed and filled with sound wood. All work shall be done as per IS 2338.

3.2 MASONRY, CONCRETE AND PLASTERED SURFACE



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condition, the Concessionaire shall have to make good such defects, prior to taking up of painting work.

The Concessionaire shall intimate the Independent Engineer in regard to commencement of the activity and also submit a schedule indicating the progress of work and completion date, for his approval.

2 MATERIALS

Materials shall be of highest grade products procured from approved manufacturers and shall be delivered to the site in original sealed containers bearing brand name, manufacturer's name, production batch number, date of manufacture, colour shade with labels and seals un-tampered and unbroken. All materials shall be subject to inspection, analysis and approved by the Independent Engineer. It is desired that materials of one manufacturer only shall be used as far as possible and paint of one shade is obtained from the same manufacturing batch. All paints shall be subject to analysis from random samples taken at site from painter's bucket, if so desired by the Independent Engineer and may be sent for necessary tests to ascertain the quality.

2.1 PRIMING COATS - FOR WALLS

a) Exterior Surface

One coat of 100% acrylic latex paint like Weathercoat Longlife (of Berger Make) diluted 11 with water.

b) Interior Surface

One coat of Water-based acrylic emulsion paint like Luxol Silk Luxury Premium Emulsion (of Berger make) diluted 11 with water.

2.2 PRIMING COATS - FOR WOODEN / METALS SURFACE

a) Wooden Surface

Wood Primer is based on an oil-modified alkyd resin blended with pigments to give ease of application and good penetration to substrates. Flexible and produces the ideal surface for subsequent paint finishes.

b) Metals Surface

i) Red Oxide is known for its corrosion protection, inertness to alkali and chemicals.

ii) ZINC CHROMATE PRIMER is an extremely good anticorrosive. Primer designed for use both on Ferrous and non-ferrous surfaces such as Steel Structural etc. It should be recoated as soon as possible with undercoating or surface and / or finishing enamel.

2.3 ACRYLIC LATEX PAINT FOR EXTERIOR SURFACE

Exterior face of building must be painted with 100% acrylic latex paint specially formulated for exterior walls like Weathercoat Smooth (Berger Make)


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Seamless & Water resistant

Strong & Light Weight

Long Life with no sag

Excellent adhesion to any surface

I.1.7 MODE OF MEASUREMENT

The measurement shall be in square meter for actual area treated.

I.2 TOILET FLOOR

I.2.1 GENERAL

The floor surface and vertical wall surface of Toilet shall be thoroughly cleaned with wire brushes. All loose scales shall be removed and chipped of to receive cement plaster and cement slurry.

Average 12 mm thick cement Plaster (1:4) to floor and wall of toilet at any level including extra thickness of Mortar due to uneven surface of concrete work complete in all respects as specification and direction of Independent Engineer.

- (ii) Supplying and application of one layer of "Multiplus Standard" 3kg/sqm. membrane, thermofused to the substrate after application of Multiplus Primer at the rate of 250 gm/sq. complete in all respects as per manufacturer's specification with all labour and materials. (Payment shall be made on finished work).
- (iii) Average 25 mm thick cement Concrete (1:2:4) screeding with 6 mm down stone chips including providing square or hexagonal mesh neeting made with 18 B.W.G. galvanised wire fitted and fixed top finished smooth in one operation as per drawing, direction complete with all labour and materials.

I.2.3 MODE OF MEASUREMENT

The measurement shall be in square meter for actual area treated.

PAINTING

1 GENERAL

This specification covers painting, etc., of both interior and exterior surfaces of wood work, masonry, concrete plastering, plaster of paris, structures and other miscellaneous steel items, rain water down comer, floor and roof drains, soil, waste and service water pipes and other ferrous and non-ferrous metal items as directed by the Independent Engineer.

The Concessionaire shall inspect the work already carried out by him prior to making arrangements for arrangements for paint. If any surface is found to be in a state of unsatisfactory


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Tensile Strength	280 kpa
Shear Strength	210 kpa
Closed Cell content	92% vol.
Thermal Conductivity	0.023 w/mk(design)
Water Absorption (7 days)	.2kg/m ³
Water Vapour Transmisson	2.9 ng/pasm
Temperature limit	100 ° C (max)
Extent of bum	125 mm

I.1.4 METHOD OF APPLICATION

The process of applying rigid polyurethane foam (30 mm thick) on a layer of Mix screed concrete of 50mm average thickness, by spray eliminates separate fixing procedures. LLOYDFOAM is sprayed with the help of two component GUSMER machines, which are capable of maintaining the mix ratio at +/- 2% accuracy and controlling the component temperatures at precisely the optimum range.

On roof work the insulation effect of the foam reduces thermal movement of the roof deck and helps prevent failure of the roof covering. Far from being confined to flat surface, spray applied LLOYDFOAM is ideal for curved corrugated, and irregular surfaces.

Besides external use, spray foam can be applied internally as long as the building is suitable, having easy, convenient access for application and good ventilation. The foam can be sprayed on to the underside of roofs or suspended floors and on to the inner surface of wall.

Although the foam forms a weather resistance membrane, a final coating in two layers is required as an additional protection against U.V radiation in exterior applications. In the same way as any other organic material, plyurethane foam can eventually be attacked by ultraviolet rays of the sun, hence a protective coating is necessary. Apply Isothane elastomeric water proofing compound in two layers to build a total thickness of 1.5 mm complete to the above insulated surface.

Provide 25mm thick silver grey precast terrazo tiles of approved quality over the above surface including necessary underlay of cement mortar (1: 3) complete in all respect.

I.1.5 ACCEPTANCE CRITERIA

Efficient Thermal Insulation


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Hood covers shall be made of mild steel sheets not less than 0.9 mm thick. For shutters having width 3.5 m and above, the thickness of M.S. sheet of the hood cover shall be not less than 1.25 mm.

SPECIFICATION FOR WATER PROOFING

I.1. ROOF

I.1.1 GENERAL

IS 12432 Part 3 2002 Application of Spray Applied Insulation - Code of Practice - Part 3 Polyurethane

This standard provides minimum requirements for the substrate preparation and priming, selection of the foam (chemical) system, method of application and the protective insulation coatings for outdoor service for use at service temperatures from - 30 to + 120°C.

I.1.2 MATERIAL

- (i) LLOYDFOAM, the spray applied Rigid Polyurethane foam is designed to combine highly efficient thermal insulation with great ease of application. It is ideal for a wide range of insulation uses in buildings, particularly roofs, in addition to pipes and storage tanks in industry. By nature, liquid applied foam polyurethane adheres strongly to almost any surface regardless of foam. As foam does not sag, buckle or mat in use, it retains its insulation value for the life of insulation.

The SEAMLESS and MONOLITHIC nature of the sprayed foam provides a full proof method of sealing cracks and rendering any surface moisture resistance and draught proof. The closed cell foam has low water vapour transmission properties and also inhibits ingress of moisture. The excellent adhesion of the sprayed material makes mechanical fastening redundant. The low density of material adds little weight to overall loading. The firm bonding to the substrate can also add significantly to reducing vibration of thin membrane roofs and structural strength of building itself.

- (ii) Isothane EMC elastomeric membrane is liquid applied urethane prepolymer based coating, which cures by reaction with atmospheric moisture to give a continuous film which is rubbery and elastic. Isothane EMC cure to a permanently flexible, seamless membrane, which by virtue of its chemical reactivity in the wet state, has good adhesion to a wide range of substrates. Isothane EMC do not readily embrittle with age on exposure to ultra violet radiation or weathering and hence it does not crack.

I.1.3 TECHNICAL SPECIFICATIONS

Faster application rate

Density

42(±2)Kg/m³

Compressive Strength

300 kpa

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- (e) Floor surfaces and anything likely to be splashed shall be covered before applying white wash and when any white wash splashed on to the wood work, windows, door frames etc. it must be removed at once and not be allowed to dry on the wood. The cost of such cleaning or repairing damage shall be included in the tendered rate for white wash or colour wash.

7.2 CEMENT WASHING

The process is the same as for white washing only being added against lime. In order to ensure will be uniform throughout a sufficient quantity of the wash should be prepared at one time to complete each room.

7.02.01 PLASTER OF PARIS

The plastered surface is to be finished with plaster of paris punning after , combing the surface slightly with wire brushes all nails before it is completely set to form key for plaster of Paris punning. The surface shall be only damped but not soaked before the application of plaster of paris punning. The gypsum from preparing punning shall be approved quantity. Is shall be dry and free from lumps and shall be suitably packed in water tight bags or containers.

Paste shall be prepared by adding required quantum of water and same shall be used before it sets and touching up the same with Acrylic Putty where necessary. No dropping paste shall be used in the work.

Punning shall be applied to the prepared surface with steel trowel to a thickness required to make surface produced perfectly smooth and even surface, working from top to bottom.

The finished surface shall not any sign of disintegration, topping or pilling. The surface shall be protected from injury and damage.

SPECIFICATIONS FOR ROLLING SHUTTER

H.1 General

Rolling shutters shall be supplied in following alternative types or as specified in the schedule of quantities. The shutters shall be complete with accessories. The fixing arrangement shall be as per the drawing with regard to whether it shall be fixed on the inside or outside between jambs of openings, on or below the lintel etc.

H.1.1 Self Coiling Type (Push And Pull Type)

It shall be used upto a maximum of about 8 sqm. clear area without ball bearings and upto area of 12 sqm. with ball bearings.

Shutter shall be constructed with interlocking lath sections formed from cold rolled steel strips not less than 0.9 mm thick and 80 mm wide for shutters upto 3.5 m width and not less 1.25 mm thick and 80 mm wide for shutters above 3.5 m , unless otherwise specified.

The guide channels shall be of mild steel deep channel section and of rolled pressed or built-up joint less construction. For thickness of sheet used shall not be less than 3.15 mm.


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1. Level, slope, plumb as the case may be
2. Pattern and symmetry
3. Alignment of joints, Glass dividing strip, etc.
4. Colour, texture Surface finish
6. Thickness of joints
7. Details at edges, junctions, etc.
8. Performance
9. Precautions specified for durability

The dividing strips in the case of in situ terrazzo finish shall be included in the rates. Similarly, indentations, laying in desired patterns and in panels shall be inclusive in the rates.

All necessary cutting tiles, slabs, etc. cost of specials, if any, shall be included in the rates. No extra shall be paid for rounding corners and edges. Unless specifically mentioned otherwise, same rates will apply to floor, skirting, dado, treads, nosings, etc.

8.7. METHOD OF MEASUREMENT

The finished surface shall be measured for area. Any opening less than 0.1 sq. mtr (and 0.05 sq. mtr. in case of marble finish only) shall not be taken into account neither any extra shall be paid for it.

For terrazzo finish, either in situ or tiled shall be paid at the same rate unless mentioned separately in the Schedule of Items.

Except in case of in situ terrazzo finish and unless mentioned in the Schedule dividing strips shall be measured in length.

7.01 WHITE WASH

WHITE WASHING AND CEMENT WASHING

(a) Before white wash is applied the walls shall be thoroughly cleaned and free from all foreign materials. (b) The liquid is prepared by mixing and stirring slaked lime and water in such proportion as to produce a mixture with the consistency of this cream. When sufficiently mixed, the wash is strained through coarse cloth. Gum in the proportion of 120 gms to 28 kg of lime be added to the screened liquid.

(c) White wash shall be laid on the walls in three coats applied both vertically and horizontally and shall be perfectly dry before the succeeding coat is laid over it. Three coats shall be given unless otherwise directed.

(d) The final wash shall be laid on with hairbrush and not with brush made from jute.


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the thickness of the slabs and mortar bedding. Cement mortar for bedding may be mixed manually or by a mechanical mixer as directed. The amount of water added shall be the minimum necessary to give just sufficient plasticity for laying and satisfactory bedding. Care shall be taken in preparing the mortar to ensure that there are no hard lumps that would interface with the even bedding of the stores. Before spreading the mortar, sub-floor or base shall be cleaned of all dirt, scum or laitance and of loose materials and then well wetted without forming any pools of water on the surface. In case of R.C.C. floors, the top shall then be evenly and smoothly spread over the base by the use of screed battens only over so much area as will be covered with slabs within half an hour. The thickness of the mortar bedding shall not be less than 12 mm and not more than 25 mm.

Unless otherwise specified the proportion of mortar bedding shall be 12 cement mortar (1cement and 2 sand).

- iii) Laying Marble Granite Slab Before laying the Marble shall be thoroughly wetted with clean water. Neat cement grout of honey like consistency shall be spread on the mortar bed over as much area as could be covered with the slabs within ½ an hour. The specified type of Marble / Granite slabs shall be laid to pattern as directed on the neat cement float and shall be evenly and firmly bedded to the required level and slope in the mortar bed. Each slab shall be gently tapped with a wooden mallet, till it is firmly and property bedded. There shall be no hollows left. If there is a hollow sound on gentle tapping on the slabs shall be removed and rest properly. The joint shall be hair fine in width and in straight line grouted with neat coloured cement slurry to match the color of the marble. The joints shall be struck smooth but there shall be no smearing over the mortar of the slabs. The edges of the adjoining slabs shall be in one plane.
- iv) Curing The Flooring shall be kept undistributed at least seven days, and wet for fourteen days.
- v) Polishing & finishing Unevenness at the meeting edges of slabs shall be removed by approved type grinding machine set with carborandum stones of required grade.
- vi) Rate to include Apart from other factors mentioned elsewhere in this contract, the rates for item of marble flooring shall include for the following
- a) All labour, materials and equipments, cleaning the sub-base laying mortar bed and cement grout and fixing marble slabs, as specified above and making up the joints and machine polishing.
 - b) Any cutting and waste if required.
 - c) Curing
 - d) Cleaning the floor from all stains etc.
- vii) Mode of Measurement The measurement shall be in sqm. for the actual marble flooring provided.

8.5 ACCEPTANCE CRITERIA

The finish shall be checked specially for


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sand or machine rubbed before paving. All angles and edges of the slabs shall be true square and free from chippings giving a plane surface.

Thickness shall be as specified in the Schedule of Quantities.

.8.4.4.2 BEDDING

Bedding for the Kota stone slabs shall be cement mortar 12 (1 Cement 2 coarse sand) of average thickness 20 mm as given in the description of the item. Minimum thickness at any place shall be not less than 10 mm.

.8.4.4.3 LAYING

Subgrade shall be cleaned , wetted and mopped. Mortar of the specified mix and thickness shall then be spread on an area sufficient to receive one slab. The slab shall be washed clean before laying. It shall be laid on top, pressed tapped gently to bring it in level with other slabs. It shall then be lifted and laid aside. Top surface of the mortar shall then be corrected by adding fresh mortar at hollows or depressions. The mortar is then allowed to harden a bit. Over this surface, cement slurry of honey like consistency at 4.4 Kg of cement per square meter. The edges of the slabs already paved shall be buttered with white cement with pigment to match the shade of the Kota stone slabs as given in the description of item. The slab shall then be gently placed in position and tapped with wooden mallet till it is properly bedded in level with and close to the adjoining slab. The joint shall be as fine as possible. Surplus cement on the surface of the slab shall be removed. The slabs fixed in the surface of the slab shall be removed. The slabs fixed in the floor adjoining the walls shall enter not less than 10 mm under the plaster, skirting or dado. The junction between the wall and floor shall be finished neatly. The finished surface shall be true to levels and slopes as directed by the Independent Engineer

Machine polishing to achieve high polished surface and cleaning of the whole floor would be done as per direction.

8.4.5 ITALIAN COMPOSITE MARBLE / GRANITE SLAB FLOORING

- i) Marble / Granite Slabs The marble / Granite shall be of approved shade and source as mentioned in the Agreement and their size and the thickness shall be as shown in the respective items of schedule of quantities and as approved by the Independent Engineer.. They shall be of selected quality, dense uniform and homogenous in texture and free from cracks or their structural defects. It shall have even and crystalline grains. The surface shall be machined cut true and square. The rear face shall be rough enough to provide a key for the mortar. No slab shall be thinner than specified thickness at its thinnest part. The dimensions of slabs shall be as specified. A few approved samples of finished slabs to be used shall be deposited by the Concessionaire in the office of the Authority. Unless otherwise mentioned, the thickness of the marble / Granite shall be minimum 20 mm.
- ii) Concrete bedding The base cement concrete shall be laid and compacted to a reasonably true plain surface and to the required slopes and below the level of the finished floor to the extent of


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LAYING – IN FLOORS

Tiles shall be laid in position and tamped down gently with a wooden mallet to make it level with other tiles. The surface during laying shall frequently checked with a straight edge batten so as to obtain a true surface and level. The joints of the tiles shall be 3 to 4 mm wide and shall be filled with neat white cement slurry admixed with pigment to match the colour of the tiles. To maintain a perfect gap between tiles a uniform thick hard board strip can be placed between the tiles during laying. Finally cleaning and finishing must be carried out as grouting proceeds , all traces of adhesive and cement must be removed with sponge dipped in clear water.

LAYING – IN DADOS, SKIRTING

Dado / skirting work shall be done only after fixing tiles on the floor. The tiles shall soaked in water for at least 2 hours before being used. Tiles shall be fixed with water proof adhesive of approved quality and make. The back of tiles shall be covered with a layer of adhesive and tiles shall be placed on the backing surface and gently tapped against the wall a wooden mallet. The fixing shall be done from bottom of the wall upwards without any hollows in the bed or joints. Each tile shall be fixed as close as possible to the one adjoining so that all tiles faces are in one vertical plane. The joints between the tiles shall not exceed 1.5 mm in width. Joints of the tiles shall be pointed with white cement with admixture of pigment to match with shade of the tiles.

After the tiles have been fixed the surplus adhesive and cement grout that may have come out of the joints shall be cleaned off before it sets. After the complete curing the dado / skirting work shall washed and thoroughly cleaned.

E) FINISHING

The joints shall be cleaned and flush pointed with white cement and cured for 7 days by keeping it wet. The surface shall be cleaned with soap or suitable detergent, washed fully and wiped with soft cloth to prevent scratching before handing over.

8.4.4 KOTA STONE FLOORING

It shall be of selected quality, hard, sound, dense and homogenous in texture free from cracks, decay and weathering and flaws. These shall be machine cut to the requisite thickness, they should be the colour indicated in the Schedule of Quantities or as directed by the Independent Engineer.

The slab shall have the top (exposed) face polished before being brought to site.

The slab shall confirm to the size required. Before starting the work, the Concessionaire shall get the samples of slab approved by the Independent Engineer.

.8.4.4.1 DRESSING AND RUBBING

Each slabs shall be cut to the required size and shape and machine cut and fine chisel dressed at all the edges of the full depth. The sides thus dressed shall have a full contact if a straight edge is laid along. The sides shall be table rubbed with coarse


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At the junction of horizontal surface with vertical surface the tiles on the former shall enter at least 12 mm under the latter.

After fixing, the floor shall be kept moist and allowed to mature undisturbed for 7 days. Heavy traffic shall not be allowed.

Dividing strips made up of Aluminium may have to be used for dividing the work into suitable panels, as delineated in the drawing or as may be directed by the Independent Engineer.

8.4.2 GLASS MOSAIC TILE

The actual laying of glass mosaic tiles will be followed as per the specification of manufacturer.

8.4.3 CERAMIC (GLAZED / MAT / METALLIC MAT FINISH) TILES / HOMOGENEOUS VITRIFIED TILES

The finish shall be composed of glazed earthenware tiles with an underbed laid over a concrete or masonry base.

a). THICKNESS

The total thickness shall be between 20 mm and 35 mm including the underbed.

The tile finish on vertical surface shall project out 6 mm uniformly from the adjacent plaster or other wall finishes. The necessary cutting into the surface receiving the finish to accommodate the specified thickness shall be done.

B) TILES GLAZED / CERAMIC / VITRIFIED

The tiles shall be of approved manufacturer. The tolerance shall be + 1.5 mm for length and breadth and + 0.5 mm for thickness. Specials like internal and external angles, beads, covers, cornices, corner pieces, etc. shall be matching. The top surface of the tiles shall be glazed with a gloss or matt unfading stable finish as desired by the Engineer. The tiles shall be flat and true to shape. The colour shall be uniform and fractured section shall be fine grained in textures, dense and homogeneous. The tiles shall be strong and free from flaws like cracks, craze, specks, crawling, etc. other imperfections. The edge and the underside of the tiles shall be completely free from glaze and the underside shall have ribs or indentations for better anchorage with the fixing mortar.

The coloured tiles, when supplied, shall preferably come from one batch to avoid difference in colour.

C) MIX UNDERBED

The mix for the underbed shall consist of 1 Part cement and 3 parts coarse sand by weight mixed with sufficient water or any other mix if specified.

D) LAYING



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The tiles shall, unless specifically permitted in special cases be machine made under quality control in a shop. The tile shall be pressed hydraulically to a minimum of 140 Kgs. per sq.cm.

Each tile shall bear on its back permanent and legible trade mark of the manufacturer. All angles of the tiles shall be in true right angles with edges sharp and true, colour and texture of the wearing face uniform throughout. Maximum tolerance allowance length and breadth shall be + 1 mm and the thickness + 3 mm. Face of the tile shall be plane, free from pin holes and other blemishes.

The backing shall be composed of 1 part ordinary grey cement and 3 parts of stone chips by weight mixed with water.

The tile shall be cured at the shop for at least 14 days before delivery to the site. First grinding shall be given to the tiles at the shop before delivery. Tiles shall be packed properly to prevent damage during transit and storage. The tiles must be carefully stored to prevent staining by damp, rust, oil and grease or other chemicals.

Tiles made in each batch shall be kept and used separately so that colour of each area of the floor may remain uniform.

The manufacturer shall supply along with the tiles the grout mix containing cement and pigment in exact proportions as used in topping of the tiles. The containers for the grout mix shall be suitably marked to relate it to the particular type and batch of tiles.

C) MIX UNDERBED

The underbed for floor and similar horizontal surfaces shall be 1 part cement and 3 parts coarse sand by weight mixed with sufficient water to form a stiff workable mass. For skirting and dado and all vertical surfaces it shall be about 12 mm thick and composed of 1 part cement and 3 parts coarse sand by weight.

D) LAYING

The underbed mortar shall be evenly spread and brought to proper grade and consolidated to a smooth surface. The surface shall be roughened for better bond. Before the underbed had time to set and while it is still fairly moist but firm, cement shall be hand dusted over it or a cement slurry applied and the tiles shall immediately be placed upon and firmly pressed by wooden mallet on to the underbed until it achieves the desired level. The tiles shall be kept soaked for about 10 minutes just before laying. The joints between tiles shall be as close as possible and not more than 1.5 mm wide.

Special care shall be taken to check the level of the surface and the lines of the joints frequently so that they are perfect.

When tiles are required to be cut to match the dimensions these shall be sawn and edges rubbed smooth. The location of cut tiles shall be planned in advance and approval of the Engineer taken.


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C) MIX

I) TOPPING

Topping proportion of the metallic hardener shall be as specified or as indicated by the manufacturer. However, in absence of any such direction 1 part metallic hardener shall be mixed dry with 4 parts of cement by volume.

II) UNDERBED

The underbed for floors and similar horizontal surfaces shall consist of a mix of 1 part cement, 1 ½ parts sand and 3 parts stone chips by volume. For vertical surfaces the mix shall consist of 1 part cement to 3 parts of sand by volume. The sand shall be coarse. The stone chips shall be 10 mm down well graded. Only sufficient water to be added to give a workable consistency.

LAYING

The concrete floor shall be laid as per specification —Cement Concrete and levelled upto the required grade. The forms, if any, shall remain sufficiently projecting to take the finish. The surface shall be roughened with brush as soon as possible.

The finish shall be laid while the concrete underbed is still very —green within about 3 hours of laying of the latter. The finish shall be of uniform thickness and even dense surface without trowel marks, pin holes, etc. This topping layer shall be pressed firmly and worked vigorously and quickly to secure full bond with the concrete base. Just when the initial set starts the surface shall be finished smooth with steel trowel.

The finished floor shall be cured for 7 days by keeping it wet.

8.4 TILE FINISH

These shall include finish tiles, stone slabs and similar manufactured or natural items over already laid and matured base of concrete or masonry by means of an underbed or an adhesive layer.

.8.4.1 TERRAZZO TILE FINISH

i) The finish will consist of manufactured terrazzo tile and an underbed.

A) THICKNESS

The total thickness including the underbed shall be minimum 40 mm for floors, 30 mm for walls unless otherwise specified.

The skirting, dado and similar vertical surfaces shall project out 6 mm uniformly from the adjacent plaster or other wall finishes. The necessary cutting into the surface receiving the tiled finish, to accommodate the specified thickness shall be done.

B) TILES TERRAZZO



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A) THICKNESS

The total thickness of the patent stone finish shall be minimum 40 mm for horizontal and 25 mm for vertical surface of which, while the topping shall (not less than 6 mm) be of uniform thickness, the underbed may vary in thickness to provide necessary slopes. The vertical surface shall project out 6 mm from the adjacent plaster or other finish. Necessary cutting into the surface receiving the finish shall be done to accommodate the specified thickness. All junctions of vertical with horizontal shall be rounded neatly to uniform radius of 25 mm.

B) MIX

l) UNDERBED

The mix for the topping shall consist of 1 part cement and 1 part fine sand by TOPPING

The mix for the topping shall consist of 1 part cement and 1 part fine sand by LAYING.

The patent stone finish, including the underbed shall be laid in alternate bays or in chequered board pattern. No panel shall be cast in contact with another already laid till the contraction of the latter has already taken place.

The maximum area of each panel shall be 3 sq. mtr. of which no side shall be more than 2 mtr. long.

A cement grout shall be applied and worked into the surface to receive the finish. The underbed then laid, compacted and levelled to proper grade with a screed or float. The topping shall be applied evenly on the underbed while it is not fully set but firm enough and rolled and pressed to get full bond. The topping shall be trowelled to a dense finish to the satisfaction of the Engineer. All trowel marks shall be mopped out with a soft cloth to give a clean smooth surface.

After the surface is sufficiently set, the finished floor shall be kept moist for 7 days for curing. If desired the finish shall be polished as directed by the Engineer.

8.3. METALLIC HARDENER LIKE —IRONITEII FINISH

This will consist of a topping (incorporating iron particles) to bond with concrete base while the latter is Green.

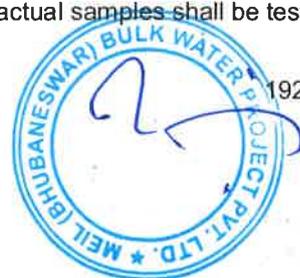
A) THICKNESS

Unless otherwise specified, the metallic hardener finish shall be of 12 mm depth.

B) MATERIAL

The hardening compound shall be uniformly graded iron particles free from non-ferrous metal impurities, oil, grease, sand, soluble alkaline compounds and other injurious materials. When desired by the Engineer, actual samples shall be tested.


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The base to receive the finish is covered under other relevant specifications.

4. SEQUENCE

Commencement scheduling and sequence of the finishing works shall be planned in detail and must be specifically approved by the Engineer in view of the activities of other agencies working in that area. However, the Concessionaire for the finishing items shall remain fully responsible for all normal precautions and vigilance to prevent any damage whatsoever till handing over.

5. INSTALLATION

5.1 SPECIAL MATERIALS

Basic materials are covered under Specification properties storage and handling of common building materials. Special materials required for individual finishing items are specified under respective items. In general, all such materials shall be as per relevant I.S. Codes where available. In all cases these materials shall be of the best quality available indigenously, unless specified otherwise.

The materials for finishing items must be procured from well-reputed, specialized manufacturers and on the basis of approval of samples by the Engineer. The materials shall be ordered, procured and stored well in advance to avoid compulsion to use substandard items to maintain the construction schedule.

6. WORKMANSHIP

Only workers specially experienced in particular items of finishing work shall be engaged. Where such workers are not readily available, with the Engineer's permission, experienced supervisors recommended by the manufacturer shall be engaged. In particular cases, where the Engineer so desires the Concessionaire shall get the finishing items installed by the manufacturer.

7. PREPARATION OF THE BASE SURFACE

The surface to be treated shall be thoroughly examined by the Concessionaire. Any rectification necessary shall be brought to the notice of the Engineer and his approval shall be taken regarding method and extent of such rectification work. For all types of flooring, skirting, dado and similar locations, the base to receive the finish shall be adequately roughened by chipping, raking out joints and cleaning thoroughly all dirt, grease etc with water and hard brush and detergent if required, unless otherwise directed by the manufacture of any special finishing materials or specifically indicated in this specification under individual item.

To prevent water from the finishing treatment, the base shall be thoroughly soaked with water and all excess water mopped up.

The surface shall be done dry where adhesives are used for fixing the finishes. Prior to commencement of the actual finishing work the approval of the Engineer shall be taken as per the acceptability of the surface.

8. IN SITU FINISHES


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Cement and sand will be of the same specifications as in section 3.01 and 3.02.

- (b) Glass beading of the same height as specified for the specified for the thickness of the floor should be laid on the under floor to form squares of convenient size or as mentioned in the schedule of items. Generally the squares may be from 1.25m to 1.85m according to the dimension of the rooms or as per engineer's instructions.
- (c) The mixture shall be spread evenly between the glass beadings. It shall be brought to an even grade by means of a strike board then beaten and thoroughly consolidated until the mortar comes to the surface and then smoothed off with a wooden float soak to give a surface free from depressions or irregularities. If any depressions have to be filled a small quantity of the finer material in the proportions specified may be used but this should be avoided as far as possible. The surface shall be finished smooth by trowel.
- (d) The operation of mixing carrying placing, consolidating and leveling shall be completes in 30 minutes after which the surface shall not be disturbed. The top surface shall be skinned with neat cement finish and finally rubbed with coconut oil or as directed by the engineer.

LIST OF FLOOR FINISHES & ALLIED WORKS

1 IN SITU FINISHES

- (i) Terrazzo finish
- (ii) Patent Stone
- (iii) Metallic Hardener like 'Ironite' finish

2 TILED FINISHES

- i) Terrazzo Tile
- ii) BISAZZA make Glass Mosaic Tile
- iii) Glazed ceramic tiles
- iv) Mat finished ceramic tiles
- v) Mat finished ceramic tiles. (Metallic finish).
- vi) Homogeneous Vitrified Tiles

3 SLAB FINISHES

- i) Sand blasting granite slab of black galaxin
- ii) Pre-polished Italian Composite marble Rover Make slab
- iii) Kota stone slabs Base


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This specification covers procurement and furnishing materials, labour, equipment, installation, finishing, curing and performing all operations necessary to complete work including testing, protection and maintenance till handing over various types of floor finishes and allied items of work as listed below

GENERAL

Level of flooring shall be 0.75m above the virgin soil at respective structures. There shall be sand filling between the virgin soil & the floor. Different types of floorings to be adopted for different units as has been discussed under the respective structures in preceding paragraphs. AS flooring(cement concrete flooring) shall be of 25mm thick of 1:2:4 CC with punning over 100 mm CC 1:3:6 base in case of ground floors/directly on roof in case of first floor.

Flooring in lavatories and bathrooms shall be laid after fixing of water closet and squatting pans and floor traps. Traps shall be plugged, while laying the floors and opened after the floors are cured and cleaned. Any damage done to W.C.s, squatting pans, floor traps, etc. during the execution of work shall be made good.

Concrete does not exceed 38oC (Degree Celsius). No concrete shall be laid within half an hour of the closing time of the day During hot weather precautions shall be taken to see that the temperature of wet unless permitted by the Independent Engineer.

6.1 SAND/EARTH FILLING

Sand/non cohesive earth filling in plinth or floors shall be watered to have specified moisture and well consolidated by vibration roller or hammer or any other mechanical men's in loose layer of maximum 150mm. In deck floors a slope of in 40 or as directed by the engineer shall be provided, compaction of sand/earth fill manually is strictly prohibited. The Bill shall be measured for the finished compact section basing on predetermination of the ground contour of the filled area.

6.2 BRICK SOLING

One layer of first class bricks shall be laid flat or as specified on consolidated surface and the joints shall be regular and uniform. In foundation first class brick shall be laid on earth, which are compacted to the desired degree. Bricks shall not be laid on the floor or foundation bed until the floor or foundation bed is inspected and approved by the engineer. Brick soling in foundation or under pile foundation shall only be taken up on written instruction from the engineer inspective of inclusion of the same on BOQ depending on soil characteristics the engineer may chose to dispense with the item.

6.3 CEMENT CONCRETE IN FOUNDATION

Cement concrete shall be made of 40mm downgraded stone ships well graded clean unless sand of fineness modulus not less than 2.5 and fresh cement in proportion (1:4:8) otherwise specified below foundations. All mixing shall be done in mixer machine

6.4 ARTIFICIAL STONE

(a) Flooring shall be of such thickness as specified in the Schedule of Item concrete shall be made of 20mm downgraded stone chips as specified passing through 20mm sieve and retained on 6mm sieve.

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three hours before use.

- (b) Where new joints are to be made with previous works, the later shall be cleaned and thoroughly watered. All facing brick works unless otherwise specified shall be laid in English Bond with fronts upward. All horizontal joints shall be parallel and level. The masonry shall be cured for at least seven days fixtures in masonry such as iron for railings, clamps for doorframe, shelf brackets, GI pipes etc shall be provided in the brick work during execution. These works are also included within the rates of brickwork.
- (c) Walls having 125mm thickness shall be brick built with cement mortar in proportion as specified the schedule of items preparation method of construction and other specifications shall be the same as those for walls stated before.

PLASTERING ANED POINTING

a. MORTAR

As specified in section 4.05 — Mortar

b. WORKMANSHIP

All brick works with 12 mm / 16 mm thick cement mortar in 1:6 & all RCC exposed surfaces & roof ceilings except for the Water retaining structures shall be with 12mm thick cement mortar in 1:4 unless specifically mentioned.

- (a) Plastering shall be done in a neat true and workman like manner. No comer shall be rounded or leveled unless directed by the engineer. All intersections edges and corners shall have sharp edges unless otherwise directed and be at right angles. The lines must be straight and true.
- (b) Unless specified otherwise cement plaster shall be used in the following proportion. On brick walls one part Portland cement to six parts sand & on concrete surface one part Portland cement to four part sand by weight.
- (c) Before starting plastering brick joints shall be racked out to a depth of 12mm and concrete surfaces shall be roughened. Both brick and concrete surface shall be scrubbed and cleaned to remove loose materials and thoroughly soaked with water.
- (d) Cement plaster shall be applied to clean rough surfaces in a single coat of specified thickness and thoroughly smoothed.
- (e) All plaster shall be kept moist throughout the progress of the work and for at least 10 days thereafter. If cracks appear through negligence or due to other reasons, the Concessionaire at his own expense must make the defects good.
- (f) The surfaces along the joints to be improve for any kind of defective work. Mesh should be properly aligned with the surface. No deflection will be accepted. No construction joint is accepted in plasterwork.

FLOORING



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4.01 BRICK:

Bricks should conform to IS 1077. First class KB Bricks in cement mortar (1:6) in foundation and plinth. All non-load bearing outer walls shall be minimum 250 mm thick & inside partition walls shall be minimum 125 mm thick. First class KB bricks in cement mortar (1:6) in superstructure. The thickness of plaster shall not be more than 12 mm size for outside face & 16 mm in the inside face.

- (a) First class K.B. bricks shall be made from good brick, free from saline deposits and shall be hand molded. They shall be thoroughly burnt without being vitrified of good colour shall be regular and uniform in size and shape with sharp square edges and parallel faces. They must be homogenous in texture and emit a clear ringing sound when struck. They shall be free from flaws, cracks, chips, stones, nodules of lime or canker and other blemishes. A first class brick shall not absorb more than 1/6th of its weight in water after being soaked for four hours and its crushing strength shall not be less than 75kg/sqcm.
- (b) Bricks not meeting the above requirements shall not be used under any circumstances.
- (c) Jhama bricks are those which are so over burnt as to become vitrified or distorted so as to be useless for exact work they may be broken and used for aggregate provided the vitrified mass has not become porous or spongy as result of over burning.

4.02 CEMENT

As specified in section 3.01 Cement

4.03 FINE AGGREGATE

As specified in section 3.02 the fineness modulus of the sand shall not be less than 2.50

4.04 WATER:

As specified in section 3.04 – water

4.05 MORTAR

- (a) Cement mortar shall consist of a mixture by volume of the part cement to the specified parts of sand as is mentioned on the schedule of items.
- (b) The cement and sand shall be mixed dry in the specified proportions until the colour of the mixture is uniform water shall then be added sparingly only on minimum necessary being used to produce a workable mixture of normal consistency. The water ration in no case shall exceed 0.50 by weight or as directed by the engineer.
- (c) The Mixing shall be done on a clean board or platform with ties to avoid leakage. At the close of each day's work the trough and pans shall be thoroughly cleaned.

4.6 WORKMANSHIP

- (a) Brick work shall be built to proper plumb, curved or battered as shown in the drawings. Bricks shall be cleaned and if necessary shall be scrubbed. Brick shall be soaked in water for at least

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considered as part of the floor system and shall be placed monolithically therewith.

1.16.4 DAY'S WORK JOINTS

- (a) No fresh concrete shall be placed against any concrete which has attained its initial set. Concrete is deemed to have attained its initial set 30 minutes after water has been added to the mix. Provided that the set concrete has been properly placed and compacted and is acceptable to the engineer it shall not be disturbed. It shall be allowed to attain its final set and to harden sufficiently to enable a day's work joint surface on it to be prepared by through hacking without damage. Concrete may be deemed to have hardened sufficiently for this purpose 72 hrs after placing.
- (b) Any concrete, which has been disturbed after it has attained initial set, shall be rejected and subsequently removed by the Concessionaire at his own expenses.
- (c) When concreting must be suspended at any point because of weather or for any other cause a day's work joint shall be made.
- (d) The concrete at day's work shall be allowed to harden for 72 hrs. Before fresh concrete is placed against the day's work joint all those and imperfect materials, cement scum or linate shall be removed from the joint surface which shall be thoroughly hacked until a completely hacked, roughened, fresh surface is obtained. The fresh surface shall then be brushed clean and immediately before fresh concrete is placed against it shall be thoroughly whetted and covered with a layer of 1:1.5 cement and sand mortar not less than 38mm thick. The mortar shall have the consistency of condensed milk.

1.16.5 SYNTHETIC FIBERS (RECRON 3S)

Synthetic fibers shall be used in concrete and other cement based materials in order to achieve strength and durability. This leads to greater tendency to self induced cracking on account of dry shrinkages, plastic settlement, chemical shrinkages, early thermal shrinkages, etc.

DOSAGE

Weigh batched @0.25% by wt. of cement used i.e. 125 gms/50kgs bag of **Cement for concrete CT 2024** (12 mm fiber cut length) – For Concrete Applications CT 2424 (12 mm fiber cut length) — For Concrete Applications in RMC / Batching Plants CT 2012 (06 mm fiber cut length) — For Plaster Applications.

MIXING

The Recron 3S fiber pouch is to be mixed in full/ half bucket of water and then added to revolving drum of the empty mixer. Thereafter normal procedure of adding aggregates, sand, cement and balance qty. of water is to be done. The mixture should be properly mixed by giving adequate nos. of revolutions to the drum of mixer. The uniformly dispersed fiber like hairs can be immediately seen once mortar mixture is taken out.

BRICK WORK


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bracing shall be provided to prevent movement of all steel projecting from the concrete in the course of construction.

- (c) Where it is necessary to maintain two layers reinforcement at the correct distance apart Steel riders bent from 12mm diameter mild steel bars shall be used.

1.16.1 SPLICING AND WELDING OF REINFORCEMENT

Welding of reinforcement will be permitted only where shown on the drawings. The welding shall be by electric and shall be performed by a skilled operator approved by engineer. The surface of the bars shall be thoroughly cleaned and scrubbed with brush immediately before welding and weld must be deposited evenly and all along shall be of even contour without cavities as per drawing or instruction of the Engineer.

1.16.2 COVERING OF REINFORCEMENT

- (a) The reinforcement of footing and other principal structural members in which the concrete is deposited against the ground shall have not less than 75mm of concrete between it and the ground contact surface. If concrete surface after removal of the forms are to be exposed to the weather or to be in contact with the ground the reinforcement shall be protected with not less than 50mm concrete.
- (b) The concrete protective covering for any reinforcement at surface not exposed directly to the ground or weather shall be not less than 25mm for slabs and walls and not less than 50mm for beams and girders.
- (c) Column spirals or ties shall be protected everywhere by a covering of concrete cast monolithically with the core for which the thickness shall be not less than 50mm.
- (d) Greater thickness of concrete covering if specified shall be kept as per drawings and direction of the engineer.
- (e) Exposed reinforcing bars intended for binding with future extensions shall be protected from corrosion by concrete or other adequate covering.

1.16.3 CONSTRUCTION JOINTS

Concrete should be deposited continuously and as rapidly as practicable until the unit of operation approved by the engineer in charge is completed where construction joints are from the beams or slabs and not over the support.

- (a) As per drawing or as per engineer approval joints not indicated on the plans shall be so made and located as not to impair significantly the strength of the structure. Where a joint is to be made the surface of the concrete shall be thoroughly cleaned and all Latinate removed. In addition to the forgoing vertical joints shall be thoroughly sealed and slashed with a coat of neat cement grout immediately before placing of new concrete.
- (b) A delay must occur at least until the concrete in columns or walls is no longer plastic before casting of concrete in beams girders brackets columns capitals and haunches shall

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Before new concrete is deposited against the surface of set concrete at construction Joints the surface of the set concrete shall be thoroughly scrubbed or roughened and cleaned by means of compressed air and sand or other approved means to such an extent that on smooth skin of concrete that may be left from the previous concrete is placed. These scrubbed surfaces shall be thoroughly cleaned, brushed and watered and if so instructed by the engineer be coated with neat cement grout well brushed into the surface.

1.14 STEEL OF REINFORCEMENT

- (a) The steel for normal reinforced concrete shall be high yield strength deformed round bars conforming to IS 1786 and IS 1139. Corrosion resistance rod shall be exclusively used in piles provided in the foundation. Mild steel rod conforming to IS 432 shall be used wherever required by the engineer. The engineer shall perform tests to be made on samples of steel reinforcement stored at the site before use. . In the event of any sample not meeting the requirement of Bureau of Indian standard, the whole consignment of bars from which the samples were taken will be rejected by the engineer notwithstanding any previous acceptance on the strength of the manufacturers certificate. Any reinforcement rejected by the engineer shall be removed from the site.
- (b) The steel shall be kept clean and shall be free from mill scales, loose dust oil earth or other harmful materials before being placed in the forms. The steel at site shall be stored under roof with non-porous enclosure around.
- (c) The steel shall only be procured from the authorized outlets of the manufacturer approved by the engineer.

1.15 BENDING OF REINFORCEMENT

All reinforcement shall be bent cold using bar bending machines and appliance approved by the Independent Engineer. Unless otherwise specified in the drawings, the bending dimension tolerances and the dimensions of anchors, hooks binders stirrups and the like shall comply with the IS standards. Only experienced steel benders and fixer shall be employed. Bending shall be accurately carried out and no steel blocks or wooden wedges will be permitted for keeping reinforcement in place.

1.16 PLACING OF REINFORCEMENT

The number size from and position of all steel bars shall be in accordance with the drawings and in the placing and fixing of them the function of each bar is to be kept in mind. The reinforcement shall be accurately assembled and firmly secured by wire ties made from no. 16 soft annealed wire so that the whole assembly is rigid and will not be misplaced while concrete is being compacted around it. The ends of the wire ties shall be turned inward away from and shall not be left projecting beyond the reinforcing bar. The engineer due to valid reasons may order change in shape size and spacing of bars at Concessionaire's cost.

- (b) The cover of concrete to steel shall be maintained by spacing blocks securely wired to the bars or by other means approved by the engineer. Spacing blocks for the various cover dimensions shall be cast from cement mortar made from I part of cement and II parts of sand. The blocks shall be well compacted and shall be fully cured before being used. Temporary

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If for any reason the form work moved after the concrete has been placed thus disturbing the freshly placed concrete or if the concrete is found to be defective in alignment, the Concessionaire may be ordered to take out and replace such concrete without extra payment. All the faces of form work in contact with concrete shall be smooth and free from surface imperfections.

- (b) The formwork shall be constructed with any of the following materials depending of suitability.

Steel shuttering of 14 gauges for RCC works especially in roof/ floor slab and columns.

Waterproof plywood of approved manufacture 18mm thick securely fixed to timber may be used after approval by the Independent Engineer

- (c) The height of formwork will be as follows

(i) Timber formwork should not exceed the height of 1200mm

(ii) Steel formwork should not exceed the height of 2150mm

- (d) The use of wire passing through the concrete for the purpose of securing form will not be permitted.

Bolts may be used but their number shall be kept to the minimum required to secure the formwork rigidly. The bolts shall not be less than 13mm dia. The hole left by bolts shall be cleaned and filled with cement mortar containing waterproofing materials of approached quality.

- (e) Before concreting all forms shall be cleaned and treated with approved mould oil to prevent adhesion of the concrete care being exercised to ensure that no oil falls on the set concrete or reinforcement provision shall be made to allow the form work to be removed without shock or damage to the concrete its contains or to adjacent work.

- (f) Opening sufficient in size and number to permit convenient access to clean properly and inspect the inside of the forms shall provide. All dirt, chips sawdust and other foreign matter shall be removed from within the form before any concrete is deposited therein. Forms shall be kept wet for at least 10 minutes before concrete is placed.

- (g) Within one week of the acceptance of his tender the Concessionaire shall submit for the approval of the engineer drawing and descriptions should in the methods he proposes to use for the creation and support of the form work.

1.12 STRIKING OF FORM WORK

No form work shall be struck without the prior approval of the engineer form work shall be removed in accordance with a programme agreeably the engineer without such shock or vibration as would damage the concrete and without interruption to the curing of the concrete.

- (a) Concrete exposed by the removal of formwork shall be left untouched till the Engineer inspects it.

1.13 PREPARATION OF SURFACES TO RECEIVE CONCRETE



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required and directed by the engineer. Concreting between two walls shall be compacted by power driven vibrators of the immersion type and concrete in slabs with no form work or upper surface shall be compacted by power driven vibrators of the pan type or by vibrating screeds. The vibrators shall be of ample power operating at not less than 6000 RPM and of kind approved by the engineer. They shall be operated by workmen skilled in their use he shall be additional to the laborers employed for placing and tamping the concrete.

(b) No concreting shall begin until the required number of vibrators are available, all being tested and found to be in good working condition at the work site.

(c) In general the number of vibrators available for use shall be as follows

On vibrator for each four cubic meter of concrete placed per hour and one stand by vibrator for each three vibrators in service but in any case at least two vibrators in good working order shall be present at the forms.

(d) Immersion vibrators shall be inserted and withdrawn slowly at a uniform rate of approximately 10mm per second. Compaction shall be deemed to be completed when cement mortar appears in a circle round the vibrator. The immersion vibrators shall be inserted at intervals determined by area of mortar shown after the previous vibrator with a certain allowance made for over lapping. The immersion vibrators shall not be allowed to come into contact with the formwork and the reinforcement.

(e) Pan vibrators shall be placed on the surface of the concrete, which shall have previously been tamped and leveled but left slightly high to allow for settlement during compacting until cement mortar appears under the pan. The vibrators shall then be lifted and placed on the adjoining area and the operation shall be repeated until the whole surface has been compacted. Alternatively a vibrating screed spanning the full width of the panel shall be used.

(f) In all case the placing of concrete shall be sufficiently ahead of the vibrators so that the mass of concrete beyond the vibrators is sufficient to a stand flooring while vibration is in progress. On the other hand the concrete shall be fully compacted before initial set is attained.

1.10 CURING

(a) As soon the freshly placed concrete has hardened sufficiently to withstand such treatment without damage the exposed surfaces shall be completely covered with wet gunny bags or any other means approved by the engineer and shall be kept thoroughly wet continuously by generous applications of water every two hours for period of 14 days. Water shall be allowed to run down between the forms and the formed concrete surfaces. Floor slabs shall have water impounded on them for period of at least 14 days after placing. Any excess water or cream that may have come to the surface shall first be removed dry cement or dry mixture of cement and sand shall not be sprinkled on the surface to absorb such excess moisture.

1.11 FORMWORK

All form work shall be erected true to line and level as shall be adequately secured and braced to prevent deflection or movement during the placing tamping or vibration of the concrete and shall be sufficiently tight to prevent loss of liquid from the concrete.

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introduction of the materials including water into the mixer. The engineer reserves the right for the required uniformity of composition and consistency within the batch and from batch to batch.

- (c) The leading skip the mixer drum its blades and the discharge chute shall be kept clean and free from hardened mortar or concrete.

1.08 CONVEYING AND PLACING

Before placing concrete the sub grade should be properly prepared and the forms and reinforcement should be erected. A moist sub grade is especially important to prevent too rapid extraction of water from the concrete when pavement, floors and similar work are be cast in hot whether. Where the foundation is rock, all those materials should be removed before the concrete is placed. When it is necessary to cut rock in foundation, the surfaces in general should be vertical or horizontal and not sloping.

Where fomworks are used they shall be clean, tight, adequately braced and constructed with materials that will import the desired texture to the finished concrete. Care should be taken to see that sawdust nails and other debris are removed form the space to the concerted. Forms should be moistened or oiled previous to placing to facilitate free removal. Where they have been exposed to the sun it may be necessary to saturate the wood thoroughly before concreting.

Reinforcing steel used for concreting should be cleaned and free of loose rust or mill scales. The concrete shall be placed before the initial set so that it remains workable and can be compacted satisfactorily. Additional water shall not be added to improve workability as it disturbs the water cement ratio. Placing of concrete shall be done in a continued operation till the predetermined position of construction joint is reached.

The maximum thickness of layer shall not be more than 300mm even for wet consistencies. Horizontal flow concrete shall be avoided as far as possible Each subsequent layer shall be deposited while the previous layer is soft In sloping member small quantities of concrete shall be deposited starting from the lower end of the slope.

In case of reinforced concrete work using shutter or formworks, the shutter and forms must be rendered watertight and concrete shall not be deposited until the engineer in charge has inspected reinforcement, forms and their support.

Before depositing fresh concrete over or against hardened concrete of construction joints the hardened surface shamble roughened and cleared by wire brush or water jet with a pressure of 0.07kg/cm² or by sand blasting after the concrete has hardened

sufficiently. The surface shall not be allowed to any between jetting and placing on concrete. A thin layer of motor of the same perpetration as in the concrete shall be applied just before placing fresh concrete.

1.09 VIBRATION

The concrete after placing shall be thoroughly compacted as it is placed to secure a dense structure close bond with reinforcement and smooth surface by robbing, hand tamping or mechanical vibration as



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strength of the sample shall be crushing strength at failure of the weakest test specimen in the set.

- (d) The cost of supplying moulds all materials and labour for making and crushing the test cylinders shall be borne by the Concessionaire.

1.06 UNSATISFACTORY CONCRETE

- (A) If any of the test specimens shows a compressive strength less than that specified the Independent Engineer shall at his discretion
- (i) Order all concerning work to stop.
- (ii) Order any change in the proportions of the concrete mixes for which the Concessionaire cannot claim extra rate pending receipt of the 28 days test results.
- (B) If any of the specimens tested at 28 days show a compressive strength less than that specified the engineer might at his discretion order the breaking etc, removal and replacement of all concrete mixed and placed on the day when the sample at his discretion
- (ii) Order such remedial works as he may consider necessary to ensure that the strength is not less than it would have been had the concrete complied with the specification.

1.07 BATCHING

- (a) The Concessionaire shall provide and maintain such means and equipment as are required to determine and control accurately the relative amount of the various materials including water cement sand such individual sizes of coarse aggregate entrain the concrete and such means and the equipment and their operation shall be at all time to be approved by the Engineer.
- (b) All batches of concrete shall be proportioned on the basis of whole bags of cement unless the cement is batches by weight.
- (c) The amount of sand and coarse aggregate entering each batch of concrete shall be determined by volume.
- (d) The amount of water added to each batch of concrete shall be measured by weight and shall be poured in the concrete mixer machine in method approved by the engineer.
- (e) No change in the specified mix will be permitted except with the authority of the Engineer.

1.07.1.1 MIXING

- (a) All concrete used in the works shall be mixed in mechanical batch mixer /weigh batcher of approved pattern fitted with power driven loading skip.
- (b) Each batch of concrete shall be thoroughly mixed for period of not less than 2 minutes to produce well-mixed concrete of uniform consistency and appearance. The minimum mixing period specified is predicated on proper control of the speed of rotation of the mixer and the


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- (b) The minimum 28 days and 7 days cube strength shall not be less than that specified below for different graders of concrete.

Concrete grade	7days strength in MPA	28 days strength in MPA
M-10	7	10
M-15	10	15
M-20	13.5	20
M 25	17.5	25

1.05.3 CONCRETE CONSISTENCY

(A) The consistency or slumps shall be determined by the method laid down in ISS or in British standard 1981, — Method of Testing concrete Part-2

(B) The slump of the concrete after it has been deposited but before it is consolidated shall not exceed 75mm. The Independent Engineer reserves the right to require a lesser slump which can be properly consolidated.

(C) During the course of the work the test set out below will be made by the Concessionaire under the direction of the engineer to whom the Concessionaire shall render all the necessary assistance for carrying out these tests.

(D) The amount of water to be added to the concrete mix shall be determined by means of standard slumps tests which shall be carried out

(i) Daily while concrete is being placed whenever samples for test specimen are taken (part of sample obtained for making test specimens shall be used last test was made.

(iii) Wherever in the opinion of the engineer the grading the grading or condition of any of the aggregate has changed since the last test was made.

(iv) The water cement ratio shall be about 0.45 if need be suitable plasticizer shall be used to improve workability of the concrete but water cement ratio shall not be increased to more than 0.45 in order to have improved workability. Use of plasticizer is mandatory in pile foundation.

1.05.4 AGGREGATE GRADING AND PURITY

(a) The grading and purity of the fine and coarse aggregate shall be tested in accordance with IS 383Table III and IS 383 Table II respectively on the instruction of the engineer whenever these materials are delivered to the site or in the opinion of the engineer the grading or conditions of these materials differ from the originally accepted for use in the work.

(b) Samples do concrete discharged from the mixer shall be taken for the preparation of concrete test specimens as described in clause 3.112 of this specification at least twice a week while concretions in progress and in addition whenever the proportions of the mix are changed or the engineer desires to check the quality of the concrete.

(c) The Strength of the concrete sample shall be the average crushing strength at failure of the three specimens test provided that when difference between the strongest and the weakest of any set of three specimens exceeds 20% of the average crushing strength the crushing

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The fine and coarse aggregate shall be measured loose in measuring box generally made of timber / steel. The measuring box shall be such size as to contain the exact amount of sand by weight required for mixing with one bag of cement (50 KG). Under filled cement bags should not be used in work.

1.05.1 PROPORTION OF CONCRETE MIXING

- (a) Controlled concrete shall only be used in work the proportions in which the various ingredients shall be used in the concrete mix for different parts of the work shall be designed in accordance with the strength specified subject to variations ordered by the engineer which shall be adopted without extra cost should tests show such variation to be necessary to produce a dense concrete of the specified strength and workability. The mix proportions shall be determined on the basis of producing concrete having suitable workability, improve ability, durability and required strength without the use of an excess amount of cement.
- (b) A preliminary laboratory test shall be made from trial mix of every class of concrete to be used in the works and the 3, 7 and 28 days permanent works.
- (c) The concrete shall make trial mixes in the presence of the engineer or his representative using the proportion as calculated in accordance with the procedures laid down in DSIR Road note.4 (second Edison) published by HMSO, York House, Kings way, London WC or other standard procedures as in accordance with ISS and approved by the Engineer.
- (d) Samples of each of these trial mixed will be taken by the Engineer to determine the compacting factor and the test cube strength at 3. 7 and 28 days after casting.
- (e) If the trial mix shall fail to attain the strength and workability required the engineer may other further trial mixes to be made until an acceptance mix is obtained.
- (f) The minimum cement dosage and mix proportion for different grades of concrete irrespective of strength explicated shall be as follows:

Grade of concrete	Mix	Minimum Qty. of cement in kg per cum of concrete
M7.5	1:4:8 Mix/As per design mix	As per Government of Orissa Analysis of rate
M-15	1:2:4 Mix/As per design mix	As per Government of Orissa Analysis of rate
M-20	1:1.5:3 Mix/As per design mix	As per Government of Orissa Analysis of rate

1.05.2 CONCRETE QUALITY AND TESTING

- (a) All concrete shall be uniformly dense and sound and shall be free faults, creaks, voids, honeycombs and other imperfections. All materials used in consecution with the concrete mix all equipment and methods used in manufacturing transporting testing placing finishing an curing the concrete and mortar shall be subject to approval by the Engineer.


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The sand shall be completely free from chloride acidic or any other deleterious constituent.

A sample of the sand to be used in the work shall be submitted to the engineer for the prior approval in accordance with clause stated above.

- (f) Fine aggregate shall be stored at the site in such a manner that it is not contaminated by coarse aggregate, earth or other foreign materials.
- (g) The moisture content of the fine aggregate on the site shall be determined daily before concrete mixing is commenced. The amount of water to be added to each batch shall be adjusted on the direction of the engineer to allow for the moisture content of the fine aggregate. This test shall be repeated whenever there is reason to believe that the moisture content of the fine aggregate has changed since the previous test was made.

1.3 COARSE AGGREGATE

- (a) Coarse aggregate may consist of 20mm down grade-crushed stone chips carefully and properly graded shown in the table below. All coarse aggregate shall be screened and washed and shall consist of clear well shaped cubical practices free from splintered or flaky particles soil organic matter or any detritus materials. A representative shall be produced for approval and the materials used in the works shall not be inferior to the approved.
- (b) The grading of coarse aggregate shall be within the following limits and also within the limits of the relative grading in IS 383, table II

Normal size aggregate of	Percentage Passing British standard sieves				
76mm	(7.61)	33mm	19mm	10mm	5mm
33mm	100	95-100	30-70	10-35	0-5
19mm	100	100	95-100	25-55	0-10

Abrasion loss should not exceed 25% for chips

- (c) Coarse aggregate shall be stored at site in such a manner that is not contaminated by fine aggregate, earth or other foreign materials. Adequate precautions shall be taken to prevent segregation of the coarse aggregate while it is being transported and stacked.

1.4 WATER

All water used in the concrete shall be subject to the engineer's approval shall be reasonably clear free of soil. acid, salts and organic substances and of required by the engineer shall be tested by comparison with distilled water comparison shall be made by means of standard cement tests for soundness time or setting and mortar strength. Any indication of soundness change in time of setting of plus or minus 30 minutes or more or decrease of more than 10% in strength from results obtained with mixtures containing distilled water shall be sufficient cause for rejection of the water that is being tested.

1.05 MEASURING AGGREGATE


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- (e) Batches of cement shall be used for the work in the order in which they are delivered to the site.

Notwithstanding any previous acceptance any bag of cement containing materials, which has hardened or otherwise deteriorated shall be rejected for any cause shall be removed from the site immediately.

- (g) Cement, which has been stored at site for more than two months from the date of manufacture, (as printed over the container by manufacturer) shall not be used for the work and removed from the site immediately.
- (h) The Concessionaire shall deliver the samples of cement collected for the work to the Independent Engineer for his approval after necessary tests in a reputed material testing laboratory of the state. After getting the approval from the engineer in charge, the Concessionaire shall use the cement in construction works. In the event of any sample being found to be not in accordance with relevant Indian Standard, the whole consignment from which the samples come shall be rejected and removed from the site immediately notwithstanding any previous acceptance on the strength of the manufacturer's certificate.
- (i) Use of re-bagged cement will not be allowed.

1.2 FINE AGGREGATE

- (a) The fine aggregate shall be sand or any other inert materials having similar characteristics and shall consist of hard, strong uncoated particles free from injurious amounts of organic or other deleterious substances. To obtain such an aggregates, screening or washing or both as may be directed by the Engineer shall be employed. It shall be uniformly graded from fine to coarse with the following limits as least or specification by the Engineer.

(b)

Sieve no.	Percentage Passing by Wt.
10mm	100
4.75mm	90-100
2.36mm	85-100
1.18mm	75-100
600 micron	60-79
300 micron	12-40
150 micron	10

- (c) Fine aggregate from different sources of supply shall not mixed or stored in the same pit and not used alternately in the same class of construction without permission from the Engineer.
- (d) Fine aggregate shall not contain silt or other fine materials exceeding 5% by volume when tested according to the standard method shall neither contain organic material in sufficient quantity to show a darker colour than the standard depth of colour no.3 when tested according to the method in British standard 812, clause 28: —Organic Impurities. The grading of the fine aggregate shall be at least within the limits of grading zones II to III as defined in IS 383 table IV.


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hauling. Any method of blasting which leads to overshooting shall be discontinued. When blasting is done with powder, the fuse cut to the required length shall be inserted into the hole and the powder dropped in. The powder shall be gently tamped with copper rods with rounded ends. The explosive power shall then be covered with tamping material which shall be tamped lightly but firmly.

When blasting is done with dynamite and other high explosives, dynamite cartridges shall be prepared by inserting the square cut end of a fuse into the detonator and finishing it with nippers at the open end, the detonator gently pushed into the primer leaving 1/3rd of the copper tube exposed outside. The paper of the cartridge shall then be closed up and securely bound with wire or twine. The primer shall be housed into the explosive. Bore holes shall be of such size that the cartridge can easily go down. The holes shall be cleared of all debris and explosive inserted. The space of about 200 mm above the charge shall then be gently filled with dry clay, pressed home and the rest of the tamping formed of any convenient material gently packed with a wooden rammer.

At a time not more than 10 such charges will be prepared and fired. The man in charge shall blow a whistle in a recognized manner for cautioning the people. All the people shall then be required to move to safe distances. The charges shall be lighted by the man in charge only. The man in charges shall count the number of explosions. He shall satisfy himself that all the charges have been exploded before allowing the workmen to go back to the work site.

PLAIN AND REINFORCED CONCRETE

1.1 CEMENT

- (a) Cement used in any concrete work shall be Portland slag cement conforming to IS 455 but having crushing strength of 43 Mpa in cement mortar 1:3 on 28 days strength and may be measured by weight or in a standard bag to weight 50 Kg. having a volume of 0.04 cum. It shall have the adhesive and cohesive properties necessary strength and durability. Reference to cement in the following paragraph shall mean Portland slag cement. In case the engineer or his representative directed use of cement like rapid hardening Portland cement as per IS 8041-1990 or any other grade of Portland cement the same shall be used at any stage of the work as directed. Cement of approved (by Independent Engineer) manufacturer is only to be used in the work.
- (b) The cement shall be stored in such a manner as to permit easy access for proper inspection handling and identification of each shipment and in a suitable water tight and well-ventilated building that will protect the cement from dampness. It should be kept on wooden platform of at least 300mm high.
- (c) Only one brand of cement may be used in the contract except by written permission of the Independent Engineer. Different types of cement shall be stored separately and shall not be mixed. Only such cement, manufacturers of which approved by the Independent Engineer shall be used in the work. Works executed by the cement of unapproved manufacturers shall not be accepted.
- (d) The cement shall be protected from moisture and damage in transit and shall be stored on the site in a store provided with a wooden floor raised not less than 300mm above the ground.



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- (a) Spoils from the site shall be disposed off within the areas as directed by the engineer.
- (b) Under no circumstances shall the spoils from the site be sold or given away to any unauthorized party for any consideration.

1.04. EARTH FILING PLINTH

Fill material should be well-graded natural inorganic soil approved by the engineer and meeting the following requirement.

- (a) It shall be free of organic or other weak or compressible materials and be of such nature and character that it can be compacted to the specified density on a reasonable length of time.
- (b) It shall be free of highly plastic clay or all materials subject to decay, decomposition or dissolution and corrosion etc.
- (c) It shall have a maximum dry density of not less than 1590 Kg. Per cubic meters
- (d) It should have liquid limit of 35 to 40% and P.I. value of 5 to 7
- (e) Earth available from trench cutting any also be utilized for filling plinth if it meets the above requirements.
- (f) The work under plinth or any places to make up level with sand having FM not less than 0.8
- (g) Earth shall be filled in plinth in 15cm. Layers and in each shall be compacted to the entire satisfaction of the engineer by vibration roller/power hammer at optimum moisture contents. The Concessionaire shall be very careful regarding foundations walls/columns so that no harm is done during ramming.
- (h) All the cut earth shall be stacked at the sides of the building for approval of the engineer and the filling must be done in presence of the engineer or the authorized representative
- (i) Power hammer/vibration roller must be used for compacting the filling materials.

Blasting Operations

The blasting shall be carried out during fixed hours of the day preferably during the mid day lunch hour or at the close of the work as ordered in writing by the engineer. The hours shall be made known to the people in the vicinity. All the charges shall be prepared by the man in charge only.

Red danger flags shall be displayed prominently in all directions during the blasting operations. The flags shall be planted 200 meters away from the blasting site in all directions. People except those who actually light the fuse, shall be prohibited from entering this area, and the persons including the workman shall be excluded from the flagged area at least 10 minutes before firing, a warning whistle being sounded for the purpose.

The charge holes shall be drilled to required depths and in suitable places. Blasting should be as light as possible consistent with through breakage of the material necessary for economic loading and


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All excavations shall be carried out in regular stages to the levels shown on the drawings, subject only to such modifications as may be ordered by the engineer as extras or omissions under the terms and conditions of the contract. In all excavations the last 15 cm, of the depth shall be carried out and trimmed by manual labour in case the Concessionaire fails to verify the tender drawing before starting excavation this drawing will be the basis for unit calculations.

(b) The length width and depths of all excavations shall be sufficient to provide for the necessary working space shuttering and any other temporary structures required during construction of all excavations shall be measured net and neither allowance shall made for the extra space for working etc. nor for the increase in bulk after excavation.

(c) Any excavation including excavation in rock made in error below the level shown on the drawings or below the levels ordered by the engineer will not be paid for and shall be brought back to the specified levels with mass concrete at the Concessionaire's own expense.

Where indicated the excavation shall be out to slopes the cost of which be included in the rates.

(e) No concrete or screed shall be placed in any excavation without the prior approval of the Engineer.

(f) Mechanical excavation shall not be carried down to within less than 15 cm. above the required formation level the last 15cm will be removed by hand. If required by the engineer this 15 cm. shall not be removed until immediately before concreting takes place.

1.2 REMOVAL OF UNSUITABLE MATERIALS

Where unsuitable materials in encountered at the exposed formation level in excavations or immediately there under it shall be excavated to such levels as the engineer shall direct. The resultant excavations shall be back filled with selected materials deposited and compacted in layers of 15 cm as directed by the engineer. Such excavations shall be measured in accordance with the relevant item in the bill.

1.3 1.03 TEMPORARY DRAINAGE AND TIMBERING

(a) During the whole time that the excavations are open they shall be kept dry. The Concessionaire shall construct temporary drains and bunds to prevent the entry of surface water excavate and maintain all drains bunds and provide and operated all pumps necessary to collect and remove all water, which enters into the excavations.

(b) The Concessionaires shall be solely responsible for the safety and stability of the excavations. He shall at his own cost slope the sides of the excavations or provide timber supports built and secured to the satisfaction of the engineer in order to prevent the occurrence of subsidence or slips.

(c) The Concessionaire shall at his own cost promptly provide and maintain any temporary drainage or other protective measures required by the engineer. Compliance with the engineer's instructions in this respect shall not however relieve him of his sole responsibility for the stability of the excavations on site.

1.03.1 DISPOSAL OF SOIL


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of the site including rainfall run off from surrounding areas, which drain on to his site.

- (b) The Concessionaire shall at his own cost all temporary drains and other works necessary to prevent erosion of earth works and the discharge of site or debris from the site and shall control the drainage from the site so that no flooding or other drainage or disturbance is caused in areas surrounding the work.

WORKMEN

The Concessionaire shall be responsible for restricting his workmen to the site of the works and shall take all necessary precautions to prevent damage arising from nuisances of any kind.

- (a) The Concessionaire shall allow for attendance of the Independent Engineer during visits or inspections of the works shall afford every assistance and facility necessary thereto.
- (b) The Concessionaire shall supply all labour and materials required by the engineer and his staff to carry out their duties of inspection and supervision.
- (c) The Concessionaire shall provide all equipment's and instruments necessary to carry out the work of field test. (d) The Concessionaire shall provide all necessary technicians to carry out the works in testing the materials and samples

INSPECTION AND APPROVAL BY ENGINEER

The Independent Engineer shall have the right to inspect all materials before being built or placed in the works and no materials shall be built in and placed without his prior approval. Such approval will not however relieve the Concessionaire of any of his responsibilities for the sufficiency of the materials or equipment.

COMPLETION

On completion of the works required under this contract the Concessionaire shall dismantle and remove all the temporary structures fill and make good all holes and temporary excavations drains and roads clear away all rubbish and leave the whole of the works in clean and tidy conditions to the satisfaction of the engineer.

SITE WORK AND EXCAVATIONS

1.1 SITE CLEARANCE

- (a) The Concessionaire shall clear the site from grass, bushes, trees and organic soil where required over the area of the works and deposit as directed. All top soil excavated shall be stockpiled and then spread as directed on areas to be turned.
- (b) All stumps and roots of the trees on the site shall be grubbed and disposed off by removal from the site or as otherwise directed by the engineer. The holes made by grubbing shall be filled in with approved materials and compacted by ramming.

1.01.1 EXCAVATION


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- (c) If during excavations the Concessionaire workmen uncover any cable, water or other service pipes he report the matter to the engineer and all excavation which might endanger the service concerned shall be stopped until the engineer's instructions are received as to the manner in which the work shall be continued.
- (d) The cost of deviating or realigning these services shall not be borne by the Concessionaire but he shall provide and maintain at his own cost any temporary works necessary to support or protect the services affected by his excavations to the satisfaction of the authorities concerned.
- (e) The Concessionaire shall attend upon the authorities concerned and afford them all facilities necessary to enable them to undertake any work required to deviate these services or to prevent interruption of such services during the progress of the contract.

TEMPORARY BUILDING

- (a) The Concessionaire shall construct and maintain temporary building to the satisfaction of the engineer and shall comply with the requirements of the local Authorities. Moreover the building shall be protected against weather dust insects noise and other nuisance to the satisfaction of the Engineer.
- (b) The building should be 10|| brickwork C.I. sheet roofing and protective ceiling made of hardboard and timber as per approval of the engineer. The floor finish will be a layer brick patent stone and neat cement finish. Foundation of the building shall be to the approval of the engineer.
- (c) The Concessionaire shall keep the site clean and free from rubbish at all times.

WATER SUPPLY

The Concessionaire shall provide at his own cost pumps storage tanks and or everything necessary for an adequate supply of water from an approved source on the site for concreting and general use.

PERMISSION FROM LOCAL AUTHORITIES

The Concessionaire shall be responsible for obtaining all the necessary permits from the local authorities for any of the work to be carried out under this contract. The Concessionaire shall also be responsible for observing the current immigration regulations and for obtaining work permits for his staff where required.

ELECTRICITY SUPPLY FOR PLANT AND LIGHTING

- (a) The Concessionaire shall assume that no electricity will be available at the site of the work for operation of plant or for lighting and he shall make all necessary arrangements for the provision of the power and light requirements at his own cost.
- (b) The Concessionaire shall store diesel oil, petrol and other inflammable fuel on site only with approval of the engineer and shall take additional precautions against fire.

DRAINAGE

- (a) The Concessionaire shall make proper provision for the drainage of surface water from the whole


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and articles delivered to the site and used in the contract.

SITE AND LAND FOR USE BY CONCESSIONAIRE

The Concessionaire shall be deemed to have visited the site of the works before tendering and to have acquainted himself therewith as to the position the nature of the soils and ground water conditions existing ground levels, access, storage and work areas and any other contingency liable to effect this tender. No claim for extra payment in this connection will be entertained.

- b) The Concessionaire shall ensure that all his plant, materials, temporary storage, office etc. are within the area allocated to him by the Engineer.
- c) If it should be necessary to utilize land outside this area the Concessionaire shall be responsible for any rent, hire or compensation incurred thereby and shall indemnify the owner against all such claims.

PUBLIC AND PRIVATE ROADS

- (a) The Concessionaire shall provide at his own expense for any temporary access he may require from the existing road to the work and for the adjacent storage and working areas.
- (b) The Concessionaire shall make his own arrangement for the use of private roads or for way leave across private land and shall indemnify the owner against any claims arising from his use of these access roads.
- (c) The Concessionaire shall ensure that no unnecessary inconvenience is caused to the public or the users of any roads during the progress of the works.
- (d) The Concessionaire shall arrange for the conveyance of material plant etc. so as to cause a minimum of damage to existing roads. The Concessionaire shall be responsible for any damage caused by his lorries or workmen to any existing roads culverts etc. from whatsoever original conditions to the satisfaction of the Engineer or alternatively shall bear the cost such maintenance and restoration as a deduction from money due or to become due to the Concessionaire under this contract.

WATCHING AND LIGHTING

The Concessionaire shall provide and maintain all notices, fencing by C.I. sheet or other approved means watching and lighting necessary to ensure security of the works the materials and tools stored on site and to protect from injury all persons who have access to the site.

BOUNDARY STONES AND EXISTING UNDERGROUND SERVICES.

- (a) The Concessionaire's attention is specially drawn to the following responsibilities.
- (b) Before commencing any excavations for the purpose of carrying out work under this agreement, the Concessionaire shall accompany the Independent Engineer on a site inspection in order to consider any circumstances which may indicate the presence of boundary stones survey works underground cables water or other services pipes at or in the vicinity of such excavations in such manner and sequence as the Engineer directs.


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GENERAL SPECIFICATION & TECHNICAL SPECIFICATION OF CIVIL WORKS SCOPE OF WORK

- (a) The Concessionaire shall provide at his own risk and cost all labour, materials, tool, plant and everything else necessary for the construction of work as described above and on drawings in accordance with the terms of the contract documents comprising the conditions of contract, the form of tender, acceptance of tender, the specifications, the schedule of items, drawings as per attached list and other explanatory specifications and drawings which may be issued by the Engineer from time to time, or drawings supplied by the Concessionaire and approved by the Engineer.
- (b) The Concessionaire shall allow for any of the provisions of the contract documents incurring additional cost in his rates in the appropriate bills, no claim for extra in this connection will be entertained.

MATERIALS AND WORKMANSHIP

- (a) All materials and workmanship used in this contract shall be new and shall conform to the requirements of the relevant current Indian and/or British standard where applicable.

The Concessionaire shall appoint assistants at the site who will be technically qualified personnel, possessing sufficient knowledge to conduct the work satisfactorily and carry out Engineer's instructions. If any representative is found to be unqualified or fails to carry out work properly or is insubordinate, the Concessionaire will replace him at the instruction of the Engineer.

- (b) The Concessionaire shall at his own cost dismantle, remove and reconstruct part of the work and remove and replace any materials or plants which fail to comply with the provisions of this contract and terms of this specification whether explicitly stated or implied.

MECHANICAL PLANT

The type and size of all mechanical plant shall be subject to the approval of the Engineer. If in the opinion of the engineer any plant is suitable for use on the works the use of such plant shall be suspended and the plant shall be forthwith removed from the site all at the Concessionaire's cost.

SAMPLES OF MATERIALS

- (a) Within seven (7) days of receipt of work order for each location the Concessionaire shall deliver the following samples to the engineer for his approval after necessary tests in a reputed material testing laboratory of the state, approved by the engineer. All costs involved in testing of materials including transportation to and from place of testing is to be borne by the Concessionaire.

(1) 50 Kg. Coarse aggregate

(2) 25 Kg. Of fine aggregate

- (b) The samples submitted to the engineer for his approval shall be representative of the quality and type of material which the Concessionaire proposes to use in this work samples approved by the Engineer will be retained by him and shall be used as standard for comparison of the materials


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- | | | | |
|-----|---------------------------------------|---|---|
| 7) | Binding Wire | : | IS: 280/1978 (galvanized minimum 1mm.) |
| 8) | Rain Water Pipe | : | IS: 2527/1984 |
| 9) | Construction Joint | : | IS: 3414/1968 |
| 10) | Steel Window Frame | : | IS: 1038/1983 |
| 11) | Steel Door Frame | : | IS: 4351/ 1976 |
| 12) | Fitting and fixtures for joinery work | : | Conforming to IS: 7452/82 strictly conform to IS specification and as per direction of Engineer -in-charge. |

BUREAU OF INDIAN STANDARDS (BIS) CODE REFERENCE

- 1) Concrete shall be with conformity to IS: 456/2000.
- 2) Foundation shall be with conformity to IS: 1080/1995.
- 3) Stone masonry (R.R.) shall be with conformity to IS: 1597/1992 (Part-I)
- 4) Brick masonry shall be with conformity to IS: 2212/1991.
- 5) Cement plastering shall be with conformity to IS: 1661/1972
- 6) Mortar shall be with conformity to IS:2250/1981.
- 7) White washing and color washing shall be with conformity to IS: 6278/1971.
- 8) Cement Concrete Flooring shall be with conformity to IS: 2571/1970.
- 9) Antitermite treatment shall be with conformity to IS: 6313/1981 (Part - I & II).
- 10) Painting to all surface shall be with conformity to IS: 2395/1994 (Part - I & II).
- 11) D.P.C. shall be with conformity to IS:3067/1988.
- 12) Tarfelt treatment shall be with conformity to IS: 1346/1991.
- 13) Mosaic flooring shall be with conformity to IS:2114/1984.
- 14) Steel painting shall be with conformity to IS:1477/1971 (Part - I & II).

Note: The latest version of the above BIS codes shall be followed.


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alignment and level of the steel work shall be + 3 mm on any part of the structure. The structure shall not be out of plumb by more than 10 mm. These tolerances shall apply to all parts of the structure.

iv) Painting:

All the steel works shall be painted.

Painting operation and paint schedules shall be as per IS:1477 (part- II).

All steel structural other than in chemical house shall receive one coat of red oxide zinc chromate primer conforming to IS:2239 after fabrication and one coat of the same primer after erection. Steel structures in chemical house shall receive acid / alkali resistant epoxy based primer.

Priming coat shall be followed by two coats of painting by approved quality colour shade paints. Steel structure in chemical house shall be painted with acid/alkali resistant epoxy-based paint.

Before starting actual painting operation, the members to be painted shall be thoroughly cleaned of all dirt, grease, rust, scales etc.

22. Walkway work:

i) The walkway shall be paved with Chequered tile and of 1 mtr wide and constructed with the following specification.

ii) The base shall consist of 150mm thick sand layer & above 100mm thick PCC layer, paved with Chequered tile of approved design uniformly jointed by 1:4 mixed cement mortar.

23. Disposal of Surplus Earth & Debris after construction:

The surplus left over earth and debris after completion of erection work and leveling the site shall be transported and dumped in areas as directed by the Independent Engineer without any extra claim.

TECHNICAL SPECIFICATION OF CIVIL PORTION OF WORK

Materials of following specification are to be used in the work. The Concessionaire are expected to possess and be well conversant with the following I.S. Standard and Code Practice.

- | | | | |
|----|-----------|---|--|
| 1) | Cement | : | IS: 269/1989 & 455/1989 |
| 2) | Steel | : | I.S: 432/1982 (Part-1&2) and 1786/1985 |
| 3) | Vibrator | : | I.S: 7246/1974 |
| 4) | Aggregate | : | I.S: 383/1970 - IS: 515/1959 |

- | | | | |
|----|---------------------------|---|--|
| 5) | Water for mixing & curing | : | Shall be clean, free from injurious amount of oil, salt, acid, vegetable materials and other substances harmful to concrete conforming to IS: 456/2000 and IS: 3023/1965 |
| 6) | Sand/ fine aggregate | : | IS : 2116/1980 |


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All the embedment and anchorages shall be provided by the Concessionaire and shall be rigidly fastened. Anchor bolts and other anchorages or inserts shall be set to template and /or firmly secured in position.

19. Grouting :

Nominal minimum strength of grouting concrete shall be 40 N/mm² or such other values as may be shown on the approved drawings. The nominal maximum size of aggregate for grouting concrete shall be 10 mm.

In case Dry concrete or mortar is used, slump shall not exceed 6 mm. If, Wet expanding concrete or mortar is used, slump shall be at least **125 mm** or more but not exceeding 225 mm. An expanding grouting admixture shall be of approved type and in accordance with the manufacturer's instruction.

20. Doors/Window/Ventilators/Grills:

1. There shall be adequate nos. of doors & windows in all the buildings/structures.
2. All windows shall be with aluminium frame & 5 mm thick reinforced glass panels provided with all related aluminium hardware fittings. The shutters shall be of sliding type in two folds.
3. All doors except for those specified separately shall be with aluminium frame & 12mm thick pre laminated plywood panels provided with all related aluminium hardware fittings.
4. The panels of all external doors, toilets, etc. shall be of waterproof pre-laminated plywood shutter of minimum 12 mm thickness. For chemical house, the panels should be of chemical resistant materials.

21. Steel & Structural Fabrication:

i) Method and Material for construction:

Steel structures shall generally be of welded construction. Structural steel shall conform to IS:226 or IS:2062 as required from design considerations. In welded construction plates up-to and including 20 mm thickness and rolled section shall be of grade St.42 conforming to IS:226. Plates above 20 mm thickness, where welding is employed shall be of steel grade St.42 conforming to IS:2062. Electrodes, bolts, nuts, washers etc. shall conform to relevant Indian Standards. Only tested materials shall be used and all test certificates are to be submitted by the Concessionaire, unless permission of the Purchaser is granted for use of untested materials for specifically mentioned structures.

i) Fabrication:

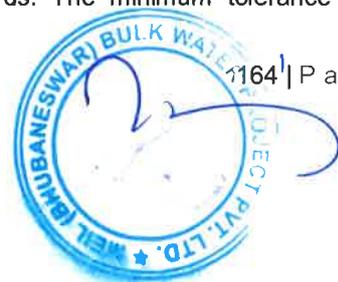
The fabrication of structures shall be carried out as per relevant India Standards and also according to latest practices. Steel structures shall be fabricated to suit transport requirement and minimum site work. All steel structural works are shall be subject to inspection by the Independent Engineer before erection and painting.

All permissible tolerance in workmanship shall be as per IS:7215.

iii) Erection:

The erection shall be carried out as per relevant Indian Standards. The minimum tolerance for


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Motor starting:-

The fault level calculation of suggested electrical system has been carried out; the fault level at 132kW motor terminal is approximately working out to be 5.9 MVA. If we go for a star-delta starter the starting MVA is working out to be 0.32 and voltage dip at the time of starting is working out to be 9.75% which is within 15%, hence Star delta starter starting option is considered.

Capacitor Banks and APFCR Panels

For RWPS PMCC panel at Bus number-1 a capacitor bank of 64 KVAR shall be provided and Bus number-2 a capacitor bank of 64 KVAR shall be provided The capacitor banks shall be provided with Automatic Power Factor Correction Relay with 16 steps and power factor at bus shall be maintained to a level of 0.97.

RWPS MCC

RWPS Auxiliary MCC shall be located at raw water pumping station with one incomer and supply power for dewatering pump, crane, and exhaust loads etc.

8.2.4 Proposed power supply arrangement at Gurujanga pumping station (Khorda)

The power for proposed Pumping station is planned by taking tap-off from nearest existing 11KV overhead line of CESU (Central electricity supply utility of Orissa). The electrical system of Gurujanga pumping station shall be as per single line diagram.

Incoming Four pole structure at pumping station:

The 11KV overhead line is terminating to a four pole structure near Gurjanga pumping station with lightning arrestor, Isolator and C.T- P.T metering set with H.T metering box kept in weather proof enclosure box kept on suitable support. Outgoing feeder consisting of isolator and Dropout fuse is going to 2 Nos 100KVA 11/0.433KV Transformers

Transformers:

The total working load of Gurjanga pumping station with auxiliary load shall be 98.9 kVA, considering 20% contingency. It is being suggested to provide two number of transformer of rating 100kVA, 11kV/0.433kV.

Under normal working condition both the main transformers shall be in charged conditions. In case of failure of any single transformer the other transformer is designed to take pumping load and Auxiliary load. The transformers will be located near pumping station.

Main LV switchgear:

A Main LV Switchgear panel of 415V is suggested at Gurujanga Pumping station to cater power supply for motors and auxiliary loads. The incomers of Main switchgear panel are connected to the secondary of the transformer suitable sized 415V XLPE cable. The outgoing of the main switchgear panel is as follows

- ▶ 22KW Motor


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For CWPS Auxiliary Load MCC panel at Bus number-1 a capacitor bank of 72 KVAR shall be provided and Bus number-2 a capacitor bank of 72 KVAR shall be provided this capacitor bank shall take care of Auxiliary loads of CWPS and WTP. The capacitor banks shall be provided with Automatic Power Factor Correction Relay with 16 steps and power factor at bus shall be maintained to a level of 0.97.

8.2.3 Proposed power supply arrangement for Raw water pumping station:

The power source for proposed RWPS is planned by taking tap-off of 33KV overhead line from existing two pole structures at raw water pumping station.

Incoming four Pole Structure:

The incoming 33kV overhead line is terminated on an outdoor four pole structure consisting of Lightning arrestor, Isolator and C.T- P.T metering set with H.T metering box kept in weather proof enclosure box kept on suitable support. The outgoing of this four structure are connecting to 2 Nos 400KVA 33/0.433KV RWPS transformers.

RWPS Transformer:

The total working load at the water works shall be as follows:

Raw Water Pumping station (Main Pumping Load): 289kVA (Consisting of 132kW motors (2W+1S).

Raw water Pumping station Auxiliary load is working out to be 32kVA.

The total working load of raw water pumping station shall be 384kVA, considering 20% contingency it is being suggested to provide two numbers of main transformers of rating 400KVA, 33kV/0.433kV at raw water pumping station. These transformers are provided with 100% redundancy. In case of failure of any single transformer the other transformer is designed to take main pumping loads of RWPS. The transformers will be located near raw water pumping station.

RWPS PMCC

A RWPS PMCC Panel is suggested in raw water pumping station to cater power supply for 132kW motors and auxiliary load. The panel consists of 2nos of 415V, 630A ACB as incomers and Bus coupler of same rating.

The incomers are connected to the secondary of the RWPS transformer suitable sized 415V XLPE cable. The outgoing of RWPS PMCC as follows:

- ▶ RWPS Auxiliary MCC
- ▶ 132KW motor
- ▶ LDB

Under normal condition bus coupler shall be kept in open condition and incomers will be feeding bus number 1 and 2 separately. In case of a failure of any transformer, corresponding incomer is open and bus coupler is closed so that total clear water pumping load will be fed by single healthy transformer.


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4) Floor

5) Each lift of the wall

6) Roof slab.

7) Any other portion of the structure as required by the Independent Engineer. In the event of any deviation from the desired strength, the Concessionaire shall dismantle the defective parts of the construction and make good the same at his own cost. All the building materials including steel rods shall be tested in recognized testing laboratory to be selected by Independent Engineer at the cost of the Concessionaire. Any material found defective/not to specification shall be replaced forth with by the Concessionaire without any extra financial implication.

15.The steel rod shall be from **SAIL/TISCO/ VIJAG**. The testing for water tightness of the structures shall be conducted as per **IS: 3370** and the results shall have to satisfy the relevant provisions of the above code. All reinforcement shall be checked on the basis of approved design and recorded prior to concreting by the Independent Engineer and the Concessionaire shall countersign this. Entire concreting work shall be done in the presence of an officer not below the rank of Assistant Engineer, The Concessionaire shall, therefore, give notice of at least two days to the Independent Engineer so that the works can be checked by him or his authorised representative.

16. Form Work

i) The form work shall be of steel plates of steel frame, sound and seasoned timber or of any approved materials, having sufficient strength to hold the concrete and withstand ramming and vibrations. If timber shuttering is used it shall be constructed in such a way that none of the concrete grout leaks away and shall be such as to leave a clean smooth surface not requiring further plastering. The surface of all forms in contact with concrete shall be clean, rigid, tight and smooth. Before a piece of work on formwork is concreted, the formwork shall be cleaned of all mortar, shavings, concrete from previous work and all other dirt. It shall then be covered with thin coat of mould oil approved by the Independent Engineer.

ii) The joints in the form work shall be arranged in a regular pattern.

iii) Shuttering shall be provided to concrete faces where the slope exceeds 1: 2½.

iv) The stripping time of all form work shall be in accordance with recommendations contained in **IS:456**.

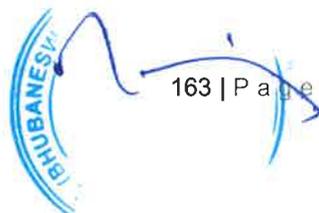
Concrete face work:

- The exposed faces of concrete shall be true to line have smooth surface and without roughness occurring between successive sections of shuttering. In removal of forms, minor uneven surface defects shall be picked out to such a depth, refilled and properly replaced with such class concrete as necessary. All pin holes shall be plugged.

- The surface of non shuttered faces of concrete shall be finished with a wooden flat to give a finish equal to that of the rubbed down shuttered faces. The top faces of slabs not intended to be surfaced shall be leveled and floated to a smooth finish.

18. Embedment and Anchorages:


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All External surfaces shall be painted with two coats of Weather proof acrylic emulsion paint of Asian Paints (Apex) / Shalimar Paints (Xtra) / Berger Paint (Weather Coat) make and of approved colour over a coat of primer. All internal surfaces of all the buildings/Room shall be given with two coats of distemper paint over a coat of primer. Ceiling of all round of building shall be painted with two coats of white distemper over a coat of primer.

5. Flooring:

Level of flooring shall be 0.75m above the virgin soil at respective structures. There shall be sand filling between the virgin soil & the floor. Different types of floorings to be adopted for different units as has been discussed under the respective structures in preceding paragraphs. AS flooring(cement concrete flooring) shall be of 25mm thick of 1:2:4 CC with punning over 100 mm CC 1:3:6 base in case of ground floors/directly on roof in case of first floor.

6. The Concessionaire shall provide necessary sun shades/Chajja etc. wherever necessary.
7. The Concessionaire shall provide ramp with gentle slope to the buildings wherever required.
8. Plinth protection for a width of 1.00 m around all the buildings shall be provided. It shall be C.C. checkered tile over 100 mm PCC.
9. All roofs shall be provided with grading plaster of 25 mm thick in 1:4 cement plasters with required grading for drainage. There shall be drainage pipes of 110 mm PVC pipes with all fixtures and specials extending up to the surface drain for disposal of rainwater. The number of pipes shall be as per the roof drainage plan to be approved by the Independent Engineer. A DPC course in 1:2:4 concrete shall be provided at plinth level for a thickness of 40mm for all buildings.
10. There shall be parapet walls of 250 mm brick masonry up to 600 mm height above the roof of all buildings.
11. Expansion joints shall be provided in exposed pipelines as per standard practice & in conformity with relevant IS Specification.
12. Machine mix shall be used in concrete works of the structures with nominal mix. Vibrator of appropriate type shall be used for compaction of the concrete.
13. The Concessionaire shall give at his cost concrete cubes to the Independent Engineer made from samples of fresh concrete taken as per IS: 1199 cured for 7 days and 28 days for testing by the Independent Engineer at the cost of the Concessionaire. Besides, the Concessionaire shall also carry out such tests as required by the Independent Engineer at regular intervals at his own cost.
14. The sample shall be taken from the concrete prepared for use in the following component of the structure:
 - 1) Foundation.
 - 2) Each lift of supporting structure in case of elevated reservoir
 - 3) Floor beam


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direction of Independent Engineer.

14. Foundation of all structure including supply of materials shall be designed depending on Ground water table / subsoil condition. In no case the Depth of foundation below virgin soil shall be less than 1.0 mtr. At respective places.
15. All equipments, accessories, auxiliaries, piping, electrical instruments, installations, construction, buildings etc. including all mechanical, electrical & civil engineering works covered under the scope of work of Concessionaire shall be subject to inspection & testing by the Independent Engineer for its material, quality, workmanship and the performance. The Concessionaire shall arrange and carryout all such inspection, testing, trial run etc. and demonstrate in presence of the Independent Engineer.
16. The cost of such inspection, testing, trial run, demonstration etc. shall be borne by the Concessionaire. All responsibility of such inspection, testing, trial run, demonstration etc. and any damage/loss that may cause directly or indirectly shall exclusively rest with the Concessionaire.
17. Such inspection, testing, trial run, demonstration etc. shall, however, not relieve the Concessionaire of their liability for replacing / rectifying any defects, which may subsequently appear or be detected during erection and guarantee period.
18. All equipments, sub-assembly and components, auxiliaries and accessories shall be tested at manufacturer's cost in accordance with relevant Indian Standards/International Standards. The Concessionaire shall furnish all test certificates etc. related to the quality of all the materials to the Independent Engineer along with the delivery of the materials at site without
19. Which no payment shall be released. However, such test certificates, quality assurance certificate shall not relieve the Concessionaire of it's obligation to replace forth with any instrument/materials found defective during tests at works / trial running period/guarantee period.
20. Testing for performance of equipments shall be carried out and be checked with the approved parameters and performance characteristic curves for the purpose of acceptance.

Building Work:

1. Brick work:

Bricks should conform to IS 1077. First class KB Bricks in cement mortar (1:6) in foundation and plinth. All non-load bearing outer walls shall be minimum 250 mm thick & inside partition walls shall be minimum 125 mm thick. First class KB bricks in cement mortar (1:6) in superstructure. The thickness of plaster shall not be more than 12 mm size for outside face & 16 mm in the inside face.

2. Plastering:

All brick works with 12 mm / 16 mm thick cement mortar in 1:6 & all RCC exposed surfaces & roof ceilings except for the Water retaining structures shall be with 12mm thick cement mortar in 1:4 unless specifically mentioned.

3. PCC:

Minimum 100mm thick **M-10** under RCC foundation and flooring.

4. Painting / Colouring over Plastering:


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ANNEX-I OF SCHEDULE-C: STANDARDS AND SPECIFICATIONS

Intake Specification

S No	Item Description	Specification
1	Filling Plumb Concrete	M-15 (1:2:4) using 20mm downgraded metal
2	PCC	M-10 (1:3:6) using 40mm downgraded metal
3	RCC	M-25 design mix
4	Brick Work	1:6 mortar jointing using 75 Kg/cm ² strength KB brick
5	Plastering - External	1:6 mortar of 12 mm thick
6	Plastering – Internal	1:6 mortar of 16 mm thk.e
7	Painting – External	2 coat of weather coat over a coat of primer
8	Painting – Internal	2 coats of distemper over a coat of primer
9	Flooring – Platform	2.5 cm AS flooring (1:2:4) using 12mm metal
10	Flooring Toilet	Glazed tiles of approved shade
11	Rain water pipe	75 mm dia PVC pipe having 4 Kg/cm ²
12	Doors & Windows	Aluminium OEL anodised frame with 6mm tinted glass and 12mm pre laminated board
13	Hand Railings	50mm dia posts and 32mm hand tailing of 2 mm thk. SS 304 pipe
14	Chequered plate cover	6mm thk. Chequered plate
15	Rungs	500 mm x 300mm of C.I. make
16	Screed Concrete	40 mm thick with 1:2:4 using 12 mm metal

General Specification:

1. Cement shall not be less than O.P.C.-43 grade of reputed manufactures confirming to relevant IS.
2. Reinforcement to confirm Fe-415 and IS specification (SAIL/TATA/Vizag).
3. As & when required, the steel/cement & other building materials will be tested by Independent Engineer at the cost of Concessionaire to ensure proper quality as per IS specification.
4. Testing of water tightness shall be conducted as per relevant IS Codes.
5. Machine mix shall be used in concrete work for all structure. Design mix of concrete will be preferred. Vibrator of appropriate type shall be used for compaction of concrete.
6. All the structures are to be designed as permanent type and shall have aesthetic elevation.
7. Form work shall be of steel plates and frame, sound seasoned timber or any approved materials as decided by Independent Engineer to be used for the centring and shuttering of the structures.
8. Painting of all steel / MS structure to be done as per approved quality of enamel paint over a coat of primer.
9. All electrical work / earthings including wiring of pump house, filter house, chemical house, chlorine chamber with store, office building & laboratory etc., to be done as per relevant IS specification and Indian Electrical Rules. Single phase wiring shall be done for lighting purpose & three phase wiring shall be done for running pump motors, W.T.P. & wherever necessary.
10. All the valves are to conform to relevant IS specification and of reputed make.
11. The surplus earth and debris should be lifted after completion of work and proper levelling of site as directed by Independent Engineer without any extra claim.
12. Pumps and motors to be of reputed and approved make.
13. All the work including supply of materials to be executed as per relevant IS specification and

(Handwritten signature)

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O/o the E.L.C. P.H. (Urban)



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SCHEDULE – C: SPECIFICATIONS AND STANDARDS

(See Clause 2)

The Concessionaire shall comply with the Specifications and Standards as set forth in Annex-I and Annex-II of this Schedule-C for construction of the Project Water Supply System.



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	Distribution to high elevation zone				m3/hr, 25m (2W), 310 m3/hr, 25m (1W+1S)
21	BPS (1 No.) for Distribution to high elevation zone	Kaju plantation	1.7	2.4	1.75 MLD: 75 m3/hr, 33m (2W), 150 m3/hr, 33m (1W+1S)



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				CM linings & 30 mm Guniting 12 km (250-800mm, DI)	
8	Flow Meters	Intake, CWPS, MBR, inlet, MBR Outlet, IIT Tapping, NISER Tapping, Khorda & Jatni Tapping	8 nos	-	-
Khorda Distribution System					
9	UGR (1 No.)	Jamadei	1.4	1.75 ML	-
10	GSR (1 No.)	Gurujang	1.1	1.25 ML	-
11	UGR (1 No.)	PHED Stores	1.2	1.25 ML	-
12	BPS (1 No.) for Distribution & Transmission to PHED Stores	Jemadei	2.21 5	3+6.9 MLD Common pumping station	2.21 MLD: 100 m ³ /hr, 23m (2W), 200 m ³ /hr, 23m (1W+1S) 5MLD: 270 m ³ /hr, 25m (1W+1S)
e	BPS (1 No.) for Distribution	Gurujang	2.6	3.6 MLD	2.6 MLD: 115 m ³ /hr, 23m (2W), 225 m ³ /hr, 23m (1W+1S)
14	BPS (1 No.) for Distribution	PHED Stores	5	-	5 MLD: 220 m ³ /hr, 25m (2W), 435 m ³ /hr, 27m (1W+1S)
Jatni Distribution System					
15	GSR (1 No.)	Bachchra Mundia	2.12	2.25 ML	-
16	Sump (1 No.)	PHED	-	0.25 ML	-
17	GSR (1 No.)	PHED	0.28	0.75 ML	-
18	GSR (1 No.)	Kaju plantation	0.73	1 ML	-
19	BPS (1 No.) for Transmission to PHED GSR	PHED	4.8	6.9 MLD	4.8 MLD: 225 m ³ /hr, 44m (1W+1S)
20	BPS (1 No.) for	PHED	3.5	4.8	3.47 MLD: 155

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ii) IIT Tapping

Cumulative flow readings will be available on the flowmeter readout unit. 230 Volts A.C. power supply alongwith UPS needs to be provided for continuous operation of the flowmeters. The flowmeter readout unit and the UPS need to be enclosed in a sheet metal cubicle which will be installed adjacent to the flowmeter. The enclosure needs to be well protected, since it will be installed in public area and will be prone to tampering. Pressure gauges will be provided in the cubicles. The tapping points will be provided at the same locations as the flowmeters and will be connected to the pressure gauges using piping.

The list of major components and required capacity for intermediate phase 2026 is provided in the table below:

S No.	Component	Location	Capacity (MLD)	Proposed Works	
			2026	Civil	Mechanical
Intake & Pump House					
1	Intake & RWPS	Munduli	52	70 MLD	52 MLD: 1380 m ³ /hr, 27 m (2W+1S)
Raw Water Transmission Main					
2	RWTM	Munduli	52	70 MLD (1000mm MS Pipe, 1km, 7mm shell tk, 10 internal CM linings & 30 mm Guniting	-
Water Treatment Plant & Pumping Station					
3	WTP	Munduli	52	52 MLD	52
4	CWPS	Munduli	48	66 MLD	50 MLD: 1350 m ³ /hr, 59m (2W+1S)
Clear Water Pumping Main					
5	Clear Water Pumping Main	Munduli to Medhasala	48	66 MLD (22.5 km, 1000mm, MS, 7mm shell tk, 10 internal CM linings & 30 mm Guniting	-
6	MBR	Medhasala	8	11 ML	-
7	Gravity Transmission Main	Medhasala to tappings	48	66 MLD 18.8km (900-1200mm, MS), Shell tk-8-6 mm, 10 internal	-


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Pre chlorination is proposed to be carried out in the WTP inlet. Post chlorination will be carried out in the filtered water conduit. Chlorination using vacuum chlorinators shall be provided.

9.4 INSTRUMENTATION AND CONTROLS AT CLEAR WATER PUMPING STATION

For the clear water pumping station, the following measuring instruments are proposed.

- ▶ Water level in sump
- ▶ Flow in pumping station discharge line
- ▶ Pressure transmitter on pumping station discharge line
- ▶ Pressure gauges on pump suction and discharge
- ▶ Pressure switches for pump discharge

The readings will be available on digital indicators on the local control panel.

An alarms annunciator will be installed for cautioning the operator for failure of an operating pump or for low or high level in the sump. The pump will automatically stop when the water level is too low or the pump discharge pressure is abnormally low / high.

9.5 INSTRUMENTATION AT MASTER BALANCING RESERVOIR (MBR)

It is proposed to provide the following instruments for MBR –

- ▶ Water level monitoring using level meter
- ▶ Flowmeter at inlet of MBR
- ▶ Flowmeter on outlet of MBR
- ▶ Level switches for generating alarms for low and high levels.

The digital indicating instruments for the above will be provided on the local control panel of MBR.

9.6 INSTRUMENTATION AND CONTROLS AT PUMPING STATIONS IN DISTRIBUTION SYSTEM

The following pumping stations in the distribution system will be included for monitoring purpose

- a) UGR and Pumping station at Jemadai
- b) UGR and Pumping station at PHED, Khorda (existing)
- c) UGR and Pumping station at Kaju Plantation
- d) Pumping station at PHED, Jatni

The following instruments will be included at each of the above UGRs & pumping stations–

- i) Water Level in UGR using level meter
- ii) Pressure measurement in the pumping station discharge line

9.7 FLOW METERS AT TAPPING POINTS

Electromagnetic flowmeters will be provided at the following tapping points –

- i) NISER


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- ▶ Cascade type Aerators
- ▶ Coagulation and Flocculation
- ▶ Flash Mixers
- ▶ Clariflocculator
- ▶ Gravity Filtration
- ▶ Pre and post Chlorination

The data from the equipment panels will be connected to local control room for monitoring. A live user friendly mimic will be installed in the control room to monitor the operations of various equipment of WTP.

9.3.1 Cascade type Aerators and Inlet Channel

The proposed aeration system being Cascade type of Aerator, no mechanical equipment is envisaged.

The raw water inlet from cascade aerator will be through Parshall flume with a flowmeter. Also turbidity measuring instrument will be provided at the inlet channel. The flow and turbidity readings will be available on the central control panel of WTP. These readings will be useful for deciding dosing flow rates for coagulation and flocculation.

9.3.2 Coagulation and Flocculation

The coagulation and flocculation is proposed to be carried out with Alum, Lime and Polyelectrolyte as a coagulant. Rotameters will be installed for measuring the dosing flow rates for local indication. Level switches will be provided for the feeding tanks of the Alum, Lime and Polyelectrolyte. Alarm will be generated when the level in the feeding tanks becomes low.

9.3.3 Clariflocculator

It is proposed to have Two (2) nos centrally driven type clariflocculators. A local control panel will be provided near each clariflocculator. The signals for status of motors which will be available in the local panels will be connected to the central control panel of the WTP.

9.3.4 Gravity Filtration

The clarified water from clariflocculators will be filtered in the filtration plant which will contain six (6) declining rate filters. Each filter has an inlet isolation gate and outlet sluice valve. The inlet gate and outlet valve will be provided with electrical actuators.

It is proposed to provide a differential pressure (D.P.) switch across the filter for generating alarm when the filter is clogged and is due for backwash. A control console will be provided near each filter bed. The operations of filters - viz. taking filter into operation, starting of backwash, stopping a filter etc. will be carried out by the operator from the control console. Provision will be made in the control console for automation for sequence of backwash operations. The signals regarding the status of filters will be connected to the central control panel of WTP.

9.3.5 Pre and post Chlorination


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9.1 INSTRUMENTATION SYSTEM

Measuring instruments are proposed to be installed at the water works viz. intake pumping station, Water Treatment Plant and Distribution Pumping stations for monitoring the operations.

The instruments proposed to be installed include measuring instruments for level of reservoirs, flowmeters for measuring flow in the pumping station discharge and pressures instruments for the pipelines. The instruments will be electronic and will generate electrical signals which will be connected to local instrument panels for monitoring. The readings generated by the measuring instruments installed on the reservoirs / pipelines will be centrally available on the instrument control panel for the plant operators. Alarms will be generated for abnormal conditions which may arise in the operation of water works equipment.

9.1.1 Local Control Panels

Local Control Panels are proposed at the following locations in the comprehensive water supply system:

- a) Intake Pumping Station
- b) Water Treatment Plant & Clear water pumping station
- c) Master Balancing Reservoir at Mendasala
- d) UGR at Jemadai
- e) UGR and Pumping station at PHED, Khorda (existing)
- f) UGR and Pumping station at Kaju Plantation
- g) UGR and Pumping station at PHED, Jatni

The local control panels will contain display instruments for level, pressure and flow. At the WTP, the local control panel will contain display instruments for water quality monitoring. An alarm annunciator will be installed in the local control panel for cautioning the operator for any abnormal situation.

9.2 INSTRUMENTATION AT INTAKE PUMPING STATION

For the intake pumping station at Mundali Barrage, the following measuring instruments are proposed –

- Water level in sump
- Level switch in intake sump for generating alarm / trip signals
- Pressure gauges on pump suction and discharge
- Flow in pumping station discharge line
- Pressure Transmitter in pumping station discharge line
- Pressure switches on pump discharge to generate alarms

An alarms annunciator will be installed for cautioning the operator for failure of an operating pump or for low level at intake.

9.3 INSTRUMENTATION AT WATER TREATMENT PLANT

Equipment control panels are proposed for each of the following equipment / subsystems in the water treatment plant -


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All power cables shall be sized based on continuous current capacity, permissible voltage drop and short circuit current rating. The voltage drop will be limited to 2.5 % at rated equipment current rating. The other rating factors for variation in ground temperature, variation in ambient air temperature, grouping of cables, depth of laying, etc. shall also be considered for cable sizing.

All LV power cables up to 6 sq mm shall have stranded copper conductors and above that, it shall be stranded aluminium conductor. Power cables shall be XLPE / PVC insulated, extruded inner and outer sheaths and galvanized flat/wire armouring.

The main L.V cable from transformer secondary to the incomer of main L.V switchboard which is laid directly in ground shall be XLPE insulated.

The outgoing cables from main L.V switchboards and Sub distribution boards which are laid on cable trays and trenches shall be PVC insulated.

Control cables will be with stranded copper conductor, PVC insulation, extruded inner and outer sheaths and galvanised flat/wire armouring

The illumination levels for various areas shall be considered as follows:

<u>Area</u>	<u>Illumination level (Lux)</u>
Pump House	200
Office Room	300
Switchboard Room	200
Cable Galleries	150
All other indoor areas	150
Outdoor plant area and Road	10 – 20

The earthing shall be carried out as per IS: 3043. The material of earthing conductor will be GI. The values of fault level for designing the electrical system shall be based on transformer capacity, its impedance and system fault level. Fault clearing time for sizing of earth conductor will be taken as one second.

While sizing the buried earth conductor, a corrosion allowance of at least 20 % shall be taken. Plant earthing system shall be designed such that the overall earthing grid resistance is maximum one ohm.

Main earthing conductors outside and inside the building shall be planned in such a manner that various equipment are connected to earthing system by two connections in a reliable manner.

RCCBs shall be provided at the incomer of Lighting panels.

Compliance to Standards:

The electrical safety and clearances will be maintained as per Indian Electricity Rules and CBIP guidelines. The equipment selection and electrical installation will generally conform to the latest edition of Indian Standards (IS) and the International Electro-technical Commission (IEC).

9.0 INSTRUMENTATION WORKS


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c) LV Incomer

- i) Ammeters with ammeter selector switch
- ii) Voltmeter with voltmeter selector switch
- iii) kW meter
- iv) Power factor meter
- v) Kilowatthour meter
- vi) Frequency meter

LV Outgoing Feeders: Ammeter with ammeter selector switch

Indication:

- a) 33kV Incomer feeders: Circuit breaker ON, OFF & TRIP, spring charged, control supply healthy and trip circuit healthy.
- b) 3.3 kV Incomer, Buscoupler and Transformer feeders: Circuit breaker ON, OFF & TRIP, spring charged, control supply healthy and trip circuit healthy.
- c) 3.3 kV Motor Feeders: Motor ON, OFF & Trip indication (Red, green & Amber), control supply healthy and trip circuit healthy.
- d) LV Incomer: Mains ON (red, yellow & blue)
- e) LV Motor Feeders: Motor ON, OFF & Trip indication (Red, green & Amber)

The capacity of the transformers shall be decided based on 100 % standby (redundancy) i.e. in the event of outage of any one of the transformer, other transformer can supply the complete load. Here since the main motors are H.T and auxiliary motors L.T separate transformers are provided for H.T and L.T.

L.T motor up to and equal 5.5kW shall be provided with DOL starters, motor ratings above 5.5kW up to or equal to 250kW shall be provided with Star delta starters and all motor above 250kW shall be provided with Reactance soft starters.

If a motor rating goes beyond 250kW then H.T motors shall be used with voltage supply 3.3kV. The method of starting shall be either DOL or Reactance soft starter such that voltages dip during shall be within 15%.

The main LV switchboard is proposed with 'Form-4' enclosure as per the Indian Standards. All indoor boards/panels and motors are proposed with a degree of protection of IP 54, while all outdoor equipment will be with a degree of protection of IP55. Necessary metering, protections and indications will be provided on the LV switchboard.



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i) Breaker controlled with electronic comprehensive motor protection relay consisting of following protection thermal overload, locked rotor, short circuit, negative sequence and earth fault.

Auxillary Transformer Feeders

i) IDMT over current, Instantaneous over current and Instantaneous earth fault protection

ii) Transformer auxiliary protection (e.g. WTI, OTI, Bucholz, etc.)

c) LV switchboard

i) The ACB feeders shall be provided with electronic releases for IDMT Short circuit, over current and earth fault.

ii) The ACB bus coupler feeders shall be provided with electronic releases for IDMT short circuit and over current.

iii) The MCCB feeders shall be provided with Thermo magnetic releases for IDMT Short circuit, over current and earth fault.

d) LV Motors

i) For motor ratings less than or equal to 132kW shall be provided with overload protection by thermal (bimetal) relays in all the three phases to trip with single phase preventer (SPP)

ii) For motor ratings above 132kW shall be provided electronic comprehensive motor protection relay consisting of following protection thermal overload, locked rotor, short circuit, negative sequence and earth fault.

Metering :

The following metering shall be provided.

a) 33 kV/3.3 kV Incomer

i) Ammeters with ammeter selector switch

ii) Voltmeter with voltmeter selector switch

iii) kW meter

iv) Power factor meter

v) Kilowatthour meter

vi) Frequency meter

b) 33 kV/3.3 kV Outgoing Feeders: Ammeters with ammeter selector switch


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- i) Main motor : 0.9
- ii) Auxiliary load, gate valve motors, etc. : 0.9
- iii) Lighting load : 1.0

b) Diversity Factor

- i) Main motor : 1.0
- ii) Auxiliary load, gate valve motors, etc. : 1.5
- iii) Lighting load : 1.5

c) Power factor of MV/LV Motors shall be as per manufacturer's catalogue

d) Efficiency of MV/LV Motors shall be as per manufacturer's catalogue

Energy efficient, high performance motors are proposed for main pump motors for optimum utilization of energy.

Protections:

The following protections are proposed for switchboard, motors and other plant feeders.

a) 33kV Switchgear

Main Transformer Feeders

- i) IDMT over current, Instantaneous over current and Instantaneous earth fault protection
- ii) Transformer differential Protection only for ratings above 5 MVA.
- iii) Restricted Earth Fault Protection with inter trip
- iv) Transformer auxiliary protection (e.g. WTI, OTI, Bucholz, etc.)

Incomer and Outgoing Feeders

- v) IDMT over current, Instantaneous over current and Instantaneous earth fault protection

b) 3.3kV MCC

Incomer Feeders

- i) IDMT over current, Instantaneous over current and Instantaneous earth fault protection

Main Motor Feeders



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- ▶ Exhaust fan
- ▶ Lighting (indoor and outdoor)

Capacitor Banks and APFCR Panels

For main LV switchgear panel (Transmission) capacitor bank of 20 KVAR shall be provided to each bus. This capacitor bank should be with Automatic Power Factor Correction Relay with 16 steps and power factor at bus shall be maintained to a level of 0.98.

For Main LV switchgear panel (distribution) capacitor bank of 27 KVAR shall be provided to each bus. This capacitor bank should be with Automatic Power Factor Correction Relay with 16 steps and power factor at bus shall be maintained to a level of 0.98.

8.2.9 Cables and cables carrier system

XLPE insulated aluminum armored cable shall be provided for all 33kV loads, 3.3kV loads, in-comer of PMCC from secondary of transformer and outgoing from PMCC to CWPS & RWPS Auxiliary MCC and other loads.

PVC insulated aluminum armored cable shall be provided from WTP and chemical house MCC to various small loads at downstream. Copper cables shall be used for all cables sizes up to and including 6 sq mm.

Built up trench shall be provided for laying of cables at Substation rooms, at clear water pumping station and pumping stations. The cables shall be laid on cable trays of ladder type or perforated type supported on MS angles. Cables shall be laid directly buried in ground for cables going from CWPS Auxiliary MCC room at CWPS to various load centers such as chemical house, feeder pillar, machine room, Internal Road lighting etc. Hume Pipes of required size shall be provided for road crossings.

8.2.10 Battery and battery charger with D.C distribution board

Closing Coils, Tripping Coils, Annunciation Windows, Indicating Lamps, Auxiliary relays of 3.3kV MCC and 33kV switchgear shall be operated on 110V DC supply. Battery with Battery charger and D.C distribution Board shall be provided at Substation room at Clear water Pumping station.

8.2.11. Lighting system

Lighting distribution boards are provided at Clear Water Pumping station, raw water pumping station and control room at WTP with 63A MCB in-comer and 10A single phase MCB outgoing. At the in-comer of lighting panel shall be provided 30mA RCCB

8.3 GENERAL DESIGN CRITERIA

All electrical equipment will be rated for 45°C designed ambient temperature. The installation will generally conform to Indian Standards / IEC.

The following assumptions shall be made to arrive at the load

a) Load Factor


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The 11KV overhead line is terminating to a four pole structure near PHED Transmission pumping station with lightning arrestor, Isolator and C.T- P.T metering set with H.T metering box kept in weather proof enclosure box kept on suitable support. Outgoing feeder consisting of isolator and Dropout fuse is going to 2 Nos 100KVA 11/0.433KV Transformers.

Further from four pole structure internal 11KV overhead line is terminating to a four pole structure near PHED Distribution pumping station with lightning arrestor, Isolator and C.T- P.T metering set with H.T metering box kept in weather proof enclosure box kept on suitable support. Outgoing feeders consisting of isolator and Dropout fuse is going to 2 Nos 160KVA 11/0.433KV Transformers.

Transformers:

Pumping load and auxiliary loads at PHED transmission and distribution are supplied by 4 No's transformer. The rating of the transformers as below

- ▶ 100KVA 11/0.433KV for PHED transmission pumping station – 2 Nos
- ▶ 160KVA 11/0.433KV for PHED distribution pumping station – 2 Nos

The total working load of Transmission pumping station with auxiliary load shall be 90 kVA, considering 20% contingency. It is being suggested to provide two number of transformer of rating 100kVA, 11kV/0.433kV.

The total working load of distribution pumping station with auxiliary load shall be 126 kVA, considering 20% contingency. It is being suggested to provide two number of transformer of rating 160kVA, 11kV/0.433kV.

Under normal working condition both the transformers shall be in charged conditions. In case of failure of any single transformer the other transformer is designed to take pumping load and Auxiliary load. The transformers will be located near respective pumping station.

Main LV switchgear (Transmission & Distribution):

A Main LV switchgear panel of 415V is suggested at Transmission and distribution Pumping station to cater power supply for motors and auxiliary loads. The incomer of Main LV switchgear panel is connected to the secondary of the transformer suitable sized 415V XLPE cable.

The outgoing of the Main LV switchgear panel (Transmission) is as follows

- ▶ 45KW Motor
- ▶ Crane
- ▶ Exhaust fan
- ▶ Lighting (indoor and outdoor)

The outgoing of the Main LV switchgear panel (distribution) is as follows

- ▶ 37KW Motor
- ▶ 18.5KW Motor
- ▶ Crane



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8.2.7 Proposed power supply arrangement at Kaju Plantation pumping station(Jatni)

The power for proposed Pumping station is planned by taking tap-off from nearest existing 11KV overhead line of CESU (Central electricity supply utility of Orissa). The electrical system of Kaju Plantation pumping station shall be as per single line diagram.

Incoming Four pole structure at pumping station:

The 11KV overhead line is terminating to a four pole structure near Gurjanga pumping station with lightning arrester, Isolator and C.T- P.T metering set with H.T metering box kept in weather proof enclosure box kept on suitable support. Outgoing feeder consisting of isolator and Dropout fuse is going to 2 Nos 100KVA 11/0.433KV Transformers

The total working load of Kaju Plantation pumping station with auxiliary load shall be 85 kVA, considering 20% contingency. It is being suggested to provide two number of transformer of rating 100kVA, 11kV/0.433kV. Under normal working condition both the main transformers shall be in charged conditions. In case of failure of any single transformer the other transformer is designed to take pumping load and Auxiliary load. The transformers will be located near pumping station.

Main LV switchgear:

A Main LV Switchgear panel of 415V is suggested at Kaju Plantation pumping station to cater power supply for motors and auxiliary loads. The incomer of Main LV Switchgear panel is connected to the secondary of the main transformer suitable sized 415V XLPE cable.

The outgoings of the Main LV Switchgear panel is as follows

- ▶ 22KW Motor
- ▶ 11KW Motor
- ▶ Chain pully
- ▶ Exhaust fan
- ▶ Lighting (indoor and outdoor)

Capacitor Banks and APFCR Panels

For Main LV Switchgear panel capacitor bank of 20 KVAR shall be provided to each bus. This capacitor bank should be with Automatic Power Factor Correction Relay with 16 steps and power factor at bus shall be maintained to a level of 0.98.

8.2.8 Proposed power supply arrangement at PHED transmission and distribution Pumping station (Jatni)

The power for proposed Pumping station is planned by taking tap-off from nearest existing 11KV overhead line of CESU (Central electricity supply utility of Orissa). Further it will connect to PHED Distribution Pumping station. The electrical system of PHED transmission and distribution pumping station shall be as per single line diagram.

Incoming Four pole structure at Transmission and distribution pumping station:


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For Main LV Switchgear panel capacitor bank of 53 KVAR shall be provided to each bus. This capacitor bank should be with Automatic Power Factor Correction Relay with 16 steps and power factor at bus shall be maintained to a level of 0.98.

8.2.6 Proposed power supply arrangement at Jemadei pumping station (Khorda)

The power for proposed Pumping station is planned by taking tap-off from nearest existing 11KV overhead line of CESU (Central electricity supply utility of Orissa).

The electrical system of Jemadei pumping station shall be as per single line diagram.

Incoming Four pole structure at pumping station:

The 11KV overhead line is terminating to a four pole structure near Gurjanga pumping station with lightning arrester, Isolator and C.T- P.T metering set with H.T metering box kept in weather proof enclosure box kept on suitable support. Outgoing feeder consisting of isolator and Dropout fuse is going to 2 Nos 160KVA 11/0.433KV Transformers

Transformers:

The total working load of Jemadei pumping station with auxiliary load shall be 135 kVA, considering 20% contingency. It is being suggested to provide two number of transformer of rating 160kVA, 11kV/0.433kV.

Under normal working condition both the main transformers shall be in charged conditions. In case of failure of any single transformer the other transformer is designed to take pumping load and Auxiliary load. The transformers will be located near pumping station.

Main LV switchgear:

A Main LV Switchgear panel of 415V is suggested at Pumping station to cater power supply for motors and auxiliary loads. The incomer of Main LV Switchgear panel is connected to the secondary of the main transformer suitable sized 415V XLPE cable.

The outgoing of the Main LV Switchgear panel is as follows

- ▶ 30KW Motor
- ▶ 18.5KW Motor
- ▶ 9.3KW Motor
- ▶ Crane
- ▶ Exhaust fan
- ▶ Lighting (indoor and outdoor)

Capacitor Banks and APFCR Panels

For Main LV Switchgear panel capacitor bank of 31 KVAR shall be provided to each bus. This capacitor bank should be with Automatic Power Factor Correction Relay with 16 steps and power factor at bus shall be maintained to a level of 0.98.

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- ▶ 11KW Motor
- ▶ Crane
- ▶ Exhaust fan
- ▶ Lighting (indoor and outdoor)

Capacitor Banks and APFCR Panels

For pump house panel capacitor bank of 24 KVAR shall be provided to each bus. This capacitor bank should be with Automatic Power Factor Correction Relay with 16 steps and power factor at bus shall be maintained to a level of 0.98.

8.2.5 Proposed power supply arrangement at PHED pumping station (Khorda)

The power for proposed Pumping station is planned by taking tap-off from nearest existing 11KV overhead line of CESU (Central electricity supply utility of Orissa). The electrical system of PHED pumping station shall be as per single line diagram.

Incoming Four pole structure at pumping station:

The 11KV overhead line is terminating to a four pole structure near Gurjanga pumping station with lightning arrester, Isolator and C.T- P.T metering set with H.T metering box kept in weather proof enclosure box kept on suitable support. Outgoing feeder consisting of isolator and Dropout fuse is going to 2 Nos 315KVA 11/0.433KV Transformers

Transformers:

The total working load of PHED pumping station with auxiliary load shall be 275 kVA, considering 20% contingency. It is being suggested to provide two number of transformer of rating 315kVA, 11kV/0.433kV.

Under normal working condition both the main transformers shall be in charged conditions. In case of failure of any single transformer the other transformer is designed to take pumping load and Auxiliary load. The transformers will be located near pumping station.

Main LV switchgear:

A Main LV Switchgear of 415V is suggested at Pumping station to cater power supply for motors and auxiliary loads.

The incomer of Main LV Switchgear panel is connected to the secondary of the main transformer suitable sized 415V XLPE cable. The outgoing of the Main LV Switchgear panel is as follows

- ▶ 90KW Motor
- ▶ 45KW Motor
- ▶ Crane
- ▶ Exhaust fan
- ▶ Lighting (indoor and outdoor)

Capacitor Banks and APFCR Panels


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H.T Motor starting:

The fault level calculation of suggested electrical system has been carried out; the fault level at 280kW motor terminal is approximately working out to be 19.3 MVA. If we go for a DOL Starter the starting MVA is working out to be 0.349 and voltage dip at the time of starting is working out to be 12.67% which is within 15%, hence DOL starter starting option is considered.

CWPS Auxiliary Load MCC:

A CWPS Auxiliary Load MCC Panel is suggested at Clear water pumping station to cater power supply for Auxiliary loads of WTP & CWPS The CWPS Auxiliary Load MCC panel Consists of 2nos of 415V, 630A ACB as incomers and 1 No Bus coupler of same rating. The incomers are connected to the secondary of the Auxiliary transformer suitable sized 415V XLPE cable.

The CWPS Auxiliary Load MCC panel is feeding to the following loads

- ▶ WTP and chemical hose MCC
- ▶ Backwash pumps
- ▶ Air blower
- ▶ Service water pump
- ▶ Chlorine booster pump for Pre chlorination and post chlorination
- ▶ Exhaust fan
- ▶ Crane
- ▶ Lighting (indoor and outdoor)

Under normal condition bus coupler shall be kept in open condition and incomers will be feeding bus number 1 and 2 separately. In case of a failure of any transformer, corresponding incomer is open and bus coupler is closed so that total auxiliary load will be fed by single healthy transformer.

WTP and chemical hose MCC shall be located at Chemical house which is approximately 250mtr away from clear water pumping station having two incomers and one bus coupler .This panel supplies the loads of Feeder pillar-1,2,3,Chlorine booster pump, service water pump, Exhaust fan, actuator and lighting of water treatment plant area. Under normal condition bus coupler shall be kept in open condition and incomers from CWPS Auxiliary Load MCC panel will be feeding bus number 1 and 2 separately. In case of a failure of any Feeder or cable corresponding incomer is open and bus coupler is closed so that total load will be fed by other feeder.

Feeder pillar-1,2 &3 shall be supplying the loads of Flash mixture, clarifagulator and valves

Capacitor:

3.3KV Capacitor banks:

For 280kW clear water pump motors it has been suggested to install 98 KVAR fixed capacitors banks on main motor terminals. The power factor value at each motor terminal is working out to be 0.97

LV Capacitor banks and APFCR panel:

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From Six pole structure 33KV cable laid upto 33KV indoor switchgear panel .This 33KV switchgear panel shall be provided with one SF6 /Vacuum circuit breaker as incomer and Two No's outgoing to 1250KVA 33/3.3KV transformer.

A Separate room is suggested near clear water pumping station for this panel. All incomers and outgoing feeders of 33kV switchgear shall be provided with necessary protection and indication as per design criteria mentioned below.

Transformers:

Main pumping load and auxiliary loads at CWPS and WTP are supplied by 4 No's transformer. The rating of the transformers as below:

- ▶ 1250KVA 33/3.3KV for main pumping load at CWPS – 2 Nos
- ▶ 400KVA 33/3.3KV for auxiliary loads at CWPS & WTP – 2 Nos

The total working load at the water works shall be as follows, Clear Water Pumping station (Main Pumping Load): 752kVA (Consisting of 280kW motors (2W+1S)).

The total working main pumping load of Clear water pumping station shall be 752kVA, considering 20% contingency it is being suggested to provide two numbers of main transformers of rating 1.25MVA, 33kV/3.3kV near clear water pumping station.

The Total Auxiliary working load of CWPS & WTP shall be 321kVA, considering 20% contingency it is being suggested to provide two numbers of Auxiliary transformers of rating 400KVA, 33kV/0.433kV near clear water pumping station.

Under normal working condition both the transformers (main as well as auxiliary) shall be in charged conditions. In case of failure of any single transformer the other transformer is designed to take all pumping loads. The transformers will be located near clear water pumping station.

Neutral Grounding resistor:

For restricting the earth fault current flow in stator of 3.3kV , 280kW motor it has been suggested to provide neutral grounding resistors at the secondary of main transformer with duty rating of 10 sec.

CWPS PMCC:

A 3.3kV panel is suggested in clear water pumping station to cater power supply for 280kW 3.3KV motors. The CWPS PMCC panel consists of 2nos VCB as incomers and 1 No Bus coupler of same rating. The incomers are connected to the secondary of the main transformer suitable sized 3.3kV XLPE cable. The panel shall be provided with 3 Nos of 3.3kV 400A VCB out going feeders.

The Bus number I and II shall have 2 No's & 1No feeders for 280kW motor. Under normal condition bus coupler shall be kept in open condition and incomers will be feeding bus number 1 and 2 separately.

In case of a failure of any transformer, corresponding incomer is open and bus coupler is closed so that total clear water pumping load will be fed by single healthy transformer.



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8. ELECTRICAL SYSTEM

8.1. Introduction

Power supply arrangement for various locations is described as below:

- ▶ Clear water pumping station & water treatment plant (CWPS & WTP) located at Munuduli
- ▶ Raw water pumping station (RWPS) at Munuduli
- ▶ Distribution pumping station at Gurujanga, Jemadei and PHED Store located at Khorda
- ▶ Distribution pumping station at Kaju Plantation, PHED area located at Jatni

8.2 POWER SUPPLY ARRANGEMENT

Existing system for CWPS, WTP and RWPS:

The 33KV substation located at existing WTP & CWPS premises is getting power supply from Chandaka grid substation which is approximately 15km away.

The Chandaka grid substation is having a 33kV bus, fed by 3 no's transformers of following details,

- ▶ Transformer-1 132kV / 33kV, 40MVA
- ▶ Transformer-2 132kV / 33kV, 40MVA
- ▶ Transformer-3 132kV / 33kV, 40MVA

At existing WTP substation, the incoming 33KV overhead line from Chandaka grid substation is terminated to a two pole structure and a four pole structure. From four pole structure, one outgoing is going to existing CWPS and other is going to existing RWPS substation.

8.2.1 Proposed power supply arrangement for CWPS and WTP:

The power source for CWPS & WTP is planned by taking tap-off from existing 33KV four pole structure at CWPS & WTP Substation. The overall electrical system inside pumping station shall be as per single line diagram.

8.2.2 Incoming six pole structure at clear water pumping station:

The incoming 33kV line is terminated on an outdoor six pole structure consisting of Lightning arrester, Isolator and C.T- P.T metering set with H.T metering box kept in weather proof enclosure box kept on suitable support. The outgoings of this structure are as follow

- ▶ 1 No feeder going to 33KV indoor switchgear panel
- ▶ 2 Nos feeder consisting of isolator and Dropout fuse is going to 2 Nos 400KVA 33/0.433KV Transformers

33kV Indoor Switchgear panel



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Table: Jemadei to PHED Stores Transmission Pump Details

S No.	Pumping to	Total flow (mld)	Pump capacity (cum/hr)	Head (mwc)	Pump kW rating	Pump speed (rpm)	EOT Crane (Ton)
1	PHED GSR	4.8	255	43	44	1450	2 Ton

7.4.8 Pump-Materials of Construction

The materials of construction of pump components are as under:

- a) Casing: CI IS 210 Gr. 220
- b) Shaft: SS AISI 431
- c) Impeller: SS ASTM A351 CF8M

7.4.9 EOT Crane

For handling the equipment (pump-sets, valves, panel etc.) in the pump house, an EOT crane of 2.0 T capacity is proposed within the pumping house superstructure. All motions will be electrically operated from a pendant controller. The crane will fully comply with international standards and will be of the single girder type with box section girders. The crane rails will be supported on beam built off the structural frame of the pumping station superstructure.

7.4.10 Piping and Valves

Existing piping system will be discarded and new piping system will be installed for new pumps in the existing superstructure. Pump suction with manually operated isolation sluice valve will be taken from clear water reservoir. At the pump delivery, non-return valve and electrically operated sluice valve will be provided. Dismantling joints to facilitate installation of the valves are proposed. The pump suction, delivery pipe and individual delivery header is shown in table below. Individual pump delivery pipe is connected to discharge header outside the pump house. On delivery header station isolation valve and flow meter will be provided with valve chamber for maintenance and flow measurement of pumping station.

Table: PHED Area Existing Transmission Piping Details

S No.	Details	Pump suction line (mm)	Pump discharge line (mm)	Delivery header size (mm)
1	PHED GSR	300	250	300

7.4.11 Portable Fire Extinguishers

To fight incidences of accidental fires, portable extinguishers of CO2 type are suggested in the pump house.

7.4.12 HVAC SYSTEM

Exhaust fans will be provided for proper ventilation of the pump house.


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Pump suction with manually operated isolation sluice valve will be taken from clear water reservoir. At the pump delivery, non-return valve and sluice valve will be provided. Dismantling joints to facilitate installation of the valves are proposed. The pump suction, delivery pipe and individual delivery header is shown in table below. Individual pump delivery pipe is connected to discharge header outside the pump house. On delivery header station isolation valve and flow meter will be provided with valve chamber for maintenance and flow measurement of pumping station.

Table: Piping details of distribution pumping system in Jatni

S No.	Pumping to	Pump suction line (mm)	Pump discharge line (mm)	Delivery header size (mm)
1	Kaju Plantation distribution	200	150	250
		150	150	
2	PHED area Distribution	300	250	400
		250	200	

7.4.4 Portable Fire Extinguishers

To fight incidences of accidental fires, portable extinguishers of CO2 type are suggested in the pump house.

7.4.5. HVAC SYSTEM

Exhaust fans will be provided for proper ventilation of the pump house.

7.4.6 Existing Pumping Station For Transmission At PHED Area (Jatni)

The clear water from existing sump will be pumped to PHED GSR by means of existing pumping stations at PHED area (Jatni). This clear water pumping station of PHED area consisting of two (2) nos (1W+1S) horizontal centrifugal split casing pumps. Existing pumps and piping system of the existing pumping station will be replaced by the new 255 m³/hr capacity pumps and piping system.

7.4.7 Horizontal Centrifugal Split Casing Pump

Horizontal centrifugal split casing type of pumps is located in a pump house and draw suction from existing sump. The pump suction is positive, so pump priming is not required. Due to split casing arrangement pump maintenance is easier compare to other horizontal type of pump. Pump will operate 20 hours and a margin of 5% is taken for individual pump capacity. This margin is due to overall reduction in impeller diameter due to wear and tear over a period of time. The pump house will house the MCC-cum-ICP for the pumps besides pumps, pipe, valves and fittings. Pressure gauges will be provided for both suction and delivery pipe line of the pumps. The pump will be required to give high efficiencies in both single and parallel operation. Preliminary information available from manufacturers and their technical literature suggests that pump efficiency at the guarantee point will be about 85%. The power absorbed by each pump at Clear Water Distribution Pumping Station would be as stated in the table below


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7.4.2 PHED Distribution Pumping System

3.47 mld clear water will be pumped from PHED area GSR to distribution by 2 nos (1W+1S) 310 m3/hr capacity pumps by 2 nos (2W) pumps of capacity 155 m3/hr. Pump will operate 8 hours a day and margin of 5% is taken for individual pump capacity. This margin is due to overall reduction in impeller diameter due to wear and tear over a period of time. The pump house will house the MCC-cum-ICP for the pumps besides pumps, pipe, valves, fittings and Chain pulley block/EOT Crane. Pressure gauges will be provided for both suction and delivery pipe line of the pumps. The pump will be required to give high efficiencies in both single and parallel operation. Preliminary information available from manufacturers and their technical literature suggests that pump efficiency at the guarantee point will be about 85%. The power absorbed by each pump at each Clear Water Distribution Pumping Station (CWPS) would be as stated in the table below.

Table: Pump details of distribution pumping system in Jatni

S No.	Pumping to	Total flow (mld)	Pump capacity (cum/hr)	Head (mwc)	Pump kW rating	Pump speed (rpm)	Chain Pulley Block / EOT Capacity (Ton)
1	Kaju Plantation distribution	1.7	150	33	20	1450	1 Ton
			75		10		
2	PHED area Distribution	3.47	310	25	31	1450	2 Ton
			155		15.5		

8.4.1 Pump-Materials of Construction

The materials of construction of pump components are as under:

- a) Casing : CI IS 210 Gr. 220
- b) Shaft : SS AISI 431
- c) Impeller : SS ASTM A351 CF8M

7.4.2 Electrically Operated Chain Pulley Block With Monorail

For handling the equipment (pump sets, valves, panel etc.) in the pump house, electrically operated chain pulley block with monorail and hoist of 1.0T capacity is proposed within the pumping house for distribution Pumping station at Kaju Plantation (Jatni) superstructure and 2.0 T capacity EOT Crane for distribution Pumping station at PHED area (Jatni). All motions will be electrically operated from a pendant controller. The crane will fully comply with international standards and will be of the single girder type with box section girders. The crane rails will be supported on beam built off the structural frame of the pumping station superstructure.

7.4.3 Piping and Valves


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Table: Summary of Distribution network of Jatni

Zone No.	Service reservoir	Governing level (m)	Diameter (mm)	Total length (m)	Existing distribution length (m)
I	Bachchra Mundia GSR	48	100	59	1750 (Dia 100-150 mm)
			150	807	
			200	252	
			250	1567	
			400	115	
			450	247	
II	Bachchra Mundia GSR	47	100	1198	6241 (Dia 100-450 mm)
			150	560	
			200	1352	
			250	125	
			300	800	
			400	481	
III	PHD area GSR	52	100	5663	5659 (Dia 100-350 mm)
			150	312	
			200	959	
			250	2362	
			300	59	
			450	596	
IV	Kaju plantation GSR	33	100	2574	
			150	1400	
			200	688	
			250	1941	
			300	1947	
			350	103	

7.4 CLEAR WATER PUMPING SYSTEM IN JATNI

The clear water pumping scheme is proposed as below. The total proposed zones in Jatni is four and clear water pumping scheme for clear water distribution system involves two zones (Zone 3 and 4). Two (2) pumping station have been proposed for Zone 3 & 4. Each pumping station shall directly distribute water to the consumers. Each pumping station comprises of 2 nos (1W+1S) pump having lean flow capacity each and 2 nos (2W) pump having half of lean flow capacity each. At the of peak flow all working pumps will operate. At the time of lean flow, pump having lean flow capacity will operate. By intermittent service of pumps having half of lean flow capacity, the flow variation can be controlled. The head of all pumps in respective pumping station will be same. Horizontal centrifugal split casing type of pumps is located in a pump house and draw suction from respective UGR. The pump suction is positive, so pump priming is not required. Due to split casing arrangement pump maintenance is easier compare to other horizontal type of pump.

7.4.1 Kaju plantation Distribution Pumping System

1.75 mld clear water will be pumped from Kaju Plantation UGR to distribution by 2 nos (1W+1S) pumps of capacity 150 m³/hr and by 2 nos (2W) pumps of capacity 75 m³/hr.


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7.1 SERVICE RESERVOIRS FOR JATNI

Sizing of service reservoirs is based on mass curve. Summary of storage capacity is presented in table below.

Table: Summary of Storage Capacity of Jatni

Zone no.	Type of reservoir	Proposed/ Existing	No.	Location	Capacity (ML)	Fire storage included (ML)	Approximate Ground Level (m)	Minimum Water Level (m)	Full Supply Level (m)
I	GSR	Proposed	1	Bachchra Mundia	2.25	0.26	49	49	54
II	Same as above								
III	Sump	Existing	1	PHED area	0.225	0.2	47	-	-
	GSR	Existing	1		1.35		52	52	55
	Sump	Proposed	1		0.225		47	-	-
	GSR	Proposed	1		0.75		52	52	57
IV	GSR	Proposed	1	Kaju Plantation	0.75	0.15	33	33	38

7.2 SIZING OF FEEDER MAINS

Gravity feeder mains are proposed from GSR at Bachchra Mundia directly to Zone I & II. Pumping main is proposed from proposed PHED area sump to GSRs and Kaju plantation GSR is feed by direct supply from MBR. Summary of feeder mains is presented in table below.

Table: Summary of feeder mains of Jatni

Zone No.	To	Length (m)	Diameter (mm)
I	Gravity network	800	600
II	Gravity network		
III	PHD area GSR	120	350
IV	Kaju plantation	1900	250

7.3 HYDRAULIC SIZING OF ZONAL NETWORK

Hydraulic model of each zone is prepared for ultimate land-use of 2041. In areas of proposed residential land-use where no existing roads are available, proposed demand is seeded on the peripheral nodes of existing roads. Proposed network is sized for design year 2041. Pipelines of existing network of size 100 mm and above are compared with required proposed diameter and utilized wherever feasible. Zonal distribution network is also checked for intermediate phase 2026 demand, using existing network as far as possible. Priority distribution pipeline network to be proposed for intermediate phase is identified for tender works. Balance pipelines (for ultimate demand) will be implemented in need based manner. Summary of distribution network identified for each zone is presented in table as below:






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named "Clear water distribution pumping station at Jemadei". The capacity of pumping station is 5.01 mld with one (1) working and one (1) standby pump of capacity 270 m³/hr with pumping head of 25 mwc. Pump will operate 20 hours and a margin of 5% is taken for individual pump capacity. This margin is due to overall reduction in impeller diameter due to wear and tear over a period of time. The pump house will house the MCC-cum-ICP for the pumps besides pumps, pipe, valves and fittings. Pressure gauges will be provided for both suction and delivery pipe line of the pumps. The pump will be required to give high efficiencies in both single and parallel operation. Preliminary information available from manufacturers and their technical literature suggests that pump efficiency at the guarantee point will be about 85%. The power absorbed by each pump at Clear Water Distribution Pumping Station would be as stated in the table below:

Table: Jemadei to PHED Stores Transmission Pump Details

S No.	Pumping to	Total flow (mld)	Pump capacity (cum/hr)	Head (mwc)	Pump kW rating	Pump speed (rpm)
1	Existing PHED area UGR	5.01	270	25	26	1450

The material of construction of pump components is as under:

- a) Casing : CI IS 210 Gr.220
- b) Shaft : SS AISI 431
- c) Impeller : SS ASTM A351 CF8M

For handling the equipment (pumpsets, valves, panel etc) in the pump house, an EOT crane of 2.0 T capacity is proposed within the pumping house superstructure. All motions will be electrically operated from a pendant controller. The crane will fully comply with international standards and will be of the single girder type with box section girders. The crane rails will be supported on beam built off the structural frame of the pumping station superstructure. This 2 T capacity EOT crane will be also used for handling Jemadei distribution pumps and pumping equipments.

6.4.10 Piping And Valves

Existing piping system will be discarded and new piping system will be installed for new pumps in the existing superstructure. Pump suction with manually operated isolation sluice valve will be taken from clear water reservoir. At the pump delivery, non-return valve and electrically operated sluice valve will be provided. Dismantling joints to facilitate installation of the valves are proposed. The pump suction, delivery pipe and individual delivery header is shown in table below. Individual pump delivery pipe is connected to discharge header outside the pump house. On delivery header station isolation valve and flow meter will be provided with valve chamber for maintenance and flow measurement of pumping station.

Table: Jemadei to PHED Stores Transmission Piping Details

S No.	Details	Pump suction line (mm)	Pump discharge line (mm)	Delivery header size (mm)
1	Jemadei transmission PS	300	300	300

7. Distribution System of Jatni

The proposed Jatni water supply system is divided into four zones.


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The material of construction of pump components is as under:

- a) Casing : CI IS 210 Gr.220
- b) Shaft : SS AISI 431
- c) Impeller : SS ASTMA351 CF8M

6.4.5. EOT Crane

For handling the equipment (pumpsets, valves, panel etc.) in the pump house, an EOT crane of 2.0T capacity is proposed within the pumping house superstructure. All motions will be electrically operated from a pendant controller. The crane will fully comply with international standards and will be of the single girder type with box section girders. The crane rails will be supported on beam built off the structural frame of the pumping station superstructure.

6.4.6. Piping and Valves

Pump suction with manually operated isolation sluice valve will be taken from clear water reservoir. At the pump delivery, non-return valve and sluice valve will be provided. Dismantling joints to facilitate installation of the valves are proposed. The pump suction, delivery pipe and individual delivery header is shown in table below. Individual pump delivery pipe is connected to discharge header outside the pump house. On pump delivery header station isolation valve and flow meter will be provided with valve chamber for maintenance and flow measurement of pumping station. Details are summarized in table below:

Table: Piping details of distribution pumping system in Khorda

S No.	Pumping to	Pump suction line (mm)	Pump discharge line (mm)	Delivery header size (mm)
1	Jamadei Distribution	200 150	200 150	300
2	Gurujanga Distribution	250 200	200 150	350
3	PHED area Distribution	350 250	300 200	450

6.4.7. Portable Fire Extinguishers

To fight incidences of accidental fires, portable extinguishers of CO2 type are suggested in the pump house.

6.4.8. HVAC System

Exhaust fans will be provided for proper ventilation of the pump house.

6.4.9. Jamadei to PHED Stores Transmission

The clear water from existing UGR at Jamadei will be pumped to PHED UGR. This clear water transmission pumping station of PHED area consisting of two (2) horizontal centrifugal split casing pumps (1W+1S). These pumps will be installed along with Jamadei distribution pumps in single pump house


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pump having lean flow capacity each and 2 nos (2W) pump having half of lean flow capacity each. At the of peak flow all working pumps will operate. At the time of lean flow, pump having lean flow capacity will operate. By intermittent service of pumps having half of lean flow capacity, the flow variation can be controlled. The head of all pumps in respective pumping station will be same. Horizontal centrifugal split casing type of pumps is located in a pump house and draw suction from respective UGR. The pump suction is positive, so pump priming is not required. Due to split casing arrangement pump maintenance is easier compare to other horizontal type of pump.

6.4.1. Jemadei Distribution Pumping System

2.21 MLD clear water will be pumped from Jemadei UGR to Jemadei distribution by 2 nos (1W+1S) pumps of capacity 200 m³/hr each and 2 nos (2W) pumps of capacity 100 m³/hr each.

6.4.2. Gurujang Distribution Pumping System

2.6 MLD clear water from Gurujanga UGR will be pumped to Gurujanga distribution by 2 nos (1W+1S) 225 m³/hr capacity pumps and 2 nos (2W) 115 m³/hr capacity pumps.

6.4.3. PHED Stores Distribution Pumping System

5.01 MLD clear water will be pumped from existing PHED area UGR to PHED area distribution by 2 nos (1W+1S) pumps of capacity 435 m³/hr and 2 nos (2W) pumps of capacity 220 m³/hr. Clear water distribution pumping station at Jemadei (with clear water transmission pumps) and at Gurjanga are proposed pumping station while PHED area distribution pumping station is existing pumping station. Existing pumps & piping system shall be replaced by new pumps and piping system for existing PHED area pumping station.

Pump will operate 8 hours a day and margin of 5% is taken for individual pump capacity. This margin is due to overall reduction in impeller diameter due to wear and tear over a period of time. The pump house will house the MCC-cum-ICP for the pumps besides pumps, pipe, valves, fittings and EOT crane. Pressure gauges will be provided for both suction and delivery pipe line of the pumps. The pump will be required to give high efficiencies in both single and parallel operation. Preliminary information available from manufacturers and their technical literature suggests that pump efficiency at the guarantee point will be about 85%. The power absorbed by each pump at each Clear Water Distribution Pumping Station would be as stated in the table below. Distribution pump details are provided in table below:

Table: Pump details of distribution pumping system in Khorda

S No.	Pumping to	Total flow (mld)	Pump capacity (cum/hr)	Head (mwc)	Pump kW rating	Pump speed (rpm)	EOT Capacity (Ton)
1	Jamadei Distribution	2.21	200 100	23	18 9	1450	2 Ton
2	Gurujanga Distribution	2.60	225 115	23	21 24	1450	2 Ton
3	PHED area Distribution	5.01	435 220	27	85 43	1450	2 Ton

6.4.4. Pumping-materials of construction



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6.2. Sizing of feeder mains

Pumping feeder mains are proposed from existing & proposed sump at Jamadei directly to local Jamadei GSR and PHED store area sump and Gurujang GSR directly feed by gravity main from MBR. Summary of feeder mains is presented in the table below:

Table: Summary of feeder mains of Khorda

Zone no,	To	Length (m)	Diameter (mm)
I	Jamadei UGR	250	250
II	PHED Store UGT & UGR	3000	350
III	Gurujang GSR	4500	250

6.3. Hydraulic sizing of Zonal network

Hydraulic model of each zone is prepared for ultimate land-use of 2041. In areas of proposed residential land-use where no existing roads are available, proposed demand is seeded on the peripheral nodes of existing roads. Proposed network is sized for design year 2041. Pipelines of existing network of size 100 mm and above are compared with required proposed diameter and utilized wherever feasible. Zonal distribution network is also checked for intermediate phase 2026 demand, using existing network as far as possible. Priority distribution pipeline network to be proposed for intermediate phase is identified for tender works. Balance pipelines (for ultimate demand) will be implemented in need based manner. Summary of distribution network for each zone is presented in table below as below:

Table: Summary of Distribution network of Khorda

Zone No.	Service reservoir	Governing level (m0)	Diameter (mm)	Total length (m)	Existing distribution length (m)
I	Jamadei UGR	45	100	3363	4382 (Dia 100-150 mm)
			150	1377	
			200	368	
			250	451	
			300	444	
II	PHED Store UGR	55	100	5857	12724 (Dia 100-300 mm)
			150	5169	
			200	1976	
			250	11	
			350	494	
III	Gurujang GSR	38	400	988	969 (Dia 100-150 mm)
			100	173	
			150	3076	
			200	1553	
			250	287	

6.4. Clear Water Pumping System in Khorda

The clear water pumping scheme for tender works is proposed as below. The clear water pumping scheme for Khorda clear water distribution system involves Three (3) pumping station. Each pumping station shall directly distribute water to the consumers. Each pumping station comprises of 2 nos (1W+1S)

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H. (Urban)
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S No.	Start node	End note	Material of pipe	Dia (mm)	Length (m)	Shell thickness (mm)
						IS 8329
6	PITAPPALI JN	NISER	Spirally welded MS Pipe	1000	4300	7
7	NISER	IIT TAPPING	Spirally welded MS Pipe	900	600	6
8	IIT TAPPING	BACHARA CROSSING	Spirally welded MS Pipe	800	1830	6
9	BACHARA CROSSING	BACHARA MUNDIA	DI-K9	600	780	As per IS 8329
10	BACHARA CROSSING	PHED	DI-K9	500	1212	As per IS 8329
11	PITAPALLI JN	GURUJUNG	DI-K9	250	4500	As per IS 8329
12	NISER TAPPING	NISER	DI-K9	250	25	As per IS 8329
13	IIT TAPPING	IIT	DI-K9	500	2000	As per IS 8329
14	KAJU PLANTATION TAPPING	KAJU PLANTATION	DI-K9	250	1900	As per IS 8329

6. Distribution system of Khorda

The Proposed Khorda water supply system is divided into three zones:

- (a) Gurujung GSR
- (b) Jamadei GRS
- (c) PHD area GSR

6.1. Service reservoirs of Khorda

Sizing of service reservoirs is based on mass curve. Summary of storage capacity integrated in proposed system is presented in the table below:

Table: Summary of storage capacity of Khorda

Zone no.	Type of reservoir	Proposed / existing	No.	Location	Capacity (ML)	Fire storage included (ML)	Base level (m)
I	UGT	Existing	1	Jamadei	0.225	0.15	45
	UGR	Proposed	1		1.75		
II	UGT	Existing	2	PHED Store	0.225	0.23	55
	UGR	Proposed	1		1.25		
III	GSR	Proposed	1	Gurujang	1.25	0.16	38

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Flow (cu m/day)	Minor losses	Pumping hours	Pump efficiency	Motor efficiency	Power rate (Rs./kWh)
66000	10%	20	80%	95%	3

5.2. Hydraulic design of Raw Water Mains from RWPS to WTP

- ▶ Locations and ground levels for tapping are based on survey works.
- ▶ Minimum water level at RWPS is proposed at 21.55m.
- ▶ Maximum water level at WTP is assumed at 49 m.
- ▶ Selected pipe material is MS with cement mortar lining (C value as per CPHEEO).
- ▶ Diameter of 1000 mm is feasible for raw water transmission main of MS with cement mortar lining.

5.3. Hydraulic design of Clear Water Mains from MBR to Service areas

- ▶ Locations and ground levels for tapping are based on survey works.
- ▶ Selected pipe material is MS with cement mortar lining for diameters of 800 mm and above, and DI with cement mortar lining for lower diameters (C value as per CPHEEO).

5.4. Conclusions

Mild Steel spirally welded pipeline (Grade B) for nominal diameter 1000 mm with 7 mm shell thickness, 10 mm internal cement mortar lining and 30 mm external guniting for clear water pumping main from CWPS upto Mendhasala MBR is most economic design.

Gravity flow is feasible for minimum water level scenario also upto INFOCITY-II tapplings, Khorda underground reservoir, base of IIT hill and highest ground level in Jatni area. Mild Steel spirally welded pipeline (Grade B) for nominal diameter 1200 mm to 800 mm (Shell thickness 8-6 mm) and Ductile Iron for diameters 250 mm to 600 mms are proposed for clear water gravity main. Details of transmission main are provided in table below:

As per best engineering practices no tapplings are considered on pumping main (CWPS to MBR). However, if any enroute tapping needs to be provided in the future, hydraulic design of pumping main will have to be checked for residual pressures.

Table: Summary of Clear water transmission and Gravity Main

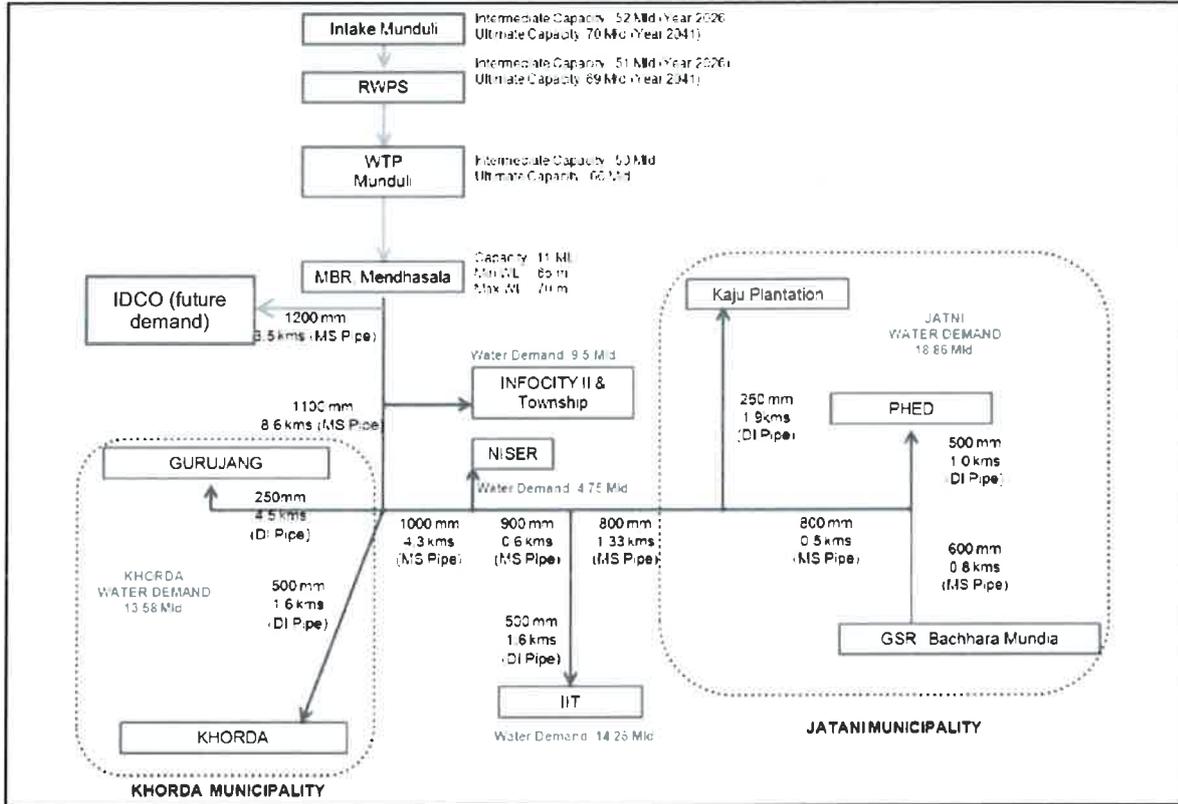
S No.	Start node	End note	Material of pipe	Dia (mm)	Length (m)	Shell thickness (mm)
1	RWPS	WTP	Spirally welded MS Pipe	1000	1000	7
2	WTP	MBR	Spirally welded MS Pipe	1000	21500	7
3	MBR	INFOCITY	Spirally welded MS Pipe	1200	3500	8
4	INFOCITY	PITAPALLI JN	Spirally welded MS Pipe	1100	8600	7
5	PITAPPALI JN	KHORDA	DI-K9	500	1600	As per


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Figure: Schematic of Clear water transmission system



5.1. Concept Design Alternatives

Design alternatives considered for transmission main are as mentioned below:

- ▶ MS Pipeline with cement mortar lining:
C value 120 to 140
Pumping Hours: 22 hours & 20 hours
Diameters: 800 mm to 1400 mm
- ▶ DI Pipeline with cement mortar lining:
C value 120 to 140
Pumping Hours: 22 hours & 20 hours
Diameters: 800 mm to 1000 mm

Base design inputs are as in the table below:

Table: Base design inputs

GL at CWPS (m)	GL at MBR (m)	Chainage of MBR (kms)	IL at CWPS (m)	IL at MBR (m)	Minimum water level at CWPS (m)	MBR HGL (m)
41	65	21.39	37.8	63	38.5	72


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4.9. Replacement Pumps

3 pumps (2W+1S) will be capable of pumping 1735 m³/hr of clear water to Master Balancing Reservoir for design capacity. Pumps will operate 20 hours for the ultimate demand of 66 MLD. Pump capacity noted above included a margin of 5% on calculated discharge.. Considering design flow of 3300 cum/hr (correspond to 66 MLD) the total pump head works out to 59 mwc. The power absorbed by each pump at Munduli River Clear Water Pumping Station (CWPS) would be stated in table below:

Table: Pumps details of CWPS

Pumping to	Type of pump	Capacity (m ³ /hr)	Head (MWC)	No of pump (W+S)	Power required (kW)	Delivery pipe size (mm)	Delivery header size (mm)
MBR	Horizontal slit casing type	1735	59	2+1	378	600	1000

4.10. Replacement of Piping and valves

Pump suction will be replaced with 700 mm isolation sluice valve will be taken from clear water reservoir separately for each pump. At the 600 mm pump delivery pipe line, non-return valve and electrically operated gate valve will be provided. Dismantling joints to facilitate installation of the valves are proposed. The delivery header size will be 1000 mm for clear water supply. Backwash pumps, service water pumps, pre-chlorination and post-chlorination booster pumps will be replaced with new pumps of same capacity and allied piping works during augmentation of WTP.

5. Clear Water Transmission System

Clear water gravity transmission mains transmits the water from MBR at Mendhasala, directly to all bulk single point tapplings as well as Khorda and Jatni service reservoirs. Transmission system comprises of 42 kms of spirally welded mild steel pipeline ranging between diameters 800 mm to 1200 mm of K-9 ductile Iron pipeline ranging from 250 mm to 500 mm.

The proposed transmission route is given in the below figure. The route is assumed along the west side of the road leading to Khorda to minimise crossings. Site for MBR (Mendhasala) is on the east side of the road. The cross-country route of approximately 8 kms from intake works upto SOG crosses through the Chandaka forest (which houses the Elephant Sanctuary).

A 20m ROW along the existing transmission main is available up till SOG location for the proposed transmission main. 500 m stretch from location A to location B as shown in Appendix 12 will be above the ground with supports. The route along the road to NH- 5 junction crosses along about 4 bridges across major nalas and above 39 culverts above ground.


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O/o the E.I.C. P.H.(O), BBSR



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This clear water pumping station consists of two (2) nos. (1W+1S) service water pumps, two (2) nos. (1W+1S) chlorine booster pumps for pre chlorination and two (2) nos. chlorine booster pumps for post chlorination. All these pumps taking suction from clear water reservoir having 20 m³/hr, 15 m³/hr and 10 m³/hr capacity respectively with a design head of 40mwc, 25mwc and 25 mwc. Horizontal centrifugal end suction top discharge back pull out type pumps (1W+1S) shall be provided for service water supply, pre and post chlorination boosting purpose. Pump details are provided in table below:

Table: Pump Material of Construction for Service Water, Pre and Post Chlorination Booster Pumps

S No.	Component	Material
1	Casing	Cast iron: IS210 Grade FG 200
2	Impeller	Stainless steel: ASTM A 743 CF8M
3	Shaft	ASTM A276 Gr. 316 S13
4	Casing rings	Stainless steel: ASTM A743 CA15
5	Shaft sleeve	ASTM A276 Gr. 316 S13

Table: Pumps Details for Service water, , Pre and Post Chlorination Booster Pumps

Pumping to	Type of pump	Capacity (m ³ /hr)	Head (MWC)	No of pump (w+s)	Delivery pipe size (mm)	Delivery header size (mm)
Service water pumps	End suction back pullout type pump	25	25	1W+1S	50	50
Booster pump for pre-chlorination	End suction back pullout type pump	14	40	1W+1S	50	50
Booster pump for post-chlorination	End suction back pullout type pump	8	40	1W+1S	50	50

At the pump delivery, non-return valve and electrically operated gate valve will be provided for Service Water pump. Dismantling joints to facilitate installation of the valves are proposed. Individual pump delivery pipe is connected to discharge header. Pressure gauges shall be provided both pump suction and discharge pipeline for service water pump.

4.7. Portable Fire Extinguishers

To fight incidences of accidental fires, portable extinguishers of CO₂ type are suggested in the pump house.

4.8. HVAC System

Exhaust fans will be provided for proper ventilation of the pump house. The clear water pumping scheme for ultimate capacity involves pumping clear water (66 MLD) from the clear water reservoir of WTP to the master balancing reservoir (MBR) of 11ML capacity through 1000 mm MS main pipe line. B on conditional assessment and need, the mechanical equipment will be replaced after 15 years for design capacity in due course. Key features of design pumping scheme are elaborated below.

**Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR**



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The pump will be required to give high efficiencies in both single and parallel operation. Preliminary information available from manufacturers and their technical literature suggests that pump efficiency at the guarantee point will be about 85%.

Table: Pump Details of CWPS

Pumping to	Type of pump	Capacity (m ³ /hr)	Head (MWC)	No of pump (W+S)	Power required (kW)	Delivery pipe size (mm)	Delivery header size (mm)
MBR	Horizontal slit casing	1350	59	2+1	274	500	700

4.2.1. Pump materials of construction

The materials of construction of pump components is as under:

- a) Casing : CI IS 210 Gr.220
- b) Shaft : SS AISI 431
- c) Impeller : SS ASTM A351 CF8M

4.3. EOT Crane

For handling the equipment (pumpsets, valves, panel etc.) in the pump house, an EOT crane of 5.0T capacity is proposed within the pumping house superstructure. All motions will be electrically operated from a pendant controller. The crane will fully comply with international standards and will be of the single girder type with box section girders. The crane rails will be supported on beam built off the structural frame of the pumping station superstructure. The design of EOT Crane shall conform to IS 3177 (Latest edition).

4.4. Piping and Valves

Pump suction with 600 mm isolation sluice valve will be taken from clear water reservoir separately for each pump. At the 500 mm pump delivery pipe line, non-return valve and gate valve will be provided. Dismantling joints to facilitate installation of the valves are proposed. The delivery header size will be 700 mm for clear water supply. Individual pump delivery pipe is connected to discharge header outside the pump house. On pump delivery headers station isolation valve will be provided with valve chamber for maintenance of pumping station.

4.5. Backwash Pumps

This clear water pumping station consist of backwash water pumps taking suction from clear water reservoir having 2520 m³/hr capacity with a design head of 15 mwc. Horizontal centrifugal split casing pumps (1W+1S) shall be provided for backwashing purpose. Pump suction with 800 mm isolation sluice valve will be taken from clear water reservoir. At the pump delivery, non-return valve and gate valve will be provided. The pump delivery size for backwash water pump will be 700 mm. Dismantling joints to facilitate installation of the valves are proposed. The delivery header size will be 700 mm. Individual pump delivery pipe is connected to discharge header outside the pump house.

4.6. Service water pumps, Chlorine booster pumps and for Pre and Post Chlorination


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- ▶ Control Building
- ▶ Clear Water Reservoir
- ▶ Clear water Pump House

The sizes of the various units for the water treatment plant is depicted below. The detailed structural drawings are presented in the below table:

Table: Sizes of the various units for WTP

S No.	Equipment	Size	Quantity	MOC
1	Cascade Aerator	Dia 11 m x 1.5 m Total Height	1	RCC
2	Flash mixing tanks	2.7 m x 2.7 m x 3.0 m SWD + 0.3 m FB	2	RCC
3	Clariflocculators	Dia 35 m x 3.5 m SWD + 0.3 M FB	2	RCC
4	Declining rate filters	10m x 7.8 m x 4.0 m SWD + 0.5 m FB	6	RCC
5	Clear water sump	39.0 m x 39.0 m x 3.5 m SWD + 0.3 m FB (In 2 Compartments)	1	RCC
6	Clear water pump house with space for chlorine booster pump, backwash pump and service water pumps	27m x 15m x 7.5 m Total Height	1	RCC
7	Alum dosing tank	2 m x 2 m x 2.0 m SWD + 0.3 m FB	3	RCC
8	Lime dosing tank	3.5 m x 3.5 m x 2.0 m SWD + 0.3 m FB	3	RCC
9	Polyelectrolyte dosing tank	1.5 m x 1.5 m x 2.0 m SWD + 0.3 m FB	3	RCC

4. Clear Water Pumping Station at Munduli River

The transient analysis is done for the clear water rising main from clear water pumping station (CWPS) at Munduli to the Master Balancing Reservoir (MBR) at Mendhasala. The CWPS pumps from the clear water reservoir of WTP to the MBR of 11 ML capacity through 1000 mm diameter MS pipes having length about 21 km.

4.1. Horizontal Centrifugal Split Casing Pump

Horizontal centrifugal split casing type of pumps is located in a pump house and draw suction from a reservoir. The pump suction is positive, so pump priming is not required. Due to split casing arrangement pump maintenance is easier compare to other horizontal types of pump. Horizontal split casing pump is preferred due to lesser capital cost and easier maintenance. There are three (3) number pumps (2W+1S) in the pump house with each pump capable of pumping 1350 m³/hr of clear water to Master Balancing Reservoir. Pumps will operate 20 hours for the demand of 50 mld.

4.2. Pump Parameters, Operation and Salient Features

Considering design flow of 2500 cum/hr (correspond to 50 mld) the total pump head works out to 59 mwc. The pump house will house the MCC-cum-ICP for the pumps besides pumps, pipe, valves, fittings and EOT Crane.


Chief Engineer
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The power absorbed by each pump at Munduli Intake Pumping Station (RWPS) would be approx. 180 kW (240 Hp). For a flow of 1810 cum/hr, the friction head in pipes and fittings works out to 3.4mwc. The total pump head hence works out to 26.32 mwc, say 27 mwc.

2.11. Valve Replacement

The pump delivery size will be 600 mm. Two dismantling joints of bellow type, to facilitate installation of the valves on the pump delivery line, will be provided. The header size will be 1000mm. A bypass gate valve on the delivery header, with bypass leading back to the river, will be provided to facilitate draining of the intake well upto minimum water level for cleaning.

3. Water Treatment Plant

The treatment plant shall comprise of the unit processes given in the below sub-points:

- ▶ Pre-chlorination
- ▶ Lime Dosing
- ▶ Alum Dosing
- ▶ Polyelectrolyte Dosing
- ▶ Flash Mixing
- ▶ Flocculation
- ▶ Clarification
- ▶ Filtration
- ▶ Disinfection with chlorine

The treatment plant is designed for a capacity of 52 MLD of raw water and to provide 50 MLD of treated water of the specified quality with 20 hrs of operation. The plant layout has a provision of adequate space for all necessary units including allied buildings. The treatment plant is proposed with operation based on PLC. The proposed WTP is designed to operate with following process chain:

- ▶ Cascade aerator
- ▶ Pre-chlorination
- ▶ Flash mixing
- ▶ Coagulation & flocculation
- ▶ Clarification
- ▶ Rapid sand gravity decline rate filtration
- ▶ Post chlorination
- ▶ Clear water sump
- ▶ Clear water pumping station & electrical sub station

A storage capacity of 2 hours will be considered in the WTP area which will be a clear water reservoir. The treated water from the water treatment plant will be pumped to the respective MBR through the proposed transmission main.

The major civil works involved in WTP Campus involves:

- ▶ Plant Boundary
- ▶ RCC Water Retaining Structures of the Various Units
- ▶ Substation
- ▶ Chemical Storage Building



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Individual pump delivery pipe is connected to discharge header inside the pump house. At the pump delivery, non-return valve and manually operated gate valve will be provided. The pump delivery size will be 600 mm. Two dismantling joints of bellow type, to facilitate installation of the valves on the pump delivery line, will be provided. The header size will be 1000mm. A bypass gate valve on the delivery header, with bypass leading back to the river, will be provided to facilitate draining of the intake well upto minimum water level for cleaning. On pump delivery headers station isolation valve (butterfly type) will be provided with valve chamber for maintenance of pumping station.

2.7. Dewatering Pump

The intake well has to be cleaned to prevent silt accumulation. For this the well has to be dewatered. Dewatering will be done by lowering the gate and isolating the intake. Water in the well would be drained upto the design normal pond level by running the VT pump and opening the bypass. Further emptying of the intake well would be by means of a portable submersible pump of 100 cum/hr capacity and 25 mwc head, which would be lowered from the pump house in the intake well drainage pit. The submersible pump discharge would be led to the river.

2.8. Portable Fire Extinguishers

To fight incidences of accidental fires, portable extinguishers of CO2 type are suggested in the pump house.

2.9. HVAC SYSTEM

Exhaust fans will be provided for proper ventilation of the pump house. The raw water pumping scheme for ultimate capacity involves pumping raw water (69 MLD) from the river Mahanadi near Munduli Barrage to the treatment plant. The design flow requirement works out to 3450 cum/hr (69 MLD) considering that pumping operation is for 20 hours per day. It is observed that mechanical equipment deteriorates in about 15 years, and based on conditional assessment and need, the mechanical equipment will be replaced for design capacity in due course. Key features of design pumping scheme are elaborated below.

2.10. Pump Replacement

Pump of capacity 1810 cum/hr of 27 m of head running for 20 hours would meet the requirement of 69 mld. It is observed in pumps that over a period of time the pump impeller gets slightly worn out due to which there is a marginal drop in desired discharge. Hence it is felt prudent to consider a margin of 5% on the desired discharge. The pump parameters for the pumps thus are 1810 cum/hr discharge at 27 mwc total head. Pumps would be self-water lubricated and of non-pullout type. Pump details are provided below.

Type of Pump	Capacity (m3/hr)	Head (MWC)	No. Of Pump (W+S)	Motor power required (kW)	Delivery main size (mm)	Deliver header size (mm)
Vertical Turbine Pump	1810	27	2+2	180	600	1000


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The pump discharge varies with the variation in the static head. In case of RW levels, the variation is from 21.550m (Design minimum flood level) to 31.300m (Design maximum flood level), which is around 9.75m. Considering design normal pond level elevation for design purpose, i.e. 24.080m and the water treatment plant intake level as 46.650m the static head is 22.92 mwc. For a flow of 1380 cum/hr, the friction head in pipes and fittings works out to 3.4mwc. The total pump head hence works out to 26.32 mwc, say 27 mwc.

Operation of the pumping station would be manual. Starting of the pumps, in the condition of empty discharge header, would be with closed pump delivery valve. The valve will be gradually opened after pump has started. In addition of 3 nos (2W+1S) pumps, future provision of space requirement for one more pump shall be kept in the pump house for ultimate flow requirement of 78 mld.

A rectangular pump house above an intake well is proposed for installing the VT pumpsets. The dimension of the pump house is worked out to 13.5 m x 12.2 m (approx). The height of the pump house would be about 10m. Water entry to the intake well would be through 4 nos. (1.6mX1.25m size) openings provided in the well. The well can isolated from the river by means of sluice gates, which slide over the openings to shut the entry and screen is provided for restriction in entry of floating material in pump intake well

Table: Pump Details of RWPS

Type of Pump	Capacity (m ³ /hr)	Head (MWC)	No. Of Pump (W+S)	Motor power required (kW)	Delivery main size (mm)	Deliver header size (mm)
Vertical Turbine Pump	1380	27	2+1	130	600	1000

2.3. Pump-Materials Of Construction

The materials of construction of pump components are as under:

- a) Bowl assembly : CI IS 210 Gr. 220
- b) Column pipe : MS IS 2062
- c) Shaft and shaft coupling : SS AISI 431
- d) Impeller : SS ASTM A351 CF8M

2.4. EOT Crane

For handling the equipment (pump sets, valves, and other equipments) in the pump house an Electrically Operated Travelling (EOT) crane is proposed. The capacity of this crane, based on the heaviest equipment to be lifted, is 5 T. A lift of about 8.0m for the crane would be required to lift the equipment in the pump house.

2.5. Electrically Operated Chain Pulley Block

Electrically operated chain pulley block with monorail shall be provided for operation and handling the sluice gates. Capacity of chain pulley block shall be of 1.2 times of heaviest weight of components to be lifted for sluice gates.

2.6. Valves


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Annex – I
(Schedule-B)

Description of Project Water Supply System

1. Intake Works and Raw Water Transmission System

The proposed Intake location is near Munduli Barrage on Mahanadi is at about 30 km by road from heart of Bhubaneswar. The location is at 100m upstream of existing Intake structure. The site has access to National highway (NH-5) to Cuttack (connected by Banki road of about 15 kms). The proposed raw water transmission (pumping) main starts at the intake and continues along the (Munduli) barrage road for almost 1 km until in turns to enter WTP.

The raw water pumping station involved pumping of raw water from the river Mahanadi near Munduli Barrage to the treatment plant for the intermediate phase. A total of three (3) pumps each of 50% capacity of total flow are proposed.

2. Raw Water Intake Pumping Station

The raw water pumping works involves pumping raw water (52.0 mld) from the river Mahanadi near Munduli Barrage to the treatment plant for the intermediate phase. The pump capacity is 1380 cum/hr running for 20 hrs would meet the requirement (52 MLD) for the year 2026. The key features of pumping scheme are elaborated below:

2.1. Vertical Turbine Pump (VT)

Vertical pump is submerged and motor is installed on floor above maximum flood level. The motor is connected to the pump by shaft. The VT pumps being submerged are assured of positive suction at all times.

The water level in the river Mahanadi varies in wide range. Vertical turbine pumps are the most suited for water extraction from river intake where there is a large amount of level variation. Hence vertical turbine pumps are recommended for this installation. Three (3) number pumps, each of 50% capacity of total flow, two (2) working and one (1) standby (2W+1S) are proposed.

2.2. Pump parameters, Operation and Salient features

Pump of capacity 1380 cum/hr of 27 m of head running for 20 hours would meet the requirement of 52 mld.

It is observed in pumps that over a period of time the pump impeller gets slightly worn out due to which there is a marginal drop in desired discharge. Hence it is felt prudent to consider a margin of 6% on the desired discharge. The pump parameters for the pumps thus are 1380 cum/hr discharge at 27 mwc total head. Pumps would be self-water lubricated and of non-pullout type.

Preliminary information available from manufacturers and their technical literature suggests that pump efficiency at the guarantee point will be about 85%. The power absorbed by each pump at Munduli Intake Pumping Station would be approx. 130 kW (175 Hp).



**Chief Engineer
O/o the E.I.C. P.H.(U), BODR**



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SCHEDULE – B: DEVELOPMENT OF PROJECT WATER SUPPLY SYSTEM

(See Clause 2)

1. Development of the Project Water Supply System

Development of the Project Water Supply System shall include construction of the Project Water Supply System as described in this Schedule-B. The Concessionaire shall build the Project Water Supply System in accordance with minimum description as provided in Schedule –B.

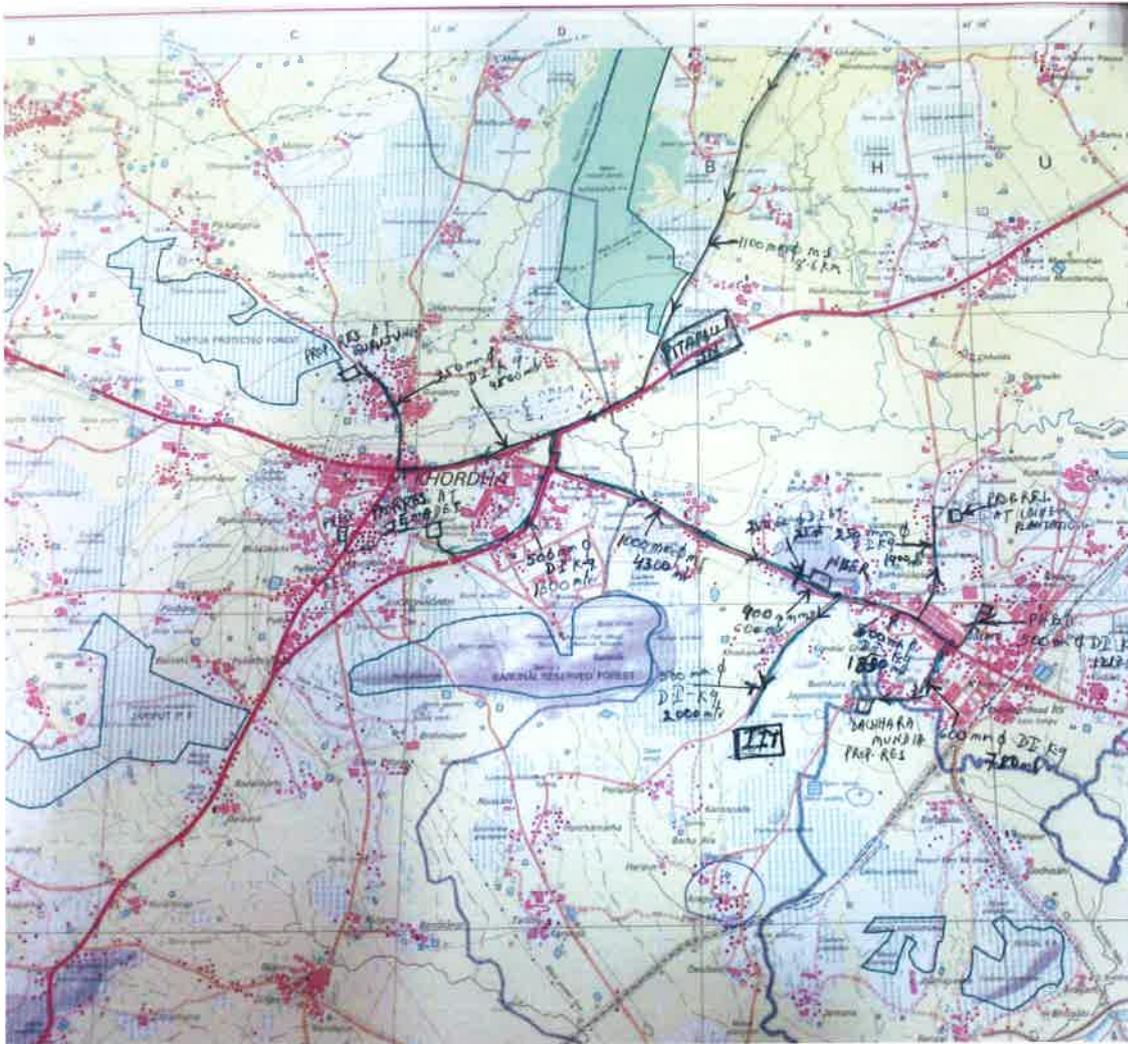
The Project Water Supply System shall be completed by the Concessionaire in conformity with the Specifications and Standards set forth in Annex-I of Schedule-C.



**Chief Engineer P.H. (Urban)
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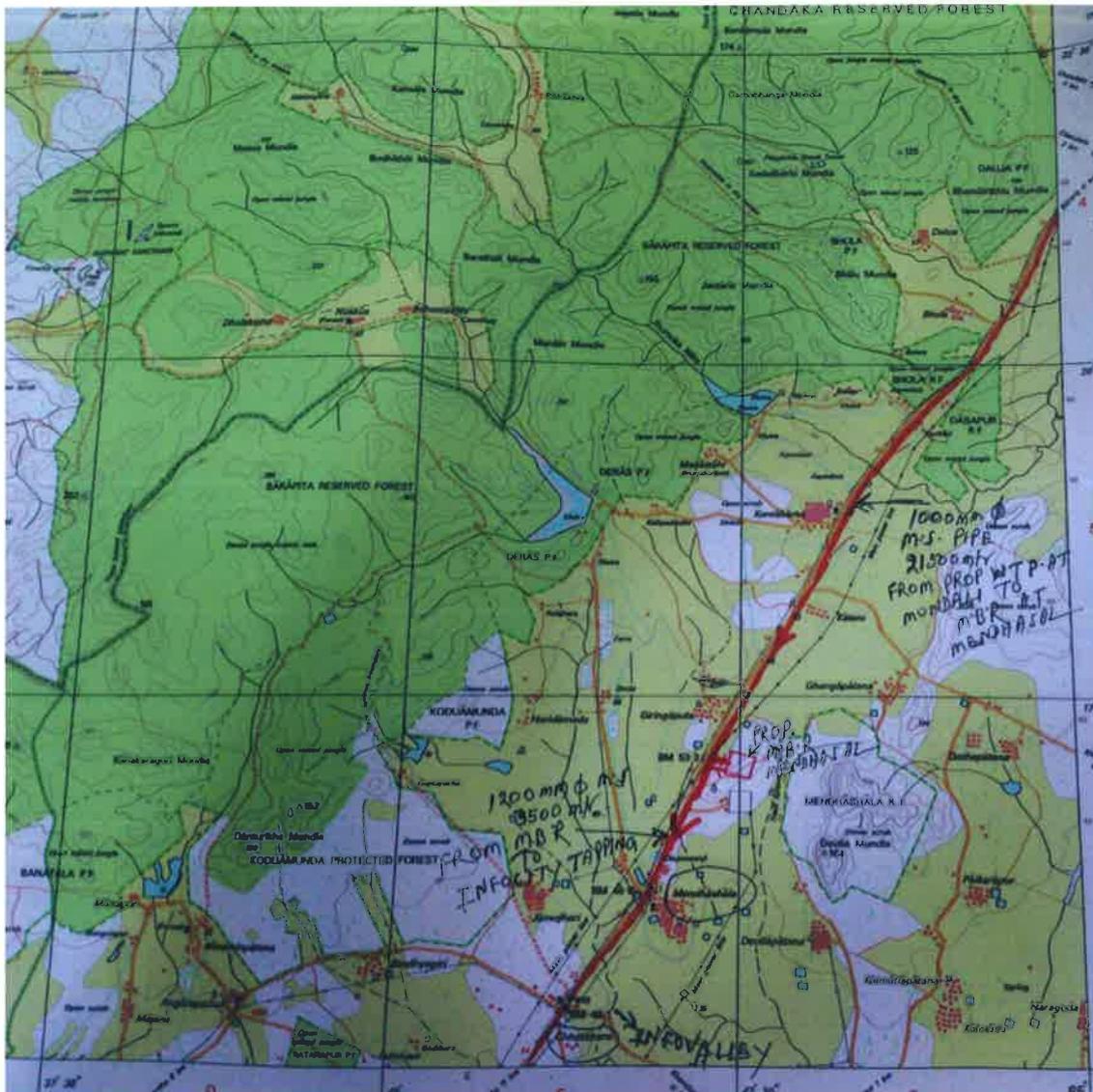


Delivery Points (Indicative Map)


Chief Engineer P. [Name] (Jan)
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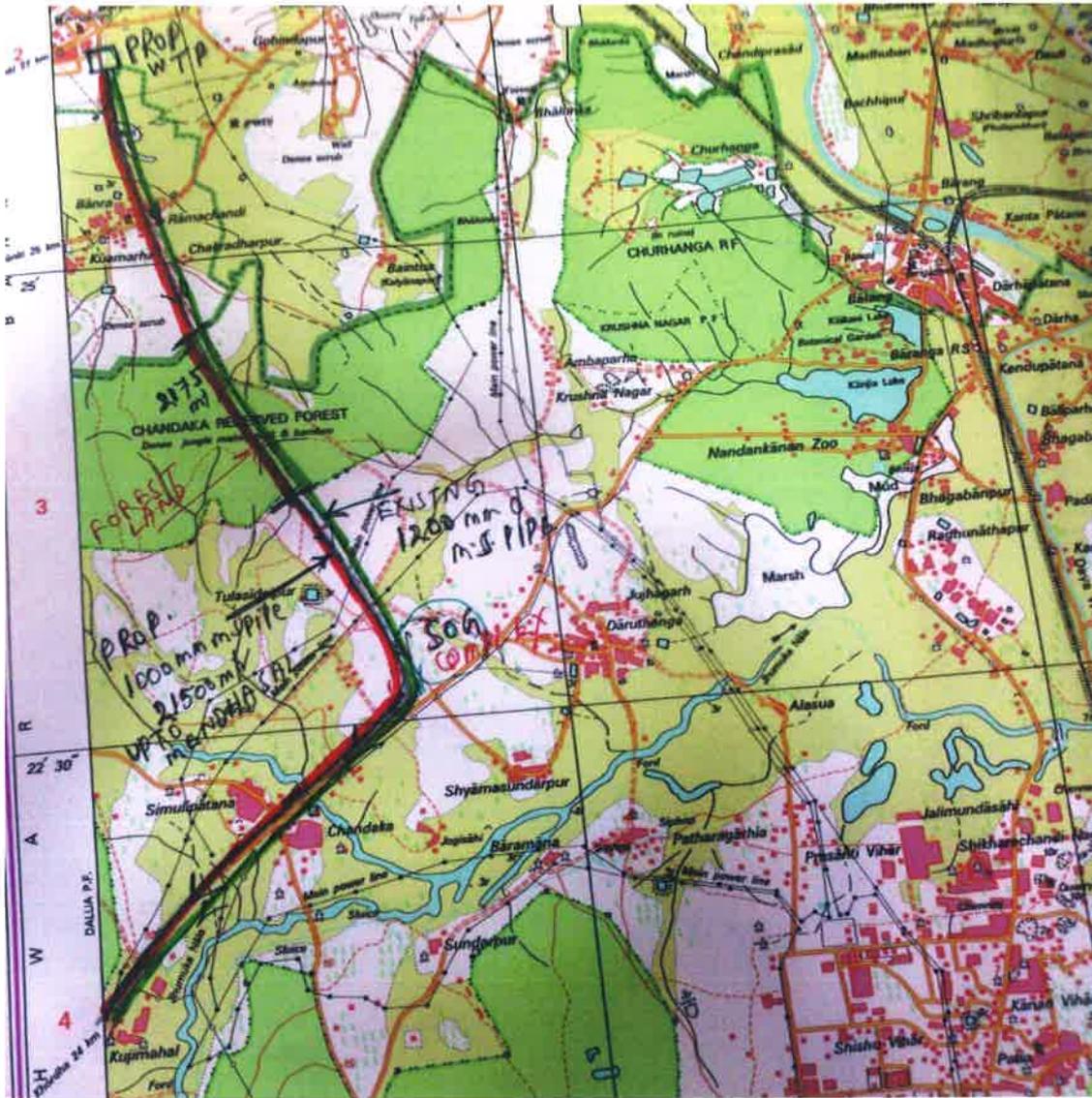
Alignment of the Pipeline (Indicative Map)

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Chief Engineer (Urban)
O/o the E.I.C. P.H.(O), BBSR



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Water Intake Point (Indicative Map)

**Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR**

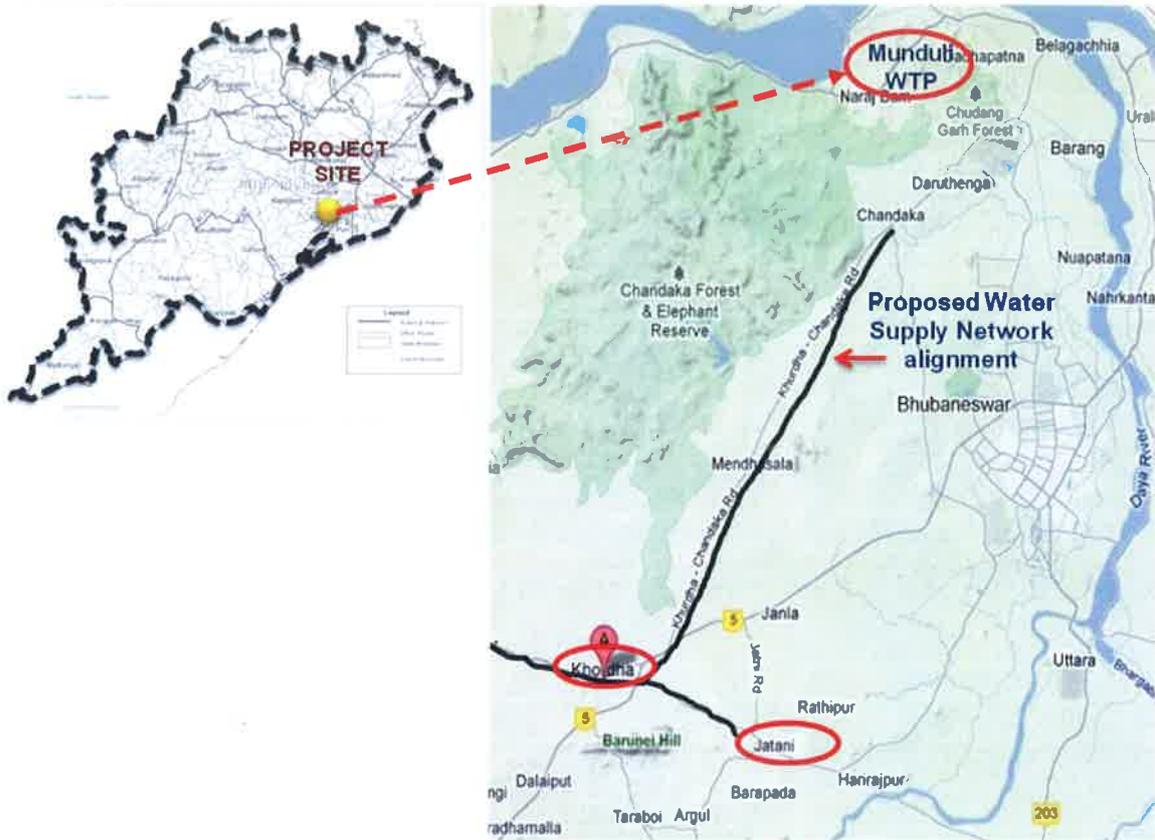


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ANNEX-I OF SCHEDULE-A: PROJECT SITE

1. Location and Access of Site

The location of the project is in vicinity of Bhubaneswar city, Odisha



The single point tapplings from transmission main are proposed at following locations:

- (a) IIT Bhubaneswar: Location is at Argul, near Jatni
- (b) National Institute of Science, Education & Research (NISER): Location is at 5 kms from NH-8 along the Khorda-Jatni Road
- (c) IDCO project locations
- (d) INFOCITY-II: Location is at about 3kms north-west of Janla
- (e) Khorda ULB
- (f) Jatni ULB


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SCHEDULE – A: SITE OF THE PROJECT

1. The Site
 - 1.1. The Site for the Bulk Water Supply System has been described in Annex-I of this Schedule-A.
 - 1.2. An inventory of the Site including the land, buildings, structures, road works, trees and any other immovable property on, or attached to, the Site shall be prepared jointly by the Authority Representative and the Concessionaire, and such inventory shall form part of the Schedules to the Concession Agreement referred to in Clause 11.3.1 of this Agreement.


Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



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PART – V

▶ SCHEDULES



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

IN WITNESS WHEREOF THE PARTIES HAVE EXECUTED AND DELIVERED THIS AGREEMENT AS OF THE DAY, MONTH AND YEAR FIRST ABOVE WRITTEN.

SIGNED, SEALED AND DELIVERED

For and on behalf of THE AUTHORITY by:



(Er. KSHITISH CHANDRA SAHU)

Chief Engineer P.H. (Urban)
CHIEF ENGINEER, PH (U)
O/o the E.I.C. P.H.(O), BBSR

OFFICE OF THE ENGINEER-IN-CHIEF, PUBLIC HEALTH, ODISHA, BHUBANESWAR HEADS OF DEPARTMENT BUILDING, 1ST FLOOR, UNIT-V, BHUBANESWAR – 751001

In the presence of:

1.

SIGNED, SEALED AND DELIVERED

For and on behalf of THE CONCESSIONAIRE by:



(Ch. P. Subbaiah)

Director

MEIL (BHUBANESWAR) BULK WATER PROJECT PRIVATE LIMITED
S-2, TECHNOCRAT INDUSTRIAL ESTATE, BALANAGAR, HYDERABAD – 500037, INDIA

2.



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

Termination Payment	means the amount payable by the Authority to the Concessionaire upon Termination and may consist of payments on account of and restricted to the Debt Due and Adjusted Equity, as the case may be, which form part of the Total Project Cost in accordance with the provisions of this Agreement; provided that the amount payable in respect of any Debt Due expressed in foreign currency shall be computed at the Reference Exchange Rate for conversion into the relevant foreign currency as on the date of Termination Payment. For the avoidance of doubt, it is agreed that within a period of 60 (sixty) days from COD, the Concessionaire shall notify to the Authority, the Total Project Cost as on COD and its disaggregation between Debt Due and Equity, and only the amounts so conveyed shall form the basis of computing Termination Payment, and it is further agreed that in the event such disaggregation is not notified to the Authority, Equity shall be deemed to be the amount arrived at by subtracting Debt Due from Total Project Cost;
Tests	means the tests set forth in Schedule-H to determine the completion of Water Supply System in accordance with the provisions of this Agreement;
Total Project Cost	Means the lowest of: (a) the capital cost of the Project, less Equity Support as set forth in the Financial Package; (b) the actual capital cost of the Project upon completion of of the Project less Equity Support; and (c) a sum of Rs. 187.7118 Crores (Rupees One Hundred and Eighty Seven Crores and Seventy One Lakhs), less Equity Support; provided that in the event of Termination, the Total Project Cost shall be deemed to be modified to the extent of variation in WPI or Reference Exchange Rate occurring in respect of Adjusted Equity and Debt Due, as the case may be, in accordance with the provisions of this Agreement; provided further that in the event WPI increases, on an average, by more than 6% (six per cent) per annum for the period between the date hereof and COD, the Parties shall meet, as soon as reasonably practicable, and agree upon revision of the amount hereinbefore specified such that the effect of increase in WPI, in excess of such 6% (six per cent), is reflected in the Total Project Cost;
Transfer Date	means the date on which this Agreement and the Concession hereunder expires pursuant to the provisions of this Agreement or is terminated by a Termination Notice;
User Fees	Means the charges levied on account of water supply to the Bulk Users for domestic or non-domestic purposes.
Vesting Certificate	Shall have the meaning set forth in Clause 35.4;


 Chief Engineer P.H. (Urban)
 Q/o the E.I.C. P.H.(O), BBSR



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

	Act, 1956 including any statutory modification or re-enactment thereof, for the time being in force, and appointed in accordance with Clause 30.2.1;
“Subordinated Debt”	<p>means the aggregate of the following sums expressed in Indian Rupees or in the currency of debt, as the case may be, outstanding as on the Transfer Date:</p> <p>(a) the principal amount of debt provided by lenders or the Concessionaire for meeting the Total Project Cost and subordinated to the financial assistance provided by the Senior Lenders; and</p> <p>(b) all accrued interest on the debt referred to in Sub-clause (a) above but restricted to the lesser of actual interest rate and a rate equal to 5% (five per cent) above the Bank Rate in case of loans expressed in Indian Rupees and lesser of the actual interest rate and six-month LIBOR (London Inter Bank Offer Rate) plus 2% (two per cent) in case of loans expressed in foreign currency, but does not include any interest that had fallen due one year prior to the Transfer Date;</p> <p>provided that if all or any part of the Subordinated Debt is convertible into Equity at the option of the lenders and/or the Concessionaire, it shall for the purposes of this Agreement be deemed to be Subordinated Debt even after such conversion and the principal thereof shall be dealt with as if such conversion had not been undertaken;</p>
Subsistence Revenue	Means the total amount of Fee revenue that is required by the Concessionaire in an Accounting Year to meet the sum of (a) O&M Expenses, subject to an annual ceiling of 3% (three per cent) of the Total Project Cost, plus Grant during the first Accounting Year after COD, to be revised for each subsequent year to reflect the variations in WPI occurring between COD and commencement of such Accounting Year, and (b) Debt Service in such Accounting Year, but excluding any interest paid by the Authority under clause 31.7.2 or 32.2;
Suspension	shall have the meaning set forth in Clause 33.1;
Service Requirements Level	Means the service level requirement referred to in this Schedule-Q;
Taxes	means any Indian taxes including excise duties, customs duties, value added tax, sales tax, local taxes, cess and any impost or surcharge of like nature (whether Central, State or local) on the goods, materials, equipment and services incorporated in and forming part of the Project Water Supply System charged, levied or imposed by any Government Instrumentality, but excluding any interest, penalties and other sums in relation thereto imposed on any account whatsoever. For the avoidance of doubt, Taxes shall not include taxes on corporate income;
Termination	means the expiry or termination of this Agreement and the Concession hereunder;
Termination Notice	means the communication issued in accordance with this Agreement by one Party to the other Party terminating this Agreement;


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System	accordance with this Agreement;
Provisional Certificate	shall have the meaning set forth in Clause 15.3;
Raw Water	Shall mean the water that shall be drawn from the Mundali Barrage of River Mahanadi;
Realisable Fee	"Realisable Fee" means all the Fee due and realisable under this Agreement, but does not include fees that the Concessionaire has not been able to realise after due diligence and best efforts. For the avoidance of doubt, Realisable Fee shall, save as provided in Clause 24.3, be the amount so declared by the Concessionaire on the basis of its provisional accounts or the audited accounts, as the case may be, and in the event of a dispute thereto, the Dispute Resolution procedure shall apply;
Request for Proposal	Shall have the meaning set forth in Recital (D)
Request for Qualification	Shall have the meaning set forth in Recital (C)
Right of Way	means the constructive possession of the Site, together with all way leaves, easements, unrestricted access and other rights of way, howsoever described, necessary for construction, operation and maintenance of the Project Water Supply System in accordance with this Agreement;
Safety Requirements	Shall have the meanings as set forth in Clause 19.1;
Safety Fund	Shall have the meanings as set forth in Clause 19.2;
Scheduled Water Supply System	Shall have the meanings as set forth in Clause 13.3;
Scope of the Project	Shall have the meanings as set forth in Clause 2.1;
Senior Lenders	means the financial institutions, banks, multilateral lending agencies, trusts, funds and agents or trustees of debenture holders, including their successors and assignees, who have agreed to guarantee or provide finance to the Concessionaire under any of the Financing Agreements for meeting all or any part of the Total Project Cost and who hold <i>pari passu</i> charge on the assets, rights, title and interests of the Concessionaire;
Site	Shall have the meanings as set forth in Clause 11.1;
Specifications and Standards	means the specifications and standards relating to the quality, quantity, capacity and other requirements for the Project Water Supply System, as set forth in Schedule-C, and any modifications thereof, or additions thereto, as included in the design and engineering for the Project Water Supply System submitted by the Concessionaire to, and expressly approved by, the Authority;
State	means the State of Odisha and "State Government" means the government of that State;
Statutory Auditors	means a reputable firm of chartered accountants acting as the statutory auditors of the Concessionaire under the provisions of the Companies


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	reconstruction, reinstatement, improvement and maintenance costs, (f) payments required to be made under the O&M Contract, or any other contract in connection with or incidental to O&M, and (g) all other expenditure required to be incurred under Applicable Laws, Applicable Permits or this Agreement;
O&M Inspection Report	Shall have the meaning set forth in Clause 20.2;
Operation Period	means the period commencing from COD and ending on the Transfer Date;
Panel of Chartered Accountants	shall have the meaning set forth in Clause 30.2.1;
Parties	means the parties to this Agreement collectively and "Party" shall mean any of the parties to this Agreement individually;
Performance Security	shall have the meaning set forth in Clause 10.1;
Political Event	shall have the meaning set forth in Clause 31.4;
Premium	Shall have the meaning set forth in Clause 23.3;
Project	means the construction, operation and maintenance of the Project Water Supply System in accordance with the provisions of this Agreement, and includes all works, services and equipment relating to or in respect of the Scope of the Project;
Project Agreements	Means this Agreement, Financing Agreements, EPC Contract, Bulk Water Supply Agreement, and any other agreements or material contracts (other than the Financing Agreements) that may be entered into by the Concessionaire with any person in connection with matters relating to, arising out of or incidental to the Project;
Project Assets	means all physical and other assets relating to and forming part of the Project Site including (a) rights over the Project Site in the form of licence, right of way or otherwise; (b) tangible assets such as civil works and equipment (including tankers); (c) Project Facilities situated on the Project Site; (d) all rights of the Concessionaire under the Project Agreements; (e) financial assets, such as receivables, security deposits etc.; (f) insurance proceeds; and (g) Permits and authorisations relating to or in respect of the Project;
Project Completion Date	Means the date on which the Completion Certificate or the Provisional Certificate is issued under the provisions of Article 15;
Project Completion Schedule	means the progressive Project Milestones set forth in Schedule-F for completion of the Project Water Supply System on or before the Scheduled Water Supply System Completion Date;
Project Facilities	means the new facilities to be constructed in accordance with this Agreement and the Existing Assets (both before and during the Concession Period);
Project Water Supply	means the new facilities to be constructed including the laying of pipelines, water treatment plant, intake, pumping stations, etc. in

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	programmes and manuals, drawings, copyright (including rights in computer software), database rights, semi-conductor, topography rights, utility models, rights in know-how and other intellectual property rights, in each case whether registered or unregistered and including applications for registration, and all rights or forms of protection having equivalent or similar effect anywhere in the world;
Lead Member	Shall have the meaning set forth in Recital (C)
LOA or Letter of Award	Means the letter of award referred to in Recital (E);
Lenders Representative	means the person duly authorised by the Senior Lenders to act for and on behalf of the Senior Lenders with regard to matters arising out of or in relation to this Agreement, and includes his successors, assigns and substitutes;
Maintenance Manual	Shall have the meaning ascribed to it in Clause 18.3;
Maintenance Programme	Shall have the meaning ascribed to it in Clause 18.4;
Maintenance Requirements	Shall have the meaning ascribed to it in Clause 18.2;
Material Adverse Effect	means a material adverse effect of any act or event on the ability of either Party to perform any of its obligations under and in accordance with the provisions of this Agreement and which act or event causes a material financial burden or loss to either Party;
Minimum Drawdown Level	means the level below which the reservoir will not be drawn down;
MLD	means million litres per day;
Nominated Company	means a company selected by the Lenders' Representative and proposed to the Authority for substituting the Concessionaire in accordance with the provisions of the Substitution Agreement;
Non-Political Event	Shall have the meaning set forth in Clause 31.2;
O&M	means the operation and maintenance of the Project Water Supply System and includes all matters connected with or incidental to such operation and maintenance, provision of services and facilities, and collection of Fee in accordance with the provisions of this Agreement;
O&M Contract	means the operation and maintenance contract that may be entered into between the Concessionaire and the O&M Contractor for performance of all or any of the O&M obligations;
O&M Contractor	means the person, if any, with whom the Concessionaire has entered into an O&M Contract for discharging O&M obligations for and on behalf of the Concessionaire;
O&M Expenses	means expenses incurred by or on behalf of the Concessionaire or by the Authority, as the case may be, for all O&M including (a) cost of salaries and other compensation to employees, (b) cost of materials, supplies, utilities and other services, (c) premia for insurance, (d) all taxes, duties, cess and fees due and payable for O&M, (e) all repair, replacement,



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	parameters used for making calculations and projections therein;
Financial Package	means the financing package indicating the total capital cost of Water Supply Project and the means of financing thereof, as set forth in the Financial Model and approved by the Senior Lenders, and includes Equity, all financial assistance specified in the Financing Agreements, Subordinated Debt and Equity Support, if any;
Financing Agreements	means the agreements executed by the Concessionaire in respect of financial assistance to be provided by the Senior Lenders by way of loans, guarantees, subscription to non-convertible debentures and other debt instruments including loan agreements, guarantees, notes, debentures, bonds and other debt instruments, security agreements, and other documents relating to the financing (including refinancing) of the Total Project Cost, and includes amendments or modifications
Force Majeure or Force Majeure Event	shall have the meaning ascribed to it in Clause 31.1;
GOI	Means the Government of India;
GoO	Government of Odisha;
Good Industry Practice	means the practices, methods, techniques, designs, standards, skills, diligence, efficiency, reliability and prudence which are generally and reasonably expected from a reasonably skilled and experienced operator engaged in the same type of undertaking as envisaged under this Agreement and which would be expected to result in the performance of its obligations by the Concessionaire in accordance with this Agreement, Applicable Laws and Applicable Permits in reliable, safe, economical and efficient manner;
Government	Means the Government of India;
Grant	Shall have the meaning set forth in Clause 23.1.1;
Indemnified Party	Means the Party entitled to the benefit of an indemnity pursuant to Article 39;
Indemnifying Party	Means the Party obligated to indemnify the other Party pursuant to Article 39;
Independent Engineer	Shall have the meaning set forth in Clause 21.1
Indirect Political Event	Shall have the meaning set forth in Clause 31.3;
Insurance Cover	means the aggregate of the maximum sums insured under the insurances taken out by the Concessionaire pursuant to Article 29, and includes all insurances required to be taken out by the Concessionaire under Clause 29.1 but not actually taken, and when used in the context of any act or event, it shall mean the aggregate of the maximum sums insured and payable or deemed to be insured and payable in relation to such act or event;
Intellectual Property	Means all patents, trademarks, service marks, logos, get-ups, trade names, internet domain names, rights in designs, blue prints,

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	Facilities in accordance with the provisions of this Agreement;
EPC Contractor	Means the person with whom the Concessionaire has entered into an EPC Contract;
Emergency	means a condition or situation that is likely to endanger the security of the individuals on or about the Project Water Supply System, including Users thereof, or which poses an immediate threat of material damage to any of the Project Assets;
Encumbrances	means, in relation to the Project Water Supply System, any encumbrances such as mortgage, charge, pledge, lien, hypothecation, security interest, assignment, privilege or priority of any kind having the effect of security or other such obligations, and shall include any designation of loss payees or beneficiaries or any similar arrangement under any insurance policy pertaining to the Project Water Supply System, where applicable herein but excluding utilities referred to in Clause 12.1;
Equity	means the sum expressed in Indian Rupees representing the paid up equity share capital of the Concessionaire for meeting the equity component of the Total Project Cost, and shall for the purposes of this Agreement include convertible instruments or other similar forms of capital, which shall compulsorily convert into equity share capital of the Company, and any interest-free funds advanced by any shareholder of the Company for meeting such equity component, but does not include Equity Support;
Equity Support	Shall have the meaning set forth in Clause 23.2.1;
Escrow Account	means an Account which the Concessionaire shall open and maintain with a Bank in which all inflows and outflows of cash on account of capital and revenue receipts and expenditures shall be credited and debited, as the case may be, in accordance with the provisions of this Agreement, and includes the Sub-Accounts of such Escrow Account;
Escrow Agreement	Shall have the meaning set forth in Clause 28.1.2
Escrow Bank	Shall have the meaning set forth in Clause 28.1.1
Escrow Default	Shall have the meaning set forth in Schedule-P;
Fee or User Fee	Shall mean the charge levied on and payable for consumption of water using the Project Water Supply System, in accordance with Schedule-K of this Agreement.
Financial Close	means the fulfilment of all conditions precedent to the initial availability of funds under the Financing Agreements;
Financial Default	shall have the meaning set forth in Schedule-U;
Financial Model	means the financial model adopted by Senior Lenders, setting forth the capital and operating costs of the Project and revenues therefrom on the basis of which financial viability of the Project has been determined by the Senior Lenders, and includes a description of the assumptions and


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	Authority or the Independent Engineer to accord their approval;
DBFOT	Design, Build, Finance, Operate and Transfer" shall have the meaning set forth in Recital (B);
Damages	shall have the meaning set forth in Sub-clause (w) of Clause 1.2.1;
Debt Due	<p>means the aggregate of the following sums expressed in Indian Rupees outstanding on the Transfer Date:</p> <p>(a) the principal amount of the debt provided by the Senior Lenders under the Financing Agreements for financing the Total Project Cost (the "principal") but excluding any part of the principal that had fallen due for repayment two years prior to the Transfer Date;</p> <p>(b) all accrued interest, financing fees and charges payable under the Financing Agreements on, or in respect of, the debt referred to in Sub-clause (a) above until the Transfer Date but excluding (i) any interest, fees or charges that had fallen due one year prior to the Transfer Date, (ii) any penal interest or charges payable under the Financing Agreements to any Senior Lender, and (iii) any prepayment charges in relation to accelerated repayment of debt except where such charges have arisen due to Authority Default; and (c) any Subordinated Debt which is included in the Financial Package and disbursed by lenders for financing the Total Project Cost;</p> <p>provided that if all or any part of the Debt Due is convertible into Equity at the option of Senior Lenders and/or the Concessionaire, it shall for the purposes of this Agreement be deemed to be Debt Due even after such conversion and the principal thereof shall be dealt with as if such conversion had not been undertaken;</p>
Debt Service	means the sum of all payments on account of principal, interest, financing fees and charges due and payable in an Accounting Year to the Senior Lenders under the Financing Agreements;
Development Period	means the period from the date of this Agreement until the Appointed Date;
Dispute	Shall have the meaning set forth in Clause 41.1.1;
Dispute Resolution Procedure	Means the procedure for resolution of Disputes set forth in Article 41;
Divestment Requirements	Means the obligations of the Concessionaire for and in respect of Termination as set forth in Clause 35.1;
Document or Documentation	means documentation in printed or written form, or in tapes, discs, drawings, computer programmes, writings, reports, photographs, films, cassettes, or expressed in any other written, electronic, audio or visual form;
EPC Contract	means the engineering, procurement and construction contract or contracts entered into by the Concessionaire with one or more Contractors for, inter alia, engineering and construction of the Project


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	Consortium Member to the total Equity, if it occurs prior to COD, shall Change in Ownership;
Change of Scope	Shall have the meaning set forth in Clause 16.1
Company	Means the Company acting as the Concessionaire under this Agreement;
Completion Certificate	Shall have the meaning set forth in Clause 15.2
Concession	Shall have the meaning set forth in Clause 3.1.1
Concessionaire	Shall have the meaning attributed thereto in the array of Parties hereinabove as set forth in the Recitals;
Concession Fee	Shall have the meaning as set forth in Clause 24.1
Concession Period	means the period starting on and from the Appointed Date and ending on the Transfer Date;
Concessionaire Default	Shall have the meaning set forth in Clause 34.1.1
Conditions Precedent	Shall have the meaning set forth in Clause 4.1.1.
Consortium	Shall have the meaning set forth in Recital (C);
Consortium Member	means a company specified in Recital (C) as a member of the Consortium;
Construction Period	means the period beginning from the Appointed Date and ending on the COD;
Construction Works	means all works and things necessary to complete the Project Water Supply System in accordance with this Agreement;
Contractor	means the person or persons, as the case may be, with whom the Concessionaire has entered into any of the EPC Contract, the O&M Contract, or any other agreement or a material contract for construction, operation and/or maintenance of the Project Water Supply System or matters incidental thereto, but does not include a person who has entered into an agreement for providing financial assistance to the Concessionaire;
Cure Period	means the period specified in this Agreement for curing any breach or default of any provision of this Agreement by the Party responsible for such breach or default and shall: (a) commence from the date on which a notice is delivered by one Party to the other Party asking the latter to cure the breach or default specified in such notice; (b) not relieve any Party from liability to pay Damages or compensation under the provisions of this Agreement; and (c) not in any way be extended by any period of Suspension under this Agreement; provided that if the cure of any breach by the Concessionaire requires any reasonable action by the Concessionaire that must be approved by the Authority or the Independent Engineer hereunder, the applicable Cure Period shall be extended by the period taken by the


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	Rs. 1,000 crore (Rupees one thousand crore) or any other bank acceptable to Senior Lenders, but does not include a bank in which any Senior Lender has an interest;
Bank Rate	means the rate of interest specified by the Reserve Bank of India from time to time in pursuance of section 49 of the Reserve Bank of India Act, 1934 or any replacement of such Bank Rate for the time being in effect;
Bid	means the documents in their entirety comprised in the bid submitted by the Consortium in response to the Request for Proposals in accordance with the provisions thereof;
Bid Security	means the security provided by the Concessionaire to the Authority along with the Bid in a sum of Rs. 1.87 Crore (Rupees One Crore Eighty Seven Lakh only), in accordance with the Request for Proposals, and which is to remain in force until substituted by the Performance Security;
Bulk Users	means the users who will purchase the treated water in accordance with the Bulk Water Supply Agreement;
COD or Commercial Operation Date	Shall have the meaning set forth in Clause 16.1
CPHEEO	the Central Public Health & Environmental Engineering Organisation;
Change in Law	means the occurrence of any of the following after the date of Bid: (a) the enactment of any new Indian law; (b) the repeal, modification or re-enactment of any existing Indian law; (c) the commencement of any Indian law which has not entered into effect until the date of Bid; (d) a change in the interpretation or application of any Indian law by a judgement of a court of record which has become final, conclusive and binding, as compared to such interpretation or application by a court of record prior to the date of Bid; or (e) any change in the rates of any of the Taxes that have a direct effect on the Project;
Change in Ownership	means a transfer of the direct and/or indirect legal or beneficial ownership of any shares, or securities convertible into shares, that causes the aggregate holding of the Consortium Members, together with their Associates, in the total Equity to decline below (i) 51% (fifty one per cent) thereof during Construction Period, (ii) 33% (thirty three per cent) thereof during a period of 3 (three) years following COD, and (iii) 26% (twenty six per cent) thereof, or such lower proportion as may be permitted by the Authority during the remaining Concession Period; provided that any material variation (as compared to the representations made by the Concessionaire during the bidding process for the purposes of meeting the minimum conditions of eligibility or for evaluation of its application or bid, as the case may be,) in the proportion of the equity holding of the


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	hereunder, as may be in force and effect during the subsistence of this Agreement;
Applicable Permits	means all clearances, licences, permits, authorisations, no objection certificates, consents, approvals and exemptions required to be obtained or maintained under Applicable Laws in connection with the construction, operation and maintenance of the Project Water Supply System, herein referred to as “ Project ” during the subsistence of this Agreement;
Appointed Date	means the date on which Financial Close is achieved or an earlier date that the Parties may by mutual consent determine, and shall be deemed to be the date of commencement of the Concession Period. For the avoidance of doubt, every Condition Precedent shall have been satisfied or waived prior to the Appointed Date and in the event all Conditions Precedent are not satisfied or waived, as the case may be, the Appointed Date shall be determined to occur only when each and every Condition Precedent is either satisfied or waived, as the case may be;
Arbitration Act	means the Arbitration and Conciliation Act, 1996 and shall include modifications to or any re-enactment thereof, as in force from time to time;
Associate or Affiliate	means, in relation to either Party and/or Consortium Members, a person who controls, is controlled by, or is under the common control with such Party or Consortium Member (as used in this definition, the expression “control” means, with respect to a person which is a company or corporation, the ownership, directly or indirectly, of more than 50% (fifty per cent) of the voting shares of such person, and with respect to a person which is not a company or corporation, the power to direct the management and policies of such person, whether by operation of law or by contract or otherwise);
Authority Default	Shall have the meaning set forth in Clause 34.2.1
Authority Representative	means such person or persons as may be authorised in writing by the Authority to act on its behalf under this Agreement and shall include any person or persons having authority to exercise any rights or perform and fulfil any obligations of the Authority under this Agreement;
Average Daily Fee	Means the amount arrived at after dividing the total Realisable Fee of the immediately preceding Accounting Year by 365 (three hundred and sixty five), and increasing the result thereof by 5% (five per cent); Provided that the Average Daily Fee for any period prior to completion of the first Accounting Year following COD shall be a simple average of the Fee collected each month during the period between COD and the last day of the month preceding the month on which the event requiring calculation hereof occurred, and in the event that the Fee payable by any segment of Users has not been realised for any reason, an assessment thereof shall be made by the Independent Engineer to form part of the Average Daily Fee for such period;
Bank	means a bank incorporated in India and having a minimum net worth of


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44. DEFINITIONS

44.1. Definitions

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

Accounting Year	means the financial year commencing from the first day of April of any calendar year and ending on the thirty-first day of March of the next calendar year;
Adjoining Areas	Means the Urban Local Bodies, i.e, Khorda and Jatni ULB
Adjusted Equity	<p>means the Equity funded in Indian Rupees and adjusted on the first day of the current month (the “Reference Date”), in the manner set forth below, to reflect the change in its value on account of depreciation and variations in WPI, and for any Reference Date occurring:</p> <p>(a) on or before COD, the Adjusted Equity shall be a sum equal to the Equity funded in Indian Rupees and expended on the Project, revised to the extent of one half of the variation in WPI occurring between the first day of the month of Appointed Date and the Reference Date;</p> <p>(b) from COD and until the 4th (fourth) anniversary thereof, an amount equal to the Adjusted Equity as on COD shall be deemed to be the base (the “Base Adjusted Equity”) and the Adjusted Equity hereunder shall be a sum equal to the Base Adjusted Equity, revised at the commencement of each month following COD to the extent of variation in WPI occurring between COD and the Reference Date;</p> <p>(c) after the 4th (fourth) anniversary of COD, the Adjusted Equity hereunder shall be a sum equal to the Base Adjusted Equity, reduced by 0.33% (zero point three three per cent) thereof at the commencement of each month following the 4th (fourth) anniversary of COD and the amount so arrived at shall be revised to the extent of variation in WPI occurring between COD and the Reference Date;</p> <p>For the avoidance of doubt, the Adjusted Equity shall, in the event of Termination, be computed as on the Reference Date immediately preceding the Transfer Date; provided that no reduction in the Adjusted Equity shall be made for a period equal to the duration, if any, for which the Concession Period is extended, but the revision on account of WPI shall continue to be made;</p>
Agreement or Concession Agreement	means this Agreement, its Recitals, the Schedules hereto and any amendments thereto made in accordance with the provisions contained in this Agreement;
Applicable Laws	means all laws, brought into force and effect by GOI or the Government of Odisha including rules, regulations and notifications made there under, and judgements, decrees, injunctions, writs and orders of any court of record, applicable to this Agreement and the exercise, performance and discharge of the respective rights and obligations of the Parties


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- (a) In the case of the Concessionaire, be given by facsimile or e-mail and by letter delivered by hand to the address given and marked for attention of the person set out below or to such other person as the Concessionaire may from time to time designate by notice to the Authority; provided that notices or other communications to be given to an address outside Bhubaneswar may, if they are subsequently confirmed by sending a copy thereof by registered acknowledgement due, air mail or by courier, be sent by facsimile or e-mail to the number as the Concessionaire may from time to time designate by notice to the Authority;

Attention: Chief Engineer, PHEO (U)

Designation: Chief Engineer

Address: Heads of Department Building, 1st floor, Unit-V, Bhubaneswar – 751001, Odisha

Tel No.: 0674 – 2393909

FAX NO. 0674 – 2396935

Email: cephodisha@gmail.com; ceph@ori.nic.in

- (b) In the case of the Authority, be given by facsimile or e-mail and by letter delivered by hand and be addressed to the Chairman of the Authority with a copy delivered to the Authority Representative or such other person as the Authority may from time to time designate by notice to the Concessionaire; provided that if the Concessionaire does not have an office in Delhi it may send such notice by facsimile or e-mail and by registered acknowledgement due, air mail or by courier; and
- (c) any notice or communication by a Party to the other Party, given in accordance herewith, shall be deemed to have been delivered when in the normal course of post it ought to have been delivered and in all other cases, it shall be deemed to have been delivered on the actual date and time of delivery; provided that in the case of facsimile or e-mail, it shall be deemed to have been delivered on the working day following the date of its delivery.

43.15. Language

All notices required to be given by one Party to the other Party and all other communications, Documentation and proceedings which are in any way relevant to this Agreement shall be in writing and in English language.

43.16. Counterparts

This Agreement may be executed in two counterparts, each of which, when executed and delivered, shall constitute an original of this Agreement.

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43.9. Entire Agreement

This Agreement and the Schedules together with any addendum / amendments to this agreement, the Letter of Award, the Letter of Intent, the addendum/ corrigendum to the Request for Proposal (if any) and Request for Proposal constitutes a complete and exclusive statement of the terms of the agreement between the Parties on the subject hereof, and no amendment or modification hereto shall be valid and effective unless such modification or amendment is agreed to in writing by the Parties and duly executed by persons especially empowered in this behalf by the respective Parties. All prior written or oral understandings, offers or other communications of every kind pertaining to this Agreement are abrogated and withdrawn. For the avoidance of doubt, the Parties hereto agree that any obligations of the Concessionaire arising from the Request for Qualification or Request for Proposals, as the case may be, shall be deemed to form part of this Agreement and treated as such.

43.10. Severability

If for any reason whatever, any provision of this Agreement is or becomes invalid, illegal or unenforceable or is declared by any court of competent jurisdiction or any other instrumentality to be invalid, illegal or unenforceable, the validity, legality or enforceability of the remaining provisions shall not be affected in any manner, and the Parties will negotiate in good faith with a view to agreeing to one or more provisions which may be substituted for such invalid, unenforceable or illegal provisions, as nearly as is practicable to such invalid, illegal or unenforceable provision. Failure to agree upon any such provisions shall not be subject to the Dispute Resolution Procedure set forth under this Agreement or otherwise.

43.11. No partnership

This Agreement shall not be interpreted or construed to create an association, joint venture or partnership between the Parties, or to impose any partnership obligation or liability upon either Party, and neither Party shall have any right, power or authority to enter into any agreement or undertaking for, or act on behalf of, or to act as or be an agent or representative of, or to otherwise bind, the other Party.

43.12. Third Parties

This Agreement is intended solely for the benefit of the Parties, and their respective successors and permitted assigns, and nothing in this Agreement shall be construed to create any duty to, standard of care with reference to, or any liability to, any person not a Party to this Agreement.

43.13. Successors and Assigns

This Agreement shall be binding upon, and inure to the benefit of the Parties and their respective successors and permitted assigns.

43.14. Notices

Any notice or other communication to be given by any Party to the other Party under or in connection with the matters contemplated by this Agreement shall be in writing and shall:



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O/o the E.I.C. P.H.(O), BBSR**



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43.5. Waiver

Waiver, including partial or conditional waiver, by either Party of any default by the other Party in the observance and performance of any provision of or obligations under this Agreement:-

- (a) shall not operate or be construed as a waiver of any other or subsequent default hereof or of other provisions of or obligations under this Agreement;
- (b) shall not be effective unless it is in writing and executed by a duly authorised representative of the Party; and
- (c) shall not affect the validity or enforceability of this Agreement in any manner.

43.6. Liability for review of Documents and Drawings

Except to the extent expressly provided in this Agreement:

- (a) no review, comment or approval by the Authority or the Independent Engineer of any Project Agreement, Document or Drawing submitted by the Concessionaire nor any observation or inspection of the construction, operation or maintenance of the Project Water Supply System nor the failure to review, approve, comment, observe or inspect hereunder shall relieve or absolve the Concessionaire from its obligations, duties and liabilities under this Agreement, the Applicable Laws and Applicable Permits; and
- (b) the Authority shall not be liable to the Concessionaire by reason of any review, comment, approval, observation or inspection referred to in Sub-clause (a) above.

43.7. Exclusion of implied warranties etc.

This Agreement expressly excludes any warranty, condition or other undertaking implied at law or by custom or otherwise arising out of any other agreement between the Parties or any representation by either Party not contained in a binding legal agreement executed by both Parties.

43.8. Survival

43.8.1. Termination shall:

- (a) not relieve the Concessionaire or the Authority, as the case may be, of any obligations hereunder which expressly or by implication survive Termination hereof; and
- (b) except as otherwise provided in any provision of this Agreement expressly limiting the liability of either Party, not relieve either Party of any obligations or liabilities for loss or damage to the other Party arising out of, or caused by, acts or omissions of such Party prior to the effectiveness of such Termination or arising out of such Termination.

43.8.2. All obligations surviving Termination shall only survive for a period of 1 (one) years following the date of such Termination.


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43. MISCELLANEOUS

43.1. Governing law and jurisdiction

This Agreement will be construed and interpreted in accordance with, and governed by, the laws of India, and the courts at Bhubaneswar will have jurisdiction over matters arising out of or relating to this Agreement.

43.2. Waiver of immunity

Each Party unconditionally and irrevocably –

- (a) Agrees that the execution, delivery and performance by it of this Agreement and the matters contemplated hereby constitute commercial acts done and performed for commercial purpose;
- (b) Agrees that, should any proceedings be brought against it or its assets property or revenues in any jurisdiction in relation to this Agreement no immunity (whether by reason of sovereignty or otherwise) from such proceedings will be claimed by or on behalf of the Party with respect to its assets, property or revenues.
- (c) waives any right of immunity which it or its assets, property or revenues now has, may acquire in the future or which may be attributed to it in any jurisdiction; and
- (d) consents generally in respect of the enforcement of any judgement or award against it in any such proceedings to the giving of any relief or the issue of any process in any jurisdiction in connection with such proceedings (including the making, enforcement or execution against it or in respect of any assets, property or revenues whatsoever irrespective of their use or intended use of any order or judgement that may be made or given in connection therewith).

43.3. Depreciation and Interest

43.3.1. For the purposes of depreciation under the Applicable Laws, the property representing the capital investment made by the Concessionaire in the Project shall be deemed to be acquired and owned by the Concessionaire. For the avoidance of doubt, the Authority shall not in any manner be liable in respect of any claims for depreciation to be made by the Concessionaire under the Applicable Laws.

43.3.2. Unless otherwise specified, any interest payable under this Agreement shall accrue on a daily outstanding basis and shall be compounded on the basis of quarterly rests.

43.4. Delayed payments

The Parties hereto agree that payments due from one Party to the other Party under the provisions of this Agreement excluding the Water Payments, will be made within 15 (fifteen) days of receiving a demand along with the necessary particulars. In the event of delay beyond such period, the defaulting Party shall pay interest for the period of delay calculated at a rate equal to 5% (five per cent) above the Bank Rate, and recovery thereof shall be without prejudice to the rights of the Parties under this Agreement including Termination thereof.



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42. DISCOUSURE

42.1. Disclosure of Specified Documents

The Concessionaire shall make available for inspection by any person, copies of this Concession Agreement, the Maintenance Manual, the Maintenance Programme and the Maintenance Requirements (hereinafter collectively referred to as the “**Specified Documents**”), free of charge, during normal business hours on all working days and Concessionaire's Registered Office. The Concessionaire shall prominently display at public notices stating the availability of the Specified Documents for such inspection, and shall make copies of the same available to any person upon payment of copying charges on a 'no profit no loss' basis.

42.2. Disclosure of Documents relating to safety

The Concessionaire shall make available for inspection by any person copies of all Documents and data relating to safety of the Project Water Supply System, free of charge, during normal business hours on all working days, at the Concessionaire's Registered Office. The Concessionaire shall make copies of the same available to any person upon payment of copying charges on a 'no profit no loss' basis.

Notwithstanding the provisions of Clauses 42.1 and 42.2, the Authority shall be entitled to direct the Concessionaire, from time to time, to withhold the disclosure of Protected Documents (as defined hereinbelow) to any person in pursuance of the aforesaid Clauses.

Explanation:

The expression Protected Documents shall mean such of the Specified Documents or documents referred to in Clauses 42.1 and Clause 42.2, or portions thereof, the disclosure of which the Authority is entitled to withhold under the provisions of the Right to Information Act, 2005.



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41.3.4. The Concessionaire and the Authority agree that an Award may be enforced against the Concessionaire and/or the Authority, as the case may be, and their respective assets wherever situated.

41.3.5. This Agreement and the rights and obligations of the Parties shall remain in full force and effect pending the Award in any arbitration proceedings hereunder.

41.4. Adjudication by Regulatory Authority or Commission

In the event of constitution of a statutory Regulatory Authority or Commission with powers to adjudicate upon disputes between the Concessionaire and the Authority, all Disputes arising after such constitution shall, instead of reference to arbitration under Clause 41.3, be adjudicated upon by such Regulatory Authority or Commission in accordance with the Applicable Law and all references to Dispute Resolution Procedure shall be construed accordingly. For the avoidance of doubt, the Parties hereto agree that the adjudication hereunder shall not be final and binding until an appeal against such adjudication has been decided by an appellate tribunal or High Court, as the case may be, or no such appeal has been preferred within the time specified in the Applicable Law.



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41. DISPUTE RESOLUTION

41.1. Dispute resolution

- 41.1.1. Any dispute, difference or controversy of whatever nature howsoever arising under or out of or in relation to this Agreement (including its interpretation) between the Parties, and so notified in writing by either Party to the other Party (the “Dispute”) shall, in the first instance, be attempted to be resolved amicably in accordance with the conciliation procedure set forth in Clause 41.2.
- 41.1.2. The Parties agree to use their best efforts for resolving all Disputes arising under or in respect of this Agreement promptly, equitably and in good faith, and further agree to provide each other with reasonable access during normal business hours to all non-privileged records, information and data pertaining to any Dispute.

41.2. Conciliation

In the event of any Dispute between the Parties, either Party may call upon the Independent Engineer to mediate and assist the Parties in arriving at an amicable settlement thereof. Failing mediation by the Independent Engineer or without the intervention of the Independent Engineer, either Party may require such Dispute to be referred to the Chairman of the Authority and the Chairman of the Board of Directors of the Concessionaire for amicable settlement, and upon such reference, the said persons shall meet no later than 7 (seven) days from the date of reference to discuss and attempt to amicably resolve the Dispute. If such meeting does not take place within the 7 (seven) day period or the Dispute is not amicably settled within 15 (fifteen) days of the meeting or the Dispute is not resolved as evidenced by the signing of written terms of settlement within 30 (thirty) days of the notice in writing referred to in Clause 41.1.1 or such longer period as may be mutually agreed by the Parties, either Party may refer the Dispute to arbitration in accordance with the provisions of Clause 41.3.

41.3. Arbitration

- 41.3.1. Any Dispute which is not resolved amicably by conciliation, as provided in Clause 41.2, shall be finally decided by reference to arbitration by a Board of Arbitrators appointed in accordance with Clause 41.3.2. Such arbitration shall be held in accordance with the Rules of Arbitration of the International Centre for Alternative Dispute Resolution, New Delhi (the “Rules”), or such other rules as may be mutually agreed by the Parties, and shall be subject to the provisions of the Arbitration Act. The venue of such arbitration shall be Bhubaneswar, and the language of arbitration proceedings shall be English and/or Odia.
- 41.3.2. There shall be a Board of three arbitrators, of whom each Party shall select one, and the third arbitrator shall be appointed by the two arbitrators so selected, and in the event of disagreement between the two arbitrators, the appointment shall be made in accordance with the Rules.
- 41.3.3. The arbitrators shall make a reasoned award (the “Award”). Any Award made in any arbitration held pursuant to this Article 41 shall be final and binding on the Parties as from the date it is made, and the Concessionaire and the Authority agree and undertake to carry out such Award without delay.


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40. RIGHTS AND TITLE OVER THE SITE

40.1. Licensee rights

For the purpose of this Agreement, the Concessionaire shall have rights to the use of the Site as sole licensee subject to and in accordance with this Agreement, and to this end, it may regulate the entry and use of the Project Water Supply System by third parties in accordance with and subject to the provisions of this Agreement.

40.2. Access rights of the Authority and others

40.2.1. The Concessionaire shall allow free access to the Site at all times for the authorised representatives and vehicles of the Authority, Senior Lenders, and the Independent Engineer, and for the persons and vehicles duly authorised by any Government Instrumentality to inspect the Project Water Supply System or to investigate any matter within their authority, and upon reasonable notice, the Concessionaire shall provide to such persons reasonable assistance necessary to carry out their respective duties and functions.

40.2.2. The Concessionaire shall, for the purpose of operation and maintenance of any utility or road specified in Article 11, allow free access to the Site at all times for the authorised persons and vehicles of the controlling body of such utility or road.

40.3. Property taxes

All property taxes on the Site shall be payable by the Authority as owner of the Site; provided, however, that any such taxes payable by the Concessionaire under Applicable Laws for use of the Site shall not be reimbursed or payable by the Authority.

40.4. Restriction on sub-letting

The Concessionaire shall not sub-license or sublet the whole or any part of the Site, save and except as may be expressly set forth in this Agreement; provided that nothing contained herein shall be construed or interpreted as restricting the right of the Concessionaire to appoint Contractors for the performance of its obligations hereunder including for operation and maintenance of all or any part of the Project Water Supply System.



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action, but the fees and expenses of such counsel shall be at the expense of the Indemnified Party, when and as incurred, unless:

- (a) the employment of counsel by such party has been authorised in writing by the Indemnifying Party; or
- (b) the Indemnified Party shall have reasonably concluded that there may be a conflict of interest between the Indemnifying Party and the Indemnified Party in the conduct of the defence of such action; or
- (c) the Indemnifying Party shall not, in fact, have employed independent counsel reasonably satisfactory to the Indemnified Party, to assume the defence of such action and shall have been so notified by the Indemnified Party; or
- (d) the Indemnified Party shall have reasonably concluded and specifically notified the Indemnifying Party either:
 - (i) that there may be specific defences available to it which are different from or additional to those available to the Indemnifying Party; or
 - (ii) that such claim, action, suit or proceeding involves or could have a material adverse effect upon it beyond the scope of this Agreement:

Provided that if Sub-clauses (b), (c) or (d) of this Clause 39.4.3 shall be applicable, the counsel for the Indemnified Party shall have the right to direct the defence of such claim, demand, action, suit or proceeding on behalf of the Indemnified Party, and the reasonable fees and disbursements of such counsel shall constitute legal or other expenses hereunder.

39.5. No consequential claims

Notwithstanding anything to the contrary contained in this Article 39, the indemnities herein provided shall not include any claim or recovery in respect of any cost, expense, loss or damage of an indirect, incidental or consequential nature, including loss of profit, except as expressly provided in this Agreement.

39.6. Survival on Termination

The provisions of this Article 39 shall survive Termination.


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to the Project. If in any such suit, action, claim or proceedings, a temporary restraint order or preliminary injunction is granted, the Concessionaire shall make every reasonable effort, by giving a satisfactory bond or otherwise, to secure the revocation or suspension of the injunction or restraint order. If, in any such suit, action, claim or proceedings, the Project, or any part thereof or comprised therein, is held to constitute an infringement and its use is permanently enjoined, the Concessionaire shall promptly make every reasonable effort to secure for the Authority a licence, at no cost to the Authority, authorising continued use of the infringing work. If the Concessionaire is unable to secure such licence within a reasonable time, the Concessionaire shall, at its own expense, and without impairing the Specifications and Standards, either replace the affected work, or part, or process thereof with non-infringing work or part or process, or modify the same so that it becomes non-infringing.

39.3. Notice and contest of claims

In the event that either Party receives a claim or demand from a third party in respect of which it is entitled to the benefit of an indemnity under this Article 39 (the "**Indemnified Party**") it shall notify the other Party (the "**Indemnifying Party**") within 15 (fifteen) days of receipt of the claim or demand and shall not settle or pay the claim without the prior approval of the Indemnifying Party, which approval shall not be unreasonably withheld or delayed. In the event that the Indemnifying Party wishes to contest or dispute the claim or demand, it may conduct the proceedings in the name of the Indemnified Party, subject to the Indemnified Party being secured against any costs involved, to its reasonable satisfaction.

39.4. Defence of claims

- 39.4.1. The Indemnified Party shall have the right, but not the obligation, to contest, defend and litigate any claim, action, suit or proceeding by any third party alleged or asserted against such Party in respect of, resulting from, related to or arising out of any matter for which it is entitled to be indemnified hereunder, and reasonable costs and expenses thereof shall be indemnified by the Indemnifying Party. If the Indemnifying Party acknowledges in writing its obligation to indemnify the Indemnified Party in respect of loss to the full extent provided by this Article 39, the Indemnifying Party shall be entitled, at its option, to assume and control the defence of such claim, action, suit or proceeding, liabilities, payments and obligations at its expense and through the counsel of its choice; provided it gives prompt notice of its intention to do so to the Indemnified Party and reimburses the Indemnified Party for the reasonable cost and expenses incurred by the Indemnified Party prior to the assumption by the Indemnifying Party of such defence. The Indemnifying Party shall not be entitled to settle or compromise any claim, demand, action, suit or proceeding without the prior written consent of the Indemnified Party, unless the Indemnifying Party provides such security to the Indemnified Party as shall be reasonably required by the Indemnified Party to secure the loss to be indemnified hereunder to the extent so compromised or settled.
- 39.4.2. If the Indemnifying Party has exercised its rights under Clause 39.3, the Indemnified Party shall not be entitled to settle or compromise any claim, action, suit or proceeding without the prior written consent of the Indemnifying Party (which consent shall not be unreasonably withheld or delayed).
- 39.4.3. If the Indemnifying Party exercises its rights under Clause 39.3, the Indemnified Party shall nevertheless have the right to employ its own counsel, and such counsel may participate in such

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39. LIABILITY AND INDEMNITY

39.1. General indemnity

39.1.1. The Concessionaire will indemnify, defend, save and hold harmless the Authority and its officers, servants, agents, Government Instrumentalities and Government owned and/or controlled entities/enterprises, ("the Authority Indemnified Persons") against any and all suits, proceedings, actions, demands and third party claims for any loss, damage, cost and expense of whatever kind and nature arising out of any breach by the Concessionaire of any of its obligations under this Agreement or any related agreement or on account of any defect or deficiency in the provision of services by the Concessionaire to any User, except to the extent that any such suits, proceedings, actions, demands and claims have arisen due to any negligent act or omission, or breach or default of this Agreement on the part of the Authority Indemnified Persons.

39.1.2. The Authority will indemnify, defend, save and hold harmless the Concessionaire against any and all suits, proceedings, actions, demands and third party claims for any loss, damage, cost and expense of whatever kind and nature arising out of (i) defect in title and/or the rights of the Authority in the land comprised in the Site, and/or (ii) breach by the Authority of any of its obligations under this Agreement or any related agreement, which materially and adversely affect the performance by the Concessionaire of its obligations under this Agreement, save and except that where any such claim, suit, proceeding, action, and/or demand has arisen due to a negligent act or omission, or breach of any of its obligations under any provision of this Agreement or any related agreement and/or breach of its statutory duty on the part of the Concessionaire, its subsidiaries, affiliates, contractors, servants or agents, the same shall be the liability of the Concessionaire.

39.2. Indemnity by the Concessionaire

39.2.1. Without limiting the generality of Clause 39.1, the Concessionaire shall fully indemnify, hold harmless and defend the Authority and the Authority Indemnified Persons from and against any and all loss and/or damages arising out of or with respect to:

- (a) failure of the Concessionaire to comply with Applicable Laws and Applicable Permits;
- (b) payment of taxes required to be made by the Concessionaire in respect of the income or other taxes of the Concessionaire's contractors, suppliers and representatives; or
- (c) non-payment of amounts due as a result of materials or services furnished to the Concessionaire or any of its contractors which are payable by the Concessionaire or any of its contractors.

39.2.2. Without limiting the generality of the provisions of this Article 39, the Concessionaire shall fully indemnify, hold harmless and defend the Authority Indemnified Persons from and against any and all suits, proceedings, actions, claims, demands, liabilities and damages which the Authority Indemnified Persons may hereafter suffer, or pay by reason of any demands, claims, suits or proceedings arising out of claims of infringement of any domestic or foreign patent rights, copyrights or other intellectual property, proprietary or confidentiality rights with respect to any materials, information, design or process used by the Concessionaire or by the Concessionaire's Contractors in performing the Concessionaire's obligations or in any way incorporated in or related



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38.3. Protection of NPV

Pursuant to the provisions of Clauses 38.1 and 38.2 and for the purposes of placing the Concessionaire in the same financial position as it would have enjoyed had there been no Change in Law affecting the costs, returns or other financial burden or gains, the Parties shall rely on the Financial Model to establish a net present value (the "NPV") of the net cash flow and make necessary adjustments in costs, revenues, compensation or other relevant parameters, as the case may be, to procure that the NPV of the net cash flow is the same as it would have been if no Change in Law had occurred.

38.4. Restriction on cash compensation

The Parties acknowledge and agree that the demand for cash compensation under this Article 38 shall be restricted to the effect of Change in Law during the respective Accounting Year and shall be made at any time after commencement of such year, but no later than one year from the close of such Accounting Year. Any demand for cash compensation payable for and in respect of any subsequent Accounting Year shall be made after the commencement of the Accounting Year to which the demand pertains, but no later than 2 (two) years from the close of such Accounting Year.

38.5. No claim in the event of recovery from Users

Notwithstanding anything to the contrary contained in this Agreement, the Authority shall not in any manner be liable to reimburse to the Concessionaire any sums on account of a Change in law if the same are recoverable from the Users.


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38. CHANGE IN LAW

38.1. Increase in costs

If as a result of Change in Law, the Concessionaire suffers an increase in costs or reduction in net after-tax return or other financial burden, the aggregate financial effect of which exceeds the higher of Rs. 1 crore (Rupees one crore) and 0.5% (zero point five percent) of the Realisable Fee in any Accounting Year, the Concessionaire may so notify the Authority and propose amendments to this Agreement so as to place the Concessionaire in the same financial position as it would have enjoyed had there been no such Change in Law resulting in the cost increase, reduction in return or other financial burden as aforesaid. Upon notice by the Concessionaire, the Parties shall meet, as soon as reasonably practicable, but in any event no later than 30 (thirty) days from the date of notice, and either agree on amendments to this Agreement or on any other mutually agreed arrangement:

Provided that if no agreement is reached within 90 (ninety) days of the aforesaid notice, the Concessionaire may by notice require the Authority to pay an amount that would place the Concessionaire in the same financial position that it would have enjoyed had there been no such Change in Law, and within 15 (fifteen) days of receipt of such notice, along with particulars thereof, the Authority shall pay the amount specified therein; provided that if the Authority shall dispute such claim of the Concessionaire, the same shall be settled in accordance with the Dispute Resolution Procedure. For the avoidance of doubt, it is agreed that this Clause 38.1 shall be restricted to changes in law directly affecting the Concessionaire's costs of performing its obligations under this Agreement.

38.2. Reduction in costs

If as a result of Change in Law, the Concessionaire benefits from a reduction in costs or increase in net after-tax return or other financial gains, the aggregate financial effect of which exceeds the higher of Rs. 1 crore (Rupees one crore) and 0.5% (zero point five percent) of the Realisable Fee in any Accounting Year, the Authority may so notify the Concessionaire and propose amendments to this Agreement so as to place the Concessionaire in the same financial position as it would have enjoyed had there been no such Change in Law resulting in the decreased costs, increase in return or other financial gains as aforesaid. Upon notice by the Authority, the Parties shall meet, as soon as reasonably practicable but no later than 30 (thirty) days from the date of notice, and either agree on such amendments to this Agreement or on any other mutually agreed arrangement:

Provided that if no agreement is reached within 90 (ninety) days of the aforesaid notice, the Authority may by notice require the Concessionaire to pay an amount that would place the Concessionaire in the same financial position that it would have enjoyed had there been no such Change in Law, and within 15 (fifteen) days of receipt of such notice, along with particulars thereof, the Concessionaire shall pay the amount specified therein to the Authority; provided that if the Concessionaire shall dispute such claim of the Authority, the same shall be settled in accordance with the Dispute Resolution Procedure. For the avoidance of doubt, it is agreed that this Clause 38.2 shall be restricted to changes in law directly affecting the Concessionaire's costs of performing its obligations under this Agreement.



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37.4. Assignment by the Authority

Notwithstanding anything to the contrary contained in this Agreement, the Authority may, after giving 60 (sixty) days' notice to the Concessionaire, assign any of its rights and benefits and/or obligations under this Agreement to an assignee who is, in the reasonable opinion of the Authority, capable of fulfilling all of the Authority's then outstanding obligations under this Agreement.



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37. ASSIGNMENT AND CHARGES

37.1. Restrictions on assignment and charges

- 37.1.1. Subject to Clauses 37.2 and 37.3, this Agreement shall not be assigned by the Concessionaire to any person, save and except with the prior consent in writing of the Authority, which consent the Authority shall be entitled to decline without assigning any reason.
- 37.1.2. Subject to the provisions of Clause 37.2, the Concessionaire shall not create nor permit to subsist any Encumbrance, or otherwise transfer or dispose of all or any of its rights and benefits under this Agreement or any Project Agreement to which the Concessionaire is a party except with prior consent in writing of the Authority, which consent the Authority shall be entitled to decline without assigning any reason.

37.2. Permitted assignment and charges

The restraints set forth in Clause 37.1 shall not apply to:

- (a) liens arising by operation of law (or by an agreement evidencing the same) in the ordinary course of business of the Project Water Supply System;
- (b) mortgages/pledges/hypothecation of goods/assets other than Project Assets, and their related documents of title, arising or created in the ordinary course of business of the Project Water Supply System, and as security only for indebtedness to the Senior Lenders under the Financing Agreements and/or for working capital arrangements for the Project Water Supply System;
- (c) assignment of rights, interest and obligations of the Concessionaire to or in favour of the Lenders' Representative as nominee and for the benefit of the Senior Lenders, to the extent covered by and in accordance with the Substitution Agreement as security for financing provided by Senior Lenders under the Financing Agreements; and
- (d) liens or encumbrances required by any Applicable Law.

37.3. Substitution Agreement

- 37.3.1. The Lenders' Representative, on behalf of Senior Lenders, may exercise the right to substitute the Concessionaire in accordance with the agreement for substitution of the Concessionaire (the "**Substitution Agreement**") to be entered into amongst the Concessionaire, the Authority and the Lenders' Representative, on behalf of Senior Lenders, substantially in the form set forth in Schedule-U.
- 37.3.2. Upon substitution of the Concessionaire under and in accordance with the Substitution Agreement, the Nominated Company substituting the Concessionaire shall be deemed to be the Concessionaire under this Agreement and shall enjoy all rights and be responsible for all obligations of the Concessionaire under this Agreement as if it were the Concessionaire; provided that where the Concessionaire is in breach of this Agreement on the date of such substitution, the Authority shall by notice grant a Cure Period of 120 (one hundred and twenty) days to the Concessionaire for curing such breach.



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PART – VI
OTHER PROVISIONS



36. DEFECTS LIABILITY AFTER TERMINATION

36.1. Liability for defects after Termination

The Concessionaire shall be responsible for all defects and deficiencies in the Project for a period of 120 (One hundred and twenty) days after Termination, and it shall have the obligation to repair or rectify, at its own cost, all defects and deficiencies observed by the Independent Engineer in the Project Water Supply System during the aforesaid period. In the event that the Concessionaire fails to repair or rectify such defect or deficiency within a period of 15 (fifteen) days from the date of notice issued by the Authority in this behalf, the Authority shall be entitled to get the same repaired or rectified at the Concessionaire's risk and cost so as to make the Project Water Supply System conform to the Maintenance Requirements. All costs incurred by the Authority hereunder shall be reimbursed by the Concessionaire to the Authority within 15 (fifteen) days of receipt of demand thereof, and in the event of default in reimbursing such costs, the Authority shall be entitled to recover the same from the Escrow Account.

36.2. Retention in Escrow Account

36.2.1. Notwithstanding anything to the contrary contained in this Agreement, but subject to the provisions of Clause 36.2.3, a sum equal to 5% (five per cent) of the total Realisable Fee for the year immediately preceding the Transfer Date shall be retained in the Escrow Account for a period of 120 (one hundred and twenty) days after Termination for meeting the liabilities, if any, arising out of or in connection with the provisions of Clause 36.1.

36.2.2. Without prejudice to the provisions of Clause 36.2.1, the Independent Engineer shall carry out an inspection of the Project Water Supply System at any time prior to the Termination and if it recommends that the status of the Project Water Supply System is such that a sum larger than the amount stipulated in Clause 36.2.1 should be retained in the Escrow Account and for a period longer than the aforesaid 120 (one hundred and twenty) days, the amount recommended by the Independent Engineer shall be retained in the Escrow Account for the period specified by it.

36.2.3. The Concessionaire may, for the performance of its obligations under this Article 36, provide to the Authority a guarantee from a Bank for a sum equivalent to the amount determined under Clause 36.2.1 or 36.2.2, as the case may be, and for the period specified therein, substantially in the form set forth in Schedule-E (the "**Performance Guarantee**"), to be modified, *mutatis mutandis*, for this purpose, and the Authority shall, without prejudice to its other rights and remedies hereunder or in law, be entitled to encash and appropriate the required amounts from the Performance Guarantee for undertaking the repairs or rectification at the Concessionaire's risk and cost in accordance with the provisions of this Article 36. Upon furnishing of a Performance Guarantee under this Clause 36.2.3, the retention of funds in the Escrow Account in terms of Clause 36.2.1 or 36.2.2, as the case may be, shall be dispensed with.


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O/o the E.I.C. P.H.(O), BBSR



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as to protect the safety of and avoid undue delay or inconvenience to the Users, other members of the public or the lawful occupiers of any part of the Site.

- 35.3.2. The Parties shall provide to each other, 9 (nine) months prior to the Transfer Date in the event of Termination by efflux of time and immediately in the event of either Party conveying to the other Party its intent to issue a Termination Notice, as the case may be, as much information and advice as is reasonably practicable regarding the proposed arrangements for operation of the Project following the Transfer Date. The Concessionaire shall further provide such reasonable advice and assistance as the Authority, its concessionaire or agent may reasonably require for operation of the Project until the expiry of 6 (six) months after the Transfer Date.
- 35.3.3. The Authority shall have the option to purchase or hire from the Concessionaire at a fair market value and free from any encumbrance all or any part of the plant and machinery used in connection with the Project but which does not form part of the assets specified in Clause 35.1.1 and is reasonably required in connection with operation of the Project. For the avoidance of doubt, in the event of dispute or difference relating to fair market value, the Dispute Resolution Procedure shall apply.

35.4. Vesting Certificate

The divestment of all rights, title and interest in the Project shall be deemed to be complete on the date when all of the Divestment Requirements have been fulfilled, and the Authority shall, without unreasonable delay, thereupon issue a certificate substantially in the form set forth in Schedule-V (the “**Vesting Certificate**”), which will have the effect of constituting evidence of divestment by the Concessionaire of all of its rights, title and interest in the Project, and their vesting in the Authority pursuant hereto. It is expressly agreed that any defect or deficiency in the Divestment Requirements shall not in any manner be construed or interpreted as restricting the exercise of any rights by the Authority or its nominee on, or in respect of, the Project on the footing that all Divestment Requirements have been complied with by the Concessionaire.

35.5. Additional facilities

Notwithstanding anything to the contrary contained in this Agreement, all Additional Facilities shall continue to vest in the Concessionaire upon and after Termination.

35.6. Divestment costs etc.

- 35.6.1. The Concessionaire shall bear and pay all costs incidental to divestment of all of the rights, title and interest of the Concessionaire in the Project Water Supply System in favour of the Authority upon Termination, save and except that all stamp duties payable on any deeds or Documents executed by the Concessionaire in connection with such divestment shall be borne by the Authority.
- 35.6.2. In the event of any dispute relating to matters covered by and under this Article 35, the Dispute Resolution Procedure shall apply.



Chief Engineer (Project) (San)
O/o the E.I.C. P.H.(O), BBSR



35. DIVESTMENT OF RIGHTS AND INTEREST

35.1. Divestment Requirements

Upon Termination, the Concessionaire shall comply with and conform to the following Divestment Requirements:

- (a) notify to the Authority forthwith the location and particulars of all Project Assets;
- (b) deliver forthwith the actual or constructive possession of the Project Water Supply System, free and clear of all Encumbrances, save and except to the extent set forth in the Substitution Agreement;
- (c) cure all Project Assets, including the structures and equipment, of all defects and deficiencies so that the Project Water Supply System is compliant with the Maintenance Requirements; provided that in the event of Termination during the Construction Period, all Project Assets shall be handed over on 'as is where is' basis after bringing them to a safe condition;
- (d) deliver and transfer relevant records, reports, intellectual property rights and other licences pertaining to the Project Water Supply System and its design, engineering, construction, operation and maintenance, including all programmes and manuals pertaining thereto, and complete 'as built' Drawings as on the Transfer Date;
- (e) transfer and/or deliver all Applicable Permits to the extent permissible under Applicable Laws;
- (f) execute such deeds of conveyance, documents and other writings as the Authority may reasonably require for conveying, divesting and assigning all the rights, title and interest of the Concessionaire in the Project Water Supply System, including the right to receive outstanding insurance claims to the extent due and payable to the Authority, absolutely unto the Authority or its nominee; and
- (g) comply with all other requirements as may be prescribed or required under Applicable Laws for completing the divestment and assignment of all rights, title and interest of the Concessionaire in the Project Water Supply System, free from all Encumbrances, absolutely unto the Authority or to its nominee.

35.2. Inspection and Cure

Not earlier than 90 (ninety) days before Termination but not later than 15 (fifteen) days before the effective date of such Termination, the Independent Engineer shall verify, after giving due notice to the Concessionaire of the time, date and venue of such verification, compliance by the Concessionaire with the Maintenance Requirements, and if required, cause appropriate tests to be carried out at the Concessionaire's cost for this purpose. Defaults, if any, in the Maintenance Requirements shall be cured by the Concessionaire at its cost and the provisions of Article 36 shall apply, *mutatis mutandis*, in relation to curing of defects or deficiencies under this Article 35.

35.3. Cooperation and assistance on transfer of Project

35.3.1. The parties shall cooperate on a best effort basis and take all necessary measures, in good faith, to achieve a smooth transfer of the Project in accordance with the provisions of this Agreement so


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- (b) take possession and control of all materials, stores, implements, construction plants and equipment on or about the Site;
- (c) be entitled to restrain the Concessionaire and any person claiming through or under the Concessionaire from entering upon the Site or any part of the Project;
- (d) require the Concessionaire to comply with the Divestment Requirements set forth in Clause 35.1; and
- (e) succeed upon election by the Authority, without the necessity of any further action by the Concessionaire, to the interests of the Concessionaire under such of the Project Agreements as the Authority may in its discretion deem appropriate, and shall upon such election be liable to the Contractors only for compensation accruing and becoming due and payable to them under the terms of their respective Project Agreements from and after the date the Authority elects to succeed to the interests of the Concessionaire. For the avoidance of doubt, the Concessionaire acknowledges and agrees that all sums claimed by such Contractors as being due and owing for works and services performed or accruing on account of any act, omission or event prior to such date shall constitute debt between the Concessionaire and such Contractors, and the Authority shall not in any manner be liable for such sums. It is further agreed that in the event the Authority elects to cure any outstanding defaults under such Project Agreements, the amount expended by the Authority for this purpose shall be deducted from the Termination Payment.

34.5. Survival of rights

Notwithstanding anything to the contrary contained in this Agreement, but subject to the provisions of Clause 34.3.4, any Termination pursuant to the provisions of this Agreement shall be without prejudice to the accrued rights of either Party including its right to claim and recover money damages, insurance proceeds, security deposits, and other rights and remedies, which it may have in law or contract. All rights and obligations of either Party under this Agreement, including Termination Payments and Divestment Requirements, shall survive the Termination to the extent such survival is necessary for giving effect to such rights and obligations.


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- (c) the Authority repudiates this Agreement or otherwise takes any action that amounts to or manifests an irrevocable intention not to be bound by this Agreement;
- (d) the Authority fails to supply Raw Water to the Concessionaire for a continuous period of 15 (fifteen) days.

34.2.2. Without prejudice to any other right or remedy which the Concessionaire may have under this Agreement, upon occurrence of an Authority Default, the Concessionaire shall, subject to the provisions of the Substitution Agreement, be entitled to terminate this Agreement by issuing a Termination Notice to the Authority; provided that before issuing the Termination Notice, the Concessionaire shall by a notice inform the Authority of its intention to issue the Termination Notice and grant 15 (fifteen) days to the Authority to make a representation, and may after the expiry of such 15 (fifteen) days, whether or not it is in receipt of such representation, issue the Termination Notice.

34.3. Termination Payment

34.3.1. Upon Termination on account of a Concessionaire Default during the Operation Period, the Authority shall pay to the Concessionaire, by way of Termination Payment, an amount equal to 90% (ninety per cent) of the Debt Due less Insurance Cover; provided that if any insurance claims forming part of the Insurance Cover are not admitted and paid, then 80% (eighty per cent) of such unpaid claims shall be included in the computation of Debt Due. For the avoidance of doubt, the Concessionaire hereby acknowledges that no Termination Payment shall be due or payable on account of a Concessionaire Default occurring prior to COD.

34.3.2. Upon Termination on account of an Authority Default, the Authority shall pay to the Concessionaire, by way of Termination Payment, an amount equal to:

- (a) Debt Due; and
- (b) 150% (one hundred and fifty per cent) of the Adjusted Equity.

34.3.3. Termination Payment shall become due and payable to the Concessionaire within 15 (fifteen) days of a demand being made by the Concessionaire to the Authority with the necessary particulars, and in the event of any delay, the Authority shall pay interest at a rate equal to 3% (three per cent) above the Bank Rate on the amount of Termination Payment remaining unpaid; provided that such delay shall not exceed 90 (ninety) days. For the avoidance of doubt, it is expressly agreed that Termination Payment shall constitute full discharge by the Authority of its payment obligations in respect thereof hereunder.

34.3.4. The Concessionaire expressly agrees that Termination Payment under this Article 34 shall constitute a full and final settlement of all claims of the Concessionaire on account of Termination of this Agreement for any reason whatsoever and that it shall not have any further right or claim under any law, treaty, convention, contract or otherwise.

34.4. Other rights and obligations of the Authority

Upon Termination for any reason whatsoever, the Authority shall:

- (a) be deemed to have taken possession and control of the Project Facilities forthwith;


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- (v) the Concessionaire commits a default in complying with any other provision of this Agreement if such a default causes a Material Adverse Effect on the Authority.
- (w) The Concessionaire fails to ensure regular supply of treated water to the Bulk Users for a minimum period of 15 (fifteen) days in accordance with Bulk Water Supply Agreement.

34.1.2. Without prejudice to any other rights or remedies which the Authority may have under this Agreement, upon occurrence of a Concessionaire Default, the Authority shall be entitled to terminate this Agreement by issuing a Termination Notice to the Concessionaire; provided that before issuing the Termination Notice, the Authority shall by a notice inform the Concessionaire of its intention to issue such Termination Notice and grant 15 (fifteen) days to the Concessionaire to make a representation, and may after the expiry of such 15 (fifteen) days, whether or not it is in receipt of such representation, issue the Termination Notice, subject to the provisions of clause 34.1.3.

34.1.3. The Authority shall, if there be Senior Lenders, send a copy of its notice of intention to issue a Termination Notice referred to in Clause 34.1.2 to inform the Lenders' Representative and grant 15 (fifteen) days to the Lenders' Representative, for making a representation on behalf of the Senior Lenders stating the intention to substitute the Concessionaire in accordance with the Substitution Agreement. In the event the Authority receives such representation on behalf of Senior Lenders, it shall, in its discretion, either withhold Termination for a period not exceeding 180 (one hundred and eighty) days from the date of such representation or exercise its right of Suspension, as the case may be, for enabling the Lenders' Representative to exercise the Senior Lenders' right of substitution in accordance with the Substitution Agreement:

34.1.4. Provided that the Lenders' Representative may, instead of exercising the Senior Lenders' right of substitution, procure that the default specified in the notice is cured within the aforesaid period of 180 (one hundred and eighty) days, and upon such curing thereof, the Authority shall withdraw its notice referred to above and restore all the rights of the Concessionaire:

34.1.5. Provided further that upon written request from the Lenders' Representative and the Concessionaire, the Authority shall extend the aforesaid period of 180 (one hundred and eighty) days by such further period not exceeding 90 (ninety) days, as the Authority may deem appropriate.

34.2. Termination for Authority Default

34.2.1. In the event that any of the defaults specified below shall have occurred, and the Authority fails to cure such default within a Cure Period of 90 (ninety) days or such longer period as has been expressly provided in this Agreement, the Authority shall be deemed to be in default of this Agreement (the "**Authority Default**") unless the default has occurred as a result of any breach of this Agreement by the Concessionaire or due to Force Majeure. The defaults referred to herein shall include:

- (a) The Authority commits a material default in complying with any of the provisions of this Agreement and such default has a Material Adverse Effect on the Concessionaire;
- (b) the Authority has failed to make any payment to the Concessionaire within the period specified in this Agreement;

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- (m) a Change in Ownership has occurred in breach of the provisions of Clause 5.3;
- (n) there is a transfer, pursuant to law either of (i) the rights and/or obligations of the Concessionaire under any of the Project Agreements, or of (ii) all or part of the assets or undertaking of the Concessionaire, and such transfer causes a Material Adverse Effect;
- (o) an execution levied on any of the assets of the Concessionaire has caused a Material Adverse Effect;
- (p) the Concessionaire is adjudged bankrupt or insolvent, or if a trustee or receiver is appointed for the Concessionaire or for the whole or material part of its assets that has a material bearing on the Project;
- (q) the Concessionaire has been, or is in the process of being liquidated, dissolved, wound-up, amalgamated or reconstituted in a manner that would cause, in the reasonable opinion of the Authority, a Material Adverse Effect;
- (r) a resolution for winding up of the Concessionaire is passed, or any petition for winding up of the Concessionaire is admitted by a court of competent jurisdiction and a provisional liquidator or receiver is appointed and such order has not been set aside within 90 (ninety) days of the date thereof or the Concessionaire is ordered to be wound up by Court except for the purpose of amalgamation or reconstruction; provided that, as part of such amalgamation or reconstruction, the entire property, assets and undertaking of the Concessionaire are transferred to the amalgamated or reconstructed entity and that the amalgamated or reconstructed entity has unconditionally assumed the obligations of the Concessionaire under this Agreement and the Project Agreements; and provided that:
 - (i) the amalgamated or reconstructed entity has the capability and operating experience necessary for the performance of its obligations under this Agreement and the Project Agreements;
 - (ii) the amalgamated or reconstructed entity has the financial standing to perform its obligations under this Agreement and the Project Agreements and has a credit worthiness at least as good as that of the Concessionaire as at the Appointed Date; and
 - (iii) each of the Project Agreements remains in full force and effect;
- (s) any representation or warranty of the Concessionaire herein contained which is, as of the date hereof, found to be materially false or the Concessionaire is at any time hereafter found to be in breach thereof;
- (t) the Concessionaire submits to the Authority any statement, notice or other document, in written or electronic form, which has a material effect on the Authority's rights, obligations or interests and which is false in material particulars;
- (u) the Concessionaire has failed to fulfil any obligation, for which failure Termination has been specified in this Agreement;


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34. TERMINATION

34.1. Termination for Concessionaire Default

34.1.1. Save as otherwise provided in this Agreement, in the event that any of the defaults specified below shall have occurred, and the Concessionaire fails to cure the default within the Cure Period set forth below, or where no Cure Period is specified, then within a Cure Period of 60 (sixty) days, the Concessionaire shall be deemed to be in default of this Agreement (the "**Concessionaire Default**"), unless the default has occurred solely as a result of any breach of this Agreement by the Authority or due to Force Majeure. The defaults referred to herein shall include:

- (a) the Performance Security has been encashed and appropriated in accordance with Clause 10.2 and the Concessionaire fails to replenish or provide fresh Performance Security within a Cure Period of 30 (thirty) days;
- (b) subsequent to the replenishment or furnishing of fresh Performance Security in accordance with Clause 10.2, the Concessionaire fails to cure, within a Cure Period of 90 (ninety) days, the Concessionaire Default for which whole or part of the Performance Security was appropriated;
- (c) the Concessionaire does not achieve the latest outstanding Project Milestone due in accordance with the provisions of Schedule-F and continues to be in default for 120 (ninety) days;
- (d) the Concessionaire abandons or manifests intention to abandon the construction or operation of the Project Water Supply System without the prior written consent of the Authority;
- (e) Project Completion Date does not occur within the period specified in Clause 13.3.3;
- (f) the Concessionaire is in breach of the Maintenance Requirements or the Safety Requirements, as the case may be;
- (g) the Concessionaire has failed to make any payment to the Authority within the period as specified in accordance with Clause 27.3.1;
- (h) an Escrow Default has occurred and the Concessionaire fails to cure the default within a Cure Period of 15 (fifteen) days;
- (i) upon occurrence of a Financial Default, the Lenders' Representative has by notice required the Authority to undertake Suspension or Termination, as the case may be, in accordance with the Substitution Agreement and the Concessionaire fails to cure the default within the Cure Period specified in hereinabove;
- (j) a breach of any of the Project Agreements by the Concessionaire has caused a Material Adverse Effect;
- (k) the Concessionaire creates any Encumbrance in breach of this Agreement;
- (l) the Concessionaire repudiates this Agreement or otherwise takes any action or evidences or conveys an intention not to be bound by the Agreement;


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days from the date of Suspension, and any extension thereof under Clause 33.1, for enabling the Lenders' Representative to exercise its rights of substitution on behalf of Senior Lenders.

33.5. Termination

33.5.1. At any time during the period of Suspension under this Article 33, the Concessionaire may by notice require the Authority to revoke the Suspension and issue a Termination Notice. Subject to the rights of the Lenders' Representative to undertake substitution in accordance with the provisions of this Agreement and within the period specified in Clause 33.4, the Authority shall, within 15 (fifteen) days of receipt of such notice, terminate this Agreement under and in accordance with Article 33.

33.5.2. Notwithstanding anything to the contrary contained in this Agreement, in the event that Suspension is not revoked within 180 (one hundred and eighty) days from the date of Suspension hereunder or within the extended period, if any, set forth in Clause 33.1, the Concession Agreement shall, upon expiry of the aforesaid period, be deemed to have been terminated by mutual agreement of the Parties and all the provisions of this Agreement shall apply, *mutatis mutandis*, to such Termination as if a Termination Notice had been issued by the Authority upon occurrence of a Concessionaire Default.



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O/o the E.I.C. P.H.(O), BBSR**



33. SUSPENSION OF CONCESSIONAIRE'S RIGHTS

33.1. Suspension upon Concessionaire Default

Upon occurrence of a Concessionaire Default, the Authority shall be entitled, without prejudice to its other rights and remedies under this Agreement including its rights of Termination hereunder, to (i) suspend all rights of the Concessionaire under this Agreement including the Concessionaire's right to collect Water Tariff, and other revenues pursuant hereto, and (ii) exercise such rights itself and perform the obligations hereunder or authorise any other person to exercise or perform the same on its behalf during such suspension (the "**Suspension**"). Suspension hereunder shall be effective forthwith upon issue of notice by the Authority to the Concessionaire and may extend up to a period not exceeding 180 (one hundred and eighty) days from the date of issue of such notice; provided that upon written request from the Concessionaire and the Lenders' Representative, the Authority shall extend the aforesaid period of 180 (one hundred and eighty) days by a further period not exceeding 90 (ninety) days.

33.2. Authority to act on behalf of Concessionaire

33.2.1. During the period of Suspension, the Authority shall, on behalf of the Concessionaire, collect all Fee and revenues under and in accordance with this Agreement and deposit the same in the Escrow Account. The Authority shall be entitled to make withdrawals from the Escrow Account for meeting the costs incurred by it for remedying and rectifying the cause of Suspension, and thereafter for defraying the expenses specified in Clause 28.3.

33.2.2. During the period of Suspension hereunder, all assets and liabilities in relation to the Project shall continue to vest in the Concessionaire and all things done or actions taken, including expenditure incurred by the Authority for discharging the obligations of the Concessionaire under and in accordance with this Agreement and the Project Agreements, shall be deemed to have been done or taken for and on behalf of the Concessionaire and the Concessionaire undertakes to indemnify the Authority for all costs incurred during such period. The Concessionaire hereby licences and sub-licences respectively, the Authority or any other person authorised by it under Clause 33.1 to use during Suspension, all intellectual property belonging to or licensed to the Concessionaire.

33.3. Revocation of Suspension

33.3.1. In the event that the Authority shall have rectified or removed the cause of Suspension within a period not exceeding 90 (ninety) days from the date of Suspension, it shall revoke the Suspension forthwith and restore all rights of the Concessionaire under this Agreement.

33.3.2. Upon the Concessionaire having cured the Concessionaire Default within a period not exceeding 90 (ninety) days from the date of Suspension, the Authority shall revoke the Suspension forthwith and restore all rights of the Concessionaire under this Agreement.

33.4. Substitution of Concessionaire

At any time during the period of Suspension, the Lenders' Representative, on behalf of Senior Lenders, shall be entitled to substitute the Concessionaire under and in accordance with the Substitution Agreement, and upon receipt of notice thereunder from the Lenders' Representative, the Authority shall withhold Termination for a period not exceeding 180 (one hundred and eighty)



Chief Engineer P. ()
O/o the E.I.C.P.H.(O), BBSR



32. COMPENSATION FOR BREACH OF AGREEMENT

32.1. Compensation for default by the Concessionaire

Subject to the provisions of Clause 32.5, in the event of the Concessionaire being in material default or breach of this Agreement, it shall pay to the Authority by way of compensation, all direct costs suffered or incurred by the Authority as a consequence of such material default, within 30 (thirty) days of receipt of the demand supported by necessary particulars thereof; provided that no compensation shall be payable under this Clause 32.1 for any breach or default in respect of which Damages are expressly specified and payable under this Agreement.

32.2. Compensation for default by the Authority

Subject to the provisions of Clause 32.5, in the event of the Authority being in material default or breach of this Agreement at any time after the Appointed Date, it shall pay to the Concessionaire by way of compensation, all direct costs suffered or incurred by the Concessionaire as a consequence of such material default within 30 (thirty) days of receipt of the demand supported by necessary particulars thereof; provided that no such compensation shall be payable for any breach or default in respect of which Damages have been expressly specified in this Agreement. For the avoidance of doubt, compensation payable may include interest payments on debt, O&M Expenses, any increase in capital costs on account of inflation and all other costs directly attributable to such material default but shall not include loss of Fee revenues or debt repayment obligations, and for determining such compensation, information contained in the Financial Package and the Financial Model may be relied upon to the extent it is relevant.

32.3. Extension of Concession Period

Subject to the provisions of Clause 32.5, in the event that a material default or breach of this Agreement set forth in Clause 32.2 causes delay in achieving COD, the Authority shall, in addition to payment of compensation under Clause 32.2, extend the Concession Period, such extension being equal in duration to the period by which COD was delayed.

32.4. Compensation to be in addition

Compensation payable under this Article 32 shall be in addition to, and not in substitution for, or derogation of, Termination Payment, if any.

32.5. Mitigation of costs and damage

The Affected Party shall make all reasonable efforts to mitigate or limit the costs and damage arising out of or as a result of breach of Agreement by the other Party.



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31.9.3. If Termination is on account of a Political Event, the Authority shall make a Termination Payment to the Concessionaire in an amount that would be payable under Clause 34.3.2 as if it were an Authority Default.

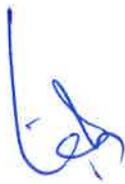
31.10. Dispute resolution

In the event that the Parties are unable to agree in good faith about the occurrence or existence of a Force Majeure Event, such Dispute shall be finally settled in accordance with the Dispute Resolution Procedure; provided that the burden of proof as to the occurrence or existence of such Force Majeure Event shall be upon the Party claiming relief and/or excuse on account of such Force Majeure Event.

31.11. Excuse from performance of obligations

If the Affected Party is rendered wholly or partially unable to perform its obligations under this Agreement because of a Force Majeure Event, it shall be excused from performance of such of its obligations to the extent it is unable to perform on account of such Force Majeure Event; provided that:

- (a) the suspension of performance shall be of no greater scope and of no longer duration than is reasonably required by the Force Majeure Event;
- (b) the Affected Party shall make all reasonable efforts to mitigate or limit damage to the other Party arising out of or as a result of the existence or occurrence of such Force Majeure Event and to cure the same with due diligence; and
- (c) when the Affected Party is able to resume performance of its obligations under this Agreement, it shall give to the other Party notice to that effect and shall promptly resume performance of its obligations hereunder.



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- (a) upon occurrence of a Non-Political Event, the Parties shall bear their respective Force Majeure Costs and neither Party shall be required to pay to the other Party any costs thereof;
- (b) upon occurrence of an Indirect Political Event, all Force Majeure Costs attributable to such Indirect Political Event, and not exceeding the Insurance Cover for such Indirect Political Event, shall be borne by the Concessionaire, and to the extent Force Majeure Costs exceed such Insurance Cover, one half of such excess amount shall be reimbursed by the Authority to the Concessionaire; and
- (c) upon occurrence of a Political Event, all Force Majeure Costs attributable to such Political Event shall be reimbursed by the Authority to the Concessionaire.

For the avoidance of doubt, Force Majeure Costs may include interest payments on debt, O&M Expenses, any increase in the cost of Construction Works on account of inflation and all other costs directly attributable to the Force Majeure Event, but shall not include loss of Fee revenues or debt repayment obligations, and for determining such costs, information contained in the Financial Package may be relied upon to the extent that such information is relevant.

31.7.3. Save and except as expressly provided in this Article 31, neither Party shall be liable in any manner whatsoever to the other Party in respect of any loss, damage, cost, expense, claims, demands and proceedings relating to or arising out of occurrence or existence of any Force Majeure Event or exercise of any right pursuant hereto.

31.8. Termination Notice for Force Majeure Event

If a Force Majeure Event subsists for a period of 180 (one hundred and eighty) days or more within a continuous period of 365 (three hundred and sixty five) days, either Party may in its discretion terminate this Agreement by issuing a Termination Notice to the other Party without being liable in any manner whatsoever, save as provided in this Article 31, and upon issue of such Termination Notice, this Agreement shall, notwithstanding anything to the contrary contained herein, stand terminated forthwith; provided that before issuing such Termination Notice, the Party intending to issue the Termination Notice shall inform the other Party of such intention and grant 15 (fifteen) days time to make a representation, and may after the expiry of such 15 (fifteen) days period, whether or not it is in receipt of such representation, in its sole discretion issue the Termination Notice.

31.9. Termination Payment for Force Majeure Event

31.9.1. If Termination is on account of a Non-Political Event, the Authority shall make a Termination Payment to the Concessionaire in an amount equal to 90% (ninety per cent) of the Debt Due less Insurance Cover.

31.9.2. If Termination is on account of an Indirect Political Event, the Authority shall make a Termination Payment to the Concessionaire in an amount equal to:

- (a) Debt Due less Insurance Cover; provided that if any insurance claims forming part of the Insurance Cover are not admitted and paid, then 80% (eighty per cent) of such unpaid claims shall be included in the computation of Debt Due; and
- (b) 110% (one hundred and ten per cent) of the Adjusted Equity.


Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



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- (b) the estimated duration and the effect or probable effect which such Force Majeure Event is having or will have on the Affected Party's performance of its obligations under this Agreement;
- (c) the measures which the Affected Party is taking or proposes to take for alleviating the impact of such Force Majeure Event; and
- (d) any other information relevant to the Affected Party's claim.

31.5.2. The Affected Party shall not be entitled to any relief for or in respect of a Force Majeure Event unless it shall have notified the other Party of the occurrence of the Force Majeure Event as soon as reasonably practicable, and in any event not later than 7 (seven) days after the Affected Party knew, or ought reasonably to have known, of its occurrence, and shall have given particulars of the probable material effect that the Force Majeure Event is likely to have on the performance of its obligations under this Agreement.

31.5.3. For so long as the Affected Party continues to claim to be materially affected by such Force Majeure Event, it shall provide the other Party with regular (and not less than weekly) reports containing information as required by Clause 31.5.1, and such other information as the other Party may reasonably request the Affected Party to provide.

31.6. Effect of Force Majeure Event on the Concession

31.6.1. Upon the occurrence of any Force Majeure Event prior to the Appointed Date, the period set forth in Clause 22.1.1 for achieving Financial Close shall be extended by a period equal in length to the duration of the Force Majeure Event.

31.6.2. At any time after the Appointed Date, if any Force Majeure Event occurs:

- (a) before COD, the Concession Period and the dates set forth in the Project Completion Schedule shall be extended by a period equal in length to the duration for which such Force Majeure Event subsists;
- (b) after COD, the Concessionaire shall continue to make all reasonable efforts to operate the Project and/or to collect the fee, but if it unable or prevented from doing so, the Concession Period shall, having due regard to the extent of the impact thereof as determined by the representative of the Authority, be extended by the period for which collection of Fee remains affected on account thereof; and
- (c) cost arising out of or concerning such Force Majeure Event shall be borne in accordance with the provisions of Clause 31.8 below.

31.7. Allocation of costs arising out of Force Majeure

31.7.1. Upon occurrence of any Force Majeure Event prior to the Appointed Date, the Parties shall bear their respective costs and no Party shall be required to pay to the other Party any costs thereof.

31.7.2. Upon occurrence of a Force Majeure Event after the Appointed Date, the costs incurred and attributable to such event and directly relating to the Project (the "**Force Majeure Costs**") shall be allocated and paid as follows:


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- (b) industry-wide or State-wide strikes or industrial action for a continuous period of 24 (twenty four) hours and exceeding an aggregate period of 7 (seven) days in an Accounting Year;
- (c) any civil commotion, boycott or political agitation which prevents collection of Fee by the Concessionaire for an aggregate period exceeding 7 (seven) days in an Accounting Year;
- (d) any failure or delay of a Contractor to the extent caused by any Indirect Political Event and which does not result in any offsetting compensation being payable to the Concessionaire by or on behalf of such Contractor;
- (e) any Indirect Political Event that causes a Non-Political Event; or
- (f) any event or circumstances of a nature analogous to any of the foregoing.

31.4. Political Event

A Political Event shall mean one or more of the following acts or events by or on account of any Government Instrumentality:

- (a) Change in Law, only if consequences thereof cannot be dealt with under and in accordance with the provisions of Article 38 and its effect, in financial terms, exceeds the sum specified in Clause 38.1;
- (b) compulsory acquisition in national interest or expropriation of any Project Assets or rights of the Concessionaire or of the Contractors;
- (c) unlawful or unauthorised or without jurisdiction revocation of, or refusal to renew or grant without valid cause, any clearance, licence, permit, authorisation, no objection certificate, consent, approval or exemption required by the Concessionaire or any of the Contractors to perform their respective obligations under this Agreement and the Project Agreements; provided that such delay, modification, denial, refusal or revocation did not result from the Concessionaire's or any Contractor's inability or failure to comply with any condition relating to grant, maintenance or renewal of such clearance, licence, authorisation, no objection certificate, exemption, consent, approval or permit;
- (d) any failure or delay of a Contractor but only to the extent caused by another Political Event and which does not result in any offsetting compensation being payable to the Concessionaire by or on behalf of such Contractor; or
- (e) any event or circumstance of a nature analogous to any of the foregoing.

31.5. Duty to report Force Majeure Event

31.5.1. Upon occurrence of a Force Majeure Event, the Affected Party shall by notice report such occurrence to the other Party forthwith. Any notice pursuant hereto shall include full particulars of:

- (a) the nature and extent of each Force Majeure Event which is the subject of any claim for relief under this Article 31 with evidence in support thereof;


Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



31. FORCE MAJEURE

31.1. Force Majeure

As used in this Agreement, the expression “**Force Majeure**” or “**Force Majeure Event**” shall mean occurrence in India of any or all of Non-Political Event, Indirect Political Event and Political Event, as defined in Clauses 31.3, 31.4 and 31.5 respectively, if it affects the performance by the Party claiming the benefit of Force Majeure (the “**Affected Party**”) of its obligations under this Agreement and which act or event (i) is beyond the reasonable control of the Affected Party, and (ii) the Affected Party could not have prevented or overcome by exercise of due diligence and following Good Industry Practice, and (iii) has Material Adverse Effect on the Affected Party.

31.2. Non-Political Event

A Non-Political Event shall mean one or more of the following acts or events:

- (a) epidemic, extremely adverse weather conditions, lightning, earthquake, landslide, cyclone, flood, drought, volcanic eruption, chemical or radioactive contamination or ionising radiation, fire or explosion (to the extent of contamination or radiation or fire or explosion originating from a source external to the Site);
- (b) strikes or boycotts (other than those involving the Concessionaire, Contractors or their respective employees/representatives, or attributable to any act or omission of any of them) interrupting supplies and services to the Project Water Supply System for a continuous period of 48 (forty eight) hours and an aggregate period exceeding 15 (fifteen) days in an Accounting Year, and not being an Indirect Political Event set forth in Clause 31.3;
- (c) any failure or delay of a Contractor but only to the extent caused by another Non-Political Event and which does not result in any offsetting compensation being payable to the Concessionaire by or on behalf of such Contractor;
- (d) any judgement or order of any court of competent jurisdiction or statutory authority made against the Concessionaire in any proceedings for reasons other than (i) failure of the Concessionaire to comply with any Applicable Law or Applicable Permit, or (ii) on account of breach of any Applicable Law or Applicable Permit or of any contract, or (iii) enforcement of this Agreement, or (iv) exercise of any of its rights under this Agreement by the Authority;
- (e) the discovery of geological conditions, toxic contamination or archaeological remains on the Site that could not reasonably have been expected to be discovered through a site inspection; or
- (f) any event or circumstances of a nature analogous to any of the foregoing.

31.3. Indirect Political Event

An Indirect Political Event shall mean one or more of the following acts or events:

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


Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



PART – V

FORCE MAJEURE AND TERMINATION



**Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR**



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30.3. Certification of claims by Statutory Auditors

Any claim or document provided by the Concessionaire to the Authority in connection with or relating to receipts, income, payments, costs, expenses, accounts or audit, and any matter incidental thereto shall be valid and effective only if certified by its Statutory Auditors. Dispute resolution

In the event of there being any difference between the findings of the Additional Auditors or the Concurrent Auditors, as the case may be, and the certification provided by the Statutory Auditors, such Auditors shall meet to resolve the differences and if they are unable to resolve the same, such Dispute shall be resolved by the Authority by recourse to the Dispute Resolution Procedure.



**Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR**



30. ACCOUNTS AND AUDIT

30.1. Audited accounts

30.1.1. The Concessionaire shall maintain books of accounts recording all its receipts (including all Realisable Fees and other revenues derived/collected by it from or on account of the Project Facility and/or its use), income, expenditure, payments (including payments from the Escrow Account), assets and liabilities, in accordance with this Agreement, Good Industry Practice, Applicable Laws and Applicable Permits. The Concessionaire shall provide 2 (two) copies of its Balance Sheet, Cash Flow Statement and Profit and Loss Account, along with a report thereon by its Statutory Auditors, within 90 (ninety) days of the close of the Accounting Year to which they pertain and such audited accounts, save and except where expressly provided to the contrary, shall form the basis of payments by either Party under this Agreement. The Authority shall have the right to inspect the records of the Concessionaire during office hours and require copies of relevant extracts of books of accounts, duly certified by the Statutory Auditors, to be provided to the Authority for verification of basis of payments, and in the event of any discrepancy or error being found, the same shall be rectified and such rectified account shall form the basis of payments by either Party under this Agreement.

30.1.2. The Concessionaire shall, within 30 (thirty) days of the close of each quarter of an Accounting Year, furnish to the Authority its unaudited financial results in respect of the preceding quarter, in the manner and form prescribed by the Securities and Exchange Board of India for publication of quarterly results by the companies listed on a stock exchange.

30.1.3. On or before the thirty-first day of May each Year, the Concessionaire shall provide to the Authority, for the preceding Accounting Year, a statement duly audited by its Statutory Auditors.

30.2. Appointment of auditors

30.2.1. The Concessionaire shall appoint, and have during the subsistence of this Agreement as its Statutory Auditors, a firm chosen by it from the mutually agreed list of 10 (ten) reputable firms of chartered accountants (the "**Panel of Chartered Accountants**"), such list to be prepared substantially in accordance with the criteria set forth in Schedule-T. All fees and expenses of the Statutory Auditors shall be borne by the Concessionaire.

30.2.2. The Concessionaire may terminate the appointment of its Statutory Auditors after a notice of 45 (forty five) days to the Authority, subject to the replacement Statutory Auditors being appointed from the Panel of Chartered Accountants.

30.2.3. Notwithstanding anything to the contrary contained in this Agreement, the Authority shall have the right, but not the obligation, to appoint at its cost from time to time and at anytime, another firm (the "**Additional Auditors**") from the Panel of Chartered Accountants to audit and verify all those matters, expenses, costs, realisations and things which the Statutory Auditors are required to do, undertake or certify pursuant to this Agreement.

30.2.4. In the event that the Grant exceeds 40% (forty per cent) of the Total Project Cost, the Authority shall have the right, but not the obligation, to appoint at its cost, for the duration of the Construction Period, another firm (the "**Concurrent Auditors**") from the Panel of Chartered Accountants to undertake concurrent audit of the Concessionaire's accounts.



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subsidiaries, affiliates, employees, insurers and underwriters, and of any right of the insurers to any set-off or counterclaim or any other deduction, whether by attachment or otherwise, in respect of any liability of any such person insured under any such policy or in any way connected with any loss, liability or obligation covered by such policies of insurance.

29.6. Concessionaire's waiver

The Concessionaire hereby further releases, assigns and waives any and all rights of subrogation or recovery against, inter alia, the Authority and its assigns, undertakings and their subsidiaries, affiliates, employees, successors, insurers and underwriters, which the Concessionaire may otherwise have or acquire in or from or in any way connected with any loss, liability or obligation covered by policies of insurance maintained or required to be maintained by the Concessionaire pursuant to this Agreement (other than third party liability insurance policies) or because of deductible clauses in or inadequacy of limits of any such policies of insurance.

29.7. Application of insurance proceeds

The proceeds from all insurance claims, except life and injury, shall be paid to the Concessionaire by credit to the Escrow Account and it shall, notwithstanding anything to the contrary contained in Clause 28.3, apply such proceeds for any necessary repair, reconstruction, reinstatement, replacement, improvement, delivery or installation of the Project, and the balance remaining, if any, shall be applied in accordance with the provisions contained in this behalf in the Financing Agreements.


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29. INSURANCE

29.1. Insurance during Concession Period

The Concessionaire shall effect and maintain at its own cost, during the Construction Period and the Operation Period, such insurances for such maximum sums as may be required under the Financing Agreements, and the Applicable Laws, and such insurances as may be necessary or prudent in accordance with Good Industry Practice. The Concessionaire shall also effect and maintain such insurances as may be necessary for mitigating the risks that may devolve on the Authority as a consequence of any act or omission of the Concessionaire during the Construction Period. The Concessionaire shall procure that in each insurance policy, the Authority shall be a co-insured and that the insurer shall pay the proceeds of insurance into the Escrow Account. For the avoidance of doubt, the level of insurance to be maintained by the Concessionaire after repayment of Senior Lenders' dues in full shall be determined on the same principles as applicable for determining the level of insurance prior to such repayment of Senior Lenders' dues.

29.2. Notice to the Authority

Not later than 45 (forty-five) days prior to commencement of the Construction Period or the Operation Period, as the case may be, the Concessionaire shall by notice furnish to the Authority, in reasonable detail, information in respect of the insurances that it proposes to effect and maintain in accordance with this Article 29. Within 30 (thirty) days of receipt of such notice, the Authority may require the Concessionaire to effect and maintain such other insurances as may be necessary pursuant hereto, and in the event of any difference or disagreement relating to any such insurance, the Dispute Resolution Procedure shall apply.

29.3. Evidence of Insurance cover

All insurances obtained by the Concessionaire in accordance with this Article 29 shall be maintained with insurers on terms consistent with Good Industry Practice. Within 15 (fifteen) days of obtaining any insurance cover, the Concessionaire shall furnish to the Authority, notarised true copies of the certificate(s) of insurance, copies of insurance policies and premia payment receipts in respect of such insurance, and no such insurance shall be cancelled, modified, or allowed to expire or lapse until the expiration of at least 45 (forty five) days after notice of such proposed cancellation, modification or non-renewal has been delivered by the Concessionaire to the Authority.

29.4. Remedy for failure to insure

If the Concessionaire shall fail to effect and keep in force all insurances for which it is responsible pursuant hereto, the Authority shall have the option to either keep in force any such insurances, and pay such premia and recover the costs thereof from the Concessionaire, or in the event of computation of a Termination Payment, treat an amount equal to the Insurance Cover as deemed to have been received by the Concessionaire.

29.5. Waiver of subrogation

All insurance policies in respect of the insurance obtained by the Concessionaire pursuant to this Article 29 shall include a waiver of any and all rights of subrogation or recovery of the insurers thereunder against, inter alia, the Authority, and its assigns, successors, undertakings and their


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- (g) monthly proportionate provision of debt service payments due in an Accounting Year in respect of Subordinated Debt;
- (h) any reserve requirements set forth in the Financing Agreements; and
- (i) balance, if any, in accordance with the instructions of the Concessionaire.

28.3.2. The Concessionaire shall not in any manner modify the order of payment specified in Clause 28.3.1, except with the prior written approval of the Authority.

28.4. Withdrawals upon Termination

28.4.1. Notwithstanding anything to the contrary contained in this Agreement, all amounts standing to the credit of the Escrow Account shall, upon Termination, be appropriated in the following order:

- (a) all taxes due and payable by the Concessionaire for and in respect of the Project;
- (b) 90% (ninety per cent) of Debt Due excluding Subordinated Debt;
- (c) outstanding Concession Fee;
- (d) all payments and Damages certified by the Authority as due and payable to it by the Concessionaire;
- (e) retention and payments relating to the liability for defects and deficiencies set forth in Article 36;
- (f) outstanding Debt Service including the balance of Debt Due;
- (g) outstanding Subordinated Debt;
- (h) incurred or accrued O&M Expenses;
- (i) any other payments required to be made under this Agreement; and
- (j) balance, if any, in accordance with the instructions of the Concessionaire:

Provided that no appropriations shall be made under Sub-clause (j) of this Clause 28.4.1 until a Vesting Certificate has been issued by the Authority under the provisions of Article 35.

28.4.2. The provisions of this Article 28 and the instructions contained in the Escrow Agreement shall remain in full force and effect until the obligations set forth in Clause 28.4.1 have been discharged.



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28. ESCROW ACCOUNT

28.1. Escrow Account

28.1.1. The Concessionaire shall, prior to the Appointed Date, open and establish an Escrow Account with a Bank (the “**Escrow Bank**”) in accordance with this Agreement read with the Escrow Agreement.

28.1.2. The nature and scope of the Escrow Account are fully described in the agreement (the “**Escrow Agreement**”) to be entered into amongst the Concessionaire, the Authority, the Escrow Bank and the Senior Lenders through the Lenders’ Representative, which shall be substantially in the form set forth in Schedule-P.

28.2. Deposits into Escrow Account

The Concessionaire shall deposit or cause to be deposited the following inflows and receipts into the Escrow Account:

- (a) all funds constituting the Financial Package;
- (b) all Fee and any other revenues from or in respect of the Project, including the proceeds of any deposits, capital receipts or insurance claims; and
- (c) all payments by the Authority;

Provided that the Senior Lenders may make direct disbursements to the EPC Contractor in accordance with the express provisions contained in this behalf in the Financing Agreements.

28.3. Withdrawals during Concession Period

28.3.1. The Concessionaire shall, at the time of opening the Escrow Account, give irrevocable instructions, by way of an Escrow Agreement, to the Escrow Bank instructing, inter alia, that deposits in the Escrow Account shall be appropriated in the following order every month, or at shorter intervals as necessary, and if not due in a month then appropriated proportionately in such month and retained in the Escrow Account and paid out therefrom in the month when due:

- (a) all taxes due and payable by the Concessionaire for and in respect of the Project;
- (b) all payments relating to construction of the Project, subject to and in accordance with the conditions, if any, set forth in the Financing Agreements;
- (c) O&M Expenses, subject to the ceiling, if any, set forth in the Financing Agreements;
- (d) O&M Expenses and other costs and expenses incurred by the Authority in accordance with the provisions of this Agreement, and certified by the Authority as due and payable to it;
- (e) monthly proportionate provision of Debt Service due in an Accounting Year;
- (f) all payments and Damages certified by the Authority as due and payable to it by the Concessionaire;


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27.4. Delivery and Acceptance of Treated Water

From the COD until the Termination Date, the Concessionaire shall supply Treated Water to the Bulk Users at the Delivery Point in the quantities determined in each of the Bulk Water Supply Agreement with Bulk Users and in accordance with Schedule-L (Water Quality Requirements). The Treated Water delivered to the Bulk Users shall be measured in accordance with the applicable provisions of the Bulk Water Supply Agreement. The Bulk Users shall accept and pay the User Fees for the water supplied in accordance with Schedule-K.



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- 27.1.4. If the Authority fails to supply Raw Water to the Concessionaire for a continuous period of 15 (fifteen) days, then the same may be treated as Authority Event of Default.
- 27.1.5. The Authority shall ensure that the minimum static water level in Mundali Barrage of river Mahanadi shall not be less than Minimum Drawdown Level as pre-decided between the Concessionaire and the Authority.
- (1) If the minimum static water level is lower than the Minimum Drawdown Level then the Authority shall supply Raw Water as per the provisions of Clause 27.1.3;
 - (2) If the minimum static water level is equal to or higher than the Minimum Drawdown Level then the Concessionaire is liable to supply Treated Water and shall not enforce the provisions of Clause 27.1.3.

27.2. Supply of Treated Water to the Project

- 27.2.1. In the event that the Concessionaire fails to supply Treated Water for a capacity as defined in Bulk Water Supply Agreement during Supply Period in breach of its obligations.
- (1) then the Concessionaire shall rectify the problem to ensure full capacity of Treated Water supply within 48 (forty eight) hours from the drop in capacity of water supply. However if the Concessionaire fails to rectify the same, a penalty of twice the amount of Treated Water charges not supplied from the period from where the supply has not been provided shall be deducted from next applicable payment.
 - (2) If the Concessionaire rectifies the problem and ensures full capacity of water supply within 48 (forty eight) hours from the drop in capacity of water, then Concessionaire shall receive the payment for the capacity of water actually supplied during that period.
 - (3) the Concessionaire shall also ensure that minimum 20% (twenty per cent) of the Net Water Requirement to the specific Bulk Users be supplied by tanker/s or by any other plausible means at the delivery point at its own cost. The same needs to be supplied on a daily basis and on immediate request of Bulk Users. If the Concessionaire provides water through tanker/s, then the Concessionaire shall obtain acknowledgement for the water supplied from Bulk Users and submit the same to the Authority for record;
 - (4) If the Bulk User/s is/are in need of additional water due to the fall in water supply capacity and arranges the additional water as per its requirement on its own, then the Concessionaire shall indemnify the Bulk User/s for all costs, liability and expenses suffered or incurred by the User subject to twice of applicable amount for charges of total net water requirement as provided in the Bulk Water Supply Agreement during that period.

27.2.2. Deleted

27.3. Payment of Raw Water Charges

- 27.3.1. The Authority shall pay the Raw Water Charges to the relevant third party and will submit the copy of invoice to the Concessionaire. The Concessionaire on receiving such invoice shall make payment within a period of 15 (fifteen) days from the receipt of such invoice.


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26. CALCULATION OF USER FEES

26.1. Calculation of User Fees

26.1.1. The User Fees owing to the Concessionaire for each contract month shall be calculated in accordance with Schedule-J;

26.2. Payment of User Fees

26.2.1. The Bulk Users will pay to the Concessionaire the User Fees as set out in and in accordance with Schedule-K. The Concessionaire may appoint a person to collect the User Fees for and on behalf of the Concessionaire, provided that notwithstanding such appointment, the Concessionaire shall be and remain solely liable and responsible for collection of User Fees in accordance with this Agreement and its deposit into the Escrow Account and for compliance with the provisions of this Agreement.

27. SUPPLY OF WATER

27.1. Supply of Raw Water to the Concessionaire

27.1.1. The Authority will ensure that the Concessionaire is entitled to draw up to a maximum of 70 MLD or 28.5 cusec from Mundali Barrage of River Mahanadi for use in the Project in accordance with Schedule-W. The Authority shall have no obligation to supply Raw Water in accordance with any standard or to meet any quality.

27.1.2. The Concessionaire will only draw up to a maximum of 70 MLD or 28.5 cusec of Raw Water from Mundali Barrage and only use such Raw Water in the Project. However, in the event the demand of water in the supply area increases beyond the allocated Raw Water, it would be the responsibility of the Authority to arrange for additional Raw Water on a best effort basis for the additional demand of water.

27.1.3. In case of failure to supply Raw Water to the Concessionaire then:

- (1) the Authority shall rectify the problem to ensure full capacity of Raw Water supply within 48 (forty eight) hours from the drop in capacity of water supply. However if the Authority fails to rectify the same, a penalty of twice the amount of Raw Water charges not supplied from the period from where the supply has not been provided shall be deducted from next applicable payment;
- (2) If the Authority rectifies the problem and ensures full capacity of Raw Water supply within 48 (forty eight) hours from the drop in capacity of Raw Water, then Authority shall receive the payment for the capacity of water actually supplied during that period;
- (3) the Authority shall indemnify the Concessionaire for all costs, expenses and liabilities (excluding any indirect, consequential or incidental damages, including in respect of consequential financial or economic loss) subject to twice of applicable amount for charges of Treated Water requirement as provided in the Schedule-W during that period, also the Concessionaire is not liable to provide Treated Water for the same period.

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25. USER FEES

25.1. Collection of User Fees

- 25.1.1. On and from the COD till the Transfer Date, the Concessionaire shall have the sole and exclusive right to demand, collect and appropriate Fee from the Bulk Users subject to and in accordance with this Agreement;
- 25.1.2. The Concessionaire will ensure that User Fees and all other relevant charges collected from the Bulk Users are deposited into the Escrow Account.
- 25.1.3. The Bulk Users shall submit a Bank Guarantee for an amount equivalent to the cost of the Treated Water for 6 (six) months to the Authority during signing of the Bulk Water Supply Agreement. If any Bulk Users fails to pay the User Fee, the Concessionaire shall encash the Bank Guarantee for non-payment of the User Fee. The Concessionaire may also exercise all rights and remedies available under the law for recovery of User Fees, including suspension, termination or cancellation of supply of services to the relevant Bulk User. The Concessionaire shall notify the Authority from time to time of all action taken to recover Charges.



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24. CONCESSION FEE

24.1. Concession Fee

In consideration of the grant of Concession, the Concessionaire shall pay to the Authority by way of concession fee (the "Concession Fee") a sum of Re. 1 (Rupee one) per annum.

24.2. Additional Concession Fee¹

24.2.1. Not Applicable

24.2.2. Not Applicable

24.3. Payment of Concession Fee

Not Applicable


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¹ In the event of the Concessionaire seeking a Grant under Clause 23.1 of this Agreement, Clauses 24.2 to 24.3 shall be omitted.

23. GRANT

23.1. Grant

23.1.1. The Authority agrees to provide to the Concessionaire cash support by way of an outright grant equal to the sum set forth in the Bid, namely, Rs. 50.00 Crore (Rupees Fifty Crore only), in accordance with the provisions of this Article 23 (the "Grant")

23.1.2. The Grant shall be disbursed to the Concessionaire by way of Equity Support in accordance with the provisions of Clause 23.2.

23.2. Equity Support

23.2.1. Subject to the conditions specified in this Clause 23.2, the Grant shall be credited to the Escrow Account and shall be applied by the Concessionaire for meeting the Total Project Cost (the "Equity Support").

23.2.2. The Equity Support shall not exceed the sum specified in the Bid and as accepted by the Authority, but shall in no case be greater than twice the Equity, and shall be further restricted to a sum not exceeding 40% (forty per cent) of the Total Project Cost. Provided, however, that in the event Equity Support shall exceed 20% (twenty per cent) of the Total Project Cost, the amount in excess of such 20% (twenty per cent) shall be released against an irrevocable bank guarantee for 2 (two) years which may be invoked if the Concessionaire commits any breach of the obligations specified in this Agreement. For the avoidance of doubt, the Total Project Cost to be reckoned for the purposes of this Clause 23.2.2 shall include Equity Support.

23.2.3. Equity Support shall be due and payable to the Concessionaire after it has expended the Equity, and shall be disbursed proportionately along with the loan funds thereafter remaining to be disbursed by the Senior Lenders under the Financing Agreements. The Authority shall disburse each tranche of the Equity Support as and when due, but not later than 15 (fifteen) days of receiving a request from the Concessionaire along with necessary particulars.

23.2.4. In the event of occurrence of a Concessionaire Default, disbursement of Equity Support shall be suspended till such Concessionaire Default has been cured by the Concessionaire.

23.3. Not Applicable

Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



22. FINANCIAL CLOSE

22.1. Financial Close

22.1.1. The Concessionaire hereby agrees and undertakes that it shall achieve Financial Close within 180 (one hundred and eighty) days from the date of this Agreement and in the event of delay, it shall be entitled to a further period not exceeding 120 (one hundred and twenty) days, subject to payment of Damages to the Authority in a sum calculated at the rate of 0.1% (zero point one percent) of the Performance Security for each day of delay; provided that the Damages specified herein shall be payable every week in advance and the period beyond the said 180 (one hundred and eighty) days shall be granted only to the extent of Damages so paid; provided further that no Damages shall be payable if such delay in Financial Close has occurred solely as a result of any default or delay by the Authority in procuring satisfaction of the Conditions Precedent specified in Clause 4.1.2 or due to Force Majeure. For the avoidance of doubt, the Damages payable hereunder by the Concessionaire shall be in addition to the Damages, if any, due and payable under the provisions of Clause 4.3

22.1.2. The Concessionaire shall, upon occurrence of Financial Close, notify the Authority forthwith, and shall have provided to the Authority, at least 2 (two) days prior to Financial Close, 3 (three) true copies of the Financial Package and the Financial Model, duly attested by a Director of the Concessionaire, along with 3 (three) soft copies of the Financial Model in MS Excel Version or any substitute thereof, which is acceptable to the Senior Lenders.

22.2. Termination due to failure to achieve Financial Close

22.2.1. Notwithstanding anything to the contrary contained in this Agreement, but subject to Clause 31.6.1, in the event that Financial Close does not occur, for any reason whatsoever, within the period set forth in Clause 22.1.1 or the extended period thereunder, all rights, privileges, claims and entitlements of the Concessionaire under or arising out of this Agreement shall be deemed to have been waived by, and to have ceased with the concurrence of the Concessionaire, and the Concession Agreement shall be deemed to have been terminated by mutual agreement of the Parties. For the avoidance of doubt, it is agreed that in the event the Parties hereto have, by mutual consent, determined the Appointed Date to precede the Financial Close, the provisions of this Clause 22.2.1 shall not apply.

22.2.2. Upon Termination under Clause 22.2.1, the Authority shall be entitled to encash the Bid Security and appropriate the proceeds thereof as Damages; provided, however, if Financial Close has not occurred solely as a result of the Authority being in default of any of its obligations under Clause 4.1.2, it shall, upon Termination, return the Bid Security forthwith along with Damages due and payable under Clause 4.2. For the avoidance of doubt, it is expressly agreed that if the Bid Security shall have been substituted by Performance Security, the Authority shall be entitled to encash therefrom an amount equal to Bid Security.

Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



PART – IV
FINANCIAL COVENANTS


Chief Engineer (Urban)
O/o the E.I.C. P.H.(O), BBSR



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provided that the Independent Engineer may, by notice in writing, substitute any of the designated persons by any of its employees.

21.6. Dispute resolution

If either Party disputes any advice, instruction, decision, direction or award of the Independent Engineer, or, as the case may be, the assertion or failure to assert jurisdiction, the Dispute shall be resolved in accordance with the Dispute Resolution Procedure.



**Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR**



21. INDEPENDENT ENGINEER

21.1. Appointment of Independent Engineer

The Authority shall appoint a consulting engineering firm or bodies corporate constituted by the Authority substantially in accordance with the selection criteria set forth in Schedule-N, to be the independent consultant under this Agreement (the “**Independent Engineer**”). The appointment shall be made no later than 30 (ninety) days from the date of this Agreement and shall be for a period of 3 (three) years. On expiry or termination of the aforesaid period, the Authority may in its discretion renew the appointment, or appoint another firm from a fresh panel constituted pursuant to Schedule-N to be the Independent Engineer for a term of 3 (three) years, and such procedure shall be repeated after expiry of each appointment.

21.2. Duties and Functions

21.2.1. The Independent Engineer shall discharge its duties and functions substantially in accordance with the terms of reference set forth in Schedule-O.

21.2.2. The Independent Engineer shall submit regular periodic reports (at least once every month) to the Authority in respect of its duties and functions set forth in Schedule-O.

21.3. Remuneration

The remuneration, cost and expenses of the Independent Engineer shall be paid by the Authority and subject to the limits set forth in Schedule-N, one-half of such remuneration, cost and expenses shall be reimbursed by the Concessionaire to the Authority within 15 (fifteen) days of receiving a statement of expenditure from the Authority.

21.4. Termination of Appointment

21.4.1. The Authority may, in its discretion, terminate the appointment of the Independent Engineer at any time, but only after appointment of another Independent Engineer in accordance with Clause 21.1.

21.4.2. If the Concessionaire has reason to believe that the Independent Engineer is not discharging its duties and functions in a fair, efficient and diligent manner, it may make a written representation to the Authority and seek termination of the appointment of the Independent Engineer. Upon receipt of such representation, the Authority shall hold a tripartite meeting with the Concessionaire and Independent Engineer for an amicable resolution of the Dispute, and if any difference or disagreement between the Authority and the Concessionaire remains unresolved, the Dispute shall be settled in accordance with the Dispute Resolution Procedure. In the event that the appointment of the Independent Engineer is terminated hereunder, the Authority shall appoint forthwith another Independent Engineer in accordance with Clause 21.1.

21.5. Authorized Signatories

The Authority shall require the Independent Engineer to designate and notify to the Authority and the Concessionaire up to 2 (two) persons employed in its firm to sign for and on behalf of the Independent Engineer, and any communication or document required to be signed by the Independent Engineer shall be valid and effective only if signed by any of the designated persons;


Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



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20.5. Monthly Fee Statement

During the Operation Period, the Concessionaire shall furnish to the Authority, within 7 (seven) days of completion of each month, a monthly fee statement. The Concessionaire shall also furnish to the Authority such other information as the Authority may reasonably require, at specified intervals, in discharge of its statutory functions.



**Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR**



20. MONITORING OF OPERATION AND MAINTENANCE

20.1. Monthly status reports

During Operation Period, the Concessionaire shall, no later than 7 (seven) days after the close of each month, furnish to the Authority and the Independent Engineer a monthly report stating in reasonable detail the condition of the Project Water Supply System including its compliance or otherwise with the Maintenance Requirements, Maintenance Manual, Maintenance Programme and Safety Requirements, and shall promptly give such other relevant information as may be required by the Independent Engineer. In particular, such report shall separately identify and state in reasonable detail the defects and deficiencies that require rectification.

20.2. Inspection

The Independent Engineer shall inspect the Project Water Supply System at least once a month. It shall make a report of such inspection (the "O&M Inspection Report") stating in reasonable detail the defects or deficiencies, if any, with particular reference to the Maintenance Requirements, Maintenance Manual, the Maintenance Programme and Safety Requirements, and send a copy thereof to the Authority and the Concessionaire within 7 (seven) days of such inspection.

20.3. Tests

For determining that the Project Water Supply System conforms to the Maintenance Requirements, the Independent Engineer shall require the Concessionaire to carry out, or cause to be carried out, tests specified by it in accordance with Good Industry Practice. The Concessionaire shall, with due diligence, carry out or cause to be carried out all such tests in accordance with the instructions of the Independent Engineer and furnish the results of such tests forthwith to the Independent Engineer. One half of the costs incurred on such tests, and to the extent certified by the Independent Engineer as reasonable, shall be reimbursed by the Authority to the Concessionaire.

20.4. Remedial measures

20.4.1. The Concessionaire shall repair or rectify the defects or deficiencies, if any, set forth in the O&M Inspection Report or in the test results referred to in Clause 20.3 and furnish a report in respect thereof to the Independent Engineer and the Authority within 15 (fifteen) days of receiving the O&M Inspection Report or the test results, as the case may be; provided that where the remedying of such defects or deficiencies is likely to take more than 15 (fifteen) days, the Concessionaire shall submit progress reports of the repair works once every week until such works are completed in conformity with this Agreement.

20.4.2. The Independent Engineer shall require the Concessionaire to carry out or cause to be carried out tests, at its own cost, to determine that such remedial measures have brought the Project Water Supply System into compliance with the Maintenance Requirements and the procedure set forth in this Clause 20.4 shall be repeated until the Project Water Supply System conforms to the Maintenance Requirements. In the event that remedial measures are not completed by the Concessionaire in conformity with the provisions of this Agreement, the Authority shall be entitled to recover Damages from the Concessionaire under and in accordance with the provisions of Clause 18.5.

Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



19. SAFETY REQUIREMENTS

19.1. Safety Requirements

The Concessionaire shall comply with the provisions of this Agreement, Applicable Laws and Applicable Permits and conform to Good Industry Practice for securing the safety of the Users. In particular, the Concessionaire shall develop, implement and administer a surveillance and safety programme for providing a safe environment on or about the Project Water Supply System, and shall comply with the safety requirements (the “**Safety Requirements**”).

19.2. Expenditure on Safety Requirements

Unless otherwise expressly provided in this Agreement, all costs and expenses arising out of or relating to Safety Requirements shall be borne by the Concessionaire to the extent such costs and expenses form part of the works and services included in the Scope of the Project, and works and services, if any, not forming part of the Scope of the Project shall be undertaken in accordance with the provisions of Article 17. Costs and expenses on works and services not covered hitherto before and arising out of Safety Requirements shall, subject to the provisions of Clause 17.3.2, be borne from out of a dedicated safety fund (the “**Safety Fund**”) to be funded, owned and operated by the Authority or a substitute thereof.



**Chief Engineer (Urban)
Of the E.I.C. P.H.(O), BBSR**



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- (a) an event of Force Majeure;
- (b) measures taken to ensure the safe use of the Project Water Supply System except when unsafe conditions occurred because of failure of the Concessionaire to perform its obligations under this Agreement; or
- (c) compliance with a request from the Authority or the directions of any Government Instrumentality, the effect of which is to close all or any part of the Project Water Supply System.

18.11. Barriers and diversions

The Authority shall procure that during the Operations Period, no barriers are erected or placed by any Government Instrumentality on the Project Water Supply System except for reasons of Emergency, national security, law and order.



Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



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breach is causing or likely to cause material hardship or danger to the Users, the Authority may, without prejudice to any of its rights under this Agreement including Termination thereof, by notice require the Concessionaire to take reasonable measures immediately for rectifying or removing such hardship or danger, as the case may be.

18.7.2. In the event that the Concessionaire, upon notice under Clause 18.7.1, fails to rectify or remove any hardship or danger within 48 (forty eight) hours of receipt of such notice, the Authority may exercise overriding powers under this Clause 18.7.2 and take over the performance of any or all the obligations of the Concessionaire to the extent deemed necessary by it for rectifying or removing such hardship or danger; provided that the exercise of such overriding powers by the Authority shall be of no greater scope and of no longer duration than is reasonably required hereunder; provided further that any costs and expenses incurred by the Authority in discharge of its obligations hereunder shall be deemed to be O&M Expenses, and the Authority shall be entitled to recover them from the Concessionaire in accordance with the provisions of Clause 18.7 along with the Damages specified therein.

18.7.3. In the event of a national emergency, civil commotion or any other act specified in Clause 31.3, the Authority may take over the performance of any or all the obligations of the Concessionaire to the extent deemed necessary by it or as directed by the Government, and exercise such control over the Project Water Supply System or give such directions to the Concessionaire as may be deemed necessary; provided that the exercise of such overriding powers by the Authority shall be of no greater scope and of no longer duration than is reasonably required in the circumstances which caused the exercise of such overriding power by the Authority. For the avoidance of doubt, the consequences of such action shall be dealt in accordance with the provisions of Article 31.

18.8. Restoration of loss or damage to Project Water Supply System

18.8.1. Save and except as otherwise expressly provided in this Agreement, in the event that the Project Water Supply System or any part thereof suffers any loss or damage during the Concession Period from any cause whatsoever, the Concessionaire shall, at its cost and expense, rectify and remedy such loss or damage forthwith so that the Project Water Supply System conforms to the provisions of this Agreement.

18.9. Modifications to the Project Water Supply System

18.9.1. The Concessionaire shall not carry out any material modifications to the Project Water Supply System save and except where such modifications are necessary for the Project Water Supply System to operate in conformity with the Maintenance Requirements, Good Industry Practice and Applicable Laws; provided that the Concessionaire shall notify the Independent Engineer of the proposed modifications along with particulars thereof at least 15 (fifteen) days before commencing work on such modifications and shall reasonably consider any suggestions that the Independent Engineer may make within 15 (fifteen) days of receiving the Concessionaire's proposal.

18.10. Excuse from performance of obligations

18.10.1. The Concessionaire shall not be considered in breach of its obligations under this Agreement if Treated Water is not available for Bulk Users on account of any of the following for the duration thereof:

**Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR**



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18.4.2. Within 15 (fifteen) days of receipt of the Maintenance Programme, the Independent Engineer shall review the same and convey its comments to the Concessionaire with particular reference to its conformity with the Maintenance Requirements, Maintenance Manual and Safety Requirements.

18.4.3. The Concessionaire may modify the Maintenance Programme as may be reasonable in the circumstances, and the procedure specified in Clauses 18.4.1 and 18.4.2 shall apply *mutatis mutandis* to such modifications.

18.5. Damages for breach of maintenance obligations

18.5.1. In the event that the Concessionaire fails to repair or rectify any defect or deficiency set forth in the Maintenance Requirements within the period specified therein, it shall be deemed to be in breach of this Agreement and the Authority shall be entitled to recover Damages, to be calculated and paid for each day of delay until the breach is cured, at the higher of (a) 0.5% (zero point five per cent) of Average Daily Fee, and (b) 0.1% (zero point one per cent) of the cost of such repair or rectification as estimated by the Independent Engineer. Recovery of such Damages shall be without prejudice to the rights of the Authority under this Agreement, including the right of Termination thereof.

18.5.2. The Damages set forth in Clause 18.5.1 may be assessed and specified forthwith by the Independent Engineer; provided that the Authority may, in its discretion, demand a smaller sum as Damages, if in its opinion, the breach has been cured promptly and the Concessionaire is otherwise in compliance with its obligations hereunder. The Concessionaire shall pay such Damages forthwith and in the event that it contests such Damages, the Dispute Resolution Procedure shall apply.

18.6. Authority's right to take remedial measures

18.6.1. In the event the Concessionaire does not maintain and/or repair the Project Water Supply System or any part thereof in conformity with the Maintenance Requirements, the Maintenance Manual or the Maintenance Programme, as the case may be, and fails to commence remedial works within 15 (fifteen) days of receipt of the O&M Inspection Report or a notice in this behalf from the Authority or the Independent Engineer, as the case may be, the Authority shall, without prejudice to its rights under this Agreement including Termination thereof, be entitled to undertake such remedial measures at the risk and cost of the Concessionaire, and to recover its cost from the Concessionaire. In addition to recovery of the aforesaid cost, a sum equal to 20% (twenty per cent) of such cost shall be paid by the Concessionaire to the Authority as Damages.

18.6.2. The Authority shall have the right, and the Concessionaire hereby expressly grants to the Authority the right, to recover the costs and Damages specified in Clause 18.6.1 directly from the Escrow Account as if such costs and Damages were O&M Expenses, and for that purpose, the Concessionaire hereby agrees to give irrevocable instructions to the Escrow Bank to make payment from the Escrow Account in accordance with the instructions of the Authority under this Clause 18.6.2 and debit the same to O&M Expenses.

18.7. Overriding powers of the Authority

18.7.1. If in the reasonable opinion of the Authority, the Concessionaire is in material breach of its obligations under this Agreement and, in particular, the Maintenance Requirements, and such


Chief Engineer P.H. (Urban)
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fails to comply with the same with a reasonable timeframe, then the Authority has the right to carry out repairs to bring them up to such condition. The Concessionaire shall indemnify the Authority for any such costs (and any such costs may be deducted from amounts payable to the Concessionaire)

18.2. Maintenance Requirements

The Concessionaire shall procure that all times during the Operation Period; the Project Water Supply System conforms to the maintenance requirements set forth in Schedule-X (the "Maintenance Requirements").

18.3. Maintenance Manual

18.3.1. Not later than 180 (one hundred and eighty) days prior to the Scheduled Water Supply System Date, the Concessionaire shall, in consultation with the Independent Engineer, evolve a repair and maintenance manual (the "Maintenance Manual") for the regular and preventive maintenance of the Project Water Supply System in conformity with the Maintenance Requirements, Safety Requirements and Good Industry Practice, and shall provide 5 (five) copies thereof to the Authority and 2 (two) copies to the Independent Engineer. The Maintenance Manual shall be revised and updated once every 3 (three) years and the provisions of this Clause 18.3 shall apply, mutatis mutandis, to such revision.

18.3.2. Without prejudice to the provision of Clause 18.3.1, the Maintenance Manual shall, in particular, include provisions for maintenance of Project Assets and shall provide for life cycle maintenance, routine maintenance and reactive maintenance which may be reasonably necessary for maintenance and repair of the Project Assets, including replacement thereof, such that its overall condition conforms to Good Industry Practice.

18.4. Maintenance Programme

18.4.1. Not later than 45 (forty five) days prior to the beginning of each Accounting Year during the Operation Period, the Concessionaire shall provide to the Authority and the Independent Engineer, its proposed annual programme of preventive, urgent and other scheduled maintenance (the "Maintenance Programme") to comply with the Maintenance Requirements, Maintenance Manual and Safety Requirements. Such Maintenance Programme shall include:

- (a) preventive maintenance schedule;
- (b) arrangements and procedures for carrying out urgent repairs;
- (c) criteria to be adopted for deciding maintenance needs;
- (d) intervals and procedures for carrying out inspection of all elements of the Project Water Supply System;
- (e) intervals at which the Concessionaire shall carry out periodic maintenance;
- (f) arrangements and procedures for carrying out safety related measures; and
- (g) intervals for major maintenance works and the scope thereof.

**Chief Engineer P.H. (O.San)
O/o the E.I.C. P.H.(O), BBSR**



18. OPERATION AND MAINTENANCE

18.1. O&M obligations of the Concessionaire

18.1.1. During the Operation Period, the Concessionaire shall, operate and maintain the Project Water Supply System in accordance with this Agreement either by itself, or through the O&M Contractor and if required, modify, repair or otherwise make improvements to the Project Water Supply System to comply with the provisions of this Agreement, Applicable Laws and Applicable Permits, and conform to Specifications and Standards and Good Industry Practice. The obligations of the Concessionaire hereunder shall include:

- (a) Supplying uninterrupted treated water to the Bulk Users during normal operating conditions;
- (b) Collecting and appropriating the Fee;
- (c) Carry out periodic preventive maintenance of the Project Water Supply System;
- (d) Undertaking routine maintenance including prompt repairs of pipelines, pumps, valves, cracks, joints, structures, water meters, flow meters etc;
- (e) Supplying treated water to the Bulk Users in accordance with the Service Level Requirement;
- (f) Preventing, with the assistance of the concerned law enforcement agencies, any unauthorised use of the Project Water Supply System;
- (g) Protection of the environment and provision of equipment and materials thereof;
- (h) Operation and maintenance of all communication, control and administrative systems necessary for the efficient operation of the Project Water Supply System;
- (i) Maintain a public relations unit to interface with and attend to suggestions from the Bulk Users, government agencies, media and other agencies; and
- (j) Complying with Safety Requirements in accordance with Article 19.

18.1.2. The Concessionaire shall in order to monitor the water quality, at its own cost, sample and test the water samples at the source, at treatment and at the distribution system in accordance with the provision of Schedule-L.

18.1.3. The Concessionaire shall, at its own cost, plan for replacement of equipment well ahead of the end of the useful life thereof and replace such equipment in accordance with Good Industry Practice.

18.1.4. The condition of the Project Water Supply System as transferred to the Authority on the expiration of the Concession Period or on the Termination Date shall be such that they are fully operational as intended under this Agreement and require only a continuation of the programme of continuous maintenance, as performed regularly by the Concessionaire during the Concession Period, in order to maintain this fully operational condition. If the Project Water Supply System are not in fully operational condition at the time of transfer, the Authority shall direct the Concessionaire to make the Water Supply System operational as envisaged in this Agreement and if the Concessionaire


Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



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17.5. Power of the Authority to undertake works

- 17.5.1. Notwithstanding anything to the contrary contained in Clauses 17.1, 17.2 and 17.3, the Authority may, after giving notice to the Concessionaire and considering its reply thereto, award such works or services to any person on the basis of open competitive bidding; provided that the Concessionaire shall have the option of matching the first ranked bid in terms of the selection criteria, subject to payment of 2% (two per cent) of the bid amount to the Authority, and thereupon securing the award of such works or services. For the avoidance of doubt, it is agreed that the Concessionaire shall be entitled to exercise such option only if it has participated in the bidding process and its bid does not exceed the first ranked bid by more than 10% (ten per cent) thereof. It is agreed that the Concessionaire shall provide access, assistance and cooperation to the person who undertakes the works or services hereunder.
- 17.5.2. The works undertaken in accordance with this Clause 17.5 shall conform to the Specifications and Standards and shall be carried out in a manner that minimises the disruption in operation of the Project Water Supply System. The provisions of this Agreement, insofar as they relate to Construction Works and Tests, shall apply *mutatis mutandis* to the works carried out under this Clause 17.5.

17.6. Reduction in Scope of the Project

- 17.6.1. If the Concessionaire shall have failed to complete any Construction Works on account of Force Majeure or for reasons solely attributable to the Authority, the Authority may, in its discretion, require the Concessionaire to pay 80% (eighty per cent) of the sum saved there from, and upon such payment to the Authority, the obligations of the Concessionaire in respect of such works shall be deemed to have been fulfilled. For the avoidance of doubt, it is agreed that in the event such reduction in Scope of the Project causes or will cause a reduction in net after-tax return of the Concessionaire, the Parties shall meet, as soon as reasonably practical, and agree on a full or partial waiver of the aforesaid payment of 80% (eighty per cent) so as to place the Concessionaire in the same financial position as it would have enjoyed had there been no reduction in Scope of the Project. It is further agreed that the liability of the Authority under this Clause 16.5 shall not extend beyond waiver of the aforesaid 80% (eighty per cent). It is also agreed that in the event of a dispute, the Dispute Resolution Procedure shall apply.
- 17.6.2. For determining the obligations of the Concessionaire under this Clause 17.5, the provisions of Clauses 17.1, 17.2 and 17.4 shall apply *mutatis mutandis*, and upon issue of Change of Scope Order by the Authority hereunder, the Concessionaire shall pay forthwith the sum specified therein.


Chief Engineer R.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



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performance thereof. In the event that the Parties are unable to agree, the Authority may, by issuing a Change of Scope Order, require the Concessionaire to proceed with the performance thereof pending resolution of the Dispute, or carry out the works in accordance with Clause 17.5.

17.2.4. The Provisions of this Agreement, insofar as they relate to Construction Works and Tests, shall apply *mutatis mutandis* to the works undertaken by the Concessionaire under this Article 17.

17.3. Payment for Change of Scope

17.3.1. Within 7 (seven) days of issuing a Change of Scope Order, the Authority shall make an advance payment to the Concessionaire in a sum equal to 20% (twenty per cent) of the cost of Change of Scope as agreed hereunder, and in the event of a Dispute, 20% (twenty per cent) of the cost assessed by the Independent Engineer. The Concessionaire shall, after commencement of work, present to the Authority bills for payment in respect of the works in progress or completed works, as the case may be, supported by such Documentation as is reasonably sufficient for the Authority to determine the accuracy thereof. Within 30 (thirty) days of receipt of such bills, the Authority shall disburse to the Concessionaire such amounts as are certified by the Independent Engineer as reasonable and after making a proportionate deduction for the advance payment made hereunder, and in the event of any Dispute, final adjustments thereto shall be made under and in accordance with the Dispute Resolution Procedure.

17.3.2. Notwithstanding anything to the contrary contained in Clause 17.3.1, all costs arising out of any Change of Scope Order issued during the Construction Period shall be borne by the Concessionaire, subject to an aggregate ceiling of 0.25% (zero point two five per cent) of the Total Project Cost. Any costs in excess of the ceiling shall be reimbursed by the Authority in accordance with Clause 17.3.1. In the event that the total cost arising out of Change of Scope Orders (if any) issued prior to the Project Completion Date is less than 0.25% (zero point two five per cent) of the Total Project Cost, the difference thereof shall be credited by the Concessionaire to the Safety Fund within a period of 180 (one hundred and eighty) days of the Project Completion Date. For the avoidance of doubt, it is agreed that the aforesaid 0.25% (zero point two five per cent) of the Total Project Cost shall, to the extent borne by the Concessionaire, be deemed to form part of the actual capital cost of the Project.

17.4. Restriction on certain works

17.4.1. Notwithstanding anything to the contrary contained in this Article 17, but subject to the provisions of Clause 17.4.2, the Authority shall not require the Concessionaire to undertake any works or services if such works or services are likely to delay completion of the Water Supply System; provided that in the event that the Authority considers such works or services to be essential, it may issue a Change of Scope Order, subject to the condition that the works forming part of or affected by such Order shall not be reckoned for the purposes of determining completion of Water Supply System. and issuing the Provisional Certificate.

17.4.2. Notwithstanding anything to the contrary contained in this Article 17, the Concessionaire shall be entitled to nullify any Change of Scope Order if it causes the cumulative costs relating to all the Change of Scope Orders to exceed 5% (five per cent) of the Total Project Cost in any continuous period of 3 (three) years immediately preceding the date of such Change of Scope Order or if such cumulative costs exceed 20% (twenty per cent) of the Total Project Cost at any time during the Concession Period.


Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



17. CHANGE OF SCOPE

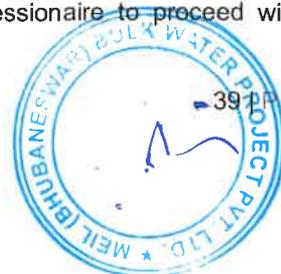
17.1. Change of Scope

- 17.1.1. The Authority may, notwithstanding anything to the contrary contained in this Agreement, require the provision of additional works and services which are not included in the Scope of the Project as contemplated by this Agreement (“**Change of Scope**”). Any such Change in Scope shall be made in accordance with the provisions of this Article 17 and the costs thereof shall be expended by the Concessionaire and reimbursed to it by the Authority in accordance with Clause 17.3.
- 17.1.2. If the Concessionaire determines at any time that a Change of Scope is necessary for providing improved services to the Bulk Users or to enhance the economic efficiency of the Project or such other reason related to the performance of services or the Project, it shall by notice in writing require the Authority to consider such Change of Scope. The Authority shall, within 15 (fifteen) days of receipt of such notice, either accept such Change of Scope with modifications, if any, and initiate proceedings therefore in accordance with this Article 17 or inform the Concessionaire in writing of its reasons for not accepting such Change of Scope.
- 17.1.3. Any works or services which are provided under and in accordance with this Article 17 shall form part of the Project Water Supply System and the provisions of this Agreement shall apply *mutatis mutandis* to such works or services.

17.2. Procedure for Change of Scope

- 17.2.1. In the event of the Authority determining that a Change of Scope is necessary, it shall issue to the Concessionaire a notice specifying in reasonable detail the works and services contemplated thereunder (the “**Change of Scope Notice**”).
- 17.2.2. Upon receipt of a Change of Scope Notice, the Concessionaire shall, with due diligence, provide to the Authority such information as is necessary, together with preliminary Documentation in support of:
- (a) The impact, if any, which the Change of Scope is likely to have on the Project Completion Schedule if the works or services are required to be carried out during the Construction Period; and
 - (b) The options for implementing the proposed Change of Scope and the effect, if any, each such option would have on the costs and time thereof, including a detailed breakdown by work classifications specifying the material and labour costs calculated in accordance with the Schedule of Rates applicable to the works assigned by the Authority to its contractors; provided that the cost incurred by the Concessionaire in providing such information shall be reimbursed by the Authority to the extent such cost is certified by the Independent Engineer as reasonable.
- 17.2.3. Upon receipt of information set forth in Clause 17.2.2, if the Authority decides to proceed with the Change of Scope, it shall convey its preferred option to the Concessionaire, and the Parties shall, with assistance of the Independent Engineer, thereupon make good faith efforts to agree upon the time and costs for implementation thereof. Upon reaching an agreement, the Authority shall issue an order (the “**Change of Scope Order**”) requiring the Concessionaire to proceed with the

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16. ENTRY INTO COMMERCIAL SERVICE

16.1. Commercial Operation Date (COD)

The Water Supply System shall be deemed to be complete when the Completion Certificate is issued under the provisions of Article 15, and accordingly the commercial operation date of the Project shall be the date on which such Completion Certificate or Provisional Certificate is issued (the "COD"). The Project Water Supply System shall enter into commercial service on COD whereupon the Concessionaire shall supply water throughout the year under each Bulk Water Supply Agreements and shall be entitled to demand and collect User Fee in accordance with the provisions of Article 25.

16.2. Damages for delay

16.2.1. Subject to the provisions of Clause 13.3, if COD does not occur prior to the 91st (ninety first) day from the Scheduled Water Supply System Date, unless the delay is on account of reasons solely attributable to the Authority or due to Force Majeure, the Concessionaire shall pay Damages to the Authority in a sum calculated at the rate of 0.1% (zero point one per cent) of the amount of Performance Security for delay of each day until COD is achieved.



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been completed. Upon issue of such Provisional Certificate, the provisions of Article 15 shall apply to such completed part.

15.4. Completion of Punch List items

15.4.1. All items in the Punch List shall be completed by the Concessionaire within 90 (ninety) days of the date of issue of the Provisional Certificate and for any delay thereafter, other than for reasons solely attributable to the Authority or due to Force Majeure, the Authority shall be entitled to recover Damages from the Concessionaire to be calculated and paid for each day of delay until all items are completed, at the lower of (a) 0.1% (zero point one per cent) of the Performance Security, and (b) 0.2% (zero point two per cent) of the cost of completing such items as estimated by the Independent Engineer. Subject to payment of such Damages, the Concessionaire shall be entitled to a further period not exceeding 120 (one hundred and twenty) days for completion of the Punch List items. For the avoidance of doubt, it is agreed that if completion of any item is delayed for reasons solely attributable to the Authority or due to Force Majeure, the completion date thereof shall be determined by the Independent Engineer in accordance with Good Industry Practice, and such completion date shall be deemed to be the date of issue of the Provisional Certificate for the purposes of Damages, if any, payable for such item under this Clause 15.4.1.

15.4.2. Upon completion of all Punch List items, the Independent Engineer shall issue the Completion Certificate. Failure of the Concessionaire to complete all the Punch List items within the time set forth in Clause 15.4.1 for any reason, other than conditions constituting Force Majeure or for reasons solely attributable to the Authority, shall entitle the Authority to terminate this Agreement.

15.5. Withholding of Provisional Certificate

15.5.1. If the Independent Engineer determines that the Project Water Supply System or any part thereof does not conform to the provisions of this Agreement and cannot be safely and reliably placed in commercial operation, it shall forthwith make a report in this behalf and send copies thereof to the Authority and the Concessionaire. Upon receipt of such a report from the Independent Engineer and after conducting its own inspection, if the Authority is of the opinion that the Project Water Supply System is not fit and safe for commercial service, it shall, within 7 (seven) days of receiving the aforesaid report, notify the Concessionaire of the defects and deficiencies in the Project Water Supply System and direct the Independent Engineer to withhold issuance of the Provisional Certificate. Upon receipt of such notice, the Concessionaire shall remedy and rectify such defects or deficiencies and thereupon Tests shall be undertaken in accordance with this Article 15. Such procedure shall be repeated as necessary until the defects or deficiencies are rectified.

15.5.2. Notwithstanding anything to the contrary contained in Clause 15.3.1, the Authority may, at any time after receiving a report from the Independent Engineer under that Clause, direct the Independent Engineer to issue a Provisional Certificate under Clause 15.3, and such direction shall be complied forthwith.

15.6. Rescheduling of Tests

If the Independent Engineer certifies to the Authority and the Concessionaire that it is unable to issue the Completion Certificate or Provisional Certificate, because of events or circumstances on account of which the Tests could not be held or had to be suspended, the Concessionaire shall be entitled to re-schedule the Tests and hold the same as soon as reasonably practicable.


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15. COMPLETION CERTIFICATE

15.1. Tests

15.1.1. At least 30 (thirty) days prior to the likely completion of the Project Water Supply System, the Concessionaire shall notify the Independent Engineer of its intent to subject the Project Water Supply System to Tests. The date and time of each of the Tests shall be determined by the Independent Engineer in consultation with the Concessionaire, and notified to the Authority who may designate its representative to witness the Tests. The Concessionaire shall provide such assistance as the Independent Engineer may reasonably require for conducting the Tests. In the event of the Concessionaire and the Independent Engineer failing to mutually agree on the dates for conducting the Tests, the Concessionaire shall fix the dates by not less than 10 (ten) days notice to the Independent Engineer.

15.1.2. All Tests shall be conducted in accordance with Schedule-H. The Independent Engineer shall observe, monitor and review the results of the Tests to determine compliance of the Project Water Supply System with Specifications and Standards and if it is reasonably anticipated or determined by the Independent Engineer during the course of any Test that the performance of the Project Water Supply System or any part thereof does not meet the Specifications and Standards, it shall have the right to suspend or delay such Test and require the Concessionaire to remedy and rectify the defects or deficiencies. Upon completion of each Test, the Independent Engineer shall provide to the Concessionaire and the Authority copies of all Test data including detailed Test results. For the avoidance of doubt, it is expressly agreed that the Independent Engineer may require the Concessionaire to carry out or cause to be carried out additional Tests, in accordance with Good Industry Practice, for determining the compliance of the Project Water Supply System with Specifications and Standards.

15.2. Completion Certificate

Upon completion of Construction Works and the Independent Engineer determining the Tests to be successful, it shall forthwith issue to the Concessionaire and the Authority a certificate substantially in the form set forth in Schedule-I (the "**Completion Certificate**").

15.3. Provisional Certificate

15.3.1. The Independent Engineer may, at the request of the Concessionaire, issue a provisional certificate of completion substantially in the form set forth in Schedule-I (the "**Provisional Certificate**") if the Tests are successful and the Project Water Supply System can be safely and reliably placed in commercial operation though certain works or things forming part thereof are outstanding and not yet complete. In such an event, the Provisional Certificate shall have appended thereto a list of outstanding items signed jointly by the Independent Engineer and the Concessionaire (the "**Punch List**"); provided that the Independent Engineer shall not withhold the Provisional Certificate for reason of any work remaining incomplete if the delay in completion thereof is attributable to the Authority.

15.3.2. The Parties hereto expressly agree that a Provisional Certificate under this Clause 15.3 may, upon request of the Concessionaire to this effect, be issued for operating part of the Project Water Supply System, if at least 75% (seventy five per cent) of the Project Water Supply System has

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14.4. Delays during construction

Without prejudice to the provisions of Clause 13.3.2, if the Concessionaire does not achieve any of the Project Milestones or the Independent Engineer shall have reasonably determined that the rate of progress of Construction Works is such that Water Supply System is not likely to be achieved by the Scheduled Water Supply System Date, it shall notify the Concessionaire to this effect, and the Concessionaire shall, within 15 (fifteen) days of such notice, by a communication inform the Independent Engineer in reasonable detail about the steps it proposes to take to expedite progress and the period within which it shall achieve the Project Completion Date.

14.5. Video recording

During the Construction Period, the Concessionaire shall provide to the Authority for every calendar quarter, a video recording, which will be compiled into a 3 (three)-hour compact disc or digital video disc, as the case may be, covering the status and progress of Construction Works in that quarter. The first such video recording shall be provided to the Authority within 7 (seven) days of the Appointed Date and thereafter, no later than 15 (fifteen) days after the close of each quarter.



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14. MONITORING OF CONSTRUCTION

14.1. Monthly progress reports

During the Construction Period, the Concessionaire shall, no later than 7 (seven) days after the close of each month, furnish to the Authority and the Independent Engineer a monthly report on progress of the Construction Works and shall promptly give such other relevant information as may be required by the Independent Engineer.

14.2. Inspection

During the Construction Period, the Independent Engineer shall inspect the Project Water Supply System at least once a month and make a report of such inspection (the "Inspection Report") stating in reasonable detail the defects or deficiencies, if any, with particular reference to the Scope of the Project and Specifications and Standards. It shall send a copy of the Inspection Report to the Authority and the Concessionaire within 7 (seven) days of such inspection and upon receipt thereof, the Concessionaire shall rectify and remedy the defects or deficiencies, if any, stated in the Inspection Report. Such inspection or submission of Inspection Report by the Independent Engineer shall not relieve or absolve the Concessionaire of its obligations and liabilities hereunder in any manner whatsoever.

14.3. Tests

- 14.3.1. For determining that the Construction Works conform to the Specifications and Standards and also being undertaken in accordance with the Project Requirements, the Independent Engineer shall require the Concessionaire to carry out or cause to be carried out tests, at such time and frequency and in such manner as may be specified by the Independent Engineer from time to time, in accordance with Good Industry Practice for quality assurance. The Concessionaire shall, with due diligence, carry out or cause to be carried out all the tests in accordance with the instructions of the Independent Engineer and furnish the results thereof to the Independent Engineer. One half of the costs incurred on such tests, and to the extent certified by the Independent Engineer as reasonable, shall be reimbursed by the Authority to the Concessionaire. For the avoidance of doubt, the costs to be incurred on any Test which is undertaken for determining the rectification of any defect or deficiency in construction shall be borne solely by the Concessionaire.
- 14.3.2. In the event that results of any tests conducted under this Clause 14.3 establish any defects or deficiencies in the Construction Works, the Concessionaire shall carry out remedial measures and furnish a report to the Independent Engineer in this behalf. The Independent Engineer shall require the Concessionaire to carry out or cause to be carried out tests to determine that such remedial measures have brought the Construction Works into compliance with the Specifications and Standards, and the procedure set forth in this Clause 14.3 shall be repeated until such Construction Works conform to the Specifications and Standards. For the avoidance of doubt, it is agreed that tests pursuant to this Clause 14.3 shall be undertaken in addition to and independent of the tests that shall be carried out by the Concessionaire for its own quality assurance in accordance with Good Industry Practice. It is also agreed that a copy of the results of such tests shall be sent by the Concessionaire to the Independent Engineer forthwith.


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amended as above; provided further that in the event Project Completion Date is achieved on or before the Scheduled Water Supply System Date, the Damages paid under this Clause 13.3.2 shall be refunded by the Authority to the Concessionaire, but without any interest thereon. For the avoidance of doubt, it is agreed that recovery of Damages under this Clause 13.3.2 shall be without prejudice to the rights of the Authority under this Agreement, including the right of Termination thereof.

- 13.3.3. In the event that the Water Supply System is not completed within 270 days from the Scheduled Date, unless the delay is on account of reasons solely attributable to the Authority or due to Force Majeure, the Authority shall be entitled to terminate this Agreement.


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conformity or otherwise with the Scope of the Project and the Specifications and Standards. The Concessionaire shall not be obliged to await the observations of the Independent Engineer on the Drawings submitted pursuant hereto beyond the said 15 (fifteen) days period and may begin or continue Construction Works at its own discretion and risk;

- (d) If the aforesaid observations of the Independent Engineer indicate that the Drawings are not in conformity with the Scope of the Project or the Specifications and Standards, such Drawings shall be revised by the Concessionaire and resubmitted to the Independent Engineer for review. The Independent Engineer shall give its observations, if any, within 7 (seven) days of receipt of the revised Drawings;
- (e) No review and/or observation of the Independent Engineer and/or its failure to review and/or convey its observations on any Drawings shall relieve the Concessionaire of its obligations and liabilities under this Agreement in any manner nor shall the Independent Engineer or the Authority be liable for the same in any manner;
- (f) Without prejudice to the foregoing provisions of this Clause 13.3, the Concessionaire shall submit to the Authority for review and comments, its Drawings relating to the Project, and the Authority shall have the right but not the obligation to undertake such review and provide its comments, if any within 30 (thirty) days of the receipt of such Drawings. The provisions of this Clause 13.3 shall apply *mutatis mutandis* to the review and comments hereunder; and
- (g) Within 90 (ninety) days of the Project Completion Date, the Concessionaire shall furnish to the Authority and the Independent Engineer a complete set of as-built Drawings, in 2 (two) hard copies and in micro film form or in such other medium as may be acceptable to the Authority, reflecting the Project Water Supply System as actually designed, engineered and constructed including an as-built survey illustrating the layout of the Project and setback lines, if any, of the buildings and structures forming part of Project Facilities.

13.3. Construction of the Project Water Supply System

- 13.3.1. On or after the Appointed Date, the Concessionaire shall undertake construction of the Water Supply System as specified in Schedule-B, and in conformity with the Specifications and Standards set forth in Schedule-C. The 730th (seven hundred and thirty) days i.e. 24 (twenty four) months from the Appointed Date shall be the scheduled date for completion of the water supply system (the "**Scheduled Water Supply System Date**") and the Concessionaire agrees and undertakes that the project facilities shall be completed on or before the Scheduled Water Supply System Date.
- 13.3.2. The Concessionaire shall construct the Project Water Supply System in accordance with the Project Completion Schedule set forth in Schedule-F. In the event that the Concessionaire fails to achieve any Project Milestone within a period of 90 (ninety) days from the date set forth for such Milestone in Schedule-F, unless such failure has occurred due to Force Majeure or for reasons solely attributable to the Authority, it shall pay Damages to the Authority in a sum calculated at the rate of 0.1% (zero point one per cent) of the amount of Performance Security for delay of each day until such Milestone is achieved; provided that if any or all Project Milestones or the Scheduled Water Supply System Date are extended in accordance with the provisions of this Agreement, the dates set forth in Schedule-F shall be deemed to be modified accordingly and the provisions of this Agreement shall apply as if Schedule-F has been


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13. CONSTRUCTION OF THE WATER SUPPLY SYSTEM

13.1. Obligations prior to commencement of construction

Prior to commencement of Construction Works, the Concessionaire shall:

- (a) Submit to the Authority and the Independent Engineer its detailed design, drawings, construction methodology, quality assurance procedures, and the procurement, engineering and construction time schedule for completion of the Project in accordance with the Project Completion Schedule as set forth in Schedule-F;
- (b) Appoint its representative duly authorized to deal with the Authority in respect of all matters under or arising out of relating to this Agreement;
- (c) Undertake, do and perform all such acts, deeds and things as may be necessary or required before commencement of construction under and in accordance with the Agreement, the Applicable Laws and Applicable Permits;
- (d) make its own arrangements for quarrying of materials needed for the Project Water Supply System under and in accordance with the Applicable Laws and Applicable Permits;
- (e) submit a comprehensive work plan including necessary planning for metering of Bulk users, consumer complaint recording and monitoring system, computerized billing and collection system, reduction of water loss in the system, measures to be undertaken and maintain the portability of supplied water, plan to maintain appropriate pressure levels at pre-decided production and distribution points, plan to cover growing supply area in future either because of increase in the number of Bulk Users or on account of geographical area etc;

The Concessionaire shall submit the comprehensive work plan within 60 (sixty) days from the date of signing of this Agreement. Within 15 (fifteen) days from the submission of the comprehensive work plan, the Authority and the Independent Engineer shall review and give comments, if any. The Concessionaire shall finalize the comprehensive work plan after taking into account the comments of the Authority and IE or give reasons with full justification, in case of disagreement, if any.

13.2. Drawings

In respect of the Concessionaire's obligations with respect to the Drawings of the Project Water Supply System as set forth in Schedule-G, the following shall apply:

- (a) The Concessionaire shall prepare and submit, with reasonable promptness and in such sequence as is consistent with the Project Completion Schedule 5 (five) copies each of all Drawings to the Independent Engineer for review;
- (b) By submitting the Drawings for review to the Independent Engineer, the Concessionaire shall be deemed to have represented that it has determined and verified that the design and engineering, including field construction criteria related thereto, are in conformity with the Scope of the Project and the Specifications and Standards;
- (c) Within 15 (fifteen) days of the receipt of the Drawings, the Independent Engineer shall review the same and convey its observations to the Concessionaire with particular reference to their


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12. UTILITIES AND TREES

12.1. Existing utilities

Notwithstanding anything to the contrary contained herein, the Concessionaire shall ensure that the respective entities owning the existing roads, right of way or utilities on, under or above the Site are enabled by it to keep such utilities in continuous satisfactory use.

12.2. Shifting of obstructing utilities

The Concessionaire shall, subject to Applicable Laws and with assistance of the Authority, undertake shifting of any utility including electric lines, water pipes and telephone cables, to an appropriate location or alignment within or outside the Site if and only if such utility causes or shall cause a material adverse effect on the construction, operation or maintenance of the Project Water Supply System. The cost of such shifting shall be borne by the Authority or by the entity owning such utility, if the Authority so directs, and in the event of any delay in shifting thereof, the Concessionaire shall be excused for failure to perform any of its obligations hereunder if such failure is a direct consequence of delay on the part of the entity owning such electric lines, water pipes or telephone cables, as the case may be.

12.3. New utilities

12.3.1. The Concessionaire shall allow, subject to such conditions as the Authority may specify, access to, and use of the Site for laying telephone lines, water pipes, electric cables or other public utilities. Where such access or use causes any financial loss to the Concessionaire, it may require the user of the Site to pay compensation or damages as per Applicable Laws. For the avoidance of doubt, it is agreed that use of the Site under this Clause shall not in any manner relieve the Concessionaire of its obligation to maintain the Project Water Supply System in accordance with this Agreement and any damage caused by such use shall be restored forthwith.

12.3.2. The Authority may, by notice require the Concessionaire to connect any adjoining area to the Project Water Supply System, and the connecting portion thereof falling within the Site shall be constructed by the Concessionaire at the Authority's cost in accordance with Article 17. The maintenance of such connecting portion shall be undertaken by the Concessionaire in accordance with the provisions of Clause 18.1.3.

12.4. Felling of trees

The Authority shall assist the Concessionaire in obtaining the Applicable Permits for felling of trees to be identified by the Authority for this purpose if and only if such trees cause a material adverse effect on the construction, operation or maintenance of the Project Water Supply System. The cost of such felling shall be borne by the Authority, and in the event of any delay in felling thereof for reasons beyond the control of the Concessionaire, it shall be excused for failure to perform any of its obligations hereunder if such failure is a direct consequence of delay in the felling of trees. For the avoidance of doubt, the Parties hereto agree that the felled trees shall be deemed to be owned by the Authority and shall be disposed in such manner and subject to such conditions as the Authority may in its sole discretion deem appropriate.


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instructions as the concerned Government Instrumentality may reasonably give for the removal of such property. For the avoidance of doubt, it is agreed that any reasonable expenses incurred by the Concessionaire hereunder shall be reimbursed by the Authority. It is also agreed that the Government shall procure that the instructions hereunder are issued by the concerned Government Instrumentality within a reasonable period.



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for which Right of Way is granted within 90 (ninety) days of the Appointed Date shall be completed before the Project Completion Date. It is further agreed that the obligation of the Concessionaire to complete the affected Construction Works shall subsist so long as the Authority continues to pay the Damages specified herein, and upon the Authority ceasing to pay such Damages after giving 60 (sixty) days' notice thereof to the Concessionaire, the obligation of the Concessionaire to complete such works on such part of the Site shall cease forthwith.

11.4. Site to be free from Encumbrances

Subject to the provisions of Clause 11.3, the Site shall be made available by the Authority to the Concessionaire pursuant hereto free from all Encumbrances and occupations and without the Concessionaire being required to make any payment to the Authority on account of any costs, compensation, expenses and charges for the acquisition and use of such Site for the duration of the Concession Period, except insofar as otherwise expressly provided in this Agreement. For the avoidance of doubt, it is agreed that existing rights of way, easements, privileges, liberties and appurtenances to the Licensed Premises shall not be deemed to be Encumbrances.

11.5. Protection of Site from encroachments

During the Concession Period, the Concessionaire shall protect the Site from any and all occupations, encroachments or Encumbrances, and shall not place or create nor permit any Contractor or other person claiming through or under the Concessionaire to place or create any Encumbrance or security interest over all or any part of the Site or the Project Assets, or on any rights of the Concessionaire therein or under this Agreement, save and except as otherwise expressly set forth in this Agreement.

11.6. Special / temporary right of way

The Concessionaire shall bear all costs and charges for any special or temporary right of way required by it in connection with access to the Site. The Concessionaire shall obtain at its cost such facilities on or outside the Site as may be required by it for the purposes of the Project Water Supply System and the performance of its obligations under this Agreement.

11.7. Access to the Authority and Independent Engineer

The licence, right of way and right to the Site granted to the Concessionaire hereunder shall always be subject to the right of access of the Authority and the Independent Engineer and their employees and agents for inspection, viewing and exercise of their rights and performance of their obligations under this Agreement.

11.8. Geological and archaeological finds

It is expressly agreed that mining, geological or archaeological rights do not form part of the licence granted to the Concessionaire under this Agreement and the Concessionaire hereby acknowledges that it shall not have any mining rights or interest in the underlying minerals, fossils, antiquities, structures or other remnants or things either of particular geological or archaeological interest and that such rights, interest and property on or under the Site shall vest in and belong to the Authority or the concerned Government Instrumentality. The Concessionaire shall take all reasonable precautions to prevent its workmen or any other person from removing or damaging such interest or property and shall inform the Authority forthwith of the discovery thereof and comply with such


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11.2.6. It is expressly agreed that trees on the Site are property of the Authority except that the Concessionaire shall be entitled to exercise usufructory rights thereon during the Concession Period;

11.3. Procurement of the Site

11.3.1. Pursuant to the notice specified in Clause 4.1.2, the Authority Representative and the Concessionaire shall, on a mutually agreed date and time, inspect the Site and prepare a memorandum containing an inventory of the Site including the vacant and unencumbered land, buildings, structures, road works, trees and any other immovable property on or attached to the Site. Such memorandum shall have appended thereto an appendix (the "Appendix") specifying in reasonable detail those parts of the Site to which vacant access and Right of Way has not been granted to the Concessionaire. Signing of the memorandum, in two counterparts (each of which shall constitute an original), by the authorised representatives of the Parties shall be deemed to constitute a valid licence and Right of Way to the Concessionaire for free and unrestricted use and development of the vacant and unencumbered Site during the Concession Period under and in accordance with the provisions of this Agreement and for no other purpose whatsoever. For the avoidance of doubt, it is agreed that valid licence and Right of Way with respect to the parts of the Site as set forth in the Appendix shall be deemed to have been granted to the Concessionaire upon vacant access thereto being provided by the Authority to the Concessionaire.

11.3.2. Without prejudice to the provisions of Clause 11.3.1, the Parties hereto agree that on or prior to the Appointed Date, the Authority shall have granted vacant access and Right of Way such that the Appendix shall not include more than 50% (fifty per cent) of the total area of the Site required and necessary for the Project Water Supply System, and in the event Financial Close is delayed solely on account of delay in grant of such vacant access and Right of Way, the Authority shall be liable to payment of Damages under and in accordance with the provisions of Clause 4.2.

11.3.3. On and after signing the memorandum and until the Transfer Date, the Concessionaire shall maintain a round-the-clock vigil over the Site and shall ensure and procure that no encroachment thereon takes place, and in the event of any encroachment or occupation on any part thereof, the Concessionaire shall report such encroachment or occupation forthwith to the Authority and undertake its removal at its cost and expenses.

11.3.4. The Authority shall make best efforts to provide and grant the Right of Way to the Concessionaire in respect of all land included in the Appendix, and in the event of delay for any reason other than Force Majeure or breach of this Agreement by the Concessionaire, it shall pay to the Concessionaire Damages in a sum calculated at the rate of Rs. 50 (Rupees fifty) per day for every 1,000 (one thousand) square meters or part thereof, commencing from the 91st (ninety first) day of the Appointed Date and until such Right of Way is procured.

11.3.5. Upon receiving Right of Way in respect of any land included in the Appendix, the Concessionaire shall complete the Construction Works thereon within a reasonable period to be determined by the Independent Engineer in accordance with Good Industry Practice; provided that the issue of Provisional Certificate shall not be affected or delayed on account of vacant access to any part of the Site not being granted to the Concessionaire or any construction on such part of the Site remaining incomplete on the date of Tests on account of the delay or denial of such access thereto. For the avoidance of doubt, it is expressly agreed that Construction Works on all lands


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11. RIGHT OF WAY

11.1. The Site

The site of the Project Water Supply System shall comprise the real estate described in Schedule-A and respect of which the Right of Way shall be provided and granted by the Authority to the Concessionaire as a licensee under in accordance with this Agreement (the "Site"). For the avoidance of doubt, it is hereby acknowledged and agreed that references to the Site shall be construed as references to the real estate required for the Project Bulk Water Supply System as set forth in Schedule-A.

11.2. Licence, Access and Right of Way

- 11.2.1. The Authority hereby grants to the Concessionaire access to the Site for carrying out any surveys, investigations and soil tests that the Concessionaire may deem necessary during the Development Period, it being expressly agreed and understood that the Authority shall have no liability whatsoever in respect of survey, investigations and tests carried out or work undertaken by the Concessionaire on or about the Site pursuant hereto in the event of Termination or otherwise.
- 11.2.2. In consideration of the Concession Fee, this Agreement and the covenants and warranties on the part of the Concessionaire herein contained, the Authority, in accordance with the terms and conditions set forth herein, hereby grants to the Concessionaire, commencing from the Appointed Date, leave and licence rights in respect of all the land (along with any buildings, constructions or immovable assets, if any, thereon) comprising the Site which is described, delineated and shown in Schedule-A hereto (the "Licensed Premises"), on an "as is where is" basis, free of any Encumbrances, to develop, operate and maintain the said Licensed Premises, together with all and singular rights, liberties, privileges, easements and appurtenances whatsoever to the said Licensed Premises, hereditaments or premises or any part thereof belonging to or in any way appurtenant thereto or enjoyed therewith, for the duration of the Concession Period and, for the purposes permitted under this Agreement, and for no other purpose whatsoever.
- 11.2.3. The licence, access and right of way granted by this Agreement to the Concessionaire shall always be subject to existing rights of way.
- 11.2.4. It is expressly agreed that the Licence granted hereunder shall terminate automatically and forthwith, without the need for any action to be taken by the Authority to terminate the Licence, upon the Termination of this Agreement for any reason whatsoever. For the avoidance of doubt, the Parties expressly agree that notwithstanding any temporary or permanent structures erected on the Site shall automatically terminate, without any further act of the Parties, upon Termination of this Agreement.
- 11.2.5. The Concessionaire hereby irrevocably appoints the Authority (or its nominee) to be its true and lawful attorney, to execute and sign in the name of the Concessionaire a transfer or surrender of the licence granted hereunder at any time after the Concession Period has expired or has been terminated earlier in terms hereof, a sufficient proof of which will be the declaration of any duly authorised officer of the Authority, and the Concessionaire consents to it being registered for this purpose.


Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H. (O), BBSR



10. PERFORMANCE SECURITY

10.1. Performance Security

10.1.1. The Concessionaire shall, for the performance of its obligations hereunder during the Construction Period, provide to the Authority no later than 180 (one hundred and eighty) days from the date of this Agreement, an irrevocable and unconditional guarantee from a Bank for a sum equivalent to Rs. 9.38 Crores (Rupees Nine Crore and Thirty Eight Lakhs) in the form set forth in Schedule-E (the "Performance Security"). Until such time the Performance Security is provided by the Concessionaire pursuant hereto and the same comes into effect, the Bid Security shall remain in force and effect, and upon such provision of the Performance Security pursuant hereto, the Authority shall release the Bid Security to the Concessionaire.

10.1.2. Notwithstanding anything to the contrary contained in this Agreement, in the event Performance Security is not provided by the Concessionaire within a period of 180 (one hundred and eighty) days from the date of this Agreement, the Authority may encash the Bid Security and appropriate the proceeds thereof as Damages, and thereupon all rights, privileges, claims and entitlements of the Concessionaire under or arising out of this Agreement shall be deemed to have been waived by, and to have ceased with the concurrence of the Concessionaire, and this Agreement shall be deemed to have been terminated by mutual agreement of the Parties.

10.2. Appropriation of Performance Security

Upon occurrence of a Concessionaire Default, the Authority shall, without prejudice to its other rights and remedies hereunder or in law, be entitled to encash and appropriate the relevant amounts from the Performance Security as Damages for such Concessionaire Default. Upon such encashment and appropriation from the Performance Security, the Concessionaire shall, within 30 (thirty) days thereof, replenish, in case of partial appropriation, to its original level the Performance Security, and in case of appropriation of the entire Performance Security provide a fresh Performance Security, as the case may be, and the Concessionaire shall, within the time so granted, replenish or furnish fresh Performance Security as aforesaid failing which the Authority shall be entitled to terminate this Agreement in accordance with Article 34. Upon replenishment or furnishing of a fresh Performance Security, as the case may be, as aforesaid, the Concessionaire shall be entitled to an additional Cure Period of 90 (ninety) days for remedying the Concessionaire Default, and in the event of the Concessionaire not curing its default within such Cure Period, the Authority shall be entitled to encash and appropriate such Performance Security as Damages, and to terminate this Agreement in accordance with Article 34.

10.3. Release of Performance Security

The Performance Security shall remain in force and effect for a period of one year from the Appointed Date, but shall be released earlier upon the Concessionaire expending on Project construction an aggregate sum that is not less than 20% (twenty percent) of the Total Project Cost; provided the Concessionaire is not in breach of this Agreement. Upon request made by the Concessionaire for release of the Performance Security along with the particulars which establish satisfaction of the requirements specified under this Clause 10.3, the Authority shall release the Performance Security forthwith.

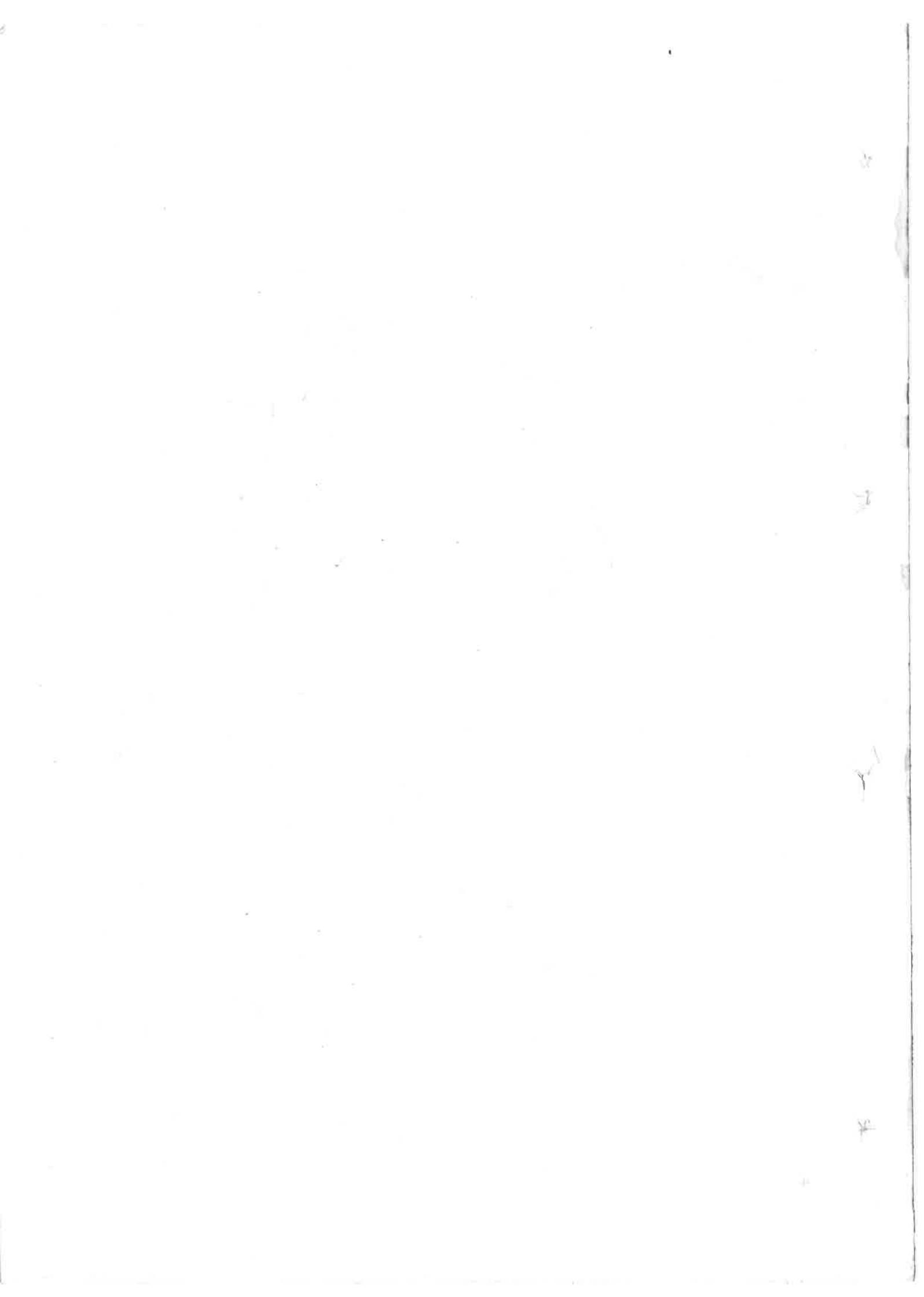
Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



PART – III
DEVELOPMENT AND OPERATIONS


Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR





Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

thereof, the Concessionaire shall promptly take all reasonable measures for eliminating or minimizing such danger.

6 Daily Inspection by the Concessionaire

The Concessionaire shall, through its engineer, undertake a daily visual inspection of the Project Water Supply System and maintain a record thereof in a register to be kept in such form and manner as the Independent Engineer may specify. Such record shall be kept in safe custody of the Concessionaire and shall be open to inspection by the Authority and the Independent Engineer at any time during office hours.

7 Divestment Requirements

All defects and deficiencies shall be repaired and rectified by the Concessionaire so that the Project Water Supply System conforms to the Maintenance Requirements on the Transfer Date.



**Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR**



SCHEDULE – X: MAINTENANCE SCHEDULE
(See Clause 18.2)

1 Maintenance Requirements

- 1.1 The Concessionaire shall, at all times, operate and maintain the Project Water Supply System in accordance with the provisions of the Agreement, Applicable Laws and Applicable Permits. In particular, the Concessionaire shall, at all times during the Operation Period, conform to the maintenance requirements set forth in this Schedule-X (the "Maintenance Requirements").
- 1.2 The Concessionaire shall repair or rectify any defect or deficiency set forth in Paragraph 2 of this Schedule-X within the time limit specified therein and any failure in this behalf shall constitute a breach of the Agreement. Upon occurrence of any breach hereunder, the Authority shall be entitled to recover Damages as set forth in Clause 18.5 of the Agreement, without prejudice to the rights of the Authority under the Agreement, including Termination thereof.
- 1.3 The Concessionaire shall at all times operate and maintain the Project Water Supply System in accordance with the Central Public Health and Environmental Engineering Organization (CPHEEO) Manual on Operation and Maintenance of Water Supply Systems issued by the Ministry of Urban Development, Government of India, January 2005 edition.

2 Repair/rectification of defects and deficiencies

The obligations of the Concessionaire in respect of Maintenance Requirements shall include repair and rectification of the defects and deficiencies of the Water Supply System within a time frame as specified by the Independent Engineer.

3 Other defects and deficiencies

- 3.1 If any additional defects or deficiencies exist in the Water Supply System, the Concessionaire shall undertake repair or rectification in accordance with Good Industry Practice.
- 3.2 In respect of any defect or deficiency, the Independent Engineer may, in conformity with Good Industry Practice, specify the permissible limit of deviation or deterioration with reference to the Specifications and Standards, and any deviation or deterioration beyond the permissible limit shall be repaired or rectified by the Concessionaire within the time limit specified by the Independent Engineer.

4 Extension of time limit

Notwithstanding anything to the contrary specified in this Schedule-X, if the nature and extent of any defect or deficiency justifies more time for its repair or rectification than the time specified herein, the Concessionaire shall be entitled to additional time in conformity with Good Industry Practice. Such additional time shall be determined by the Independent Engineer and conveyed to the Concessionaire and the Authority with reasons thereof.

5 Emergency repairs/restoration

Notwithstanding anything to the contrary contained in this Schedule-X, if any defect, deficiency or deterioration in the Project Water Supply System poses danger to the life or property of the Users


Chief Engineer
Of the E.I.C. P.H.(O), BBSR



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SCHEDULE – W
(Not to be a part of Concession Agreement)



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

SCHEDULE – V: VESTING CERTIFICATE
(See Clause 35.4)

- 1 The Chief Engineer, PHEO (U) (the “**Authority**”) refers to the Concession Agreement dated (the “**Agreement**”) entered into between the Authority and MEIL (BHUBANESWAR) BULK WATER PROJECT PRIVATE LIMITED (the “**Concessionaire**”) for Bulk Water Supply Project for IIT Bhubaneswar, National Institute of Science, Education & Research (NISER), INFOCITY-II and Adjoining areas in PPP basis (the “**Project**”) on design, build, finance, operate and transfer (“**DBFOT**”) basis.
- 2 The Authority hereby acknowledges compliance and fulfilment by the Concessionaire of the Divestment Requirements set forth in Clause 35.1 of the Agreement on the basis that upon issue of this Vesting Certificate, the Authority shall be deemed to have acquired, and all title and interest of the Concessionaire in or about the Project shall be deemed to have vested unto the Authority, free from any encumbrances, charges and liens whatsoever.
- 3 Notwithstanding anything to the contrary contained hereinabove, it shall be a condition of this Vesting Certificate that nothing contained herein shall be construed or interpreted as waiving the obligation of the Concessionaire to rectify and remedy any defect or deficiency in any of the Divestment Requirements and/or relieving the Concessionaire in any manner of the same.

Signed this day of, 20..... at Bhubaneswar.

AGREED, ACCEPTED AND SIGNED

For and on behalf of
CONCESSIONAIRE by:

(Signature)
(Name)
(Designation)
(Address)

SIGNED, SEALED AND DELIVERED

For and on behalf of
Public Health Engineering Organization (Urban) by:

(Signature)
(Name)
(Designation)
(Address)

In the presence of:

1.


Chief Engineer P.H.O. (Urban)
O/o the E.I.C. P.H.(O), BBSR

2.



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

IN WITNESS WHEREOF THE PARTIES HAVE EXECUTED AND DELIVERED THIS AGREEMENT AS OF THE DATE FIRST ABOVE WRITTEN.

SIGNED, SEALED AND DELIVERED

For and on behalf of
CONCESSIONAIRE by:

(Signature)
(Name)
(Designation)
(Address)
(Fax No.)
(Email address)

SIGNED, SEALED AND DELIVERED

For and on behalf of
Public Health Engineering Organization (Urban) by:

(Signature)
(Name)
(Designation)
(Address)
(Fax No.)
(Email address)

SIGNED, SEALED AND DELIVERED

For and on behalf of
SENIOR LENDERS by the Lenders' Representative:

(Signature)
(Name)
(Designation)
(Address)
(Fax)
(Email address)

In the presence of:

1.


**Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR**

2.



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

unenforceable provision. Failure to agree upon any such provisions shall not be subject to dispute resolution under Clause 8 of this Agreement or otherwise.

9.9 Successors and assigns

This Agreement shall be binding on and shall inure to the benefit of the Parties and their respective successors and permitted assigns.

9.10 Notices

All notices or other communications to be given or made under this Agreement shall be in writing, shall either be delivered personally or sent by courier or registered post with an additional copy to be sent by facsimile or e-mail. The address for service of each Party, its facsimile number and e-mail address are set out under its name on the signing pages hereto. A notice shall be effective upon actual receipt thereof, save that where it is received after 5.30 (five thirty) p.m. on any day, or on a day that is a public holiday, the notice shall be deemed to be received on the first working day following the date of actual receipt. Without prejudice to the foregoing, a Party giving or making a notice or communication by facsimile or e-mail shall promptly deliver a copy thereof personally, or send it by courier or registered post to the addressee of such notice or communication. It is hereby agreed and acknowledged that any Party may by notice change the address to which such notices and communications to it are to be delivered or mailed. Such change shall be effective when all the Parties have notice of it.

9.11 Language

All notices, certificates, correspondence and proceedings under or in connection with this Agreement shall be in English.

9.12 Authorised representatives

Each of the Parties shall by notice in writing designate their respective authorised representatives through whom only all communications shall be made. A Party hereto shall be entitled to remove and/or substitute or make fresh appointment of such authorised representative by similar notice.

9.13 Original Document

This Agreement may be executed in three counterparts, each of which when executed and delivered shall constitute an original of this Agreement.


Chief Engineer P.H. (Urban)
Of the E.I.C. P.H.(O), BBSR



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

All additions, amendments, modifications and variations to this Agreement shall be effectual and binding only if in writing and signed by the duly authorised representatives of the Parties.

9.5 Waiver

9.5.1 Waiver by any Party of a default by another Party in the observance and performance of any provision of or obligations under this Agreement:

- (a) shall not operate or be construed as a waiver of any other or subsequent default hereof or of other provisions of or obligations under this Agreement;
- (b) shall not be effective unless it is in writing and executed by a duly authorised representative of the Party; and
- (c) shall not affect the validity or enforceability of this Agreement in any manner.

9.5.2 Neither the failure by either Party to insist on any occasion upon the performance of the terms, conditions and provisions of this Agreement or any obligation thereunder nor time or other indulgence granted by a Party to another Party shall be treated or deemed as waiver of such breach or acceptance of any variation or the relinquishment of any such right hereunder.

9.6 No third party beneficiaries

This Agreement is solely for the benefit of the Parties and no other person or entity shall have any rights hereunder.

9.7 Survival

9.7.1 Termination of this Agreement:

- (a) shall not relieve the Parties of any obligations hereunder which expressly or by implication survive termination hereof; and
- (b) except as otherwise provided in any provision of this Agreement expressly limiting the liability of either Party, shall not relieve either Party of any obligations or liabilities for loss or damage to the other Party arising out of or caused by acts or omissions of such Party prior to the effectiveness of such termination or arising out of such termination.

9.7.2 All obligations surviving the cancellation, expiration or termination of this Agreement shall only survive for a period of 3 (three) years following the date of such termination or expiry of this Agreement.

9.8 Severability

If for any reason whatever any provision of this Agreement is or becomes invalid, illegal or unenforceable or is declared by any court of competent jurisdiction or any other instrumentality to be invalid, illegal or unenforceable, the validity, legality or enforceability of the remaining provisions shall not be affected in any manner, and the Parties will negotiate in good faith with a view to agreeing to one or more provisions which may be substituted for such invalid, unenforceable or illegal provisions, as nearly as is practicable to such invalid, illegal or


Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

- 8.1.1 Any dispute, difference or claim arising out of or in connection with this Agreement which is not resolved amicably shall be decided by reference to arbitration to a Board of Arbitrators comprising one nominee each of the Authority, Concessionaire and the Lenders' Representative. Such arbitration shall be held in accordance with the Rules of Arbitration of the International Centre for Alternative Dispute Resolution, New Delhi (the "Rules") or such other rules as may be mutually agreed by the Parties, and shall be subject to provisions of the Arbitration and Conciliation Act, 1996.
- 8.1.2 The Arbitrators shall issue a reasoned award and such award shall be final and binding on the Parties. The venue of arbitration shall be Bhubaneswar and the language of arbitration shall be English.

9 MISCELLANEOUS PROVISIONS

9.1 Governing law and jurisdiction

This Agreement shall be construed and interpreted in accordance with and governed by the laws of India, and the Courts at Bhubaneswar shall have jurisdiction over all matters arising out of or relating to this Agreement.

9.2 Waiver of sovereign immunity

The Authority unconditionally and irrevocably:

- (a) agrees that the execution, delivery and performance by it of this Agreement constitute commercial acts done and performed for commercial purpose;
- (b) agrees that, should any proceedings be brought against it or its assets, property or revenues in any jurisdiction in relation to this Agreement or any transaction contemplated by this Agreement, no immunity (whether by reason of sovereignty or otherwise) from such proceedings shall be claimed by or on behalf of the Authority with respect to its assets;
- (c) waives any right of immunity which it or its assets, property or revenues now has, may acquire in the future or which may be attributed to it in any jurisdiction; and
- (d) consents generally in respect of the enforcement of any judgement or award against it in any such proceedings to the giving of any relief or the issue of any process in any jurisdiction in connection with such proceedings (including the making, enforcement or execution against it or in respect of any assets, property or revenues whatsoever irrespective of their use or intended use of any order or judgement that may be made or given in connection therewith).

9.3 Priority of agreements

In the event of any conflict between the Concession Agreement and this Agreement, the provisions contained in the Concession Agreement shall prevail over this Agreement.

9.4 Alteration of terms


Chief Engineer P.H. (BBSR)
Of the E.I.C. P.H.(O), BBSR



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

This Agreement shall come into force from the date hereof and shall expire at the earliest to occur of the following events:

- (a) Termination of the Agreement; or
- (b) no sum remains to be advanced, or is outstanding to the Senior Lenders, under the Financing Agreements.

7 INDEMNITY

7.1 General indemnity

- 7.1.1 The Concessionaire will indemnify, defend and hold the Authority and the Lenders' Representative harmless against any and all proceedings, actions and third party claims for any loss, damage, cost and expense of whatever kind and nature arising out of any breach by the Concessionaire of any of its obligations under this Agreement or on account of failure of the Concessionaire to comply with Applicable Laws and Applicable Permits.
- 7.1.2 The Authority will indemnify, defend and hold the Concessionaire harmless against any and all proceedings, actions and third party claims for any loss, damage, cost and expense arising out of failure of the Authority to fulfil any of its obligations under this Agreement, materially and adversely affecting the performance of the Concessionaire's obligations under the Concession Agreement or this Agreement, other than any loss, damage, cost and expense, arising out of acts done in discharge of their lawful functions by the Authority, its officers, servants and agents.
- 7.1.3 The Lenders' Representative will indemnify, defend and hold the Concessionaire harmless against any and all proceedings, actions and third party claims for any loss, damage, cost and expense arising out of failure of the Lenders' Representative to fulfil its obligations under this Agreement, materially and adversely affecting the performance of the Concessionaire's obligations under the Concession Agreement, other than any loss, damage, cost and expense, arising out of acts done in discharge of their lawful functions by the Lenders' Representative, its officers, servants and agents.

7.2 Notice and contest of claims

In the event that any Party hereto receives a claim from a third party in respect of which it is entitled to the benefit of an indemnity under Clause 7.1 or in respect of which it is entitled to reimbursement (the "**Indemnified Party**"), it shall notify the other Party responsible for indemnifying such claim hereunder (the "**Indemnifying Party**") within 15 (fifteen) days of receipt of the claim and shall not settle or pay the claim without the prior approval of the Indemnifying Party, such approval not to be unreasonably withheld or delayed. In the event that the Indemnifying Party wishes to contest or dispute the claim, it may conduct the proceedings in the name of the Indemnified Party and shall bear all costs involved in contesting the same. The Indemnified Party shall provide all cooperation and assistance in contesting any claim and shall sign all such writings and documents as the Indemnifying Party may reasonably require.

8 DISPUTE RESOLUTION

8.1 Dispute resolution


Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



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The decision of the Lenders' Representative and the Authority in selection of the Nominated Company shall be final and binding on the Concessionaire. The Concessionaire irrevocably agrees and waives any right to challenge the actions of the Lenders' Representative or the Senior Lenders or the Authority taken pursuant to this Agreement including the transfer/assignment of the Concession in favour of the Nominated Company. The Concessionaire agrees and confirms that it shall not have any right to seek revaluation of assets of the Project or the Concessionaire's shares. It is hereby acknowledged by the Parties that the rights of the Lenders' Representative are irrevocable and shall not be contested in any proceedings before any court or Authority and the Concessionaire shall have no right or remedy to prevent, obstruct or restrain the Authority or the Lenders' Representative from effecting or causing the transfer by substitution and endorsement of the Concession as requested by the Lenders' Representative.

4 PROJECT AGREEMENTS

4.1 Substitution of Nominated Company in Project Agreements

The Concessionaire shall ensure and procure that each Project Agreement contains provisions that entitle the Nominated Company to step into such Project Agreement, in its discretion, in place and substitution of the Concessionaire in the event of such Nominated Company's assumption of the liabilities and obligations of the Concessionaire under the Concession Agreement.

5 TERMINATION OF CONCESSION AGREEMENT

5.1 Termination upon occurrence of Financial Default

At any time after issue of a Notice of Financial Default, the Lenders' Representative may by a notice in writing require the Authority to terminate the Concession Agreement forthwith, and upon receipt of such notice, the Authority shall undertake Termination under and in accordance with the provisions of Article 30 of the Concession Agreement.

5.2 Termination when no Nominated Company is selected

In the event that no Nominated Company acceptable to the Authority is selected and recommended by the Lenders' Representative within the period of 180 (one hundred and eighty) days or any extension thereof as set forth in Clause 3.3.2, the Authority may terminate the Concession Agreement forthwith in accordance with the provisions thereof.

5.3 Realisation of Debt Due

The Authority and the Concessionaire hereby acknowledge and agree that, without prejudice to their any other right or remedy, the Lenders' Representative is entitled to receive from the Concessionaire, without any further reference to or consent of the Concessionaire, the Debt Due upon Termination of the Concession Agreement. For realisation of the Debt Due, the Lenders' Representative shall be entitled to make its claim from the Escrow Account in accordance with the provisions of the Concession Agreement and the Escrow Agreement.

6 DURATION OF THE AGREEMENT

6.1 Duration of the Agreement


Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

accordance with the provisions of this Agreement within a period of 180 (one hundred and eighty) days from the date of such representation, and the Authority shall either withhold Termination or undertake Suspension for the aforesaid period of 180 (one hundred and eighty) days; provided that upon written request from the Lenders' Representative and the Concessionaire, the Authority shall extend the aforesaid period of 180 (one hundred and eighty) days by a period not exceeding 90 (ninety) days.

3.4 Procedure for substitution

- 3.4.1 The Authority and the Concessionaire hereby agree that on or after the date of Notice of Financial Default or the date of representation to the Authority under Clause 3.3.2, as the case may be, the Lenders' Representative may, without prejudice to any of the other rights or remedies of the Senior Lenders, invite, negotiate and procure offers, either by private negotiations or public auction or tenders for the take over and transfer of the Project including the Concession to the Nominated Company upon such Nominated Company's assumption of the liabilities and obligations of the Concessionaire towards the Authority under the Concession Agreement and towards the Senior Lenders under the Financing Agreements.
- 3.4.2 To be eligible for substitution in place of the Concessionaire, the Nominated Company shall be required to fulfil the eligibility criteria that were laid down by the Authority for short-listing the bidders for award of the Concession; provided that the Lenders' Representative may represent to the Authority that all or any of such criteria may be waived in the interest of the Project, and if the Authority determines that such waiver shall not have any material adverse effect on the Project, it may waive all or any of such eligibility criteria.
- 3.4.3 Upon selection of a Nominated Company, the Lenders' Representative shall request the Authority to:
- (a) accede to transfer to the Nominated Company the right to construct, operate and maintain the Project Facilities in accordance with the provisions of the Concession Agreement;
 - (b) endorse and transfer the Concession to the Nominated Company, on the same terms and conditions, for the residual Concession Period; and
 - (c) enter into a Substitution Agreement with the Lenders' Representative and the Nominated Company on the same terms as are contained in this Agreement.
- 3.4.4 If the Authority has any objection to the transfer of Concession in favour of the Nominated Company in accordance with this Agreement, it shall within 15 (fifteen) days from the date of proposal made by the Lenders' Representative, give a reasoned order after hearing the Lenders' Representative. If no such objection is raised by the Authority, the Nominated Company shall be deemed to have been accepted. The Authority thereupon shall transfer and endorse the Concession within 15 (fifteen) days of its acceptance/deemed acceptance of the Nominated Company; provided that in the event of such objection by the Authority, the Lenders' Representative may propose another Nominated Company whereupon the procedure set forth in this Clause 3.4 shall be followed for substitution of such Nominated Company in place of the Concessionaire.

3.5 Selection to be binding


Chief Engineer, (in-charge)
Of the E.I.C. P.H.(C), BBSR



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3.1 Rights of substitution

- 3.1.1 Pursuant to the rights, title and interest assigned under Clause 2.1, the Lenders' Representative shall be entitled to substitute the Concessionaire by a Nominated Company under and in accordance with the provisions of this Agreement and the Concession Agreement.
- 3.1.2 The Authority hereby agrees to substitute the Concessionaire by endorsement on the Concession Agreement in favour of the Nominated Company selected by the Lenders' Representative in accordance with this Agreement. (For the avoidance of doubt, the Senior Lenders or the Lenders' Representative shall not be entitled to operate and maintain the Project Facilities as Concessionaire either individually or collectively).

3.2 Substitution upon occurrence of Financial Default

- 3.2.1 Upon occurrence of a Financial Default, the Lenders' Representative may issue a notice to the Concessionaire (the "**Notice of Financial Default**") along with particulars thereof, and send a copy to the Authority for its information and record. A Notice of Financial Default under this Clause 3 shall be conclusive evidence of such Financial Default and it shall be final and binding upon the Concessionaire for the purposes of this Agreement.
- 3.2.2 Upon issue of a Notice of Financial Default hereunder, the Lenders' Representative may, without prejudice to any of its rights or remedies under this Agreement or the Financing Agreements, substitute the Concessionaire by a Nominated Company in accordance with the provisions of this Agreement.
- 3.2.3 At any time after the Lenders' Representative has issued a Notice of Financial Default, it may by notice require the Authority to suspend all the rights of the Concessionaire and undertake the operation and maintenance of the Project Facilities in accordance with the provisions of Article 33 of the Concession Agreement, and upon receipt of such notice, the Authority shall undertake Suspension under and in accordance with the provisions of the Concession Agreement. The aforesaid Suspension shall be revoked upon substitution of the Concessionaire by a Nominated Company, and in the event such substitution is not completed within 180 (one hundred and eighty) days from the date of such Suspension, the Authority may terminate the Concession Agreement forthwith by issuing a Termination Notice in accordance with the provisions of the Concession Agreement; provided that upon written request from the Lenders' Representative and the Concessionaire, the Authority may extend the aforesaid period of 180 (one hundred and eighty) days by a period not exceeding 90 (ninety) days.

3.3 Substitution upon occurrence of Concessionaire Default

- 3.3.1 Upon occurrence of a Concessionaire Default, the Authority shall by a notice inform the Lenders' Representative of its intention to issue a Termination Notice and grant 15 (fifteen) days time to the Lenders' Representative to make a representation, stating the intention to substitute the Concessionaire by a Nominated Company.
- 3.3.2 In the event that the Lenders' Representative makes a representation to the Authority within the period of 15 (fifteen) days specified in Clause 3.3.1, stating that it intends to substitute the Concessionaire by a Nominated Company, the Lenders' Representative shall be entitled to undertake and complete the substitution of the Concessionaire by a Nominated Company in


Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

1.1 Definitions

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

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

"Financial Default" means occurrence of a material breach of the terms and conditions of the Financing Agreements or a continuous default in Debt Service by the Concessionaire for a minimum period of 3 (three) months;

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

"Nominated Company" means a company, incorporated under the provisions of the Companies Act, 1956, selected by the Lenders' Representative, on behalf of Senior Lenders, and proposed to the Authority for assignment/transfer of the Concession as provided in this Agreement;

"Notice of Financial Default" shall have the meaning ascribed thereto in Clause 3.2.1; and

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

1.2 Interpretation

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

1.2.2 References to Clauses are, unless stated otherwise, references to Clauses of this Agreement.

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

1.2.4 The rules of interpretation stated in Clauses 1.2, 1.3 and 1.4 of the Concession Agreement shall apply, *mutatis mutandis*, to this Agreement.

2 ASSIGNMENT

2.1 Assignment of rights and title

The Concessionaire hereby agrees to assigns the rights, title and interest in the Concession to, and in favour of, the Lenders' Representative pursuant to and in accordance with the provisions of this Agreement and the Concession Agreement by way of security in respect of financing by the Senior Lenders under the Financing Agreements.

3 SUBSTITUTION OF THE CONCESSIONAIRE



Chief Engineer P.H. (Urban)
O/o the E.I.C.P.H.(O), BBSR



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

SCHEDULE – U: SUBSTITUTION AGREEMENT
(See Clause 37.3.1)

THIS SUBSTITUTION AGREEMENT is entered into on this the day of 20....

AMONGST

- 1 The Public Health Engineering Organization (Urban), established under the administrative control of Housing and Urban Development (H & UD) Department of the Government of Odisha, represented by Chief Engineer, PHEO (U) and having its principal office at Heads of Department Building, 1st floor, Unit-V, Bhubaneswar – 751001, Odisha (hereinafter referred to as the “**Authority**” which expression shall unless repugnant to the context or meaning thereof include its administrators, successors and assigns);
- 2 MEIL (BHUBANESWAR) BULK WATER PROJECT PRIVATE LIMITED, a company incorporated under the provisions of the Companies Act, 1956 and having its registered office at S-2, Technocrat Industrial Estate, Balanagar, Hyderabad – 500037, India, (hereinafter referred to as the “**Concessionaire**” which expression shall unless repugnant to the context or meaning thereof include its successors and permitted assigns and substitutes);
- 3name and particulars of Lenders' Representative and having its registered office at, acting for and on behalf of the Senior Lenders as their duly authorised agent with regard to matters arising out of or in relation to this Agreement (hereinafter referred to as the “**Lenders' Representative**”, which expression shall unless repugnant to the context or meaning thereof include its successors and substitutes);

WHEREAS:

- (A) The Authority has entered into a Concession Agreement dated with the Concessionaire (the “**Concession Agreement**”) for Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and Adjoining areas in the State of Odisha on design, build, finance, operate and transfer basis (DBFOT), and a copy of which is annexed hereto and marked as Annex-A to form part of this Agreement.
- (B) Senior Lenders have agreed to finance the Project in accordance with the terms and conditions set forth in the Financing Agreements.
- (C) Senior Lenders have requested the Authority to enter into this Substitution Agreement for securing their interests through assignment, transfer and substitution of the Concession to a Nominated Company in accordance with the provisions of this Agreement and the Concession Agreement.
- (D) In order to enable implementation of the Project including its financing, construction, operation and maintenance, the Authority has agreed and undertaken to transfer and assign the Concession to a Nominated Company in accordance with the terms and conditions set forth in this Agreement and the Concession Agreement.

NOW IT IS HEREBY AGREED as follows:

1 **DEFINITIONS AND INTERPRETATION**


Chief Engineer P.H. (U)
Of the E.I.C. P.H.(O), BBSR



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

prescribed procedure and it shall send its comments, if any, to the Authority within 15 (fifteen) days of receiving the aforesaid panel.

5. Mutually agreed panel

- 5.1. The Authority shall, after considering all relevant factors including the comments, if any, of the Concessionaire, finalise and constitute a panel of 10 (ten) firms which shall be deemed to be the mutually agreed Panel of Chartered Accountants.
- 5.2. After completion of every five years from the date of preparing the mutually agreed Panel of Chartered Accountants, or such earlier period as may be agreed between the Authority and the Concessionaire, a new panel shall be prepared in accordance with the provisions of this Schedule - T.



Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



SCHEDULE – T: PANEL OF CHARTERED ACCOUNTANTS

(See Clause 30.2.1)

1. Panel of Chartered Accountants

Pursuant to the provisions of Clause 30.2.1 of the Agreement, the Authority and the Concessionaire shall prepare a mutually agreed panel of 10 (ten) reputable firms of Chartered Accountants having their registered offices in India (the “Panel of Chartered Accountants”). The criteria for preparing such Panel and the procedure to be adopted in this behalf shall be as set forth in this Schedule-T.

2. Invitation for empanelment

2.1. The Authority shall invite offers from all reputable firms of Chartered Accountants who fulfil the following eligibility criteria, namely:

- (a) The firm should have conducted statutory audit of the annual accounts of at least one hundred companies registered under the Companies Act, 1956, of which at least ten should have been public sector undertakings;
- (b) The firm should have at least 5 (five) practising Chartered Accountants on its rolls, each with a minimum experience of ten years in the profession;
- (c) The firm or any of its partners should not have been disqualified or black-listed by the Comptroller and Auditor General of India or the Authority; and
- (d) the firm should have an office in the State or in an adjacent State with at least 2 (two) practising Chartered Accountants on its rolls in such State.

2.2. Interested firms meeting the eligibility criteria shall be required to submit a statement of their capability including the bio-data of all the practising Chartered Accountants on its rolls. In particular, each firm shall be required to furnish year- wise information relating to the names of all the companies with an annual turnover exceeding Rs. 100,00,00,000 (Rs. one hundred crore) whose annual accounts were audited by such firm in any of the preceding 5 (five) Accounting Years.

3. Evaluation and selection

3.1. The information furnished by each firm shall be scrutinised and evaluated by the Authority and 1 (one) point shall be awarded for each annual audit of the companies specified in Paragraph 2.2 above. (For the avoidance of doubt, a firm which has conducted audit of the annual accounts of any such company for five years shall be awarded five points).

3.2. The Authority shall prepare a list of all the eligible firms along with the points scored by each such firm and 10 (ten) firms scoring the highest points shall be identified and included in the draft Panel of Chartered Accountants.

4. Consultation with the Concessionaire

The Authority shall convey the aforesaid panel of firms to the Concessionaire for scrutiny and comments, if any. The Concessionaire shall be entitled to scrutinise the relevant records of the Authority to ascertain whether the selection of firms has been undertaken in accordance with the


Chief Engineer
Of the E.I.C. P.H.(U), BBSR



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SCHEDULE – S: RAW WATER QUALITY

S No.	Parameters	At Intake of WTP (River Mahanadi)	At Cascade Aerator of existing WTP
1	Ph	6.71	6.62
2	Turbidity (NTU)	1.2	1.3
3	Temperature 0C	-	-
4	Colour (Hazen)	0.1	0.1
5	Odour	Odourless	Odourless
6	Total Suspended Solids	1.0	1.0
7	Total Alkalinity as CaCo3, mg/l	84	78
8	Total Hardness as CaCo3, mg/l	64	66
9	Calcium Hardness as CaCo3, mg/l	18.4	18.1
10	Magnesium hardness as CaCo3, mg/l	45.6	47.9
11	Chloride as Cl, mg/l	13	12
12	Sulphate as SO4 mg/l	7.05	8.09
13	Nitrates as NO3 mg/l	0.01	0.01
14	Phosphate –P (PO4-P) mg/l	0.04	0.08
15	Ammonical Nitrogen (NH4-N) mg/l	0.12	0.14
16	Flouride, as F mg/l	BDL	BDL
17	Total Dissolved Solids mg/l	120	125
18	Residual Chlorine mg/l	NIL	NIL
19	Iron mg/l	0.21	0.26
20	Phenolic Compounds	Nil	Nil
21	Hexavalent Chromium mg/l	Nil	Nil
22	Chemical Oxygen Demand mg/l	2	2.4
23	Oil and Grease mg/l	BDL	BDL

**Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR**



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SCHEDULE – R: BULK WATER SUPPLY AGREEMENT
(Enclosed as Volume – II)



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

SCHEDULE – Q: SERVICE LEVEL REQUIREMENTS

S No.	Parameter	Operation Period
1	Complaint Management System	At least 80% of the complaints received should be attained within 24 hours and resolved within 72 hours of registration. A copy of the same on monthly basis may be submitted to the Authority for record.
2	Supply of water	Daily supply to all Bulk Users. Water should be supplied for minimum 20 hours per day.
3	Quality of water supplied	Must be as per Bureau of Indian Standards (BIS) norms,
4	Water Treatment Plant capacity	100%
5	Storage levels	33%
6	Raw water transmission loss level	Less than 2%
7	Water Treatment loss	2%- 3%
8	Non-Revenue Water (NRW)	20%



Chief Engineer P.H. (Urban)
Of the E.I.C. P.H.(O), BBSR



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

For and on behalf of

ESCROW BANK by:

For and on behalf of

PUBLIC HEALTH ENGINEERING
ORGANIZATION (URBAN) by:

(Signature)

(Signature)

(Name)

(Name)

(Designation)

(Designation)

(Address)

(Address)

(Fax No.)

(Fax No.)

(Email address)

(Email address)

In the presence of:

1.

2.

Chief Engineer P.H. (Urban)
Of the E.I.C. P.H.(O), BBSR



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

11.11 Language

All notices, certificates, correspondence and proceedings under or in connection with this Agreement shall be in English.

11.12 Authorised representatives

Each of the Parties shall, by notice in writing, designate their respective authorised representatives through whom only all communications shall be made. A Party hereto shall be entitled to remove and/or substitute or make fresh appointment of such authorised representative by similar notice.

11.13 Original Document

This Agreement may be executed in four counterparts, each of which when executed and delivered shall constitute an original of this Agreement.

IN WITNESS WHEREOF THE PARTIES HAVE EXECUTED AND DELIVERED THIS AGREEMENT AS OF THE DATE FIRST ABOVE WRITTEN.

SIGNED, SEALED AND

DELIVERED

For and on behalf of

CONCESSIONAIRE by:

(Signature)

(Name)

(Designation)

(Address)

(Fax No.)

(Email address)

SIGNED, SEALED AND

DELIVERED

SIGNED, SEALED AND

DELIVERED

For and on behalf of

SENIOR LENDERS by the Lenders' Representative:

(Signature)

(Name)

(Designation)

(Address)

(Fax No.)

(Email address)

SIGNED, SEALED AND

DELIVERED



Chief Engineer (M. & S.)
O/o the E.I.C. P.H.(O), BBSR



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

11.7 Survival

11.7.1 Termination of this Agreement:

- (a) shall not relieve the Parties of any obligations hereunder which expressly or by implication survive termination hereof; and
- (b) except as otherwise provided in any provision of this Agreement expressly limiting the liability of either Party, shall not relieve either Party of any obligations or liabilities for loss or damage to the other Party arising out of, or caused by, acts or omissions of such Party prior to the effectiveness of such termination or arising out of such termination.

11.7.2 All obligations surviving the cancellation, expiration or termination of this Agreement shall only survive for a period of 3 (three) years following the date of such termination or expiry of this Agreement.

11.8 Severability

If for any reason whatever any provision of this Agreement is or becomes invalid, illegal or unenforceable or is declared by any court of competent jurisdiction or any other instrumentality to be invalid, illegal or unenforceable, the validity, legality or enforceability of the remaining provisions shall not be affected in any manner, and the Parties will negotiate in good faith with a view to agreeing to one or more provisions which may be substituted for such invalid, unenforceable or illegal provisions, as nearly as is practicable to such invalid, illegal or unenforceable provision. Failure to agree upon any such provisions shall not be subject to dispute resolution under Clause 10.1 of this Agreement or otherwise.

11.9 Successors and assigns

This Agreement shall be binding on and shall inure to the benefit of the Parties and their respective successors and permitted assigns.

11.10 Notices

All notices or other communications to be given or made under this Agreement shall be in writing and shall either be delivered personally or sent by courier or registered post with an additional copy to be sent by facsimile or e-mail. The address for service of each Party, its facsimile number or e-mail are set out under its name on the signing pages hereto. A notice shall be effective upon actual receipt thereof, save that where it is received after 5.30 (five thirty) p.m. on a business day, or on a day that is not a business day, the notice shall be deemed to be received on the first business day following the date of actual receipt. Without prejudice to the foregoing, a Party giving or making a notice or communication by facsimile or e-mail shall promptly deliver a copy thereof personally, or send it by courier or registered post to the addressee of such notice or communication. It is hereby agreed and acknowledged that any Party may by notice change the address to which such notices and communications to it are to be delivered or mailed. Such change shall be effective when all the Parties have notice of it.


**Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR**



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- (b) agrees that, should any proceedings be brought against it or its assets, property or revenues in any jurisdiction in relation to this Agreement or any transaction contemplated by this Agreement, no immunity (whether by reason of sovereignty or otherwise) from such proceedings shall be claimed by or on behalf of the Authority with respect to its assets;
- (c) waives any right of immunity which it or its assets, property or revenues now has, may acquire in the future or which may be attributed to it in any jurisdiction; and
- (d) consents generally in respect of the enforcement of any judgement or award against it in any such proceedings to the giving of any relief or the issue of any process in any jurisdiction in connection with such proceedings (including the making, enforcement or execution against it or in respect of any assets, property or revenues whatsoever irrespective of their use or intended use of any order or judgement that may be made or given in connection therewith).

11.3 Priority of agreements

In the event of any conflict between the Concession Agreement and this Agreement, the provisions contained in the Concession Agreement shall prevail over this Agreement.

11.4 Alteration of terms

All additions, amendments, modifications and variations to this Agreement shall be effectual and binding only if in writing and signed by the duly authorised representatives of the Parties.

11.5 Waiver

11.5.1 Waiver by any Party of a default by another Party in the observance and performance of any provision of or obligations under this Agreement:

- (a) shall not operate or be construed as a waiver of any other or subsequent default hereof or of other provisions of or obligations under this Agreement;
- (b) shall not be effective unless it is in writing and executed by a duly authorised representative of the Party; and
- (c) shall not affect the validity or enforceability of this Agreement in any manner.

11.5.2 Neither the failure by any Party to insist on any occasion upon the performance of the terms, conditions and provisions of this Agreement or any obligation thereunder nor time or other indulgence granted by any Party to another Party shall be treated or deemed as waiver of such breach or acceptance of any variation or the relinquishment of any such right hereunder.

11.6 No third party beneficiaries

This Agreement is solely for the benefit of the Parties and no other person or entity shall have any rights hereunder.


Chief Engineer P.H. (Urban)
Of the E.I.C. P.H.(O), BBSR



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other than any loss, damage, cost and expense, arising out of acts done in discharge of their lawful functions by the Escrow Bank, its officers, servants and agents.

9.2 Notice and contest of claims

In the event that any Party hereto receives a claim from a third party in respect of which it is entitled to the benefit of an indemnity under Clause 9.1 or in respect of which it is entitled to reimbursement (the "Indemnified Party"), it shall notify the other Party responsible for indemnifying such claim hereunder (the "Indemnifying Party") within 15 (fifteen) days of receipt of the claim and shall not settle or pay the claim without the prior approval of the Indemnifying Party, which approval shall not be unreasonably withheld or delayed. In the event that the Indemnifying Party wishes to contest or dispute the claim, it may conduct the proceedings in the name of the Indemnified Party and shall bear all costs involved in contesting the same. The Indemnified Party shall provide all cooperation and assistance in contesting any claim and shall sign all such writings and documents as the Indemnifying Party may reasonably require.

10 DISPUTE RESOLUTION

10.1 Dispute resolution

10.1.1 Any dispute, difference or claim arising out of or in connection with this Agreement, which is not resolved amicably, shall be decided finally by reference to arbitration to a Board of Arbitrators comprising one nominee of each Party to the dispute, and where the number of such nominees is an even number, the nominees shall elect another person to such Board. Such arbitration shall be held in accordance with the Rules of Arbitration of the International Centre for Alternative Dispute Resolution, New Delhi (the "Rules") or such other rules as may be mutually agreed by the Parties, and shall be subject to the provisions of the Arbitration and Conciliation Act, 1996.

10.1.2 The Arbitrators shall issue a reasoned award and such award shall be final and binding on the Parties. The venue of arbitration shall be Bhubaneswar and the language of arbitration shall be English.

11 MISCELLANEOUS PROVISIONS

11.1 Governing law and jurisdiction

This Agreement shall be construed and interpreted in accordance with and governed by the laws of India, and the Courts at Bhubaneswar shall have jurisdiction over all matters arising out of or relating to this Agreement.

11.2 Waiver of sovereign immunity

The Authority unconditionally and irrevocably:

- (a) agrees that the execution, delivery and performance by it of this Agreement constitute commercial acts done and performed for commercial purpose;



Chief Engineer P.H. (Urban)
Of the E.I.C.P.H.(O), BBSR



7.3 Closure of Escrow Account

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

8 SUPPLEMENTARY ESCROW AGREEMENT

8.1 Supplementary escrow agreement

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

9 INDEMNITY

9.1 General indemnity

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

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

9.1.3 The Escrow Bank will indemnify, defend and hold the Concessionaire harmless against any and all proceedings, actions and third party claims for any loss, damage, cost and expense arising out of failure of the Escrow Bank to fulfill its obligations under this Agreement materially and adversely affecting the performance of the Concessionaire's obligations under the Concession Agreement


Chief Engineer P.H. (Urban)
O/o the E.I.C.P.H.(O), BBSR



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represents and warrants that it is not aware of any reason why such regulatory approvals will not ordinarily be granted to the Escrow Bank.

6 ESCROW DEFAULT

6.1 Escrow Default

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

- (a) the Concessionaire commits breach of this Agreement by failing to deposit any receipts into the Escrow Account as provided herein and fails to cure such breach by depositing the same into the Escrow Account within a Cure Period of 5 (five) business days;
- (b) the Concessionaire causes the Escrow Bank to transfer funds to any account of the Concessionaire in breach of the terms of this Agreement and fails to cure such breach by depositing the relevant funds into the Escrow Account or any Sub-Account in which such transfer should have been made, within a Cure Period of 5 (five) business days; or
- (c) the Concessionaire commits or causes any other breach of the provisions of this Agreement and fails to cure the same within a Cure Period of 5 (five) business days.

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

7 TERMINATION OF ESCROW AGREEMENT

7.1 Duration of the Escrow Agreement

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

7.2 Substitution of Escrow Bank

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


Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



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5.1 Segregation of funds

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

5.2 Notification of balances

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

5.3 Communications and notices

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

- (a) may, in the absence of bad faith or gross negligence on its part, rely as to any matters of fact which might reasonably be expected to be within the knowledge of the Concessionaire upon a certificate signed by or on behalf of the Concessionaire;
- (b) may, in the absence of bad faith or gross negligence on its part, rely upon the authenticity of any communication or document believed by it to be authentic;
- (c) shall, within 5 (five) business days after receipt, deliver a copy to the Lenders' Representative of any notice or document received by it in its capacity as the Escrow Bank from the Concessionaire or any other person hereunder or in connection herewith; and
- (d) shall, within 5 (five) business days after receipt, deliver a copy to the Concessionaire of any notice or document received by it from the Lenders' Representative in connection herewith.

5.4 No set off

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

5.5 Regulatory approvals

The Escrow Bank shall use its best efforts to procure, and thereafter maintain and comply with, all regulatory approvals required for it to establish and operate the Escrow Account. The Escrow Bank


Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



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- (c) outstanding Concession Fee;
- (d) all payments and Damages certified by the Authority as due and payable to it by the Concessionaire pursuant to the Concession Agreement and any claims in connection with or arising out of Termination;
- (e) retention and payments arising out of, or in relation to, liability for defects and deficiencies set forth in Article 36 of the Concession Agreement;
- (f) outstanding Debt Service including the balance of Debt Due;
- (g) outstanding Subordinated Debt;
- (h) incurred or accrued O&M Expenses;
- (i) any other payments required to be made under the Concession Agreement; and
- (j) balance, if any, in accordance with the instructions of the Concessionaire;

Provided that the disbursements specified in Sub-clause (j) of this Clause 4.2 shall be undertaken only after the Vesting Certificate has been issued by the Authority.

4.3 Application of insufficient funds

Funds in the Escrow Account shall be applied in the serial order of priority set forth in Clauses 4.1 and 4.2, as the case may be. If the funds available are not sufficient to meet all the requirements, the Escrow Bank shall apply such funds in the serial order of priority until exhaustion thereof.

4.4 Application of insurance proceeds

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

4.5 Withdrawals during Suspension

Notwithstanding anything to the contrary contained in this Agreement, the Authority may exercise all or any of the rights of the Concessionaire during the period of Suspension under Article 29 of the Concession Agreement. Any instructions given by the Authority to the Escrow Bank during such period shall be complied with as if such instructions were given by the Concessionaire under this Agreement and all actions of the Authority hereunder shall be deemed to have been taken for and on behalf of the Concessionaire.

5 OBLIGATIONS OF THE ESCROW BANK



**Chief Engineer P.H. (Urban)
Of the E.I.C. P.H.(O), BBSR**



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month, then retain such monies in such Sub-Accounts and pay out therefrom on the Payment Date(s):

- (a) all taxes due and payable by the Concessionaire for and in respect of the Project;
- (b) all payments relating to construction of the Project, subject to and in accordance with the conditions, if any, set forth in the Financing Agreements;
- (c) O&M Expenses, subject to the ceiling, if any, set forth in the Financing Agreements;
- (d) O&M Expenses incurred by the Authority, provided it certifies to the Escrow Bank that it had incurred such expenses in accordance with the provisions of the Concession Agreement and that the amounts claimed are due to it from the Concessionaire;
- (e) Deleted;
- (f) monthly proportionate provision of Debt Service due in an Accounting Year;
- (g) Deleted;
- (h) all payments and Damages certified by the Authority as due and payable to it by the Concessionaire pursuant to the Concession Agreement;
- (i) monthly proportionate provision of debt service payments due in an Accounting Year in respect of Subordinated Debt;
- (j) any reserve requirements set forth in the Financing Agreements; and
- (k) balance, if any, in accordance with the instructions of the Concessionaire.

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

4.2 Withdrawals upon Termination

Upon Termination of the Concession Agreement, all amounts standing to the credit of the Escrow Account shall, notwithstanding anything in this Agreement, be appropriated and dealt with in the following order:

- (a) all taxes due and payable by the Concessionaire for and in respect of the Project;
- (b) 90% (ninety per cent) of Debt Due excluding Subordinated Debt;


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3.1.2 The Concessionaire may at any time make deposits of its other funds into the Escrow Account, provided that the provisions of this Agreement shall apply to such deposits.

3.2 Deposits by the Authority

The Authority agrees and undertakes that, as and when due and payable, it shall deposit into and/or credit the Escrow Account with:

- (a) Grant and any other monies disbursed by the Authority to the Concessionaire;
- (b) Deleted;
- (c) all Fee collected by the Authority in exercise of its rights under the Concession Agreement; and
- (d) Termination Payments:

Provided that the Authority shall be entitled to appropriate from the aforesaid amounts, any Concession Fee due and payable to it by the Concessionaire and the balance remaining shall be deposited into the Escrow Account.

3.3 Deposits by Senior Lenders

The Lenders' Representative agrees, confirms and undertakes that the Senior Lenders shall deposit into and/or credit the Escrow Account with all disbursements made by them in relation to or in respect of the Project; provided that notwithstanding anything to the contrary contained in this Agreement, the Senior Lenders shall be entitled to make direct payments to the EPC Contractor under and in accordance with the express provisions contained in this behalf in the Financing Agreements.

3.4 Interest on deposits

The Escrow Bank agrees and undertakes that all interest accruing on the balances of the Escrow Account shall be credited to the Escrow Account; provided that the Escrow Bank shall be entitled to appropriate therefrom the fee and expenses due to it from the Concessionaire in relation to the Escrow Account and credit the balance remaining to the Escrow Account.

4 WITHDRAWALS FROM ESCROW ACCOUNT

4.1 Withdrawals during Concession Period

4.1.1 At the beginning of every month, or at such shorter intervals as the Lenders' Representative and the Concessionaire may by written instructions determine, the Escrow Bank shall withdraw amounts from the Escrow Account and appropriate them in the following order by depositing such amounts in the relevant Sub-Accounts for making due payments, and if such payments are not due in any


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

2.4 Escrow Bank's fee

The Escrow Bank shall be entitled to receive its fee and expenses in an amount, and at such times, as may be agreed between the Escrow Bank and the Concessionaire. For the avoidance of doubt, such fee and expenses shall form part of the O&M Expenses and shall be appropriated from the Escrow Account in accordance with Clause 4.1.

2.5 Rights of the parties

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

2.6 Substitution of the Concessionaire

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

3 DEPOSITS INTO ESCROW ACCOUNT

3.1 Deposits by the Concessionaire

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

- (a) all monies received in relation to the Project from any source, including the Senior Lenders, lenders of Subordinated Debt and the Authority;
- (b) all funds received by the Concessionaire from its share-holders, in any manner or form;
- (c) all Fee levied and collected by the Concessionaire;
- (d) any other revenues, deposits or capital receipts, as the case may be, from or in respect of the Project; and
- (e) all proceeds received pursuant to any insurance claims.


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not defined herein but defined in the Concession Agreement shall, unless repugnant to the context, have the meaning ascribed thereto in the Concession Agreement.

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

1.2.4 The rules of interpretation stated in Clauses 1.2, 1.3 and 1.4 of the Concession Agreement shall apply, mutatis mutandis, to this Agreement.

2 ESCROW ACCOUNT

2.1 Escrow Bank to act as trustee

2.1.1 The Concessionaire hereby appoints the Escrow Bank to act as trustee for the Authority, the Lenders' Representative and the Concessionaire in connection herewith and authorises the Escrow Bank to exercise such rights, powers, authorities and discretion as are specifically delegated to the Escrow Bank by the terms hereof together with all such rights, powers, authorities and discretion as are reasonably incidental hereto, and the Escrow Bank accepts such appointment pursuant to the terms hereof.

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

2.2 Acceptance of Escrow Bank

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

2.3 Establishment and operation of Escrow Account

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

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


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NOW IT IS HEREBY AGREED as follows:

1 DEFINITIONS AND INTERPRETATION

1.1 Definitions

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

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

“Concession Agreement” means the Concession Agreement referred to in Recital (A) above and annexed hereto as Annex-A, and shall include all of its Recitals and Schedules and any amendments made thereto in accordance with the provisions contained in this behalf therein;

“Cure Period” means the period specified in this Agreement for curing any breach or default of any provision of this Agreement by the Concessionaire, and shall commence from the date on which a notice is delivered by the Authority or the Lenders' Representative, as the case may be, to the Concessionaire asking the latter to cure the breach or default specified in such notice;

“Escrow Account” means an escrow account established in terms of and under this Agreement, and shall include the Sub-Accounts;

“Escrow Default” shall have the meaning ascribed thereto in Clause 6.1;

“Lenders' Representative” means the person referred to as the Lenders' Representative in the foregoing Recitals;

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

“Payment Date” means, in relation to any payment specified in Clause 4.1, the date(s) specified for such payment; and

“Sub-Accounts” means the respective Sub-Accounts of the Escrow Account, into which the monies specified in Clause 4.1 would be credited every month and paid out if due, and if not due in a month then appropriated proportionately in such month and retained in the respective Sub Accounts and paid out therefrom on the Payment Date(s).

1.2 Interpretation

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

1.2.2 The words and expressions beginning with capital letters and defined in this Agreement shall have the meaning ascribed thereto herein, and the words and expressions used in this Agreement and


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SCHEDULE – P: ESCROW AGREEMENT

(See Clause 28.1.2)

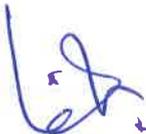
THIS ESCROW AGREEMENT is entered into on this the day of 20....

AMONGST

- 1 MEIL (BHUBANESWAR) BULK WATER PROJECT PRIVATE LIMITED, a company incorporated under the provisions of the Companies Act, 1956 and having its registered office at S-2, Technocrat Industrial Estate, Balanagar, Hyderabad – 500037, India (hereinafter referred to as the “**Concessionaire**” which expression shall, unless repugnant to the context or meaning thereof, include its successors, permitted assigns and substitutes);
- 2name and particulars of Lenders’ Representative and having its registered office atacting for and on behalf of the Senior Lenders as their duly authorised agent with regard to matters arising out of or in relation to this Agreement (hereinafter referred to as the “**Lenders’ Representative**” which expression shall, unless repugnant to the context or meaning thereof, include its successors and substitutes);
- 3name and particulars of the Escrow Bank and having its registered office at (hereinafter referred to as the “**Escrow Bank**” which expression shall, unless repugnant to the context or meaning thereof, include its successors and substitutes); and
- 4 The Public Health Engineering Organization (Urban), established under the administrative control of Housing and Urban Development (H & UD) Department of the Government of Odisha, represented by Chief Engineer, PHEO (U) and having its principal office at Heads of Department Building, 1st floor, Unit-V, Bhubaneswar – 751001, Odisha (hereinafter referred to as the “**Authority**” which expression shall, unless repugnant to the context or meaning thereof, include its administrators, successors and assigns).

WHEREAS:

- (A) The Authority has entered into a Concession Agreement dated with the Concessionaire (the “**Concession Agreement**”) for Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and Adjoining areas in the State of Odisha on design, build, finance, operate and transfer (DBFOT) basis, and a copy of which is annexed hereto and marked as Annex-A to form part of this Agreement.
- (B) Senior Lenders have agreed to finance the Project in accordance with the terms and conditions set forth in the Financing Agreements.
- (C) The Concession Agreement requires the Concessionaire to establish an Escrow Account, inter alia, on the terms and conditions stated therein.


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shall specify such meaning, scope and nature by issuing a reasoned written statement relying on good industry practice and authentic literature.

10. Other duties and functions

The Independent Engineer shall perform all other duties and functions specified in the Agreement.

11. Miscellaneous

- 11.1. The Independent Engineer shall notify its programme of inspection to the Authority and to the Concessionaire, who may, in their discretion, depute their respective representatives to be present during the inspection.
- 11.2. A copy of all communications, comments, instructions, Drawings or Documents sent by the Independent Engineer to the Concessionaire pursuant to this TOR, and a copy of all the test results with comments of the Independent Engineer thereon shall be furnished by the Independent Engineer to the Authority forthwith.
- 11.3. The Independent Engineer shall obtain, and the Concessionaire shall furnish in two copies thereof, all communications and reports required to be submitted, under this Agreement, by the Concessionaire to the Independent Engineer, whereupon the Independent Engineer shall send one of the copies to the Authority along with its comments thereon.
- 11.4. The Independent Engineer shall retain at least one copy each of all Drawings and Documents received by it, including 'as-built' Drawings, and keep them in its safe custody.
- 11.5. Upon completion of its assignment hereunder, the Independent Engineer shall duly classify and list all Drawings, Documents, results of tests and other relevant records, and hand them over to the Authority or such other person as the Authority may specify, and obtain written receipt thereof. Two copies of the said documents shall also be furnished in micro film form or in such other medium as may be acceptable to the Authority.



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Specifications and Standards and shall also specify the time limit for repair or rectification of any deviation or deterioration beyond the permissible limit.

- 6.8. The Independent Engineer shall determine if any delay has occurred in completion of repair or remedial works in accordance with the Agreement, and shall also determine the Damages, if any, payable by the Concessionaire to the Authority for such delay.
- 6.9. The Independent Engineer shall examine the request of the Concessionaire for closure of pipelines for undertaking maintenance/repair thereof.
- 6.10. The Independent Engineer shall monitor and review the curing of defects and deficiencies by the Concessionaire.
- 6.11. In the event that the Concessionaire notifies the Independent Engineer of any modifications that it proposes to make to the Project Facilities, the Independent Engineer shall review the same and send its comments to the Authority and the Concessionaire within 15 (fifteen) days of receiving the proposal.

7. Termination

- 7.1. At any time, not earlier than 90 (ninety) days prior to Termination but not later than 15 (fifteen) days prior to such Termination, the Independent Engineer shall, in the presence of a representative of the Concessionaire, inspect the Project Facilities for determining compliance by the Concessionaire with the Divestment Requirements set forth in Clause 31.1 and, if required, cause tests to be carried out at the Concessionaire's cost for determining such compliance. If the Independent Engineer determines that the status of the Project Facilities is such that its repair and rectification would require a larger amount than the sum set forth in Clause 36.2, it shall recommend retention of the required amount in the Escrow Account and the period of retention thereof.
- 7.2. The Independent Engineer shall inspect the Project Facilities once in every 15(fifteen) days during a period of 90 (ninety) days after Termination for determining the liability of the Concessionaire under Article 32, in respect of the defects or deficiencies specified therein. If any such defect or deficiency is found by the Independent Engineer, it shall make a report in reasonable detail and send it forthwith to the Authority and the Concessionaire.

8. Determination of costs and time

- 8.1. The Independent Engineer shall determine the costs, and/or their reasonableness, that are required to be determined by it under the Agreement.
- 8.2. The Independent Engineer shall determine the period, or any extension thereof, that is required to be determined by it under the Agreement.

9. Assistance in Dispute resolution

- 9.1. When called upon by either Party in the event of any Dispute, the Independent Engineer shall mediate and assist the Parties in arriving at an amicable settlement.
- 9.2. In the event of any disagreement between the Parties regarding the meaning, scope and nature of Good Industry Practice, as set forth in any provision of the Agreement, the Independent Engineer


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Schedule, to which the Concessionaire is reasonably entitled, and shall notify the Authority and the Concessionaire of the same.

- 5.12. The Independent Engineer shall carry out, or cause to be carried out, all the Tests as required and issue a Completion Certificate, as the case may be. For carrying out its functions under this Paragraph 5.13 and all matters incidental thereto, the Independent Engineer shall act under and in accordance with the provisions of Article 14.
- 5.13. Upon reference from the Authority, the Independent Engineer shall make a fair and reasonable assessment of the costs of providing information, works and services as set forth in Article 16 and certify the reasonableness of such costs for payment by the Authority to the Concessionaire.
- 5.14. The Independent Engineer shall aid and advise the Concessionaire in preparing the Maintenance Manual.

6. Operation Period

- 6.1. In respect of the Drawings, Documents and Safety Report received by the Independent Engineer for its review and comments during the Operation Period, the provisions of Paragraph 4 shall apply, *mutatis mutandis*.
- 6.2. The Independent Engineer shall review the annual Maintenance Programme furnished by the Concessionaire and send its comments thereon to the Authority and the Concessionaire within 15 (fifteen) days of receipt of the Maintenance Programme.
- 6.3. The Independent Engineer shall review the monthly status report furnished by the Concessionaire and send its comments thereon to the Authority and the Concessionaire within 7 (seven) days of receipt of such report.
- 6.4. The Independent Engineer shall inspect the Project Facilities once every month, preferably after receipt of the monthly status report from the Concessionaire, but before the 20th (twentieth) day of each month in any case, and make out an O&M Inspection Report setting forth an overview of the status, quality and safety of O&M including its conformity with the Maintenance Requirements and Safety Requirements. In a separate section of the O&M Inspection Report, the Independent Engineer shall describe in reasonable detail the lapses, defects or deficiencies observed by it in O&M of the Project Facilities. The Independent Engineer shall send a copy of its O&M Inspection Report to the Authority and the Concessionaire within 7 (seven) days of the inspection.
- 6.5. The Independent Engineer may inspect the Project Facilities more than once in a month, if any lapses, defects or deficiencies require such inspections.
- 6.6. The Independent Engineer shall in its O&M Inspection Report specify the tests, if any, that the Concessionaire shall carry out, or cause to be carried out, for the purpose of determining that the Project Facilities is in conformity with the Maintenance Requirements. It shall monitor and review the results of such tests and the remedial measures, if any, taken by the Concessionaire in this behalf.
- 6.7. In respect of any defect or deficiency, the Independent Engineer shall, in conformity with Good Industry Practice, specify the permissible limit of deviation or deterioration with reference to the


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in reasonable detail the lapses, defects or deficiencies observed by it in the construction of the Project Facilities. The Independent Engineer shall send a copy of its Inspection Report to the Authority and the Concessionaire within 7 (seven) days of the inspection.

- 5.4. The Independent Engineer may inspect the Project Facilities more than once in a month if any lapses, defects or deficiencies require such inspections.
- 5.5. For determining that the Construction Works conform to Specifications and Standards, the Independent Engineer shall require the Concessionaire to carry out, or cause to be carried out, tests on a sample basis, to be specified by the Independent Engineer in accordance with Good Industry Practice for quality assurance. The Independent Engineer shall issue necessary directions to the Concessionaire for ensuring that the tests are conducted in a fair and efficient manner, and shall monitor and review the results thereof.
- 5.6. The timing of tests and the criteria for acceptance/ rejection of their results shall be determined by the Independent Engineer. The tests shall be undertaken on a random sample basis and shall be in addition to, and independent of, the tests that may be carried out by the Concessionaire for its own quality assurance in accordance with Good Industry Practice.
- 5.7. In the event that the Concessionaire carries out any remedial works for removal or rectification of any defects or deficiencies, the Independent Engineer shall require the Concessionaire to carry out, or cause to be carried out, tests to determine that such remedial works have brought the Construction Works into conformity with the Specifications and Standards, and the provisions of this Paragraph 5 shall apply to such tests.
- 5.8. In the event that the Concessionaire fails to achieve any of the Project Milestones, the Independent Engineer shall undertake a review of the progress of construction and identify potential delays, if any. If the Independent Engineer shall determine that completion of the Project is not feasible within the time specified in the Agreement, it shall require the Concessionaire to indicate within 15 (fifteen) days the steps proposed to be taken to expedite progress, and the period within which the Project Completion Date shall be achieved. Upon receipt of a report from the Concessionaire, the Independent Engineer shall review the same and send its comments to the Authority and the Concessionaire forthwith.
- 5.9. If at any time during the Construction Period, the Independent Engineer determines that the Concessionaire has not made adequate arrangements for the safety of workers and Users in the zone of construction or that any work is being carried out in a manner that threatens the safety of the workers and the Users, it shall make a recommendation to the Authority forthwith, identifying the whole or part of the Construction Works that should be suspended for ensuring safety in respect thereof.
- 5.10. In the event that the Concessionaire carries out any remedial measures to secure the safety of suspended works and Users, it may, by notice in writing, require the Independent Engineer to inspect such works, and within 3 (three) days of receiving such notice, the Independent Engineer shall inspect the suspended works and make a report to the Authority forthwith, recommending whether or not such suspension may be revoked by the Authority.
- 5.11. If suspension of Construction Works is for reasons not attributable to the Concessionaire, the Independent Engineer shall determine the extension of dates set forth in the Project Completion


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- (ix) undertaking all other duties and functions in accordance with the Agreement; and
- (x) Monitor and check the Quality and quantity of Water supplied to the Bulk Users as set forth in Schedule-L.

3.2. The Independent Engineer shall discharge its duties in a fair, impartial and efficient manner, consistent with the highest standards of professional integrity and Good Industry Practice.

4. Development Period

- 4.1. During the Development Period, the Independent Engineer shall undertake a detailed review of the Drawings to be furnished by the Concessionaire along with supporting data, including the geo-technical and hydrological investigations, characteristics of materials, topographical surveys and other surveys. The Independent Engineer shall complete such review and send its comments/observations to the Authority and the Concessionaire within 15 (fifteen) days of receipt of such Drawings. In particular, such comments shall specify the conformity or otherwise of such Drawings with the Scope of the Project and Specifications and Standards.
- 4.2. The Independent Engineer shall review any modified Drawings or supporting Documents sent to it by the Concessionaire and furnish its comments within 7 (seven) days of receiving such Drawings or Documents.
- 4.3. The Independent Engineer shall also review the Safety Report submitted by the Concessionaire and furnish its comments thereon to the Authority within 15 (fifteen) days of receiving such report.
- 4.4. The Independent Engineer shall review the detailed design, construction methodology, quality assurance procedures and the procurement, engineering and construction time schedule sent to it by the Concessionaire and furnish its comments within 15 (fifteen) days of receipt thereof.
- 4.5. Upon reference by the Authority, the Independent Engineer shall review and comment on the EPC Contract or any other contract for construction, operation and maintenance of the Project, and furnish its comments within 7 (seven) days from receipt of such reference from the Authority.

5. Construction Period

- 5.1. In respect of the Drawings, Documents and Safety Report received by the Independent Engineer for its review and comments during the Construction Period, the provisions of Paragraph 4 shall apply, mutatis mutandis.
- 5.2. The Independent Engineer shall review the monthly progress report furnished by the Concessionaire and send its comments thereon to the Authority and the Concessionaire within 7 (seven) days of receipt of such report.
- 5.3. The Independent Engineer shall inspect the Construction Works and the Project Facilities once every month, preferably after receipt of the monthly progress report from the Concessionaire, but before the 20th (twentieth) day of each month in any case, and make out a report of such inspection (the "Inspection Report") setting forth an overview of the status, progress, quality and safety of construction, including the work methodology adopted, the materials used and their sources, and conformity of Construction Works with the Scope of the Project and the Specifications and Standards. In a separate section of the Inspection Report, the Independent Engineer shall describe


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SCHEDULE – O: TERMS OF REFERENCE FOR INDEPENDENT ENGINEER
(See Clause 21.2.1)

1. Scope

- 1.1. These Terms of Reference for the Independent Engineer (the “TOR”) are being specified pursuant to the Concession Agreement dated(the “Agreement”), which has been entered into between the Authority and MEIL (BHUBANESWAR) BULK WATER PROJECT PRIVATE LIMITED (the “Concessionaire”) for Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and Adjoining areas in the state of Odisha on design, build, finance, operate and transfer (DBFOT) basis, and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.
- 1.2. The TOR shall apply to construction, operation and maintenance of the Project.

2. Definitions and Interpretation

- 2.1. The words and expressions beginning with or in capital letters used in this TOR and not defined herein but defined in the Agreement shall have, unless repugnant to the context, the meaning respectively assigned to them in the Agreement.
- 2.2. References to Articles, Clauses and Schedules in this TOR shall, except where the context otherwise requires, be deemed to be references to the Articles, Clauses and Schedules of the Agreement, and references to Paragraphs shall be deemed to be references to Paragraphs of this TOR.
- 2.3. The rules of interpretation stated in Clauses 1.2, 1.3 and 1.4 of the Agreement shall apply, *mutatis mutandis*, to this TOR.

3. Role and functions of the Independent Engineer

- 3.1. The role and functions of the Independent Engineer shall include the following:
- (i) review of the Drawings and Documents as set forth in Paragraph 4;
 - (ii) review, inspection and monitoring of Construction Works as set forth in Paragraph 5;
 - (iii) conducting Tests on completion of construction and issuing Completion as set forth in Paragraph 5;
 - (iv) review, inspection and monitoring of O&M as set forth in Paragraph 6;
 - (v) review, inspection and monitoring of Divestment Requirements as set forth in Paragraph 7;
 - (vi) determining, as required under the Agreement, the costs of any works or services and/or their reasonableness;
 - (vii) determining, as required under the Agreement, the period or any extension thereof, for performing any duty or obligation;
 - (viii) assisting the Parties in resolution of disputes as set forth in Paragraph 9;


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Schedule-N; provided that the Authority may, at any time prepare a fresh panel with prior written consent of the Concessionaire.

4. Appointment of government entity as Independent Engineer

Notwithstanding anything to the contrary contained in this Schedule, the Authority may in its discretion appoint a government-owned entity as the Independent Engineer; provided that such entity shall be a body corporate having as one of its primary function the provision of consulting, advisory and supervisory services for engineering projects; provided that a government-owned entity which is owned or controlled by the Authority shall not be eligible for appointment as Independent Engineer.



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SCHEDULE – N: SELECTION OF INDEPENDENT ENGINEER
(See Clause 21.1)

1. Selection of Independent Engineer

- 1.1. The provisions of Part II of the Standard Bidding Documents for Consultancy Assignments: Time Based (Volume V) issued by the Ministry of Finance, GOI in July, 1997 or any substitute thereof shall apply, *mutatis mutandis*, for invitation of bids and evaluation thereof save as otherwise provided herein.
- 1.2. The Authority shall invite expressions of interest from consulting engineering firms or bodies corporate to undertake and perform the duties and functions set forth in Schedule – O and thereupon shortlist qualified firms in accordance with the pre-determined criteria. The Authority shall convey the aforesaid list of firms to the Concessionaire for scrutiny and comments, if any. The Concessionaire shall be entitled to scrutinise the relevant records of the Authority to ascertain whether the selection of firms has been undertaken in accordance with the prescribed procedure and it shall send its comments, if any, to the Authority within 15 (fifteen) days of receiving the aforesaid list of firms. Upon receipt of such comments, if any, the Authority shall, after considering all relevant factors, finalise and constitute a panel of firms (the “Panel of Firms”) and convey its decision to the Concessionaire.
- 1.3. The Authority shall invite the aforesaid firms in the Panel of Firms to submit their respective technical and financial offers, each in a separate sealed cover. All the technical bids so received shall be opened and pursuant to the evaluation thereof, the Authority shall shortlist 3 (three) eligible firms on the basis of their technical scores. The financial bids in respect of such 3 (three) firms shall be opened and the order of priority as among the firms shall be determined on the basis of a weighted evaluation where technical and financial scores shall be assigned respective weights of 80:20.

2. Fee and Expenses

- 2.1. In determining the nature and quantum of duties and services to be performed by the Independent Engineer during the Development Period and Construction Period, the Authority shall endeavour that payments to the Independent Engineer on account of fee and expenses do not exceed 2% (two per cent) of the Total Project Cost for one time selection for a maximum period of 3 (three) years. Payments not exceeding such 2% (two per cent) shall be borne equally by the Authority and the Concessionaire in accordance with the provisions of this Agreement and any payments in excess thereof shall be borne entirely by the Authority.
- 2.2. The nature and quantum of duties and services to be performed by the Independent Engineer during the Operation Period shall be determined by the Authority in conformity with the provisions of this Agreement and with due regard for economy in expenditure. All payments made to the Independent engineer on account of fee and expenses during the Operation Period, shall be borne equally by the Authority and the Concessionaire.

3. Constitution of fresh panel

Not later than three years from the date of this Agreement, and every three years thereafter, the Authority shall prepare a fresh panel of firms in accordance with the criteria set forth in this

Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

SCHEDULE – M: REPORTING REQUIREMENTS

A list of reports required to be submitted by the Concessionaire to the Authority and Independent Engineer are given below. Apart from these, the Concessionaire should submit any additional reports as required under the Agreement or to meet compliance, regulatory and oversight requirements of the Project, as required by the Authority, Independent Engineer, and other regulatory / compliance enforcement authorities.

A. During Construction Period

The Concessionaire will submit the following reports during the Construction Period to the Authority and Independent Engineer -

1. Monthly and quarterly progress report - Physical and financial progress of the Project;
2. Project Grant utilization certificate;
3. Report on installation of water bulk production meters;
4. Report on installation of water bulk distribution meters;

B. During Operations and Maintenance Period (Post COD)

1. Monthly Raw Water drawal report;
2. Monthly water quality report;
3. Monthly water production report;
4. Quarterly report on water loss;
5. Quarterly report on complaints and redress of complaints;
6. Quarterly report on water availability within Supply Area;
7. Yearly audited balance sheet and profit & loss statements with all schedules, in a format as described by Securities and Exchange Board of India for any listed entity; and
8. Quarterly unaudited balance sheet and profit & loss statements with all schedules, in a format as described by Securities and Exchange Board of India for any listed entity.



Chief Engineer P.H. (Urban)
O/c the E.I.C. P.H.(O), BBSR



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

E Coli or Thermotolerant Coliform bacteria		Must not be detectable in any 100 ml sample
Total Coliform bacteria		Must not be detectable in any 100 ml sample
Treated water in the distribution system		
E Coli or Thermotolerant Coliform bacteria		Must not be detectable in any 100 ml sample
Total Coliform bacteria		Must not be detectable in any 100 ml sample. In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12 month period.
S No.	Water Quality Monitoring-Key Aspects	Details
1	Responsibility	Concessionaire to collect water samples
2	Frequency of monitoring	<ul style="list-style-type: none"> • Once every week; • On case basis with respect to complaints received
3	Monitoring points	<ul style="list-style-type: none"> • Outlet of WTP; • Inlet & outlet of MBR; • Bulk Water Tapping Points.
4	Sample testing lab	The Concessionaire may get the samples tested from a certified laboratory and submit the report to the Authority.



Chief Engineer P. (Urban)
O/o the E.I.C. P.H.(O), BBSR



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

SCHEDULE – L: WATER QUALITY REQUIREMENTS

The design of Water Treatment Plant (WTP) shall be as per CPHEEO guidelines and/ good engineering practice. The raw water quality will be defined in the specification in terms of the range of parameters. The treated water quality requirements will be specified by reference to the recommendations of the Central Public Health and Environmental Engineering Organization (CPHEEO). The quality of water supplied to the Bulk Users shall be as per the IS 10500: 1991 (Drinking Water Specification).

S No.	CHARACTERISTICS	ACCEPTABLE
1	Turbidity (NTU)	1.0
2	Colour (Pt/Co scale)	5.0
3	Taste and Odour	Unobjectionable
4	pH	7.0 to 8.5
5	Total dissolved solids	500
6	Total hardness (mg/l as CaCO ₃)	200
7	Chlorides (mg/l)	200
8	Sulphates (mg/l as SO ₄)	200
9	Fluorides (mg/l)	1.0
10	Nitrates (mg/l as NO ₃)	45
11	Calcium (mg/l)	75
12	Magnesium (mg/l) ***	30
13	Iron (mg/l)	0.1
14	Manganese (mg/l)	0.05
15	Copper (mg/l)	0.05
16	Aluminium as Al mg/l	0.03
17	Alkalinity mg/l	200
18	Residual Chlorine mg/l	0.2
19	Zinc (mg/l)	5.0
20	Phenolic compounds (mg/l as phenol)	0.001
21	Anionic detergents mg/l as MBAS)	0.2
22	Mineral Oil (mg/l)	0.01
23	Arsenic (mg/l)	0.05
24	Cadmium (mg/l)	0.01
25	Chromium (mg/l as hexavalent Cr)	0.05
26	Cyanides (mg/l as CN)	0.05
27	Lead (mg/l)	0.1
28	Selenium (mg/l)	0.01
29	Mercury (mg/l)	0.001
30	Polynuclear aromatic hydrocarbons (ug/l)	0.2

BACTERIOLOGICAL QUALITY FOR TREATED WATER	
ORGANISMS	GUIDELINE VALUE
Drinking Water	
E Coli or Thermotolerant Coliform bacteria	Must not be detectable in any 100 ml sample
Treated water entering the distribution system	

Chief Engineer P.H. (IIT Bhubaneswar)
O/o the E.I.C. P.H. (O), Bhubaneswar



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

--Page 2--

Memo No. 31092 /HUD/dt. 24/10/13

Copy forwarded to P.S to His Excellency, the Governor of Odisha/ P.S to the Hon'ble Chief Minister, Odisha/ P.S to the Hon'ble Minister, Housing & Urban Development/ Secretary, Ministry of Urban Development, Government of India, Nirman Bhawan, New Delhi/ P.S to Additional Chief Secretary, H&UD Department/ P.S to Special Secretary, H&UD Department/ all Department of Government/ all Heads of Departments/ Revenue Divisional Commissioners/ Engineer-in-Chief, Public Health (Urban), Odisha/ Public Health Engineering Organisation (Urban), Odisha, Bhubaneswar/ Member Secretary, OWS&SB, Bhubaneswar/ Chief Engineer, Rural Water Supply & Sanitation, Odisha/ all District Magistrates/ Director, Municipal Administration, H&UD Department/ Chief Engineer, PH(U)/ all Superintending Engineers, Rural Water Supply & Sanitation/ all Executive Engineers of Rural Water Supply & Sanitation Divisions/ all Municipal Commissioners of Municipal Corporations/ all Executive Officers of Municipalities and Notified Area Councils/ Director of Estate, General Administration Department/ Valuation Officer, H&UD Department for information and necessary action.

Shankar
23/10/13

Under Secretary to Government

Memo No. 31093 /HUD/dt. 24-10-13

Copy along with soft copy of the Notification forwarded to Officer-in-Charge, Gazette Cell, Commerce and Transport (Commerce) Department for information and necessary action. He is requested to publish the Notification in the next extra-ordinary issue of Odisha Gazette.

Office of
Engineer-in-Chief, P.H.
Odisha, Bhubaneswar
SOT-86/2012

Shankar
23/10/13

Under Secretary to Government

memo: No (PB) 740

Date 26.10.2013

Copy forwarded to all SPS (P.H.) for information and necessary action.
cc to EIC PH for information and necessary action.

Shankar

Chief Engineer P.H. (Urban)
Of the E.I.C. P.H.(O), BBSR



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

GOVERNMENT OF ORISSA
HOUSING & URBAN DEVELOPMENT DEPARTMENT

NOTIFICATION

No. 31671 /HUD, Bhubaneswar, 30/10, October, 2013
13-HUD-65-REFM-15-POLICY-0035/2013

Subject: Water Rate for Bulk Water Supply Project for IIT Bhubaneswar, National Institute of Science, Education and Research (NISER), INFOCITY-II, Bhubaneswar and adjoining areas under PPP mode.

Housing & Urban Development Department Resolution No. 30471/HUD, dt. 15th October, 2013.

CPA Ref
2.2.5/10

In exercise of powers under Rule-20(5) of the Orissa Water Works (Urban Local Bodies) Rules-1980, State Government do hereby notify the rate of water charges for bulk supply of water to IIT Bhubaneswar, National Institute of Science, Education and Research (NISER), INFOCITY-II and other institutions to be included under the project "Bulk Water Supply to IIT Bhubaneswar, National Institute of Science, Education and Research (NISER), INFOCITY-II and adjoining areas" under PPP mode at the rate of Rs 17.73 per 1000 litres (Seventeen Rupees and Seventy-three paise per one thousand litre) only for the financial year 2013-14.

2. The provisions of automatic increase of water tariff at the rate of 5% each year for all categories of consumers under Rule 48 of the Orissa Water Works (Urban Local Bodies) Rules 1980 shall also be applicable to the above project with effect from 2014-15.

3. The aforesaid water rate shall be applicable from the date of issue of this Notification in the Odisha Gazette.

By Order of Governor

(Injeti Srinivas)

Additional Chief Secretary to Government




Chief Engineer P.H. (Urban)
D/o the E.I.C. P.H.(O), BBSR

Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

SCHEDULE – K: USER FEES FOR CONCESSION PERIOD

(See Clause 26.2)

Concession Period	Water Tariff for Urban Local Bodies (Rs./KI)	Water Tariff for Bulk Institutional & Industrial Users (Rs./KI)
Year 1 (2013-2014)	3.57	17.73
Year 2	3.75	18.62
Year 3	3.94	19.55
Year 4	4.14	20.53
Year 5	4.34	21.56
Year 6	4.56	22.63
Year 7	4.79	23.77
Year 8	5.03	24.95
Year 9	5.28	26.20
Year 10	5.54	27.51
Year 11	5.82	28.89
Year 12	6.11	30.33
Year 13	6.41	31.85
Year 14	6.74	33.44
Year 15	7.07	35.11
Year 16	7.43	36.87
Year 17	7.80	38.71
Year 18	8.19	40.65
Year 19	8.60	42.68
Year 20	9.03	44.81
Year 21	9.48	47.05
Year 22	9.95	49.41
Year 23	10.45	51.88
Year 24	10.97	54.47
Year 25	11.52	57.20
Year 26	12.10	60.06

The rate of water charges for bulk supply of water to IIT Bhubaneswar, National Institute of Science, Education and Research (NISER), INFOCITY-II and other institutions is notified by the Housing & Urban Development Department, Government of Odisha vide Letter No. 31091/HUD, Bhubaneswar, 24th October, 2013. The water rate shall be applicable from the date of issue of the above mentioned notification in the Odisha Gazette.

(Handwritten Signature)
Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

In the event that the Parties do not, within 15 (fourteen) business days of the delivery of an Invoice Dispute Notice, resolve any dispute arising under clause mentioned above of this Schedule, either party may refer the matter to be determined in accordance with Clause 41 of the Agreement.

Handwritten signature

Chief
Office (Urban)
BBSR



SCHEDULE – J: CALCULATION OF USER FEES AND INVOICING

(See Clause 26.1)

1. Calculation of User Fees

During the Concession Period, the User Fees for the water supplied to the Bulk Users shall be calculated as following:

The Net Demand (MLD) for the month for which User Fees is being calculated, as established from the reading of the Bulk meters, multiplied by the applicable Water Tariff for that month. For avoidance of doubt, if the Net Demand of a Bulk User is 100 Million Litres during the month and the Water Tariff is Rs 4.00 per KL, then the total amount payable for the month shall be Rs $(100 \times 10^3 \times 4.00)$.

Provided however, the Bulk Users shall pay for the usage guided by the Contract Volume as defined in the individual Bulk Water Supply Agreements entered into between the Concessionaire, Authority and the Bulk User.

2. Delivery of Invoices

For each Contract Month, the Concessionaire shall submit to the Bulk Users by the 5th (fifth) business day of succeeding month (or, if such day is not a business day, the immediately following business day) an invoice setting out the User Fee payable in respect of the immediately preceding month in accordance with this Agreement.

3. Payment of Invoices

Any amount payable under an invoice shall be paid with immediately available and freely transferable cleared funds, for value within 15 (fifteen) days of receipt of such invoice, to such account of the Concessionaire as shall have been previously notified to the Bulk Users.

4. Disputed Invoices

If the Bulk Users does not question or dispute an invoice within 15 (fifteen) days of receiving it, the invoice shall be considered correct and complete and conclusive between the Parties.

If the Bulk Users disputes any item or part of an item set out in any invoice provided in accordance with Clause 2 of this Schedule, the Authority and the Bulk Institutional Users shall serve a notice (an "Invoice Dispute Notice") on the Concessionaire setting out the item or part of an item set out in such invoice which is in dispute together with its estimate of what such item or part of an item should be along with the reasons and basis of such disputed amount.

Notwithstanding that Bulk Users has issued an Invoice Dispute Notice in accordance with Clause above of this Schedule, it shall still be required to pay to the Concessionaire the Water Payment less the disputed amount as described in the disputed invoice. After the settlement of the dispute, the disputed amount shall paid within a period of 7 (seven) days.



Chief Engineer P.H. (Urban)
Of the E.I.C. P.H.(O), BBSR



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

PROVISIONAL CERTIFICATE

- 1 I, (Name of the Independent Engineer), acting as Independent Engineer, under and in accordance with the Concession Agreement dated (the “**Agreement**”), for Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and Adjoining areas (the “**Project Water Supply System**”) in the state of Odisha on design, build, finance, operate and transfer (DBFOT) basis through MEIL (BHUBANESWAR) BULK WATER PROJECT PRIVATE LIMITED, hereby certify that the Tests specified in Article 15 and Schedule-H of the Agreement have been undertaken to determine compliance of the Project Water Supply System with the provisions of the Agreement.

- 2 Construction Works that were found to be incomplete and/or deficient have been specified in the Punch List appended hereto, and the Concessionaire has agreed and accepted that it shall complete and/or rectify all such works in the time and manner set forth in the Agreement. (Some of the incomplete works have been delayed as a result of reasons attributable to the Authority or due to Force Majeure and the Provisional Certificate cannot be withheld on this account. Though the remaining incomplete works have been delayed as a result of reasons attributable to the Concessionaire,) @ I am satisfied that having regard to the nature and extent of such incomplete works, it would not be prudent to withhold commercial operation of the Project Water Supply System, pending completion thereof.

- 3 In view of the foregoing, I am satisfied that the Project Water Supply System can be safely and reliably placed in commercial service for supply of water to the Bulk Users s thereof, and in terms of the Agreement, the Project Water Supply System is hereby provisionally declared fit for entry into commercial operation on this the day of 20.....

ACCEPTED, SIGNED, SEALED
AND DELIVERED

For and on behalf of
CONCESSIONAIRE by:

(Signature)
(Name and Designation)
(Address)


Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR

SIGNED, SEALED AND
DELIVERED

For and on behalf of
INDEPENDENT ENGINEER by:

(Signature)
(Name and Designation)
(Address)



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

SCHEDULE – I: COMPLETION CERTIFICATE
(See Clause 15.2 & 15.3)

1. I, (Name of the Independent Engineer), acting as Independent Engineer, under and in accordance with the Concession Agreement dated (the “**Agreement**”), for Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and Adjoining areas (the “**Project Water Supply System**”) in the state of Odisha on design, build, finance, operate and transfer (DBFOT) basis, through MEIL (BHUBANESWAR) BULK WATER PROJECT PRIVATE LIMITED, hereby certify that the Tests specified in Article 15 and Schedule-H of the Agreement have been successfully undertaken to determine compliance of the Project Water Supply System with the provisions of the Agreement, and I am satisfied that the Project Water Supply System can be safely and reliably placed for commercial service for supply of water to the Bulk Users thereof
2. It is certified that, in terms of the aforesaid Agreement, all works forming part of the Water Supply System have been completed, and the Project Water Supply System is hereby declared fit for entry into commercial operation on this the day of 20.....

SIGNED, SEALED AND DELIVERED
For and on behalf of the INDEPENDENT ENGINEER by:

(Signature)
(Name)
(Designation)
(Address)



Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

- 3.3. Environmental audit: The Independent Engineer shall carry out a check to determine conformity of the Water Supply System, as the case may be, with the environmental requirements set forth in Applicable Laws and Applicable Permits.
- 3.4. Safety review: Safety audit of the Project Water Supply System shall be undertaken by the Independent Engineer and on the basis of such audit, the Independent Engineer shall determine conformity of the Project Water Supply System in accordance with the provisions of this Agreement.
- 3.5. Other Tests: The Independent Engineer may require the Concessionaire to carry out or cause to be carried additional Tests, in accordance with Good Industry Practice, for determining the compliance of the Project Water Supply System with Specifications and Standards.

6. Agency for conduction Tests

All Tests set forth in this Schedule-H shall be conducted by the Independent Engineer or such other agency or person as it may specify in consultation with the Authority.

7. Completion/Provisional Certificate

Upon successful completion of Tests, the Independent Engineer shall issue the Completion Certificates or the Provisional Certificates, as the case may be, in accordance with the provisions of Article 15


Chief Engineer (Urban)
D/o the E.I. (Urban), BBSR



SCHEDULE – H: TESTS

(See Clause 15.1.2)

1. Schedule for Tests

- 1.1 The Concessionaire shall, no later than 60 (sixty) days prior to the likely completion of Water Supply System, notify the Independent Engineer and the Authority of its intent to subject the Project Water Supply System to Tests, and no later than 7 (seven) days prior to the actual date of Tests, furnish to the Independent Engineer and the Authority detailed inventory and particulars of all works forming part of the Water Supply System.
- 1.2 The Concessionaire shall notify the Independent Engineer of its readiness to subject the Project Water Supply System to Tests at any time after 7 (seven) days from the date of such notice, and upon receipt of such notice, the Independent Engineer shall, in consultation with the Concessionaire, determine the date and time for each Test and notify the same to the Authority who may designate its representative to witness the Tests. The Independent Engineer shall thereupon conduct the Tests itself or cause any of the Tests to be conducted in accordance with Article 15 and this Schedule-H.

2. Tests

- 2.1 Tests: Without prejudice to the provisions of this Clause 2, the Independent Engineer shall require the Concessionaire to carry out or cause to be carried out Tests, in accordance with Good Industry Practice, for determining the compliance of the Water Supply System with Specifications and Standards. The Tests would be carried out on a random sample basis and the number or frequency, as the case may be, of such Tests shall, to the extent possible, not exceed 10% (ten per cent) of the tests that the contractor of such works would normally undertake in accordance with Good Industry Practice.
- 2.2 Visual and physical Test: The Independent Engineer shall conduct a visual and physical check of the Water Supply System to determine that all works and equipment forming part thereof conform to the provisions of this Agreement.

3. Test for Pipelines

- 3.1 The Concessionaire shall, no later than 30 (thirty) days prior to the likely completion of the laying of pipelines notify the Independent Panel and the Authority of its intent to subject the Water Supply System to Tests, and no later than 7 (seven) days prior to the actual date of Tests, furnish to the Independent Engineer and the Authority detailed inventory and particulars of manufacturers, guidelines, guarantees and warranties.
- 3.2 The Concessionaire shall notify the Independent Engineer of its readiness to subject the Water Supply System to Tests at any time after 7 (seven) days from the date of such notice, and upon receipt of such notice, the Independent Engineer shall, in consultation with the Concessionaire, determine the date and time for each Test and notify the same to the Authority who may designate its representative to witness the Tests. The Independent Engineer shall thereupon conduct the Tests to determine that laying of Water Supply System.


Chief Engineer P.H. (Urban)
Of the E.I.C. P.H.(O), BBSR



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

S No.	Description
12	Proposed Zones for Khorda Town
13	Proposed Zones for Jatni Town

Handwritten signature

Chief Engineer
O/o the E.I.C.

and
BSR



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

S No.	Description
	(Jatni)
98	PHED pumping station Lighting and Socket Layout(khorda)
99	Jemadei pumping station Lighting and Socket Layout (khorda)
100	Gurjanga zone pumping station Earthing Layout (khorda)
101	Kaju plantation pumping station Earthing Layout (jatni)
102	PHED Transmission Pumping station Earthing Layout (jatni)
103	PHED distribution Pumping station Earthing Layout (Jatni)
104	Jemadei Pumping station Earthing Layout (Khorda)
105	PHED Pumping station Earthing Layout (Khorda)

Drawings for Transmission System

S No.	Description
1	Pipe Trench Details
2	Air Valve Chamber Details
3	Sluice Valve Chamber Details
4	Butterfly Valve Chamber
5	Scour Valve Chamber Details
6	Vacuum Breaker Valve Chamber
7	Thrust Block
8	Details of Saddle Support
9	Details of Expansion Joint
10	Details of Bellows
11	Details of Flow Meters
12	Details of Non Return Valve
13	Details of Anchor Block
14	L-Sections of Raw water Main
15	L-Sections of Transmission Main

Drawings for Distribution System

S No.	Description
1	Khorda Zone 1 : Water Distribution Network Layout
2	Khorda Zone 2 : Water Distribution Network Layout
3	Khorda Zone 3 : Water Distribution Network Layout
4	Jatni Zone 1 : Water Distribution Network Layout
5	Jatni Zone 2 : Water Distribution Network Layout
6	Jatni Zone 3 : Water Distribution Network Layout
7	Jatni Zone 4 : Water Distribution Network Layout
8	Pipe Trench Details for Distribution System
9	Sluice Valve Chamber Details for Distribution System
10	Typical Details of Thrust Block for Distribution System
11	Details of Pipe Connections for Distribution System

**Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR**



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

S No.	Description
56	Beam plan and Reinforcement details at EL +49.00 for Clear Water Pump House at PHED Area Jatni
57	Slab and Wall Reinforcement details at EL +49.00 for Clear Water Pump House at PHED Area Jatni
58	Beam Plan and Reinforcement details at EL +53.50 for Clear Water Pump House at PHED Area Jatni
59	Beam Plan and Reinforcement details at EL +54.66 for Clear Water Pump House at PHED Area Jatni
60	Beam plan for Clear Water Pump House at PHED Area Khorda
61	Foundation details for Clear Water Pump House at PHED Area Khorda
62	Beam Plan at EL 55.00 details for Clear Water Pump House at PHED Area Khorda
63	Beam Plan at EL 58.7 details for Clear Water Pump House at PHED Area Khorda
64	Beam Plan at EL 61.2 and 63.7 details for Clear Water Pump House at PHED Area Khorda
65	Beam Plan at EL 65.2 details for Clear Water Pump House at PHED Area Khorda
66	Typical Details of Valve Chambers
67	Civil General Arrangement for CWPS at PHD Area distribution, Jatni
68	Beam plan for CWPS at PHD Area Jatni
69	Foundation details for CWPH at PHD Area Jatni
70	Beam Plan Details at EL 45.5 for Clear Water Pump House at PHD Area, Jatni
71	Beam Plan Details at EL & 49.2 for Clear Water Pump House at PHD Area, Jatni
72	Beam Plan Details at EL 51.70 & 54.2 for Clear Water Pump House at PHD Area, Jatni
73	Beam Plan Details at EL 55.7 for Clear Water Pump House at PHD Area, Jatni
74	Schematic P & I Diagram
75	General Arrangement Drawing of Clear Water Pump House Transmission to PHED Area and Jemadei distribution
76	General Arrangement Drawing of Gurujang Clear Water Pump House
77	General Arrangement Drawing of Kajuplantation Clear Water Pump House
78	General Arrangement Drawing of PHED Jatni Clear Water Pump House-Transmission
79	General Arrangement Drawing of PHED Khorda Clear Water Pump House
80	General Arrangement for CWPS at PHD Area distribution , Jatni
81	Single Line Diagram for GURJANGA PUMPING STATION (KHORDA)
82	Single Line Diagram for KAJU PLANTATION PUMPING STATION (JATNI)
83	Single Line Diagram for PHED TRANSMISSION & DISTRIBUTION PUMPING STATION (JATNI)
84	Single Line Diagram for PHED PUMPING STATION (KHORDA)
85	Single Line Diagram for JEMADEI PUMPING STATION (KHORDA)
86	Typical Lighting Details
87	Typical Cabling details
88	Typical Earthing Details
89	Cable tray, trench and Equipment Layout for kaju plantation pumping station (Jatni)
90	Cable tray, Trench, Equipment, Lighting and socket Layout for PHED Transmission pumping station (Jatni)
91	Cable tray, trench , Equipment, Lighting and socket Layout for PHED distribution pumping station (jatni)
92	Cable tray, trench and Equipment Layout for PHED pumping station (khorda)
93	Cable tray, trench and Equipment Layout for Jemadei pumping station (khorda)
94	Cable tray, trench and Equipment Layout for Gurjanga pumping station (khorda)
95	Gurjanga pumping station Lighting and Socket Layout(khorda)
96	Kaju plantation pumping station Lighting and Socket Layout (jatni)
97	PHED Transmission and distribution pumping station outdoor Lighting and cable route Layout


Chief Engineer P.H. (Urban)
O/o the E.I.C.P.H.(O), BBSR



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

S No.	Description
	Jeamdei distribution
15	Civil General Arrangement Drawing of Gurujang Clear Water Pump House
16	General Arrangement Drawing of 0.5 ML GSR at PHED Sump Jatni
17	General Arrangement Drawing of 0.75 ML GSR at PHED Jatni
18	General Arrangement Drawing of 1 ML GSR at Kajuplantation Jatni
19	General Arrangement Drawing of 1.25 ML GSR at Gurujang Khordai
20	Civil General Arrangement Drawing of Kajuplantation Clear Water Pump House
21	Structural Details of 2.25ML GSR at Bachramundia Jatni
22	Structural Details of wall and Slab for MBR at Mendhasala
23	Civil General Arrangement Drawing of PHED Jatni Clear Water Pump House-Transmission
24	Structural Details of 1.25ML GSR at Gurujanga Jatni
25	Structural Details of 1.25ML GSR at PHED Khorda
26	Structural Details of 1.75ML GSR at Jemadei Khorda
27	Civil General Arrangement Drawing of PHED Khorda Clear Water Pump House
28	General Arrangement Drawing of Master Balancing Reservoir at Mendhasala
29	Structural Details of 0.5 ML GSR at PHED Sump Jatni
30	Structural Details of 0.75 ML GSR at PHED Area Jatni
31	Structural Details of 1 ML GSR at Kajuplantation Jatni
32	Structural Details of wall and Slab for MBR at Mendhasala
33	Beam Plan for Clear Water Pumping Station at Jemadei Khorda
34	Foundation Plan for Clear Water Pump House Transmission to PHED area and Jemadei Distribution
35	Beam Plan for Clear Water Pumping Station at EL 46.00 for Clear Water Pumping Station Jemadei
36	Beam Plan for Clear Water Pumping Station at EL 49.70 for Clear Water Pumping Station Jemadei
37	Beam Plan for Clear Water Pumping Station at EL 54.35 for Clear Water Pumping Station Jemadei
38	Beam Plan for Clear Water Pumping Station at EL 56.20 and EL 51.6 for Clear Water Pumping Station Jemadei
39	Beam Plan for Clear Water Pumping Station at Gurujang Khorda
40	Beam Plan Details for Clear Water Pump House at Kajuplantation Jatni
41	Foundation details for Clear Water Pumping Station at Gurujang Khorda
42	Beam Plan Details at 36.5 for Clear Water Pumping Station at Gurujang Khorda
43	Beam Plan Details at 40.2 for Clear Water Pumping Station at Gurujang Khorda
44	Beam Plan Details at EL 42.7 and 45.2 for Clear Water Pumping Station at Gurujang Khorda
45	Beam Plan Details at EL 46.7 for Clear Water Pumping Station at Gurujang Khorda
46	Beam Plan Details for Clear Water Pump House at Kajuplantation Jatni
47	Foundation Details for Clear Water Pump House at Kajuplantation Jatni
48	Beam Plan Details at EL 31.5 for Clear Water Pump House at Kajuplantation Jatni
49	Beam Plan Details at EL 35.2 for Clear Water Pump House at Kajuplantation Jatni
50	Beam Plan Details at EL 37.7& 40.2 for Clear Water Pump House at Kajuplantation Jatni
51	Beam Plan Details at EL 41.7 for Clear Water Pump House at Kajuplantation Jatni
52	Foundation details for Clear Water Pump House at PHED Area
53	Beam Layout for Clear Water Pump House at PHED area
54	Foundation plan and Column Reinforcement details for Clear Water Pump House at PHED Area Jatni
55	Beam plan and Reinforcement details at EL +0.6 for Clear Water Pump House at PHED Area Jatni


Chief Engineer (Urban)
O/o the E.I.C. P.H.(O), BBSR



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

S No.	Description
46	Plinth Beam and Lintel Beam of Control Panel Room
47	Plinth Beam and Tie Beam Sectional Details of Control Panel Room
48	Control Panel Room -Lintel Beam Section of Control Panel Room
49	Control Panel Room -Roof Slab of Control Panel Room
50	Roof Slab Beam Sectional Details of Control Panel Room
51	Control Panel Room -Slab Section of Control Panel Room
52	General Arrangement Drawing for Clear Water Pumping House at Mundali
53	Beam Plan For Clear Water Pumping House at Mundali
54	Foundation Plan Details for CWPS at Mundali
55	Beam Plan at EL 39.500 for Clear Water Pumping House at Mundali
56	Beam Plan at EL 43.200 for Clear Water Pumping House at Mundali
57	Beam Plan at EL 48.200 for Clear Water Pumping House at Mundali
58	Beam Plan at EL 49.700 for Clear Water Pumping House at Mundali
	Mechanical
1	P & I Diagram for Water Treatment Plant
2	P & I Diagram for Water Treatment Plant
	Electrical
1	Single Line diagram for CWPS,WTP and intake Power Plant and Power Distribution
2	Clear water pumping station tray, trench and Equipment Layout
3	Clear water pumping station Lighting and Socket Layout
4	Chemical, chlorine and control room at WTP Equipment,earthing,Lighting and Socket Layout
5	WTP cable route,equipment and street light layout
6	Clear water pumping station Earthing Layout
7	Typical Lighting Details
8	Typical Cabling Details
9	Typical Earthing Details

Drawings for GSR

S No.	Description
1	Location of Reservoir Sites in Khorda on Zonal Map
2	Location of Reservoir Sites in Jatni on Zonal Map
3	Layout Drawing for Gurujang Khorda
4	Layout Drawing for Jemadei Khorda
5	Layout Drawing for PHED Jatni
6	Layout Drawing for Kajuplantation Jatni
7	Layout Drawing for Bachramundia Jatni
8	Layout Drawing for PHED Khorda
9	Layout Drawing for MBR at Mendhasala
10	Layout Drawing for Clear Water Pumping Station Mundali
11	General Arrangement Drawing of 1.25 ML GSR at PHED Khordai
12	General Arrangement Drawing of 1.75 ML GSR at Jemadei Khordai
13	General Arrangement Drawing of 2.25 ML GSR at Bachra Jatni
14	Civil General Arrangement Drawing of Clear Water Pump House Transmission to PHED Area &


 Chief Engineer P.H. (Urban)
 O/o the E.I.C. P.H.(O), BBSR



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

Drawings for WTP

S No.	Description
1	General Arrangement Drawing for Cascade Aerator
2	General Arrangement Drawing for Chemical House
3	General Arrangement Drawing for Chlorine room
4	General Arrangement Drawing for clarifloculator
5	General Arrangement Drawing for Clear Water Sump
6	General Arrangement Drawing for Control Panel & Operator Room
7	General Arrangement Drawing for Flash Mixing Tank
8	General Arrangement Drawing for Gravity Sand Filter
9	General Arrangement Drawing for Gravity Sand Filter
10	General Arrangement Drawing for Parshall Flume
11	Top Slab of Clear Water Sump at WTP Mundali
12	Bottom Slab Section 5-5 of Clear Water Sump at WTP Mundali
13	Foundation Plan of Clear Water Sump at WTP Mundali
14	Section 1-1 of Clear Water Sump at WTP Mundali
15	Section 2-2 of Clear Water Sump at WTP Mundali
16	Section 4-4 of Clear Water Sump at WTP Mundali
17	Section 3-3 of Clear Water Sump at WTP Mundali
18	Parshall Flume
19	Flash Mixing Tank
20	Clarifloculator Plan
21	Clarifloculator Plan
22	First Slab and Sectional Details of Casacade Aerator
23	Foundation Plan and Section Details of Casacade Aerator
24	Tie Beam Plan and Sectional Details of Casacade Aerator
25	Plint Beam and Lintel Beam of Chemical House
26	Plint Beam and Tie Beam Sectional Details of Chemical House
27	Lintel Beam Sectional Details of Chemical House
28	First Slab and Slab Schedule of Chemical House
29	Beam Section-2 of Chemical House
30	Beam Section-2 of Chemical House
31	Staircase Plan/Passage Plan and Sectional Details of Chemical House
32	Terrace Slab and Slab Schedule of Chemical House
33	Beam Section-1 of Chemical House
34	Foundation Details of Chemical House
35	Footing Section of Chemical House
36	Plinth Beam and Lintel Beam of Chlorine Room
37	Plinth Beam and Tie Beam Sectional Details of Chlorine Room
38	Lintel Beam Sectional Sectional of Chlorine Room
39	Roof Plan of Chlorine Room
40	Roof Beam Details of Chlorine Room
41	Roof Slab Details of Chlorine Room
42	Foundation Detail of Chlorine Room
43	Footing Section of Chlorine Room
44	Foundation Plan of Control Panel Room
45	Footing Section of Control Panel Room

[Handwritten Signature]
Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



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. Annex-I
(Schedule-G)

List of Drawings

Drawings for Intake:

S No.	Description
1	Location of Reservoir Sites in Khorda on Zonal Map
2	Location of Reservoir Sites in Jatni on Zonal Map
3	Schematic Arrangement of Raw Water Intake At Location-2
4	General Arrangement & Section Details for Raw Water Intake at Mundali
5	General Arrangement & Section Details for Raw Water Intake at Mundali
6	Architectural Details for Raw Water Intake Pumping Station at Mundali
7	Plan Details for Raw Water Intake Pumping Station at Mundali
8	Plan Details for Raw Water Intake Pumping Station at Mundali
9	Beam Plan & Reinforcement Details at LVL. +23.05 for Raw Water Intake at Mundali
10	Beam Plan & Reinforcement Details at LVL. +26.05 for Raw Water Intake at Mundali
11	Beam Plan & Reinforcement Details at LVL. +29.05 for Raw Water Intake at Mundali
12	Beam Plan & Reinforcement Details at LVL. +32.05 for Raw Water Intake at Mundali
13	Beam Plan & Reinforcement Details at LVL. +34.05 for Raw Water Intake at Mundali
14	Beam Plan & Reinforcement Details at LVL. +38.7 for Raw Water Intake at Mundali
15	Beam Plan & Reinforcement Details at LVL. +41.9 for Raw Water Intake at Mundali
16	Foundation Plan and Column reinforcement details for Raw Water Intake Pumping Station at Mundali
17	Foundation Plan and Column reinforcement details for Raw Water Intake Pumping Station at Mundali
18	Foundation Plan and Wall reinforcement details for Raw Water Intake Pumping Station at Mundali
19	Wall reinforcement details for Raw Water Intake Pumping Station at Mundali
20	General Arrangement and Reinforcement details for Gate
21	Reinforcement Details of retaining wall for Raw Water Intake Pumping Station at Mundali
22	Details of Butterfly Valve Chamber
23	Detailles of Flow Meters
24	Single Line Diagram for CWPS,WTP & Intake power plant & Power Distribution
25	Raw Water Pumping Station Lighting & small power layout.
26	Raw Water Pumping Station Earthing layout.
27	Raw Water Pumping Station Cable Tray,trench & equipment layout.
28	Typical Lighting Details
29	Typical Cabling Details
30	Typical Earthing Details
31	Raw Water Pumping Station P & I Diagram

Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

SCHEDULE – G: DRAWINGS

(See Clause 13.2)

1. Drawings

In compliance of the obligations set forth in Clause 13.2 of this Agreement, the Concessionaire shall furnish to the Independent Engineer, free of cost, all Drawings listed in Annex-I of this Schedule-G.

2. Additional drawings

If the Independent Engineer determines that for discharging its duties and functions under this Agreement, it required any drawings other than those listed in Annex-I, it may by notice require the Concessionaire to prepare and furnish such drawings forthwith. Upon receiving a requisition to this effect, the Concessionaire shall promptly prepare and furnish such drawings to the Independent Engineer, as if such drawings formed part of Annex-I of this Schedule-G



**Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR**



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

Upon extension of any or all of the aforesaid Project Milestones or the Scheduled Water Supply System Date, as the case may be, under and in accordance with the provisions of this Agreement, the Project Completion Schedule shall be deemed to have been amended accordingly.

Ch. ^{an)}
O/o the ~~Director~~ BBSR.



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SCHEDULE – F: PROJECT COMPLETION SCHEDULE

(See Clause 13.1)

1 Project Completion Schedule

During Construction Period, the Concessionaire shall comply with the requirements set forth in this Schedule-F for each of the Project Milestones and the Scheduled Water Supply System Date (the “**Project Completion Schedule**”). Within 15 (fifteen) days of the date of each Project Milestone, the Concessionaire shall notify the Authority of such compliance alongwith necessary particulars thereof.

2 Project Milestone-I

- 2.1 Project Milestone-I shall occur on the date falling on the 180th (one hundred and eightieth) day from the Appointed Date (the “**Project Milestone-I**”).
- 2.2 Prior to the occurrence of Project Milestone-I, the Concessionaire shall have commenced construction of the Project Water Supply System and expended not less than 15% (fifteen per cent) of the total capital cost set forth in the Financial Package

3 Project Milestone-II

- 3.1 Project Milestone-II shall occur on the date falling on the 365th (three hundred and sixty fifth) day from the Appointed Date (the “**Project Milestone-II**”).
- 3.2 Prior to the occurrence of Project Milestone-II, the Concessionaire shall have commenced construction of the Project Water Supply System and expended not less than 40% (forty per cent) of the total capital cost set forth in the Financial Package

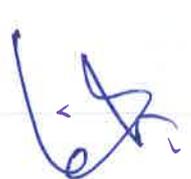
4 Project Milestone-III

- 4.1 Project Milestone-III shall occur on the date falling on the 550th (five hundred and fiftieth) day from the Appointed Date (the “**Project Milestone-III**”).
- 4.2 Prior to the occurrence of Project Milestone-III, the Concessionaire shall have commenced construction of the Project Water Supply System and expended not less than 70% (seventy per cent) of the total capital cost set forth in the Financial Package

5.1.3 Scheduled Water Supply System Date

- 5.1 The Scheduled Water Supply System Date shall occur on the 730th (seven hundred and thirty) days from the Appointed Date.
- 5.2 On or before the Scheduled Water Supply System Date, the Concessionaire shall have completed Water Supply System in accordance with this Agreement

6 Extension of period



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.

11. This Guarantee shall come into force with immediate effect and shall remain in force and effect for a period of one year or until it is released earlier by the Authority pursuant to the provisions of the Agreement.

Signed and sealed this day of, 20..... at

SIGNED, SEALED AND DELIVERED
For and on behalf of the BANK by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

- (a) The bank guarantee should contain the name, designation and code number of the officer(s) signing the guarantee.
- (b) The address, telephone number and other details of the Head Office of the Bank as well as of issuing Branch should be mentioned on the covering letter of issuing Branch.


Chief Engineer P.H. (Urban)
O/o the E.I.C.P.H.(O), BBSR



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3. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Concessionaire and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.
4. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Concessionaire before presenting to the Bank its demand under this Guarantee.
5. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Agreement or to extend the time or period for the compliance with, fulfilment and/ or performance of all or any of the obligations of the Concessionaire contained in the Agreement or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Concessionaire, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Concessionaire or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.
6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Agreement or for the fulfilment, compliance and/or performance of all or any of the obligations of the Concessionaire under the Agreement.
7. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee, not later than 6 (six) months from the date of expiry of this Guarantee, all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.
8. The Performance Security shall cease to be in force and effect when the Concessionaire shall have expended on Project construction an aggregate sum not less than 20% (twenty per cent) of the Total Project Cost which is deemed to be Rs. 37.54 crore. For the purposes of this Guarantee, and provided the Concessionaire is not in breach of this Agreement. Upon request made by the Concessionaire for release of the Performance Security along with the particulars required hereunder, duly certified by a statutory auditor of the Concessionaire, the Authority shall release the Performance Security forthwith.
9. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.
10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred Branch, which shall be deemed to have been duly authorised to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to



Chief Engineer (Civil) (Urban)
Of the E.I.C. P.H.(O), BBSR



Concession Agreement: Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and adjoining areas in PPP mode

SCHEDULE – E: PERFORMANCE SECURITY

(See Clause 10.1)

The Chief Engineer, PHEO (U)
Heads of Department Building, 1st floor, Unit-V,
Bhubaneswar – 751001, Odisha

WHEREAS:

- (A) MEIL (BHUBANESWAR) BULK WATER PROJECT PRIVATE LIMITED (the “**Concessionaire**”) and the Chief Engineer, PHEO (U) (the “**Authority**”) have entered into a Concession Agreement dated (the “**Agreement**”) whereby the Authority has agreed to the Concessionaire undertaking Bulk Water Supply Project for IIT Bhubaneswar, NISER, INFOCITY-II and Adjoining areas on design, build, finance, operate and transfer (“**DBFOT**”) basis, subject to and in accordance with the provisions of the Agreement.
- (B) The Agreement requires the Concessionaire to furnish a Performance Security to the Authority in a sum of Rs. 9.38 Crores (Rupees Nine Crore and Thirty Eight Lakhs) (the “**Guarantee Amount**”) as security for due and faithful performance of its obligations, under and in accordance with the Agreement, during the Construction Period (as defined in the Agreement).
- (C) We,through our Branch at (the “**Bank**”) have agreed to furnish this Bank Guarantee by way of Performance Security.

NOW, THEREFORE, the Bank hereby, unconditionally and irrevocably, guarantees and affirms as follows:

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful performance of the Concessionaire’s obligations during the Construction Period, under and in accordance with the Agreement, and agrees and undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Concessionaire, such sum or sums upto an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.
2. A letter from the Authority, under the hand of an Officer not below the rank of Chief Engineer in the Public Health Engineering Organization (Urban) Bhubaneswar, that the Concessionaire has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Concessionaire is in default in due and faithful performance of its obligations during the Construction Period under the Agreement and its decision that the Concessionaire is in default shall be final, and binding on the Bank, notwithstanding any differences between the Authority and the Concessionaire, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Concessionaire for any reason whatsoever.

Chief Engineer P.H. (Urban)
O/o the E.I.C. P.H.(O), BBSR

